FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
PHOENIX, ARIZONA

SOLS WASH

DOWNTOWN WICKENBURG FLOOD HAZARD MITIGATION PROJECT

Update to Candidate Assessment Report

FCD 2003C052

(On-call Task No. 4)

Prepared by:

Registered Professional Engineer (Civil)
CERTIFICATE NO.
15594
MARK T.
GAVAN
Date Signed 10/21/05
ARIZONA, U.S.A.

Engineering and Environmental Consultants, Inc.
3003 North Central, Suite 600
Phoenix, Arizona 85012-2905
Phone: (602) 248-7702
FAX: (602) 248-7851

October 2005

Table of Contents

		Page
Section 1	INTRODUCTION	1
1.1	Project Purpose/Project Tasks	1
1.2	Project Need/Background Information	1
1.3	Description of Study Area	2
1.4	Project Participation	2
Section 2	EXISTING CONDITIONS	3
2.1	Hydrology	3
	2.1.1 Sols Wash Hydrology	3
	2.1.2 Hospital Wash Hydrology	3
	2.1.3 Local Drainage	3
2.2	Hydraulics	4
	2.2.1 Previous Studies	4
	2.2.2 Sols Wash Hydraulics	4
2.3	Study Results	4
2.4	FEMA Flood Zone	5
Section 3	PROPOSED CONDITIONS	6
3.1	SR-93 Bypass Bridge to Tegner Street Bridge (Sta. 11+12 to 27+16)	6
	3.1.1 New Levee (Sta. 11+12 to 16+05)	7
	3.1.2 New Floodwall/Retaining Wall (Sta. 14+60 to 25+50)	7
	3.1.3 New Retaining Wall (Sta. 24+26 to 27+16)	7
	3.1.4 Drop Structure in Sols Wash (Sta. 14+75)	7
	3.1.5 New Detention Basin and Discharge Pipes (Sta. 13+00)	8
3.2	Tegner Street Bridge upstream of Goldmine Village (Sta. 27+17 to 43+73)	8
	3.2.1 North Bank Floodwall (Sta. 28+62 to 38+83)	9
	3.2.2 South Bank Gabions (Sta. 27+17 to 43+73)	9
3.3	Island Trimming	9
Section 4	PROPOSED CONDITIONS COSTS	11
4.1	Summary of Proposed Drainage Improvements	11
4.2	Summary of Project Costs	11
Section 5	REFERENCES	12

LIST OF FIGURES

Figure 1.2	Sols Wash at Tegner Street Bridge during 2000 storm event	1
Figure 1.3	Location Map	2

LIST OF TABLES

Table 2.1.1	100-year Peak Discharge	3
Table 2.1.2	Peak Discharge for Hospital Wash	3
Table 2.3	Existing Conditions versus CLOMR along Goldmine Village	5
Table 3.1.5	Storm Water Storage in the local Detention Basin	8
Table 4.2	Summary of Project Costs	11

Table of Contents Continued

LIST OF EHXIBITS

Exhibit 1 Hydrology and Drainage Area Map
Exhibit 2 Hydraulic Cross Section Map – Existing Conditions
Exhibit 3 Hydraulic Cross Section Map – Proposed Conditions
Exhibit 4 Concept Plan Set (under separate cover)

LIST OF APPENDICES

Appendix A Hydrology
- Appendix A.1 Sols Wash Hydrology
- Appendix A.2 Hospital Wash Hydrology
- Appendix A.3 Local Drainage behind SR-93 Bypass

Appendix B n-Value Worksheets
- Appendix B.1 Sols Wash – Existing Conditions
- Appendix B.2 Sols Wash – Proposed Conditions
- Appendix B.3 Hospital Wash

Appendix C Survey Data
- Appendix C.1 Datum Conversion for Tegner Street Bridge
- Appendix C.2 Survey Data

Appendix D Hydraulic Modeling
- Appendix D.1 Sols Wash HEC-RAS Model – Existing Condition
- Appendix D.2 Sols Wash HEC-RAS Model – Proposed Conditions
- Appendix D.3 Hospital Wash HEC-RAS Model

Appendix E Hydraulic Calculations – Proposed Conditions
- Appendix E.1 Station 11+12 to 27+16
- Appendix E.2 Station 27+17 to 43+73
- Appendix E.3 Island Trimming

Appendix F Cost Estimates

SECTION 1: INTRODUCTION

1.1 Project Purpose/Project Tasks

The purpose of this report is to update the Sols Wash Candidate Assessment Report (CAR) by reevaluating the wash hydraulics based upon new two-foot contour interval mapping, evaluate a storage solution to the Hospital Wash inflow, provide more detail on the wash improvements relative to the existing property lines, and update the cost estimate for the Sols Wash improvements. Project tasks included:

1) coordination with the DISTRICT, and the Town of Wickenburg
2) collection and analysis of existing data (i.e., drainage studies, flood studies, etc)
3) determination of approximate peak discharges utilizing existing hydrologic studies
4) perform a hydrologic analysis of the Hospital Wash watershed
5) create existing and proposed conditions HEC-RAS modes for Sols Wash
6) develop and evaluate alternatives then prepare conceptual level design plans
7) prepare an associated cost estimate
8) documentation of the CAR in a final report

1.2 Project Need/Background Information

Sols Wash experienced serious flooding in October 2000. The peak discharge of the storm was approximately11,000 cfs (the 100-year peak discharge for Sols Wash is approximately 15,000 cfs). The following photograph was taken at the Tegner Street Bridge (SR 93) during this storm.

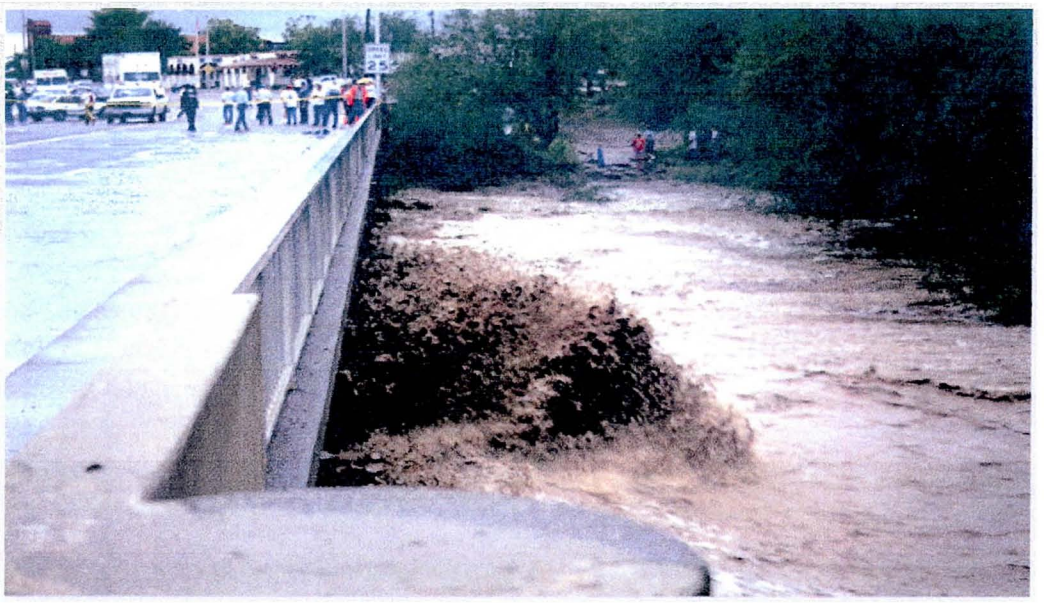


Figure 1.2 Sols Wash at Tegner Street Bridge during 2000 storm event

In the 2000 flood, flow overtopped the north prong of Sols Wash and inundated Hospital Wash which overtopped its banks as result. The mobile home park and homes east of Hospital Wash flooded due to this breakout of flow. The floodwater also overtopped Tegner Street and flooded houses in the neighborhood north of Coffinger Park.

Coffinger Park is located on the north side of Sols Wash between the existing US-93 (Tegner Street) and the proposed US-93 bypass. The park has experienced flooding both from the flow in Sols Wash and from the overflowing of Tegner Street.

1.3 Description of Study Area

The study area is Sols Wash from its confluence with the Hassayampa River to approximately 1.25 miles upstream.

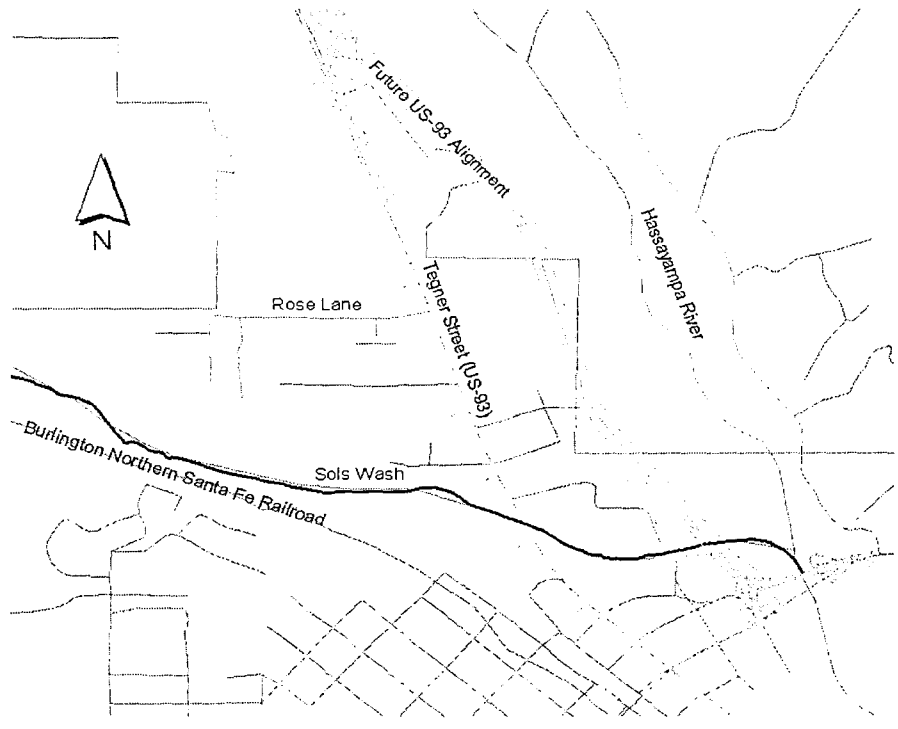


Figure 1.3 Location Map

1.4 Project Participation

From the beginning of the study, the District closely involved the Town of Wickenburg in the decision process. The goal was for the District and the Town of Wickenburg to reach an Inter-Governmental Agreement (IGA) for participation in the design and construction phases.

SECTION 2: EXISTING CONDITIONS

2.1 Hydrology

2.1.1 Sols Wash Hydrology

There are several existing hydrology studies for Sols Wash performed by different entities. They included the Flood Control District of Maricopa County, Federal Emergency Management Agency (FEMA), and Army Corp of Engineers (USACE). The peak discharge used for this report was taken from the FEMA study. Exhibit 1 shows all the design discharges used with this study.

Table 2.1.1 100-year Peak Discharge

Location	Contributing Drainage Area [sq. miles]	Peak 100-year Discharge [cfs]
Sols Wash, at confluence with Hassayampa River	147.2	15,045
Sols Wash, above confluence of Casandro Wash	145.2	14,459
Sols Wash, above confluence of Hospital Wash	145.1	14,413
Sols Wash, above confluence of Flying E Wash	134.8	12,945

2.1.2 Hospital Wash Hydrology

According to FEMA the regulatory discharge for Hospital Wash is 900 cfs. The discharge was believed to be inaccurate so the watershed was re-delineated with the following methodology: The watershed boundary was drawn using new 2' contour mapping and aerial photographs. The soil, land use, and sub-basin parameters were input in DDMSW. Green-Ampt was used for loss parameters. Clark was used for the hydrograph since the watershed was less than 5 square miles, and HEC-1 models were created for the 10-year and 100-year peak discharge.

Table 2.1.2 Peak Discharge for Hospital Wash

Location	Drainage Area [acres]	10-Year Peak Discharge [cfs]	100-year (24-Hr) Peak Discharge [cfs]	100-year (6-Hr) Peak Discharge [cfs]
Hospital Wash at confluence with Sols Wash	242.5	168	369	502

2.1.3 Local Drainage

This drainage area is created, by confining previously uncontained flows, with the embankment for the ADOT SR-93 Bypass and the channel improvements on Sols Wash. The contributing drainage area extends west to the ridge that separates the Hospital Wash watershed and north to where a natural ridge line intersects with the SR-93 Bypass improvements (see Exhibit 1).

Hydrology for the local drainage area east of Tegner Street was also calculated with HEC-1 using the same methodology as for Hospital Wash. The drainage area is broken down into seven subbasins. The HEC-1 Model was set up with three outfalls. The first

two outfalls discharge storm water to the Hassayampa River via culverts that extend through the SR-93 Bypass embankment.

The third outfall is at the south end of the drainage area just east of Coffinger Park and adjacent to Sols Wash. This outfall discharges storm water from a proposed detention basin into Sols Wash via two 48-inch pipes.

2.2 Hydraulics

2.2.1 Previous Studies

Both the CLOMR completed by J.E. Fuller (dated July 2002) and the CAR completed by AZTEC (dated August 2004) used HEC-RAS to hydraulically define the water surface. The AZTEC models, in the CAR, uses a blended combination of the CLOMR sections and those from ADOT to create a base model.

2.2.2 Sols Wash Hydraulics

This report uses all new cross sections based upon new 2-foot contour mapping with the exception of the bridge and piers developed with the J.E. Fuller model. A new existing conditions HEC-RAS model was developed for Sols Wash from the confluence with the Hassayampa River to approximately 1.25 miles upstream. The new model is based upon new 2-foot contours (circa 2004) and new "n" values determined from field observations.

The Tegner Street bridge, taken from the J.E. Fuller model, was adjusted for a change in vertical datum (NGVD 1929 to NAVD 1988). The datum conversion can be found in Appendix C.1.

2.3 Study Results

The study results for the existing conditions cannot be directly compared with the results of the CAR or the CLOMR due to differences in the existing conditions. The existing conditions, for this study, most closely resembles the CLOMR developed conditions from the J.E. Fuller study in that the bank along Goldmine Village had been trimmed back and there is new gabion bank protection along that bank. However, certain elements were not completed, such as the bank protection on the north side of Sols Wash and the raising of the Goldmine Village site to above the floodplain elevation.

Keeping in mind the differences in modeling conditions the following table compares the calculated floodplain elevations along Goldmine Village with those from the CLOMR (adjusted for the datum difference).

Table 2.3 Existing Conditions versus CLOMR along Gold Mine Village

EEC Station ID	Approximate Equivalent JE Fuller Station ID	EEC Existing Conditions WSEL [ft]	JE Fuller (CLOMR)[1] WSEL [ft]	Adjusted JE Fuller (CLOMR) WSEL[2] [ft]
0.497	0.43	**2065.29**	2063.04	**2065.22**
0.541	0.48	**2065.43**	2063.28	**2065.46**
	0.52		2063.85	2066.03
0.606		2066.12		
	0.57		2064.92	2067.10
0.66		2067.60		
	0.61		2067.03	2069.21
0.717		2069.93		
	0.66		2068.59	2070.77
0.779		2071.23		
	0.71		2070.14	2072.32

1) developed conditions
2) adjusted from NGVD 1929 to NAVD 1988 by adding 2.18 feet

As can be observed from the above table the models have quite similar water surfaces especially at locations where cross sections are in nearly the same locations (bold values).

2.4 FEMA Flood Zone

The FEMA designation for Sols Wash is a Zone AE floodplain with floodway. The community map identifier is 04013C0255 G, dated July 19, 2001 (see Appendix D.1).

SECTION 3: PROPOSED CONDITIONS

The project has been separated into three distinct sections. The first is from the new ADOT SR-93 Bypass Bridge, over Sols Wash, upstream to the Tegner Street Bridge. The second is from the Tegner Street Bridge upstream to the upstream end of Gold Mine Village. The third section is the trimming of the island between the north and south prongs of Sols Wash.

A combined HEC-RAS model was developed, using the 100-year peak discharge, for the entire study reach and incorporates features of each different section to present the overall proposed design. Theoretical banks were programmed into the model to simulate proposed conditions while leaving the natural channel bottom unchanged. Multiple cross sections are located both up and downstream of the proposed drop structure at Sta. 0.243. The plans and typical cross sections can be found under a separate cover. The proposed bank protection cross sections can be found in Appendix E.2 and E.3.

3.1 SR-93 Bypass Bridge to Tegner Street Bridge (Sta. 11+12 to 27+16)

Existing conditions is characterized by Coffinger Park's natural bank on the north side of the Wash. The south side is characterized by an existing retaining wall above a rail and wired tied rock bank protection located along the Bashas and the apartment complex as well as the natural bank located along the frontage of the Wickenburg Community Center.

Design criteria and constraints for this section include:

- Maintaining a 24-foot wide roadway if possible on the south side of the park without disturbing existing park features. This requirement includes an additional 10-foot landscape setback from the proposed floodwall to the edge of the roadway.
- Design new bank protection for the south side of the wash so that the existing retaining wall and bank protection can remain.
- Design the south bank to include additional freeboard due to super elevated flow caused by the bend in the wash.
- Maintain a stable subcritical flow regime so as to minimize the need for additional freeboard along the banks.
- FCDMC freeboard. South bank no lower than north levee.

Floodwall/Levee heights were established for this reach using the calculated water surface elevations at the HEC-RAS cross sections. Then freeboard was added using the higher of the values calculated from either the District method or the Sand Wave Run-up method. Additional freeboard was added to the section of Sols Wash where a bend in the wash causes super elevated flow.

Additionally, a scour depth was determined for each reach based upon the Districts methodology. This scour depth is reported in Appendix E.2.

3.1.1 New Levee (Sta. 11+12 to 16+05)

The proposed conditions beginning at ADOT's SR-93 Bypass Bridge includes a new levee on both sides of the wash. These new levees will use stacked gabion baskets to protect the face of the levee and a gabion mattress extending out under the surface of the wash to protect the integrity of the levee from scour.

The levee will be approximately 15 feet higher than the wash bottom and will have a 14-foot topwidth. The backside of the levee will slope at 3:1 to match the existing ground.

3.1.2 New Floodwall/Retaining Wall (Sta. 14+60 to 25+50)

The proposed conditions, between these stations, include both retaining walls and floodwalls. The cross sections for each wall type is similar having footings that are protected by stacked gabion baskets and gabion mattresses.

The north bank is somewhat easier to construct in that the existing bank is natural so that after clearing vegetation and widening the channel the construction of the new improvements should be straightforward.

Contrarily, the south bank is more challenging. There is an existing retaining wall with rail and wire tied rock bank protection. The new floodwall is to be located between the existing retaining wall and the lower wire tied rock. Bank protection for the new floodwall will go in the wash directly in front of the existing wire tied rock. The bank protection will consist of stacked gabion baskets to protect the footing of the new floodwall and a gabion mattress extending out under the surface of the wash to protect the floodwall from scour.

3.1.3 New Retaining Wall (Sta. 24+26 to 27+16)

This section requires a new retaining wall along the north side of the wash. A retaining wall is the only choice for improvement due to the close proximity of the Coffinger Park entrance roadway and the need to widen the wash to convey the 100-year discharge.

This retaining wall will extend below the surface of the wash down to the calculated scour depth. The wall will stand above the wash to a height 3-feet above the calculated water surface so as to provide required freeboard.

3.1.4 Drop Structure in Sols Wash (Sta. 14+75)

In order to facilitate the design of the bank protection along Sols Wash a drop structure is needed adjacent to River Street for the following reasons.

- Reduce flow velocities from 21 fps to under 15 fps which is more in line with the upper limit of serviceability of the gabion baskets used for bank protection.
- Reduce the Froude number below 0.86 for the entire reach downstream of the Tegner Bridge thereby maintaining a stable subcritical flow regime.

The 4-foot drop structure will extend bank to bank and have a 150-foot stilling basin on the downstream side. As flow in Sols Wash falls over the drop, the flow regime will

change from subcritical to supercritical. Energy dissipaters such as baffles will be used in the stilling basin to encourage a quick transition back to subcritical flow.

3.1.5 New Detention Basin and Discharge Pipes (Sta. 13+00)
On the north side of the wash a new detention basin is located just east of Coffinger Park. The basin has a storage capacity of approximately 3.9 acre-feet (see calculations in Appendix E.1). Additional volume associated with this basin comes from overbank storage in the area around the east end of Coffinger Park. The following table summarizes storm water storage.

Table 3.1.5 Storm Water Storage in the local Detention Basin

Contour Elevation [ft]	Area [acres]	Depth [ft]	Volume [acre-ft]	Accumulative Volume [acre-ft]
2043	1.03	0	0.0	0.0
2046	1.58	3	3.9	3.9
2048	2.38	2	3.9	7.8
2050	2.86	2	5.2	13.1
2051	3.50	1	3.2	16.2

1) Invert of detention basin is 2043 at outlet pipes
2) includes overbank volume at east end of Coffinger Park

In order to prevent excessive ponding above an elevation of 2051, which would flood homes on the north side of Coffinger Park, there are two 48-inch discharge pipes that convey stormwater, from the detention basin, through the proposed levee into Sols Wash. The discharge pipes require a headwall and flap gates, at the outfall, to prevent storm water in Sols Wash from backing up into the basin.

3.2 Tegner Street Bridge to upstream of Goldmine Village (Sta. 27+17 to 43+73)

Existing conditions, on the north side of the wash, are characterized by a short section with dumped riprap and a much longer section of natural bank. The south side is characterized by existing gabion mattress bank protection located between the Tegner Street Bridge and the upstream end of Goldmine Village.

Design criteria and constraints for this section include:

- Increase the conveyance capacity of the Tegner Street Bridge so that it will convey the 100-year peak discharge.
- Increase the bank full capacity of the wash so that it can convey the entire 100-year discharge.
- Limit the encroachment into the residential parcels on the north side of the wash and at the same time save as many of the Tamarisk trees as possible.
- If possible, do not move the Town's well site.
- FCDMC freeboard
- South Bank no lower than north levee.

Floodwall heights were established for this reach using the calculated water surface elevations at the HEC-RAS cross sections. Then freeboard was added using the higher of the values calculated by the District method or the Sand Wave Run-up method.

Additionally, a scour depth was determined for each reach based upon the Districts methodology. This scour depth is reported in Appendix E.2.

3.2.1 North Bank Floodwall (Sta. 28+62 to 38+83)
The proposed improvements on the north bank include construction of a new floodwall built into the existing wash bank. The cross sections for the new floodwall shows the footing protected by stacked gabion baskets with a gabion mattress that extend out under the surface of the wash to protect the floodwall from scour.

The proposed floodwall is located so as to limit the encroachment to the residential properties along Cavaness Avenue as well as limit the number of Tamarisk trees that will have to be removed.

3.2.2 South Bank Gabions (Sta. 27+17 to 43+73)
The HEC-RAS modeling included trimming of the undeveloped Goldmine Village property so as to increase the capacity of the wash and improve the approach to the Tegner Street Bridge, thereby improving the capacity and efficiency of the structure.

This trimming will also affect the Town's well site and the outfall of Casandro Wash. The well site will have to be relocated and the discharge pipes, at the outfall of Casandro Wash, will have to be shortened, which will require the removal and replacement of the existing headwall.

Bank protection along the extent of Goldmine Village will include a gabion basket set below the level of the wash with a gabion mattress extending out into the wash to protect the bank from scour. The bank itself will be graded at 3:1 to match the proposed Goldmine Village top of bank. The bank will have a second gabion mattress lying on the face, tied into the stacked baskets at the toe, to prevent erosion of the bank.

3.3 Island Trimming

The existing island, upstream of the confluence with Hospital Wash, tends to restrict the conveyance capacity of Sols Wash, forcing floodwaters over the lower, north bank of the wash and into the adjacent mobile home park. These over bank flood flows leave Sols Wash as unconfined flow over Tegner Street, north of the bridge. To prevent this breakout flow condition, the plan is to excavate, or trim, a portion of the island in order to lower the water surface elevation below the top elevation of the north bank of the wash.

The HEC-RAS model indicates that on the upstream end of the island, the majority of the floodwater flows through the south prong of Sols Wash. Then, as conveyance in the south prong is restricted, excess flow spills over the island and into the north prong. Under existing conditions, the north prong has limited capacity so these flows simply

spill over the north bank of the north prong and into the mobile home park. The approach to the island trimming was to identify the cross section where flows first begin to spill over the island from the south prong. At this cross section, the north prong was widened to accept this spillover flow without overtopping its north bank. Each consecutive downstream cross section was adjusted in this manner. The total area of disturbance, for channel widening, is approximately 6.6 acres.

Future maintenance will be necessary to maintain the condition of the widened wash and prevent new vegetation from reducing it's conveyance capacity.

SECTION 4: PROPOSED CONDITIONS COSTS

4.1 Summary of Proposed Drainage Improvements

- *Sols Wash downstream of the Tegner Street Bridge* – The channelization of Sols Wash between the Tegner Street Bridge and the proposed SR-93 bypass includes levees, floodwalls, retaining walls, stacked gabion baskets and a drop structure. The local drainage area formed by the union of the SR-93 embankment and the Sols Wash levee will include a detention basin and pipes that discharge to Sols Wash.
- *Sols Wash upstream of the Tegner Street Bridge* – These improvements include the relocation of the Town well and the trimming of the Goldmine Village bank along with new floodwalls and/or gabion bank protection on both the north and south banks.
- *Sols Wash Island Trimming upstream of confluence with Hospital Wash* – Trimming of the island to increase the capacity of both the north and south prongs of Sols Wash so as to prevent breakout flows over the north bank.

4.2 Summary of Project Costs

The following table contains estimates of construction costs for each reach within the project. Individual cost estimate sheets can be found in Appendix F.

Table 4.2 Summary of Project Costs

Location		Cost Estimate [$]
Sols Wash - SR-93 to Tegner Street Bridge		
North Bank - Sta. 12+20 to 14+60	$	182,200.00
South Bank - Sta. 11+12 to 16+05	$	411,200.00
North Bank - Sta. 14+60 to 21+00	$	655,100.00
South Bank - Sta. 16+05 to 17+26	$	99,600.00
North Bank - Sta. 21+00 to 24+26	$	240,900.00
South Bank - Sta. 17+26 to 25+50	$	743,800.00
North Bank - Sta. 24+26 to 27+16	$	489,900.00
Detention Basin (13+00)	$	111,200.00
Drop Structure (14+75)	$	369,600.00
subtotal	**$**	**3,303,500.00**
Sols Wash - Tegner Street Bridge to u/s of Goldmine Village		
North Bank - Sta. 28+62 to 38+83	$	829,900.00
South Bank - Sta. 27+17 to 43+73	$	1,382,900.00
Tegner Street Bridge Abutment and Parapet Wall	$	29,600.00
subtotal	**$**	**2,242,400.00**
Sols Wash - Reach 2		
Island Trimming	$	401,900.00
subtotal		**$401,900.00**
Total	**$**	**5,947,800.00**

1) includes 30% for contingencies

SECTION 5 REFERENCES

1. US-93 Interim Wickenburg Bypass – Bridge Hydraulics and Bank Protection Report. For ADOT by West Consultants, Inc. March 28, 2005.
2. State Highway, Kingman-Wickenburg Highway (US 93) Wickenburg Bypass (90% Plans). Jacobs Engineering. March 2005.
3. Sols Wash: Final Candidate Assessment Report. AZTEC. August 16, 2004.
4. Goldmine Village, Conditional Letter of Map Revision. JE Fuller. July 2002.
5. Drainage Design Manual for Maricopa County, Arizona, Volume I Hydrology. Flood Control District of Maricopa County. June 1992. rev. January 1995.
6. Drainage Design Manual for Maricopa County, Arizona, Volume II Hydraulics. Flood Control District of Maricopa County. January 1996.
7. HEC-RAS River Analysis System, User's Manual Version 3.1. US Army Corps of Engineers. November 2002.

Appendix A
HYDROLOGY

Appendix A.1
SOLS WASH HYDROLOGY

Appendix A.1 Sols Wash Hydrology

The hydrology for Sols Wash has been calculated in previous studies. The following information is from FEMA's *Flood Insurance Study for Maricopa County, Arizona and Incorporated Areas, Volumes 1 through 16, revision date July 19, 2001.*

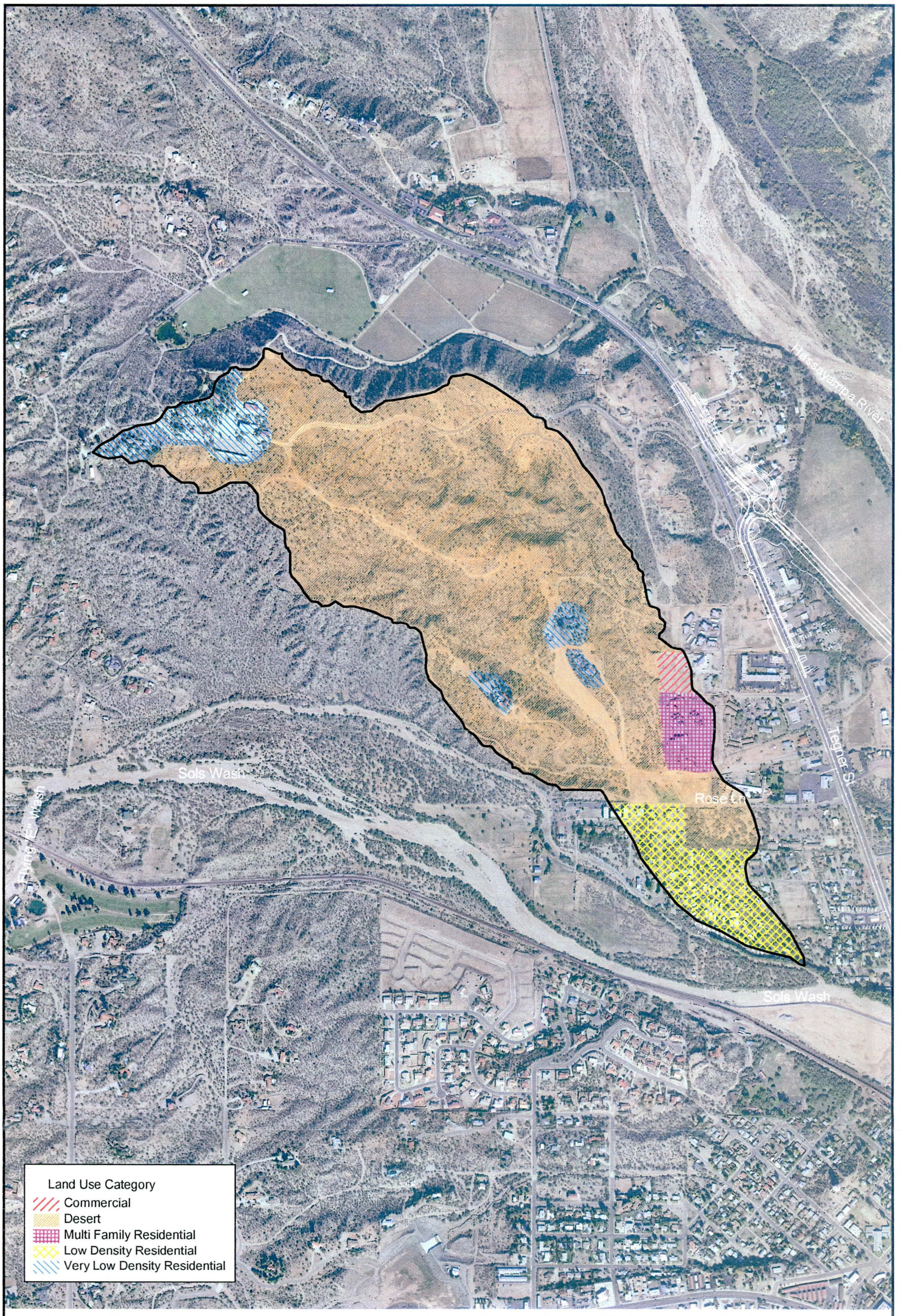
Location	Contributing Drainage Area [sq. miles]	Peak 100-year Discharge [cfs]
Sols Wash, at confluence with Hassayampa River	147.2	15,045
Sols Wash, above confluence of Cassandro Wash	145.2	14,459
Sols Wash, above confluence of Hospital Wash	145.1	14,413
Sols Wash, above confluence of Flying E Wash	134.8	12,945

Appendix A.2

HOSPITAL WASH HYDROLOGY

Hospital Wash Peak
Discharge Summary

HEC-1	PEAK
MODEL	DISCHARGE
	(cfs)
100-year, 24-hour	369
100-year, 6-hour	502
10-year, 6-hour	168



Downtown Wickenburg
Flood Hazard Mitigation Report

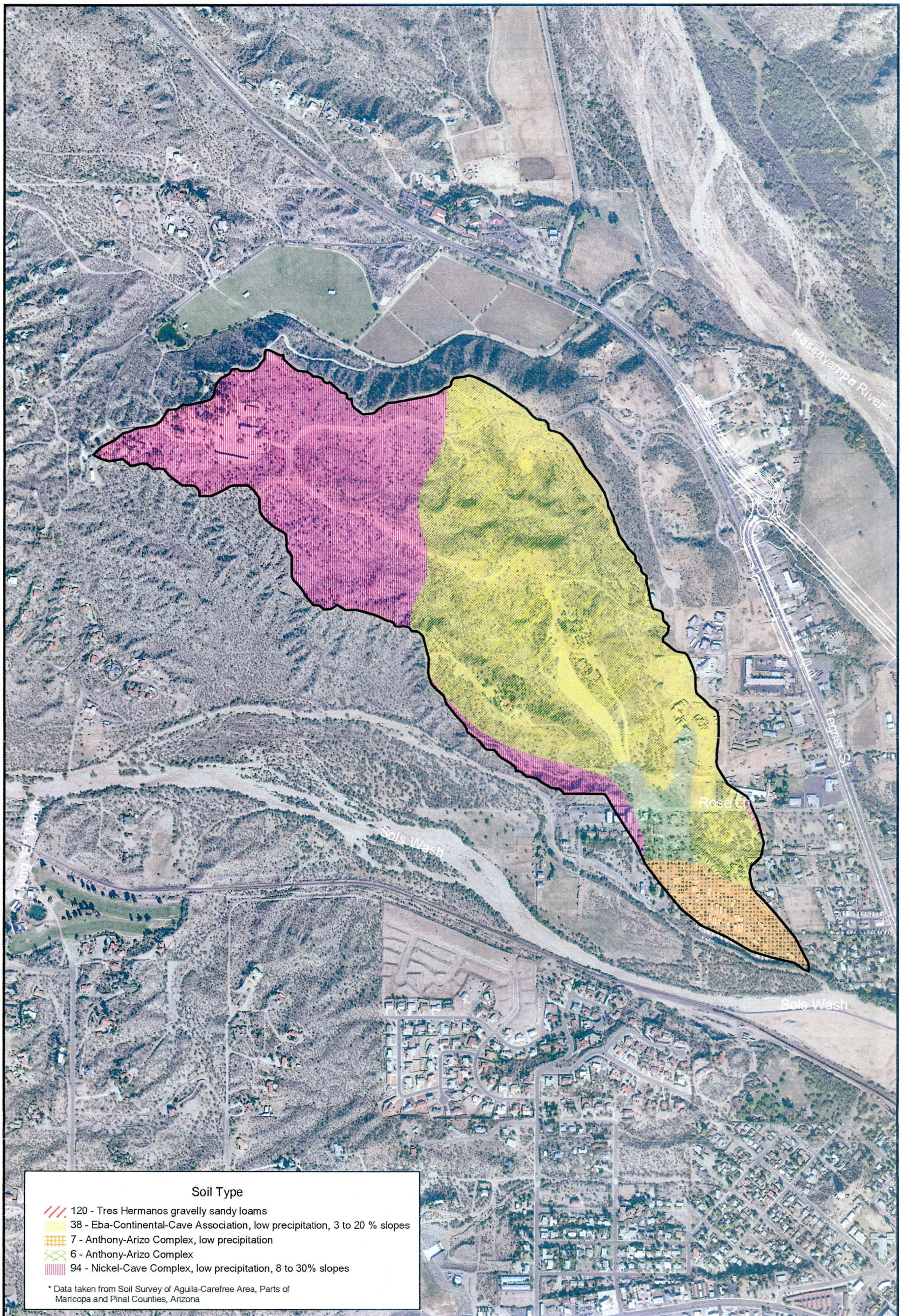
FCD2003C052

N

800 0 800 1600 Feet

1" = 800'

Hospital Wash Land Use Map



Downtown Wickenburg
Flood Hazard Mitigation Report

FCD2003C052

N

800 0 800 1600 Feet

1" = 800'

Hospital Wash Soils Map

Land Use Data

Sub Basin ID	Land Use Code	Area	Area Pct (%)	DTHETA Condition	Vegetation Cover (%)	RTIMP (%)	IA (in)	Kn	Kb Type	Kb
Major Basin: 01										
SB01	L.D.R.	0.031	8.1	Normal	50.0	15	0.30	0.050	Low	0.062
	COMM	0.003	0.9	Normal	75.0	80	0.10	0.020	Min	0.038
	M.F.R.	0.010	2.7	Normal	50.0	45	0.25	0.050	Low	0.069
	V.L.D.R.	0.031	8.1	Normal	20.0	5	0.30	0.050	Low	0.062
	DESERT	0.304	80.2	Dry	25.0		0.35	0.030	Low	0.049

* Custom Value (not default value)

Soil Data

	Sub Basin ID	Soil Survey	Map Unit	Area	Area Pct (%)	XKSAT	Rock Outcrop (%)	Effective (%)
Major Basin 01								
	SB01	Maricopa	A_7	0.019	5.0	0.62		
		Maricopa	A_120	0.001	0.2	0.06		
		Maricopa	A_6	0.016	4.1	0.62		
		Maricopa	A_94	0.011	2.9	0.33		
		Maricopa	A_38	0.212	55.7	0.13		
		Maricopa	A_94	0.122	32.1	0.33		

* Custom Value (not default value)

Sub Basin Data

7/27/2005

Basin: 01 | Storms: Single | Duration: 6 Hour | Loss Method:Green-Ampt | Unit Hydrograph: Clark

	Sub Basin Parameters						Rainfall Losses						Return Period (Years)					
Sub Basin ID	Area (sq mi)	Length (mi)	Slope (ft/mi)	Adj Slope	Time-Area	Kb	IA (in)	DTHETA	PSIF (in)	XKSAT (in/hr)	RTIMP (%)		2	5	10	25	50	100
SB01	0.38	1.79	106.0	106.0	Natural	0.052	0.34	0.35	5.20	0.26	4	**Tc (hrs)**	1.50	0.92	0.78	0.63	0.55	0.50
												Vel (f/s)	1.75	2.85	3.39	4.15	4.74	5.21
												R (hrs)	1.61	0.94	0.77	0.62	0.53	0.48

* Non default value

```
1****************************************
*************************************
                                        *                                                    *
 -   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *                                                    *    U.S. ARMY CORPS OF
ENGINEERS     *
 *                JUN   1998             *                                                    *    HYDROLOGIC ENGINEERING
: NTER    *
               VERSION 4.1              *                                                    *          609 SECOND STREET
*
 *                                      *                                                    *       DAVIS, CALIFORNIA
5-616       *
    RUN DATE   26AUG05  TIME  08:05:43   *                                                    *           (916) 756-1104
.
 *                                      *                                                    *
*
  ****************************************
  *************************************
```

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

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT
STRUCTURE.

THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

HEC-1 INPUT PAGE 1

```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

  1           ID   FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
  2           ID   SOLS WASH  CAR - Contract # 2003C052
  3           ID
  4           ID   Prepared by:
  5           ID   Engineering and Environmental Consultants
  6           ID   3003 N. Central, Suite 600
  7           ID   Phoenix, Arizona   85012
  8           ID   Phone: 602-248-7702  FAX: 602-248-7851
  9           ID
 10           ID
 11           ID
 12           ID
 13           ID   4/26/05  Filename:  HOSPITAL.IH1
 14           ID                Last Revised: 04/26/05
 15           ID
 16           ID   1. The storm used was 100-year, 24-hour.
 17           ID   2. Clark was the unit hydrograph.
 18           ID   3. Time step of 2 minutes.
 19           ID   4. Green-Ampt loss methods were used. Normal depth Channel routing.
 20           ID   5. The sub-basin parameters were generated using FCDMC's DDMSW software.
 21           ID
 22           ID
              *DIAGRAM
 23           IT       2                    2000
 24           IO       3
              *

 25           KK    SB01
 26           KM        Runoff subbasin SB01
 27           BA   0.379
 28           IN      15
 29           PB   4.141
 30           PC   0.000   0.002   0.005   0.008   0.011   0.014   0.017   0.020   0.023   0.026
 31           PC   0.029   0.032   0.035   0.038   0.041   0.044   0.048   0.052   0.056   0.060
 32           PC   0.064   0.068   0.072   0.076   0.080   0.085   0.090   0.095   0.100   0.105
 33           PC   0.110   0.115   0.120   0.126   0.133   0.140   0.147   0.155   0.163   0.172
```

```
34          PC   0.181   0.191   0.203   0.218   0.236   0.257   0.283   0.387   0.663   0.707
35          PC   0.735   0.758   0.776   0.791   0.804   0.815   0.825   0.834   0.842   0.849
36          PC   0.856   0.863   0.869   0.875   0.881   0.887   0.893   0.898   0.903   0.908
37          PC   0.913   0.918   0.922   0.926   0.930   0.934   0.938   0.942   0.946   0.950
38          PC   0.953   0.956   0.959   0.962   0.965   0.968   0.971   0.974   0.977   0.980
39          PC   0.983   0.986   0.989   0.992   0.995   0.998   1.000
40          LG    0.34    0.35    5.20    0.26       4
41          UC   0.529   0.506
42          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
43          UA     100
            *
44          ZZ
```

SCHEMATIC DIAGRAM OF STREAM NETWORK

```
INPUT
 LINE      (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

  NO.      (.) CONNECTOR        (<---) RETURN OF DIVERTED OR PUMPED FLOW

   25        SB01
```

RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

	OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME MAX STAGE
+	HYDROGRAPH AT	SB01	369.	12.37	53.	14.	5.	.38		

*** NORMAL END OF HEC-1 ***

```
1*****************************************
*****************************************
 *                                       *                                                    *
 *
     FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *                                                    *    U.S. ARMY CORPS OF
ENGINEERS     *
 *                JUN   1998             *                                                    *    HYDROLOGIC ENGINEERING
CENTER    *
               VERSION 4.1               *                                                    *          609 SECOND STREET
 *                                       *                                                    *       DAVIS, CALIFORNIA
95616       *
    RUN DATE   25MAY05  TIME  17:20:48   *                                                    *           (916) 756-1104
                                         *                                                    *
*
 *****************************************
 *****************************************
```

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

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.

THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1 HEC-1 INPUT PAGE 1

```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

  1           ID   FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
  2           ID   SOLS WASH  CAR - Contract # 2003C052
  3           ID
  4           ID   Prepared by:
  5           ID   Engineering and Environmental Consultants
  6           ID   3003 N. Central, Suite 600
  7           ID   Phoenix, Arizona   85012
  8           ID   Phone: 602-248-7702  FAX: 602-248-7851
  9           ID
 10           ID
 11           ID
 12           ID
 13           ID   4/26/05  Filename:  HOSPITAL.IH1
 14           ID                Last Revised: 05/25/05
 15           ID
 16           ID   1. The storm used was 100-year, 6-hour.
 17           ID   2. Clark was the unit hydrograph.
 18           ID   3. Time step of 2 minutes.
 19           ID   4. Green-Ampt loss methods were used. Normal depth Channel routing.
 20           ID   5. The sub-basin parameters were generated using FCDMC's DDMSW software.
 21           ID
 22           ID
              *DIAGRAM
 23           IT       2                    2000
 24           IO       3
              *

 25           KK    SB01
 26           KM        Runoff subbasin SB01
 27           BA   0.379
 28           IN      15
 29           PB   3.314
 30           PC   0.000   0.008   0.016   0.025   0.033   0.041   0.050   0.058   0.066   0.074
 31           PC   0.087   0.099   0.118   0.138   0.216   0.377   0.834   0.911   0.931   0.950
 32           PC   0.962   0.972   0.983   0.991   1.000
 33           LG    0.34    0.35    5.20    0.26       4
```

```
34          UC   0.504   0.479
35          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
36          UA     100
                   *
37          ZZ
```

1

SCHEMATIC DIAGRAM OF STREAM NETWORK

INPUT
LINE (V) ROUTING (--->) DIVERSION OR PUMP FLOW

NO. (.) CONNECTOR (<---) RETURN OF DIVERTED OR PUMPED FLOW

25 SB01

RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

OF AGE	OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME MAX
	HYDROGRAPH AT	SB01	502.	4.33	68.	17.	6.	.38		

*** NORMAL END OF HEC-1 ***

```
1 ****************************************
*****************************************
 *                                      *                                                    *
*
     FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *                                                    *    U.S. ARMY CORPS OF
ENGINEERS     *
 *              JUN   1998              *                                                    *    HYDROLOGIC ENGINEERING
CENTER    *
              VERSION 4.1               *                                                    *          609 SECOND STREET
*
 *                                      *                                                    *       DAVIS, CALIFORNIA
95616       *
    RUN DATE   25MAY05  TIME  17:21:04  *                                                    *           (916) 756-1104
*
                                        *                                                    *
*
 ****************************************
* ************************************
```

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

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT
STRUCTURE.

THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1 HEC-1 INPUT PAGE 1

```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

  1           ID   FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
  2           ID   SOLS WASH  CAR - Contract # 2003C052
  3           ID
  4           ID   Prepared by:
  5           ID   Engineering and Environmental Consultants
  6           ID   3003 N. Central, Suite 600
  7           ID   Phoenix, Arizona   85012
  8           ID   Phone: 602-248-7702  FAX: 602-248-7851
  9           ID
 10           ID
 11           ID
 12           ID
 13           ID   4/26/05  Filename:  HOSPITAL.IH1
 14           ID                Last Revised: 05/25/05
 15           ID
 16           ID   1. The storm used was 10-year, 6-hour.
 17           ID   2. Clark was the unit hydrograph.
 18           ID   3. Time step of 2 minutes.
 19           ID   4. Green-Ampt loss methods were used. Normal depth Channel routing.
 20           ID   5. The sub-basin parameters were generated using FCDMC's DDMSW software.
 21           ID
 22           ID
              *DIAGRAM
 23           IT       2                    2000
 24           IO       3
              *

 25           KK    SB01
 26           KM        Runoff subbasin SB01
 27           BA   0.379
 28           IN      15
 29           PB   2.169
 30           PC   0.000   0.008   0.016   0.025   0.033   0.041   0.050   0.058   0.066   0.074
 31           PC   0.087   0.099   0.118   0.138   0.216   0.377   0.834   0.911   0.931   0.950
 32           PC   0.962   0.972   0.983   0.991   1.000
 33           LG    0.34    0.35    5.20    0.26       4
```

```
34          UC   0.775   0.772
35          UA       0     3.0     5.0     8.0    12.0    20.0    43.0    75.0    90.0    96.0
36          UA     100
            *
37          ZZ
```

1

SCHEMATIC DIAGRAM OF STREAM NETWORK

INPUT
LINE (V) ROUTING (--->) DIVERSION OR PUMP FLOW

NO. (.) CONNECTOR (<---) RETURN OF DIVERTED OR PUMPED FLOW

25 SB01

RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

OF AGE	OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME MAX
	HYDROGRAPH AT	SB01	168.	4.57	32.	8.	3.	.38		

*** NORMAL END OF HEC-1 ***

Appendix A.3

LOCAL DRAINAGE BEHIND SR-93 BYPASS

Land Use Data

Sub Basin ID	Land Use Code	Area	Area Pct (%)	DTHETA Condition	Vegetation Cover (%)	RTIMP (%)	IA (in)	Kn	Kb Type	Kb
Major Basin: 01										
SB01	COMM	0.008	15.4	Normal	75.0	80	0.10	0.020	Min	0.035
	DESERT	0.035	63.6	Dry	25.0		0.25*	0.030	Low	0.061
	M.F.R.	0.012	21.1	Normal	50.0	45	0.25	0.050	Low	0.068
SB02	COMM	0.039	94.9	Normal	75.0	80	0.10	0.020	Min	0.031
	ROWCROP	0.002	5.1	Normal	85.0		0.50	0.100	Hi	0.147
SB03	COMM	0.028	59.3	Normal	75.0	80	0.10	0.020	Min	0.032
	M.D.R.	0.007	14.4	Normal	50.0	30	0.25	0.050	Low	0.071
	M.F.R.	0.013	26.3	Normal	50.0	45	0.25	0.050	Low	0.068
SB04	COMM	0.002	3.9	Normal	75.0	80	0.10	0.020	Min	0.039
	COMM	0.023	41.5	Normal	75.0	80	0.10	0.020	Min	0.033
	M.D.R.	0.013	23.7	Normal	50.0	30	0.25	0.050	Low	0.067
	ROWCROP	0.017	30.9	Normal	*		0.50	0.100	Hi	0.124
SB05	M.D.R.	0.048	100.0	Normal	50.0	30	0.25	0.050	Low	0.060
SB06	COMM	0.007	9.7	Normal	75.0	80	0.10	0.020	Min	0.036
	M.D.R.	0.050	73.4	Normal	50.0	30	0.25	0.050	Low	0.059
	PARK	0.012	17.0	Normal	90.0		0.20	0.100	Hi	0.128
SB1A	COMM	0.014	41.7	Normal	75.0	80	0.10	0.020	Min	0.034
	DESERT	0.012	35.4	Dry	25.0		0.25*	0.030	Low	0.068
	M.F.R.	0.008	22.9	Normal	50.0	45	0.25	0.050	Low	0.070

* Custom Value (not default value)

Soil Data

	Sub Basin ID	Soil Survey	Map Unit	Area	Area Pct (%)	XKSAT	Rock Outcrop (%)	Effective (%)
Major Basin 01								
	SB01	Maricopa	A_38	0.054	98.7	0.13		
		Maricopa	A_120	0.001	1.3	0.06		
	SB02	Maricopa	A_38	0.000	1.0	0.13		
		Maricopa	A_54	0.006	13.3	0.29		
		Maricopa	A_120	0.036	85.8	0.06		
	SB03	Maricopa	A_38	0.001	1.9	0.13		
		Maricopa	A_38	0.005	10.6	0.13		
		Maricopa	A_120	0.042	87.5	0.06		
	SB04	Maricopa	A_38	0.024	43.5	0.13		
		Maricopa	A_54	0.005	9.1	0.29		
		Maricopa	A_54	0.005	8.1	0.29		
		Maricopa	A_120	0.022	39.2	0.06		
	SB05	Maricopa	A_7	0.018	37.7	0.62		
		Maricopa	A_38	0.002	3.5	0.13		
		Maricopa	A_38	0.001	2.7	0.13		
		Maricopa	A_54	0.016	32.7	0.29		
		Maricopa	A_120	0.011	23.3	0.06		
	SB06	Maricopa	A_7	0.004	5.4	0.62		
		Maricopa	A_8	0.001	1.3	0.96		
		Maricopa	A_38	0.002	3.1	0.13		
		Maricopa	A_54	0.062	90.2	0.29		
	SB1A	Maricopa	A_38	0.021	61.7	0.13		
		Maricopa	A_120	0.013	38.3	0.06		

* Custom Value (not default value)

Sub Basin Data

Basin: 01 | Storms: Single | Duration: 6 Hour | Loss Method:Green-Ampt | Unit Hydrograph: Clark

	Sub Basin Parameters						Rainfall Losses						Return Period (Years)					
Sub Basin ID	Area (sq mi)	Length (mi)	Slope (ft/mi)	Adj Slope	Time-Area	Kb	IA (in)	DTHETA	PSIF (in)	XKSAT (in/hr)	RTIMP (%)		2	5	10	25	50	100
SB01	0.06	0.39	327.3	272.0	Urban	0.059	0.23	0.32	6.40	0.17	22	**Tc (hrs)**	0.23	0.20	0.18	0.16	0.15	0.15
												Vel (f/s)	2.45	2.92	3.20	3.51	3.71	3.81
												R (hrs)	0.18	0.15	0.14	0.12	0.11	0.11
SB1A	0.03	0.28	328.6	272.0	Urban	0.054	0.19	0.22	7.00	0.15	44	**Tc (hrs)**	0.18	0.15	0.14	0.13	0.13	0.12
												Vel (f/s)	2.35	2.74	2.89	3.18	3.29	3.51
												R (hrs)	0.13	0.11	0.11	0.10	0.09	0.09
SB02	0.04	0.35	103.7	103.7	Urban	0.037	0.12	0.15	7.60	0.14	76	**Tc (hrs)**	0.21	0.18	0.17	0.16	0.15	0.15
												Vel (f/s)	2.47	2.81	3.00	3.25	3.42	3.52
												R (hrs)	0.17	0.15	0.14	0.13	0.12	0.12
SB03	0.05	0.50	132.5	132.5	Urban	0.047	0.16	0.15	8.00	0.11	64	**Tc (hrs)**	0.26	0.23	0.22	0.20	0.19	0.18
												Vel (f/s)	2.79	3.20	3.38	3.67	3.82	4.01
												R (hrs)	0.27	0.23	0.22	0.20	0.19	0.18
SB04	0.06	0.46	65.9	65.9	Urban	0.069	0.26	0.17	6.80	0.16	43	**Tc (hrs)**	0.48	0.38	0.35	0.31	0.29	0.27
												Vel (f/s)	1.42	1.78	1.95	2.19	2.34	2.49
												R (hrs)	0.45	0.35	0.32	0.28	0.26	0.24
SB05	0.05	0.48	54.2	54.2	Urban	0.060	0.25	0.25	4.70	0.36	30	**Tc (hrs)**	0.57	0.43	0.38	0.33	0.30	0.28
												Vel (f/s)	1.23	1.63	1.86	2.14	2.32	2.49
												R (hrs)	0.62	0.46	0.40	0.34	0.31	0.29
SB06	0.07	0.51	39.5	39.5	Urban	0.069	0.23	0.25	4.50	0.45	30	**Tc (hrs)**	0.80	0.60	0.52	0.45	0.41	0.38
												Vel (f/s)	0.94	1.26	1.44	1.68	1.83	1.99
												R (hrs)	0.78	0.56	0.48	0.41	0.37	0.34

* Non default value

```
1****************************************
****************************************
                                        *                                                    *
     FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *                                                    *    U.S. ARMY CORPS OF
ENGINEERS     *
 *              JUN   1998             *                                                    *    HYDROLOGIC ENGINEERING
( NTER    *
             VERSION 4.1               *                                                    *         609 SECOND STREET
*
 *                                      *                                                    *       DAVIS, CALIFORNIA
05616       *
    RUN DATE   28SEP05  TIME  08:38:40  *                                                    *           (916) 756-1104

 *                                      *                                                    *
*
  ****************************************
  ****************************************
```

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

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT
STRUCTURE.

THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1 HEC-1 INPUT PAGE 1

```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

  1           ID   FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
  2           ID   SOLS WASH  CAR - Contract # 2003C052
  3           ID
  4           ID   Prepared by:
  5           ID   Engineering and Environmental Consultants
  6           ID   3003 N. Central, Suite 600
  7           ID   Phoenix, Arizona   85012
  8           ID   Phone: 602-248-7702  FAX: 602-248-7851
  9           ID
 10           ID
 11           ID
 12           ID
 13           ID   7/21/05  Filename:  NODLOCAL248.IH1
 14           ID                 Last Revised: 07/21/05
 15           ID
 16           ID   1. The storm used was 100-year, 6-hour.
 17           ID   2. Clark was the unit hydrograph.
 18           ID   3. Time step of 2 minutes.
 19           ID   4. Green-Ampt loss methods were used. Normal depth Channel routing.
 20           ID   5. The sub-basin parameters were generated using FCDMC's DDMSW software.
 21           ID
 22           ID
              *DIAGRAM
 23           IT       2                    2000
 24           IO       3
              *

 25           KK    SB01   BASIN
 26           BA   0.055
 27           IN      15
 28           PB   3.385
 29           PC   0.000   0.008   0.016   0.025   0.033   0.041   0.050   0.058   0.066   0.074
 30           PC   0.087   0.099   0.118   0.138   0.216   0.377   0.834   0.911   0.931   0.950
 31           PC   0.962   0.972   0.983   0.991   1.000
 32           LG    0.23    0.32    6.40    0.17      22
 33           UC   0.150   0.111
```

```
 34          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 35          UA     100
             *

 36          KK     R01
 37          KM        Route flow from SB01 to CP02
 38          RS       1    FLOW      -1
 39          RC   0.030   0.030   0.030    1600  0.0100
 40          RX       0      12      14      16      18      20      22      34
 41          RY    2074    2070    2070    2070    2070    2070    2070    2074
             *

 42          KK   SB01A   BASIN
 43          BA   0.034
 44          LG    0.19    0.22    7.00    0.15      44
 45          UC   0.117   0.085
 46          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 47          UA     100
             *
1                                          HEC-1 INPUT                                          PAGE  2

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 48          KK    R01A
 49          KM        Route flow from SB01A to CP02
 50          RS       1    FLOW      -1
 51          RC   0.030   0.030   0.030     900  0.0200
 52          RX       0      12      14      16      18      20      22      34
 53          RY    2074    2070    2070    2070    2070    2070    2070    2074
             *

 54          KK    SB02   BASIN
 55          BA   0.041
 56          LG    0.12    0.15    7.60    0.14      76
 57          UC   0.146   0.116
 58          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 59          UA     100
             *

 60          KK    CP02
 61          KM        Combine SB01 with SB02
 62          HC       3   0.130
             *

 63          KK     D02
 64          KM        Divert to Hassayampa through 48" pipe
 65          DT    DV02
 66          DI       0     305     305
 67          DQ       0     305    1000
             *

 68          KK     R02
 69          KM        Route flow from SB02 to CP04
 70          RS       1    FLOW      -1
 71          RC   0.030   0.030   0.030    1800  0.0100
 72          RX       0       6       9      12      22      25      28      34
 73          RY    2057    2055    2054    2053    2053    2054    2055    2057
             *

 74          KK    SB03   BASIN
 75          BA   0.048
 76          LG    0.16    0.15    8.00    0.11      64
 77          UC   0.183   0.183
 78          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 79          UA     100
             *

 80          KK     R03
 81          KM        Route flow from SB03 to CP04
 82          RS       1    FLOW      -1
 83          RC   0.045   0.045   0.045    1200  0.0100
 84          RX       0      30      60      80     100     120     150     180
 85          RY    2070    2065    2060    2060    2060    2060    2065    2070
             *
-                                          HEC-1 INPUT                                          PAGE  3

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 86          KK    SB04   BASIN
 87          BA   0.056
 88          LG    0.26    0.17    6.80    0.16      43
 89          UC   0.271   0.241
```

```
 90          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
 91          UA     100
             *

 92          KK    CP04
 93          KM        Combine R02, SB03 with SB04
 94          HC       3   0.234
             *

 95          KK     R04
 96          KM        Route flow from SB04 to CP06
 97          RS       1    FLOW      -1
 98          RC   0.030   0.030   0.030    2000  0.0100
 99          RX       0       6       9      12      22      25      28      34
100          RY    2057    2055    2054    2053    2053    2054    2055    2057
             *

101          KK    SB05   BASIN
102          BA   0.048
103          LG    0.25    0.25    4.70    0.36      30
104          UC   0.283   0.286
105          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
106          UA     100
             *

107          KK     R05
108          KM        Route flow from SB05 to CP06
109          RS       1    FLOW      -1
110          RC   0.045   0.045   0.045    1500  0.0100
111          RX       0      40      80      90     110     120     160     200
112          RY    2056    2055    2054    2053    2053    2054    2055    2056
             *

113          KK    SB06   BASIN
114          BA   0.068
115          LG    0.23    0.25    4.50    0.45      30
116          UC   0.375   0.336
117          UA       0     5.0    16.0    30.0    65.0    77.0    84.0    90.0    94.0    97.0
118          UA     100
             *

119          KK    CP06
120          KM        Combine CP04, SB05 with SB06
121          HC       3   0.350
             *
```



```
LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

122          KK   BASIN
123          KM        BASIN DISCHARGES THROUGH 2-48" PIPES TO SOLS WASH
124          KM        LOWEST ADJACENT FFE=2052.76 AT 649 CHESTNUT STREET
125          RS       1    STOR      -1
126          SV       0     3.9     7.8     8.9    13.1    16.2    18.5
127          SE    2043    2046    2048  2048.4    2050    2051  2051.5
128          SQ       0       0       0     147     245     290     310
             *
129          ZZ
```

SCHEMATIC DIAGRAM OF STREAM NETWORK

```
INPUT
 LINE      (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

  NO.      (.) CONNECTOR        (<---) RETURN OF DIVERTED OR PUMPED FLOW

   25        SB01
                V
                V
   36         R01
                .
                .
   42           .       SB01A
                .           V
                .           V
   48           .        R01A
                .           .
                .           .
   54           .           .        SB02
                .           .           .
                .           .           .
   60        CP02.......................
                .
                .
```

```
 65          .------->    DV02
 63        D02
             V
             V
 68        R02
             .
             .
 74          .        SB03
             .          V
             .          V
 80          .        R03
             .          .
             .          .
 86          .          .        SB04
             .          .          .
             .          .          .
 92       CP04.......................
             V
             V
 95        R04
             .
             .
101          .        SB05
             .          V
             .          V
107          .        R05
             .          .
             .          .
113          .          .        SB06
             .          .          .
             .          .          .
119       CP06.......................
             V
             V
122      BASIN
```

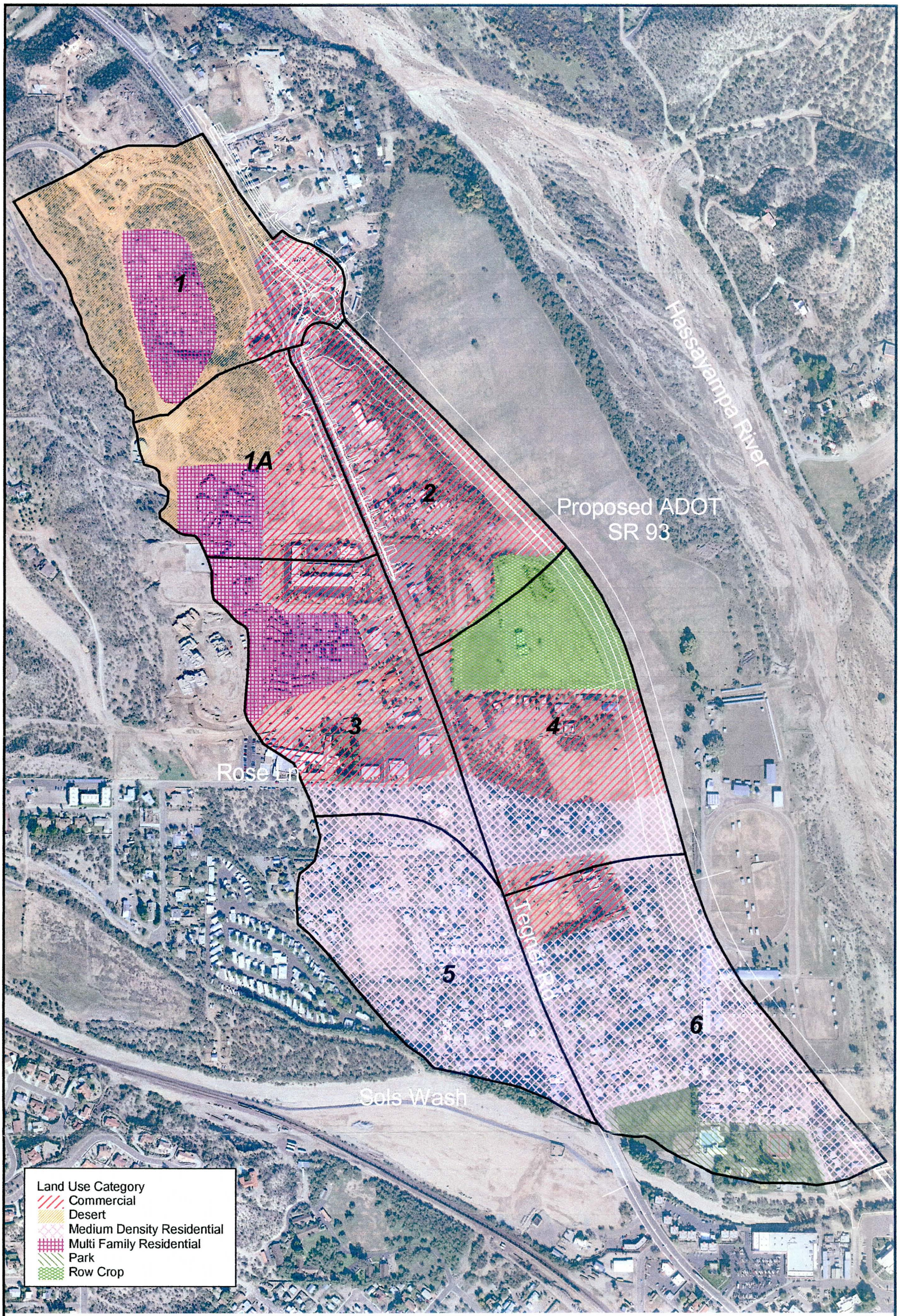
(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

	OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME MAX STAGE
+	HYDROGRAPH AT	SB01	177.	4.03	13.	3.	1.	.05		
+	ROUTED TO	R01	166.	4.07	13.	3.	1.	.05	2071.78	4.07
	HYDROGRAPH AT	SB01A	121.	4.00	10.	2.	1.	.03		
	ROUTED TO	R01A	119.	4.03	10.	2.	1.	.03	2071.24	.03
	HYDROGRAPH AT	SB02	141.	4.03	14.	3.	1.	.04		
+	3 COMBINED AT	CP02	423.	4.03	36.	9.	3.	.13		
	DIVERSION TO	DV02	305.	4.03	33.	8.	3.	.13		
	HYDROGRAPH AT	D02	118.	4.03	3.	1.	0.	.13		
+	ROUTED TO	R02	79.	4.10	3.	1.	0.	.13	2054.19	1.10
+	HYDROGRAPH AT	SB03	142.	4.03	15.	4.	1.	.05		
	ROUTED TO									

+	R03	128.	4.10	15.	4.	1.	.05	
+								2060.71
10								
HYDROGRAPH AT								
+	SB04	139.	4.10	16.	4.	1.	.06	
3 COMBINED AT								
	CP04	346.	4.10	34.	8.	3.	.23	
ROUTED TO								
+	R04	318.	4.13	34.	8.	3.	.23	
								2055.40
13								
HYDROGRAPH AT								
+	SB05	100.	4.10	11.	3.	1.	.05	
ROUTED TO								
+	R05	87.	4.20	11.	3.	1.	.05	
+								2054.02
20								
HYDROGRAPH AT								
+	SB06	122.	4.13	15.	4.	1.	.07	
3 COMBINED AT								
	CP06	522.	4.13	60.	15.	5.	.35	
ROUTED TO								
+	BASIN	282.	4.43	53.	13.	5.	.35	
								2050.82
43								

*** NORMAL END OF HEC-1 ***



Downtown Wickenburg
Flood Hazard Mitigation Report

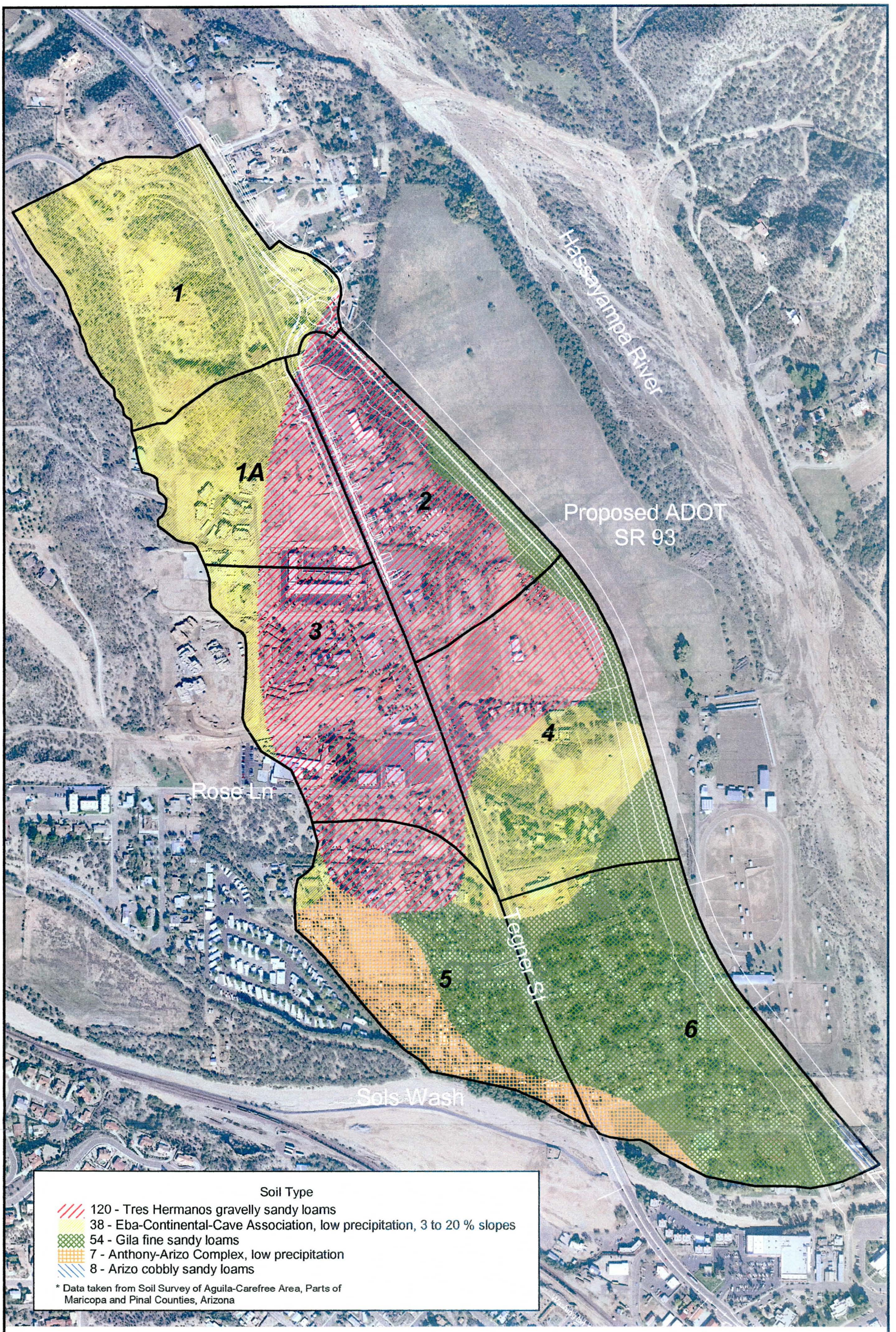
FCD2003C052

N

500 0 500 1000 Feet

1" = 500'

Local Drainage Land Use Map



Downtown Wickenburg
Flood Hazard Mitigation Report
FCD2003C052

N

500 0 500 1000 Feet

1" = 500'

Local Drainage Soils Map

Appendix B
n-VALUE WORKSHEETS

Appendix B.1

SOLS WASH – EXISTING CONDITIONS

Project Title Sols Wash Project No. 303012.04 Date

Subject Prepared By CTG Checked By GAU Page

Section 6.4.1.3 (Drainage Design Manual for Maricopa County, AZ Volume II, Hydraulics)

pg 6-29

$$n_4 = n_0\left(1.5\left(\frac{w_T}{\Sigma w_0}\right) + \left(1 - \frac{w_T}{\Sigma w_0}\right)\frac{\Sigma L_0}{L_T} - 0.5\right)$$

$n_0 = 0.018$

$w_0 = 160'$

$w_T = 1000'$

$L_0 = 80'$

$L_T = 400'$

$n_4 = 0.141$

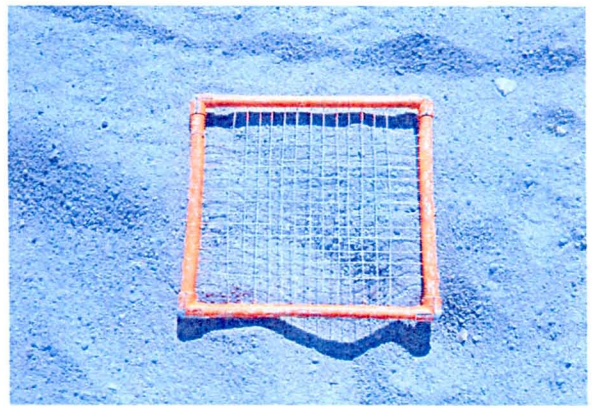
Use n-value = 0.150

The above calculation was performed to estimate the "n" value for a highly urbanized area (Mobile Home Park). This "n" value was used in the HEC-RAS model cross section 0.096 in the left overbank to represent roughness for storm water flowing through the mobile home park.

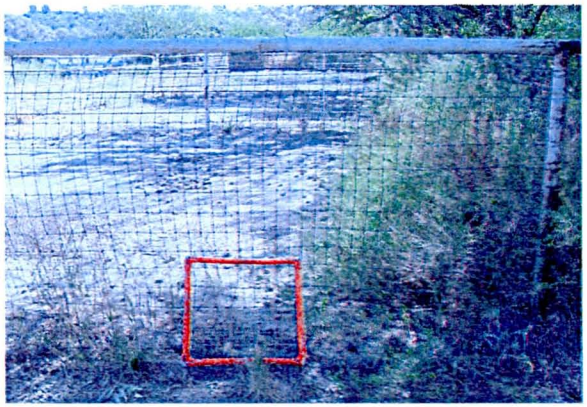
Sols Wash - 0.187

Left Bank-Looking Downstream
Photo 4

Right Bank-Looking Downstream
Photo 3



Main Wash-Bed Material
Photo 1



Left Overbank-Looking Downstream
Photo 5

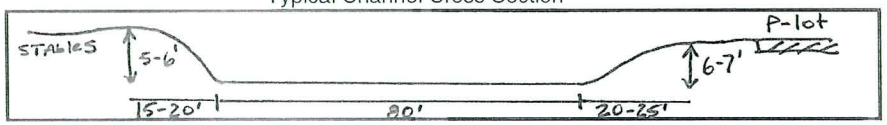
Right Overbank-Looking Downstream
Photo 2

River Mile = 0.187

Determination of Manning's Roughness Coefficients by FCDMC Method

Project: **Sols Wash CAR**
Stream: Sols Wash
Photograph No.: 303013.04
Section Description: Channel has a sandy bottom and vegetated banks
LOB is stables.
ROB is a parking lot.

Rough Sketch of
Typical Channel Cross Section

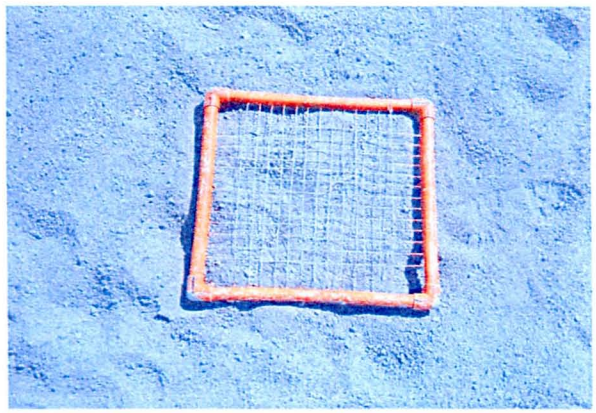


Channel Conditions		Manning's n Adjustment		Left Overbank	Main Channel (left bank -A1)	Main Channel (center -A2)	Main Channel (right bank -A3)	Right Overbank
Area [ft^2]					52.5	480	67.5	
% [decimal]					0.09	0.80	0.11	
Channel Bed Material	Concrete	n0	0.012-0.018					0.020
	Rock Cut		0.025					
	Firm Soil		0.025-0.032	0.028	0.028		0.028	
	Fine Sand		0.023-.026			0.025		
	Coarse Sand		0.026-0.036					
	Gravel		0.028-0.035					
	Cobble		0.030-0.050					
	Boulder		0.040-0.070					
Degree of Irregularity	Smooth	n1	0.000					
	Minor		0.001-0.005	0.005	0.005	0.001	0.005	0.001
	Moderate		0.006-0.010					
	Severe		0.011-0.020					
Effects of Obstructions	Negligible	n2	0.000-0.004		0.000	0.000	0.000	0.000
	Minor		0.005-0.015	0.005				
	Appreciable		0.020-0.030					
	Severe		0.040-0.060					
Vegetation	Small	n3	0.002-0.010			0.000		0.000
	Medium		0.01-0.025					
	Large		0.025-0.050	0.025	0.040		0.040	
	Very Large		0.050-0.100					
Variations in the Channel Cross Section	Gradual	n4	0.000					
	Alternating (occasionally)		0.001-0.005					
	Alternating (frequently)		0.010-0.015					
Sum (n0-n4)					0.073	0.026	0.073	
x (% of Area)					0.006	0.021	0.008	
Sum (left, right,center)						0.035		
Degree of Meandering	Minor	m	1	1		1		1
	Appreciable		1.15					
	Severe		1.3					
n = (n0 + n1 + n2 + n3 + n4)m				0.063	0.035			0.021

Sols Wash - 0.286

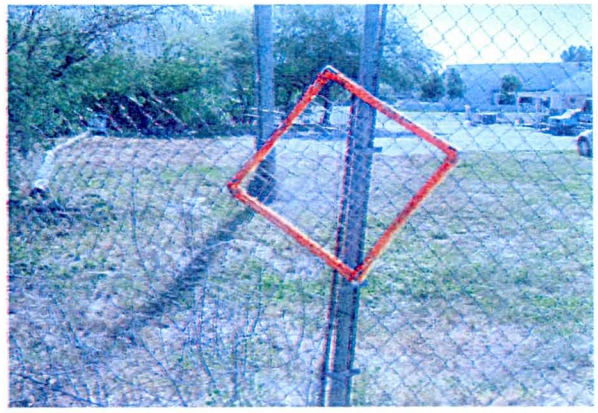
Left Bank-Looking Downstream
Photo 10

Right Bank-Looking Downstream
Photo 8



Main Wash-Bed Material
Photo 6

Left Overbank-Looking Downstream
Photo 9



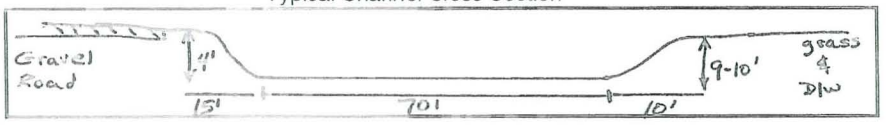
Right Overbank-Looking Downstream
Photo 7

River Mile = 0.286

Determination of Manning's Roughness Coefficients by FCDMC Method

Project: **Sols Wash CAR**
Stream: Sols Wash
Photograph No.: 303013.04
Section Description: Channel has a sandy bottom and vegetated banks
LOB is a road and then the park.
ROB is a parking lot.

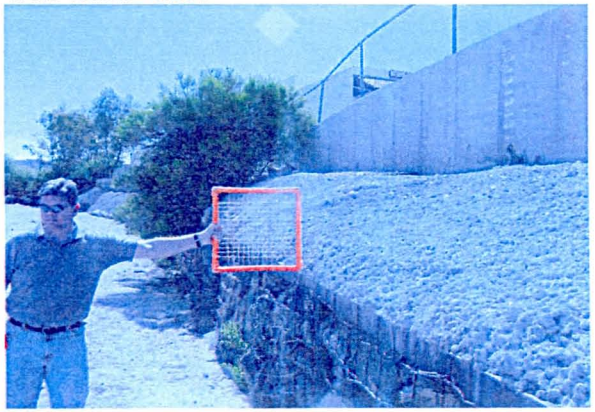
Rough Sketch of
Typical Channel Cross Section



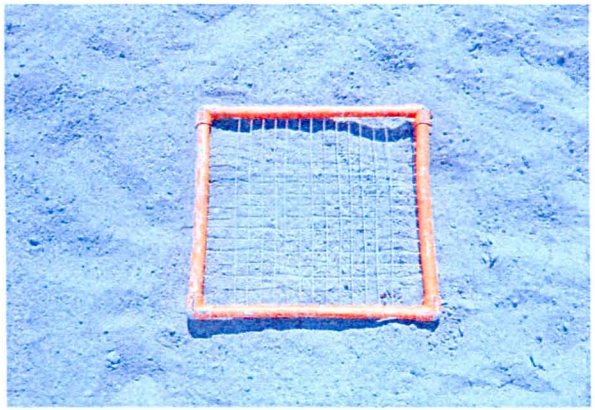
Channel Conditions		Manning's n Adjustment		Left Overbank	Main Channel (left bank -A1)	Main Channel (center -A2)	Main Channel (right bank -A3)	Right Overbank
Area [ft^2]					75	490	35	
% [decimal]					0.13	0.82	0.06	
Channel Bed Material	Concrete	n0	0.012-0.018					
	Rock Cut		0.025					
	Firm Soil		0.025-0.032	0.030	0.032			0.032
	Fine Sand		0.023-.026			0.028		
	Coarse Sand		0.026-0.036					
	Gravel		0.028-0.035					
	Cobble		0.030-0.050				0.040	
	Boulder		0.040-0.070					
Degree of Irregularity	Smooth	n1	0.000	0.000		0.000		0.000
	Minor		0.001-0.005		0.005		0.008	
	Moderate		0.006-0.010					
	Severe		0.011-0.020					
Effects of Obstructions	Negligible	n2	0.000-0.004	0.000	0.002	0.000	0.002	
	Minor		0.005-0.015					0.005
	Appreciable		0.020-0.030					
	Severe		0.040-0.060					
Vegetation	Small	n3	0.002-0.010	0.005		0.000		0.003
	Medium		0.01-0.025					
	Large		0.025-0.050		0.035		0.035	
	Very Large		0.050-0.100					
Variations in the Channel Cross Section	Gradual	n4	0.000	0.000	0.000	0.000	0.000	
	Alternating (occasionally)		0.001-0.005					
	Alternating (frequently)		0.010-0.015					
Sum (n0-n4)					0.074	0.028	0.085	
x (% of Area)					0.009	0.023	0.005	
Sum (left, right,center)						0.037		
Degree of Meandering	Minor	m	1	1		1		1
	Appreciable		1.15					
	Severe		1.3					
n = (n0 + n1 + n2 + n3 + n4)m				0.035		0.037		0.040

Sols Wash - 0.351

Left Bank-Looking Downstream
Photo 14



Right Bank-Looking Downstream
Photo 13



Main Wash-Bed Material
Photo 11

Left Overbank-Looking Downstream
Photo 15

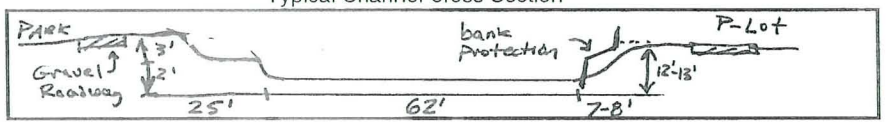
Right Overbank-Looking Downstream
Photo 16

River Mile = 0.351

Determination of Manning's Roughness Coefficients by FCDMC Method

Project: **Sols Wash CAR**
Stream: Sols Wash
Photograph No.: 303013.04
Section Description: Channel has a sandy bottom and vegetated LB
LOB is a road and then the park.
ROB is a parking lot.

Rough Sketch of
Typical Channel Cross Section

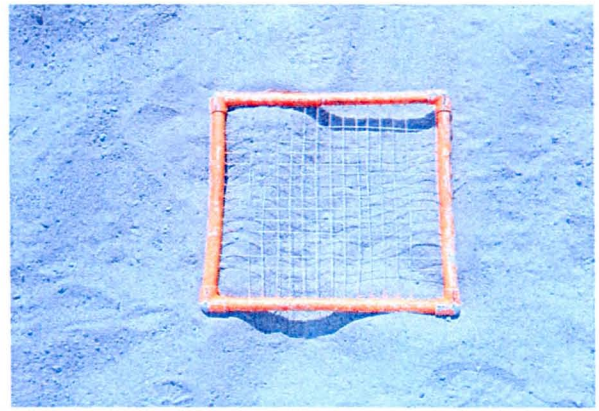


Channel Conditions		Manning's n Adjustment		Left Overbank	Main Channel (left bank -A1)	Main Channel (center -A2)	Main Channel (right bank -A3)	Right Overbank
Area [ft^2]					62.5	496	60	
% [decimal]					0.10	0.80	0.10	
Channel Bed Material	Concrete	n0	0.012-0.018					0.018
	Rock Cut		0.025					
	Firm Soil		0.025-0.032		0.032			
	Fine Sand		0.023-.026			0.025		
	Coarse Sand		0.026-0.036					
	Gravel		0.028-0.035	0.030			0.035	
	Cobble		0.030-0.050					
	Boulder		0.040-0.070					
Degree of Irregularity	Smooth	n1	0.000	0.000				0.000
	Minor		0.001-0.005		0.004	0.001	0.002	
	Moderate		0.006-0.010					
	Severe		0.011-0.020					
Effects of Obstructions	Negligible	n2	0.000-0.004	0.000		0.000	0.002	0.000
	Minor		0.005-0.015		0.006			
	Appreciable		0.020-0.030					
	Severe		0.040-0.060					
Vegetation	Small	n3	0.002-0.010	0.000		0.000	0.007	0.000
	Medium		0.01-0.025		0.025			
	Large		0.025-0.050					
	Very Large		0.050-0.100					
Variations in the Channel Cross Section	Gradual	n4	0.000	0.000		0.000		0.000
	Alternating (occasionally)		0.001-0.005		0.003		0.002	
	Alternating (frequently)		0.010-0.015					
Sum (n0-n4)					0.070	0.026	0.048	
x (% of Area)					0.007	0.021	0.005	
Sum (left, right,center)						0.033		
Degree of Meandering	Minor	m	1	1		1		1
	Appreciable		1.15					
	Severe		1.3					
n = (n0 + n1 + n2 + n3 + n4)m				0.030		0.033		0.018

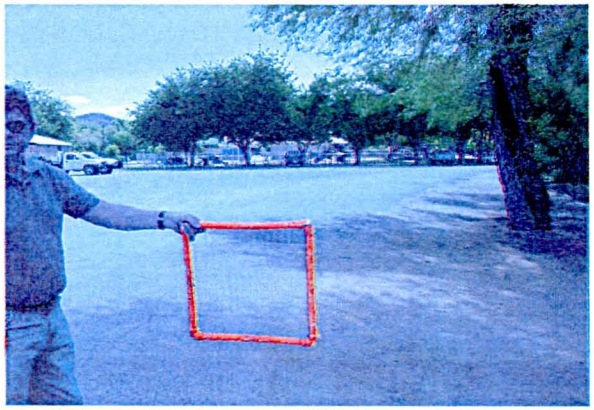
Sols Wash - 0.425

Left Bank-Looking Downstream
Photo 19

Right Bank-Looking Downstream
Photo 18



Main Wash-Bed Material
Photo 17



Left Overbank-Looking Downstream
Photo 20

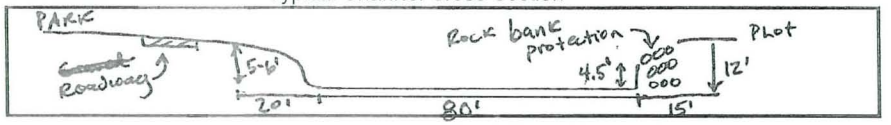
Right Overbank-Looking Downstream
Photo 16

River Mile = 0.425

Determination of Manning's Roughness Coefficients by FCDMC Method

Project: **Sols Wash CAR**
Stream: Sols Wash
Photograph No.: 303013.04
Section Description: Channel has a sandy bottom and vegetated LB
LOB is a road and then the park.
ROB is a parking lot.

Rough Sketch of
Typical Channel Cross Section

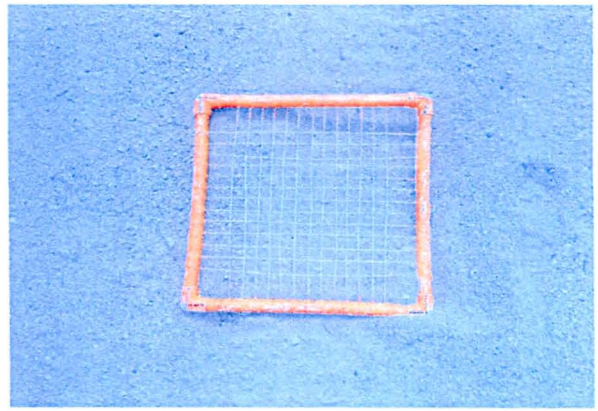


Channel Conditions		Manning's n Adjustment		Left Overbank	Main Channel (left bank -A1)	Main Channel (center -A2)	Main Channel (right bank -A3)	Right Overbank
Area [ft^2]					100	640	60	
% [decimal]					0.13	0.80	0.08	
Channel Bed Material	Concrete	n0	0.012-0.018	0.018				0.018
	Rock Cut		0.025					
	Firm Soil		0.025-0.032		0.030			
	Fine Sand		0.023-.026			0.025		
	Coarse Sand		0.026-0.036					
	Gravel		0.028-0.035					
	Cobble		0.030-0.050				0.040	
	Boulder		0.040-0.070					
Degree of Irregularity	Smooth	n1	0.000	0.000			0.000	0.000
	Minor		0.001-0.005		0.005	0.001		
	Moderate		0.006-0.010					
	Severe		0.011-0.020					
Effects of Obstructions	Negligible	n2	0.000-0.004	0.000	0.002	0.000	0.002	0.000
	Minor		0.005-0.015					
	Appreciable		0.020-0.030					
	Severe		0.040-0.060					
Vegetation	Small	n3	0.002-0.010			0.000		0.000
	Medium		0.01-0.025	0.010			0.020	
	Large		0.025-0.050		0.045			
	Very Large		0.050-0.100					
Variations in the Channel Cross Section	Gradual	n4	0.000	0.000		0.000	0.000	0.000
	Alternating (occasionally)		0.001-0.005		0.005			
	Alternating (frequently)		0.010-0.015					
Sum (n0-n4)					0.087	0.026	0.062	
x (% of Area)					0.011	0.021	0.005	
Sum (left, right,center)						0.036		
Degree of Meandering	Minor	m	1	1		1		1
	Appreciable		1.15					
	Severe		1.3					
n = (n0 + n1 + n2 + n3 + n4)m				0.028	0.036			0.018

Sols Wash - 0.541

Left Bank-Looking Downstream
Photo 23

Right Bank-Looking Downstream
Photo 22



Main Wash-Bed Material
Photo 21

Left Overbank-Looking Downstream
Photo 24

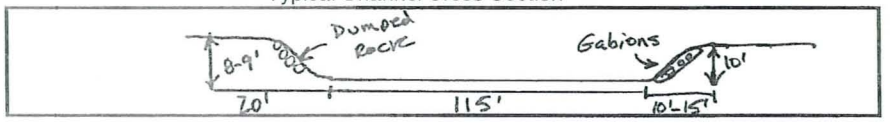
Right Overbank-Looking Downstream
Photo 32

River Mile = 0.541

Determination of Manning's Roughness Coefficients by FCDMC Method

Project: **Sols Wash CAR**
Stream: Sols Wash
Photograph No.: 303013.04
Section Description: Channel has a sandy bottom and rock bank protection
LOB is dirt and backyards.
ROB is a graded lot with small vegetation.

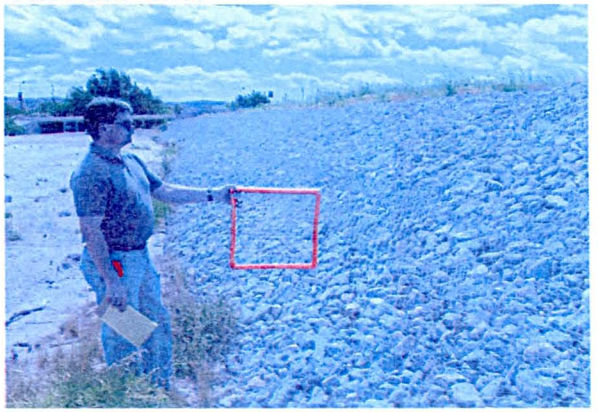
Rough Sketch of
Typical Channel Cross Section



Channel Conditions		Manning's n Adjustment		Left Overbank	Main Channel (left bank -A1)	Main Channel (center -A2)	Main Channel (right bank -A3)	Right Overbank
Area [ft^2]					110	1150	65	
% [decimal]					0.08	0.87	0.05	
Channel Bed Material	Concrete	n0	0.012-0.018					
	Rock Cut		0.025					
	Firm Soil		0.025-0.032	0.028				0.029
	Fine Sand		0.023-.026			0.025		
	Coarse Sand		0.026-0.036					
	Gravel		0.028-0.035					
	Cobble		0.030-0.050		0.038		0.038	
	Boulder		0.040-0.070					
Degree of Irregularity	Smooth	n1	0.000			0.000	0.000	0.000
	Minor		0.001-0.005	0.002	0.003			
	Moderate		0.006-0.010					
	Severe		0.011-0.020					
Effects of Obstructions	Negligible	n2	0.000-0.004	0.000		0.000	0.000	0.000
	Minor		0.005-0.015		0.005			
	Appreciable		0.020-0.030					
	Severe		0.040-0.060					
Vegetation	Small	n3	0.002-0.010	0.010		0.000	0.002	0.003
	Medium		0.01-0.025		0.020			
	Large		0.025-0.050					
	Very Large		0.050-0.100					
Variations in the Channel Cross Section	Gradual	n4	0.000			0.000		0.000
	Alternating (occasionally)		0.001-0.005	0.002	0.002		0.002	
	Alternating (frequently)		0.010-0.015					
Sum (n0-n4)					0.068	0.025	0.042	
x (% of Area)					0.006	0.022	0.002	
Sum (left, right,center)						0.029		
Degree of Meandering	Minor	m	1	1		1		1
	Appreciable		1.15					
	Severe		1.3					
n = (n0 + n1 + n2 + n3 + n4)m				0.042	0.029			0.032

Sols Wash - 0.606

Left Bank-Looking Downstream
Photo 27



Right Bank-Looking Downstream
Photo 26

Main Wash-Bed Material
Photo 25

Left Overbank-Heavily vegetated, large trees
No photo taken

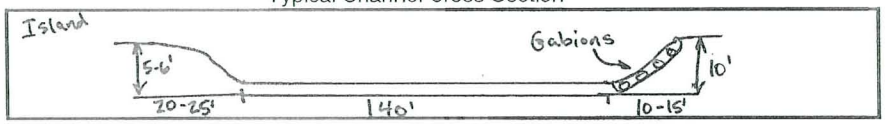
Right Overbank-Looking Downstream
Photo 32

River Mile = 0.606

Determination of Manning's Roughness Coefficients by FCDMC Method

Project: **Sols Wash CAR**
Stream: Sols Wash
Photograph No.: 303013.04
Section Description: Channel has a sandy bottom, rock on RT, veg on LT
LOB is large trees and backyards.
ROB is a graded lot with small vegetation.

Rough Sketch of
Typical Channel Cross Section

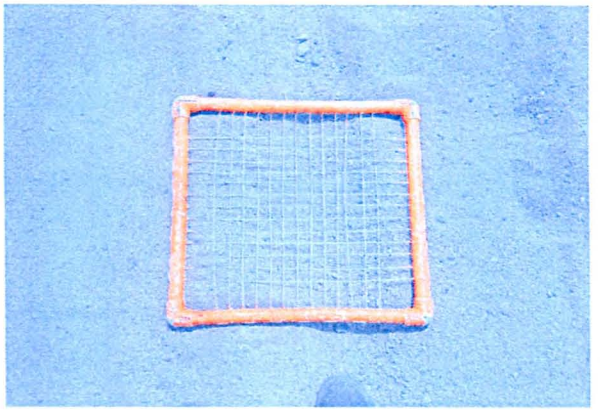


Channel Conditions		Manning's n Adjustment		Left Overbank	Main Channel (left bank -A1)	Main Channel (center -A2)	Main Channel (right bank -A3)	Right Overbank
Area [ft^2]					157.5	1400	65	
% [decimal]					0.10	0.86	0.04	
Channel Bed Material	Concrete	n0	0.012-0.018					
	Rock Cut		0.025					
	Firm Soil		0.025-0.032	0.030	0.030			0.029
	Fine Sand		0.023-.026			0.025		
	Coarse Sand		0.026-0.036					
	Gravel		0.028-0.035					
	Cobble		0.030-0.050				0.038	
	Boulder		0.040-0.070					
Degree of Irregularity	Smooth	n1	0.000			0.000	0.000	0.000
	Minor		0.001-0.005	0.005	0.005			
	Moderate		0.006-0.010					
	Severe		0.011-0.020					
Effects of Obstructions	Negligible	n2	0.000-0.004			0.000	0.000	0.000
	Minor		0.005-0.015	0.005	0.005			
	Appreciable		0.020-0.030					
	Severe		0.040-0.060					
Vegetation	Small	n3	0.002-0.010			0.000	0.002	0.003
	Medium		0.01-0.025					
	Large		0.025-0.050	0.040	0.045			
	Very Large		0.050-0.100					
Variations in the Channel Cross Section	Gradual	n4	0.000			0.000	0.000	0.000
	Alternating (occasionally)		0.001-0.005	0.002	0.002			
	Alternating (frequently)		0.010-0.015					
Sum (n0-n4)					0.087	0.025	0.040	
x (% of Area)					0.008	0.022	0.002	
Sum (left, right,center)						0.032		
Degree of Meandering	Minor	m	1	1		1		1
	Appreciable		1.15					
	Severe		1.3					
n = (n0 + n1 + n2 + n3 + n4)m				0.082	0.032			0.032

Sols Wash - 0.779

Left Bank-Looking Downstream
Photo 29

Right Bank-Looking Downstream
Photo 31



Main Wash-Bed Material
Photo 28

Left Overbank-Heavily vegetated, large trees
No photo taken

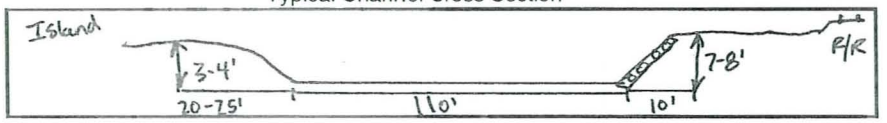
Right Overbank-Looking Downstream
Photo 32

River Mile = 0.779

Determination of Manning's Roughness Coefficients by FCDMC Method

Project: **Sols Wash CAR**
Stream: Sols Wash
Photograph No.: 303013.04
Section Description: Channel has a sandy bottom, rock on RT, veg on LT
LOB is large trees and backyards.
ROB is a graded lot with small vegetation.

Rough Sketch of
Typical Channel Cross Section

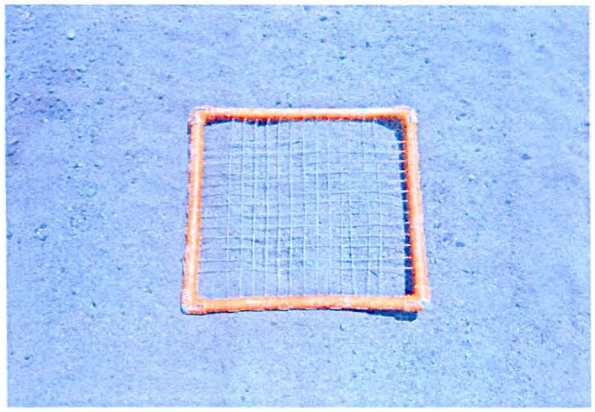


Channel Conditions		Manning's n Adjustment		Left Overbank	Main Channel (left bank -A1)	Main Channel (center -A2)	Main Channel (right bank -A3)	Right Overbank
Area [ft^2]					135	880	40	
% [decimal]					0.13	0.83	0.04	
Channel Bed Material	Concrete	n0	0.012-0.018					
	Rock Cut		0.025					
	Firm Soil		0.025-0.032	0.028	0.030			0.029
	Fine Sand		0.023-.026			0.025		
	Coarse Sand		0.026-0.036					
	Gravel		0.028-0.035					
	Cobble		0.030-0.050				0.038	
	Boulder		0.040-0.070					
Degree of Irregularity	Smooth	n1	0.000			0.000	0.000	0.000
	Minor		0.001-0.005	0.005	0.005			
	Moderate		0.006-0.010					
	Severe		0.011-0.020					
Effects of Obstructions	Negligible	n2	0.000-0.004			0.000	0.000	0.000
	Minor		0.005-0.015	0.005	0.005			
	Appreciable		0.020-0.030					
	Severe		0.040-0.060					
Vegetation	Small	n3	0.002-0.010			0.000	0.002	0.003
	Medium		0.01-0.025					
	Large		0.025-0.050	0.040	0.045			
	Very Large		0.050-0.100					
Variations in the Channel Cross Section	Gradual	n4	0.000			0.000	0.000	0.000
	Alternating (occasionally)		0.001-0.005	0.002	0.003			
	Alternating (frequently)		0.010-0.015					
Sum (n0-n4)					0.088	0.025	0.040	
x (% of Area)					0.011	0.021	0.002	
Sum (left, right,center)						0.034		
Degree of Meandering	Minor	m	1	1		1		1
	Appreciable		1.15					
	Severe		1.3					
n = (n0 + n1 + n2 + n3 + n4)m				0.080	0.034			0.032

Sols Wash - North Prong 0.779

Left Bank-Looking Downstream
Photo 49

Right Bank-Looking Upstream
Photo 48



Main Wash-Bed Material
Photo 46

Left Overbank Mobile Home Park
No photo taken

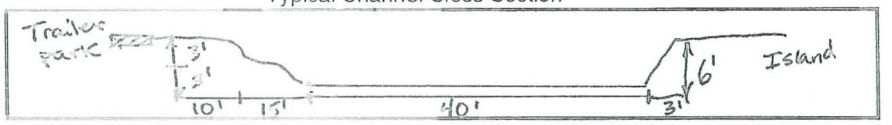
Right Overbank-Looking South
Photo 50

River Mile = 0.779 (North Prong)

Determination of Manning's Roughness Coefficients by FCDMC Method

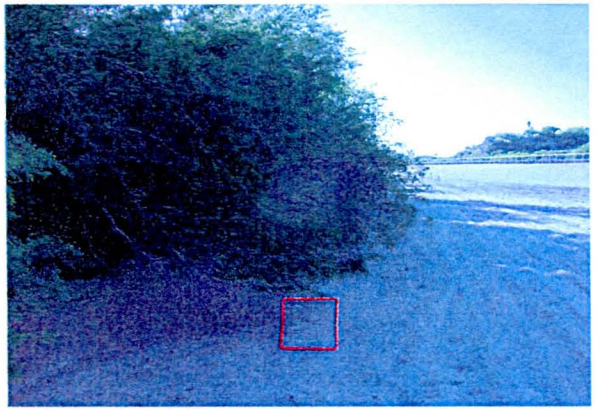
Project: **Sols Wash CAR**
Stream: Sols Wash
Photograph No.: 303013.04
Section Description: Channel has a sandy bottom and vegetated banks
LOB is a mobile home park.
ROB is an island with heavy vegetation.

Rough Sketch of
Typical Channel Cross Section



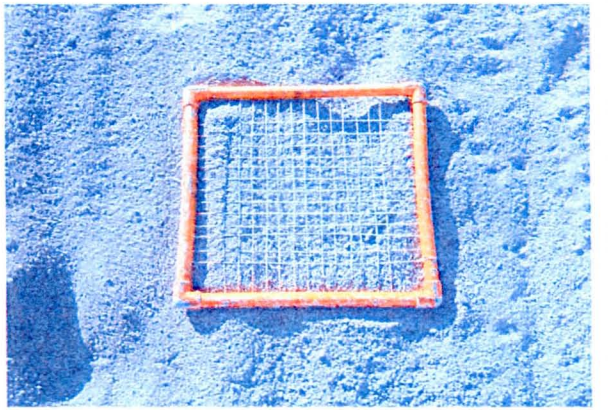
Channel Conditions		Manning's n Adjustment		Left Overbank	Main Channel (left bank -A1)	Main Channel (center -A2)	Main Channel (right bank -A3)	Right Overbank
Area [ft^2]					75	240	18	
% [decimal]					0.23	0.72	0.05	
Channel Bed Material	Concrete	n0	0.012-0.018					
	Rock Cut		0.025					
	Firm Soil		0.025-0.032	0.030	0.030		0.030	0.030
	Fine Sand		0.023-.026			0.025		
	Coarse Sand		0.026-0.036					
	Gravel		0.028-0.035					
	Cobble		0.030-0.050					
	Boulder		0.040-0.070					
Degree of Irregularity	Smooth	n1	0.000			0.000		
	Minor		0.001-0.005	0.002	0.005		0.005	0.002
	Moderate		0.006-0.010					
	Severe		0.011-0.020					
Effects of Obstructions	Negligible	n2	0.000-0.004		0.003	0.000	0.003	0.002
	Minor		0.005-0.015	0.005				
	Appreciable		0.020-0.030					
	Severe		0.040-0.060					
Vegetation	Small	n3	0.002-0.010	0.010		0.000		
	Medium		0.01-0.025					
	Large		0.025-0.050		0.045		0.045	0.040
	Very Large		0.050-0.100					
Variations in the Channel Cross Section	Gradual	n4	0.000	0.000		0.000		
	Alternating (occasionally)		0.001-0.005		0.002		0.002	0.002
	Alternating (frequently)		0.010-0.015					
Sum (n0-n4)					0.085	0.025	0.085	
x (% of Area)					0.019	0.018	0.005	
Sum (left, right,center)						0.042		
Degree of Meandering	Minor	m	1	1		1		1
	Appreciable		1.15					
	Severe		1.3					
n = (n0 + n1 + n2 + n3 + n4)m				0.047		0.042		0.076

Sols Wash - 1.025 Main Channel



Left Bank-Looking Downstream
Photo 57

Right Bank-Looking Downstream
Photo 55



Main Wash-Bed Material
Photo 56

Left Overbank-Looking Downstream
Photo 59

Right Overbank-Looking Downstream
Photo 52

River Mile = 1.025

Determination of Manning's Roughness Coefficients by FCDMC Method

Project: **Sols Wash CAR**
Stream: Sols Wash
Photograph No.: 303013.04
Section Description: Channel has a sandy bottom and vegetated banks
LOB is a vegetated island
ROB other side of R/R, channel like

Rough Sketch of
Typical Channel Cross Section

Channel Conditions		Manning's n Adjustment		Left Overbank	Main Channel (left bank -A1)	Main Channel (center -A2)	Main Channel (right bank -A3)	Right Overbank
Area [ft^2]					175	900	150	
% [decimal]					0.14	0.73	0.12	
Channel Bed Material	Concrete	n0	0.012-0.018				0.018	
	Rock Cut		0.025					
	Firm Soil		0.025-0.032	0.030	0.030			0.030
	Fine Sand		0.023-.026			0.025		
	Coarse Sand		0.026-0.036					
	Gravel		0.028-0.035					
	Cobble		0.030-0.050					
	Boulder		0.040-0.070					
Degree of Irregularity	Smooth	n1	0.000					
	Minor		0.001-0.005		0.002			
	Moderate		0.006-0.010					
	Severe		0.011-0.020					
Effects of Obstructions	Negligible	n2	0.000-0.004		0.002			
	Minor		0.005-0.015					
	Appreciable		0.020-0.030					
	Severe		0.040-0.060					
Vegetation	Small	n3	0.002-0.010					
	Medium		0.01-0.025					0.020
	Large		0.025-0.050	0.035	0.040			
	Very Large		0.050-0.100					
Variations in the Channel Cross Section	Gradual	n4	0.000					
	Alternating (occasionally)		0.001-0.005	0.002	0.002			
	Alternating (frequently)		0.010-0.015					
Sum (n0-n4)					0.076	0.025	0.018	
x (% of Area)					0.011	0.018	0.002	
Sum (left, right,center)						0.031		
Degree of Meandering	Minor	m	1	1		1		1
	Appreciable		1.15					
	Severe		1.3					
n = (n0 + n1 + n2 + n3 + n4)m				0.067	0.031			0.050

Sols Wash - 1.175 North Prong

Left Bank-Looking Downstreamstream
Photo 63

Right Bank-Looking Downstream
Photo

Main Wash-Bed Material
Photo 64

Left Overbank-Looking Upstream
Photo 62

Right Overbank-Looking Downstream
Photo 59

River Mile = 1.175 (North Prong)

Determination of Manning's Roughness Coefficients by FCDMC Method

Project: **Sols Wash CAR**
Stream: Sols Wash
Photograph No.: 303013.04
Section Description: Channel has a sandy bottom and vegetated banks
LOB is natural desert
ROB is an island with heavy vegetation.
represents NP for sections 1.175 & 1.112

Rough Sketch of
Typical Channel Cross Section

Channel Conditions		Manning's n Adjustment		Left Overbank	Main Channel (left bank -A1)	Main Channel (center -A2)	Main Channel (right bank -A3)	Right Overbank
Area [ft^2]					18	180	18	
% [decimal]					0.08	0.83	0.08	
Channel Bed Material	Concrete	n0	0.012-0.018					
	Rock Cut		0.025					
	Firm Soil		0.025-0.032	0.030			0.030	0.030
	Fine Sand		0.023-.026			0.025		
	Coarse Sand		0.026-0.036					
	Gravel		0.028-0.035					
	Cobble		0.030-0.050		0.030			
	Boulder		0.040-0.070					
Degree of Irregularity	Smooth	n1	0.000					
	Minor		0.001-0.005	0.002			0.002	
	Moderate		0.006-0.010					
	Severe		0.011-0.020					
Effects of Obstructions	Negligible	n2	0.000-0.004		0.002		0.002	
	Minor		0.005-0.015					
	Appreciable		0.020-0.030					
	Severe		0.040-0.060					
Vegetation	Small	n3	0.002-0.010					
	Medium		0.01-0.025					0.020
	Large		0.025-0.050	0.035			0.040	
	Very Large		0.050-0.100					
Variations in the Channel Cross Section	Gradual	n4	0.000					
	Alternating (occasionally)		0.001-0.005	0.002			0.002	
	Alternating (frequently)		0.010-0.015					
Sum (n0-n4)					0.032	0.025	0.076	
x (% of Area)					0.003	0.021	0.006	
Sum (left, right,center)						0.030		
Degree of Meandering	Minor	m	1	1		1		1
	Appreciable		1.15					
	Severe		1.3					
n = (n0 + n1 + n2 + n3 + n4)m				0.069	0.030			0.050

Sols Wash - 1.246 North Prong

Left Bank-Looking Downstream
Photo 70

Right Bank-Looking Downstream
Photo 68

Main Wash-Bed Material
Photo

Left Overbank-Heavy vegetation
No Photo

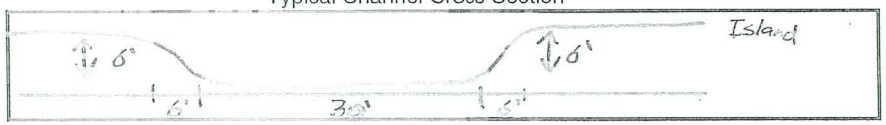
Right Overbank-Looking Downstream
Photo 59

River Mile = 1.246 (North Prong)

Determination of Manning's Roughness Coefficients by FCDMC Method

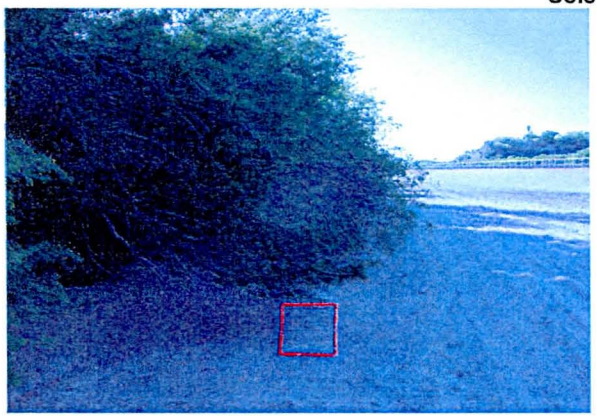
Project: **Sols Wash CAR**
Stream: Sols Wash
Photograph No.: 303013.04
Section Description: Channel has a sandy bottom and vegetated banks
LOB is natural desert
ROB is an island with heavy vegetation.
represents NP for sections 1.246 & 1.025

Rough Sketch of
Typical Channel Cross Section



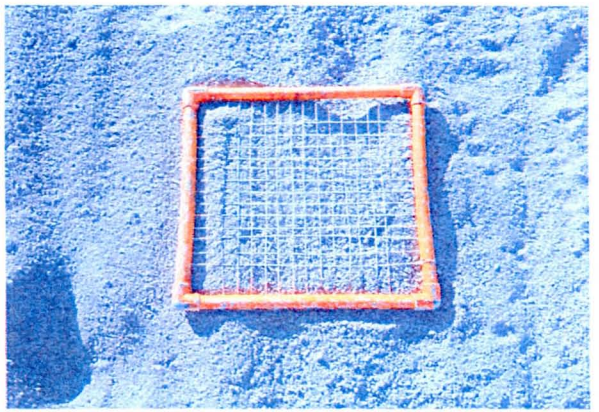
Channel Conditions		Manning's n Adjustment		Left Overbank	Main Channel (left bank -A1)	Main Channel (center -A2)	Main Channel (right bank -A3)	Right Overbank
Area [ft^2]					18	180	18	
% [decimal]					0.08	0.83	0.08	
Channel Bed Material	Concrete	n0	0.012-0.018					
	Rock Cut		0.025					
	Firm Soil		0.025-0.032	0.030	0.030		0.030	0.030
	Fine Sand		0.023-.026			0.025		
	Coarse Sand		0.026-0.036					
	Gravel		0.028-0.035					
	Cobble		0.030-0.050					
	Boulder		0.040-0.070					
Degree of Irregularity	Smooth	n1	0.000					
	Minor		0.001-0.005	0.002	0.002	0.002	0.002	
	Moderate		0.006-0.010					
	Severe		0.011-0.020					
Effects of Obstructions	Negligible	n2	0.000-0.004		0.002		0.002	
	Minor		0.005-0.015					
	Appreciable		0.020-0.030					
	Severe		0.040-0.060					
Vegetation	Small	n3	0.002-0.010					
	Medium		0.01-0.025					0.020
	Large		0.025-0.050	0.035	0.040		0.040	
	Very Large		0.050-0.100					
Variations in the Channel Cross Section	Gradual	n4	0.000					
	Alternating (occasionally)		0.001-0.005	0.003	0.002		0.002	
	Alternating (frequently)		0.010-0.015					
Sum (n0-n4)					0.076	0.027	0.076	
x (% of Area)					0.006	0.023	0.006	
Sum (left, right,center)						0.035		
Degree of Meandering	Minor	m	1	1		1		1
	Appreciable		1.15					
	Severe		1.3					
n = (n0 + n1 + n2 + n3 + n4)m				0.070	0.035			0.050

Sols Wash - 1.246 Main Channel



Left Bank-Looking Downstream
Photo 57

Right Bank-Looking Downstream
Photo 54



Main Wash-Bed Material
Photo 56

Left Overbank-Heavily vegetated, large trees
Photo 58

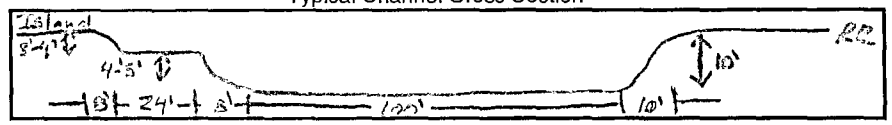
Right Overbank-Looking Downstream
Photo 52

River Mile = 1.246

Determination of Manning's Roughness Coefficients by FCDMC Method

Project: **Sols Wash CAR**
Stream: Sols Wash
Photograph No.: 303013.04
Section Description: Channel has a sandy bottom and vegetated banks
LOB is a vegetated island
ROB between wash and R/R
represents main channel for 1.246, 1.175 & 1.112

Rough Sketch of
Typical Channel Cross Section



Channel Conditions		Manning's n Adjustment		Left Overbank	Main Channel (left bank -A1)	Main Channel (center -A2)	Main Channel (right bank -A3)	Right Overbank
Area [ft^2]					175	2200	150	
% [decimal]					0.07	0.87	0.06	
Channel Bed Material	Concrete	n0	0.012-0.018					
	Rock Cut		0.025					
	Firm Soil		0.025-0.032	0.030	0.030			0.030
	Fine Sand		0.023-.026			0.025		
	Coarse Sand		0.026-0.036					
	Gravel		0.028-0.035					
	Cobble		0.030-0.050					
	Boulder		0.040-0.070				0.040	
Degree of Irregularity	Smooth	n1	0.000					
	Minor		0.001-0.005		0.002		0.003	
	Moderate		0.006-0.010					
	Severe		0.011-0.020					
Effects of Obstructions	Negligible	n2	0.000-0.004		0.002		0.003	
	Minor		0.005-0.015					
	Appreciable		0.020-0.030					
	Severe		0.040-0.060					
Vegetation	Small	n3	0.002-0.010	0.010			0.005	
	Medium		0.01-0.025					0.020
	Large		0.025-0.050		0.040			
	Very Large		0.050-0.100					
Variations in the Channel Cross Section	Gradual	n4	0.000					
	Alternating (occasionally)		0.001-0.005		0.002		0.002	
	Alternating (frequently)		0.010-0.015					
Sum (n0-n4)					0.076	0.025	0.053	
x (% of Area)					0.005	0.022	0.003	
Sum (left, right,center)						0.030		
Degree of Meandering	Minor	m	1	1		1		1
	Appreciable		1.15					
	Severe		1.3					
n = (n0 + n1 + n2 + n3 + n4)m				0.040	0.030			0.050

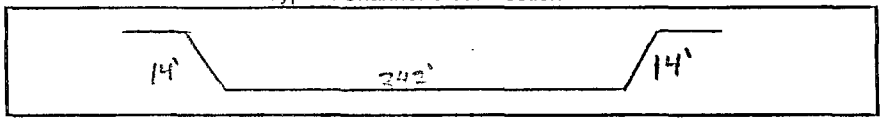
Appendix B.2

SOLS WASH – PROPOSED CONDITIONS

Determination of Manning's Roughness Coefficients by FCDMC Method

Project: **Sols Wash CAR**
Stream: Sols Wash
Photograph No.: 303013.04
Section Description: Channel has a sandy bottom and vegetated banks
No LOB since flow will will be contained in wash.
No ROB since flow will will be contained in wash.

Rough Sketch of
Typical Channel Cross Section

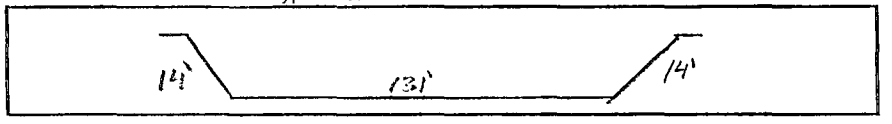


Channel Conditions		Manning's n Adjustment		Left Overbank	Main Channel (left bank -A1)	Main Channel (center -A2)	Main Channel (right bank -A3)	Right Overbank
Area [ft^2]					45	2460	45	
% [decimal]					0.02	0.96	0.02	
Channel Bed Material	Concrete	n0	0.012-0.018					
	Rock Cut		0.025					
	Firm Soil		0.025-0.032					
	Fine Sand		0.023-.026			0.025		
	Coarse Sand		0.026-0.036					
	Gravel		0.028-0.035					
	Cobble		0.030-0.050		0.040		0.040	
	Boulder		0.040-0.070					
Degree of Irregularity	Smooth	n1	0.000	0.000	0.000	0.000	0.000	0.000
	Minor		0.001-0.005					
	Moderate		0.006-0.010					
	Severe		0.011-0.020					
Effects of Obstructions	Negligible	n2	0.000-0.004	0.000	0.000	0.000	0.000	0.000
	Minor		0.005-0.015					
	Appreciable		0.020-0.030					
	Severe		0.040-0.060					
Vegetation	Small	n3	0.002-0.010	0.000	0.000	0.000	0.000	0.000
	Medium		0.01-0.025					
	Large		0.025-0.050					
	Very Large		0.050-0.100					
Variations in the Channel Cross Section	Gradual	n4	0.000	0.000	0.000	0.000	0.000	0.000
	Alternating (occasionally)		0.001-0.005					
	Alternating (frequently)		0.010-0.015					
Sum (n0-n4)					0.04	0.025	0.04	
x (% of Area)					0.001	0.024	0.001	
Sum (left, right,center)						0.026		
Degree of Meandering	Minor	m	1	1		1		1
	Appreciable		1.15					
	Severe		1.3					
n = (n0 + n1 + n2 + n3 + n4)m				0	0.026			0

Determination of Manning's Roughness Coefficients by FCDMC Method

Project: **Sols Wash CAR**
Stream: Sols Wash
Photograph No.: 303013.04
Section Description: Channel has a sandy bottom and vegetated banks
No LOB since flow will will be contained in wash.
No ROB since flow will will be contained in wash.

Rough Sketch of
Typical Channel Cross Section

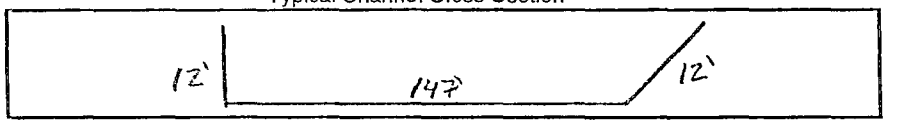


Channel Conditions		Manning's n Adjustment		Left Overbank	Main Channel (left bank -A1)	Main Channel (center -A2)	Main Channel (right bank -A3)	Right Overbank
Area [ft^2]					45	1480	45	
% [decimal]					0.03	0.94	0.03	
Channel Bed Material	Concrete	n0	0.012-0.018					
	Rock Cut		0.025					
	Firm Soil		0.025-0.032					
	Fine Sand		0.023-.026			0.025		
	Coarse Sand		0.026-0.036					
	Gravel		0.028-0.035					
	Cobble		0.030-0.050		0.040		0.040	
	Boulder		0.040-0.070					
Degree of Irregularity	Smooth	n1	0.000	0.000	0.000	0.000	0.000	0.000
	Minor		0.001-0.005					
	Moderate		0.006-0.010					
	Severe		0.011-0.020					
Effects of Obstructions	Negligible	n2	0.000-0.004	0.000	0.000	0.000	0.000	0.000
	Minor		0.005-0.015					
	Appreciable		0.020-0.030					
	Severe		0.040-0.060					
Vegetation	Small	n3	0.002-0.010	0.000	0.000	0.000	0.000	0.000
	Medium		0.01-0.025					
	Large		0.025-0.050					
	Very Large		0.050-0.100					
Variations in the Channel Cross Section	Gradual	n4	0.000	0.000	0.000	0.000	0.000	0.000
	Alternating (occasionally)		0.001-0.005					
	Alternating (frequently)		0.010-0.015					
Sum (n0-n4)					0.04	0.025	0.04	
x (% of Area)					0.001	0.024	0.001	
Sum (left, right,center)						0.026		
Degree of Meandering	Minor	m	1	1		1		1
	Appreciable		1.15					
	Severe		1.3					
n = (n0 + n1 + n2 + n3 + n4)m				0.000	0.026			0.000

Determination of Manning's Roughness Coefficients by FCDMC Method

Project: **Sols Wash CAR**
Stream: Sols Wash
Photograph No.: 303013.04
Section Description: Channel has a sandy bottom and vegetated LB
No LOB since flow will will be contained in wash.
No ROB since flow will will be contained in wash.

Rough Sketch of
Typical Channel Cross Section



Channel Conditions		Manning's n Adjustment		Left Overbank	Main Channel (left bank -A1)	Main Channel (center -A2)	Main Channel (right bank -A3)	Right Overbank
Area [ft^2]					30	1400	50	
% [decimal]					0.02	0.95	0.03	
Channel Bed Material	Concrete	n0	0.012-0.018		0.012			
	Rock Cut		0.025					
	Firm Soil		0.025-0.032					
	Fine Sand		0.023-.026			0.025		
	Coarse Sand		0.026-0.036					
	Gravel		0.028-0.035					
	Cobble		0.030-0.050				0.040	
	Boulder		0.040-0.070					
Degree of Irregularity	Smooth	n1	0.000	0.000	0.000	0.000	0.000	0.000
	Minor		0.001-0.005					
	Moderate		0.006-0.010					
	Severe		0.011-0.020					
Effects of Obstructions	Negligible	n2	0.000-0.004	0.000	0.000	0.000	0.000	0.000
	Minor		0.005-0.015					
	Appreciable		0.020-0.030					
	Severe		0.040-0.060					
Vegetation	Small	n3	0.002-0.010	0.000	0.000	0.000	0.000	0.000
	Medium		0.01-0.025					
	Large		0.025-0.050					
	Very Large		0.050-0.100					
Variations in the Channel Cross Section	Gradual	n4	0.000	0.000	0.000	0.000	0.000	0.000
	Alternating (occasionally)		0.001-0.005					
	Alternating (frequently)		0.010-0.015					
Sum (n0-n4)					0.012	0.025	0.040	
x (% of Area)					0.000	0.024	0.001	
Sum (left, right,center)						0.025		
Degree of Meandering	Minor	m	1	1		1		1
	Appreciable		1.15					
	Severe		1.3					
n = (n0 + n1 + n2 + n3 + n4)m				0.000	0.025			0.000

Determination of Manning's Roughness Coefficients by FCDMC Method

Project: **Sols Wash CAR**
Stream: Sols Wash
Photograph No.: 303013.04
Section Description: Channel has a sandy bottom and vegetated LB
No LOB since flow will will be contained in wash.
No ROB since flow will will be contained in wash.

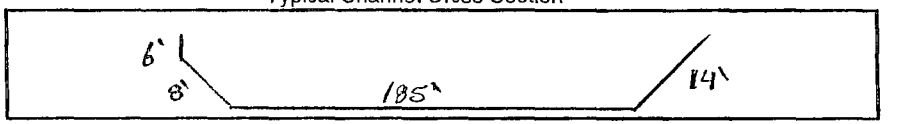
Rough Sketch of
Typical Channel Cross Section

Channel Conditions		Manning's n Adjustment		Left Overbank	Main Channel (left bank -A1)	Main Channel (center -A2)	Main Channel (right bank -A3)	Right Overbank
Area [ft^2]					30	1290	40	
% [decimal]					0.02	0.95	0.03	
Channel Bed Material	Concrete	n0	0.012-0.018		0.012		0.012	
	Rock Cut		0.025					
	Firm Soil		0.025-0.032					
	Fine Sand		0.023-.026			0.025		
	Coarse Sand		0.026-0.036					
	Gravel		0.028-0.035					
	Cobble		0.030-0.050					
	Boulder		0.040-0.070					
Degree of Irregularity	Smooth	n1	0.000	0.000	0.000		0.000	0.000
	Minor		0.001-0.005			0.000		
	Moderate		0.006-0.010					
	Severe		0.011-0.020					
Effects of Obstructions	Negligible	n2	0.000-0.004	0.000	0.000	0.000	0.000	0.000
	Minor		0.005-0.015					
	Appreciable		0.020-0.030					
	Severe		0.040-0.060					
Vegetation	Small	n3	0.002-0.010		0.000	0.000	0.000	0.000
	Medium		0.01-0.025	0.000				
	Large		0.025-0.050					
	Very Large		0.050-0.100					
Variations in the Channel Cross Section	Gradual	n4	0.000	0.000	0.000	0.000	0.000	0.000
	Alternating (occasionally)		0.001-0.005					
	Alternating (frequently)		0.010-0.015					
Sum (n0-n4)					0.012	0.025	0.012	
x (% of Area)					0.000	0.024	0.000	
Sum (left, right,center)						0.024		
Degree of Meandering	Minor	m	1	1		1		1
	Appreciable		1.15					
	Severe		1.3					
n = (n0 + n1 + n2 + n3 + n4)m				0.000	0.024			0.000

Determination of Manning's Roughness Coefficients by FCDMC Method

Project: **Sols Wash CAR**
Stream: Sols Wash
Photograph No.: 303013.04
Section Description: Channel has a sandy bottom and rock bank protection
No LOB since flow will will be contained in wash.
ROB is a graded lot with small vegetation.

Rough Sketch of
Typical Channel Cross Section

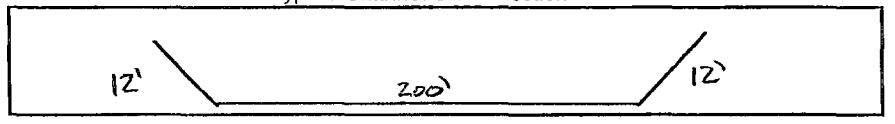


Channel Conditions		Manning's n Adjustment		Left Overbank	Main Channel (left bank -A1)	Main Channel (center -A2)	Main Channel (right bank -A3)	Right Overbank
Area [ft^2]					40	1150	65	
% [decimal]					0.03	0.92	0.05	
Channel Bed Material	Concrete	n0	0.012-0.018					
	Rock Cut		0.025					
	Firm Soil		0.025-0.032					0.029
	Fine Sand		0.023-.026			0.025		
	Coarse Sand		0.026-0.036					
	Gravel		0.028-0.035					
	Cobble		0.030-0.050		0.040		0.038	
	Boulder		0.040-0.070					
Degree of Irregularity	Smooth	n1	0.000	0.000	0.000	0.000	0.000	0.000
	Minor		0.001-0.005					
	Moderate		0.006-0.010					
	Severe		0.011-0.020					
Effects of Obstructions	Negligible	n2	0.000-0.004	0.000	0.000	0.000	0.000	0.000
	Minor		0.005-0.015					
	Appreciable		0.020-0.030					
	Severe		0.040-0.060					
Vegetation	Small	n3	0.002-0.010	0.000	0.000	0.000	0.002	0.003
	Medium		0.01-0.025					
	Large		0.025-0.050					
	Very Large		0.050-0.100					
Variations in the Channel Cross Section	Gradual	n4	0.000	0.000	0.000	0.000		0.000
	Alternating (occasionally)		0.001-0.005				0.002	
	Alternating (frequently)		0.010-0.015					
Sum (n0-n4)					0.040	0.025	0.042	
x (% of Area)					0.001	0.023	0.002	
Sum (left, right,center)						0.026		
Degree of Meandering	Minor	m	1	0		1		1
	Appreciable		1.15					
	Severe		1.3					
n = (n0 + n1 + n2 + n3 + n4)m				0.000	0.026			0.032

Determination of Manning's Roughness Coefficients by FCDMC Method

Project: **Sols Wash CAR**
Stream: Sols Wash
Photograph No.: 303013.04
Section Description: Channel has a sandy bottom, rock on RT, veg on LT
No LOB since flow will will be contained in wash.
ROB is a graded lot with small vegetation.
Also apllies to 0.660 and 0.717

Rough Sketch of
Typical Channel Cross Section



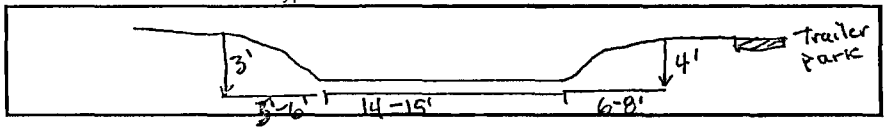
Channel Conditions		Manning's n Adjustment		Left Overbank	Main Channel (left bank -A1)	Main Channel (center -A2)	Main Channel (right bank -A3)	Right Overbank
Area [ft^2]					40	1400	65	
% [decimal]					0.03	0.93	0.04	
Channel Bed Material	Concrete	n0	0.012-0.018					
	Rock Cut		0.025					
	Firm Soil		0.025-0.032					0.029
	Fine Sand		0.023-.026			0.025		
	Coarse Sand		0.026-0.036					
	Gravel		0.028-0.035					
	Cobble		0.030-0.050		0.040		0.038	
	Boulder		0.040-0.070					
Degree of Irregularity	Smooth	n1	0.000		0.000	0.000	0.000	0.000
	Minor		0.001-0.005					
	Moderate		0.006-0.010					
	Severe		0.011-0.020					
Effects of Obstructions	Negligible	n2	0.000-0.004		0.000	0.000	0.000	0.000
	Minor		0.005-0.015					
	Appreciable		0.020-0.030					
	Severe		0.040-0.060					
Vegetation	Small	n3	0.002-0.010		0.000	0.000	0.002	0.003
	Medium		0.01-0.025					
	Large		0.025-0.050					
	Very Large		0.050-0.100					
Variations in the Channel Cross Section	Gradual	n4	0.000		0.000	0.000	0.000	0.000
	Alternating (occasionally)		0.001-0.005					
	Alternating (frequently)		0.010-0.015					
Sum (n0-n4)					0.040	0.025	0.040	
x (% of Area)					0.001	0.023	0.002	
Sum (left, right,center)						0.026		
Degree of Meandering	Minor	m	1			1		1
	Appreciable		1.15					
	Severe		1.3					
n = (n0 + n1 + n2 + n3 + n4)m				0.000	0.026			0.032

Appendix B.3
HOSPITAL WASH

Determination of Manning's Roughness Coefficients by FCDMC Method

Project: **Sols Wash CAR**
Stream: Hospital Wash - RM 0.388
Photograph No.: 303013.04
Section Description: Section taken just upstream of Palm Lane
Channel bottom is firm soil, banks are vegetated
LOB is consists of desert area.
ROB consists of desert area.

Rough Sketch of
Typical Channel Cross Section



Channel Conditions		Manning's n Adjustment		Left Overbank	Main Channel (left bank -A1)	Main Channel (center -A2)	Main Channel (right bank -A3)	Right Overbank
Area [ft^2]					40	88	32.5	
% [decimal]					0.25	0.55	0.20	
Channel Bed Material	Concrete	n0	0.012-0.018					
	Rock Cut		0.025					
	Firm Soil		0.025-0.032	0.030	0.028	0.026	0.028	0.030
	Fine Sand		0.023-.026					
	Coarse Sand		0.026-0.036					
	Gravel		0.028-0.035					
	Cobble		0.030-0.050					
	Boulder		0.040-0.070					
Degree of Irregularity	Smooth	n1	0.000					
	Minor		0.001-0.005	0.005	0.003	0.003	0.001	0.005
	Moderate		0.006-0.010					
	Severe		0.011-0.020					
Effects of Obstructions	Negligible	n2	0.000-0.004	0.000	0.002		0.001	0.000
	Minor		0.005-0.015			0.005		
	Appreciable		0.020-0.030					
	Severe		0.040-0.060					
Vegetation	Small	n3	0.002-0.010			0.002		
	Medium		0.01-0.025	0.025				0.020
	Large		0.025-0.050		0.030		0.033	
	Very Large		0.050-0.100					
Variations in the Channel Cross Section	Gradual	n4	0.000	0.000		0.000		0.000
	Alternating (occasionally)		0.001-0.005		0.002		0.002	
	Alternating (frequently)		0.010-0.015					
Sum (n0-n4)					0.065	0.036	0.065	
x (% of Area)					0.016	0.020	0.013	
Sum (left, right,center)						0.049		
Degree of Meandering	Minor	m	1	1		1		1
	Appreciable		1.15					
	Severe		1.3					
n = (n0 + n1 + n2 + n3 + n4)m				0.060	0.049			0.055

Hospital Wash - 0.388

Left Bank-Looking Downstream
Photo 36

Right Bank-Looking Downstream
Photo 34

Main Wash-Bed Material
Photo 33

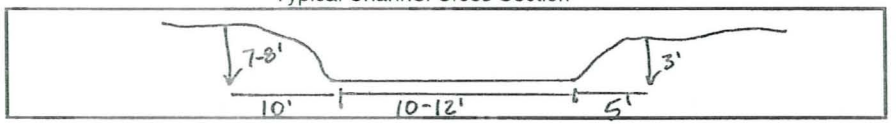
Left Overbank-Looking Downstream
Photo 37

Right Overbank-Looking Downstream
Photo 35

Determination of Manning's Roughness Coefficients by FCDMC Method

Project: **Sols Wash CAR**
Stream: Hospital Wash - RM 0.270
Photograph No.: 303013.04
Section Description: Section taken just downstream of Rose Lane
Channel is firm soil, banks are vegetated
LOB is consists of backyards and open area.
ROB consists of the mobile home park.

Rough Sketch of
Typical Channel Cross Section

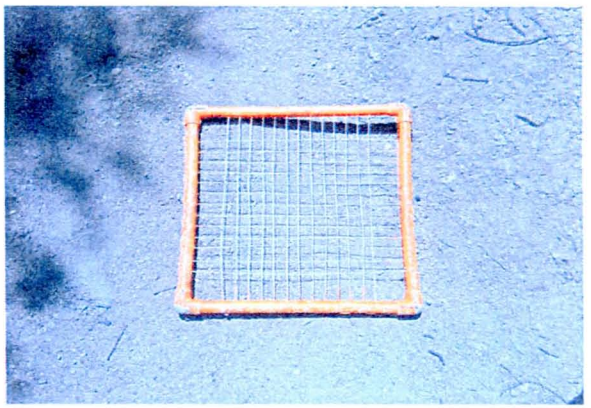


Channel Conditions		Manning's n Adjustment		Left Overbank	Main Channel (left bank -A1)	Main Channel (center -A2)	Main Channel (right bank -A3)	Right Overbank
Area [ft^2]					12.5	60	16	
% [decimal]					0.14	0.68	0.18	
Channel Bed Material	Concrete	n0	0.012-0.018					
	Rock Cut		0.025					
	Firm Soil		0.025-0.032	0.030	0.028	0.026	0.028	0.030
	Fine Sand		0.023-.026					
	Coarse Sand		0.026-0.036					
	Gravel		0.028-0.035					
	Cobble		0.030-0.050					
	Boulder		0.040-0.070					
Degree of Irregularity	Smooth	n1	0.000			0.000		
	Minor		0.001-0.005	0.005	0.002		0.002	0.005
	Moderate		0.006-0.010					
	Severe		0.011-0.020					
Effects of Obstructions	Negligible	n2	0.000-0.004		0.000	0.000	0.000	
	Minor		0.005-0.015	0.010				0.005
	Appreciable		0.020-0.030					
	Severe		0.040-0.060					
Vegetation	Small	n3	0.002-0.010			0.000		
	Medium		0.01-0.025	0.010	0.025		0.020	0.010
	Large		0.025-0.050					
	Very Large		0.050-0.100					
Variations in the Channel Cross Section	Gradual	n4	0.000		0.000	0.000	0.000	0.000
	Alternating (occasionally)		0.001-0.005	0.003				
	Alternating (frequently)		0.010-0.015					
Sum (n0-n4)					0.055	0.026	0.050	
x (% of Area)					0.008	0.018	0.009	
Sum (left, right,center)						0.034		
Degree of Meandering	Minor	m	1	1		1		1
	Appreciable		1.15					
	Severe		1.3					
n = (n0 + n1 + n2 + n3 + n4)m				0.058	0.034			0.050

Hospital Wash - 0.270

Left Bank-Looking Downstream
Photo 41

Right Bank-Looking Downstream
Photo 39



Main Wash-Bed Material
Photo 38

Left Overbank-Looking Downstream
Photo 42

Right Overbank-Looking Downstream
Photo 40

Appendix C
SURVEY

Appendix C.1

DATUM CONVERSION FOR TEGNER STREET BRIDGE

Appendix C.1

Datum Conversion for Tegner Street Bridge

The existing SR-93 bridge which crosses Sols Wash is also locally known as the Tegner Street bridge. When ADOT completes their Interim SR-93 Bypass they will relinquish ownership of the Tegner Street Bridge to the Town of Wickenburg.

For the purposes of this study the existing bridge needs to be hydraulically modeled in both the existing and proposed conditions. To simplify the modeling of this structure a previous study was referenced which included the modeling of this bridge. The study prepared by JE Fuller was completed in July of 2002 and entitled *Goldmine Village Conditional Letter of Map Revision.* In order to create the hydraulic model JE Fuller's study included survey and as-built information of the SR-93 bridge. That data was based upon the National Geodetic Vertical Datum of 1929 (NGVD 29).

EEC converted the bridge data to the North American Vertical Datum of 1988 (NAVD 88) to match the District's contour mapping. EEC also reviewed the data for accuracy prior to inclusion in this study's HEC-RAS models. Using the web based conversion program VERTCON the bridge data was converted from NGVD 29 to NAVD 88, at the Tegner Street bridge, by adding 2.18 feet to each elevation point.

Questions concerning the VERTCON process may be mailed to NGS

Latitude: 33 58 19.000

Longitude: 112 43 44.000

NGVD 29 height:

Datum shift(NAVD 88 minus NGVD 29): 0.664 meter = 2.18 ft

FCD Contour Data on NAVD 88

NGVD 29 (ADOT - project - Wickenburg bypass)

$$0.664\ m \frac{1\ ft}{0.3048\ m} = 2.18\ ft$$

Appendix C.2
SURVEY DATA

The NGS Data Sheet

See file dsdata.txt for more information about the datasheet.

```
DATABASE = Sybase ,PROGRAM = datasheet, VERSION = 7.18
1        National Geodetic Survey,   Retrieval Date = JUNE  8, 2005
 AJ3900 ***********************************************************************
 AJ3900  HT_MOD      -  This is a Height Modernization Survey Station.
 AJ3900  DESIGNATION -  4OI2
 AJ3900  PID         -  AJ3900
 AJ3900  STATE/COUNTY-  AZ/MARICOPA
 AJ3900  USGS QUAD   -  WICKENBURG (1978)
 AJ3900
 AJ3900                        *CURRENT SURVEY CONTROL
 AJ3900  ___________________________________________________________________
 AJ3900* NAD 83(1992)-  33 58 47.97621(N)    112 42 12.33153(W)     ADJUSTED
 AJ3900* NAVD 88     -       696.64   (meters)    2285.6    (feet)  GPS OBS
 AJ3900  ___________________________________________________________________
 AJ3900  X           -  -2,043,684.668 (meters)                     COMP
 AJ3900  Y           -  -4,884,765.145 (meters)                     COMP
 AJ3900  Z           -   3,544,979.433 (meters)                     COMP
 AJ3900  LAPLACE CORR-           3.18  (seconds)                    DEFLEC99
 AJ3900  ELLIP HEIGHT-         667.14  (meters)          (04/12/01) GPS OBS
 AJ3900  GEOID HEIGHT-         -29.42  (meters)                     GEOID03
 AJ3900
 AJ3900  HORZ ORDER  -  B
 AJ3900  ELLP ORDER  -  THIRD     CLASS II
 AJ3900
 AJ3900.The horizontal coordinates were established by GPS observations
 AJ3900.and adjusted by the National Geodetic Survey in April 2001.
 AJ3900
 AJ3900.The orthometric height was determined by GPS observations and a
 AJ3900.high-resolution geoid model using precise GPS observation and
 AJ3900.processing techniques.
 AJ3900
 AJ3900.The X, Y, and Z were computed from the position and the ellipsoidal ht.
 AJ3900
 AJ3900.The Laplace correction was computed from DEFLEC99 derived deflections.
 AJ3900
 AJ3900.The ellipsoidal height was determined by GPS observations
 AJ3900.and is referenced to NAD 83.
 AJ3900
 AJ3900.The geoid height was determined by GEOID03.
 AJ3900
 AJ3900;                    North         East     Units Scale Factor Converg.
 AJ3900;SPC AZ C     -   330,713.858   140,664.830   MT  0.99996512   -0 26 23.1
 AJ3900;UTM  12      - 3,761,245.242   342,646.715   MT  0.99990523   -0 57 08.1
 AJ3900
 AJ3900!             -  Elev Factor  x  Scale Factor =   Combined Factor
 AJ3900!SPC AZ C     -   0.99989528  x   0.99996512  =   0.99986040
 AJ3900!UTM  12      -   0.99989528  x   0.99990523  =   0.99980052
 AJ3900
 AJ3900                        SUPERSEDED SURVEY CONTROL
 AJ3900
 AJ3900.No superseded survey control is available for this station.
 AJ3900
 AJ3900_U.S. NATIONAL GRID SPATIAL ADDRESS: 12SUC4264761245(NAD 83)
```

```
AJ3900_MARKER: I = METAL ROD
AJ3900_SETTING: 15 = METAL ROD DRIVEN INTO GROUND. SEE TEXT FOR ADDITIONAL
AJ3900+WITH SETTING: INFORMATION.
AJ3900_STAMPING: 4OI2 2/00
AJ3900_MARK LOGO: MCDOT
AJ3900_PROJECTION: FLUSH
AJ3900_MAGNETIC: B = BAR MAGNET IMBEDDED IN MONUMENT
AJ3900_STABILITY: A = MOST RELIABLE AND EXPECTED TO HOLD
AJ3900+STABILITY: POSITION/ELEVATION WELL
AJ3900_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR
AJ3900+SATELLITE: SATELLITE OBSERVATIONS - 2000
AJ3900_ROD/PIPE-DEPTH:  2.4 meters
AJ3900_SLEEVE-DEPTH  :  0.8 meters
AJ3900
AJ3900  HISTORY      - Date     Condition        Report By
AJ3900  HISTORY      - 2000     MONUMENTED       MCDOT
AJ3900
AJ3900                           STATION DESCRIPTION
AJ3900
AJ3900'DESCRIBED BY MARICOPA CO DOT 2000 (JJR)
AJ3900'THE STATION IS LOCATED ABOUT 2.0 MI (3.2 KM) NORTHEAST OF THE TOWN OF
AJ3900'WICKENBURG, TOWNSHIP 7 NORTH, RANGE 4 WEST, SECTION 6
AJ3900'OWNERSHIP - STATE LAND
AJ3900'TO REACH THE STATION FROM THE JUNCTION OF US 60 AND EL RECREO DRIVE
AJ3900'BEING 0.2 MI (0.3 KM) WEST OF MILEPOST 111 AND 0.2 MI (0.3 KM) EAST OF
AJ3900'THE HASSAYAMPA RIVER ON US 60, DRIVE NORTHEASTERLY ON EL RECREO DRIVE
AJ3900'0.3 MI (0.5 KM) TO THE INTERSECTION OF EL RECREO DRIVE AND EL RECREO
AJ3900'ROAD (NOTE AT THIS INTERSECTION EL RECREO DRIVE BECOMES CONSTELLATION
AJ3900'ROAD) , THENCE DRIVE NORTHEASTERLY 1.1 MI (1.8 KM) TO THE STATION 37
AJ3900'FT (11.3 M) LEFT OF THE CENTERLINE OF CONSTELLATION ROAD
AJ3900'THE STATION IS MARKED BY AN ALUMINUM CAP COMPRESSED ON A 8 FOOT (2.4
AJ3900'M) STAINLESS STEEL ROD DRIVEN TO REFUSAL, ENCASED IN A 1 INCH GREASED
AJ3900'PVC SLEEVE ENCLOSED IN A 5 INCH PVC PIPE WITH A COUNTY LOGO ACCESS
AJ3900'COVER STAMPED 4OI2 2/00, SURROUNDED WITH A CONCRETE COLLAR FLUSH WITH
AJ3900'THE GROUND, WITNESSED BY A WHITE CARSONITE POST
AJ3900'STATION TIES -
AJ3900'37 FT (11.3 M) NORTHWEST OF THE CENTERLINE OF CONSTELLATION ROAD
AJ3900'300 FT (91.4 M) SOUTHWEST OF A CATTLE GUARD
AJ3900'FOR A TO REACH MAP, STATION IMAGES AND ADDITIONAL INFORMATION, YOU CAN
AJ3900'VISIT-WWW.MCDOT.MARICOPA.GOV       SEARCH KEYWORD  GDACS

*** retrieval complete.
Elapsed Time = 00:00:00
```

The NGS Data Sheet

See file dsdata.txt for more information about the datasheet.

```
DATABASE = Sybase ,PROGRAM = datasheet, VERSION = 7.18
1        National Geodetic Survey,   Retrieval Date = JUNE  8, 2005
 ET0969 ***********************************************************************
 ET0969  HT_MOD      -  This is a Height Modernization Survey Station.
 ET0969  DESIGNATION -  93 255 35
 ET0969  PID         -  ET0969
 ET0969  STATE/COUNTY-  AZ/YAVAPAI
 ET0969  USGS QUAD   -  FLORES (1969)
 ET0969
 ET0969                        *CURRENT SURVEY CONTROL
 ET0969  ___________________________________________________________________
 ET0969* NAD 83(1992)-  34 00 12.02372(N)    112 46 16.75578(W)     ADJUSTED
 ET0969* NAVD 88     -       704.73   (meters)    2312.1    (feet)  GPS OBS
 ET0969  ___________________________________________________________________
 ET0969  X           -  -2,048,913.849 (meters)                     COMP
 ET0969  Y           -  -4,881,011.034 (meters)                     COMP
 ET0969  Z           -   3,547,131.310 (meters)                     COMP
 ET0969  LAPLACE CORR-           1.35  (seconds)                    DEFLEC99
 ET0969  ELLIP HEIGHT-         675.23  (meters)          (09/30/99) GPS OBS
 ET0969  GEOID HEIGHT-         -29.42  (meters)                     GEOID03
 ET0969
 ET0969  HORZ ORDER  -  A
 ET0969  ELLP ORDER  -  THIRD     CLASS I
 ET0969
 ET0969.The horizontal coordinates were established by GPS observations
 ET0969.and adjusted by the National Geodetic Survey in September 1999.
 ET0969
 ET0969.The orthometric height was determined by GPS observations and a
 ET0969.high-resolution geoid model using precise GPS observation and
 ET0969.processing techniques.
 ET0969
 ET0969.The X, Y, and Z were computed from the position and the ellipsoidal ht.
 ET0969
 ET0969.The Laplace correction was computed from DEFLEC99 derived deflections.
 ET0969
 ET0969.The ellipsoidal height was determined by GPS observations
 ET0969.and is referenced to NAD 83.
 ET0969
 ET0969.The geoid height was determined by GEOID03.
 ET0969
 ET0969;                    North         East     Units Scale Factor Converg.
 ET0969;SPC AZ C     -   333,353.586   134,412.818   MT  0.99997681   -0 28 40.7
 ET0969;UTM  12      - 3,763,940.661   336,418.904   MT  0.99992987   -0 59 26.9
 ET0969
 ET0969!             -  Elev Factor  x  Scale Factor =   Combined Factor
 ET0969!SPC AZ C     -   0.99989401  x   0.99997681  =   0.99987082
 ET0969!UTM  12      -   0.99989401  x   0.99992987  =   0.99982389
 ET0969
 ET0969:                Primary Azimuth Mark                     Grid Az
 ET0969:SPC AZ C     -  PACK                                     273 06 58.9
 ET0969:UTM  12      -  PACK                                     273 37 45.1
 ET0969
 ET0969|-------------------------------------------------------------------|
```

```
ET0969| PID    Reference Object                          Distance      Geod. Az  |
ET0969|                                                                dddmmss.s |
ET0969| CH2169 93 255 35 RM 1                            12.753 METERS 11840     |
ET0969| ET0968 PACK                                     APPROX. 6.0 KM 2723818.2 |
ET0969| CH2170 93 255 35 RM 2                            17.087 METERS 27851     |
ET0969|-----------------------------------------------------------------------|
ET0969
ET0969                          SUPERSEDED SURVEY CONTROL
ET0969
ET0969  NAD 83(1992)-  34 00 12.02332(N)    112 46 16.75819(W) AD(       ) 2
ET0969  NAD 83(1986)-  34 00 12.02188(N)    112 46 16.76032(W) AD(       ) 2
ET0969  NAD 27      -  34 00 11.91756(N)    112 46 14.12124(W) AD(       ) 2
ET0969  NGVD 29 (07/19/86)  703.3    (m)         2307.     (f) VERT ANG
ET0969
ET0969.Superseded values are not recommended for survey control.
ET0969.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
ET0969.See file dsdata.txt to determine how the superseded data were derived.
ET0969
ET0969_U.S. NATIONAL GRID SPATIAL ADDRESS: 12SUC3641963941(NAD 83)
ET0969_MARKER: DD = SURVEY DISK
ET0969_SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT
ET0969_SP_SET: TOP OF SQUARE CONCRETE MONUMENT
ET0969_STAMPING: 93-255-35 1974
ET0969_MARK LOGO: AZDT
ET0969_MAGNETIC: N = NO MAGNETIC MATERIAL
ET0969_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO
ET0969+STABILITY: SURFACE MOTION
ET0969_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR
ET0969+SATELLITE: SATELLITE OBSERVATIONS - June 23, 2004
ET0969
ET0969  HISTORY     - Date     Condition        Report By
ET0969  HISTORY     - 1974     MONUMENTED       AZDT
ET0969  HISTORY     - 19990112 GOOD             AZ-025
ET0969  HISTORY     - 20000327 GOOD             MCDOT
ET0969  HISTORY     - 20040623 GOOD             EVANS
ET0969
ET0969                          STATION DESCRIPTION
ET0969
ET0969'DESCRIBED BY ARIZONA DEPARTMENT OF TRANSPORTATION 1974
ET0969'THE STATION IS LOCATED 12 MILES SOUTH OF CONGRESS AND 3 MILES
ET0969'NORTHWEST OF WICKENBURG.  IT IS ALONG THE EAST RIGHT OF WAY FENCELINE
ET0969'OF US HIGHWAY 93 AT THE VULTURE MINE INTERSECTION.
ET0969'
ET0969'THE STATION MARK IS AN ADOT DISK, STAMPED 93 255 35 1974.  IT IS SET
ET0969'IN TOP OF A CONCRETE MONUMENT WHICH PROJECTS 6 INCHES.  4 FEET EAST OF
ET0969'WITNESS POST AND 4 FEET WEST OF THE EAST FENCELINE.
ET0969'
ET0969'REFERENCE MARK 1 IS AN ADOT HIGHWAY DIVISION DISK STAMPED, 93 255 35
ET0969'RM 1 1974.  IT IS SET IN TOP OF A CONCRETE POST WHICH PROJECTS ABOUT 6
ET0969'INCHES
ET0969'
ET0969'REFERENCE MARK 2 IS AN ADOT HIGHWAY DIVISION DISK STAMPED, 93 255 35
ET0969'IT IS SET IN A DRILL HOLE IN A BOULDER.
ET0969'
ET0969'TO REACH THE STATION FROM THE JUNCTION OF US HIGHWAYS 93 AND 60 IN
ET0969'WICKENBURG TRAVEL NORTH ALONG US 93 FOR 3.6 MILES TO THE STATION ON
ET0969'THE RIGHT.  IT IS 95 FEET SOUTH OF THE EXTENDED CENTERLINE OF THE
ET0969'VULTURE MINE ROAD AT THE CENTERLINE OF THE CATTLE GUARD.
ET0969
ET0969                          STATION RECOVERY (1999)
```

```
ET0969
ET0969'RECOVERY NOTE BY YAVAPAI COUNTY ARIZONA 1999 (WRA)
ET0969'THE STATION IS LOCATED ABOUT 12 MI (19.3 KM) SOUTH OF CONGRESS, 3 MI
ET0969'(4.8 KM) NORTHWEST OF WICKENBURG, ALONG THE NORTH RIGHT-OF-WAY FENCE
ET0969'LINE OF U.S. HIGHWAY 93, AT THE INTERSECTION OF VULTURE MINE ROAD.
ET0969'OWNERSHIP--ARIZONA DEPARTMENT OF TRANSPORTATION.  TO REACH THE STATION
ET0969'FROM THE JUNCTION OF U.S. HIGHWAYS 93 AND 60 IN WICKENBURG, GO
ET0969'NORTHWEST FOR 3.6 MI (5.8 KM) ON HIGHWAY 93 TO VULTURE MINE ROAD AND
ET0969'THE STATION ON RIGHT.  THE STATION PROJECTS 10 CM ABOVE GROUND.
ET0969'LOCATED 90 FEET (27.4 M) NORTH AND 55 FT (16.8 M) EAST FROM THE
ET0969'INTERSECTION, 11 FT (3.4 M) NORTHWEST FROM A METAL UTILITY BOX, 4 FT
ET0969'(1.2 M) NORTHEAST FROM A WITNESS POST AND 4 FT (1.2 M) SOUTHWEST FROM
ET0969'THE NORTH RIGHT-OF-WAY FENCE LINE.
ET0969
ET0969                          STATION RECOVERY (2000)
ET0969
ET0969'RECOVERY NOTE BY MARICOPA CO DOT 2000 (JJR)
ET0969'RECOVERED AS DESCRIBED.
ET0969
ET0969                          STATION RECOVERY (2004)
ET0969
ET0969'RECOVERY NOTE BY DAVID EVANS + ASSOC 2004 (LDF)
ET0969'RECOVERED IN GOOD CONDITION.

*** retrieval complete.
Elapsed Time = 00:00:00
```

The NGS Data Sheet

See file dsdata.txt for more information about the datasheet.

```
DATABASE = Sybase ,PROGRAM = datasheet, VERSION = 7.18
1        National Geodetic Survey,   Retrieval Date = JUNE  8, 2005
 AJ3899 ***********************************************************************
 AJ3899  HT_MOD      -  This is a Height Modernization Survey Station.
 AJ3899  DESIGNATION -  4NJ1
 AJ3899  PID         -  AJ3899
 AJ3899  STATE/COUNTY-  AZ/MARICOPA
 AJ3899  USGS QUAD   -  VULTURE PEAK (1990)
 AJ3899
 AJ3899                        *CURRENT SURVEY CONTROL
 AJ3899  ______________________________________________________________________
 AJ3899* NAD 83(1992)-  33 56 33.35458(N)    112 46 18.53360(W)     ADJUSTED
 AJ3899* NAVD 88     -       724.31   (meters)    2376.3    (feet)  GPS OBS
 AJ3899  ______________________________________________________________________
 AJ3899  X           -  -2,050,419.578 (meters)                     COMP
 AJ3899  Y           -  -4,884,480.082 (meters)                     COMP
 AJ3899  Z           -   3,541,554.091 (meters)                     COMP
 AJ3899  LAPLACE CORR-           0.58  (seconds)                    DEFLEC99
 AJ3899  ELLIP HEIGHT-         694.64  (meters)          (04/12/01) GPS OBS
 AJ3899  GEOID HEIGHT-         -29.59  (meters)                     GEOID03
 AJ3899
 AJ3899  HORZ ORDER  -  B
 AJ3899  ELLP ORDER  -  THIRD     CLASS II
 AJ3899
 AJ3899.The horizontal coordinates were established by GPS observations
 AJ3899.and adjusted by the National Geodetic Survey in April 2001.
 AJ3899
 AJ3899.The orthometric height was determined by GPS observations and a
 AJ3899.high-resolution geoid model using precise GPS observation and
 AJ3899.processing techniques.
 AJ3899
 AJ3899.The X, Y, and Z were computed from the position and the ellipsoidal ht.
 AJ3899
 AJ3899.The Laplace correction was computed from DEFLEC99 derived deflections.
 AJ3899
 AJ3899.The ellipsoidal height was determined by GPS observations
 AJ3899.and is referenced to NAD 83.
 AJ3899
 AJ3899.The geoid height was determined by GEOID03.
 AJ3899
 AJ3899;                    North         East     Units Scale Factor Converg.
 AJ3899;SPC AZ C     -   326,616.802   134,311.005   MT  0.99997701   -0 28 39.0
 AJ3899;UTM  12      - 3,757,205.372   336,256.853   MT  0.99993053   -0 59 22.3
 AJ3899
 AJ3899!             -  Elev Factor  x  Scale Factor =   Combined Factor
 AJ3899!SPC AZ C     -   0.99989096  x   0.99997701  =   0.99986798
 AJ3899!UTM  12      -   0.99989096  x   0.99993053  =   0.99982150
 AJ3899
 AJ3899                        SUPERSEDED SURVEY CONTROL
 AJ3899
 AJ3899.No superseded survey control is available for this station.
 AJ3899
 AJ3899_U.S. NATIONAL GRID SPATIAL ADDRESS: 12SUC3625757205(NAD 83)
```

```
AJ3899_MARKER: I = METAL ROD
AJ3899_SETTING: 59 = STAINLESS STEEL ROD IN SLEEVE (10 FT.+)
AJ3899_STAMPING: 4NJ1 2000
AJ3899_MARK LOGO: MCDOT
AJ3899_PROJECTION: FLUSH
AJ3899_MAGNETIC: B = BAR MAGNET IMBEDDED IN MONUMENT
AJ3899_STABILITY: A = MOST RELIABLE AND EXPECTED TO HOLD
AJ3899+STABILITY: POSITION/ELEVATION WELL
AJ3899_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR
AJ3899+SATELLITE: SATELLITE OBSERVATIONS - July 07, 2004
AJ3899_ROD/PIPE-DEPTH:  5.5 meters
AJ3899_SLEEVE-DEPTH  :  0.8 meters
AJ3899
AJ3899  HISTORY     - Date     Condition        Report By
AJ3899  HISTORY     - 2000     MONUMENTED       MCDOT
AJ3899  HISTORY     - 20040707 GOOD             EVANS
AJ3899
AJ3899                          STATION DESCRIPTION
AJ3899
AJ3899'DESCRIBED BY MARICOPA CO DOT 2000 (JJR)
AJ3899'THE STATION IS LOCATED ABOUT 2.4 MI (3.9 KM) SOUTHWEST OF THE TOWN OF
AJ3899'WICKENBURG, TOWNSHIP 7 NORTH, RANGE 5 WEST, SECTION 16
AJ3899'OWNERSHIP - MARICOPA COUNTY RIGHT OF WAY
AJ3899'TO REACH THE STATION FROM THE JUNCTION OF US 60 AND US 93, DRIVE
AJ3899'WESTERLY ON US 60 2.5 MI (4.0 KM) TO THE INTERSECTION OF VULTURE MINE
AJ3899'ROAD AND US 60, THENCE TURN LEFT (SOUTH) ON VULTURE MINE ROAD AND
AJ3899'DRIVE 0.6 MI (1.0 KM) TO THE INTERSECTION OF DUFFY ROAD AND VULTURE
AJ3899'MINE ROAD, THENCE TURN LEFT (EAST) ONTO DUFFY ROAD AND IMMEDIATELY
AJ3899'MAKE A RIGHT (SOUTH) ONTO STEINWAY ROAD, THENCE DRIVE SOUTH 0.6 MI
AJ3899'(1.0 KM) TO THE END OF PAVEMENT ON STEINWAY ROAD, THENCE CONTINUE
AJ3899'DRIVING SOUTH 0.1 MI (0.2 KM) TO THE STATION ON THE RIGHT ON THE TOP
AJ3899'OF A HILL
AJ3899'THE STATION IS MARKED BY AN ALUMINUM CAP COMPRESSED ON A 18 FOOT (5.5
AJ3899'M) STAINLESS STEEL ROD DRIVEN TO REFUSAL, ENCASED IN A 1 INCH GREASED
AJ3899'PVC SLEEVE ENCLOSED IN A 5 INCH PVC PIPE WITH A COUNTY LOGO ACCESS
AJ3899'COVER STAMPED 4NJ1 2000, SURROUNDED WITH A CONCRETE COLLAR FLUSH WITH
AJ3899'THE GROUND, WITNESSED BY A WHITE CARSONITE POST
AJ3899'STATION TIES -
AJ3899'5 FT (1.5 M) EAST OF A RIGHT OF WAY  FENCE
AJ3899'FOR A TO REACH MAP, STATION IMAGES AND ADDITIONAL INFORMATION, YOU CAN
AJ3899'VISIT-WWW.MCDOT.MARICOPA.GOV       SEARCH KEYWORD  GDACS
AJ3899
AJ3899                          STATION RECOVERY (2004)
AJ3899
AJ3899'RECOVERY NOTE BY DAVID EVANS + ASSOC 2004 (LDF)
AJ3899'RECOVERED IN GOOD CONDITION.

*** retrieval complete.
Elapsed Time = 00:00:00
```

1,1082326.990836,451781.965216,2064.27,base
2,1071576.613261,440651.631381,2376.30,aj3899
4,1085020.041563,461500.060583,2285.57,aj3900
5,1078298.327412,451075.845982,-99999,
100,1082053.213223,453472.440850,2049.23,wv
101,1082088.720847,453492.616650,2049.45,hb
102,1082091.191074,453489.640768,2049.30,elecbox
103,1082085.651395,453482.385529,2049.85,ssmh
104,1082105.088474,453542.163744,2050.02,elecbox
105,1082100.968320,453541.865755,2050.04,hb
106,1082101.569643,453598.442955,2049.22,hb
107,1082105.717539,453598.622962,2049.45,elecbox
108,1082111.821719,453648.047248,2049.73,elecbox
109,1082108.070790,453651.582227,2049.30,hb
110,1082108.208951,453673.654833,2048.95,elecmeter
111,1082111.197661,453702.724909,2048.72,hb
112,1082117.201478,453703.949759,2048.19,elecbox
113,1082116.015132,453757.245389,2048.46,hb
114,1082119.699420,453755.031020,2048.63,elecbox
115,1082056.307986,453712.790800,2048.47,ac
116,1082051.616870,453636.835946,2049.08,ac
117,1082048.411427,453582.581638,2049.18,ac
118,1082045.133525,453529.011074,2049.35,ac
119,1082043.073797,453478.769437,2049.37,ac
120,1082137.982927,453498.254149,2044.17,toe1
121,1082126.050401,453503.974108,2043.31,top1
122,1082092.238024,453510.665692,2049.39,ep
123,1082098.436011,453594.249115,2048.97,ep
124,1082117.998541,453592.894884,2049.85,top1
125,1082107.467824,453697.677183,2048.50,ep
126,1082160.527318,453769.830505,2049.91,top1
127,1082177.203868,453770.655113,2043.77,toe1
128,1082165.245189,453655.995830,2042.97,toe1
129,1082156.662583,453653.518760,2044.21,top1
130,1082159.027188,453602.839416,2042.63,toe1
131,1082148.266385,453544.778195,2043.23,toe1
132,1082125.550989,453546.767185,2048.74,top1
133,1082106.169917,453362.993669,2043.71,toe1
134,1082097.808187,453364.806098,2049.44,top1
135,1082091.339568,453368.003180,2050.97,top1
136,1082070.501636,453368.826215,2050.83,ng
137,1082057.016656,453317.705875,2051.06,ng
138,1082070.022904,453313.716840,2051.39,top1
139,1082088.127892,453307.687929,2044.22,toe1
140,1082078.072931,453263.859393,2044.38,toe1
141,1082069.009544,453268.144902,2051.20,top1
142,1082036.049205,453267.153541,2052.15,ac
143,1082047.435305,453260.469892,2052.12,teleped
144,1082049.814584,453258.777725,2052.56,catvped
145,1082060.468438,453210.681713,2044.94,toe1
146,1082064.357541,453204.945166,2045.08,toe2
147,1082064.322423,453204.984887,2048.79,angleiron
148,1082047.938886,453135.264024,2045.04,toe2
149,1082047.849359,453135.329611,2048.93,angleiron
150,1082037.143588,453057.966714,2046.27,toe2
151,1082036.788570,453056.952548,2049.76,angleiron
152,1082039.324013,453056.706674,2046.02,toe2
153,1082038.895652,453012.891560,2046.00,toe2
154,1082036.398761,452973.244772,2046.09,toe2
155,1082034.047230,452972.562585,2050.37,angleiron
156,1082039.322218,452924.064936,2046.46,toe2
157,1082038.749261,452923.806555,2050.80,angleiron
158,1082041.398750,452870.348497,2051.11,angleiron
159,1082041.207960,452869.845258,2046.90,toe2
160,1082049.565740,452817.614091,2046.99,toe2
161,1082049.134762,452817.985564,2051.52,angleiron
162,1082063.059349,452757.217050,2052.29,angleiron
163,1082063.431529,452757.020513,2047.62,toe2
164,1082083.021264,452686.669903,2048.20,toe2
165,1082083.319912,452686.264073,2053.10,angleiron
166,1082104.592447,452624.027650,2053.43,angleiron
167,1082104.765196,452624.034729,2048.38,toe2
168,1082130.467755,452579.682228,2049.02,toe2
169,1082130.128875,452579.866329,2054.07,angleiron
170,1082151.187604,452542.629296,2054.14,angleiron
171,1082151.094521,452542.889861,2049.03,toe2
172,1082179.559062,452491.257669,2049.59,toe2
173,1082179.562647,452490.933788,2054.24,angleiron
174,1082210.546877,452433.974734,2053.24,angleiron

175,1082210.811770,452434.302358,2050.47,toe2
176,1082236.466193,452393.538087,2051.08,toe2
177,1082233.779930,452391.329880,2052.34,gb
178,1082231.319112,452388.878764,2054.14,angleiron
179,1082288.969107,452285.277122,2052.53,fl
180,1082491.471922,452180.709701,2065.88,corbridge
181,1082491.040955,452180.002039,2065.83,bot wall
182,1082491.005657,452180.089360,2069.73,top wall
183,1082486.578242,452182.266498,2069.70,top wall
184,1082486.458940,452182.178643,2068.17,top wall
185,1082486.458055,452182.251938,2069.73,top rail
186,1082373.166244,452236.937791,2069.79,top rail
187,1082373.571913,452237.244038,2068.41,top wall
188,1082340.327254,452253.158546,2066.22,bot wall
189,1082265.656141,452289.653420,2066.15,bot wall
190,1082261.122263,452291.838008,2066.15,bot wall
191,1082261.307406,452291.896088,2069.51,top wall
192,1082265.547710,452289.794659,2069.57,top wall
193,1082265.728124,452289.718496,2068.07,top wall
194,1082265.990414,452289.457681,2069.63,top rail
195,1082264.100950,452282.891894,2065.31,gut
196,1082263.970778,452283.163464,2066.06,tc
197,1082343.776776,452244.285092,2066.18,tc
198,1082343.599388,452244.119971,2065.33,gut
199,1082494.409694,452170.775228,2065.27,gut
200,1082494.463340,452170.957662,2065.96,tc
201,1082512.681752,452120.027427,2066.06,cl fg conc
202,1082411.910468,452168.908011,2066.15,cl fg conc
203,1082282.432725,452231.553250,2066.05,cl fg conc
204,1082299.830828,452179.681038,2065.46,gut
205,1082299.824743,452179.328278,2066.18,tc
206,1082275.727657,452183.428310,2066.24,bot wall
207,1082275.754549,452183.379323,2069.66,top wall
208,1082280.106995,452181.222988,2069.64,top wall
209,1082280.338395,452181.186333,2069.68,top rail
210,1082280.184578,452180.974899,2068.16,top wall
211,1082319.047028,452162.552641,2066.19,bot wall
212,1082318.660398,452162.166344,2068.16,top wall
213,1082318.554229,452162.350002,2069.78,top rail
214,1082324.274884,452167.867130,2065.31,gut
215,1082324.078925,452167.510255,2066.14,tc
216,1082406.499045,452127.787417,2066.20,tc
217,1082406.532414,452128.154895,2065.38,gut
218,1082403.808848,452121.761457,2066.21,bot wall
219,1082403.455332,452121.461226,2068.20,top wall
220,1082404.028749,452121.674509,2069.72,top rail
221,1082519.146529,452066.160102,2069.66,top rail
222,1082518.995292,452065.712980,2068.19,top wall
223,1082519.143951,452066.320186,2066.21,bot wall
224,1082529.585419,452061.315852,2066.12,bot wall
225,1082533.758802,452059.342193,2066.08,bot wall
226,1082529.124179,452061.456875,2069.66,top rail
227,1082529.403621,452061.164496,2068.14,top wall
228,1082529.606738,452061.113115,2069.63,top wall
229,1082533.782282,452059.119273,2069.59,top wall
230,1082530.820881,452068.180129,2065.27,gut
231,1082530.845373,452067.930517,2066.01,tc
232,1082332.892010,452128.676048,2053.23,toe3
233,1082313.150746,452123.480044,2064.19,top3
234,1082321.312383,452125.512940,2063.29,topwingwall
235,1082330.833837,452128.388814,2063.24,topwingwall
236,1082319.338328,452161.175422,2063.34,topwingwall
237,1082313.041944,452164.331176,2065.14,corbridge
238,1082275.429038,452285.858288,2065.14,corbridge
239,1082332.456685,452048.140410,2065.47,top3
240,1082351.540152,452058.972244,2055.64,toe3
241,1082396.348938,452011.823025,2055.45,toe3
242,1082380.606465,451997.571743,2063.90,toop3
243,1082417.119143,451953.072104,2063.94,top3
244,1082433.509099,451964.258055,2055.92,toe3
245,1082464.596821,451922.362706,2055.42,toe3
246,1082453.497205,451911.155173,2063.40,top3
247,1082453.700494,451907.210169,2063.84,top3
248,1082453.792832,451907.168205,2069.67,topwellsitewall
249,1082464.170957,451890.978709,2069.56,topwellsitewall
250,1082479.442819,451834.479282,2069.57,topwellsitewall
251,1082410.365371,451832.831279,2069.56,topwellsitewall
252,1082409.960800,451892.198141,2069.57,topwellsitewall
253,1082898.160011,451243.081488,2067.68,apprx ffe

254,1083091.180464,450921.320880,2068.83,topheadwall
255,1083087.251696,450932.265876,2068.78,topheadwall
256,1083087.376969,450932.420181,2069.38,topheadwall
257,1083087.312856,450932.421469,2069.32,topwingwall
258,1083104.822056,450935.548995,2068.93,topwingwall
259,1083122.465031,450939.131203,2069.59,topwingwall
260,1083091.462248,450921.186224,2068.35,topwingwall
261,1083092.078652,450921.263346,2068.32,topwingwall
262,1083100.142596,450920.187263,2068.51,topwingwall
263,1083106.074169,450915.477548,2068.67,topwingwall
264,1083087.299273,450932.293957,2066.29,inv culvert
265,1083089.229049,450927.279697,2066.29,inv culvert
266,1083091.491828,450921.401867,2066.51,inv culvert
267,1083114.614870,450912.917523,2066.63,toe4
268,1083107.817216,450905.165530,2069.64,top4
269,1083116.535973,450918.438530,2066.19,cl fl
270,1083125.531203,450928.194724,2067.38,toe5
271,1083134.556454,450938.637679,2070.10,top5
272,1083249.431372,450770.476047,2071.24,top4
273,1083262.853524,450783.818483,2066.88,toe4
274,1083275.791052,450795.470298,2067.19,toe5
275,1083283.712947,450805.727942,2070.78,top5
276,1083468.884029,450656.785598,2071.94,top5
277,1083468.896126,450656.773594,2071.95,toe5
278,1083454.580611,450634.450643,2067.55,toe4
279,1083442.567866,450620.874847,2073.15,toe4
280,1083557.054542,450520.710281,2073.90,top4
281,1083573.392782,450533.213862,2068.87,toe4
282,1083576.529727,450536.616603,2068.25,gb
283,1083577.659263,450537.218136,2067.63,gb
284,1083578.280358,450538.248726,2068.32,gb
285,1083584.485163,450543.159997,2068.81,toe5
286,1083596.165711,450554.190362,2073.27,top5
287,1083671.967039,450475.142653,2077.53,top5
288,1083656.188250,450460.868080,2070.16,toe5
289,1083650.929208,450454.824920,2069.41,cl fl
290,1083644.905859,450449.330978,2069.95,toe4
291,1083630.790738,450437.322654,2074.22,top4
292,1083668.648589,450346.028259,2075.56,top4
293,1083684.015566,450355.565894,2070.90,top4
294,1083689.128538,450356.930640,2070.63,gb
295,1083693.284376,450359.624190,2069.77,cl fl
296,1083694.637908,450362.357279,2070.39,gb
297,1083698.728788,450367.413586,2070.81,toe5
298,1083723.142828,450365.914566,2073.74,top5
299,1083755.140943,450340.727615,2073.14,pk nail tag
300,1083743.583679,450530.296822,2079.41,ep3
301,1083763.085058,450530.527654,2079.38,ep4
302,1083763.513533,450503.979228,2079.27,ep4
303,1083744.119827,450502.073102,2079.25,ep3
304,1083744.491213,450445.185354,2077.50,ep3
305,1083764.148201,450442.859247,2077.53,ep4
306,1083764.660558,450390.223759,2075.18,ep4
307,1083745.233176,450389.254294,2075.12,ep3
308,1083745.427156,450337.805104,2072.86,ep3
309,1083765.056871,450336.540713,2073.05,ep4
310,1083765.207935,450304.378594,2072.57,ep4
311,1083765.921653,450243.804161,2074.45,ep4
312,1083746.409364,450243.474339,2074.55,ep3
313,1083745.648238,450293.034843,2072.50,ep3
314,1083745.508688,450316.448475,2072.07,ep3
315,1083656.840813,450327.532442,2075.79,ng
316,1083543.494631,450503.765731,2073.99,ng
317,1083610.382667,450563.162101,2072.88,ng
318,1083506.910247,450650.569356,2072.14,ng
319,1083453.008974,450586.317168,2073.22,ng
320,1083345.605402,450673.752853,2072.31,ng
321,1083281.630977,450723.975825,2071.79,ng
322,1083220.437680,450778.604731,2071.27,ng
323,1083295.700575,450817.814591,2070.59,ng
324,1083185.474849,450910.984937,2070.51,ng
325,1083124.834052,450962.044738,2070.41,ng
326,1083092.373893,450954.479159,2069.20,ng
327,1083101.183249,450895.398278,2069.94,ng
328,1082639.273948,452128.327419,2060.05,ssmh
329,1082464.166942,452261.122763,2058.83,ssmh
330,1082375.502392,452543.901808,2057.88,ssmh
331,1082201.043035,452753.671771,2055.34,ssmh
332,1082194.299968,453265.897471,2048.61,ssmh

333,1082187.816815,453286.642194,2047.34,wv
334,1082221.419351,452392.180167,2060.71,top wall
335,1082221.800970,452392.141711,2054.65,toe wall
336,1082187.429445,452445.841030,2057.30,toe wall
337,1082187.122644,452445.852482,2060.85,top wall
338,1082157.092192,452436.165425,2061.14,ac
339,1082124.966289,452484.420092,2061.72,ac
340,1082151.839022,452500.951367,2061.64,top wall
341,1082151.518287,452500.979509,2060.66,toe wall
342,1082121.625988,452548.189866,2061.01,toe wall
343,1082121.395426,452548.171625,2061.97,top wall
344,1082096.022584,452531.710122,2061.92,ac
345,1082066.505214,452573.780607,2062.29,ac
346,1082093.299510,452592.008011,2062.44,top wall
347,1082093.418815,452591.932661,2061.43,top wall
348,1082093.498820,452591.894698,2061.40,toe wall
349,1082077.176302,452617.595660,2061.96,toe wall
350,1082077.259760,452617.626327,2062.97,top wall
351,1082050.507791,452607.478318,2062.15,ac
352,1082041.090020,452661.245475,2060.88,ac
353,1082071.839273,452667.050644,2060.92,top wall
354,1082072.200767,452667.090330,2059.14,toe wall
355,1082034.723421,452723.486750,2059.80,ac
356,1082058.572117,452729.860370,2059.89,top wall
357,1082058.671039,452730.046065,2057.80,toe wall
358,1082045.391873,452787.857136,2056.62,toe wall
359,1082045.277893,452787.515815,2058.96,top wall
360,1082026.181869,452785.375057,2059.06,ac
361,1082020.700779,452839.110128,2058.23,ac
362,1082038.905964,452843.031734,2054.31,toe wall
363,1082038.713422,452843.274305,2057.94,top wall
364,1082011.763080,452882.043271,2058.02,ac
365,1082031.655050,452885.196513,2057.41,top wall
366,1082032.019019,452884.901108,2054.43,toe wall
367,1082010.135946,452951.375394,2058.05,ac
368,1082026.317185,452951.836038,2057.72,top wall
369,1082026.224204,452952.585220,2059.59,top wall
370,1082022.969682,452951.447112,2054.62,toe wall
371,1082023.035405,452952.860581,2059.62,top wall
372,1082025.673501,452953.635958,2057.36,top shotcrete
373,1082023.071991,452952.912575,2056.53,bot wall
374,1082025.972579,453003.200223,2053.99,bot wall
375,1082029.725480,453003.666187,2053.56,top shotcrete
376,1082025.695270,453003.901933,2059.35,top wall
377,1082031.364867,453044.036855,2053.69,top shotcrete
378,1082028.306803,453043.882246,2053.74,bot wall
379,1082027.916005,453044.055933,2060.14,top wall
380,1082033.117165,453089.293780,2054.87,top shotcrete
381,1082030.631605,453088.978034,2054.89,bot wall
382,1082030.690252,453089.749327,2060.11,top wall
383,1082017.176099,453086.155767,2060.29,ac
384,1082025.969157,453132.147502,2059.44,gasmeter
385,1082156.740150,452725.385926,2048.79,toe6
386,1082174.662446,452733.791116,2054.41,top6
387,1082190.681256,452673.992945,2054.80,top6
388,1082176.681364,452674.612743,2049.34,toe6
389,1082265.588703,452579.024896,2055.82,top6
390,1082231.788084,452560.860283,2050.50,toe6
391,1082290.201445,452479.608844,2051.59,toe6
392,1082350.987971,452493.707380,2057.32,top6
393,1082371.124540,452441.324206,2058.30,top6
394,1082298.077025,452414.005104,2050.45,toe6
395,1082552.302688,451998.867951,2054.10,toe7
396,1082575.310400,452003.369200,2060.67,top7
397,1082594.077330,451988.240182,2064.40,top7
398,1082614.601155,451917.906926,2064.15,top7
399,1082591.493955,451907.789904,2055.39,toe7
400,1082623.492250,451832.969974,2056.36,toe7
401,1082638.842471,451840.158800,2062.58,top7
402,1082499.686672,451736.585614,2065.41,set 60d/disk
403,1082588.708371,451411.559774,2067.92,set 60d/disk
404,1082998.183693,451195.551581,2068.07,set 60d/disk
405,1082015.519057,452863.364850,2058.57,set 60d/disk
406,1082018.275148,453057.583228,2060.29,set 60d/disk
407,1082022.244700,453261.284692,2052.61,set 60d/disk
408,1082208.031834,453102.927564,2052.43,set 60d/disk
409,1082234.567297,452685.277923,2056.17,set 60d/disk
410,1082401.053139,452498.472461,2057.78,set 60d/disk
411,1082720.492136,452063.579193,2064.95,set 60d/disk

412,1082331.883149,453268.992607,2046.80,set 60d/disk
413,1082192.328432,453326.632071,2045.67,cl dirt road
414,1082167.039631,453345.979478,2044.15,cl dirt road
415,1082142.441981,453374.922106,2043.19,cl dirt road
416,1082120.497574,453397.892517,2043.35,cl dirt road
417,1082099.332248,453418.537672,2044.05,cl dirt road
418,1082072.856298,453435.004313,2045.19,cl dirt road
419,1082038.729263,453453.694169,2047.54,cl dirt road
420,1082209.990321,453286.003123,2048.05,fence
421,1082214.161198,453276.661909,2049.38,fence
422,1083268.497171,450010.631700,2071.34,toe8
423,1083244.563826,450010.892716,2076.38,top8
424,1082852.855063,451223.358318,2062.50,toe10
425,1082863.334865,451226.056435,2065.99,top10
426,1082819.308283,451326.841204,2060.66,toe10
427,1082832.126938,451331.534449,2065.34,top10
428,1082834.715578,451334.233993,2066.38,fence
429,1082823.354715,451363.656968,2067.21,fence
430,1082809.520385,451362.151919,2060.34,toe10
431,1082828.880121,451363.628161,2068.40,fence
432,1082830.748658,451355.147502,2066.91,ng
433,1082828.414650,451353.284617,2065.38,4ft clf
434,1082850.273937,451296.645354,2062.69,4ft clf
435,1082816.539468,451409.186031,2066.19,fence
436,1082816.254526,451409.190157,2066.19,top10
437,1082795.762005,451405.314199,2059.98,toe10
438,1082767.888674,451498.337627,2059.67,toe10
439,1082781.116472,451500.119844,2062.92,top10
440,1082807.116128,451501.457169,2064.70,ng
441,1082727.530440,451614.945075,2058.41,toe10
442,1082735.743651,451614.049189,2060.94,top10
443,1082743.317843,451613.128103,2062.22,ng
444,1082667.989261,451745.228274,2057.10,toe10
445,1082684.918840,451745.837394,2060.10,top10
446,1082695.261225,451745.755226,2059.82,ng
447,1082661.413089,451843.968339,2062.74,dripline
448,1082653.684702,451833.472431,2061.41,dripline
449,1082638.741826,451833.848396,2060.00,dripline
450,1082632.824161,451820.123935,2057.77,dripline
451,1082623.598419,451809.002458,2056.22,dripline
452,1082611.792921,451803.566675,2056.27,dripline
453,1082637.597389,451790.741591,2056.52,dripline
454,1082647.730220,451742.533617,2057.16,dripline
455,1082672.984418,451711.582765,2057.73,dripline
456,1082676.904466,451668.823886,2057.82,dripline
457,1082711.151173,451621.040859,2058.14,dripline
458,1082638.074525,451841.276807,2062.41,top riprap
459,1082623.592919,451832.435460,2056.31,toe riprap
460,1082616.958415,451892.959543,2061.02,toe riprap
461,1082601.063289,451884.679033,2055.70,toe riprap
462,1082601.052614,451884.663247,2055.70,top riprap
463,1082601.183322,451939.197927,2061.75,toe riprap
464,1082582.287117,451932.143407,2055.36,top riprap
465,1082574.578898,452002.501835,2060.32,toe riprap
466,1082036.607157,453171.600051,2058.61,cortranspad
467,1082028.203949,453171.366985,2058.50,cortranspad
468,1082028.497753,453171.367729,2058.50,cortranspad
469,1082035.809085,453179.763543,2058.68,cortranspad
470,1082029.930592,453176.393524,2062.02,trans
471,1082029.915871,453174.629150,2062.05,trans
472,1082031.234949,453174.612176,2062.01,trans
473,1082031.266005,453172.612860,2062.06,trans
474,1082034.795019,453172.512319,2062.16,trans
475,1082035.065365,453176.241895,2062.16,trans
476,1083313.464420,449865.996241,2079.59,ng
477,1083323.978994,449882.870687,2077.69,top15
478,1083331.813915,449892.222409,2072.19,toe15
479,1083354.690716,449917.500975,2072.49,toe16
480,1083357.873787,449924.985814,2074.55,gb
481,1083377.321061,449944.414626,2075.26,gb
482,1083381.852325,449952.519644,2078.58,top16
483,1083388.795994,449959.380674,2078.91,ng
484,1083227.845567,450011.046507,2076.72,ng
485,1083252.949222,450014.610852,2076.23,top15
486,1083266.761229,450012.660112,2071.28,toe15
487,1083296.986408,450027.068773,2070.92,toe16
488,1083321.406380,450034.274778,2077.48,top16
489,1083351.134074,450040.521809,2078.60,ng
490,1083293.696582,450136.078991,2077.10,ng

491,1083279.664369,450134.520961,2076.69,top16
492,1083260.955321,450128.976283,2070.64,top16
493,1083260.938704,450129.040953,2070.67,top16
494,1083260.815984,450128.992872,2070.62,toe16
495,1083226.519960,450116.866797,2070.90,toe15
496,1083216.008948,450112.039464,2077.24,top16
497,1083204.372523,450110.116542,2076.99,ng
498,1083165.990490,450215.303496,2075.95,ng
499,1083184.485277,450224.451479,2075.91,top16
500,1083194.372174,450224.867191,2070.04,toe15
501,1083242.991200,450192.890762,2070.74,toe16
502,1083263.532399,450182.484253,2076.35,top166
503,1083289.566112,450183.075225,2076.84,ng
504,1083244.648267,450309.202189,2075.67,ng
505,1083237.198113,450308.239405,2075.29,top16
506,1083097.931398,450474.523927,2068.18,set60daux
507,1083188.858274,450302.048947,2069.21,set60daux
508,1083040.234075,450667.725844,2067.02,set60daux
509,1083012.358987,450855.979890,2065.76,set60daux
510,1082963.825142,451042.542122,2064.25,set60daux
511,1082869.424943,451144.970053,2063.37,set60daux
512,1083209.439784,450309.122216,2069.81,toe16
513,1083175.593582,450298.323474,2069.74,toe15
514,1083167.526242,450295.138394,2075.60,top15
515,1083151.062732,450291.289689,2075.61,ng
516,1083055.561863,450452.091596,2073.21,ng
517,1083071.308213,450461.408551,2073.57,top15
518,1083087.293288,450468.417738,2068.63,toe15
519,1083137.824446,450499.476075,2073.89,ng
520,1083128.510295,450493.330050,2073.34,top16
521,1083118.897320,450488.401480,2067.94,toe16
522,1083096.421267,450663.740600,2072.67,ng
523,1083084.750588,450664.568593,2071.99,top16
524,1083061.047019,450666.249588,2067.21,toe16
525,1083020.367360,450659.666147,2066.81,toe15
526,1083016.863618,450654.995938,2072.67,top15
527,1082997.613350,450654.576804,2072.55,ng
528,1082978.812561,450852.302966,2070.71,ng
529,1082997.359520,450851.504949,2070.97,top15
530,1083007.592585,450854.745614,2065.96,toe15
531,1083042.060191,450860.959969,2065.94,toe16
532,1083067.003459,450866.614701,2070.91,ng
533,1083058.242300,450865.070936,2070.11,top16
534,1082921.638659,451015.342100,2069.68,ng
535,1082941.570392,451028.324572,2068.34,toe15
536,1082953.637716,451035.900813,2064.35,toe15
537,1083010.763085,451060.718574,2068.51,ng
538,1083004.373417,451057.669086,2068.46,top16
539,1082979.031402,451049.737899,2064.25,toe16
540,1082906.308766,451184.900364,2066.04,ng
541,1082897.878366,451174.791766,2066.53,top16
542,1082883.661330,451159.890337,2062.53,toe16
543,1082879.626871,451144.318045,2062.45,toe15
544,1082871.414580,451127.880986,2064.40,top15
559,1082287.427482,453506.600309,2044.99,set4rbaux
560,1082187.820850,453391.071552,2047.67,top17
561,1082181.310854,453393.463577,2044.23,toe17
562,1082193.458389,453446.702012,2043.70,toe17
563,1082202.340293,453447.012601,2045.12,top17
564,1082220.891571,453522.413544,2042.95,top17
565,1082232.411944,453520.858929,2048.43,top17
566,1082244.388981,453606.652040,2042.45,top17
567,1082249.315845,453605.360516,2044.33,top17
568,1082260.676946,453666.055913,2042.38,toe17
569,1082276.442610,453661.963095,2047.53,top17
570,1082273.404910,453717.413419,2041.87,toe17
571,1082289.434160,453714.814453,2044.05,toe17
572,1082289.359657,453714.463747,2044.01,top17
573,1082314.755720,453695.033793,2043.78,ng
574,1082306.276373,453643.603389,2044.54,ng
575,1082285.284575,453581.829104,2044.91,ng
576,1082268.764433,453534.589066,2045.13,ng
577,1082259.621672,453478.671725,2045.32,ng
578,1082230.174538,453434.775033,2047.12,ng
579,1082206.004294,453387.817955,2046.78,ng
580,1082193.155000,453353.493523,2046.87,ng
581,1082171.141266,453288.110567,2047.90,top17
582,1082162.659382,453296.157237,2045.65,toe17
583,1082169.956686,453245.936371,2048.50,top17

584,1082203.044612,453260.337977,2048.84,set60daux
585,1082202.740228,453147.818465,2052.42,set60daux
586,1082199.591490,453047.198934,2053.04,set60daux
587,1082187.628972,452946.040350,2053.83,set60daux
588,1082325.862518,452891.011026,2056.42,ffe comm ctr
589,1082189.480940,452842.896145,2054.25,set60daux
590,1082134.663581,453135.397606,2047.56,toe17
591,1082146.634239,453135.087324,2051.36,top17
592,1082144.675284,453254.081181,2045.73,toe17
593,1082139.277799,453024.589200,2048.58,toe17
594,1082155.219883,453026.521982,2052.62,top17
595,1082145.903354,452950.111602,2050.25,toe17
596,1082151.824171,452951.085482,2052.47,top17
597,1082220.450509,452984.787405,2048.24,fence
598,1082205.930016,452983.538090,2049.06,fence
599,1082207.927987,452934.578375,2049.35,fence
600,1082210.970979,452870.896231,2049.83,fence
601,1082247.183253,452913.323762,2050.22,tree
602,1082238.756076,452896.633480,2050.10,tree
603,1082241.319023,452881.500351,2049.61,tree
604,1082243.978045,452861.019918,2051.56,tree
605,1082245.735444,452849.260368,2051.43,tree
606,1082124.717144,452842.862817,2048.37,toe17
607,1082140.079388,452844.121650,2052.07,top17
608,1082171.942215,452739.435688,2054.68,top17
609,1082151.958689,452737.893067,2049.00,toe17
610,1082179.438962,452668.847266,2049.52,toe17
611,1082190.580951,452673.654834,2054.85,top17
612,1082217.167803,452586.826537,2050.12,toe17
613,1082242.247074,452607.004916,2055.94,top17
614,1082324.483431,452542.791032,2054.49,toe17
615,1082333.276046,452544.353049,2057.40,top17
616,1082340.947056,452556.512452,2058.13,ep17
617,1082350.358851,452460.262095,2055.13,toe17
618,1082361.701180,452465.478975,2058.08,top17
619,1082372.239090,452468.827976,2058.25,ep17
620,1082375.658882,452470.647124,2058.43,ep17
621,1082364.650522,452504.933268,2058.27,ep17
622,1082292.510684,452805.671055,2051.77,tree
623,1082282.189359,452772.738940,2052.61,tree
624,1082277.588177,452757.392833,2053.00,tree
625,1082269.049470,452730.392833,2053.67,tree
626,1082265.432589,452707.682347,2057.12,tree
627,1082285.725628,452700.502960,2057.48,tree
628,1082302.566660,452695.165285,2056.34,tree
629,1082288.990681,452693.228784,2050.74,fence
630,1082260.888760,452702.893534,2049.75,fence
631,1082254.789545,452710.565105,2049.63,fence
632,1082248.524590,452718.366358,2049.93,fence
633,1082244.418829,452727.166974,2049.68,fence
634,1082242.405027,452737.046218,2049.74,fence
635,1082251.510276,452765.283778,2049.34,fence
636,1082262.131867,452793.071025,2049.94,fence
637,1082273.163459,452820.596636,2049.27,fence
638,1082261.697221,452613.906052,2057.15,ep17
639,1082235.838901,452671.836742,2056.32,ep17
640,1082225.546117,452751.641545,2055.18,ep17
641,1082225.545417,452751.641540,2055.18,ep17
642,1082506.378134,452229.626213,2058.44,set60daux
643,1082641.370205,452151.699092,2059.68,ep18
644,1082585.581749,452176.144569,2058.69,ep18
645,1082538.665456,452197.986064,2058.18,ep18
646,1082510.137682,452215.462564,2058.34,ep18
647,1082493.226964,452233.717694,2058.67,ep18
648,1082480.981062,452253.455698,2058.62,ep18
649,1082462.187676,452301.598457,2058.15,ep18
650,1082440.917547,452353.646275,2058.08,ep18
651,1082422.333258,452404.446886,2057.98,ep18
652,1082405.995663,452455.244527,2058.10,ep18
653,1082392.928826,452494.256293,2058.00,ep18
654,1082390.952759,452493.843311,2058.08,ep18
655,1082385.012282,452534.166689,2057.88,ep18
656,1082294.568913,452580.580413,2056.96,ng
657,1082277.756106,452559.562274,2056.50,top17
658,1082270.346004,452555.923924,2053.45,toe17
659,1082253.896675,452538.431299,2051.11,toe17
660,1082299.235256,452452.852084,2050.22,toe17
661,1082305.726372,452454.893449,2052.97,gb
662,1082275.785002,452357.830021,2050.98,set60daux

663,1082362.211193,452079.523055,2054.00,set60daux
664,1082646.675847,452110.913833,2060.43,gut2
665,1082604.079268,452136.492619,2059.48,gut2
666,1082549.728842,452162.230713,2058.83,gut2
667,1082503.141226,452184.089032,2058.80,gut2
668,1082372.494113,452468.625605,2058.41,bot4ftwall
669,1082440.360703,452281.032219,2059.24,butwall
670,1082440.491239,452280.790153,2062.47,topwall
671,1082440.426016,452280.792732,2063.73,topwall
672,1082403.358544,452370.000168,2058.91,botwall
673,1082407.653077,452359.349300,2062.44,topwall
674,1082372.493199,452468.401790,2062.41,topwall
675,1082458.094997,452236.944238,2063.72,topwall
676,1082458.158367,452236.935743,2059.26,botwall
677,1082472.858915,452200.811306,2059.19,botwall
678,1082472.821773,452200.778808,2063.70,topwall
679,1082397.756475,452371.527811,2059.06,top17
680,1082430.153438,452287.954283,2059.06,top17
681,1082459.912570,452196.467053,2052.30,cl fl atbarrel
682,1082436.303753,452404.478174,2060.90,fence
683,1082435.226967,452383.445012,2061.16,fence
684,1082440.895257,452364.371538,2060.57,fence
685,1082455.628380,452329.064887,2060.28,fence
686,1082476.894100,452276.654622,2060.22,fence
687,1082485.024088,452259.796764,2060.23,fence
688,1082494.685398,452243.932058,2060.43,fence
689,1082507.762719,452230.849101,2061.48,fence
690,1082521.276066,452217.940029,2060.89,fence
691,1082673.108779,452158.570690,2061.71,fence
692,1083082.105901,450986.416436,2069.31,fence
693,1083330.765899,450769.982595,2070.78,fence
694,1083332.190543,450748.830391,2072.17,fence
695,1083337.620973,450746.078939,2071.39,fence
696,1083465.183361,450644.235866,2067.99,fence
697,1083596.484347,450527.896867,2069.13,fnd4rbrls28232
698,1083601.882475,450528.754572,2073.74,fence
699,1083684.823490,450497.066747,2077.37,fence
700,1083734.496102,450479.093471,2078.94,fence
701,1083117.779825,450708.378967,2072.55,epat nedge11ft
702,1083109.134299,450687.771718,2072.82,epat nedge11ft
703,1083107.359880,450653.832977,2072.94,epat nedge11ft
704,1083112.249995,450597.999723,2073.19,epat nedge11ft
705,1083125.120824,450550.341817,2073.63,epat nedge11ft
706,1083138.390058,450520.153047,2073.89,epat nedge11ft
707,1083168.475933,450477.044065,2074.27,epat nedge11ft
708,1083198.788327,450435.124128,2074.81,epat nedge11ft
709,1083211.457217,450414.148860,2075.00,epat nedge11ft
710,1083234.427459,450366.203640,2075.17,epat nedge11ft
711,1083256.471858,450313.623784,2075.74,epat nedge11ft
712,1083275.944751,450262.262346,2076.35,epat nedge11ft
713,1083294.669518,450212.868700,2076.99,epat nedge11ft
714,1083330.995185,450115.476084,2078.17,epat nedge11ft
715,1083348.085164,450074.407457,2078.79,epat nedge11ft
716,1083353.066471,450066.945372,2078.67,epat nedge11ft
717,1083374.361465,450030.941663,2078.85,epat nedge11ft
718,1083383.421357,450018.309960,2079.14,epat nedge11ft
719,1083243.972636,450008.558424,2075.06,fence bwf
720,1083203.768182,450146.797587,2075.50,fence bwf
721,1083182.361182,450223.853409,2076.07,fence bwf
722,1083163.796501,450305.842771,2075.45,fence bwf
723,1083032.385255,450579.904512,2070.98,fence bwf
724,1082999.489722,450785.399443,2071.94,fence bwf
725,1082973.261817,450945.692844,2070.19,fence bwf
726,1082946.020649,451006.957206,2069.47,fence bwf
727,1082988.097661,451177.483218,2068.31,epat nedge18ft
728,1082990.953240,451159.490033,2068.69,epat nedge18ft
729,1083013.068521,451105.045583,2068.61,epat nedge18ft
730,1083033.074111,451054.852133,2068.81,epat nedge18ft
731,1083054.063901,451002.532269,2069.09,epat nedge18ft
732,1083073.834730,450955.377942,2069.01,epat nedge18ft
733,1083094.737085,450908.112142,2069.58,epat nedge18ft
734,1083120.341141,450863.759754,2071.01,epat nedge18ft
735,1083134.390486,450840.502330,2071.24,epat nedge18ft
736,1083158.476779,450792.028999,2071.54,epat nedge18ft
737,1082369.790185,452127.548266,2053.38,cl fl atbarrel
738,1082406.953128,452108.004911,2053.75,cl fl atbarrel
739,1082432.572300,452097.158511,2053.84,cl fl atbarrel
740,1082468.798369,452080.778380,2054.01,cl fl atbarrel
741,1082499.842817,452067.149686,2054.21,cl fl atbarrel

```
742,1082355.457607,452260.981538,2052.53,cl fl atbarrel
743,1082323.838165,452271.674950,2052.69,cl fl atbarrel
744,1082297.829529,452285.209428,2052.07,cl fl atbarrel
1002,1071577.434363,440652.904768,2376.30,AJ3899
1004,1085019.220461,461498.787196,2285.60,AJ3900
1005,1078298.327412,451075.845982,-99999,
```

7-11-05 SD

BM

WICKLIFFE LEVEL LOOP

STA	+	HI	-	ELEV.
				2059.60
0048 (ARG 405) TBM	5.03			
		2063.68		
			3.46	2060.20
			3.63	2060.05
			3.54	2060.14
T/P			3.66	2060.02
	6.45			
		2066.43		
			3.04	2063.43
T/P			4.10	2062.37
	4.91			
		2067.28		
			3.20	2064.08
T/P			3.23	2060.05
	3.53			
		2063.58		
TBM #5			5.96	2058.62

[illegible]

DESCRIPTION

NM COR. BASHAS, CINCO-J BARBER/BEAUTY SHOP

EEL CHECK FOR BLDG CLOSER TO BASHE: #25-28

EEL ELEV. FOR BLDG #21-24

EEL FOR BLDG 5-8

FFE ELEV FOR BLDG 1-8

CHKIN ✓

7-17-05 OB

WICKED BUG FALL

BASE @ 1 (600 NW/DISC)

LAT: 33.582084799

LONG: -112.948749387

ELLIP: 2064.27

HI: 5.35

HDOP: 0.75

VDOP: 1.15

PDOP: 1.37

SCALE: 1.00000000000

ROTATION: 0°00'00.00"

RECEPTION: 100%

LATENCY: 1.00 sec

DIC 16-13 744-308

#6-FD 5/8" IP w/ PUNCH IN THE AREA 402

#7-FD 5/8" IP w/ PUNCH IN THE AREA 403

#8-FD 600 NW w/ 10 DISC AREA 405

#9-FD 600 NW w/ 10 DISC AREA 406

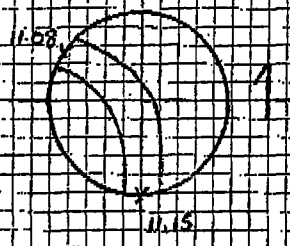
#10-FD 600 NW AREA 586

#11-FD 600 NW AREA 409

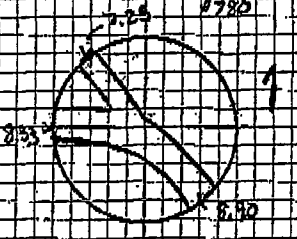
#12-FD 600 NW AREA

#13-FD 600 NW AREA 412

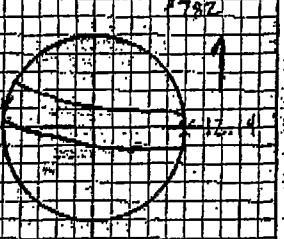
Rim=2048.16 #779 (5mm)

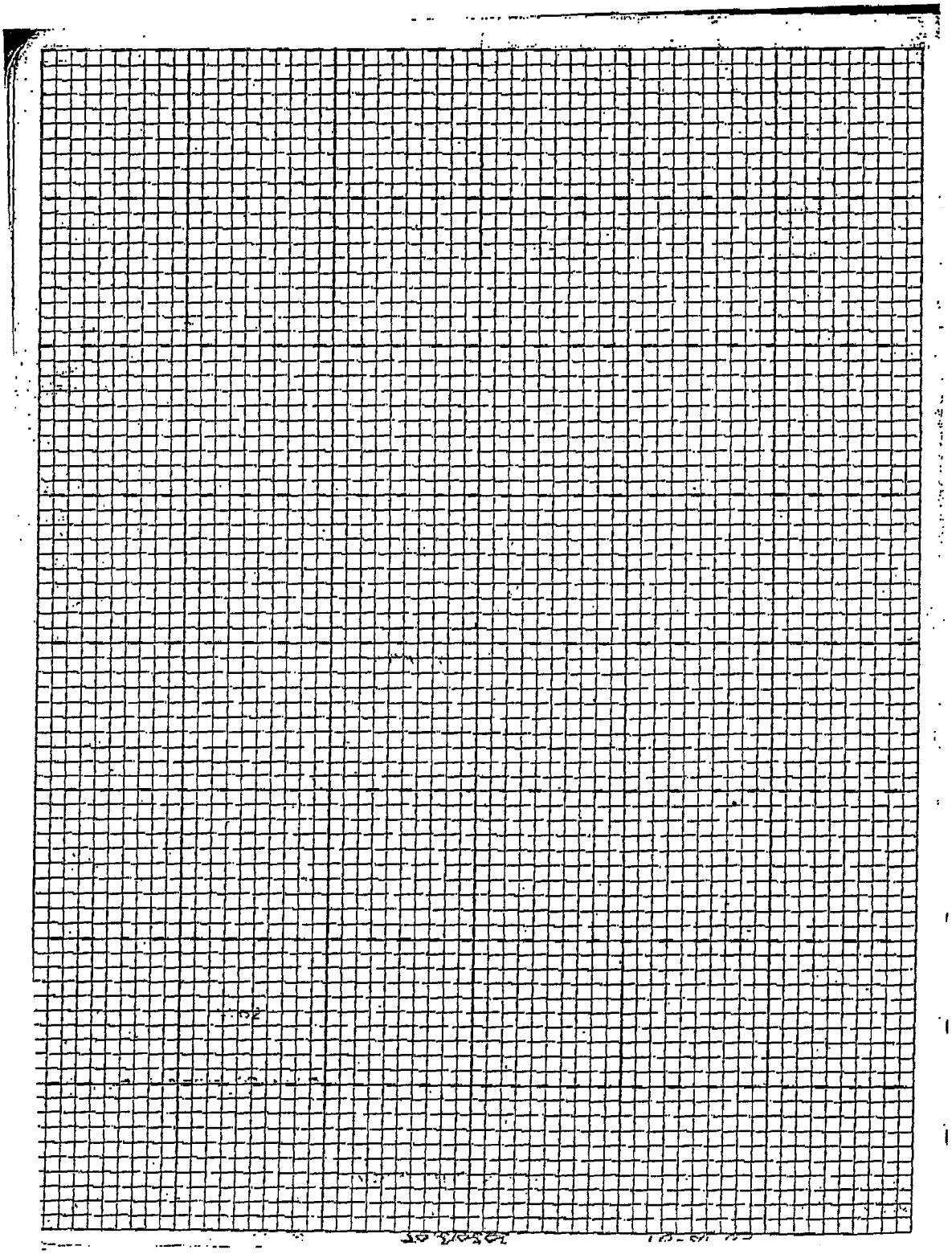


Rim=2048.59 #780



Rim=2055.38 #782





				2046.69
	8.16			
		2054.35		
			1.58	2053.77
T/P			3.02	2051.83
	4.17			
		2056.00		
T/P			2.01	2053.99
	2.67			
		2056.66		
T/P			3.90	2052.76
	4.19			
		2056.95		
T/P			3.61	2053.34
	4.05			
		2057.59		
T/P			3.63	2053.76
	2.93			
		2056.69		
CP 15 7mm			9.98	2046.71

01/20/2005 16:33 5203210333 ECC PAGE 08/08

DESCRIPTION:

TBD

FRE OF SHED OF 641 CHESTNUT ST. ENCLS IS ALSO [illegible]

FRE OF 641 CHESNUT ST.

FRE 645 CHESTNUT ST.

FRE 649 CHESTNUT ST.

FRE 657 CHESTNUT ST.

FRE 665 CHESTNUT ST.

CPT 13 TBD, CHK IN ✓

6,1085020.0364,461500.0341,2285.56,fd5/8"ipaka40I2
7,1071576.6210,440651.6249,2376.36,fd5/8"ipaka4NJ1
8,1082015.5119,452863.3382,2058.59,fd60D/discaka405
9,1082018.2810,453057.5371,2060.17,fd60D/discaka406
10,1082199.6621,453047.2436,2052.96,cp-60Dnlaka586
11,1082234.5409,452685.2553,2056.12,cp-60Dnlaka409
12,1082401.0838,452498.4596,2057.73,cp-60Dnl
13,1082331.9500,453268.9905,2046.69,cp-60Dnlaka412
745,1082678.1114,451239.6541,2069.18,top
746,1082695.4970,451245.7879,2061.31,toe
747,1082759.9438,451266.6671,2061.13,x
748,1082753.4856,450635.9978,2066.28,x
749,1082686.9340,450638.0455,2066.03,toe
750,1082672.2220,450639.3427,2072.79,top
751,1082674.9648,450639.0911,2071.83,riprap
752,1082608.0030,450636.8027,2073.15,x
753,1082679.2878,451240.3438,2068.91,riprap
754,1082819.3352,451383.5751,2065.92,3'wdf1
755,1082823.3202,451363.5854,2066.73,3'wdf1
756,1082828.3518,451363.0773,2067.15,3'wdf1
757,1082828.4841,451362.1185,2066.99,3'wdf1
758,1082829.1182,451361.9327,2066.67,4'wdf1
759,1082827.9163,451361.4891,2066.36,3.5'clf1
760,1082832.5384,451332.2227,2065.81,3.5'clf1
761,1082833.3405,451337.6298,2066.93,4'wdf1
762,1082835.7775,451330.2562,2066.78,4'wdf1
763,1082840.4887,451323.4092,2067.30,4'wdf1
764,1082851.3456,451293.8371,2067.31,3.5'clf1
765,1082851.3456,451293.8371,2067.31,7'clf2
766,1082866.3568,451280.4460,2078.15,s edgeshed ridge
767,1082866.0407,451291.8986,2067.71,s edgeshed
768,1082866.8925,451272.1504,2067.97,s edgeshed
769,1082819.3352,451383.5751,2065.92,3'wdf2
770,1082815.6412,451422.0833,2066.37,3'wdf2
771,1082184.0030,452450.0314,2060.88,c/ltop8"wl1
772,1082204.7202,452418.6377,2060.60,c/ltop8"wl1
773,1082221.2148,452392.1014,2060.66,c/ltop8"wl1
774,1082209.8360,452345.3479,2061.19,c/ltop8"wl1
775,1082206.3550,452331.0454,2061.19,c/ltop8"wl1
776,1082220.4447,452393.1079,2063.72,top wood@rail
777,1082204.9188,452417.1722,2063.47,top wood@rail
778,1082187.6428,452444.4111,2063.69,top wood@rail
779,1082078.8499,453782.1908,2048.16,smh
780,1082194.2088,453265.8972,2048.59,smh
781,1082197.1480,453047.0656,2052.99,smh
782,1082201.0367,452753.3855,2055.35,smh
783,1082083.2956,453478.2054,2049.23,smh
784,1082237.0195,452818.5572,2054.94,ng@tree
785,1082240.9152,452784.8019,2054.87,ng@tree
786,1082243.4251,452769.1378,2054.82,ng@tree
787,1082246.8098,452740.5334,2055.00,ng@tree
788,1082252.7631,452719.0918,2055.08,ng@tree
789,1082275.1830,452720.7705,2055.23,ng@tree
790,1082292.5822,452721.8098,2055.30,ng@tree
791,1082313.8633,452724.5930,2055.72,ng@tree
792,1082332.3683,452728.4562,2055.73,ng@tree
793,1082309.3146,452719.6255,2055.64,guardrail1
794,1082293.5072,452717.2862,2055.38,guardrail1
795,1082261.3021,452712.9888,2055.04,guardrail1
796,1082251.4300,452712.6933,2055.06,guardrail1
797,1082233.5193,452721.6709,2055.09,guardrail1
798,1082226.2923,452727.9555,2054.95,guardrail1
799,1082220.3025,452736.0230,2055.00,guardrail1
800,1082219.0091,452745.6685,2054.91,guardrail1
801,1082216.1527,452774.9896,2054.86,guardrail1
802,1082214.0041,452824.8210,2054.78,guardrail1
803,1082256.0545,452791.2617,2054.93,clf3
804,1082310.1369,452799.4024,2054.90,clf3
805,1082387.3212,452810.3542,2054.89,clf3
806,1082393.7030,452759.6196,2055.66,clf3
807,1082343.7847,452752.2766,2055.35,clf3
808,1082262.4803,452740.6761,2055.00,cfclf3
809,1082326.9908,451781.9652,2064.27,base--1/2"ir
810,1082614.6239,451219.1562,2069.10,x

Appendix D
HYDRAULIC MODELING

Appendix D.1

SOLS WASH HEC-RAS MODEL – EXISTING CONDITIONS

MSC Digital Post Office

Info

Scale: 20 %

Help

Zoom Win

Pan

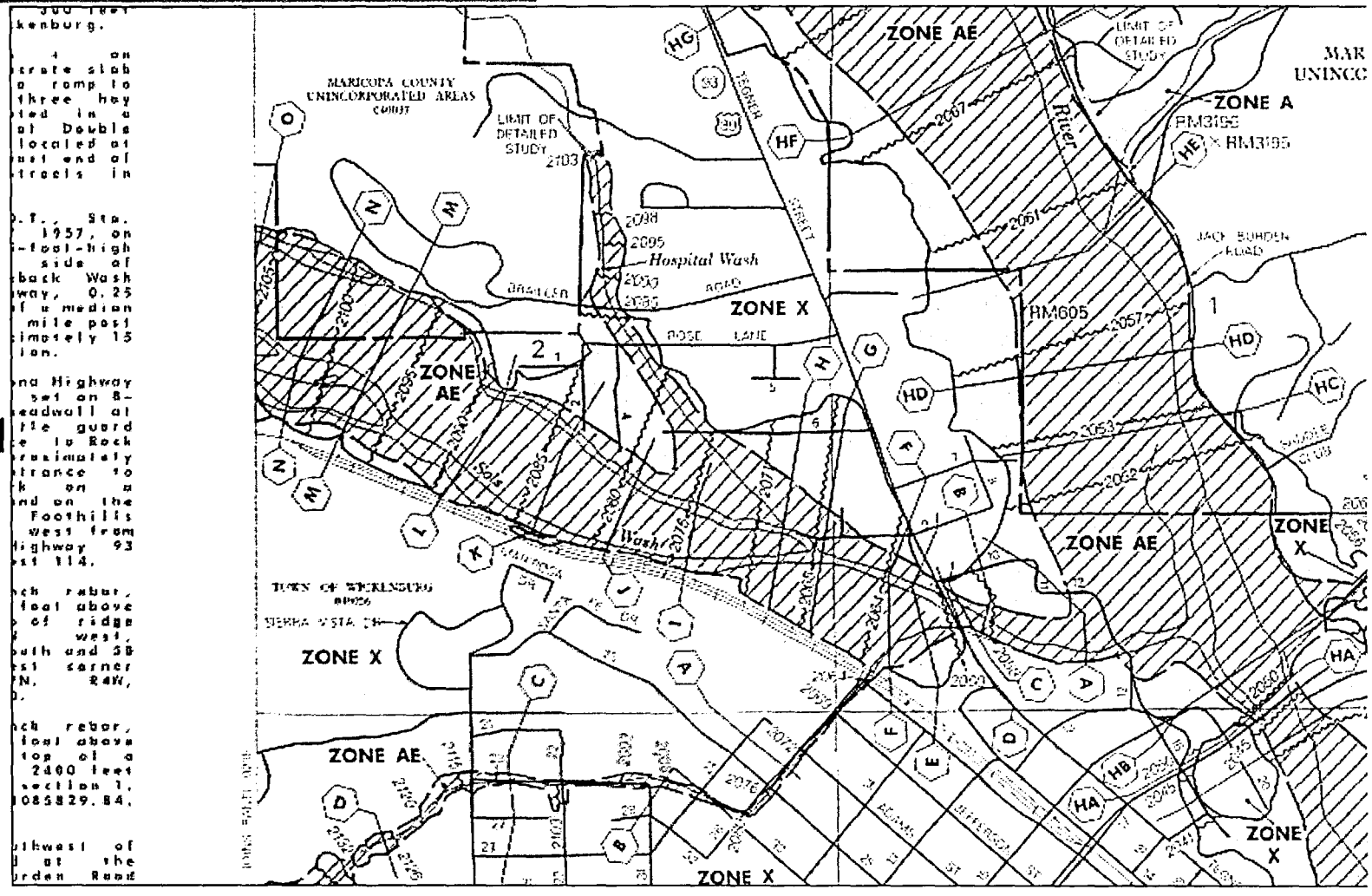
Zoom In

Zoom Out

1:1 Zoom In

MAX Zoom Out

Make a FIRMette



FEMA FIRM
04013C0255 G
July 19, 2001

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

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

*******************************************************************************

PROJECT DATA
Project Title: Sols Wash
Project File : Sols_Wash.prj
Run Date and Time: 9/7/2005 4:34:58 PM

Project in English units

Project Description:
Sols Wash CAR - Existing Conditions Model
Prepared by:
Engineering and
Environmental Consultants, Inc.
3003 N. Central Avenue, Suite 600
Phoenix,
Arizona   85012
Phone: 602-248-7702  FAX: 602-248-7851
For: Flood Control
District of Maricopa County
Sols Wash CAR - Contract #
FCD2003C052
Topographic Mapping Source:

2' Contour Interval
Discharge
information obtained from FEMA

Starting water surface from West Consultants
Model -
SR 93 Bypass Project - Hassayampa River
Profile 1: Sols Wash
(100-year) & Hassayampa River (10-year WSEL = 2045.31 NAVD 88)
Profile 2: Sols
Wash (10-year) & Hassayampa River (100-year WSEL = 2054.17 NAVD 88)

Study
Limits: Sols Wash
Final Model Run Date: September 2005
Model: Sols Wash

*******************************************************************************

PLAN DATA

Plan Title: Sols Wash
Plan File : q:\303013.04 Sols Wash\HEC-RAS\Existing Conditions\Sols_Wash.p01

           Geometry Title: Sols Wash
           Geometry File : q:\303013.04 Sols Wash\HEC-RAS\Existing Conditions\Sols_Wash.g01

           Flow Title    : Sols Wash
           Flow File     : q:\303013.04 Sols Wash\HEC-RAS\Existing Conditions\Sols_Wash.f01

Plan Summary Information:
Number of:  Cross Sections =   21    Multiple Openings  =    0
            Culverts       =    0    Inline Structures  =    0
            Bridges        =    1    Lateral Structures =    0

Computational Information
    Water surface calculation tolerance  =  0.01
```

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

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

*****************************************************************************

FLOW DATA

Flow Title: Sols Wash
Flow File : q:\303013.04 Sols Wash\HEC-RAS\Existing Conditions\Sols_Wash.f01

Flow Data (cfs)
*****************************************************************************
* River          Reach          RS      *          PF 1          PF 2 *
* Sols Wash      Sols Wash      1.246   *          14413         7019 *
* Sols Wash      Sols Wash      0.717   *          14459         7019 *
* Sols Wash      Sols Wash      0.541   *          13090         7019 *
*****************************************************************************

Boundary Conditions
*****************************************************************************************************************
* River          Reach          Profile          *          Upstream                Downstream    *
*****************************************************************************************************************
* Sols Wash      Sols Wash      PF 1             *        Normal S = 0.02       Known WS = 2045.31 *
* Sols Wash      Sols Wash      PF 2             *        Normal S = 0.02       Known WS = 2054.17 *
*****************************************************************************************************************

*****************************************************************************

GEOMETRY DATA

Geometry Title: Sols Wash
Geometry File : q:\303013.04 Sols Wash\HEC-RAS\Existing Conditions\Sols_Wash.g01

CROSS SECTION


RIVER: Sols Wash
REACH: Sols Wash          RS: 1.246

INPUT
Description:
Station Elevation Data    num=     250
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
  9221.5 2092.33 9227.81 2092.32 9227.92 2092.32 9228.11 2092.31 9235.22 2092.28
 9239.45 2092.28 9242.51 2092.28 9247.65 2092.25 9249.81 2092.25 9251.09 2092.25
  9257.1 2092.23 9262.74 2092.22 9264.39 2092.21 9267.18  2092.2 9271.69 2092.17
 9274.38 2092.16 9278.98 2092.12 9286.02 2092.07 9286.28 2092.07 9286.71 2092.07
 9293.57 2091.96 9297.66  2091.9 9300.86 2091.86 9306.24 2091.72 9308.38 2091.66
 9310.29 2091.58 9317.62  2091.3 9320.53 2091.23 9332.03 2090.81 9345.71 2089.54
 9352.42 2088.91 9372.02 2086.25 9378.52 2085.63 9386.17 2084.79 9391.58 2084.84
 9401.09 2084.86  9402.7 2084.87 9403.89 2084.87 9410.27 2084.89 9414.08 2084.85
 9417.57 2084.81 9423.42 2084.72 9424.86  2084.7 9425.72 2084.68 9432.16 2084.55
 9438.24  2084.5 9451.13  2084.2 9456.22 2085.79 9467.71 2089.37 9472.97 2089.49
 9477.33 2089.66 9490.51 2089.94 9495.57 2090.08  9497.8 2090.15 9501.54 2090.21
  9505.1 2090.25 9507.22 2090.27 9512.39 2090.31  9526.1  2090.2 9531.67 2090.22
 9535.25 2090.22 9546.34 2090.39 9554.03 2090.44 9562.99 2090.54 9568.56 2090.54
  9572.1 2090.58 9573.59  2090.6 9585.33  2090.8 9588.71 2090.85 9592.62  2090.9
 9599.19 2090.89 9599.92 2090.89 9600.35 2090.89 9607.21 2090.85 9611.99 2090.81
  9614.5 2090.79 9618.72 2090.75  9621.8 2090.71 9623.63 2090.69 9629.09 2090.64
 9635.28 2090.59 9636.39 2090.58 9638.25 2090.58 9643.68 2090.56 9646.92 2090.55
 9650.97 2090.56 9657.78 2090.57 9658.27 2090.57 9658.56 2090.57 9665.56  2090.6
  9670.2 2090.62 9672.86 2090.62 9677.31 2090.63 9680.15 2090.64 9681.84 2090.64
 9687.44 2090.63 9693.49 2090.62 9694.74 2090.61 9696.84  2090.6 9702.03 2090.57
 9705.13 2090.55 9709.33 2090.51 9716.37 2090.45 9716.62 2090.45 9716.77 2090.44
 9723.91 2090.37 9728.41 2090.33 9731.21  2090.3  9735.9 2090.27  9738.5 2090.25
 9740.05 2090.24  9745.8 2090.21  9751.7 2090.19 9753.09 2090.18 9755.43 2090.17
 9760.38 2090.16 9763.34 2090.15 9767.68 2090.13 9774.96 2090.11 9774.97 2090.11
 9782.27 2090.09 9786.62 2090.09 9789.56 2090.08 9794.49 2090.07 9796.85 2090.07
 9798.26 2090.07 9804.15 2090.06 9809.91 2090.05 9811.44 2090.05 9814.02 2090.05
```

```
 9818.73 2090.04 9821.55 2090.04 9826.03 2090.04 9833.19 2090.04 9833.32 2090.04
 9833.55 2090.04 9840.62 2090.06 9844.83 2090.07 9847.91 2090.07 9853.08 2090.08
  9855.2 2090.08 9856.47 2090.08  9862.5 2090.07 9868.12 2090.05 9869.79 2090.04
 9872.61 2090.03 9877.09 2090.01 9879.76    2090 9884.38 2089.97  9891.4 2089.93
 9891.67 2089.93 9892.14 2089.93 9898.97 2089.85 9903.04  2089.8 9906.26 2089.75
 9911.67 2089.62 9913.56 2089.57 9914.68 2089.53 9920.85 2089.32 9926.32 2089.03
 9928.14 2088.95  9931.2 2088.76 9935.44 2088.48  9943.8 2088.37 9950.29 2088.29
 9958.26 2086.84 9964.76 2084.94  9970.4 2085.18 9979.28 2085.44  9986.5 2085.68
 9989.79 2085.66 9993.79 2085.66 9996.18 2085.67   10000 2085.6810001.08 2085.69
10007.82 2085.7310008.38 2085.7310009.32 2085.7410015.67 2085.7910019.46 2085.82
10022.97 2085.8510028.85 2085.9210030.26 2085.94 10031.1 2085.9510037.55 2086.05
10042.74 2086.1610044.85  2086.210048.38 2086.2810052.14 2086.3710054.38 2086.43
10059.44 2086.5610066.03 2086.7110066.73 2086.7310067.91 2086.7510074.02 2086.88
10077.67 2086.9310081.32    208710087.44 2087.0710088.61 2087.0910089.31 2087.09
10095.91 2087.1610100.95  2087.2 10103.2 2087.2210106.97 2087.2410110.49 2087.26
10112.59 2087.2710117.79 2087.2910124.24 2087.2910125.08 2087.29 10126.5 2087.29
10132.37 2087.2910135.88 2087.2810139.67 2087.2810146.03 2087.2910146.96  2087.3
10147.94  2087.310168.62 2087.3710179.34  2088.310185.85 2088.9910189.51 2089.35
10201.64 2089.3610205.79 2089.0710216.38 2088.4110222.58 2087.76 10244.5 2091.53
10255.25 2092.86 10265.1 2092.7310271.09 2092.7110277.02 2092.9110286.47 2091.58
10326.09 2089.6710329.63  2089.410330.13 2089.4410330.63 2089.4810333.31 2089.92
10348.89 2092.38   10351 2092.5610359.54 2093.0510364.73 2093.9310367.46 2094.47
10375.48 2099.3510394.44 2109.4310407.14 2109.1910415.28 2109.1810416.84 2109.19
10419.45 2109.2110424.13 2109.2610426.92 2109.2610431.43 2109.2510435.51 2109.24

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*****************************************************************************
  9221.5     .07 9345.71    .035 9472.97     .05 9723.91     .04 9935.44     .03
10189.51     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        9943.810189.51              350     371     350             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
   1026510435.51    2094       F

CROSS SECTION OUTPUT  Profile #PF 1
*************************************************************************************************
* E.G. Elev (ft)          * 2092.08  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    2.77  * Wt. n-Val.              *   0.035  *   0.030  *   0.050  *
* W.S. Elev (ft)          * 2089.31  * Reach Len. (ft)        *  350.00  *  371.00  *  350.00  *
* Crit W.S. (ft)          * 2090.40  * Flow Area (sq ft)      *  442.66  *  629.18  *   20.89  *
* E.G. Slope (ft/ft)      *0.020014  * Area (sq ft)           *  442.66  *  629.18  *   20.89  *
* Q Total (cfs)           *14413.00  * Flow (cfs)             * 6092.71  * 8250.26  *   70.03  *
* Top Width (ft)          *  416.35  * Top Width (ft)         *  141.96  *  245.25  *   29.14  *
* Vel Total (ft/s)        *   13.19  * Avg. Vel. (ft/s)       *   13.76  *   13.11  *    3.35  *
* Max Chl Dpth (ft)       *    5.11  * Hydr. Depth (ft)       *    3.12  *    2.57  *    0.72  *
* Conv. Total (cfs)       *101879.9  * Conv. (cfs)            * 43067.0  * 58317.9  *   495.0  *
* Length Wtd. (ft)        *  360.28  * Wetted Per. (ft)       *  143.04  *  245.78  *   29.33  *
* Min Ch El (ft)          * 2084.94  * Shear (lb/sq ft)       *    3.87  *    3.20  *    0.89  *
* Alpha                   *    1.03  * Stream Power (lb/ft s) *   53.22  *   41.94  *    2.98  *
* Frctn Loss (ft)         *          * Cum Volume (acre-ft)   *  190.27  *  131.14  *   21.59  *
* C & E Loss (ft)         *          * Cum SA (acres)         *   88.55  *   23.30  *   11.30  *
*************************************************************************************************

Warning: Divided flow computed for this cross-section.
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)          * 2090.00  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    1.83  * Wt. n-Val.              *   0.035  *   0.030  *   0.050  *
* W.S. Elev (ft)          * 2088.17  * Reach Len. (ft)        *  350.00  *  371.00  *  350.00  *
* Crit W.S. (ft)          * 2088.69  * Flow Area (sq ft)      *  302.06  *  357.54  *    1.27  *
* E.G. Slope (ft/ft)      *0.020012  * Area (sq ft)           *  302.06  *  357.54  *    1.27  *
* Q Total (cfs)           * 7019.00  * Flow (cfs)             * 3628.69  * 3388.47  *    1.84  *
* Top Width (ft)          *  339.05  * Top Width (ft)         *  105.96  *  226.84  *    6.25  *
* Vel Total (ft/s)        *   10.62  * Avg. Vel. (ft/s)       *   12.01  *    9.48  *    1.45  *
* Max Chl Dpth (ft)       *    3.97  * Hydr. Depth (ft)       *    2.85  *    1.58  *    0.20  *
* Conv. Total (cfs)       * 49617.1  * Conv. (cfs)            * 25651.1  * 23953.0  *    13.0  *
* Length Wtd. (ft)        *  358.89  * Wetted Per. (ft)       *  106.77  *  227.30  *    6.31  *
* Min Ch El (ft)          * 2084.94  * Shear (lb/sq ft)       *    3.53  *    1.97  *    0.25  *
* Alpha                   *    1.05  * Stream Power (lb/ft s) *   42.46  *   18.62  *    0.36  *
* Frctn Loss (ft)         *          * Cum Volume (acre-ft)   *  128.05  *  106.57  *   17.30  *
* C & E Loss (ft)         *          * Cum SA (acres)         *   35.83  *   22.05  *    4.82  *
*************************************************************************************************
```

Warning: Divided flow computed for this cross-section.
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: Sols Wash RS: 1.175

INPUT
Description:
Station Elevation Data num= 329

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
8793.67	2088.83	8794.61	2088.72	8803.13	2087.72	8833.57	2087.72	8835.17	2087.73
8853.54	2088.16	8853.97	2088.16	8854.78	2088.17	8861.57	2088.28	8866.54	2088.33
8868.83	2088.34	8872.52	2088.34	8876.09	2088.34	8878.31	2088.34	8883.36	2088.32
8890.07	2088.28	8890.62	2088.28	8891.5	2088.27	8897.88	2088.22	8901.84	2088.19
8905.15	2088.16	8910.48	2088.11	8912.41	2088.09	8913.61	2088.08	8919.67	2088.02
8925.37	2087.97	8926.94	2087.95	8929.46	2087.92	8934.2	2087.87	8937.14	2087.84
8941.46	2087.79	8948.44	2087.72	8948.72	2087.71	8948.9	2087.71	8955.99	2087.64
8960.67	2087.58	8963.25	2087.55	8967.41	2087.5	8970.51	2087.47	8972.43	2087.44
8977.78	2087.38	8984.2	2087.29	8985.04	2087.28	8986.39	2087.27	8992.3	2087.19
8995.97	2087.14	8999.57	2087.09	9005.37	2087.01	9006.83	2086.99	9007.73	2086.98
9014.09	2086.9	9019.5	2086.82	9021.36	2086.79	9024.35	2086.75	9028.62	2086.7
9031.26	2086.66	9035.88	2086.6	9043.03	2086.51	9043.14	2086.51	9043.33	2086.51
9050.41	2086.44	9054.8	2086.4	9057.67	2086.38	9062.31	2086.36	9064.93	2086.35
9066.56	2086.35	9072.2	2086.35	9078.33	2086.37	9079.46	2086.38	9081.29	2086.4
9086.72	2086.44	9090.09	2086.48	9093.99	2086.52	9100.26	2086.6	9101.25	2086.62
9101.86	2086.63	9108.51	2086.71	9113.62	2086.78	9115.77	2086.8	9119.24	2086.83
9123.04	2086.86	9125.39	2086.87	9130.3	2086.88	9137.16	2086.85	9137.56	2086.85
9138.22	2086.83	9144.83	2086.68	9151.55	2086.58	9161.22	2086.33	9172.83	2083.15
9180.69	2081.03	9195.37	2081.26	9195.99	2081.26	9202.93	2081.25	9207.75	2081.22
9210.19	2081.2	9214.14	2081.15	9217.46	2081.11	9219.52	2081.09	9224.72	2081.04
9231.28	2081.01	9231.98	2081.01	9233.11	2081.01	9239.25	2080.99	9243.05	2080.99
9248.42	2080.97	9260.69	2081.05	9269.18	2080.24	9280.17	2081.83	9288.87	2083.4
9293.64	2083.96	9295.53	2083.76	9301.09	2083.27	9306.29	2083.27	9316.54	2083.92
9318.03	2084.06	9327.47	2084.75	9334.37	2085.41	9340.93	2086.08	9346.99	2086.42
9348.19	2086.49	9348.94	2086.51	9355.46	2086.69	9360.71	2086.77	9362.72	2086.8
9365.96	2086.83	9369.98	2086.86	9372.47	2086.87	9377.24	2086.89	9384.24	2086.91
9384.51	2086.91	9384.94	2086.91	9391.77	2086.92	9396	2086.93	9399.03	2086.93
9403.92	2086.94	9406.3	2086.94	9407.77	2086.94	9413.56	2086.95	9419.54	2086.95
9420.82	2086.95	9422.9	2086.95	9428.09	2086.95	9431.3	2086.95	9435.35	2086.94
9441.88	2086.94	9442.61	2086.94	9443.07	2086.94	9449.88	2086.93	9454.83	2086.93
9457.14	2086.92	9460.86	2086.92	9464.4	2086.92	9466.6	2086.92	9471.66	2086.92
9478.36	2086.93	9478.93	2086.93	9479.84	2086.93	9486.19	2086.95	9490.13	2086.96
9493.45	2086.98	9498.81	2087	9501.9	2087.01	9506.92	2087.04	9513.66	2087.08
9517.79	2087.11	9524.35	2086.98	9527.23	2086.92	9532.42	2086.95	9535.63	2086.97
9539.68	2087	9546.21	2087.04	9546.94	2087.04	9547.4	2087.04	9554.21	2087.03
9559.17	2087.03	9561.47	2087.03	9565.19	2087.03	9568.73	2087.03	9570.93	2087.03
9576	2087.03	9582.7	2087.03	9583.26	2087.03	9584.17	2087.03	9590.52	2087.03
9594.46	2087.03	9597.79	2087.03	9603.15	2087.03	9605.05	2087.03	9606.23	2087.03
9612.31	2087.02	9617.99	2087.01	9619.58	2087.01	9622.13	2087.01	9626.84	2087
9629.76	2087	9634.1	2087	9641.1	2087	9641.36	2087	9641.53	2087
9648.63	2087	9653.29	2087	9655.89	2087	9660.08	2086.99	9663.15	2086.99
9665.06	2086.99	9670.42	2086.97	9676.82	2086.93	9677.68	2086.93	9679.06	2086.92
9684.94	2086.87	9688.59	2086.84	9692.21	2086.81	9698.04	2086.78	9699.47	2086.77
9700.35	2086.76	9706.73	2086.76	9712.12	2086.76	9714	2086.76	9717.02	2086.77
9721.26	2086.79	9723.89	2086.8	9728.52	2086.82	9735.65	2086.86	9735.78	2086.86
9736	2086.86	9743.05	2086.89	9747.42	2086.9	9750.31	2086.91	9754.98	2086.91
9757.57	2086.91	9759.18	2086.91	9764.84	2086.9	9770.95	2086.87	9772.1	2086.87
9773.95	2086.85	9779.36	2086.81	9782.72	2086.78	9786.63	2086.74	9792.93	2086.68
9793.89	2086.68	9794.48	2086.67	9801.15	2086.59	9806.25	2086.54	9808.41	2086.51
9811.91	2086.47	9815.68	2086.42	9818.01	2086.39	9822.94	2086.32	9829.78	2086.22
9830.2	2086.22	9830.89	2086.21	9837.47	2086.11	9841.54	2086.04	9844.73	2085.99
9849.87	2085.89	9851.99	2085.84	9856.23	2086.01	9870.09	2086.7	9882.22	2084.35
9884.57	2083.82	9886.37	2083.85	9888.51	2083.89	9902.83	2084.13	9906.8	2084.07
9910.1	2084.01	9912.14	2083.98	9917.36	2083.92	9923.91	2083.84	9924.62	2083.84
9925.78	2083.82	9931.89	2083.76	9935.67	2083.71	9939.15	2083.67	9944.76	2083.59
9946.41	2083.56	9947.44	2083.54	9953.68	2083.42	9959.2	2083.29	9960.94	2083.25
9963.74	2083.17	9968.2	2083.05	9970.97	2082.97	9975.47	2082.86	9982.72	2082.71
9989.99	2082.62	9994.5	2082.62	9997.25	2082.61	10000	2082.61	10001.7	2082.62
10004.52	2082.63	10006.27	2082.64	10011.78	2082.65	10018.03	2082.61	10019.04	2082.6
10020.68	2082.63	10026.31	2082.7	10029.8	2082.67	10035.08	2082.53	10046.78	2082.51
10053.09	2084.91	10063.94	2089.27	10075.49	2089.27	10083.44	2089.07	10084.3	2089.08
10084.95	2089.09	10089.24	2088.88	10102.14	2088.41	10104.06	2088.37	10111.06	2086.62

```
10113.74 2086.0410123.99 2088.0110127.85 2088.5410137.82 2091.8910147.85 2095.12
10153.52 2096.9110157.04 2097.9510164.11 2099.8510176.23 2102.7110181.31 2103.38
10189.99 2104.1510197.27 2104.8710201.29  2105.810203.06 2106.4110208.33 2106.39
10212.17 2106.3110213.12 2106.3510219.05 2106.3610232.49 2106.41

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*****************************************************************************
 8793.67    .069 9161.22     .03 9365.96     .05 9603.15     .04 9870.09     .03
10063.94     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9870.0910063.94              270     337     340            .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
   1007510232.49    2090       F

CROSS SECTION OUTPUT  Profile #PF 1
*************************************************************************************
* E.G. Elev (ft)          * 2088.15  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    1.07  * Wt. n-Val.              *   0.030  *   0.030  *         *
* W.S. Elev (ft)          * 2087.08  * Reach Len. (ft)         *  270.00  *  337.00  *  340.00  *
* Crit W.S. (ft)          * 2087.20  * Flow Area (sq ft)       * 1062.38  *  680.26  *         *
* E.G. Slope (ft/ft)      *0.005514  * Area (sq ft)            * 1062.38  *  680.26  *    5.26  *
* Q Total (cfs)           *14413.00  * Flow (cfs)              * 8548.63  * 5864.37  *         *
* Top Width (ft)          * 1062.90  * Top Width (ft)          *  864.53  *  188.42  *    9.95  *
* Vel Total (ft/s)        *    8.27  * Avg. Vel. (ft/s)        *    8.05  *    8.62  *         *
* Max Chl Dpth (ft)       *    6.84  * Hydr. Depth (ft)        *    1.23  *    3.61  *         *
* Conv. Total (cfs)       *194091.0  * Conv. (cfs)             *115119.1  * 78971.9  *         *
* Length Wtd. (ft)        *  298.95  * Wetted Per. (ft)        *  865.78  *  189.58  *         *
* Min Ch El (ft)          * 2082.51  * Shear (lb/sq ft)        *    0.42  *    1.24  *         *
* Alpha                   *    1.00  * Stream Power (lb/ft s)  *    3.40  *   10.65  *         *
* Frctn Loss (ft)         *    3.42  * Cum Volume (acre-ft)    *  184.23  *  125.56  *   21.49  *
* C & E Loss (ft)         *    0.51  * Cum SA (acres)          *   84.51  *   21.46  *   11.14  *
*************************************************************************************

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, water
         surface was used.

CROSS SECTION OUTPUT  Profile #PF 2
*************************************************************************************
* E.G. Elev (ft)          * 2086.31  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    1.13  * Wt. n-Val.              *   0.030  *   0.030  *         *
* W.S. Elev (ft)          * 2085.18  * Reach Len. (ft)         *  270.00  *  337.00  *  340.00  *
* Crit W.S. (ft)          * 2085.16  * Flow Area (sq ft)       *  519.85  *  332.08  *         *
* E.G. Slope (ft/ft)      *0.007726  * Area (sq ft)            *  519.85  *  332.08  *         *
* Q Total (cfs)           * 7019.00  * Flow (cfs)              * 4815.46  * 2203.54  *         *
* Top Width (ft)          *  342.35  * Top Width (ft)          *  166.52  *  175.83  *         *
* Vel Total (ft/s)        *    8.24  * Avg. Vel. (ft/s)        *    9.26  *    6.64  *         *
* Max Chl Dpth (ft)       *    4.94  * Hydr. Depth (ft)        *    3.12  *    1.89  *         *
* Conv. Total (cfs)       * 79852.9  * Conv. (cfs)             * 54783.9  * 25069.0  *         *
* Length Wtd. (ft)        *  293.89  * Wetted Per. (ft)        *  167.51  *  176.48  *         *
* Min Ch El (ft)          * 2082.51  * Shear (lb/sq ft)        *    1.50  *    0.91  *         *
* Alpha                   *    1.07  * Stream Power (lb/ft s)  *   13.87  *    6.02  *         *
* Frctn Loss (ft)         *    2.25  * Cum Volume (acre-ft)    *  124.75  *  103.63  *   17.29  *
* C & E Loss (ft)         *    0.01  * Cum SA (acres)          *   34.73  *   20.34  *    4.80  *
*************************************************************************************

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.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, water
         surface was used.
Note:    Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION
```

RIVER: Sols Wash
REACH: Sols Wash RS: 1.112

INPUT
Description:
Station Elevation Data num= 467

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
8141.93	2091.62	8142.44	2091.59	8142.73	2091.59	8144.06	2091.44	8170.52	2088.44
8177.45	2088.47	8183.84	2088.36	8192.72	2088.2	8196.81	2088.13	8201.95	2088.02
8203.92	2087.99	8205.5	2087.96	8211.04	2087.84	8218.02	2087.71	8218.16	2087.71
8218.27	2087.71	8225.28	2087.58	8231.04	2087.48	8232.39	2087.46	8234.09	2087.44
8239.51	2087.36	8243.82	2087.31	8246.63	2087.28	8250.16	2087.25	8253.74	2087.21
8256.59	2087.18	8260.86	2087.15	8266.24	2087.08	8267.98	2087.07	8269.36	2087.05
8275.1	2087	8282.14	2086.89	8282.21	2086.89	8282.31	2086.89	8289.33	2086.81
8294.91	2086.72	8296.45	2086.7	8298.38	2086.66	8303.56	2086.59	8307.68	2086.5
8310.68	2086.46	8314.45	2086.37	8317.8	2086.3	8320.46	2086.21	8324.92	2086.08
8330.53	2085.8	8332.57	2085.7	8336.37	2085.13	8356.26	2083.05	8364.59	2082.94
8370.75	2081.91	8373.61	2081.98	8386.57	2082.64	8394.08	2083	8403.2	2083.63
8409.87	2083.65	8410.34	2083.64	8438.04	2083.15	8438.07	2083.15	8438.14	2083.15
8468.19	2082.95	8475.8	2082.82	8495.33	2083.5	8499.28	2083.68	8502.84	2083.77
8507.33	2083.92	8509.96	2084	8512.06	2084.06	8517.08	2084.14	8523.4	2084.24
8524.2	2084.25	8524.83	2084.26	8531.31	2084.3	8537.61	2084.32	8538.43	2084.32
8539.47	2084.32	8545.55	2084.3	8550.38	2084.27	8552.67	2084.25	8555.54	2084.23
8559.78	2084.16	8563.15	2084.1	8566.9	2084.03	8571.62	2083.95	8573.8	2083.88
8575.93	2083.89	8585.02	2083.48	8591.39	2083.25	8592.85	2083.2	8593.5	2083.17
8614.25	2083.56	8615.42	2083.55	8619.83	2083.54	8625.06	2083.43	8630.27	2083.32
8639.79	2083.62	8652.59	2083.23	8656.35	2083.37	8664.74	2083.69	8668.05	2083.82
8673.66	2083.89	8678.11	2083.95	8680.77	2083.99	8684.12	2084.03	8687.89	2084.07
8690.89	2084.1	8695.01	2084.14	8700.2	2084.19	8702.13	2084.21	8703.66	2084.22
8709.24	2084.26	8716.27	2084.32	8716.36	2084.32	8716.43	2084.32	8723.48	2084.36
8729.21	2084.39	8730.59	2084.39	8732.34	2084.4	8737.71	2084.41	8741.98	2084.42
8744.83	2084.42	8748.41	2084.42	8751.95	2084.42	8754.75	2084.42	8759.06	2084.41
8764.49	2084.41	8766.18	2084.4	8767.53	2084.4	8773.3	2084.39	8780.3	2084.38
8780.41	2084.38	8780.56	2084.38	8787.53	2084.38	8793.07	2084.38	8794.65	2084.38
8796.63	2084.38	8801.77	2084.39	8805.85	2084.41	8808.88	2084.42	8812.7	2084.43
8816	2084.45	8818.62	2084.46	8823.12	2084.49	8828.78	2084.52	8830.23	2084.53
8831.39	2084.53	8837.35	2084.57	8844.17	2084.59	8844.47	2084.6	8844.85	2084.6
8851.59	2084.62	8856.94	2084.63	8858.7	2084.64	8860.92	2084.64	8865.82	2084.65
8869.71	2084.65	8872.94	2084.66	8876.99	2084.67	8880.05	2084.67	8882.49	2084.68
8887.17	2084.7	8893.07	2084.72	8894.29	2084.73	8895.26	2084.74	8901.41	2084.76
8908.03	2084.8	8908.52	2084.81	8909.14	2084.81	8915.64	2084.84	8920.81	2084.86
8922.76	2084.87	8925.21	2084.88	8929.88	2084.88	8933.58	2084.89	8936.99	2084.89
8941.28	2084.9	8944.11	2084.89	8946.35	2084.89	8951.23	2084.88	8957.36	2084.88
8958.34	2084.87	8959.13	2084.87	8965.46	2084.85	8971.9	2084.83	8972.58	2084.83
8973.43	2084.83	8988.92	2084.53	8991.65	2084.46	8992.63	2084.44	8996.02	2084.45
9015.04	2084.71	9021.65	2084.72	9022.62	2084.7	9028.97	2084.57	9035.77	2084.68
9050.67	2084.28	9053.03	2084.3	9058.56	2084.36	9069.86	2084.49	9072.22	2084.48
9074.09	2084.47	9079.34	2084.46	9085.94	2084.44	9086.45	2084.44	9086.86	2084.44
9093.57	2084.41	9099.64	2084.4	9100.69	2084.4	9102.01	2084.4	9107.8	2084.4
9112.41	2084.4	9114.92	2084.4	9118.08	2084.41	9122.04	2084.42	9125.18	2084.43
9129.16	2084.45	9134.15	2084.47	9136.27	2084.48	9137.96	2084.5	9143.39	2084.51
9150.23	2084.56	9150.51	2084.56	9150.73	2084.56	9157.62	2084.58	9163.5	2084.6
9164.74	2084.59	9166.3	2084.57	9171.86	2084.5	9176.28	2084.27	9178.98	2084.11
9184.16	2083.68	9193.81	2082.94	9212.46	2077.63	9212.96	2077.49	9213.18	2077.43
9213.42	2077.44	9228.8	2077.91	9230.59	2077.97	9235.91	2078.14	9245.7	2077.94
9256.3	2077.78	9262.81	2078.3	9271.5	2079.06	9278.46	2079.62	9278.62	2079.63
9278.81	2079.65	9285.73	2080.25	9291.24	2080.61	9292.85	2080.72	9310.06	2081.36
9316.97	2081.63	9324.19	2081.79	9328.86	2082.27	9342.55	2083.63	9342.67	2083.64
9343.1	2083.66	9349.79	2084.09	9355.1	2084.26	9356.9	2084.31	9359.17	2084.34
9364.02	2084.43	9367.88	2084.47	9371.14	2084.5	9375.24	2084.53	9378.26	2084.55
9380.65	2084.57	9385.37	2084.59	9391.32	2084.62	9392.49	2084.63	9393.43	2084.63
9399.61	2084.66	9406.2	2084.7	9406.73	2084.7	9407.39	2084.7	9413.84	2084.72
9418.97	2084.74	9420.96	2084.75	9423.46	2084.75	9428.08	2084.76	9431.75	2084.76
9435.19	2084.76	9439.53	2084.77	9442.31	2084.76	9444.52	2084.76	9449.43	2084.76
9455.6	2084.76	9456.55	2084.76	9457.29	2084.75	9463.66	2084.75	9470.07	2084.75
9470.78	2084.75	9471.68	2084.75	9477.9	2084.75	9482.84	2084.75	9485.01	2084.76
9487.75	2084.76	9492.13	2084.77	9495.61	2084.78	9499.25	2084.79	9503.82	2084.8
9506.37	2084.81	9508.39	2084.82	9513.48	2084.84	9519.9	2084.87	9520.6	2084.87
9521.16	2084.88	9527.72	2084.91	9533.93	2084.94	9534.83	2084.95	9535.97	2084.95
9541.95	2084.99	9546.71	2085.01	9549.07	2085.03	9552.04	2085.04	9556.19	2085.07
9559.48	2085.08	9563.3	2085.1	9568.11	2085.12	9570.42	2085.14	9572.25	2085.14
9577.54	2085.16	9584.19	2085.18	9584.65	2085.19	9585.03	2085.19	9587.58	2085.19
9592.32	2085.2	9595.92	2085.2	9600.38	2085.2	9606.34	2085.2	9608.44	2085.2
9615.57	2085.22	9616.49	2085.22	9616.76	2085.22	9624.55	2085.24	9627.19	2085.25
9632.61	2085.28	9637.61	2085.31	9640.66	2085.33	9648.03	2085.38	9648.72	2085.38
9651.07	2085.4	9656.78	2085.43	9658.45	2085.44	9664.83	2085.46	9668.87	2085.48
9672.89	2085.48	9679.3	2085.47	9680.95	2085.47	9686.57	2085.44	9689	2085.43
9689.72	2085.43	9697.06	2085.37	9700.14	2085.35	9705.12	2085.31	9710.56	2085.27

```
 9713.17 2085.26 9720.99 2085.22 9721.23 2085.22 9722.06 2085.22 9729.29  2085.2
 9731.41  2085.2 9737.34  2085.2 9741.83 2085.21  9745.4 2085.23 9752.25 2085.27
 9753.46 2085.29 9757.56 2085.32 9761.51 2085.36 9762.67 2085.38 9769.57 2085.45
  9773.1 2085.49 9777.63 2085.54 9783.52 2085.59 9785.68 2085.61 9793.05 2085.65
 9793.74 2085.66 9793.94 2085.66  9801.8 2085.66 9804.36 2085.66 9809.85 2085.63
 9814.78 2085.58 9817.91 2085.54 9825.21 2085.43 9825.97 2085.41 9828.55 2085.35
 9834.02 2085.22 9835.63 2085.18 9842.08 2085.04 9846.05 2084.94 9850.13  2084.9
 9856.47 2084.75 9858.19 2084.73 9864.04 2084.62 9866.25  2084.6 9866.53 2084.59
 9884.78 2084.14 9887.84 2083.97 9900.43 2082.67 9906.68 2081.42  9912.7 2080.29
 9929.15 2080.93  9930.7 2080.99 9935.04 2081.06 9938.76 2081.13 9939.85 2081.13
 9946.81 2081.15 9950.27 2081.13 9954.87 2081.11 9960.69 2081.04 9962.93 2081.01
 9970.53 2080.84 9970.98 2080.83 9971.12 2080.83 9979.04 2080.54 9981.54 2080.43
  9987.1 2080.14 9991.96 2079.86 9995.15 2079.6910000.01 2079.4610002.38 2079.34
10003.21 2079.3210006.03 2079.3110011.27 2079.2810012.81 2079.2210014.37 2079.14
10024.82 2078.41 10032.5 2077.9710047.91 2087.3710048.43 2087.57 10081.3 2086.91
10089.19 2085.8910091.83  2085.610098.92 2084.8110110.32 2083.65 10111.9 2083.66
10120.02 2083.5610134.07 2084.3210137.87 2084.5910148.01 2085.1210148.27 2085.12
10148.39 2085.1310166.08 2085.7910168.63 2087.4610173.65 2090.5610177.71 2090.41
10182.13 2090.6310196.43  2090.310207.23  2090.510210.04 2090.4810210.08 2090.48
10224.61 2089.7810226.65 2089.7310238.09 2089.3510240.53 2089.2310244.82 2089.08
10252.68 2087.6910263.31 2086.9610267.44 2086.44 10267.8 2086.45 10270.1 2086.54
10271.91 2086.6110273.41 2086.67 10281.3 2086.8310283.16 2086.8910292.82 2086.98
10296.19 2087.0210299.01 2087.11

Manning's n Values        num=       7
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*****************************************************************************
 8141.93     .069 8933.58       0 9171.86     .03 9364.02     .05 9600.38     .04
 9864.04     .0310047.91     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9884.7810047.91               420     455     420             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
 8141.93    8950    2086       F
   1005010299.01    2089       F

CROSS SECTION OUTPUT  Profile #PF 1
*****************************************************************************************
* E.G. Elev (ft)          * 2086.26  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    1.55  * Wt. n-Val.              *   0.030  *   0.030  *         *
* W.S. Elev (ft)          * 2084.71  * Reach Len. (ft)         *  420.00  *  455.00  *  420.00  *
* Crit W.S. (ft)          * 2085.04  * Flow Area (sq ft)       *  809.67  *  637.70  *         *
* E.G. Slope (ft/ft)      *0.006955  * Area (sq ft)            * 1287.91  *  637.70  *   28.02  *
* Q Total (cfs)           *14413.00  * Flow (cfs)              * 7820.08  * 6592.92  *         *
* Top Width (ft)          * 1197.74  * Top Width (ft)          *  998.73  *  158.77  *   40.25  *
* Vel Total (ft/s)        *    9.96  * Avg. Vel. (ft/s)        *    9.66  *   10.34  *         *
* Max Chl Dpth (ft)       *    7.28  * Hydr. Depth (ft)        *    1.80  *    4.02  *         *
* Conv. Total (cfs)       *172819.2  * Conv. (cfs)             * 93766.7  * 79052.5  *         *
* Length Wtd. (ft)        *  436.36  * Wetted Per. (ft)        *  450.26  *  161.06  *         *
* Min Ch El (ft)          * 2077.97  * Shear (lb/sq ft)        *    0.78  *    1.72  *         *
* Alpha                   *    1.00  * Stream Power (lb/ft s)  *    7.54  *   17.78  *         *
* Frctn Loss (ft)         *    1.85  * Cum Volume (acre-ft)    *  176.94  *  120.46  *   21.36  *
* C & E Loss (ft)         *    0.05  * Cum SA (acres)          *   78.73  *   20.11  *   10.94  *
*****************************************************************************************

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.
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)          * 2084.05  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    1.20  * Wt. n-Val.              *   0.030  *   0.030  *         *
* W.S. Elev (ft)          * 2082.85  * Reach Len. (ft)         *  420.00  *  455.00  *  420.00  *
* Crit W.S. (ft)          * 2082.71  * Flow Area (sq ft)       *  451.34  *  355.26  *         *
* E.G. Slope (ft/ft)      *0.007579  * Area (sq ft)            *  464.10  *  355.26  *         *
* Q Total (cfs)           * 7019.00  * Flow (cfs)              * 4216.02  * 2802.98  *         *
* Top Width (ft)          *  311.01  * Top Width (ft)          *  169.18  *  141.83  *         *
* Vel Total (ft/s)        *    8.70  * Avg. Vel. (ft/s)        *    9.34  *    7.89  *         *
* Max Chl Dpth (ft)       *    5.42  * Hydr. Depth (ft)        *    3.21  *    2.50  *         *
* Conv. Total (cfs)       * 80624.5  * Conv. (cfs)             * 48427.8  * 32196.7  *         *
* Length Wtd. (ft)        *  435.28  * Wetted Per. (ft)        *  141.55  *  143.53  *         *
* Min Ch El (ft)          * 2077.97  * Shear (lb/sq ft)        *    1.51  *    1.17  *         *
* Alpha                   *    1.02  * Stream Power (lb/ft s)  *   14.09  *    9.24  *         *
```

```
* Frctn Loss (ft)        *    3.26  * Cum Volume (acre-ft)   *  121.70  *  100.97  *   17.29  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *   33.69  *   19.11  *    4.80  *
*****************************************************************************************************
```

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.
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: Sols Wash RS: 1.025

INPUT
Description:
Station Elevation Data num= 364

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
8581.07	2092.91	8589.36	2092.41	8600.01	2090.85	8603.58	2090.36	8617.02	2088.47
8622.85	2087.55	8625.37	2087.02	8629.63	2086.1	8632.67	2085.42	8634.47	2084.98
8651.42	2079.52	8652.39	2079.2	8652.68	2079.1	8653.34	2078.84	8655.16	2078.35
8670.36	2074.24	8674.88	2073	8679.99	2073.73	8706.74	2075.9	8712.97	2075.67
8715.8	2075.64	8720.27	2075.61	8727.42	2075.63	8727.57	2075.63	8727.82	2075.63
8734.87	2075.67	8739.04	2075.67	8742.17	2075.73	8747.46	2075.89	8749.47	2075.96
8750.66	2076.02	8756.77	2076.47	8762.28	2076.9	8764.07	2077.07	8767.09	2077.34
8771.37	2077.75	8773.9	2077.94	8778.67	2078.28	8785.52	2078.66	8785.97	2078.67
8786.73	2078.69	8793.27	2078.89	8797.14	2078.97	8800.57	2079	8806.37	2079.05
8807.87	2079.07	8808.75	2079.08	8815.17	2079.13	8820.37	2079.19	8822.47	2079.22
8826.01	2079.27	8829.77	2079.32	8831.99	2079.35	8837.07	2079.42	8843.61	2079.49
8844.37	2079.5	8845.65	2079.51	8851.67	2079.56	8855.23	2079.59	8858.97	2079.61
8865.28	2079.64	8866.27	2079.65	8866.85	2079.65	8873.57	2079.67	8878.47	2079.68
8880.87	2079.69	8884.92	2079.69	8888.17	2079.7	8890.09	2079.7	8895.47	2079.71
8901.71	2079.71	8902.77	2079.71	8904.56	2079.71	8910.07	2079.71	8913.33	2079.7
8917.37	2079.7	8924.2	2079.7	8924.67	2079.7	8924.95	2079.7	8931.97	2079.7
8936.57	2079.71	8939.27	2079.72	8943.84	2079.73	8946.57	2079.75	8948.19	2079.75
8953.87	2079.8	8959.81	2079.84	8961.17	2079.85	8963.48	2079.87	8968.47	2079.91
8971.42	2079.93	8975.77	2079.95	8983.04	2079.98	8983.07	2079.98	8983.11	2079.98
8990.37	2080	8994.66	2080	8997.67	2080.01	9002.75	2080.02	9004.97	2080.03
9006.28	2080.03	9012.27	2080.06	9017.9	2080.09	9019.57	2080.1	9022.39	2080.12
9026.87	2080.16	9029.52	2080.18	9034.17	2080.23	9041.14	2080.31	9041.47	2080.31
9042.03	2080.32	9048.77	2080.42	9052.76	2080.48	9056.07	2080.53	9061.67	2080.62
9063.37	2080.65	9064.38	2080.67	9070.67	2080.76	9076	2080.83	9077.97	2080.85
9081.31	2080.88	9085.27	2080.92	9087.62	2080.94	9092.57	2080.96	9099.24	2080.97
9099.87	2080.97	9100.94	2080.96	9107.17	2080.94	9110.85	2080.93	9114.47	2080.91
9120.58	2080.88	9121.77	2080.87	9122.47	2080.86	9129.07	2080.83	9134.09	2080.81
9136.37	2080.81	9140.22	2080.81	9143.67	2080.8	9145.71	2080.8	9150.97	2080.82
9157.33	2080.84	9158.27	2080.85	9159.86	2080.86	9165.57	2080.9	9168.95	2080.93
9172.87	2080.96	9179.5	2081.01	9180.17	2081.02	9180.57	2081.02	9187.47	2081.06
9192.19	2081.09	9194.77	2081.09	9199.13	2081.1	9202.07	2081.11	9203.81	2081.11
9209.37	2081.09	9215.43	2081.08	9216.67	2081.07	9218.77	2081.06	9223.97	2081.03
9227.05	2081.01	9231.27	2080.98	9238.41	2080.93	9238.57	2080.93	9238.67	2080.93
9245.87	2080.83	9250.29	2080.77	9253.17	2080.74	9258.05	2080.68	9260.7	2080.61
9267.89	2080.44	9280.11	2080.17	9284.85	2080.09	9287.36	2080.05	9295.46	2079.87
9307.98	2079.97	9311.2	2079.96	9316.59	2079.95	9321.79	2079.97	9330.7	2079.94
9331.76	2079.94	9332.38	2079.94	9332.64	2079.94	9332.9	2079.94	9336.6	2079.91
9340.77	2079.89	9343.24	2079.87	9350.16	2079.82	9351.14	2079.82	9352.29	2079.81
9353.72	2079.8	9355.55	2079.78	9358.04	2079.77	9361.68	2079.74	9365.69	2079.72
9368.84	2079.69	9369.74	2079.68	9375.47	2079.33	9378.69	2079.13	9380.28	2079.03
9381.2	2078.97	9383.4	2078.87	9406.41	2073.46	9410.09	2072.55	9415.02	2072.77
9428.37	2073.48	9441.07	2072.7	9444.69	2072.53	9446.67	2073.48	9455.72	2077.81
9469.89	2078.73	9472.17	2078.88	9474.07	2078.98	9479.47	2079.3	9482.67	2079.45
9486.77	2079.61	9493.71	2079.8	9494.07	2079.81	9494.29	2079.82	9501.37	2079.96
9505.91	2080.04	9508.67	2080.08	9513.35	2080.13	9515.97	2080.17	9517.53	2080.18
9523.27	2080.22	9529.15	2080.25	9530.57	2080.26	9532.98	2080.26	9537.87	2080.28
9540.77	2080.29	9545.17	2080.31	9552.39	2080.35	9552.47	2080.35	9552.62	2080.35
9559.77	2080.42	9564	2080.45	9567.07	2080.48	9572.26	2080.53	9574.37	2080.55
9575.62	2080.56	9581.67	2080.62	9587.24	2080.66	9588.97	2080.67	9591.9	2080.69
9596.27	2080.72	9598.86	2080.74	9603.57	2080.76	9610.48	2080.79	9610.87	2080.79
9611.54	2080.79	9618.17	2080.81	9622.1	2080.81	9625.47	2080.8	9631.18	2080.79
9632.77	2080.79	9633.72	2080.78	9640.07	2080.75	9645.34	2080.73	9647.37	2080.72
9650.81	2080.72	9654.67	2080.71	9656.96	2080.71	9661.97	2080.71	9668.58	2080.72
9669.27	2080.72	9670.45	2080.72	9676.57	2080.74	9680.2	2080.75	9683.87	2080.76
9690.09	2080.77	9691.17	2080.78	9691.82	2080.78	9698.48	2080.79	9703.44	2080.8
9705.77	2080.8	9709.73	2080.81	9713.08	2080.82	9715.05	2080.82	9720.38	2080.83

```
 9726.67 2080.83 9727.68 2080.83 9729.37 2080.83 9734.98 2080.83 9738.29 2080.83
 9742.28 2080.83 9749.01 2080.82 9749.58 2080.82 9749.91 2080.82 9754.67 2080.82
 9757.01 2080.82 9760.98 2080.82 9764.78 2080.83 9771.67 2080.86 9772.54 2080.86
 9774.84 2080.88  9780.3 2080.91 9782.35 2080.93 9788.06 2080.96 9793.04 2080.99
 9795.82 2080.99  9803.2 2080.99 9803.58 2080.99 9803.73 2080.99 9811.34 2081.06
 9812.64 2081.07 9837.37 2079.32 9839.08 2079.24 9842.93 2078.98 9850.88 2079.51
 9867.85 2080.56 9873.43 2080.75 9878.54 2080.94  9881.2    2081 9888.26 2081.18
 9888.96  2081.2 9889.22 2081.21 9896.72 2081.29 9899.91 2081.32 9904.48 2081.31
  9910.6 2081.31 9912.24 2081.29 9916.61 2081.27    9920 2081.25 9921.28 2081.24
 9927.76 2081.13 9931.97 2081.03 9943.76 2080.39 9951.41 2080.03 9956.66 2078.54
 9972.14 2074.78  9980.8 2075.11 9989.86 2075.64 9996.09 2075.76 9997.62 2075.77
   10000 2075.7810001.67 2075.7910005.38 2075.8110006.78 2075.8110013.14  2075.8
10017.46 2075.78 10020.9 2075.7610028.15 2075.7410032.43  2075.510043.87 2074.81
10046.66 2074.6810048.53 2075.7110064.35 2084.57 10066.4  2084.910068.43 2084.91
10092.84 2083.0410095.56 2082.7810101.15 2082.3610105.99 2082.3310109.68  2082.8
10111.57  2083.510123.99 2088.7710125.63 2089.5210126.98 2090.32 10131.1 2092.55
10137.22 2095.2310145.89 2098.96 10152.7 2099.6810158.21 2100.06

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
 8581.07     .15  9383.4    .035 9469.89     .05 9703.44    .067 9951.41    .031
10064.35     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9951.4110064.35              360     444     440              .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
 8581.07    9000    2084       F
   1008010158.21    2086       F

CROSS SECTION OUTPUT  Profile #PF 1
*********************************************************************************************
* E.G. Elev (ft)         * 2082.79  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.76  * Wt. n-Val.              *   0.039  *   0.031  *          *
* W.S. Elev (ft)         * 2081.03  * Reach Len. (ft)        *  360.00  *  444.00  *  440.00  *
* Crit W.S. (ft)         * 2081.43  * Flow Area (sq ft)      *  968.81  *  526.43  *          *
* E.G. Slope (ft/ft)     *0.009099  * Area (sq ft)           * 1961.27  *  526.43  *          *
* Q Total (cfs)          *14413.00  * Flow (cfs)             * 7535.21  * 6877.79  *          *
* Top Width (ft)         * 1315.58  * Top Width (ft)         * 1208.96  *  106.62  *          *
* Vel Total (ft/s)       *    9.64  * Avg. Vel. (ft/s)       *    7.78  *   13.06  *          *
* Max Chl Dpth (ft)      *    8.50  * Hydr. Depth (ft)       *    1.13  *    4.94  *          *
* Conv. Total (cfs)      *151098.9  * Conv. (cfs)            * 78995.4  * 72103.5  *          *
* Length Wtd. (ft)       *  399.02  * Wetted Per. (ft)       *  857.94  *  108.99  *          *
* Min Ch El (ft)         * 2074.68  * Shear (lb/sq ft)       *    0.64  *    2.74  *          *
* Alpha                  *    1.22  * Stream Power (lb/ft s) *    4.99  *   35.85  *          *
* Frctn Loss (ft)        *    3.46  * Cum Volume (acre-ft)   *  161.28  *  114.38  *   21.22  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *   68.09  *   18.73  *   10.75  *
*********************************************************************************************

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.
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)         * 2080.77  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.38  * Wt. n-Val.              *   0.035  *   0.031  *          *
* W.S. Elev (ft)         * 2079.39  * Reach Len. (ft)        *  360.00  *  444.00  *  440.00  *
* Crit W.S. (ft)         * 2079.05  * Flow Area (sq ft)      *  389.53  *  354.08  *          *
* E.G. Slope (ft/ft)     *0.007420  * Area (sq ft)           *  863.05  *  354.08  *          *
* Q Total (cfs)          * 7019.00  * Flow (cfs)             * 3694.50  * 3324.51  *          *
* Top Width (ft)         *  403.41  * Top Width (ft)         *  302.00  *  101.41  *          *
* Vel Total (ft/s)       *    9.44  * Avg. Vel. (ft/s)       *    9.48  *    9.39  *          *
* Max Chl Dpth (ft)      *    6.86  * Hydr. Depth (ft)       *    3.27  *    3.49  *          *
* Conv. Total (cfs)      * 81485.6  * Conv. (cfs)            * 42890.5  * 38595.2  *          *
* Length Wtd. (ft)       *  400.73  * Wetted Per. (ft)       *  121.36  *  103.26  *          *
* Min Ch El (ft)         * 2074.68  * Shear (lb/sq ft)       *    1.49  *    1.59  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *   14.10  *   14.91  *          *
* Frctn Loss (ft)        *    2.97  * Cum Volume (acre-ft)   *  115.30  *   97.27  *   17.29  *
* C & E Loss (ft)        *    0.14  * Cum SA (acres)         *   31.42  *   17.84  *    4.80  *
*********************************************************************************************

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.
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: Sols Wash RS: 0.941

INPUT
Description:
Station Elevation Data num= 280

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
8704.3	2089.89	8705.37	2089.89	8715.89	2090.02	8723.7	2089.87	8727.73	2089.74
8739.52	2088.96	8740.06	2088.93	8741.45	2088.62	8750.98	2086.27	8757.95	2083.85
8767.88	2080.03	8777.3	2080.17	8783.52	2080.26	8785.42	2080.21	8789.94	2080.08
8793.06	2080	8794.37	2079.96	8800.7	2079.62	8805.22	2079.37	8808.33	2079.2
8815.74	2078.81	8815.97	2078.8	8816.07	2078.8	8823.61	2078.49	8826.91	2078.36
8831.25	2078.23	8837.76	2078.05	8838.88	2078.02	8841.55	2077.97	8846.52	2077.89
8848.61	2077.85	8854.16	2077.77	8859.46	2077.69	8861.79	2077.65	8867.36	2077.54
8869.43	2077.51	8870.3	2077.49	8877.07	2077.32	8881.15	2077.17	8884.71	2077.04
8892	2076.66	8892.34	2076.64	8893.17	2076.58	8899.98	2076.03	8902.85	2075.64
8907.62	2075.07	8914.62	2073.95	8925.68	2072.06	8929.26	2071.95	8937.51	2071.95
8939.53	2072.26	8960.5	2074.53	8965.73	2074.6	8971.7	2074.92	8982.34	2076.18
8984.71	2076.18	8988.7	2076.15	9005.16	2076.2	9012.17	2075.88	9014.87	2075.42
9026.24	2074.34	9029.13	2074.05	9030.7	2073.96	9040.96	2074.24	9057.03	2074.49
9057.89	2074.64	9060.37	2075.01	9075.37	2075.85	9077.55	2075.87	9078.15	2075.87
9078.91	2075.87	9080.76	2075.89	9092.51	2075.88	9099.68	2076.14	9108.95	2076.53
9113.83	2076.66	9119.79	2076.74	9121.46	2076.76	9125.43	2076.77	9129.1	2076.8
9130.64	2076.81	9136.74	2076.85	9141.49	2076.88	9144.37	2076.9	9151.24	2076.93
9152.01	2076.94	9152.34	2076.94	9152.88	2076.93	9166.5	2076.78	9174.83	2076.53
9192.13	2076.63	9197.68	2076.7	9206.74	2077.1	9217.42	2077.47	9220.75	2077.54
9228.27	2077.56	9228.38	2077.56	9228.66	2077.56	9236.02	2077.56	9239.12	2077.56
9243.66	2077.56	9249.96	2077.59	9251.3	2077.59	9254.47	2077.62	9258.93	2077.64
9260.81	2077.66	9266.57	2077.69	9271.66	2077.73	9274.21	2077.73	9280.27	2077.75
9281.85	2077.75	9282.51	2077.75	9289.48	2077.72	9293.35	2077.7	9297.12	2077.67
9304.2	2077.61	9304.76	2077.61	9306.08	2077.59	9312.53	2077.52	9317.38	2077.42
9324.85	2077.29	9325.84	2077.28	9327.01	2077.26	9328.39	2077.23	9330.09	2077.2
9332.22	2077.16	9335.02	2077.11	9338.77	2077.03	9338.81	2077.03	9338.83	2077.03
9341.58	2077.07	9343.86	2077.1	9345.76	2077.12	9347.37	2077.15	9348.74	2077.16
9353.33	2077.2	9354.83	2077.21	9365.86	2077.35	9369.29	2077.35	9373.49	2077.36
9380.13	2077.36	9381.13	2077.36	9383.5	2077.35	9391.19	2077.34	9395.07	2077.26
9409.11	2077	9421.65	2077.6	9426.95	2077.84	9434.37	2078.03	9434.59	2078.04
9435.12	2078.04	9442.23	2078.12	9445.22	2078.13	9449.87	2078.12	9456.07	2078.06
9457.5	2078.02	9463.06	2077.77	9473.19	2077.31	9477.31	2077.1	9480.4	2077.13
9489.7	2077.04	9511.2	2076.74	9519.43	2076.46	9522.6	2075.26	9530.38	2072.67
9535.7	2071.91	9541.38	2070.76	9558.64	2070.59	9578.68	2070.57	9587.09	2074.25
9589.59	2075.39	9594.01	2075.61	9604.45	2075.91	9605.38	2075.94	9606.37	2075.96
9616.84	2076	9619.23	2075.93	9627.78	2076.11	9633.66	2076.44	9648.44	2077.61
9651.32	2077.72	9656.07	2077.87	9662.17	2078.05	9663.71	2078.08	9667.38	2078.15
9671.35	2078.21	9673.02	2078.24	9678.98	2078.28	9683.86	2078.3	9686.62	2078.3
9693.19	2078.31	9694.26	2078.31	9694.71	2078.31	9701.9	2078.3	9705.56	2078.31
9709.53	2078.3	9716.41	2078.31	9717.17	2078.31	9718.99	2078.3	9724.81	2078.27
9727.25	2078.27	9732.45	2078.21	9738.1	2078.15	9740.08	2078.06	9743.75	2077.89
9754.69	2077.63	9763.14	2077.24	9773.42	2076.61	9775.86	2076.67	9801.2	2077.01
9802	2077.1	9802.79	2077.16	9805.62	2077.41	9810.91	2077.85	9812.38	2077.98
9819.04	2078.27	9822.76	2078.4	9827.16	2078.47	9833.14	2078.52	9835.28	2078.51
9842.98	2078.46	9843.4	2078.45	9843.52	2078.45	9851.52	2078.4	9853.9	2078.39
9859.65	2078.43	9864.28	2078.44	9867.77	2078.48	9874.65	2078.55	9875.89	2078.56
9880.35	2078.61	9884.01	2078.65	9885.03	2078.66	9892.14	2078.63	9895.41	2078.63
9900.26	2078.55	9905.79	2078.46	9908.38	2078.38	9916.17	2078.16	9916.5	2078.15
9917.71	2078.1	9924.63	2077.85	9926.55	2077.78	9932.75	2077.5	9936.93	2077.29
9940.87	2077.08	9947.31	2076.73	9950.27	2076.58	9957.53	2076.18	9978.77	2071.73
9981	2071.42	9981.71	2071.19	9982.61	2071.23	9984.59	2071.3	9999.2	2071.86
10000.01	2071.87	10005.85	2071.93	10009.58	2071.92	10013.97	2071.91	0019.96	2071.87
10022.1	2071.88	10029.8	2071.86	10030.22	2071.85	10030.4	2071.85	10031.06	2072.04
10058.48	2077.21	10063.2	2079.88	10080.96	2080.73	10082.93	2080.8	10083.95	2080.83
10088.88	2080.56	10128.45	2078.75	10138.93	2077.26	10144.52	2076.55	10149.46	2076.67
10158.95	2076.28	10174.94	2077	10176.42	2077.03	10179.25	2077.09	10182.84	2077.17

Manning's n Values num= 8

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
8704.3	.058	8893.17	.034	8982.34	.15	9519.43	.042	9589.59	.076
9701.9	.08	9957.53	.034	10063.2	.032				

```
Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9957.53 10063.2              350     435     440            .1        .3
Ineffective Flow     num=       2
   Sta L   Sta R   Elev  Permanent
  8704.3    8955   2080       F
   1008010182.84   2082       F

CROSS SECTION OUTPUT  Profile #PF 1
*****************************************************************************************
* E.G. Elev (ft)         * 2079.64  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.32  * Wt. n-Val.              *   0.057  *   0.034  *         *
* W.S. Elev (ft)         * 2078.32  * Reach Len. (ft)        *  350.00  *  435.00  *  440.00  *
* Crit W.S. (ft)         * 2078.06  * Flow Area (sq ft)      * 1614.04  *  538.74  *         *
* E.G. Slope (ft/ft)     *0.009153  * Area (sq ft)           * 1949.80  *  538.74  *   74.43  *
* Q Total (cfs)          *14413.00  * Flow (cfs)             * 7679.65  * 6733.35  *         *
* Top Width (ft)         * 1193.49  * Top Width (ft)         * 1039.21  *  102.91  *   51.36  *
* Vel Total (ft/s)       *    6.70  * Avg. Vel. (ft/s)       *    4.76  *   12.50  *         *
* Max Chl Dpth (ft)      *    7.75  * Hydr. Depth (ft)       *    1.77  *    5.23  *         *
* Conv. Total (cfs)      *150649.0  * Conv. (cfs)            * 80270.0  * 70379.0  *         *
* Length Wtd. (ft)       *  387.68  * Wetted Per. (ft)       *  914.92  *  104.25  *         *
* Min Ch El (ft)         * 2071.19  * Shear (lb/sq ft)       *    1.01  *    2.95  *         *
* Alpha                  *    1.90  * Stream Power (lb/ft s) *    4.80  *   36.91  *         *
* Frctn Loss (ft)        *    3.73  * Cum Volume (acre-ft)   *  145.12  *  108.96  *   20.85  *
* C & E Loss (ft)        *    0.12  * Cum SA (acres)         *   58.80  *   17.66  *   10.49  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
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.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, water
         surface was used.
Note:    Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT  Profile #PF 2
*****************************************************************************************
* E.G. Elev (ft)         * 2077.65  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.91  * Wt. n-Val.              *   0.047  *   0.034  *         *
* W.S. Elev (ft)         * 2076.74  * Reach Len. (ft)        *  350.00  *  435.00  *  440.00  *
* Crit W.S. (ft)         * 2076.20  * Flow Area (sq ft)      *  613.47  *  379.04  *         *
* E.G. Slope (ft/ft)     *0.007423  * Area (sq ft)           *  805.12  *  379.04  *    5.72  *
* Q Total (cfs)          * 7019.00  * Flow (cfs)             * 3536.98  * 3482.02  *         *
* Top Width (ft)         *  532.15  * Top Width (ft)         *  407.46  *   98.47  *   26.22  *
* Vel Total (ft/s)       *    7.07  * Avg. Vel. (ft/s)       *    5.77  *    9.19  *         *
* Max Chl Dpth (ft)      *    6.17  * Hydr. Depth (ft)       *    1.79  *    3.85  *         *
* Conv. Total (cfs)      * 81466.9  * Conv. (cfs)            * 41052.4  * 40414.5  *         *
* Length Wtd. (ft)       *  391.93  * Wetted Per. (ft)       *  345.08  *   99.47  *         *
* Min Ch El (ft)         * 2071.19  * Shear (lb/sq ft)       *    0.82  *    1.77  *         *
* Alpha                  *    1.17  * Stream Power (lb/ft s) *    4.75  *   16.22  *         *
* Frctn Loss (ft)        *    3.77  * Cum Volume (acre-ft)   *  108.41  *   93.53  *   17.26  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *   28.49  *   16.82  *    4.67  *
*****************************************************************************************

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.
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: Sols Wash          RS: 0.859

INPUT
Description:
Station Elevation Data    num=     248
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
 8749.24 2092.58 8755.03 2092.52 8755.93 2092.52 8760.04 2092.49 8764.33 2092.47
 8765.27 2092.46 8772.73  2092.5  8775.5 2092.51 8781.12  2092.6 8785.74 2092.67
 8792.96 2092.81 8800.79 2092.96 8806.46 2093.06 8810.56  2093.1 8817.62 2091.72
 8826.69 2089.86  8831.5 2088.96 8836.93 2087.94  8839.9  2087.5 8846.91 2085.65
```

```
 8852.65    2085 8858.98  2084.8 8863.83 2084.53 8871.37 2084.45 8874.54 2084.38
 8882.23 2084.28 8882.92 2084.27 8884.36 2084.27 8885.99 2084.25 8886.44 2084.25
 8887.63 2084.25 8889.43 2084.25 8889.53 2084.25 8891.87 2084.49  8902.9 2084.94
 8904.68 2084.89  8909.6 2085.04 8915.87  2085.1 8917.57 2085.17 8923.87 2085.29
 8929.07 2085.21 8932.27 2085.12  8939.3 2084.75 8954.56 2083.88 8959.88 2083.56
 8961.06  2083.5 8966.21  2080.7 8970.58 2078.42 8984.32  2078.4 8992.09 2078.38
 9008.21 2078.14 9010.96 2078.14 9016.24 2078.03  9021.2 2077.98 9024.63  2077.9
 9031.44 2077.73 9033.03 2077.69 9040.29 2077.47 9041.43 2077.44 9041.68 2077.43
 9049.82 2077.09 9051.91 2077.01 9057.03 2076.78 9067.82 2076.28 9073.98 2076.06
 9083.35 2073.11 9100.32 2068.44 9112.78 2068.44 9113.38 2068.44 9113.58 2068.43
 9138.09 2071.82 9141.27 2072.25 9152.36 2072.89 9160.86 2072.95 9164.56 2073.05
 9170.24 2073.36 9184.18 2074.07    9185  2074.1 9192.57  2074.3 9195.24 2074.34
 9200.97 2074.36 9205.47 2074.37 9209.37 2074.35 9215.71  2074.3 9217.76 2074.28
 9225.95 2074.15 9226.16 2074.15 9242.42 2073.47 9244.44 2073.42 9246.99 2073.35
 9249.38 2073.29 9253.59 2073.33  9260.5  2073.4 9267.03 2073.46 9273.83 2073.59
 9276.66 2073.63 9278.02 2073.66 9288.72 2073.85 9296.92 2073.97 9303.41 2073.99
  9317.4 2074.13 9318.22 2074.12 9318.33 2074.11 9320.54 2074.16 9328.32 2074.23
 9335.32 2074.25 9338.56 2074.29 9343.72 2074.28  9348.8 2074.31 9356.73 2074.33
 9359.28 2074.32 9367.25 2074.28 9368.91 2074.26 9369.27 2074.26 9371.36 2074.19
 9385.47  2073.7 9394.27 2073.65 9396.55 2073.61 9400.43 2073.61 9403.15 2073.61
  9408.5 2073.61    9412 2073.61 9412.95 2073.61 9421.15 2073.79  9430.7 2074.07
 9447.75 2073.96 9449.42 2073.94 9450.51 2073.97 9469.67 2074.54 9471.65 2074.58
 9478.07 2074.69 9481.88 2074.74 9486.47 2074.79 9492.12 2074.84 9494.86 2074.84
 9502.36 2074.83 9503.26 2074.82 9524.69    2074 9526.26 2073.94 9526.41 2073.93
 9526.45 2073.93 9539.11 2073.89 9543.18 2073.84 9550.67 2073.76 9552.73  2073.7
 9569.09 2068.27  9572.2 2067.24 9588.88 2068.76 9591.41 2068.97 9593.05 2068.95
 9607.09 2068.59 9615.23 2072.11 9617.57 2073.12 9618.81 2073.18 9644.24 2071.16
 9647.66 2070.44 9662.54 2073.04 9664.68 2073.62  9671.3 2073.81 9681.18 2074.19
 9686.63  2074.4 9687.99 2074.42 9694.21 2074.53 9696.39 2074.57 9696.87 2074.58
 9704.79 2074.59 9707.11 2074.59 9713.18 2074.58 9717.34 2074.56 9721.58 2074.57
 9727.58 2074.58 9729.98  2074.6 9737.82 2074.65 9738.37 2074.66 9740.91 2074.68
 9746.77 2074.74 9748.06 2074.75 9755.17 2074.82 9758.29 2074.85 9763.57  2074.9
 9768.53 2074.95 9771.96 2074.99 9778.77 2075.06 9780.36 2075.08 9787.62 2075.16
 9788.76 2075.17 9789.01 2075.17 9797.15 2075.26 9799.24 2075.28 9805.55 2075.34
 9809.48 2075.37 9813.95  2075.4 9819.72 2075.44 9822.34 2075.45 9829.95 2075.51
 9830.74 2075.51 9834.33 2075.54 9834.63 2075.54 9839.41 2075.58 9840.11 2075.58
 9848.31 2075.63  9850.2 2075.64 9857.21 2075.66 9860.29 2075.66 9866.11 2075.66
 9870.38 2075.64 9875.02 2075.62 9880.47 2075.57 9883.92 2075.54 9890.55 2075.43
 9892.82 2075.37 9900.64 2075.15 9901.72 2075.09 9909.81 2074.59 9910.62 2074.54
 9910.73 2074.53 9922.63 2073.26 9938.62 2070.63 9947.45 2068.72  9957.9 2069.04
 9971.26 2069.45 9972.93 2069.45 9981.35 2069.44 9981.84 2069.44 9985.47 2069.42
 9990.74  2069.4 9991.44  2069.4 9999.64 2069.3810000.01 2069.3710001.53 2069.37
10008.54 2069.3810011.62 2069.3910017.44 2069.43 10021.7 2069.4710026.34 2069.52
10031.79  2069.410046.21 2068.8410048.25 2068.7310049.39 2068.6910050.22 2068.66
10054.16 2070.9510065.91 2076.3710078.49 2077.3710091.74 2076.9910099.95 2076.65
10105.37 2076.9410125.96 2077.2210142.32 2075.11

Manning's n Values        num=       8
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*****************************************************************************
 8749.24    .058 9073.98    .034 9152.36     .15 9552.73    .042 9664.68    .076
 9857.21     .08 9947.45    .03410046.21    .032

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9900.6410065.91              220     424     440             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
   1010010142.32    2079       F

CROSS SECTION OUTPUT  Profile #PF 1
*************************************************************************************
* E.G. Elev (ft)         * 2075.78  * Element                * Left OB * Channel * Right OB *
* Vel Head (ft)          *    0.92  * Wt. n-Val.             *   0.043 *   0.048 *         *
* W.S. Elev (ft)         * 2074.86  * Reach Len. (ft)        *  220.00 *  424.00 *  440.00 *
* Crit W.S. (ft)         * 2074.63  * Flow Area (sq ft)      * 1174.26 *  714.70 *         *
* E.G. Slope (ft/ft)     *0.010145  * Area (sq ft)           * 1174.26 *  714.70 *         *
* Q Total (cfs)          *14413.00  * Flow (cfs)             * 8368.22 * 6044.78 *         *
* Top Width (ft)         *  838.32  * Top Width (ft)         *  681.19 *  157.13 *         *
* Vel Total (ft/s)       *    7.63  * Avg. Vel. (ft/s)       *    7.13 *    8.46 *         *
* Max Chl Dpth (ft)      *    7.62  * Hydr. Depth (ft)       *    1.72 *    4.55 *         *
* Conv. Total (cfs)      *143099.3  * Conv. (cfs)            * 83083.7 * 60015.6 *         *
* Length Wtd. (ft)       *  326.95  * Wetted Per. (ft)       *  685.01 *  159.13 *         *
* Min Ch El (ft)         * 2068.66  * Shear (lb/sq ft)       *    1.09 *    2.84 *         *
* Alpha                  *    1.02  * Stream Power (lb/ft s) *    7.74 *   24.06 *         *
* Frctn Loss (ft)        *    2.89  * Cum Volume (acre-ft)   *  132.57 *  102.70 *   20.47 *
* C & E Loss (ft)        *    0.07  * Cum SA (acres)         *   51.89 *   16.36 *   10.23 *
*************************************************************************************

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.
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

E.G. Elev (ft)	2073.87	Element	Left OB	Channel	Right OB	
Vel Head (ft)	1.12	Wt. n-Val.	0.039	0.043		
W.S. Elev (ft)	2072.75	Reach Len. (ft)	220.00	424.00	440.00	
Crit W.S. (ft)	2072.53	Flow Area (sq ft)	413.83	412.56		
E.G. Slope (ft/ft)	0.012990	Area (sq ft)	413.83	412.56		
Q Total (cfs)	7019.00	Flow (cfs)	3575.51	3443.49		
Top Width (ft)	295.18	Top Width (ft)	162.88	132.30		
Vel Total (ft/s)	8.49	Avg. Vel. (ft/s)	8.64	8.35		
Max Chl Dpth (ft)	5.51	Hydr. Depth (ft)	2.54	3.12		
Conv. Total (cfs)	61584.6	Conv. (cfs)	31371.5	30213.2		
Length Wtd. (ft)	337.90	Wetted Per. (ft)	165.91	133.72		
Min Ch El (ft)	2068.66	Shear (lb/sq ft)	2.02	2.50		
Alpha	1.00	Stream Power (lb/ft s)	17.48	20.88		
Frctn Loss (ft)	3.35	Cum Volume (acre-ft)	103.51	89.58	17.23	
C & E Loss (ft)	0.02	Cum SA (acres)	26.20	15.67	4.53	

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.
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

RIVER: Sols Wash
REACH: Sols Wash RS: 0.779

INPUT
Description:
Station Elevation Data num= 262

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
8731.76	2088.43	8741.58	2087.98	8747.57	2087.34	8754.01	2086.96	8780.11	2085.1
8780.86	2085.09	8781.05	2085.09	8781.28	2085.08	8781.58	2085.09	8798.26	2084.78
8801.78	2084.8	8809.54	2084.84	8816.24	2084.8	8824.28	2084.56	8829.37	2084.49
8834.85	2084.28	8839.49	2084.17	8844.85	2083.95	8849.61	2083.79	8854.85	2083.56
8859.73	2083.34	8864.85	2083.09	8869.86	2082.81	8874.85	2082.53	8879.98	2082.2
8884.85	2081.89	8890.1	2081.54	8894.86	2081.2	8900.22	2080.86	8904.86	2080.53
8910.34	2080.2	8914.86	2079.87	8920.46	2079.53	8924.86	2079.21	8930.58	2078.81
8934.86	2078.48	8940.7	2078.02	8944.86	2077.73	8960.24	2075.35	8964.03	2074.76
8967.27	2074.27	8986.86	2074.26	8988.27	2074.26	8991.54	2074.13	8995.14	2074
9014.86	2073.14	9021.67	2073.12	9024.86	2073.12	9031.8	2073.02	9034.87	2072.97
9041.92	2072.91	9044.87	2072.87	9052.04	2072.83	9054.87	2072.8	9062.16	2072.77
9064.87	2072.75	9072.28	2072.73	9074.87	2072.72	9082.4	2072.71	9084.87	2072.7
9092.52	2072.69	9094.87	2072.69	9102.64	2072.69	9104.87	2072.69	9112.77	2072.71
9114.87	2072.71	9122.89	2072.72	9124.87	2072.72	9133.01	2072.72	9134.87	2072.71
9143.13	2072.69	9144.87	2072.68	9153.25	2072.63	9154.87	2072.62	9163.37	2072.51
9164.87	2072.5	9173.49	2072.33	9174.88	2072.3	9183.61	2072.11	9184.88	2072.08
9193.73	2071.93	9194.88	2071.91	9203.86	2071.81	9204.88	2071.8	9213.98	2071.74
9214.88	2071.74	9224.1	2071.69	9224.88	2071.68	9234.22	2071.61	9234.88	2071.61
9244.34	2071.53	9244.88	2071.53	9254.46	2071.43	9254.88	2071.43	9264.58	2071.32
9264.88	2071.32	9274.7	2071.21	9274.88	2071.21	9284.83	2071.1	9284.88	2071.1
9289.72	2071.05	9294.88	2071	9294.95	2071	9304.88	2070.87	9305.07	2070.87
9314.89	2070.77	9315.19	2070.77	9330.5	2070.65	9341.94	2070.59	9350.05	2069.32
9370.81	2065.99	9374.26	2066.04	9393.72	2066.34	9396.65	2066.89	9406.92	2068.99
9418.11	2070.57	9428.53	2070.65	9441.47	2070.75	9443.97	2070.81	9445.39	2070.82
9453.9	2070.95	9464.67	2071.08	9467.01	2071.15	9474.9	2071.25	9477.13	2071.3
9484.9	2071.38	9487.25	2071.39	9494.9	2071.42	9497.37	2071.41	9504.9	2071.38
9507.49	2071.35	9527.76	2070.86	9530.76	2070.78	9532.94	2070.72	9553.61	2071.36
9558.1	2071.45	9570.08	2071.07	9571.49	2071.04	9573.21	2071.01	9575.18	2070.99
9583.15	2070.87	9584.73	2070.91	9586.51	2070.95	9588.38	2070.99	9591.21	2071.02
9592.92	2071.07	9594.61	2071.11	9596.13	2071.13	9608.21	2071.52	9609.26	2071.52

```
 9610.33 2071.56 9616.46 2071.62  9618.5 2071.61 9624.28 2071.42 9629.14 2071.23
 9632.14 2071.22 9643.45 2070.72 9646.84 2070.52 9654.62 2069.33  9670.4 2065.42
 9673.97 2065.55 9702.59 2065.48 9711.99 2065.53 9713.03 2065.48 9720.55 2069.98
 9724.01 2070.66  9730.4 2070.87 9744.92  2071.3  9750.4 2071.45 9754.92 2071.59
 9760.52 2071.65 9764.92  2071.7 9770.64 2071.71 9774.92 2071.72 9780.76  2071.7
 9784.92 2071.69 9790.89 2071.67 9794.92 2071.65 9801.01 2071.62 9804.92  2071.6
 9811.13 2071.57 9814.92 2071.55 9821.25 2071.49 9824.92 2071.46 9831.37 2071.36
 9834.92 2071.31 9841.49 2071.17 9844.92 2071.11 9851.61 2070.92 9854.92 2070.84
 9861.73 2070.59 9864.92 2070.49 9871.85 2070.18 9874.93 2070.03 9881.98 2069.69
 9884.93 2069.52    9888 2069.33 9900.15 2068.74 9910.68 2066.18 9913.27 2065.55
  9916.2 2065.74 9918.99  2065.9 9934.93 2066.82  9942.7 2066.77 9944.93 2066.75
 9952.82 2066.67 9954.93 2066.64 9962.95  2066.5 9964.93 2066.46 9973.07 2066.23
 9974.93 2066.18 9983.19 2065.86 9984.93 2065.79 9993.31 2065.43 9994.93 2065.35
   10000 2065.1310003.43 2064.9810004.93 2064.9210013.55 2064.6410014.94 2064.59
10016.69 2064.4710033.21 2063.2310042.21 2067.2210050.96 2071.3110056.57 2071.66
10072.87 2072.3510074.94 2072.44 10084.4 2072.5410084.94 2072.5510094.52 2072.47
10094.94 2072.4610104.64 2072.3710104.94 2072.3610114.76 2072.3310114.94 2072.33
10124.89 2072.3510124.94 2072.3510129.78 2072.3810134.94 2072.4110135.01 2072.41
10144.94 2072.4610145.13 2072.4610154.95  2072.510155.25  2072.510164.95  2072.5
10165.37  2072.510174.95 2072.4610175.49 2072.4510184.95 2072.0210192.58 2071.48
10201.51 2070.86 10202.5 2070.7910203.37 2070.7210205.54  2070.610233.33 2069.34
10238.25 2069.4510241.93 2068.5910263.46 2072.3110268.99 2072.8410276.33 2072.65
10295.56 2071.9810317.85 2070.05

Manning's n Values        num=       8
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*****************************************************************************
 8731.76     .058 9341.94    .034 9418.11     .15 9646.84    .042 9724.01    .076
 9794.92      .08 9900.15    .03410050.96    .032

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9900.1510050.96              370     325     250             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
   1010010317.85    2075       F

CROSS SECTION OUTPUT  Profile #PF 1
*************************************************************************************
* E.G. Elev (ft)         * 2072.82  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.59  * Wt. n-Val.              *   0.040  *   0.034  *          *
* W.S. Elev (ft)         * 2071.23  * Reach Len. (ft)        *  370.00  *  325.00  *  250.00  *
* Crit W.S. (ft)         * 2071.23  * Flow Area (sq ft)      *  744.95  *  787.81  *          *
* E.G. Slope (ft/ft)     *0.007794  * Area (sq ft)           *  744.95  *  787.81  *   83.34  *
* Q Total (cfs)          *14413.00  * Flow (cfs)             * 5344.79  * 9068.21  *          *
* Top Width (ft)         *  671.03  * Top Width (ft)          *  445.77  *  150.64  *   74.62  *
* Vel Total (ft/s)       *    9.40  * Avg. Vel. (ft/s)        *    7.17  *   11.51  *          *
* Max Chl Dpth (ft)      *    8.00  * Hydr. Depth (ft)        *    1.67  *    5.23  *          *
* Conv. Total (cfs)      *163262.3  * Conv. (cfs)             * 60542.7  *102719.6  *          *
* Length Wtd. (ft)       *  336.40  * Wetted Per. (ft)        *  448.50  *  152.88  *          *
* Min Ch El (ft)         * 2063.23  * Shear (lb/sq ft)        *    0.81  *    2.51  *          *
* Alpha                  *    1.16  * Stream Power (lb/ft s)  *    5.80  *   28.86  *          *
* Frctn Loss (ft)        *    1.61  * Cum Volume (acre-ft)    *  127.72  *   95.38  *   20.05  *
* C & E Loss (ft)        *    0.27  * Cum SA (acres)          *   49.04  *   14.86  *    9.85  *
*************************************************************************************

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 cross-section end points had to be extended vertically for the computed water surface.
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.
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)         * 2070.50  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.05  * Wt. n-Val.              *   0.039  *   0.034  *          *
* W.S. Elev (ft)         * 2069.45  * Reach Len. (ft)        *  370.00  *  325.00  *  250.00  *
```

Crit W.S. (ft)	2069.00	Flow Area (sq ft)	355.93	522.88		
E.G. Slope (ft/ft)	0.007807	Area (sq ft)	355.93	522.88	4.09	
Q Total (cfs)	7019.00	Flow (cfs)	2349.55	4669.45		
Top Width (ft)	303.45	Top Width (ft)	140.79	146.83	15.83	
Vel Total (ft/s)	7.99	Avg. Vel. (ft/s)	6.60	8.93		
Max Chl Dpth (ft)	6.22	Hydr. Depth (ft)	2.53	3.56		
Conv. Total (cfs)	79441.3	Conv. (cfs)	26592.3	52849.0		
Length Wtd. (ft)	332.55	Wetted Per. (ft)	142.97	148.67		
Min Ch El (ft)	2063.23	Shear (lb/sq ft)	1.21	1.71		
Alpha	1.06	Stream Power (lb/ft s)	8.01	15.31		
Frctn Loss (ft)	1.75	Cum Volume (acre-ft)	101.57	85.03	17.21	
C & E Loss (ft)	0.13	Cum SA (acres)	25.43	14.31	4.45	

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

This may indicate the need for additional cross sections.
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: Sols Wash RS: 0.717

INPUT
Description:
Station Elevation Data num= 333

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
8687.92	2083.74	8698.5	2082.98	8700.6	2082.83	8701.18	2082.78	8701.55	2082.66
8732.41	2077.4	8733.04	2077.36	8733.68	2077.33	8743.06	2076.87	8744.34	2076.81
8753.07	2076.37	8755	2076.3	8763.09	2075.92	8765.66	2075.82	8773.11	2075.51
8776.31	2075.39	8783.13	2075.13	8786.97	2075.01	8793.15	2074.8	8797.63	2074.68
8803.16	2074.52	8808.29	2074.41	8813.18	2074.27	8818.95	2074.14	8823.2	2074
8829.6	2073.84	8833.22	2073.72	8840.26	2073.52	8843.24	2073.42	8850.92	2073.2
8853.25	2073.12	8861.58	2072.84	8863.27	2072.78	8872.24	2072.42	8873.29	2072.39
8874.22	2072.34	8885.47	2071.75	8897.55	2071.48	8906.8	2070.31	8916.24	2069.1
8925.56	2067.62	8929.26	2067.58	8934.69	2067.58	8943.42	2067.59	8954.66	2067.38
8962.42	2067.15	8979.96	2067.52	8996.72	2067.54	9000.13	2067.62	9003.52	2067.72
9010.79	2067.73	9013.54	2067.75	9021.45	2067.73	9023.56	2067.74	9032.11	2067.76
9033.58	2067.76	9042.77	2067.84	9043.6	2067.85	9053.43	2067.95	9053.61	2067.95
9056.56	2067.97	9063.63	2068.02	9064.08	2068.02	9073.65	2068.05	9074.74	2068.05
9083.67	2068.05	9085.4	2068.05	9093.69	2068.06	9096.06	2068.05	9103.7	2068.06
9106.72	2068.06	9113.72	2068.07	9117.37	2068.06	9123.74	2068.07	9128.03	2068.08
9133.76	2068.08	9138.69	2068.08	9143.78	2068.07	9149.35	2068.08	9153.79	2068.08
9160.01	2068.09	9163.81	2068.09	9170.67	2068.1	9173.83	2068.1	9181.32	2068.09
9183.85	2068.09	9191.98	2068.05	9193.87	2068.05	9202.64	2068.04	9203.88	2068.04
9213.3	2068.06	9213.9	2068.06	9223.36	2068.05	9223.92	2068.05	9223.96	2068.05
9233.94	2068.01	9234.61	2068.01	9243.96	2067.98	9245.27	2067.98	9253.97	2067.99
9255.93	2067.99	9263.99	2068.01	9266.59	2068.01	9274.01	2068.01	9277.25	2068.01
9284.03	2068.01	9287.91	2068.02	9294.05	2068.01	9298.56	2068.03	9304.06	2068.03
9309.22	2068.03	9314.08	2068.03	9319.88	2068.04	9324.1	2068.04	9330.54	2068.04
9334.12	2068.04	9341.2	2068.03	9344.14	2068.02	9351.85	2068.01	9354.15	2068
9362.51	2067.97	9364.17	2067.97	9373.17	2067.92	9374.19	2067.92	9383.83	2067.87
9384.21	2067.86	9390.16	2067.83	9394.23	2067.81	9394.49	2067.81	9404.24	2067.78
9405.14	2067.78	9414.26	2067.77	9415.8	2067.77	9424.28	2067.79	9426.46	2067.8
9434.3	2067.83	9437.12	2067.85	9444.32	2067.89	9447.78	2067.91	9454.33	2067.94
9458.43	2067.96	9464.35	2067.99	9469.09	2068.01	9474.37	2068.03	9479.75	2068.04
9484.39	2068.05	9490.41	2068.07	9494.41	2068.08	9501.07	2068.09	9504.42	2068.1
9511.73	2068.11	9514.44	2068.11	9522.38	2068.13	9524.46	2068.13	9533.04	2068.15
9534.48	2068.15	9543.7	2068.17	9544.5	2068.18	9554.36	2068.22	9554.51	2068.22
9556.96	2068.23	9564.53	2068.28	9565.02	2068.28	9574.55	2068.35	9575.67	2068.36
9584.57	2068.42	9586.33	2068.44	9594.59	2068.49	9596.99	2068.5	9604.6	2068.54
9607.65	2068.55	9614.62	2068.57	9618.31	2068.57	9624.64	2068.57	9628.97	2068.56
9634.66	2068.55	9639.62	2068.54	9644.68	2068.53	9650.28	2068.51	9654.69	2068.5
9656.93	2068.5	9660.04	2068.5	9664.93	2068.51	9668.29	2068.51	9675.24	2068.53
9676.55	2068.53	9681.84	2068.55	9684.8	2068.56	9685.54	2068.56	9693.06	2068.56
9695.84	2068.54	9710.15	2068.35	9732.21	2067.85	9735.47	2067.42	9760.79	2064.44
9767.74	2063.53	9768.92	2063.41	9770.34	2063.4	9772.29	2063.4	9792.53	2063.21
9801.62	2063.6	9807.04	2063.88	9821.37	2066.35	9824.13	2066.59	9825.48	2066.55
9840.25	2066.05	9845.29	2065.82	9854.99	2065.43	9857.44	2065.21	9865.23	2065.01
9887.56	2063.85	9891.59	2063.65	9899.46	2063.61	9901.9	2063.6	9907.71	2063.62
9912.2	2063.63	9915.97	2063.64	9922.5	2063.67	9924.23	2063.67	9931.18	2063.66

```
 9932.48 2063.65 9932.81 2063.65 9940.74 2063.55 9943.11 2063.52 9948.99  2063.4
 9953.41 2063.31 9957.25 2063.22 9963.71 2063.07 9965.51 2063.04 9972.74  2062.9
 9973.76 2062.88 9974.02 2062.87 9982.02 2062.79 9984.32 2062.76 9990.27 2062.64
 9994.62 2062.55   10000  2062.410003.98 2062.2910007.95 2062.1810011.12 2062.06
10017.11 2064.1710032.84 2069.6910040.31 2069.8310044.24 2069.93 10056.1  2070.3
10056.44 2070.3110064.58 2070.5210066.74 2070.5610072.83 2070.5910077.04 2070.59
10081.09 2070.5710087.35 2070.5410089.35 2070.5210097.41 2070.47 10097.6 2070.47
10097.65 2070.4710105.86 2070.4310107.95 2070.4210114.11 2070.4110118.25  2070.4
10122.37 2070.3910128.56 2070.3710130.63 2070.3610138.86 2070.3310138.88 2070.33
10138.97 2070.3310147.14 2070.3210149.16 2070.3110155.39 2070.3110159.47 2070.31
10163.65 2070.3110169.77 2070.3110171.91 2070.3110180.07 2070.3210180.16 2070.32
10180.53 2070.3210188.42 2070.3310190.37 2070.3310196.67 2070.3510200.68 2070.36
10204.93 2070.3810210.98  2070.410213.18 2070.4210221.28 2070.4510221.44 2070.45
10222.08 2070.4610231.58 2070.4910234.72 2070.4810241.89 2070.4810248.41 2070.45
10252.19 2070.4310262.11 2070.3710262.49 2070.3710263.64 2070.3610270.98 2070.32
 10272.8 2070.3110279.23 2070.28 10283.1 2070.2610287.49 2070.22 10293.4 2070.13
 10299.9 2069.9710308.84 2069.7210310.52 2069.6610318.44 2069.3510344.14 2066.54
10357.92 2066.05 10369.2 2066.0710402.97 2070.83 10407.3 2072.1110411.14 2071.59
10429.47 2070.7410436.87 2070.1210460.35 2066.6310483.25 2067.41 10487.2 2067.54
10489.15 2067.5710493.89 2067.5710499.45 2067.5710502.14 2067.5410509.76 2067.48
 10510.4 2067.4610512.98 2067.4210518.65 2067.3410520.06 2067.3210526.91 2067.22
10530.36 2067.1710535.17 2067.1310540.67 2067.0710543.42 2067.0710550.97 2067.05
10551.68 2067.0610554.54 2067.0710554.73 2067.07

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*************************************************************
 8687.92    .065 8813.18       0 9695.84    .03510066.74    .065

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9695.8410066.74              350     303     300             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
 8687.92    9130    2072       F
   1010010554.73    2072       F

CROSS SECTION OUTPUT  Profile #PF 1
*****************************************************************************************
* E.G. Elev (ft)         * 2070.62  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.68  * Wt. n-Val.              *   0.065  *   0.035  *          *
* W.S. Elev (ft)         * 2069.93  * Reach Len. (ft)         *  350.00  *  303.00  *  300.00  *
* Crit W.S. (ft)         * 2068.95  * Flow Area (sq ft)       * 1020.73  * 1760.30  *          *
* E.G. Slope (ft/ft)     *0.003246  * Area (sq ft)            * 1481.22  * 1760.30  *  492.33  *
* Q Total (cfs)          *14459.00  * Flow (cfs)              * 1969.90  *12489.11  *          *
* Top Width (ft)         * 1346.48  * Top Width (ft)          *  786.09  *  348.46  *  211.93  *
* Vel Total (ft/s)       *    5.20  * Avg. Vel. (ft/s)        *    1.93  *    7.09  *          *
* Max Chl Dpth (ft)      *    7.87  * Hydr. Depth (ft)        *    1.80  *    5.05  *          *
* Conv. Total (cfs)      *253801.6  * Conv. (cfs)             * 34578.0  *219223.6  *          *
* Length Wtd. (ft)       *  309.77  * Wetted Per. (ft)        *  565.84  *  350.37  *          *
* Min Ch El (ft)         * 2062.06  * Shear (lb/sq ft)        *    0.37  *    1.02  *          *
* Alpha                  *    1.63  * Stream Power (lb/ft s)  *    0.71  *    7.22  *          *
* Frctn Loss (ft)        *    1.33  * Cum Volume (acre-ft)    *  118.26  *   85.88  *   18.40  *
* C & E Loss (ft)        *    0.09  * Cum SA (acres)          *   43.81  *   13.00  *    9.03  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.
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)         * 2068.61  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.60  * Wt. n-Val.              *   0.065  *   0.035  *          *
* W.S. Elev (ft)         * 2068.01  * Reach Len. (ft)         *  350.00  *  303.00  *  300.00  *
* Crit W.S. (ft)         * 2066.76  * Flow Area (sq ft)       *   16.03  * 1123.71  *          *
* E.G. Slope (ft/ft)     *0.003789  * Area (sq ft)            *   69.70  * 1123.71  *  147.08  *
* Q Total (cfs)          * 7019.00  * Flow (cfs)              *    5.74  * 7013.26  *          *
* Top Width (ft)         *  743.54  * Top Width (ft)          *  284.76  *  302.86  *  155.92  *
* Vel Total (ft/s)       *    6.16  * Avg. Vel. (ft/s)        *    0.36  *    6.24  *          *
* Max Chl Dpth (ft)      *    5.95  * Hydr. Depth (ft)        *    0.11  *    3.71  *          *
* Conv. Total (cfs)      *114027.1  * Conv. (cfs)             *    93.3  *113933.8  *          *
* Length Wtd. (ft)       *  303.13  * Wetted Per. (ft)        *  145.76  *  304.47  *          *
```

* Min Ch El (ft)	* 2062.06	* Shear (lb/sq ft)	* 0.03	* 0.87	* *
* Alpha	* 1.03	* Stream Power (lb/ft s)	* 0.01	* 5.45	* *
* Frctn Loss (ft)	* 1.79	* Cum Volume (acre-ft)	* 99.76	* 78.89	* 16.78 *
* C & E Loss (ft)	* 0.12	* Cum SA (acres)	* 23.62	* 12.63	* 3.96 *

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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, water surface was used.

CROSS SECTION

RIVER: Sols Wash
REACH: Sols Wash RS: 0.660

INPUT
Description:
Station Elevation Data num= 355

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
8748.56	2070.51	8750.03	2070.52	8759.16	2070.3	8764.9	2070.11	8778.92	2069.92
8781.29	2069.84	8788.37	2069.68	8791.31	2069.59	8807.55	2068.49	8808.06	2068.46
8808.21	2068.45	8840.07	2068.2	8842.71	2067.99	8851.02	2067.66	8854.53	2067.64
8861.43	2067.29	8863.99	2067.21	8871.45	2066.79	8873.44	2066.7	8881.47	2066.29
8882.89	2066.24	8891.49	2065.94	8896.71	2065.82	8910.15	2065.55	8915.33	2065.67
8931.56	2066.05	8939.6	2066.12	8941.58	2066.12	8949.05	2066.11	8951.6	2066.1
8958.51	2066.07	8961.61	2066.05	8967.96	2066.01	8971.63	2065.99	8977.41	2065.93
8981.65	2065.89	8986.86	2065.82	8991.67	2065.75	9016.72	2065.12	9030.02	2064.79
9034.68	2064.84	9036.38	2064.9	9045.86	2065.27	9051.77	2065.5	9053.03	2065.52
9061.79	2065.67	9062.48	2065.67	9071.81	2065.7	9071.93	2065.7	9073.92	2065.7
9081.38	2065.73	9081.83	2065.74	9090.83	2065.78	9091.85	2065.79	9100.29	2065.84
9101.86	2065.85	9109.74	2065.89	9111.88	2065.9	9119.19	2065.93	9121.9	2065.94
9128.64	2065.95	9131.92	2065.96	9138.09	2065.97	9141.94	2065.97	9147.55	2065.97
9151.95	2065.96	9157	2065.95	9161.97	2065.93	9166.45	2065.92	9171.99	2065.89
9175.9	2065.88	9182.01	2065.86	9185.35	2065.86	9192.03	2065.86	9194.81	2065.86
9202.04	2065.88	9204.26	2065.88	9212.06	2065.91	9213.71	2065.91	9222.08	2065.94
9223.16	2065.94	9232.1	2065.95	9232.61	2065.95	9241.26	2065.93	9242.07	2065.93
9242.12	2065.93	9251.52	2065.88	9252.13	2065.87	9260.97	2065.77	9262.15	2065.75
9270.42	2065.57	9272.17	2065.53	9275.31	2065.37	9293.49	2064.43	9310.63	2064.56
9316.38	2064.6	9325.86	2064.76	9329.52	2064.8	9330.67	2064.81	9338.96	2064.78
9345.21	2064.82	9350.96	2064.82	9356.28	2064.79	9366.38	2064.79	9369.04	2064.95
9380.99	2064.74	9385.08	2064.6	9392.27	2064.41	9405.05	2063.98	9413.12	2064.36
9420.98	2064.71	9422.44	2064.78	9431.11	2064.95	9432.46	2064.97	9440.56	2065.02
9442.47	2065.03	9450.01	2065.1	9452.49	2065.12	9459.46	2065.2	9462.51	2065.24
9468.92	2065.32	9472.53	2065.36	9478.37	2065.44	9482.54	2065.48	9487.82	2065.55
9492.56	2065.6	9497.27	2065.66	9502.58	2065.73	9506.72	2065.77	9512.6	2065.84
9516.18	2065.88	9522.62	2065.95	9525.63	2065.98	9532.63	2066.05	9535.08	2066.07
9542.65	2066.14	9544.53	2066.15	9552.67	2066.21	9553.98	2066.22	9562.69	2066.27
9563.44	2066.27	9572.71	2066.32	9572.89	2066.32	9575.93	2066.33	9582.34	2066.36
9582.72	2066.36	9591.79	2066.4	9592.74	2066.4	9601.24	2066.42	9602.76	2066.43
9610.7	2066.45	9612.78	2066.45	9620.15	2066.46	9622.8	2066.46	9629.6	2066.46
9632.81	2066.46	9639.05	2066.45	9642.83	2066.45	9648.5	2066.43	9652.85	2066.42
9657.96	2066.4	9662.87	2066.38	9667.41	2066.36	9672.89	2066.35	9676.86	2066.34
9682.9	2066.33	9686.31	2066.32	9692.92	2066.33	9695.77	2066.33	9702.94	2066.35
9705.22	2066.36	9712.96	2066.39	9714.67	2066.4	9722.97	2066.44	9724.12	2066.45
9732.99	2066.46	9733.57	2066.46	9743.01	2066.4	9743.06	2066.4	9743.27	2066.39
9756.1	2066.09	9778.81	2065.53	9783.62	2065.55	9790.34	2065.7	9801.01	2065.95
9809.15	2066.14	9814.28	2066.27	9820.42	2066.46	9824.5	2066.58	9828.86	2066.64
9834.71	2066.72	9837.31	2066.73	9844.93	2066.77	9845.75	2066.77	9849.65	2066.76
9854.19	2066.75	9855.15	2066.75	9862.64	2066.72	9865.37	2066.7	9871.08	2066.7
9875.59	2066.69	9879.53	2066.71	9885.8	2066.74	9887.97	2066.76	9896.02	2066.8
9896.42	2066.81	9898.29	2066.81	9904.86	2066.82	9906.24	2066.82	9913.3	2066.74
9916.46	2066.68	9921.75	2066.55	9926.68	2066.43	9934.62	2066.22	9942.4	2065.97
9947.74	2064.52	9955.78	2062.23	9962.38	2059.96	9975.86	2060.19	9980.86	2060.29
9987.99	2060.35	9989.3	2060.36	9995.56	2060.42	9997.75	2060.44	9998.21	2060.44
10000	2060.47	10006.19	2060.56	10008.42	2060.61	10014.64	2060.69	10018.64	2060.76
10023.08	2060.82	10028.86	2060.91	10031.52	2060.94	10039.08	2061.01	10039.97	2061.01
10044.2	2061.02	10048.41	2061.03	10049.3	2061.02	10056.86	2060.99	10059.52	2060.97
10065.3	2060.95	10069.73	2060.93	10073.75	2060.95	10079.95	2061	10082.19	2061.05

```
10094.31  2061.110103.66 2060.8710111.85 2064.1810121.65 2067.9710141.22 2068.18
10141.26 2068.18 10141.3 2068.1810141.48 2068.1910149.74 2068.3310151.48 2068.36
10158.19 2068.42 10161.7 2068.4410166.63 2068.4410171.92 2068.4310175.08 2068.42
10182.14 2068.3910183.52 2068.3910190.12 2068.3710191.97 2068.3610192.35 2068.36
10200.41 2068.3610202.57 2068.3610208.85 2068.3710212.79 2068.37 10217.3 2068.38
10223.01 2068.3810225.74 2068.3810233.23 2068.3710234.19 2068.3710238.76 2068.35
10242.63 2068.3410243.45 2068.3410251.08 2068.3310253.66 2068.3210259.52 2068.33
10263.88 2068.3310267.96 2068.34 10274.1 2068.3510276.41 2068.3510284.32 2068.35
10284.85 2068.36 10287.4 2068.36 10293.3 2068.3610294.54 2068.3610301.74 2068.36
10304.75 2068.3610310.19 2068.3710314.97 2068.3810318.63 2068.3910325.19 2068.41
10327.07 2068.4210335.41 2068.4310335.52 2068.4310336.04 2068.4310343.96 2068.42
10345.63 2068.4210352.41  2068.410355.85 2068.3910360.85 2068.3710366.06 2068.35
 10369.3 2068.3310376.28 2068.3110377.74  2068.310384.68 2068.2810386.18 2068.28
 10386.5 2068.2810394.63 2068.2810396.72 2068.2810403.07 2068.2910406.94 2068.29
10411.52 2068.2910417.16 2068.2910419.96 2068.2910427.37 2068.2710428.41 2068.26
10433.32 2068.2310436.85  2068.210437.59  2068.210445.29 2068.1310447.81  2068.1
10453.74 2068.0410458.03 2067.9910462.18 2067.9610468.25 2067.8910470.63 2067.88
10478.47 2067.8110479.07 2067.8110481.96 2067.7910487.52 2067.7610488.68 2067.74
10495.96 2067.66 10498.9 2067.5810519.58 2066.9210520.34 2066.8710524.48 2066.06
10537.97 2063.4410538.41 2063.4310539.06 2063.3310556.62 2063.27 10559.4 2063.33
10562.93  2063.310570.69 2063.4510585.81 2070.1810588.49 2069.8210600.99 2072.55
10615.02 2071.8210628.23 2071.1310633.99 2070.98 10636.5 2070.9510639.12 2069.86

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*************************************************************
 8748.56      .1 9732.99    .065  9942.4    .03510121.65    .065

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        9942.410121.65              180     283     320             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
 8748.56    9275    2069       F
   1020010639.12    2070       F

CROSS SECTION OUTPUT  Profile #PF 1
*****************************************************************************************
* E.G. Elev (ft)         * 2069.20  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.60  * Wt. n-Val.              *   0.092  *   0.035  *         *
* W.S. Elev (ft)         * 2067.60  * Reach Len. (ft)        *  180.00  *  283.00  *  320.00  *
* Crit W.S. (ft)         * 2067.60  * Flow Area (sq ft)      * 1179.90  * 1116.38  *         *
* E.G. Slope (ft/ft)     *0.005895  * Area (sq ft)           * 1916.27  * 1116.38  *  210.35  *
* Q Total (cfs)          *14459.00  * Flow (cfs)             * 2196.44  *12262.56  *         *
* Top Width (ft)         * 1347.32  * Top Width (ft)         * 1087.11  *  178.30  *   81.91  *
* Vel Total (ft/s)       *    6.30  * Avg. Vel. (ft/s)       *    1.86  *   10.98  *          *
* Max Chl Dpth (ft)      *    7.64  * Hydr. Depth (ft)       *    1.77  *    6.26  *          *
* Conv. Total (cfs)      *188313.4  * Conv. (cfs)            * 28606.4  *159707.0  *          *
* Length Wtd. (ft)       *  270.28  * Wetted Per. (ft)       *  667.51  *  180.48  *          *
* Min Ch El (ft)         * 2059.96  * Shear (lb/sq ft)       *    0.65  *    2.28  *          *
* Alpha                  *    2.59  * Stream Power (lb/ft s) *    1.21  *   25.01  *          *
* Frctn Loss (ft)        *    0.91  * Cum Volume (acre-ft)   *  104.62  *   75.87  *   15.98  *
* C & E Loss (ft)        *    0.22  * Cum SA (acres)         *   36.29  *   11.17  *    8.02  *
*****************************************************************************************

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 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.
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)         * 2066.71  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.76  * Wt. n-Val.              *   0.100  *   0.035  *         *
* W.S. Elev (ft)         * 2064.95  * Reach Len. (ft)        *  180.00  *  283.00  *  320.00  *
* Crit W.S. (ft)         * 2064.95  * Flow Area (sq ft)      *   46.75  *  654.00  *          *
* E.G. Slope (ft/ft)     *0.010434  * Area (sq ft)           *   48.01  *  654.00  *   61.48  *
```

Q Total (cfs)	7019.00	Flow (cfs)	34.27	6984.73		
Top Width (ft)	372.49	Top Width (ft)	161.00	167.66	43.84	
Vel Total (ft/s)	10.02	Avg. Vel. (ft/s)	0.73	10.68		
Max Chl Dpth (ft)	4.99	Hydr. Depth (ft)	0.32	3.90		
Conv. Total (cfs)	68715.6	Conv. (cfs)	335.5	68380.1		
Length Wtd. (ft)	282.75	Wetted Per. (ft)	147.20	169.22		
Min Ch El (ft)	2059.96	Shear (lb/sq ft)	0.21	2.52		
Alpha	1.13	Stream Power (lb/ft s)	0.15	26.89		
Frctn Loss (ft)	1.90	Cum Volume (acre-ft)	99.29	72.70	16.06	
C & E Loss (ft)	0.24	Cum SA (acres)	21.83	10.99	3.27	

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 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.
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: Sols Wash RS: 0.606

INPUT
Description:
Station Elevation Data num= 292

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9121.07	2065.9	9132.47	2065.32	9138.64	2065.14	9141.17	2065.35	9145.22	2065.32
9173.74	2064.87	9181.06	2064.92	9182.43	2064.97	9183.43	2064.94	9186.74	2064.88
9205.79	2064.53	9221.99	2065.34	9222.2	2065.35	9223.52	2065.42	9232.82	2065.62
9236.15	2065.62	9243.24	2065.61	9252.85	2065.46	9257.93	2065.25	9268.69	2064.78
9270.38	2064.71	9274.48	2064.56	9279.19	2064.6	9288.29	2064.63	9312.95	2064.7
9317.59	2064.69	9322.96	2064.69	9328.21	2064.67	9332.98	2064.67	9338.83	2064.66
9343	2064.65	9349.45	2064.64	9353.01	2064.63	9360.07	2064.62	9363.03	2064.61
9370.69	2064.6	9373.05	2064.59	9381.32	2064.57	9383.06	2064.57	9391.94	2064.55
9393.08	2064.55	9402.56	2064.55	9403.09	2064.55	9411.99	2064.57	9413.11	2064.57
9413.18	2064.57	9423.13	2064.6	9423.8	2064.6	9433.14	2064.65	9434.42	2064.65
9443.16	2064.7	9445.04	2064.7	9453.18	2064.73	9455.66	2064.73	9463.19	2064.75
9466.28	2064.74	9473.21	2064.74	9476.91	2064.74	9483.22	2064.73	9487.53	2064.71
9493.24	2064.7	9498.15	2064.69	9503.26	2064.68	9508.77	2064.68	9513.27	2064.67
9519.39	2064.67	9523.29	2064.67	9530.01	2064.68	9533.31	2064.68	9540.63	2064.7
9543.32	2064.7	9551.25	2064.71	9553.34	2064.71	9561.88	2064.7	9563.35	2064.7
9572.5	2064.68	9573.37	2064.68	9583.12	2064.65	9583.39	2064.65	9587.83	2064.63
9593.4	2064.6	9593.74	2064.6	9603.42	2064.56	9604.36	2064.56	9613.43	2064.52
9614.98	2064.52	9623.45	2064.49	9625.6	2064.49	9633.47	2064.47	9636.22	2064.46
9643.48	2064.43	9646.84	2064.4	9653.5	2064.34	9658.35	2064.18	9684.36	2063.61
9695.68	2063.81	9714.52	2064.12	9723.77	2064.3	9726.26	2064.32	9733.84	2064.36
9735.25	2064.35	9743.91	2064.29	9744.24	2064.29	9746.98	2064.26	9753.23	2064.2
9753.99	2064.2	9762.22	2064.1	9764.06	2064.09	9771.21	2064	9774.13	2063.98
9780.2	2063.91	9784.2	2063.86	9789.19	2063.83	9794.28	2063.78	9798.18	2063.77
9804.35	2063.74	9807.17	2063.75	9814.42	2063.74	9816.16	2063.75	9824.49	2063.77
9825.15	2063.77	9830.61	2063.79	9834.14	2063.81	9834.56	2063.81	9843.13	2063.84
9844.64	2063.85	9852.12	2063.86	9854.71	2063.86	9861.11	2063.81	9864.78	2063.79
9870.1	2063.69	9874.85	2063.61	9879.09	2063.48	9884.93	2063.29	9888.08	2063.17
9895	2062.86	9896.09	2062.81	9907.31	2062.4	9915.71	2061.65	9930.74	2060.74
9935.87	2060.3	9961.36	2057.8	9983.83	2057.4	9991.09	2057.53	9995.72	2057.59
9995.95	2057.59	9997.87	2057.61	10000	2057.6	10004.94	2057.7	10005.79	2057.71
10013.93	2057.8	10015.87	2057.82	10022.92	2057.87	10025.94	2057.89	10031.91	2057.94
10036.01	2057.96	10040.9	2058.01	10046.08	2058.06	10049.89	2058.11	10056.15	2058.18
10058.88	2058.21	10066.23	2058.28	10067.87	2058.29	10076.3	2058.34	10076.86	2058.34
10081.5	2058.28	10085.85	2058.22	10087.7	2058.16	10095.7	2057.91	10099.86	2057.8
10103.09	2057.66	10106.07	2058.83	10111.97	2059.67	10133.03	2065.56	10138.1	2065.68
10143.1	2065.82	10146.8	2065.93	10148.77	2065.99	10156.88	2066.23	10157.76	2066.25
10165.13	2066.36	10166.75	2066.39	10166.95	2066.39	10175.74	2066.5	10177.02	2066.52
10184.73	2066.59	10187.09	2066.61	10193.72	2066.65	10197.17	2066.67	10202.71	2066.69

```
10207.24  2066.7 10211.7  2066.710217.31  2066.710220.69 2066.6910227.38 2066.67
10229.68 2066.6610237.46 2066.6110238.67 2066.6110247.53 2066.5510247.66 2066.55
10248.76 2066.5510256.65 2066.51 10257.6 2066.5110265.64 2066.4710267.67 2066.45
10274.63 2066.4110277.74 2066.3810283.62 2066.3410287.82 2066.3110292.61 2066.28
10297.89 2066.25 10301.6 2066.2410307.96 2066.2210310.59 2066.2210318.03 2066.22
10319.58 2066.2210328.11 2066.2310328.57 2066.2410332.39 2066.2510337.56 2066.26
10338.18 2066.2610346.54 2066.2910348.25  2066.310355.53 2066.3110358.32 2066.32
10364.52 2066.3310368.39 2066.3310373.51 2066.3210378.47 2066.31 10382.5  2066.3
10388.54 2066.2810391.49 2066.2710398.61 2066.2510400.48 2066.2410408.68 2066.23
10409.47 2066.2310416.02 2066.2310418.46 2066.2310418.76 2066.2310427.45 2066.24
10428.83 2066.2410436.44 2066.25 10438.9 2066.2510445.43 2066.2410448.97 2066.24
10454.42 2066.2310459.05 2066.2210463.41  2066.210469.12 2066.16 10472.4 2066.13
10479.19 2066.0610481.39 2066.0310489.26 2065.9110490.38 2065.8910499.33 2065.76
10499.37 2065.7610499.65 2065.7510508.36 2065.6810509.41 2065.6710517.35 2065.67
10519.48 2065.6810526.34 2065.7210529.55 2065.7510535.33 2065.7810539.62 2065.81
10544.32  2065.8 10549.7 2065.7910553.31 2065.7210559.77 2065.62   10568 2065.35
10570.86 2065.2210572.22 2065.1310581.93 2064.7610588.11 2064.4310591.37 2064.34
   10599 2064.5510600.83  2064.610612.94 2064.4210617.46 2064.5110620.29 2064.84
10625.88 2065.2210628.74 2065.1410630.26 2065.1510631.61 2065.7410634.16 2066.06
10645.63  2071.610646.87 2072.0710647.22 2072.0510651.23 2073.8910657.44  2073.9
10684.31 2074.2810697.73 2074.07

Manning's n Values        num=       3
      Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9121.07    .082    9895    .03210133.03    .032

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          989510133.03              180     344     330             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
 9121.07    9235    2068       F
   1020010697.73    2068       F

CROSS SECTION OUTPUT  Profile #PF 1
*********************************************************************************************
* E.G. Elev (ft)          * 2066.99  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.87  * Wt. n-Val.              *   0.082  *   0.032  *   0.032  *
* W.S. Elev (ft)          * 2066.12  * Reach Len. (ft)         *  180.00  *  344.00  *  330.00  *
* Crit W.S. (ft)          * 2064.07  * Flow Area (sq ft)       * 1136.05  * 1662.69  *    5.84  *
* E.G. Slope (ft/ft)      *0.002165  * Area (sq ft)            * 1251.36  * 1662.69  *  127.24  *
* Q Total (cfs)           *14459.00  * Flow (cfs)              * 1375.58  *13077.89  *    5.54  *
* Top Width (ft)          * 1192.64  * Top Width (ft)          *  773.93  *  238.03  *  180.68  *
* Vel Total (ft/s)        *    5.16  * Avg. Vel. (ft/s)        *    1.21  *    7.87  *    0.95  *
* Max Chl Dpth (ft)       *    8.72  * Hydr. Depth (ft)        *    1.72  *    6.99  *    0.29  *
* Conv. Total (cfs)       *310773.2  * Conv. (cfs)             * 29565.8  *281088.3  *   119.0  *
* Length Wtd. (ft)        *  332.30  * Wetted Per. (ft)        *  660.06  *  239.35  *   20.05  *
* Min Ch El (ft)          * 2057.40  * Shear (lb/sq ft)        *    0.23  *    0.94  *    0.04  *
* Alpha                   *    2.11  * Stream Power (lb/ft s)  *    0.28  *    7.38  *    0.04  *
* Frctn Loss (ft)         *    0.57  * Cum Volume (acre-ft)    *   98.07  *   66.85  *   14.74  *
* C & E Loss (ft)         *    0.01  * Cum SA (acres)          *   32.44  *    9.82  *    7.05  *
*********************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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)          * 2063.78  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.96  * Wt. n-Val.              *          *   0.032  *          *
* W.S. Elev (ft)          * 2062.82  * Reach Len. (ft)         *  180.00  *  344.00  *  330.00  *
* Crit W.S. (ft)          * 2061.84  * Flow Area (sq ft)       *          *  891.37  *          *
* E.G. Slope (ft/ft)      *0.004678  * Area (sq ft)            *          *  891.37  *          *
* Q Total (cfs)           * 7019.00  * Flow (cfs)              *          * 7019.00  *          *
* Top Width (ft)          *  227.37  * Top Width (ft)          *          *  227.37  *          *
* Vel Total (ft/s)        *    7.87  * Avg. Vel. (ft/s)        *          *    7.87  *          *
* Max Chl Dpth (ft)       *    5.42  * Hydr. Depth (ft)        *          *    3.92  *          *
* Conv. Total (cfs)       *102626.5  * Conv. (cfs)             *          *102626.5  *          *
* Length Wtd. (ft)        *  344.00  * Wetted Per. (ft)        *          *  228.31  *          *
* Min Ch El (ft)          * 2057.40  * Shear (lb/sq ft)        *          *    1.14  *          *
* Alpha                   *    1.00  * Stream Power (lb/ft s)  *          *    8.98  *          *
* Frctn Loss (ft)         *    1.72  * Cum Volume (acre-ft)    *   99.19  *   67.68  *   15.84  *
* C & E Loss (ft)         *    0.06  * Cum SA (acres)          *   21.50  *    9.71  *    3.11  *
*********************************************************************************************

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.
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: Sols Wash RS: 0.541

INPUT
Description: The cross section was modeled with a discharge of 1390. The
discharge was based upon the capacity of the banks.
Station Elevation Data num= 303

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
8998.21	2064.25	9000.61	2064.24	9002.81	2064.25	9002.93	2064.24	9009.42	2064.28
9013.25	2064.47	9029.8	2064.81	9043.06	2064.85	9058.6	2064.91	9062.12	2064.91
9065.02	2064.9	9070.61	2064.96	9076.59	2064.94	9083.4	2064.93	9105.3	2065.14
9111.13	2065.19	9115.27	2065.31	9124.62	2065.32	9132.52	2065.33	9140.91	2065.32
9141.53	2065.32	9144.15	2065.32	9151.72	2065.29	9153.53	2065.28	9161.9	2065.24
9166.14	2065.25	9172.09	2065.25	9178.76	2065.28	9182.27	2065.29	9191.37	2065.35
9192.46	2065.35	9196.99	2065.37	9202.64	2065.39	9203.99	2065.4	9212.82	2065.43
9216.6	2065.45	9223.01	2065.46	9229.22	2065.48	9233.19	2065.49	9241.83	2065.5
9243.38	2065.51	9249.83	2065.51	9253.56	2065.52	9254.45	2065.52	9263.74	2065.53
9267.07	2065.53	9273.93	2065.54	9279.68	2065.55	9284.01	2065.53	9293.48	2065.55
9294.8	2065.54	9295.25	2065.54	9314.66	2065.4	9324.72	2065.2	9329.24	2065.16
9335.33	2065.11	9339.49	2065.14	9349.03	2065.36	9352.4	2065.37	9365.58	2065.36
9376.47	2065.36	9380.92	2065.37	9394.93	2065.33	9406.36	2065.34	9410.35	2065.28
9420.22	2065.36	9425.58	2065.35	9433.62	2065.31	9436.87	2065.31	9454.76	2065.38
9457.82	2065.33	9461.2	2065.34	9468.91	2065.27	9477.61	2065.15	9481.53	2065.07
9487.79	2064.91	9507.21	2063.7	9510.25	2063.51	9512.18	2063.55	9528.53	2063.88
9532.82	2063.84	9548.29	2063.81	9559.3	2064.24	9568.44	2064.57	9569.26	2064.6
9569.83	2064.61	9579.45	2064.78	9582.45	2064.79	9589.63	2064.82	9595.06	2064.83
9599.82	2064.84	9607.68	2064.84	9610	2064.84	9619.72	2064.82	9620.18	2064.82
9620.3	2064.82	9630.37	2064.78	9632.91	2064.78	9640.55	2064.75	9645.53	2064.76
9650.74	2064.76	9658.14	2064.78	9660.92	2064.79	9670.76	2064.8	9671.1	2064.8
9672.56	2064.79	9681.29	2064.75	9683.37	2064.73	9691.47	2064.63	9695.99	2064.56
9701.66	2064.47	9708.6	2064.36	9711.84	2064.31	9721.22	2064.21	9722.02	2064.2
9725.4	2064.19	9732.21	2064.18	9733.83	2064.18	9742.39	2064.22	9746.45	2064.24
9752.58	2064.28	9759.06	2064.33	9762.76	2064.36	9771.68	2064.41	9772.94	2064.42
9778.25	2064.41	9783.13	2064.41	9784.29	2064.4	9793.31	2064.31	9796.91	2064.25
9803.5	2064.14	9809.52	2064.04	9813.68	2063.96	9822.14	2063.88	9823.86	2063.86
9831.09	2063.86	9834.05	2063.86	9834.76	2063.86	9844.23	2063.93	9847.37	2063.95
9854.42	2063.98	9859.99	2063.95	9864.6	2063.91	9872.6	2063.72	9875.37	2063.65
9893.82	2063.21	9900.53	2061.44	9925.29	2054.73	9944.7	2055.38	9946.07	2055.43
9948.29	2055.45	9956.26	2055.45	9960.91	2055.45	9966.44	2055.43	9973.52	2055.45
9976.62	2055.46	9986.14	2055.52	9986.81	2055.53	9989.61	2055.54	9996.99	2055.57
9998.75	2055.58	10000	2055.58	10007.08	2055.61	10008.24	2055.62	10017.13	2055.65
10017.38	2055.65	10019.85	2055.58	10026.52	2055.41	10027.75	2055.37	10043.49	2054.68
10044.19	2055.08	10056.16	2060.06	10061.99	2062.45	10063.13	2062.89	10065.02	2062.98
10081.36	2063.74	10087.48	2064.02	10090.49	2064.14	10097.53	2064.32	10099.63	2064.36
10107.58	2064.41	10108.77	2064.41	10117.63	2064.41	10117.91	2064.41	10120.81	2064.41
10127.05	2064.41	10127.68	2064.41	10136.19	2064.44	10137.73	2064.44	10145.33	2064.47
10147.77	2064.49	10154.47	2064.51	10157.82	2064.53	10163.61	2064.55	10167.87	2064.57
10172.75	2064.58	10177.92	2064.61	10181.89	2064.61	10187.97	2064.61	10191.03	2064.61
10198.02	2064.61	10200.17	2064.61	10208.07	2064.58	10209.31	2064.58	10218.12	2064.56
10218.45	2064.56	10221.77	2064.55	10227.59	2064.54	10228.17	2064.53	10236.73	2064.51
10238.22	2064.51	10245.87	2064.47	10248.27	2064.46	10255.01	2064.42	10258.32	2064.39
10264.15	2064.35	10268.37	2064.33	10273.29	2064.31	10278.42	2064.31	10282.43	2064.29
10288.47	2064.31	10291.57	2064.31	10298.52	2064.32	10300.71	2064.33	10308.56	2064.36
10309.85	2064.36	10318.61	2064.39	10318.99	2064.39	10322.73	2064.39	10328.13	2064.39
10328.66	2064.39	10337.27	2064.34	10338.71	2064.33	10346.41	2064.19	10348.76	2064.13
10355.55	2063.94	10357.1	2063.89	10368.23	2062.91	10379.18	2062.12	10380.56	2061.82
10385.83	2061.56	10399.01	2060.94	10401.24	2060.84	10409.06	2060.54	10410.38	2060.5
10419.11	2060.31	10419.33	2060.31	10436.29	2060.49	10446.19	2060.51	10466.34	2060.73
10469.1	2060.78	10471.98	2060.82	10474.36	2060.84	10479.41	2060.88	10483.5	2060.87
10489.45	2060.87	10492.64	2060.85	10499.5	2060.83	10501.78	2060.83	10509.55	2060.81
10510.92	2060.81	10519.6	2060.84	10520.34	2060.85	10528.29	2060.92	10532.53	2060.96
10538.34	2061.03	10541.67	2061.07	10548.39	2061.09	10550.81	2061.11	10558.44	2061.18
10559.95	2061.21	10568.49	2061.31	10569.09	2061.31	10575.13	2061.39	10578.23	2061.43
10578.54	2061.44	10587.37	2061.55	10588.59	2061.57	10596.51	2061.71	10598.64	2061.75
10605.65	2062.03	10608.69	2062.17	10614.79	2062.71	10618.74	2062.98	10623.93	2063.21
10628.79	2063.44	10633.07	2063.42	10655.42	2063.42	10655.75	2063.42	10655.85	2063.42
10655.92	2063.47	10656.08	2063.56	10672.95	2073.57	10678.64	2076.81	10690.57	2077.54

```
10708.83 2078.3210712.77 2078.3510717.66  2078.210723.41 2078.0610730.74 2077.79
10730.81 2077.7910731.19 2077.77   10741 2077.55

Manning's n Values          num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*************************************************************
 8998.21    .042 9293.48       0 9893.82    .02910063.13    .032

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9893.8210063.13              100     231     400            .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
 8998.21    9235    2068       F
   10100   10741    2068       F

CROSS SECTION OUTPUT  Profile #PF 1
*****************************************************************************************
* E.G. Elev (ft)          * 2066.40  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.97  * Wt. n-Val.              *   0.042  *   0.029  *   0.032  *
* W.S. Elev (ft)          * 2065.43  * Reach Len. (ft)         *  100.00  *  231.00  *  400.00  *
* Crit W.S. (ft)          * 2062.07  * Flow Area (sq ft)       *  491.90  * 1521.16  *   63.37  *
* E.G. Slope (ft/ft)      *0.001376  * Area (sq ft)            *  574.02  * 1521.16  * 1506.96  *
* Q Total (cfs)           *13090.00  * Flow (cfs)              *  575.72  *12357.76  *  156.53  *
* Top Width (ft)          * 1564.71  * Top Width (ft)          *  799.29  *  169.31  *  596.11  *
* Vel Total (ft/s)        *    6.30  * Avg. Vel. (ft/s)        *    1.17  *    8.12  *    2.47  *
* Max Chl Dpth (ft)       *   10.75  * Hydr. Depth (ft)        *    0.84  *    8.98  *    1.72  *
* Conv. Total (cfs)       *352916.4  * Conv. (cfs)             * 15521.8  *333174.6  *  4220.1  *
* Length Wtd. (ft)        *  229.13  * Wetted Per. (ft)        *  583.99  *  172.12  *   36.90  *
* Min Ch El (ft)          * 2054.68  * Shear (lb/sq ft)        *    0.07  *    0.76  *    0.15  *
* Alpha                   *    1.57  * Stream Power (lb/ft s)  *    0.08  *    6.17  *    0.36  *
* Frctn Loss (ft)         *    0.24  * Cum Volume (acre-ft)    *   94.30  *   54.27  *    8.55  *
* C & E Loss (ft)         *    0.04  * Cum SA (acres)          *   29.19  *    8.21  *    4.11  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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)          * 2062.00  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    1.61  * Wt. n-Val.              *          *   0.029  *          *
* W.S. Elev (ft)          * 2060.39  * Reach Len. (ft)         *  100.00  *  231.00  *  400.00  *
* Crit W.S. (ft)          * 2059.87  * Flow Area (sq ft)       *          *  689.33  *          *
* E.G. Slope (ft/ft)      *0.005376  * Area (sq ft)            *          *  689.33  *    0.42  *
* Q Total (cfs)           * 7019.00  * Flow (cfs)              *          * 7019.00  *          *
* Top Width (ft)          *  163.40  * Top Width (ft)          *          *  152.54  *   10.87  *
* Vel Total (ft/s)        *   10.18  * Avg. Vel. (ft/s)        *          *   10.18  *          *
* Max Chl Dpth (ft)       *    5.71  * Hydr. Depth (ft)        *          *    4.52  *          *
* Conv. Total (cfs)       * 95730.1  * Conv. (cfs)             *          * 95730.1  *          *
* Length Wtd. (ft)        *  231.00  * Wetted Per. (ft)        *          *  154.49  *          *
* Min Ch El (ft)          * 2054.68  * Shear (lb/sq ft)        *          *    1.50  *          *
* Alpha                   *    1.00  * Stream Power (lb/ft s)  *          *   15.25  *          *
* Frctn Loss (ft)         *    0.60  * Cum Volume (acre-ft)    *   99.19  *   61.44  *   15.83  *
* C & E Loss (ft)         *    0.26  * Cum SA (acres)          *   21.50  *    8.21  *    3.07  *
*****************************************************************************************

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.
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: Sols Wash          RS: 0.497

INPUT
Description:
Station Elevation Data    num=     322
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
```

```
    8602 2067.32 8609.68 2067.28 8614.74 2067.258620.441 2067.21 8629.12 2067.16
8631.201 2067.14 8632.57 2067.13 8641.96 2067.06  8650.4 2067.038652.709 2067.02
 8656.24 2067.01 8663.47 2066.97 8668.23 2066.95 8674.23 2066.928683.361 2066.87
 8684.99 2066.86 8686.06 2066.86 8695.75 2066.81 8703.89 2066.788706.499 2066.76
 8710.49 2066.74 8717.26 2066.69 8721.72 2066.67 8728.02 2066.638737.611 2066.58
8738.639 2066.578739.549 2066.56 8749.54 2066.48 8757.38 2066.43 8760.29 2066.41
 8764.73 2066.39 8770.16 2066.348775.209 2066.32 8781.81 2066.28 8791.85 2066.25
  8792.8 2066.25 8804.53 2066.178810.869 2066.14 8814.08 2066.12 8818.98 2066.09
 8823.33 2066.058825.089 2066.01 8833.48  2065.9 8846.26 2065.85 8846.29 2065.85
8846.379 2065.848856.069 2065.678857.439 2065.688864.909 2065.56  8876.5 2065.66
 8878.66 2065.688899.389 2065.52 8900.02 2065.518900.151 2065.51 8900.34 2065.51
 8911.52 2065.41 8919.12 2065.318930.509 2065.338931.569 2065.32 8939.28 2065.23
  8960.1  2065.2 8964.85 2065.18 8970.57 2065.28  8981.1 2065.25 8988.18 2065.22
8994.889 2065.19    9007 2065.05 9007.73 2065.05 9008.83 2065.03 9018.48 2064.88
 9024.83 2064.85 9029.24 2064.83 9035.96 2064.839038.849 2064.82 9040.18 2064.78
9040.879 2064.789050.359  2064.7 9052.39 2064.84 9059.08 2064.849068.679 2064.89
9071.959 2064.879080.309 2064.839099.249 2064.819110.389 2064.75 9118.72 2064.68
 9124.35 2064.629131.399 2064.659147.281  2064.6 9153.51 2064.62 9158.34 2064.62
9178.479 2064.55 9181.72 2064.56 9190.22 2064.52 9200.52 2064.48 9200.84 2064.44
9200.989 2064.449208.129 2064.34 9212.82  2064.49214.509 2064.47 9221.96 2064.47
9231.229 2064.479233.531 2064.479240.409 2064.46 9244.97 2064.45  9256.9 2064.46
 9268.11 2064.47 9275.97 2064.47 9285.44 2064.47 9307.48 2064.45 9308.27 2064.41
  9308.7 2064.439309.239 2064.42 9320.48 2064.25 9325.13  2064.4 9341.74 2064.39
9350.099 2064.359362.249 2064.29 9362.54 2064.29  9363.6 2064.28 9373.49 2064.25
9381.429 2064.25 9384.25 2064.24 9388.55 2064.269395.009 2064.28 9399.26 2064.31
9405.769 2064.33 9415.67 2064.399416.479 2064.399417.089  2064.4 9427.28 2064.42
9434.919 2064.51 9438.04 2064.52 9442.79 2064.55  9448.8 2064.57 9452.75  2064.6
 9459.56 2064.619469.909 2064.62 9470.58 2064.629481.069 2064.64 9488.41 2064.67
9491.829 2064.68 9497.04  2064.7 9502.59 2064.71 9506.24 2064.73 9513.35 2064.75
 9524.07  2064.8 9524.11  2064.89524.159  2064.89534.859 2064.839541.901 2064.87
9545.619 2064.88 9551.28  2064.99556.379 2064.92 9559.73 2064.939567.139 2064.94
 9577.56 2064.98 9577.89 2064.98  9578.4 2064.989588.649    20659595.389 2065.02
9599.409 2065.03 9605.53 2065.069610.169 2065.079613.219  2065.19620.929 2065.14
9631.049 2065.219631.679 2065.229632.649 2065.22 9642.44 2065.27 9648.88 2065.29
  9653.2  2065.39659.769 2065.329663.959 2065.339666.709 2065.349674.719 2065.36
 9684.54 2065.39 9685.47 2065.38 9686.89 2065.39 9696.23 2065.429702.369 2065.46
 9706.99 2065.449714.019 2065.49 9717.75 2065.489720.199  2065.4 9728.51 2065.16
9738.031 2064.76 9739.45  2064.7 9741.14  2064.7 9750.02 2064.64 9755.86 2064.68
 9768.26 2064.779771.539 2064.79 9773.69  2064.8 9784.68 2064.86  9793.1 2064.94
 9795.38 2064.97 9803.81  2065.1 9809.35 2065.089816.299 2065.049822.509 2065.05
9825.329 2065.04 9827.18 2065.03 9836.15 2065.019846.369 2064.98 9847.12 2064.84
9847.629 2064.85 9869.14 2064.549871.329 2064.99 9873.07 2064.919885.379 2064.89
9891.321 2064.919892.609 2064.919893.839 2064.919894.199 2064.919903.389 2064.93
9911.959 2061.26    9931 2057.45 9943.66 2054.269951.989 2054.29 9954.42 2054.29
9958.119 2054.28 9965.18 2054.27 9969.82 2054.29 9975.94 2054.32 9985.24 2054.37
  9986.7 2054.389987.649 2054.38 9997.45 2054.39   10000 2054.3710006.61 2054.32
10008.48 2054.3110010.48 2054.2810019.58 2054.16 10028.1 2054.0410030.69 2054.01
10033.46 2053.97 10041.8 2053.84 10049.6 2053.72 10052.9 2053.6710056.44 2053.62
10064.01  2053.510071.09  2053.410075.12 2053.3410079.42 2053.2710086.22 2053.21
10092.58 2053.1810097.33 2053.14 10102.4 2053.1310121.21 2058.6310126.72 2061.01
10131.08 2061.6110146.14 2064.8110168.18 2064.8610176.73    2065 10190.5 2065.17
10204.11 2065.5110206.58 2065.5410208.13 2065.5710229.32 2066.5810236.72  2066.8
10245.44 2066.9510257.87 2067.0110265.57 2067.1110277.78 2066.5910279.67 2066.46
10281.29 2066.6510294.74 2067.0910302.76  2067.510318.86 2066.32 10330.3  2067.8
10334.85 2067.8410343.81 2067.7710353.53 2067.8110361.19 2068.1510368.86 2068.26
10372.33 2068.1110375.72 2068.2310379.93 2067.8610382.12 2067.6510391.62 2067.62
10395.01 2067.65 10398.5 2067.7510401.17 2067.7510408.31 2067.8510414.99 2067.98
10419.42 2068.0510420.96 2068.0810426.66 2068.07   10444 2068.4410445.44 2068.48
10452.07 2068.7110455.28 2068.6110457.08 2068.3810458.29  2068.510472.77 2069.24
10481.28 2069.4110483.54 2069.3310490.47 2069.5910493.31 2069.4910502.98 2069.64
10518.93 2068.9910521.04 2068.8810522.02 2068.8810523.56 2068.9910534.73 2070.33
10540.58 2070.76 10547.4 2071.15 10560.4 2071.2110565.96 2071.1810573.41 2071.28
10573.45 2071.29 10574.1  2071.310591.77 2071.6710593.08 2071.75 10605.5 2071.89
10610.59 2072.0510611.06 2072.0710616.73 2072.4610635.04 2073.7410638.01 2073.89
10650.72 2074.6510659.14 2075.01

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**************************************************
    8602    .0429903.389    .02910146.14    .032

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
      9903.38910146.14               80     124      80              .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
    86029943.699    2070       F
10100.6710659.14    2070       F

CROSS SECTION OUTPUT  Profile #PF 1
```

E.G. Elev (ft)	2066.13	Element	Left OB	Channel	Right OB	
Vel Head (ft)	0.84	Wt. n-Val.		0.029		
W.S. Elev (ft)	2065.29	Reach Len. (ft)	2.00	2.00	2.00	
Crit W.S. (ft)	2059.92	Flow Area (sq ft)		1782.61		
E.G. Slope (ft/ft)	0.000805	Area (sq ft)	489.26	2311.21	16.24	
Q Total (cfs)	13090.00	Flow (cfs)		13090.00		
Top Width (ft)	1186.33	Top Width (ft)	894.40	242.75	49.19	
Vel Total (ft/s)	7.34	Avg. Vel. (ft/s)		7.34		
Max Chl Dpth (ft)	12.16	Hydr. Depth (ft)		11.36		
Conv. Total (cfs)	461454.3	Conv. (cfs)		461454.3		
Length Wtd. (ft)	2.00	Wetted Per. (ft)		156.98		
Min Ch El (ft)	2053.13	Shear (lb/sq ft)		0.57		
Alpha	1.00	Stream Power (lb/ft s)		4.19		
Frctn Loss (ft)		Cum Volume (acre-ft)	93.08	44.11	1.55	
C & E Loss (ft)		Cum SA (acres)	27.25	7.12	1.15	

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)	2061.14	Element	Left OB	Channel	Right OB	
Vel Head (ft)	0.74	Wt. n-Val.		0.029		
W.S. Elev (ft)	2060.39	Reach Len. (ft)	2.00	2.00	2.00	
Crit W.S. (ft)	2057.91	Flow Area (sq ft)		1013.47		
E.G. Slope (ft/ft)	0.001520	Area (sq ft)		1193.73		
Q Total (cfs)	7019.00	Flow (cfs)		7019.00		
Top Width (ft)	208.98	Top Width (ft)		208.98		
Vel Total (ft/s)	6.93	Avg. Vel. (ft/s)		6.93		
Max Chl Dpth (ft)	7.26	Hydr. Depth (ft)		6.46		
Conv. Total (cfs)	180046.7	Conv. (cfs)		180046.7		
Length Wtd. (ft)	2.00	Wetted Per. (ft)		156.98		
Min Ch El (ft)	2053.13	Shear (lb/sq ft)		0.61		
Alpha	1.00	Stream Power (lb/ft s)		4.24		
Frctn Loss (ft)		Cum Volume (acre-ft)	99.19	56.45	15.83	
C & E Loss (ft)		Cum SA (acres)	21.50	7.25	3.02	

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

BRIDGE

RIVER: Sols Wash
REACH: Sols Wash RS: 0.486

INPUT
Description:
Distance from Upstream XS = 2
Deck/Roadway Width = 120
Weir Coefficient = 2.6
Upstream Deck/Roadway Coordinates
num= 34

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
9849.474	2065.98		9932.45	2066.68		9932.45	2069.39	
9935.98	2069.39		9935.98	2067.89		9943.699	2067.25	2063.13
9948.002	2067.25	2063.539	964.319	2067.27	2063.53	9968.62	2067.27	2063.13
9969.87	2067.27	2063.13	9974.17	2067.27	2063.53	9990.82	2067.32	2063.53
9995.129	2067.32	2063.13	9996.38	2067.32	2063.131	0000.68	2067.32	2063.53
10016.95	2067.26	2063.531	0021.25	2067.26	2063.13	10022.5	2067.26	2063.13
10026.8	2067.26	2063.531	0043.77	2067.26	2063.531	0048.07	2067.26	2063.13
10049.32	2067.26	2063.131	0053.62	2067.26	2063.531	0070.21	2067.26	2063.53
10074.5	2067.26	2063.131	0075.76	2067.26	2063.131	0080.06	2067.26	2063.53
10096.38	2067.34	2063.531	0100.67	2067.34	2063.131	0131.53	2068.1	
10131.53	2069.6		10135.06	2069.6		10135.06	2066.2	
10351.86	2068.18							

Upstream Bridge Cross Section Data
Station Elevation Data num= 322

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
8602	2067.32	8609.68	2067.28	8614.74	2067.25	8620.441	2067.21	8629.12	2067.16
8631.201	2067.14	8632.57	2067.13	8641.96	2067.06	8650.4	2067.03	8652.709	2067.02

```
 8656.24 2067.01 8663.47 2066.97 8668.23 2066.95 8674.23 2066.928683.361 2066.87
 8684.99 2066.86 8686.06 2066.86 8695.75 2066.81 8703.89 2066.788706.499 2066.76
 8710.49 2066.74 8717.26 2066.69 8721.72 2066.67 8728.02 2066.638737.611 2066.58
8738.639 2066.578739.549 2066.56 8749.54 2066.48 8757.38 2066.43 8760.29 2066.41
 8764.73 2066.39 8770.16 2066.348775.209 2066.32 8781.81 2066.28 8791.85 2066.25
  8792.8 2066.25 8804.53 2066.178810.869 2066.14 8814.08 2066.12 8818.98 2066.09
 8823.33 2066.058825.089 2066.01 8833.48  2065.9 8846.26 2065.85 8846.29 2065.85
8846.379 2065.848856.069 2065.678857.439 2065.688864.909 2065.56  8876.5 2065.66
 8878.66 2065.688899.389 2065.52 8900.02 2065.518900.151 2065.51 8900.34 2065.51
 8911.52 2065.41 8919.12 2065.318930.509 2065.338931.569 2065.32 8939.28 2065.23
  8960.1  2065.2 8964.85 2065.18 8970.57 2065.28  8981.1 2065.25 8988.18 2065.22
8994.889 2065.19    9007 2065.05 9007.73 2065.05 9008.83 2065.03 9018.48 2064.88
 9024.83 2064.85 9029.24 2064.83 9035.96 2064.839038.849 2064.82 9040.18 2064.78
9040.879 2064.789050.359  2064.7 9052.39 2064.84 9059.08 2064.849068.679 2064.89
9071.959 2064.879080.309 2064.839099.249 2064.819110.389 2064.75 9118.72 2064.68
 9124.35 2064.629131.399 2064.659147.281  2064.6 9153.51 2064.62 9158.34 2064.62
9178.479 2064.55 9181.72 2064.56 9190.22 2064.52 9200.52 2064.48 9200.84 2064.44
9200.989 2064.449208.129 2064.34 9212.82  2064.49214.509 2064.47 9221.96 2064.47
9231.229 2064.479233.531 2064.479240.409 2064.46 9244.97 2064.45  9256.9 2064.46
 9268.11 2064.47 9275.97 2064.47 9285.44 2064.47 9307.48 2064.45 9308.27 2064.41
  9308.7 2064.439309.239 2064.42 9320.48 2064.25 9325.13  2064.4 9341.74 2064.39
9350.099 2064.359362.249 2064.29 9362.54 2064.29  9363.6 2064.28 9373.49 2064.25
9381.429 2064.25 9384.25 2064.24 9388.55 2064.269395.009 2064.28 9399.26 2064.31
9405.769 2064.33 9415.67 2064.399416.479 2064.399417.089  2064.4 9427.28 2064.42
9434.919 2064.51 9438.04 2064.52 9442.79 2064.55  9448.8 2064.57 9452.75  2064.6
 9459.56 2064.619469.909 2064.62 9470.58 2064.629481.069 2064.64 9488.41 2064.67
9491.829 2064.68 9497.04  2064.7 9502.59 2064.71 9506.24 2064.73 9513.35 2064.75
 9524.07  2064.8 9524.11  2064.89524.159  2064.89534.859 2064.839541.901 2064.87
9545.619 2064.88 9551.28  2064.99556.379 2064.92 9559.73 2064.939567.139 2064.94
 9577.56 2064.98 9577.89 2064.98  9578.4 2064.989588.649    20659595.389 2065.02
9599.409 2065.03 9605.53 2065.069610.169 2065.079613.219  2065.19620.929 2065.14
9631.049 2065.219631.679 2065.229632.649 2065.22 9642.44 2065.27 9648.88 2065.29
  9653.2  2065.39659.769 2065.329663.959 2065.339666.709 2065.349674.719 2065.36
 9684.54 2065.39 9685.47 2065.38 9686.89 2065.39 9696.23 2065.429702.369 2065.46
 9706.99 2065.449714.019 2065.49 9717.75 2065.489720.199  2065.4 9728.51 2065.16
9738.031 2064.76 9739.45  2064.7 9741.14  2064.7 9750.02 2064.64 9755.86 2064.68
 9768.26 2064.779771.539 2064.79 9773.69  2064.8 9784.68 2064.86  9793.1 2064.94
 9795.38 2064.97 9803.81  2065.1 9809.35 2065.089816.299 2065.049822.509 2065.05
9825.329 2065.04 9827.18 2065.03 9836.15 2065.019846.369 2064.98 9847.12 2064.84
9847.629 2064.85 9869.14 2064.549871.329 2064.99 9873.07 2064.919885.379 2064.89
9891.321 2064.919892.609 2064.919893.839 2064.919894.199 2064.919903.389 2064.93
9911.959 2061.26    9931 2057.45 9943.66 2054.269951.989 2054.29 9954.42 2054.29
9958.119 2054.28 9965.18 2054.27 9969.82 2054.29 9975.94 2054.32 9985.24 2054.37
  9986.7 2054.389987.649 2054.38 9997.45 2054.39   10000 2054.3710006.61 2054.32
10008.48 2054.3110010.48 2054.2810019.58 2054.16 10028.1 2054.0410030.69 2054.01
10033.46 2053.97 10041.8 2053.84 10049.6 2053.72 10052.9 2053.6710056.44 2053.62
10064.01  2053.510071.09  2053.410075.12 2053.3410079.42 2053.2710086.22 2053.21
10092.58 2053.1810097.33 2053.14 10102.4 2053.1310121.21 2058.6310126.72 2061.01
10131.08 2061.6110146.14 2064.8110168.18 2064.8610176.73    2065 10190.5 2065.17
10204.11 2065.5110206.58 2065.5410208.13 2065.5710229.32 2066.5810236.72  2066.8
10245.44 2066.9510257.87 2067.0110265.57 2067.1110277.78 2066.5910279.67 2066.46
10281.29 2066.6510294.74 2067.0910302.76  2067.510318.86 2066.32 10330.3  2067.8
10334.85 2067.8410343.81 2067.7710353.53 2067.8110361.19 2068.1510368.86 2068.26
10372.33 2068.1110375.72 2068.2310379.93 2067.8610382.12 2067.6510391.62 2067.62
10395.01 2067.65 10398.5 2067.7510401.17 2067.7510408.31 2067.8510414.99 2067.98
10419.42 2068.0510420.96 2068.0810426.66 2068.07   10444 2068.4410445.44 2068.48
10452.07 2068.7110455.28 2068.6110457.08 2068.3810458.29  2068.510472.77 2069.24
10481.28 2069.4110483.54 2069.3310490.47 2069.5910493.31 2069.4910502.98 2069.64
10518.93 2068.9910521.04 2068.8810522.02 2068.8810523.56 2068.9910534.73 2070.33
10540.58 2070.76 10547.4 2071.15 10560.4 2071.2110565.96 2071.1810573.41 2071.28
10573.45 2071.29 10574.1  2071.310591.77 2071.6710593.08 2071.75 10605.5 2071.89
10610.59 2072.0510611.06 2072.0710616.73 2072.4610635.04 2073.7410638.01 2073.89
10650.72 2074.6510659.14 2075.01

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**************************************************
    8602    .0429903.389    .02910146.14    .032

Bank Sta: Left   Right    Coeff Contr.   Expan.
      9903.38910146.14             .3        .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
    86029943.699    2070       F
10100.6710659.14    2070       F

Downstream  Deck/Roadway Coordinates
    num=       36
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
```

```
**********************************************************************
9263.961 2063.18        9647.821 2064.18          9906.3 2065.75
  9906.3 2069.15         9909.84 2069.15         9909.84 2067.65
9917.281  2067.3 2063.139921.581  2067.3 2063.53  9939.5 2067.34 2063.53
9943.799 2067.34 2063.139945.049 2067.34 2063.139949.349 2067.34 2063.53
9968.239 2067.31 2063.53 9972.54 2067.31 2063.13 9973.79 2067.31 2063.13
 9978.09 2067.31 2063.53 9994.53 2067.38 2063.539998.829 2067.38 2063.13
10000.08 2067.38 2063.1310004.38 2067.38 2063.5310020.96 2067.35 2063.53
10025.26 2067.35 2063.1310026.51 2067.35 2063.1310030.81 2067.35 2063.53
10047.32 2067.34 2063.5310051.62 2067.34 2063.1310052.87 2067.34 2063.13
10057.17 2067.34 2063.5310074.12 2067.27 2063.5310078.41 2067.27 2063.13
10085.75 2067.93        10085.75 2069.43        10089.29 2069.43
10089.29 2066.03        10118.06 2066.18        10334.86 2068.18

Downstream Bridge Cross Section Data
Station Elevation Data    num=     128
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
**********************************************************************
9533.221 2061.88 9537.19 2061.929537.209 2061.92 9537.25 2061.93 9552.39 2062.12
 9559.55 2061.949569.479 2062.17 9580.54 2061.989581.091  2061.99581.719  2061.9
 9582.31  2061.99603.969 2061.949605.829 2062.09 9618.28 2062.37 9625.76 2062.18
9627.309 2062.06 9629.71 2062.219642.999  2062.59648.541 2062.12 9655.87  2062.2
9664.001 2061.63 9669.82 2061.54 9673.68 2061.63  9697.9 2061.41 9700.29 2061.35
9704.029 2060.96 9705.73  2060.9 9711.22 2060.35 9712.37 2060.33 9733.89 2062.09
 9756.02 2060.07 9757.78 2059.79 9759.43  2059.89794.981 2061.25  9822.3 2058.98
 9824.08    20599825.919 2059.019875.279 2058.86  9880.9 2059.65 9884.45 2060.43
 9893.53 2060.699896.279 2056.039901.049 2056.039902.069 2055.83 9913.73 2055.76
 9922.58 2054.16 9934.54 2053.119935.199 2053.11 9935.95 2053.11 9946.26 2053.11
 9955.46 2053.12 9957.31 2053.12  9959.4 2053.12 9968.37 2053.12 9976.37 2053.12
9979.421 2053.12 9982.85 2053.12 9990.48 2053.11 9997.29 2053.06   10000 2053.05
10001.54 2053.04 10006.3 2053.0110012.59 2052.96 10018.2 2052.9310023.65 2052.89
10029.75 2052.84 10034.7 2052.8110039.12 2052.7810045.76 2052.73 10053.2 2052.68
10056.81 2052.6610060.04 2052.6410067.87 2052.5810076.65 2052.5210078.92  2052.5
10080.95 2052.4910089.98 2052.43 10100.1 2052.3610101.04 2052.35 10126.3 2062.94
10135.16 2062.4110135.71 2062.6610136.19 2062.7310137.06 2062.35 10137.3 2062.76
10147.49  2062.710149.68 2062.6710149.76 2062.6710149.84 2062.6710149.92 2062.67
   10150 2062.6710172.38  2063.410173.87 2063.4210175.38 2063.4410176.92 2063.46
10178.49 2063.4910180.07 2063.5110181.69 2063.5310195.83 2063.7310201.43  2065.9
10202.62 2065.8810208.23 2063.8610216.26 2065.81 10219.4 2065.8410226.39 2065.99
10238.21 2064.3110251.15 2066.0210257.59 2066.1510263.36 2065.0410274.66  2065.2
10287.83 2066.8110291.05 2066.97 10307.5 2067.3210307.64 2067.3410308.49 2067.37
10316.79 2067.5910317.57 2067.6410321.82  2067.6 10331.5 2067.3910338.78 2067.24
10346.28 2068.0810346.44 2068.0810346.51 2068.0910350.35 2067.9710372.41 2067.28
10373.21 2067.2810373.96 2067.2910376.19 2067.31

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
**************************************************************
9533.221    .042 9733.89       0 9893.53    .029 10126.3    .032

Bank Sta: Left   Right    Coeff Contr.   Expan.
        9893.53 10126.3            .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
9533.2219917.281    2065       F
10078.4110376.19    2065       F

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .95
Elevation at which weir flow begins         = 2067.26
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=9969.245    Downstream=9944.431
Upstream     num=       2
    Width   Elev    Width   Elev
********************************
    1.25  1949.5    1.25  2063.6
Downstream     num=       2
    Width   Elev    Width   Elev
********************************
    1.25  1949.5    1.25  2063.6
Debris Width  =      2.5
Debris Height =     2064
```

```
Pier Data
Pier Station     Upstream=9995.748    Downstream=9973.166
Upstream     num=        2
    Width   Elev    Width   Elev
*********************************
    1.25  1949.5    1.25  2063.6
Downstream     num=        2
    Width   Elev    Width   Elev
*********************************
    1.25  1949.5    1.25  2063.6
Debris Width  =      2.5
Debris Height =     2064

Pier Data
Pier Station     Upstream=10021.87    Downstream=9999.458
Upstream     num=        2
    Width   Elev    Width   Elev
*********************************
    1.25  1949.5    1.25  2063.6
Downstream     num=        2
    Width   Elev    Width   Elev
*********************************
    1.25  1949.5    1.25  2063.6
Debris Width  =      2.5
Debris Height =     2064

Pier Data
Pier Station     Upstream=10048.69    Downstream=10025.88
Upstream     num=        2
    Width   Elev    Width   Elev
*********************************
    1.25  1949.5    1.25  2063.6
Downstream     num=        2
    Width   Elev    Width   Elev
*********************************
    1.25  1949.5    1.25  2063.6
Debris Width  =      2.5
Debris Height =     2064

Pier Data
Pier Station     Upstream=10075.13    Downstream=10052.24
Upstream     num=        2
    Width   Elev    Width   Elev
*********************************
    1.25  1949.5    1.25  2063.6
Downstream     num=        2
    Width   Elev    Width   Elev
*********************************
    1.25  1949.5    1.25  2063.6
Debris Width  =      2.5
Debris Height =     2064

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
*******************************************************************************************
* E.G. US. (ft)          *    2066.13  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *    2065.29  * E.G. Elev (ft)         *    2066.13  *    2062.12  *
* Q Total (cfs)          *   13090.00  * W.S. Elev (ft)         *    2063.53  *    2059.93  *
```

Q Bridge (cfs)	13090.00	Crit W.S. (ft)	2060.30	2059.12
Q Weir (cfs)		Max Chl Dpth (ft)	10.40	7.42
Weir Sta Lft (ft)		Vel Total (ft/s)	9.49	12.28
Weir Sta Rgt (ft)		Flow Area (sq ft)	1378.86	1066.18
Weir Submerg		Froude # Chl	0.54	0.82
Weir Max Depth (ft)		Specif Force (cu ft)	10528.69	8674.11
Min El Weir Flow (ft)	2067.26	Hydr Depth (ft)	117662.30	6.88
Min El Prs (ft)	2063.53	W.P. Total (ft)	433.30	210.97
Delta EG (ft)	4.04	Conv. Total (cfs)	152850.9	160881.4
Delta WS (ft)	5.37	Top Width (ft)	0.01	154.93
BR Open Area (sq ft)	1378.86	Frctn Loss (ft)		
BR Open Vel (ft/s)	9.49	C & E Loss (ft)		
Coef of Q		Shear Total (lb/sq ft)	1.46	2.09
Br Sel Method	Press Only	Power Total (lb/ft s)	13.83	25.64

Note: The momentum method has computed a class B profile.
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.

BRIDGE OUTPUT Profile #PF 2

			Inside BR US	Inside BR DS
E.G. US. (ft)	2061.14	Element		
W.S. US. (ft)	2060.39	E.G. Elev (ft)	2061.02	2059.41
Q Total (cfs)	7019.00	W.S. Elev (ft)	2060.04	2058.22
Q Bridge (cfs)	7019.00	Crit W.S. (ft)	2058.11	2057.05
Q Weir (cfs)		Max Chl Dpth (ft)	6.90	5.71
Weir Sta Lft (ft)		Vel Total (ft/s)	7.96	8.76
Weir Sta Rgt (ft)		Flow Area (sq ft)	882.17	801.42
Weir Submerg		Froude # Chl	0.57	0.68
Weir Max Depth (ft)		Specif Force (cu ft)	4441.43	3995.89
Min El Weir Flow (ft)	2067.26	Hydr Depth (ft)	6.11	5.17
Min El Prs (ft)	2063.53	W.P. Total (ft)	241.67	197.29
Delta EG (ft)	1.74	Conv. Total (cfs)	107160.8	104541.3
Delta WS (ft)	2.04	Top Width (ft)	144.51	154.93
BR Open Area (sq ft)	1378.86	Frctn Loss (ft)		
BR Open Vel (ft/s)	8.76	C & E Loss (ft)		
Coef of Q		Shear Total (lb/sq ft)	0.98	1.14
Br Sel Method	Momentum	Power Total (lb/ft s)	7.78	10.01

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: Sols Wash RS: 0.474

INPUT
Description:
Station Elevation Data num= 128

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9533.221	2061.88	9537.19	2061.92	9537.209	2061.92	9537.25	2061.93	9552.39	2062.12
9559.55	2061.94	9569.479	2062.17	9580.54	2061.98	9581.091	2061.99	581.719	2061.9
9582.31	2061.99	603.969	2061.94	9605.829	2062.09	9618.28	2062.37	9625.76	2062.18
9627.309	2062.06	9629.71	2062.21	9642.999	2062.59	648.541	2062.12	9655.87	2062.2
9664.001	2061.63	9669.82	2061.54	9673.68	2061.63	9697.9	2061.41	9700.29	2061.35
9704.029	2060.96	9705.73	2060.9	9711.22	2060.35	9712.37	2060.33	9733.89	2062.09
9756.02	2060.07	9757.78	2059.79	9759.43	2059.89	794.981	2061.25	9822.3	2058.98
9824.08	2059	9825.919	2059.01	9875.279	2058.86	9880.9	2059.65	9884.45	2060.43
9893.53	2060.69	9896.279	2056.03	9901.049	2056.03	9902.069	2055.83	9913.73	2055.76
9922.58	2054.16	9934.54	2053.11	9935.199	2053.11	9935.95	2053.11	9946.26	2053.11
9955.46	2053.12	9957.31	2053.12	9959.4	2053.12	9968.37	2053.12	9976.37	2053.12
9979.421	2053.12	9982.85	2053.12	9990.48	2053.11	9997.29	2053.06	10000	2053.05
10001.54	2053.04	10006.3	2053.01	10012.59	2052.96	10018.2	2052.93	10023.65	2052.89
10029.75	2052.84	10034.7	2052.81	10039.12	2052.78	10045.76	2052.73	10053.2	2052.68

```
10056.81 2052.6610060.04 2052.6410067.87 2052.5810076.65 2052.5210078.92  2052.5
10080.95 2052.4910089.98 2052.43 10100.1 2052.3610101.04 2052.35 10126.3 2062.94
10135.16 2062.4110135.71 2062.6610136.19 2062.7310137.06 2062.35 10137.3 2062.76
10147.49  2062.710149.68 2062.6710149.76 2062.6710149.84 2062.6710149.92 2062.67
   10150 2062.6710172.38  2063.410173.87 2063.4210175.38 2063.4410176.92 2063.46
10178.49 2063.4910180.07 2063.5110181.69 2063.5310195.83 2063.7310201.43  2065.9
10202.62 2065.8810208.23 2063.8610216.26 2065.81 10219.4 2065.8410226.39 2065.99
10238.21 2064.3110251.15 2066.0210257.59 2066.1510263.36 2065.0410274.66  2065.2
10287.83 2066.8110291.05 2066.97 10307.5 2067.3210307.64 2067.3410308.49 2067.37
10316.79 2067.5910317.57 2067.6410321.82  2067.6 10331.5 2067.3910338.78 2067.24
10346.28 2068.0810346.44 2068.0810346.51 2068.0910350.35 2067.9710372.41 2067.28
10373.21 2067.2810373.96 2067.2910376.19 2067.31

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
***************************************************************
9533.221    .042 9733.89       0 9893.53    .029 10126.3    .032

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        9893.53 10126.3             180     151      50             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
9533.2219917.281    2065       F
10078.4110376.19    2065       F

CROSS SECTION OUTPUT  Profile #PF 1
*********************************************************************************************
* E.G. Elev (ft)          * 2062.09  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    2.16  * Wt. n-Val.              *          *   0.029  *          *
* W.S. Elev (ft)          * 2059.93  * Reach Len. (ft)        *  180.00  *  151.00  *   50.00  *
* Crit W.S. (ft)          * 2058.95  * Flow Area (sq ft)      *          * 1109.65  *          *
* E.G. Slope (ft/ft)      *0.004050  * Area (sq ft)           *   62.02  * 1438.91  *          *
* Q Total (cfs)           *13090.00  * Flow (cfs)             *          *13090.00  *          *
* Top Width (ft)          *  301.93  * Top Width (ft)         *   76.80  *  225.13  *          *
* Vel Total (ft/s)        *   11.80  * Avg. Vel. (ft/s)       *          *   11.80  *          *
* Max Chl Dpth (ft)       *    7.58  * Hydr. Depth (ft)       *          *    6.89  *          *
* Conv. Total (cfs)       *205691.4  * Conv. (cfs)            *          *205691.4  *          *
* Length Wtd. (ft)        *  151.45  * Wetted Per. (ft)       *          *  161.26  *          *
* Min Ch El (ft)          * 2052.35  * Shear (lb/sq ft)       *          *    1.74  *          *
* Alpha                   *    1.00  * Stream Power (lb/ft s) *          *   20.52  *          *
* Frctn Loss (ft)         *    0.72  * Cum Volume (acre-ft)   *   93.07  *   40.60  *    1.55  *
* C & E Loss (ft)         *    0.28  * Cum SA (acres)         *   27.23  *    6.89  *    1.15  *
*********************************************************************************************

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.
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)          * 2059.40  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    1.04  * Wt. n-Val.              *          *   0.029  *          *
* W.S. Elev (ft)          * 2058.36  * Reach Len. (ft)        *  180.00  *  151.00  *   50.00  *
* Crit W.S. (ft)          * 2056.94  * Flow Area (sq ft)      *          *  856.70  *          *
* E.G. Slope (ft/ft)      *0.002758  * Area (sq ft)           *          * 1089.17  *          *
* Q Total (cfs)           * 7019.00  * Flow (cfs)             *          * 7019.00  *          *
* Top Width (ft)          *  220.46  * Top Width (ft)         *          *  220.46  *          *
* Vel Total (ft/s)        *    8.19  * Avg. Vel. (ft/s)       *          *    8.19  *          *
* Max Chl Dpth (ft)       *    6.01  * Hydr. Depth (ft)       *          *    5.32  *          *
* Conv. Total (cfs)       *133646.8  * Conv. (cfs)            *          *133646.8  *          *
* Length Wtd. (ft)        *  151.02  * Wetted Per. (ft)       *          *  161.26  *          *
* Min Ch El (ft)          * 2052.35  * Shear (lb/sq ft)       *          *    0.91  *          *
* Alpha                   *    1.00  * Stream Power (lb/ft s) *          *    7.49  *          *
* Frctn Loss (ft)         *    0.52  * Cum Volume (acre-ft)   *   99.19  *   54.04  *   15.83  *
* C & E Loss (ft)         *    0.07  * Cum SA (acres)         *   21.50  *    6.82  *    3.02  *
*********************************************************************************************

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: Sols Wash          RS: 0.445
```

INPUT
Description:
Station Elevation Data num= 199

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
8967.36	2059	8967.44	2059	8973.08	2058.86	8986.14	2058.28	8993.09	2058.05
9005.7	2058.41	9018.23	2058.76	9021.18	2058.77	9028.39	2058.84	9033.54	2058.79
9038.55	2058.76	9045.91	2058.64	9048.71	2058.6	9058.27	2058.44	9058.87	2058.43
9061.61	2058.39	9069.02	2058.28	9070.63	2058.27	9079.18	2058.21	9083	2058.21
9089.34	2058.21	9095.36	2058.24	9099.5	2058.27	9107.73	2058.33	9109.66	2058.35
9118.54	2058.42	9119.81	2058.43	9120.09	2058.43	9129.97	2058.48	9132.45	2058.48
9140.13	2058.51	9145.48	2058.5	9147.69	2058.51	9178.56	2058.21	9180.46	2058.2
9182.69	2058.19	9186.85	2058.16	9208.38	2058.03	9212.97	2058.02	9214.44	2058.02
9221.39	2058.07	9231.36	2058.13	9231.55	2058.13	9232.4	2058.14	9241.71	2058.2
9243.73	2058.21	9251.87	2058.27	9256.09	2058.29	9262.02	2058.33	9268.46	2058.35
9272.18	2058.36	9280.82	2058.37	9282.34	2058.37	9289.34	2058.34	9292.5	2058.33
9293.18	2058.33	9302.66	2058.27	9305.55	2058.24	9312.81	2058.18	9317.91	2058.14
9322.97	2058.09	9330.28	2058.03	9333.13	2058	9342.64	2057.89	9343.29	2057.88
9343.74	2057.88	9356.09	2057.42	9376.37	2056.65	9378	2056.57	9380.17	2056.49
9381.54	2056.53	9382.17	2056.57	9383.85	2056.65	9402.08	2057.52	9404.03	2057.62
9404.19	2057.62	9404.81	2057.62	9416.82	2057.67	9424.55	2057.66	9429.19	2057.67
9434.71	2057.66	9441.55	2057.66	9444.87	2057.66	9453.92	2057.68	9455.02	2057.68
9460.13	2057.69	9465.18	2057.71	9466.28	2057.71	9475.34	2057.75	9478.64	2057.77
9485.5	2057.8	9491.01	2057.81	9495.66	2057.83	9503.37	2057.82	9505.81	2057.82
9515.74	2057.76	9515.97	2057.76	9517.06	2057.75	9526.13	2057.66	9528.1	2057.64
9536.29	2057.55	9540.46	2057.54	9546.45	2057.49	9569.47	2057.15	9584.28	2056.95
9589.82	2057.06	9594.07	2057.24	9607.39	2057.85	9614.65	2057.91	9617.55	2057.95
9627.01	2057.95	9627.71	2057.95	9630.93	2057.94	9637.87	2057.93	9639.37	2057.93
9648.03	2057.91	9651.74	2057.91	9658.18	2057.9	9664.1	2057.91	9668.34	2057.91
9676.47	2057.92	9678.5	2057.92	9687.86	2057.94	9688.66	2057.94	9688.83	2057.94
9698.81	2057.96	9701.19	2057.96	9708.97	2057.97	9713.56	2057.98	9719.13	2057.99
9725.92	2057.99	9729.29	2058	9738.29	2058	9739.45	2058.01	9744.79	2058.01
9749.6	2058.02	9750.65	2058.02	9759.76	2058.02	9763.01	2058.02	9769.92	2058.03
9775.38	2058.03	9780.08	2058.04	9787.74	2058.04	9790.24	2058.05	9800.11	2058.06
9800.39	2058.06	9801.72	2058.06	9810.55	2058.07	9812.47	2058.08	9820.71	2058.09
9824.83	2058.1	9830.87	2058.11	9837.2	2058.13	9841.03	2058.14	9849.56	2058.16
9851.18	2058.16	9856.22	2058.14	9860.58	2058.13	9861.27	2058.12	9862.49	2058.09
9875.77	2057.77	9890.47	2057.58	9895.25	2057.49	9900.8	2057.37	9921.83	2056.2
9932.1	2055.08	9948.3	2053.15	9962.79	2052.54	9977.54	2051.07	9981.5	2051.1
9983.25	2051.12	9991.52	2051.19	9992.69	2051.2	10000	2051.26	10001.54	2051.27
10002.12	2051.27	10011.56	2051.35	10011.61	2051.35	10021	2051.43	10021.58	2051.44
10030.43	2051.51	10031.6	2051.52	10039.87	2051.59	10041.61	2051.61	10055.6	2051.73
10058.96	2051.76	10060.67	2052.12	10063	2052.46	10085.52	2055.85	10096.36	2057.89
10106.02	2060.38	10113.4	2060.91	10121.77	2061.63	10124.8	2061.81	10131.79	2062.25
10134.24	2062.35	10144.27	2062.66	10150.32	2062.87	10150.88	2062.89		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
8967.36	.042	9900.8	.036	10106.02	.032

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9900.8	10106.02	100	107	90	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
8967.36	9830	2062	F

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2061.09	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.60	Wt. n-Val.	0.042	0.036	
W.S. Elev (ft)	2059.49	Reach Len. (ft)	100.00	107.00	90.00
Crit W.S. (ft)	2058.64	Flow Area (sq ft)	112.24	1234.47	
E.G. Slope (ft/ft)	0.005577	Area (sq ft)	1418.35	1234.47	
Q Total (cfs)	13090.00	Flow (cfs)	403.14	12686.86	
Top Width (ft)	1135.21	Top Width (ft)	933.44	201.77	
Vel Total (ft/s)	9.72	Avg. Vel. (ft/s)	3.59	10.28	
Max Chl Dpth (ft)	8.42	Hydr. Depth (ft)	1.59	6.12	
Conv. Total (cfs)	175279.1	Conv. (cfs)	5398.2	169880.9	
Length Wtd. (ft)	106.67	Wetted Per. (ft)	70.81	202.78	
Min Ch El (ft)	2051.07	Shear (lb/sq ft)	0.55	2.12	
Alpha	1.09	Stream Power (lb/ft s)	1.98	21.78	
Frctn Loss (ft)	0.50	Cum Volume (acre-ft)	90.01	35.97	1.55
C & E Loss (ft)	0.09	Cum SA (acres)	25.14	6.15	1.15

Warning: The cross-section end points had to be extended vertically for the computed water surface.
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)	2058.81	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.90	Wt. n-Val.	0.042	0.036	
W.S. Elev (ft)	2057.91	Reach Len. (ft)	100.00	107.00	90.00
Crit W.S. (ft)	2056.42	Flow Area (sq ft)	8.32	920.21	
E.G. Slope (ft/ft)	0.004347	Area (sq ft)	125.14	920.21	
Q Total (cfs)	7019.00	Flow (cfs)	8.10	7010.90	
Top Width (ft)	520.88	Top Width (ft)	325.24	195.64	
Vel Total (ft/s)	7.56	Avg. Vel. (ft/s)	0.97	7.62	
Max Chl Dpth (ft)	6.84	Hydr. Depth (ft)	0.27	4.70	
Conv. Total (cfs)	106458.4	Conv. (cfs)	122.9	106335.5	
Length Wtd. (ft)	106.98	Wetted Per. (ft)	30.85	196.44	
Min Ch El (ft)	2051.07	Shear (lb/sq ft)	0.07	1.27	
Alpha	1.01	Stream Power (lb/ft s)	0.07	9.69	
Frctn Loss (ft)	0.38	Cum Volume (acre-ft)	98.93	50.55	15.83
C & E Loss (ft)	0.05	Cum SA (acres)	20.83	6.10	3.02

Warning: Divided flow computed for this cross-section.
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: Sols Wash RS: 0.425

INPUT
Description:
Station Elevation Data num= 244

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
8828.81	2058.67	8833.83	2058.63	8838.9	2058.58	8845.84	2058.5	8849.02	2058.47
8857.85	2058.37	8859.14	2058.35	8866.06	2058.27	8869.26	2058.23	8869.86	2058.21
8879.39	2058.02	8891.1	2057.07	8899.1	2056.36	8901.06	2056.44	8908.73	2056.81
8914.86	2057.08	8929.83	2057.92	8930	2057.93	8930.48	2057.94	8940.12	2058.08
8941.92	2058.09	8950.25	2058.13	8953.93	2058.13	8960.37	2058.12	8965.94	2058.11
8970.49	2058.1	8977.95	2058.09	8980.61	2058.08	8989.96	2058.09	8990.74	2058.09
8994.9	2058.1	9000.86	2058.11	9001.97	2058.11	9010.98	2058.13	9013.98	2058.13
9021.1	2058.14	9025.99	2058.14	9031.23	2058.13	9038	2058.1	9041.35	2058.09
9050.01	2057.99	9051.47	2057.97	9052.54	2057.94	9064.01	2057.41	9075.01	2056.93
9086.97	2057.09	9090.34	2057.14	9102.03	2057.21	9121.08	2057.25	9122.43	2057.25
9122.52	2057.25	9123.73	2057.27	9132.45	2057.36	9134.08	2057.37	9142.58	2057.45
9146.09	2057.48	9152.7	2057.53	9158.1	2057.54	9162.82	2057.57	9170.11	2057.57
9172.94	2057.58	9182.12	2057.57	9183.07	2057.57	9188.15	2057.55	9193.19	2057.54
9194.13	2057.53	9203.31	2057.5	9206.14	2057.49	9213.44	2057.47	9218.15	2057.47
9223.56	2057.46	9230.16	2057.46	9233.68	2057.46	9242.17	2057.43	9243.8	2057.43
9252.57	2057.33	9253.93	2057.32	9254.56	2057.28	9270.18	2056.49	9285.85	2056.59
9287.73	2056.66	9288.61	2056.67	9292.63	2056.74	9306.23	2056.95	9314.66	2056.99
9316.98	2056.99	9324.79	2056.98	9326.24	2056.97	9334.91	2056.96	9338.25	2056.96
9345.03	2056.96	9350.26	2056.97	9355.15	2056.98	9362.27	2057.02	9365.28	2057.04
9374.28	2057.11	9375.4	2057.11	9381.4	2057.17	9385.52	2057.2	9386.29	2057.21
9395.64	2057.3	9398.3	2057.33	9405.77	2057.41	9410.31	2057.46	9415.89	2057.5
9422.32	2057.56	9426.01	2057.58	9434.33	2057.61	9436.14	2057.61	9445.82	2057.6
9446.26	2057.59	9446.34	2057.59	9456.38	2057.5	9463.69	2057.27	9468.5	2057.08
9479.96	2056.58	9495.43	2056.38	9510.59	2056.77	9524.93	2057.65	9527.24	2057.72
9530.41	2057.74	9537.36	2057.82	9542.42	2057.83	9547.49	2057.85	9554.43	2057.86
9557.61	2057.86	9566.44	2057.88	9567.73	2057.88	9574.65	2057.89	9577.85	2057.9
9578.45	2057.9	9587.98	2057.91	9590.46	2057.92	9598.1	2057.93	9602.47	2057.93
9608.22	2057.94	9614.48	2057.94	9618.34	2057.95	9626.49	2057.96	9628.47	2057.96
9638.5	2057.97	9638.59	2057.97	9639.07	2057.97	9648.71	2057.97	9650.51	2057.97
9658.84	2057.97	9662.52	2057.97	9668.96	2057.97	9674.53	2057.96	9679.08	2057.96
9686.54	2057.95	9689.2	2057.94	9698.55	2057.93	9699.33	2057.93	9703.49	2057.92
9709.45	2057.91	9710.56	2057.91	9719.57	2057.89	9722.57	2057.89	9729.69	2057.88
9734.58	2057.87	9739.82	2057.87	9746.59	2057.86	9749.94	2057.86	9758.6	2057.85
9760.06	2057.85	9767.9	2057.86	9770.13	2057.86	9779.22	2057.86	9787.18	2057.87
9790.43	2057.92	9797.03	2057.8	9805.68	2057.77	9812.68	2057.73	9818.47	2057.68
9830.66	2057.75	9830.92	2057.75	9836.3	2057.68	9847.24	2057.27	9855.65	2056.99
9857.94	2057	9862.54	2057.06	9881.02	2057.55	9885.4	2057.31	9918.64	2054.23
9920.38	2054.01	9921.58	2053.91	9928.4	2053.36	9931.63	2053.11	9937.52	2052.56
9952.48	2050.88	9957.56	2050.38	9958.86	2050.38	9970.3	2050.25	9980.94	2050.22
9983.11	2050.12	9991.95	2050.02	9992.22	2050.02	9994.92	2049.99	10000	2049.94
10001.34	2049.93	10002	2049.92	10010.46	2049.86	10012.05	2049.84	10019.58	2049.79

```
10020.78 2049.7810027.09 2050.2210050.01 2050.9310059.73  2054.710060.73 2055.26
10064.71 2056.8610071.88 2059.0610074.78 2060.6810079.44 2060.9310095.12 2061.18
10102.16 2061.2910103.44 2061.3210113.01 2061.5810121.37 2061.8710123.05    2062
10140.07 2062.6410143.84 2062.7910144.39 2062.8210144.94 2062.8310151.52 2063.35
10160.02 2063.4210169.41 2063.4210176.34 2063.4110182.45 2063.5310188.02 2063.63
 10193.9 2063.7510199.23 2063.8310209.22 2063.86 10213.8 2063.9210227.34 2064.04
10230.66 2064.8510233.45 2065.4110248.43 2068.8510253.14  2068.610254.78  2068.5
10256.98 2068.3610261.69 2068.0910271.07 2068.2610284.98 2068.68

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
 8828.81    .028 9881.02    .03610074.78    .018

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9881.0210074.78              530     391     350             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
 8828.81    9770    2061       F

CROSS SECTION OUTPUT  Profile #PF 1
**************************************************************************************************
* E.G. Elev (ft)          * 2060.50  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    1.30  * Wt. n-Val.              *   0.028  *   0.036  *         *
* W.S. Elev (ft)          * 2059.20  * Reach Len. (ft)         *  530.00  *  391.00  *  350.00  *
* Crit W.S. (ft)          * 2057.72  * Flow Area (sq ft)       *  179.71  * 1307.28  *         *
* E.G. Slope (ft/ft)      *0.004026  * Area (sq ft)            * 1723.33  * 1307.28  *         *
* Q Total (cfs)           *13090.00  * Flow (cfs)              *  834.13  *12255.87  *         *
* Top Width (ft)          * 1243.32  * Top Width (ft)          * 1052.21  *  191.11  *         *
* Vel Total (ft/s)        *    8.80  * Avg. Vel. (ft/s)        *    4.64  *    9.38  *         *
* Max Chl Dpth (ft)       *    9.42  * Hydr. Depth (ft)        *    1.62  *    6.84  *         *
* Conv. Total (cfs)       *206310.1  * Conv. (cfs)             * 13146.7  *193163.4  *         *
* Length Wtd. (ft)        *  417.58  * Wetted Per. (ft)        *  111.04  *  193.01  *         *
* Min Ch El (ft)          * 2049.78  * Shear (lb/sq ft)        *    0.41  *    1.70  *         *
* Alpha                   *    1.08  * Stream Power (lb/ft s)  *    1.89  *   15.96  *         *
* Frctn Loss (ft)         *    2.04  * Cum Volume (acre-ft)    *   86.40  *   32.85  *    1.55 *
* C & E Loss (ft)         *    0.02  * Cum SA (acres)          *   22.86  *    5.67  *    1.15 *
**************************************************************************************************

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.
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)          * 2058.38  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.74  * Wt. n-Val.              *   0.028  *   0.036  *         *
* W.S. Elev (ft)          * 2057.65  * Reach Len. (ft)         *  530.00  *  391.00  *  350.00  *
* Crit W.S. (ft)          * 2055.25  * Flow Area (sq ft)       *   16.86  * 1014.31  *         *
* E.G. Slope (ft/ft)      *0.002947  * Area (sq ft)            *  258.33  * 1014.31  *         *
* Q Total (cfs)           * 7019.00  * Flow (cfs)              *   25.69  * 6993.31  *         *
* Top Width (ft)          *  737.00  * Top Width (ft)          *  550.75  *  186.25  *         *
* Vel Total (ft/s)        *    6.81  * Avg. Vel. (ft/s)        *    1.52  *    6.89  *         *
* Max Chl Dpth (ft)       *    7.87  * Hydr. Depth (ft)        *    0.38  *    5.45  *         *
* Conv. Total (cfs)       *129302.8  * Conv. (cfs)             *  473.2  *128829.5  *         *
* Length Wtd. (ft)        *  403.25  * Wetted Per. (ft)        *   43.84  *  187.91  *         *
* Min Ch El (ft)          * 2049.78  * Shear (lb/sq ft)        *    0.07  *    0.99  *         *
* Alpha                   *    1.02  * Stream Power (lb/ft s)  *    0.11  *    6.85  *         *
* Frctn Loss (ft)         *    1.55  * Cum Volume (acre-ft)    *   98.49  *   48.18  *   15.83 *
* C & E Loss (ft)         *    0.04  * Cum SA (acres)          *   19.82  *    5.63  *    3.02 *
**************************************************************************************************

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.
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: Sols Wash          RS: 0.351
```

```
INPUT
Description:
Station Elevation Data    num=     241
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 8899.98 2048.13 8902.12 2048.09 8906.07 2048.06 8912.29 2048.01 8914.67 2048.02
 8922.45 2048.05 8923.27 2048.06 8927.74  2048.1 8931.87 2048.15 8932.62 2048.15
 8940.46 2048.22 8942.78 2048.24 8949.06 2048.25 8952.95 2048.26 8957.66 2048.25
 8963.11 2048.23 8966.26 2048.21 8973.28 2048.17 8974.85 2048.16 8983.44 2048.09
  8983.5 2048.09 8992.05 2048.02 8993.61 2048.01 9000.65 2047.96 9003.77 2047.93
 9009.24 2047.89 9013.94 2047.85 9017.84 2047.82  9024.1 2047.77 9026.44 2047.75
 9034.27 2047.67 9035.04 2047.66 9039.26 2047.61 9043.63 2047.56 9044.43 2047.55
 9052.23 2047.45  9054.6 2047.42 9060.83 2047.33 9064.76 2047.29 9069.43 2047.23
 9074.93 2047.17 9078.02 2047.14 9085.09 2047.07 9086.62 2047.06 9095.01 2046.99
 9095.22 2046.99 9095.26 2046.99 9103.82 2046.95 9105.42 2046.94 9112.41 2046.93
 9115.59 2046.93 9121.01 2046.92 9125.75 2046.91 9129.61 2046.91 9135.92 2046.89
 9138.21 2046.88 9146.08 2046.84  9146.8 2046.84 9150.77  2046.8  9155.4 2046.76
 9156.37  2046.8 9165.61 2047.04 9175.74 2046.66 9189.94    2047 9209.99 2046.39
 9215.58 2046.45 9223.86 2046.58 9232.52 2046.72 9237.72 2046.85 9247.27  2047.5
 9264.85 2046.59 9267.85 2046.43 9285.99  2045.7 9294.67 2047.01  9302.3 2048.81
 9303.03 2048.91 9318.75 2051.07 9318.88 2051.08 9327.35 2051.81 9329.05 2051.89
 9335.95 2052.19 9339.21 2052.27 9344.54 2052.42 9349.38 2052.51 9353.14 2052.58
 9359.54 2052.67 9361.74  2052.7 9369.71 2052.77 9370.34 2052.78  9373.8  2052.8
 9378.93 2052.82 9379.87 2052.83 9387.53 2052.85 9390.04 2052.86 9396.13 2052.87
  9400.2 2052.88 9404.73 2052.88 9410.37 2052.89 9413.32 2052.89 9420.53 2052.89
 9421.92 2052.89 9429.55 2052.88 9430.52 2052.88  9430.7 2052.88 9439.12 2052.86
 9440.86 2052.86 9447.71 2052.83 9451.02 2052.82 9456.31 2052.79 9461.19 2052.77
 9464.91 2052.75 9471.35 2052.72 9473.51 2052.71 9481.52 2052.69  9482.1 2052.69
 9485.31 2052.68  9490.7 2052.68 9491.68 2052.67  9499.3 2052.64 9501.85 2052.61
 9507.74 2052.38 9514.31 2052.14 9516.41 2052.07 9542.23 2051.53 9550.42  2051.4
 9556.99 2051.61 9561.86 2051.89    9573 2052.52 9576.68 2052.62 9583.17 2052.78
 9585.27 2052.79 9593.33 2052.83 9593.87 2052.83 9596.82 2052.84 9602.47 2052.87
  9603.5 2052.88 9611.07 2052.94 9613.66 2052.97 9619.66 2053.05 9623.83 2053.11
 9628.26  2053.2 9633.99 2053.32 9636.86 2053.39 9644.16 2053.56 9645.46  2053.6
 9652.58 2053.76 9654.05  2053.8 9654.32  2053.8 9662.65 2053.97 9664.49    2054
 9671.25 2054.11 9674.65 2054.16 9679.85 2054.23 9684.82 2054.28 9688.44 2054.34
 9694.98  2054.4 9697.04 2054.43 9705.15  2054.5 9705.64 2054.51 9708.34 2054.53
 9714.24 2054.58 9715.31 2054.59 9722.83 2054.65 9725.47 2054.67 9731.43 2054.72
 9735.64 2054.75 9740.03 2054.78  9745.8 2054.83 9760.02 2054.91 9765.97 2054.94
 9771.92 2054.97 9781.99 2054.97 9804.79 2054.96 9806.79 2054.94 9809.47 2054.93
 9810.82 2054.93 9819.86 2054.85 9827.12 2054.79  9834.6 2054.69 9837.29 2054.65
  9843.2 2054.55 9847.45 2054.48 9851.79 2054.42 9857.62 2054.34 9860.39 2054.31
 9867.78 2054.23 9868.99 2054.22 9875.61 2054.19 9877.59 2054.18 9877.95 2054.18
 9886.18 2053.94 9888.11 2053.89 9923.32 2053.92 9940.09 2053.86 9942.93 2053.83
    9943 2053.83 9953.33 2053.52 9954.89 2053.36 9970.68 2051.88 9980.92 2050.28
   10000 2049.1610002.15 2049.0410007.04  2048.710007.92 2048.6410010.85 2048.42
10032.01 2050.22 10063.4 2050.5510067.58 2052.1610071.04  2055.1 10073.9 2055.12
10093.04 2058.9210101.06 2059.1410108.13 2059.2810111.74 2059.3510117.77 2059.51
10120.53 2059.5810121.45 2059.5910126.52 2059.6510130.05 2059.6810130.69 2059.69
10138.65 2059.6810143.27 2059.7710163.44 2062.9910165.09 2063.3610171.45 2063.11
10201.85 2061.9210207.43 2061.8810212.01 2061.8310216.02  2061.810222.18 2061.75
10224.62 2061.7410232.34 2061.6810233.22 2061.6810238.03 2061.6710241.82 2061.67
10242.51 2061.6710250.41 2061.7110252.67 2061.7210259.01 2061.88 10268.6 2062.29
10276.62 2062.67

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 8899.98     .03 9940.09    .03310093.04    .018

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9942.9310093.04              250     346     350              .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
 8899.98    9690    2059       F

CROSS SECTION OUTPUT  Profile #PF 1
*************************************************************************************************
* E.G. Elev (ft)          * 2058.43  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    1.54  * Wt. n-Val.              *   0.030  *   0.033  *          *
* W.S. Elev (ft)          * 2056.89  * Reach Len. (ft)        *  250.00  *  346.00  *  350.00  *
* Crit W.S. (ft)          * 2056.89  * Flow Area (sq ft)      *  605.67  *  802.15  *          *
* E.G. Slope (ft/ft)      *0.006048  * Area (sq ft)           * 6123.22  *  802.15  *          *
* Q Total (cfs)           *13090.00  * Flow (cfs)             * 4171.32  * 8918.68  *          *
* Top Width (ft)          * 1182.84  * Top Width (ft)         * 1042.95  *  139.89  *          *
* Vel Total (ft/s)        *    9.30  * Avg. Vel. (ft/s)       *    6.89  *   11.12  *          *
* Max Chl Dpth (ft)       *   11.19  * Hydr. Depth (ft)       *    2.39  *    5.73  *          *
* Conv. Total (cfs)       *168314.4  * Conv. (cfs)            * 53635.9  *114678.5  *          *
```

```
* Length Wtd. (ft)       *  318.79  * Wetted Per. (ft)       *  252.94  *  141.79  *          *
* Min Ch El (ft)         * 2048.42  * Shear (lb/sq ft)       *    0.90  *    2.14  *          *
* Alpha                  *    1.15  * Stream Power (lb/ft s) *    6.23  *   23.75  *          *
* Frctn Loss (ft)        *    1.99  * Cum Volume (acre-ft)   *   38.67  *   23.38  *    1.55  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)         *   10.11  *    4.18  *    1.15  *
*****************************************************************************************************

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.
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)         * 2056.80  * Element               *  Left OB  *  Channel  * Right OB  *
* Vel Head (ft)          *    1.11  * Wt. n-Val.             *   0.030   *   0.033   *          *
* W.S. Elev (ft)         * 2055.69  * Reach Len. (ft)       *  250.00   *  346.00   *  350.00  *
* Crit W.S. (ft)         * 2055.69  * Flow Area (sq ft)     *  301.86   *  637.75   *          *
* E.G. Slope (ft/ft)     *0.005191  * Area (sq ft)          * 4870.46   *  637.75   *          *
* Q Total (cfs)          * 7019.00  * Flow (cfs)            * 1211.58   * 5807.42   *          *
* Top Width (ft)         * 1176.79  * Top Width (ft)        * 1042.95   *  133.84   *          *
* Vel Total (ft/s)       *    7.47  * Avg. Vel. (ft/s)      *    4.01   *    9.11   *          *
* Max Chl Dpth (ft)      *    9.99  * Hydr. Depth (ft)      *    1.19   *    4.77   *          *
* Conv. Total (cfs)      * 97419.4  * Conv. (cfs)           * 16816.0   * 80603.4   *          *
* Length Wtd. (ft)       *  324.27  * Wetted Per. (ft)      *  252.94   *  135.62   *          *
* Min Ch El (ft)         * 2048.42  * Shear (lb/sq ft)      *    0.39   *    1.52   *          *
* Alpha                  *    1.28  * Stream Power (lb/ft s) *    1.55   *   13.88   *          *
* Frctn Loss (ft)        *    1.09  * Cum Volume (acre-ft)   *   67.29   *   40.76   *   15.83  *
* C & E Loss (ft)        *    0.18  * Cum SA (acres)         *   10.13   *    4.20   *    3.02  *
*****************************************************************************************************

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 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.
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: Sols Wash          RS: 0.286

INPUT
Description:
Station Elevation Data    num=      96
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************************
 9620.21 2051.68 9632.79 2051.64 9649.52 2051.65 9650.04 2051.66  9658.2 2051.74
 9660.06 2051.75 9668.97 2051.84 9670.09 2051.86 9679.75 2051.96 9680.11 2051.96
 9684.99 2052.01 9690.13 2052.06 9690.52 2052.07 9700.16 2052.17 9701.29 2052.18
 9710.18 2052.27 9712.07 2052.28 9720.21 2052.36 9722.84 2052.38 9730.23 2052.44
 9733.62 2052.47 9740.26 2052.53 9744.39 2052.56 9750.28  2052.6 9755.17 2052.63
  9760.3 2052.66 9765.94 2052.67 9770.33 2052.68 9776.71 2052.66 9780.35 2052.64
 9787.49 2052.58 9790.38 2052.56 9798.26 2052.48  9800.4 2052.45 9809.04 2052.38
 9810.42 2052.36 9819.81  2052.3 9820.45 2052.29 9828.98 2052.25 9830.47 2052.24
 9830.59 2052.24  9840.5  2052.2 9841.36 2052.19 9850.52 2052.13 9852.13 2052.12
 9860.55 2052.05 9866.38 2051.91 9900.31 2051.31 9914.22  2051.2 9924.86 2051.17
```

```
 9930.72 2051.01 9938.33 2050.42 9941.94 2050.27 9957.84 2047.95 9962.56 2046.88
 9984.83 2045.89 9990.86 2045.61  9992.2 2045.55   10000  2045.210000.88 2045.16
10002.97  2045.110010.91 2044.8810013.75 2044.8110020.93 2045.0510049.39 2052.95
10056.19 2054.38 10057.8 2055.5510060.01  2055.810068.65 2056.6510081.08 2057.95
10089.17 2057.91 10091.1  2057.910098.47 2057.2210119.82 2055.1910125.42 2055.33
10129.84 2055.45 10136.2 2055.6110139.87  2055.710146.97 2055.9410149.89 2056.01
10157.75 2056.3710159.92 2056.4610168.52 2056.8510169.94 2056.9210179.29 2057.34
10179.96 2057.3810188.94 2057.7810189.99 2057.8310190.07 2057.8410200.01 2058.26
10200.84 2058.2810210.04  2058.510211.62 2058.5410220.06 2058.7410222.39 2058.79
10224.59 2058.85

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
 9620.21    .035 9930.72    .03710020.93     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9930.7210081.08               180     224     230              .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
 9620.21    9625    2057       F

CROSS SECTION OUTPUT  Profile #PF 1
*****************************************************************************************
* E.G. Elev (ft)         * 2055.93  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    2.15  * Wt. n-Val.              *   0.035  *   0.038  *          *
* W.S. Elev (ft)         * 2053.78  * Reach Len. (ft)        *  180.00  *  224.00  *  230.00  *
* Crit W.S. (ft)         * 2054.30  * Flow Area (sq ft)      *  528.92  *  751.35  *          *
* E.G. Slope (ft/ft)     *0.010077  * Area (sq ft)           *  539.00  *  751.35  *          *
* Q Total (cfs)          *13090.00  * Flow (cfs)             * 3248.44  * 9841.56  *          *
* Top Width (ft)         *  433.11  * Top Width (ft)         *  310.51  *  122.60  *          *
* Vel Total (ft/s)       *   10.22  * Avg. Vel. (ft/s)       *    6.14  *   13.10  *          *
* Max Chl Dpth (ft)      *    8.97  * Hydr. Depth (ft)       *    1.73  *    6.13  *          *
* Conv. Total (cfs)      *130400.8  * Conv. (cfs)            * 32360.5  * 98040.3  *          *
* Length Wtd. (ft)       *  209.86  * Wetted Per. (ft)       *  305.74  *  124.13  *          *
* Min Ch El (ft)         * 2044.81  * Shear (lb/sq ft)       *    1.09  *    3.81  *          *
* Alpha                  *    1.32  * Stream Power (lb/ft s) *    6.68  *   49.88  *          *
* Frctn Loss (ft)        *    2.45  * Cum Volume (acre-ft)   *   19.55  *   17.21  *    1.55  *
* C & E Loss (ft)        *    0.06  * Cum SA (acres)         *    6.23  *    3.14  *    1.15  *
*****************************************************************************************

Warning: The cross-section end points had to be extended vertically for the computed water surface.
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.
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
*****************************************************************************************
* E.G. Elev (ft)         * 2054.54  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.51  * Wt. n-Val.              *   0.035  *   0.038  *          *
* W.S. Elev (ft)         * 2054.03  * Reach Len. (ft)        *  180.00  *  224.00  *  230.00  *
* Crit W.S. (ft)         * 2053.08  * Flow Area (sq ft)      *  604.83  *  781.94  *          *
* E.G. Slope (ft/ft)     *0.002359  * Area (sq ft)           *  616.10  *  781.94  *          *
* Q Total (cfs)          * 7019.00  * Flow (cfs)             * 1965.37  * 5053.63  *          *
* Top Width (ft)         *  434.29  * Top Width (ft)         *  310.51  *  123.79  *          *
* Vel Total (ft/s)       *    5.06  * Avg. Vel. (ft/s)       *    3.25  *    6.46  *          *
* Max Chl Dpth (ft)      *    9.22  * Hydr. Depth (ft)       *    1.98  *    6.32  *          *
* Conv. Total (cfs)      *144515.2  * Conv. (cfs)            * 40465.4  *104049.8  *          *
* Length Wtd. (ft)       *  203.90  * Wetted Per. (ft)       *  305.74  *  125.33  *          *
* Min Ch El (ft)         * 2044.81  * Shear (lb/sq ft)       *    0.29  *    0.92  *          *
* Alpha                  *    1.29  * Stream Power (lb/ft s) *    0.95  *    5.94  *          *
* Frctn Loss (ft)        *    0.09  * Cum Volume (acre-ft)   *   51.54  *   35.13  *   15.83  *
* C & E Loss (ft)        *    0.13  * Cum SA (acres)         *    6.24  *    3.17  *    3.02  *
*****************************************************************************************

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

CROSS SECTION

RIVER: Sols Wash
REACH: Sols Wash RS: 0.243

INPUT
Description:
Station Elevation Data num= 109

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9541.11	2046.29	9543.31	2046.34	9551.07	2046.61	9553.68	2046.7	9554.67	2046.72
9564.05	2046.96	9568.98	2047.01	9574.42	2047.07	9583.29	2047.08	9584.8	2047.08
9588.75	2047.08	9595.17	2047.06	9597.61	2047.06	9605.54	2047.04	9611.92	2047.02
9615.91	2047.01	9626.23	2046.98	9626.28	2046.98	9626.43	2046.98	9636.66	2046.91
9640.54	2046.84	9647.03	2046.74	9664.86	2045.59	9670.5	2045.33	9680.47	2045.58
9686.61	2045.87	9698.89	2047.09	9701.78	2047.25	9709.26	2047.69	9712.1	2047.76
9719.63	2047.93	9726.41	2047.95	9730	2047.97	9739.46	2047.92	9740.38	2047.91
9740.72	2047.91	9750.75	2047.8	9755.04	2047.79	9761.12	2047.75	9769.35	2047.79
9771.49	2047.8	9777.14	2047.84	9781.86	2047.87	9783.66	2047.87	9792.24	2047.87
9797.97	2047.83	9802.61	2047.79	9812.28	2047.63	9813.23	2047.6	9814.82	2047.59
9823.35	2047.43	9826.59	2047.39	9833.72	2047.3	9840.91	2047.28	9852.49	2047.32
9854.47	2047.33	9855.22	2047.33	9864.84	2047.27	9869.53	2047.26	9879.14	2047.14
9886.24	2047.14	9895.51	2046.76	9903.23	2046.68	9908.7	2046.65	9916.33	2046.64
9923.49	2046.9	9933.55	2046.96	9937.4	2046.92	9948.42	2046.88	9958.2	2048.04
9962.29	2047.97	9963.48	2047.69	9973.4	2043.88	9973.69	2043.86	9984.34	2042.5
9985.16	2042.48	9987.66	2042.41	9989.65	2042.41	9992.08	2042.39	10000	2042.45
10006.98	2042.51	10025.14	2042.39	10025.88	2042.39	10031.29	2044.16	10040.27	2047.06
10047.13	2049.26	10053	2049.14	10065.5	2049.21	10072.28	2049.27	10078.56	2049.47
10082.65	2049.57	10084.21	2049.61	10093.02	2049.72	10098.52	2049.75	10103.4	2049.73
10112.83	2049.68	10113.77	2049.67	10116.24	2049.66	10124.14	2049.61	10127.14	2049.61
10134.51	2049.63	10141.45	2049.75	10144.88	2049.81	10147.8	2049.82	10154.65	2049.69
10162.2	2049.64	10168.3	2049.65	10174.6	2049.92	10177.52	2049.91		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9541.11	.035	9984.34	.037	10025.14	.04

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9958.21	10047.13	300	296	280	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
9541.11	9660	2055	F
10078.56	10177.52	2055	F

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2052.63	Element	Left OB	Channel	Right OB	
Vel Head (ft)	3.65	Wt. n-Val.	0.035	0.037		
W.S. Elev (ft)	2048.99	Reach Len. (ft)	300.00	296.00	280.00	
Crit W.S. (ft)	2050.09	Flow Area (sq ft)	529.30	439.13		
E.G. Slope (ft/ft)	0.024599	Area (sq ft)	782.35	439.13		
Q Total (cfs)	13090.00	Flow (cfs)	5164.45	7925.55		
Top Width (ft)	505.16	Top Width (ft)	417.09	88.07		
Vel Total (ft/s)	13.52	Avg. Vel. (ft/s)	9.76	18.05		
Max Chl Dpth (ft)	6.60	Hydr. Depth (ft)	1.77	4.99		
Conv. Total (cfs)	83461.1	Conv. (cfs)	32928.3	50532.8		
Length Wtd. (ft)	297.22	Wetted Per. (ft)	298.40	89.94		
Min Ch El (ft)	2042.39	Shear (lb/sq ft)	2.72	7.50		
Alpha	1.29	Stream Power (lb/ft s)	26.58	135.32		
Frctn Loss (ft)	3.14	Cum Volume (acre-ft)	16.82	14.15	1.55	
C & E Loss (ft)	0.15	Cum SA (acres)	4.73	2.60	1.15	

Warning: The cross-section end points had to be extended vertically for the computed water surface.
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: 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.
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)	2054.31	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.08	Wt. n-Val.	0.035	0.037	0.040
W.S. Elev (ft)	2054.23	Reach Len. (ft)	300.00	296.00	280.00
Crit W.S. (ft)	2048.99	Flow Area (sq ft)	2094.27	905.72	157.26
E.G. Slope (ft/ft)	0.000189	Area (sq ft)	2971.26	905.72	606.70
Q Total (cfs)	7019.00	Flow (cfs)	4479.97	2304.15	234.89
Top Width (ft)	636.41	Top Width (ft)	417.09	88.93	130.39
Vel Total (ft/s)	2.22	Avg. Vel. (ft/s)	2.14	2.54	1.49
Max Chl Dpth (ft)	11.84	Hydr. Depth (ft)	7.02	10.18	5.00
Conv. Total (cfs)	510645.8	Conv. (cfs)	325926.3	167631.0	17088.5
Length Wtd. (ft)	296.48	Wetted Per. (ft)	298.40	90.84	31.43
Min Ch El (ft)	2042.39	Shear (lb/sq ft)	0.08	0.12	0.06
Alpha	1.04	Stream Power (lb/ft s)	0.18	0.30	0.09
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)	44.13	30.79	14.23
C & E Loss (ft)	0.00	Cum SA (acres)	4.74	2.63	2.68

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

RIVER: Sols Wash
REACH: Sols Wash RS: 0.187

INPUT
Description:
Station Elevation Data num= 114

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9617.36	2050.2	9623.41	2048.11	9629.68	2044.18	9639.67	2044.19	9649.72	2044.37
9650.02	2044.37	9660.12	2044.47	9664.14	2044.48	9670.52	2044.48	9678.66	2044.47
9680.91	2044.46	9686.57	2044.43	9691.31	2044.42	9693.19	2044.41	9701.71	2044.38
9707.87	2044.33	9736.16	2044.41	9743.4	2044.39	9752.06	2044.28	9761.64	2044.16
9764.09	2044.14	9765.84	2044.13	9774.48	2044.09	9780.36	2044.07	9784.88	2044.06
9794.89	2044.05	9795.28	2044.05	9796.24	2044.05	9805.67	2044.07	9809.42	2044.08
9816.07	2044.1	9823.95	2044.14	9826.47	2044.15	9832.79	2044.19	9836.86	2044.21
9838.48	2044.21	9847.26	2044.26	9853.01	2044.29	9857.65	2044.32	9867.54	2044.35
9868.05	2044.35	9869.35	2044.36	9878.45	2044.38	9882.06	2044.38	9888.84	2044.39
9896.59	2044.44	9899.24	2044.46	9905.91	2044.52	9909.64	2044.56	9911.12	2044.55
9920.03	2044.57	9925.65	2044.44	9930.43	2044.37	9933.09	2044.39	9936.48	2044.47
9963.71	2042.14	9967.31	2041.85	9968.37	2041.86	9973.45	2041.89	9995.64	2042.08
9997.85	2042.09	10000	2042.11	10003.1	2042.15	10009.75	2042.26	10013.14	2042.32
10020.8	2042.44	10023.18	2042.47	10031.85	2042.57	10033.22	2042.58	10034.36	2042.56
10038.62	2042.5	10044.71	2042.32	10067.16	2043.4	10084.08	2046.48	10124.4	2048.16
10133.64	2048.52	10142.36	2048.58	10143.68	2048.61	10153.41	2048.61	10153.72	2048.61
10156.82	2048.61	10163.76	2048.61	10164.46	2048.61	10173.8	2048.61	10175.51	2048.6
10183.85	2048.58	10186.56	2048.57	10193.89	2048.56	10197.61	2048.57	10203.93	2048.57
10208.66	2048.63	10213.97	2048.69	10221.17	2048.94	10222.66	2048.99	10226.75	2049.07
10252.78	2049.64	10256.9	2049.78	10262.82	2050.11	10267.95	2050.33	10272.86	2050.51
10279	2050.71	10282.9	2050.83	10290.05	2051.05	10292.95	2051.13	10301.1	2051.28
10302.99	2051.3	10312.15	2051.3	10313.03	2051.29	10321.78	2051.26	10323.07	2051.26
10323.2	2051.26	10333.11	2051.26	10334.25	2051.26	10340.4	2051.25		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9617.36	.063	9936.48	.035	10084.08	.021

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9936.48	10084.08	220	247	260	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
9617.36	9750	2055	F
10142.36	10340.4	2055	F

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2050.28	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.89	Wt. n-Val.	0.063	0.035	0.021

W.S. Elev (ft)	2049.40	Reach Len. (ft)	220.00	247.00	260.00	
Crit W.S. (ft)	2047.85	Flow Area (sq ft)	957.01	970.75	101.00	
E.G. Slope (ft/ft)	0.003481	Area (sq ft)	1583.96	970.75	167.23	
Q Total (cfs)	13090.00	Flow (cfs)	3962.32	8519.63	608.05	
Top Width (ft)	622.08	Top Width (ft)	316.80	147.60	157.68	
Vel Total (ft/s)	6.45	Avg. Vel. (ft/s)	4.14	8.78	6.02	
Max Chl Dpth (ft)	7.55	Hydr. Depth (ft)	5.13	6.58	1.73	
Conv. Total (cfs)	221857.4	Conv. (cfs)	67155.9	144395.9	10305.5	
Length Wtd. (ft)	241.70	Wetted Per. (ft)	186.49	148.02	58.32	
Min Ch El (ft)	2041.85	Shear (lb/sq ft)	1.12	1.43	0.38	
Alpha	1.37	Stream Power (lb/ft s)	4.62	12.51	2.27	
Frctn Loss (ft)	1.27	Cum Volume (acre-ft)	8.67	9.36	1.02	
C & E Loss (ft)	0.10	Cum SA (acres)	2.20	1.80	0.64	

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, water
surface was used.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT Profile #PF 2

E.G. Elev (ft)	2054.27	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.07	Wt. n-Val.	0.063	0.035	0.021
W.S. Elev (ft)	2054.20	Reach Len. (ft)	220.00	247.00	260.00
Crit W.S. (ft)	2046.39	Flow Area (sq ft)	1852.17	1679.27	380.76
E.G. Slope (ft/ft)	0.000115	Area (sq ft)	3114.90	1679.27	1265.43
Q Total (cfs)	7019.00	Flow (cfs)	2160.01	3851.90	1007.09
Top Width (ft)	723.04	Top Width (ft)	319.12	147.60	256.32
Vel Total (ft/s)	1.79	Avg. Vel. (ft/s)	1.17	2.29	2.64
Max Chl Dpth (ft)	12.35	Hydr. Depth (ft)	9.93	11.38	6.53
Conv. Total (cfs)	655910.1	Conv. (cfs)	201848.3	359951.4	94110.4
Length Wtd. (ft)	241.70	Wetted Per. (ft)	186.49	148.02	58.32
Min Ch El (ft)	2041.85	Shear (lb/sq ft)	0.07	0.08	0.05
Alpha	1.34	Stream Power (lb/ft s)	0.08	0.19	0.12
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	23.17	22.00	8.21
C & E Loss (ft)	0.00	Cum SA (acres)	2.20	1.82	1.43

Warning: The cross-section end points had to be extended vertically for the computed water surface.
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: Sols Wash RS: 0.140

INPUT
Description:
Station Elevation Data num= 91

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9665.91	2042.73	9670.12	2042.74	9670.84	2042.73	9680.72	2042.7	9686.12	2042.67
9691.33	2042.66	9700.85	2042.63	9701.93	2042.63	9702.52	2042.63	9712.54	2042.64
9718.92	2042.66	9723.15	2042.68	9730.87	2042.72	9733.75	2042.74	9735.33	2042.75
9744.36	2042.8	9751.73	2042.82	9754.96	2042.83	9760.89	2042.84	9765.57	2042.86
9768.13	2042.87	9776.18	2042.92	9784.53	2043.04	9786.78	2043.06	9790.9	2043.16
9797.39	2043.34	9800.93	2043.43	9807.99	2043.64	9817.33	2043.82	9818.6	2043.85
9820.92	2043.89	9829.2	2044	9833.73	2044.04	9839.81	2044.1	9850.13	2044.19
9850.42	2044.2	9850.94	2044.2	9861.02	2044.29	9866.53	2044.32	9871.63	2044.35
9880.95	2044.34	9882.23	2044.33	9882.93	2044.32	9892.84	2044.2	9897.57	2044.18
9900.07	2044.17	9914.3	2043.1	9937.89	2041.18	9950.02	2041.2	9956.47	2041.21
9964.94	2041.13	9967.08	2041.1	9968.11	2041.1	9973.71	2041.05	9986.12	2040.95
9990.06	2040.91	9992.07	2040.8	10000	2040.41	10002.37	2040.31	10002.71	2040.28
10014.87	2040.79	10020.51	2041.12	10028	2041.45	10040.23	2041.82	10046.98	2042.38
10058.25	2043.05	10061.39	2042.99	10069.19	2042.52	10087.23	2044.75	10094.83	2044.06
10106.45	2049.45	10107.53	2049.51	10108.35	2049.55	10109.49	2049.58	10122.73	2049.94
10132.4	2050.03	10132.89	2050.03	10142.82	2049.94	10146.37	2049.86	10153.1	2049.68
10159.84	2049.45	10163.38	2049.31	10173.32	2048.96	10173.65	2048.95	10174.72	2048.91

10183.93 2048.63 10186.8 2048.5610194.21 2048.3710200.27 2048.2410204.49 2048.14
10209.88 2048.04

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9665.91	.063	9897.57	.03510087.23	.021	

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
9897.5710106.45 150 167 160 .1 .3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
9665.91	9790	2055	F
1013510209.88		2055	F

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2048.91	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.93	Wt. n-Val.	0.063	0.034	
W.S. Elev (ft)	2046.98	Reach Len. (ft)	150.00	167.00	160.00
Crit W.S. (ft)	2046.87	Flow Area (sq ft)	320.08	992.51	
E.G. Slope (ft/ft)	0.008800	Area (sq ft)	843.27	992.51	
Q Total (cfs)	13090.00	Flow (cfs)	1464.99	11625.01	
Top Width (ft)	435.22	Top Width (ft)	231.66	203.56	
Vel Total (ft/s)	9.97	Avg. Vel. (ft/s)	4.58	11.71	
Max Chl Dpth (ft)	6.70	Hydr. Depth (ft)	2.98	4.88	
Conv. Total (cfs)	139536.2	Conv. (cfs)	15616.5	123919.7	
Length Wtd. (ft)	165.29	Wetted Per. (ft)	107.58	204.60	
Min Ch El (ft)	2040.28	Shear (lb/sq ft)	1.63	2.67	
Alpha	1.25	Stream Power (lb/ft s)	7.48	31.22	
Frctn Loss (ft)	1.36	Cum Volume (acre-ft)	2.54	3.79	0.52
C & E Loss (ft)	0.01	Cum SA (acres)	0.81	0.80	0.17

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.
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

E.G. Elev (ft)	2054.24	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.07	Wt. n-Val.	0.063	0.034	0.021
W.S. Elev (ft)	2054.17	Reach Len. (ft)	150.00	167.00	160.00
Crit W.S. (ft)	2045.38	Flow Area (sq ft)	1093.50	2487.79	123.84
E.G. Slope (ft/ft)	0.000097	Area (sq ft)	2508.89	2487.79	508.55
Q Total (cfs)	7019.00	Flow (cfs)	1192.63	5596.73	229.64
Top Width (ft)	543.97	Top Width (ft)	231.66	208.88	103.43
Vel Total (ft/s)	1.89	Avg. Vel. (ft/s)	1.09	2.25	1.85
Max Chl Dpth (ft)	13.89	Hydr. Depth (ft)	10.17	11.91	4.34
Conv. Total (cfs)	712241.8	Conv. (cfs)	121020.1	567919.3	23302.3
Length Wtd. (ft)	164.04	Wetted Per. (ft)	107.58	210.46	28.56
Min Ch El (ft)	2040.28	Shear (lb/sq ft)	0.06	0.07	0.03
Alpha	1.21	Stream Power (lb/ft s)	0.07	0.16	0.05
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	8.97	10.19	2.92
C & E Loss (ft)	0.00	Cum SA (acres)	0.81	0.81	0.36

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

RIVER: Sols Wash
REACH: Sols Wash RS: 0.109

INPUT
Description:
Station Elevation Data num= 98

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev

```
 9653.37 2042.51 9658.91 2042.44 9663.35 2042.39 9665.86 2042.39 9673.98 2042.37
 9682.52 2042.41 9684.62 2042.42 9688.31 2042.43 9695.25 2042.46 9699.18 2042.48
 9705.88  2042.5 9715.84 2042.58 9716.52 2042.58 9717.71  2042.6 9727.15 2042.69
  9732.5 2042.77 9737.79 2042.85  9747.1 2042.99 9748.42 2043.01 9749.16 2043.01
 9759.05 2043.07 9765.82 2043.04 9769.69 2043.02  9776.5 2042.97 9780.32 2042.96
 9782.48 2042.97 9790.96    2043 9799.14 2043.12 9801.59 2043.15  9805.9 2043.24
 9812.22 2043.36  9815.8 2043.43 9822.86 2043.56 9832.46 2043.68 9833.49 2043.69
  9835.3  2043.7 9844.13  2043.7 9849.12 2043.64 9854.76 2043.57  9864.7 2043.33
 9865.39 2043.31 9865.78  2043.3 9876.03 2042.97 9882.44  2042.7 9886.66 2042.52
  9894.1 2042.06 9897.09 2041.88 9897.86 2041.79  9901.2 2041.45 9918.02 2039.74
  9922.9 2039.57 9927.09 2039.62 9933.68  2039.8 9950.05 2040.28 9951.11 2040.33
  9952.9 2040.35  9961.1 2040.43 9965.74 2040.46 9971.73 2040.49  9982.3 2040.53
 9982.37 2040.53  9982.4 2040.53    9993 2040.55 9999.06 2040.5710000.01 2040.57
10003.56 2040.5910013.88 2040.6710013.98 2040.6710014.21 2040.67 10024.4 2040.79
10036.39 2040.9310041.09 2040.9910043.22    204110044.61 2041.0710045.49 2041.11
10049.23 2041.2510066.06  2041.910072.71 2042.1210077.79 2042.2410085.63 2042.34
10108.25 2042.6110118.15 2042.6910121.33 2042.6910128.56 2042.7110131.55 2042.72
10138.98  2042.710146.25 2042.68 10149.4 2042.6710157.04 2042.6210159.82 2042.61
10160.96  2042.610170.23 2042.5110175.67 2042.4610180.65 2042.3910190.38 2042.28
10191.07 2042.2710192.74 2042.2510201.31 2042.15

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9653.37    .063  9901.2    .03510049.23    .021

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        9894.110108.25                 0       0       0              .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
 9653.37    9800    2055       F
   1013510201.31    2055       F

CROSS SECTION OUTPUT  Profile #PF 1
*****************************************************************************************
* E.G. Elev (ft)         * 2047.55  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.98  * Wt. n-Val.              *   0.063  *   0.032  *   0.021  *
* W.S. Elev (ft)         * 2045.57  * Reach Len. (ft)         *          *          *          *
* Crit W.S. (ft)         * 2045.57  * Flow Area (sq ft)       *  214.85  *  985.61  *   77.19  *
* E.G. Slope (ft/ft)     *0.007692  * Area (sq ft)            *  632.38  *  985.61  *  281.10  *
* Q Total (cfs)          *13090.00  * Flow (cfs)              *  770.46  *11348.65  *  970.89  *
* Top Width (ft)         *  547.94  * Top Width (ft)          *  240.73  *  214.15  *   93.06  *
* Vel Total (ft/s)       *   10.25  * Avg. Vel. (ft/s)        *    3.59  *   11.51  *   12.58  *
* Max Chl Dpth (ft)      *    6.00  * Hydr. Depth (ft)        *    2.28  *    4.60  *    2.89  *
* Conv. Total (cfs)      *149247.5  * Conv. (cfs)             *  8784.5  *129393.2  * 11069.8  *
* Length Wtd. (ft)       *          * Wetted Per. (ft)        *   94.14  *  214.31  *   26.75  *
* Min Ch El (ft)         * 2039.57  * Shear (lb/sq ft)        *    1.10  *    2.21  *    1.39  *
* Alpha                  *    1.21  * Stream Power (lb/ft s)  *    3.93  *   25.43  *   17.43  *
* 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.
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)         * 2054.23  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.06  * Wt. n-Val.              *   0.063  *   0.031  *   0.021  *
* W.S. Elev (ft)         * 2054.17  * Reach Len. (ft)         *          *          *          *
* Crit W.S. (ft)         * 2044.20  * Flow Area (sq ft)       * 1024.15  * 2827.41  *  307.25  *
* E.G. Slope (ft/ft)     *0.000049  * Area (sq ft)            * 2702.76  * 2827.41  * 1081.46  *
* Q Total (cfs)          * 7019.00  * Flow (cfs)              *  834.41  * 5405.96  *  778.63  *
* Top Width (ft)         *  547.94  * Top Width (ft)          *  240.73  *  214.15  *   93.06  *
* Vel Total (ft/s)       *    1.69  * Avg. Vel. (ft/s)        *    0.81  *    1.91  *    2.53  *
* Max Chl Dpth (ft)      *   14.60  * Hydr. Depth (ft)        *   10.88  *   13.20  *   11.49  *
* Conv. Total (cfs)      *997666.6  * Conv. (cfs)             *118600.9  *768392.3  *110673.5  *
* Length Wtd. (ft)       *          * Wetted Per. (ft)        *   94.14  *  214.31  *   26.75  *
* Min Ch El (ft)         * 2039.57  * Shear (lb/sq ft)        *    0.03  *    0.04  *    0.04  *
* Alpha                  *    1.27  * Stream Power (lb/ft s)  *    0.03  *    0.08  *    0.09  *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)    *          *          *          *
* C & E Loss (ft)        *          * Cum SA (acres)          *          *          *          *
*****************************************************************************************

Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, water
```

surface was used.

****

SUMMARY OF MANNING'S N VALUES

River:Sols Wash

Reach	River Sta.	n1	n2	n3	n4	n5	n6	n7	n8
Sols Wash	1.246	.07	.035	.05	.04	.03	.05		
Sols Wash	1.175	.069	.03	.05	.04	.03	.05		
Sols Wash	1.112	.069	0	.03	.05	.04	.03	.05	
Sols Wash	1.025	.15	.035	.05	.067	.031	.05		
Sols Wash	0.941	.058	.034	.15	.042	.076	.08	.034	.032
Sols Wash	0.859	.058	.034	.15	.042	.076	.08	.034	.032
Sols Wash	0.779	.058	.034	.15	.042	.076	.08	.034	.032
Sols Wash	0.717	.065	0	.035	.065				
Sols Wash	0.660	.1	.065	.035	.065				
Sols Wash	0.606	.082	.032	.032					
Sols Wash	0.541	.042	0	.029	.032				
Sols Wash	0.497	.042	.029	.032					
Sols Wash	0.486	Bridge							
Sols Wash	0.474	.042	0	.029	.032				
Sols Wash	0.445	.042	.036	.032					
Sols Wash	0.425	.028	.036	.018					
Sols Wash	0.351	.03	.033	.018					
Sols Wash	0.286	.035	.037	.04					
Sols Wash	0.243	.035	.037	.04					
Sols Wash	0.187	.063	.035	.021					
Sols Wash	0.140	.063	.035	.021					
Sols Wash	0.109	.063	.035	.021					

****

SUMMARY OF REACH LENGTHS

River: Sols Wash

Reach	River Sta.	Left	Channel	Right
Sols Wash	1.246	350	371	350
Sols Wash	1.175	270	337	340
Sols Wash	1.112	420	455	420
Sols Wash	1.025	360	444	440
Sols Wash	0.941	350	435	440
Sols Wash	0.859	220	424	440
Sols Wash	0.779	370	325	250
Sols Wash	0.717	350	303	300
Sols Wash	0.660	180	283	320
Sols Wash	0.606	180	344	330
Sols Wash	0.541	100	231	400

```
*Sols Wash        *    0.497        *        80*       124*        80*
*Sols Wash        *    0.486        *Bridge   *          *          *
*Sols Wash        *    0.474        *       180*       151*        50*
*Sols Wash        *    0.445        *       100*       107*        90*
*Sols Wash        *    0.425        *       530*       391*       350*
*Sols Wash        *    0.351        *       250*       346*       350*
*Sols Wash        *    0.286        *       180*       224*       230*
*Sols Wash        *    0.243        *       300*       296*       280*
*Sols Wash        *    0.187        *       220*       247*       260*
*Sols Wash        *    0.140        *       150*       167*       160*
*Sols Wash        *    0.109        *         0*         0*         0*
*************************************************************

*******************************************************************************

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: Sols Wash

*****************************************************
*     Reach       *   River Sta.   * Contr.  * Expan.  *
*****************************************************
*Sols Wash        *    1.246   *       .1*       .3*
*Sols Wash        *    1.175   *       .1*       .3*
*Sols Wash        *    1.112   *       .1*       .3*
*Sols Wash        *    1.025   *       .1*       .3*
*Sols Wash        *    0.941   *       .1*       .3*
*Sols Wash        *    0.859   *       .1*       .3*
*Sols Wash        *    0.779   *       .1*       .3*
*Sols Wash        *    0.717   *       .1*       .3*
*Sols Wash        *    0.660   *       .1*       .3*
*Sols Wash        *    0.606   *       .1*       .3*
*Sols Wash        *    0.541   *       .1*       .3*
*Sols Wash        *    0.497   *       .3*       .5*
*Sols Wash        *    0.486   *Bridge   *         *
*Sols Wash        *    0.474   *       .3*       .5*
*Sols Wash        *    0.445   *       .1*       .3*
*Sols Wash        *    0.425   *       .1*       .3*
*Sols Wash        *    0.351   *       .1*       .3*
*Sols Wash        *    0.286   *       .1*       .3*
*Sols Wash        *    0.243   *       .1*       .3*
*Sols Wash        *    0.187   *       .1*       .3*
*Sols Wash        *    0.140   *       .1*       .3*
*Sols Wash        *    0.109   *       .1*       .3*
*****************************************************

Profile Output Table - Standard Table 1
*******************************************************************************************************************
*****************************************************
* Reach        * River Sta   * Profile     *     Q Total *Min Ch El *W.S. Elev *Crit W.S. *E.G. Elev *E.G.
Slope * Vel Chnl *Flow Area *Top Width *Froude # Chl *
*            *            *            *            *      (cfs) *     (ft) *     (ft) *     (ft) *     (ft) *
(ft/ft) *   (ft/s) *  (sq ft) *     (ft) *            *
*******************************************************************************************************************
*****************************************************
* Sols Wash    * 1.246       * PF 1        *    14413.00 *  2084.94 *  2089.31 *  2090.40 *  2092.08 *
0.020014 *    13.11 *  1092.73 *   416.35 *        1.44 *
* Sols Wash    * 1.246       * PF 2        *     7019.00 *  2084.94 *  2088.17 *  2088.69 *  2090.00 *
0.020012 *     9.48 *   660.88 *   339.05 *        1.33 *
*            *            *            *            *           *           *           *           *
*      *            *            *            *            *
* Sols Wash    * 1.175       * PF 1        *    14413.00 *  2082.51 *  2087.08 *  2087.20 *  2088.15 *
0.005514 *     8.62 *  1742.64 *  1062.90 *        0.80 *
* Sols Wash    * 1.175       * PF 2        *     7019.00 *  2082.51 *  2085.18 *  2085.16 *  2086.31 *
0.007726 *     6.64 *   851.93 *   342.35 *        0.85 *
*            *            *            *            *           *           *           *           *
*      *            *            *            *            *
* Sols Wash    * 1.112       * PF 1        *    14413.00 *  2077.97 *  2084.71 *  2085.04 *  2086.26 *
0.006955 *    10.34 *  1447.37 *  1197.74 *        0.91 *
* Sols Wash    * 1.112       * PF 2        *     7019.00 *  2077.97 *  2082.85 *  2082.71 *  2084.05 *
0.007579 *     7.89 *   806.59 *   311.01 *        0.88 *
*            *            *            *            *           *           *           *           *
*      *            *            *            *            *
* Sols Wash    * 1.025       * PF 1        *    14413.00 *  2074.68 *  2081.03 *  2081.43 *  2082.79 *
0.009099 *    13.06 *  1495.25 *  1315.58 *        1.04 *
* Sols Wash    * 1.025       * PF 2        *     7019.00 *  2074.68 *  2079.39 *  2079.05 *  2080.77 *
0.007420 *     9.39 *   743.61 *   403.41 *        0.89 *
*            *            *            *            *           *           *           *           *
*      *            *            *            *            *
* Sols Wash    * 0.941       * PF 1        *    14413.00 *  2071.19 *  2078.32 *  2078.06 *  2079.64 *
```

```
0.009153 *    12.50 *  2152.78 *  1193.49 *       0.96 *
* Sols Wash   * 0.941       * PF 2         *    7019.00 *  2071.19 *  2076.74 *  2076.20 *  2077.65 *
0.007423 *     9.19 *   992.52 *   532.15 *       0.83 *
*             *          *          *             *          *          *          *          *
*             *          *          *             *
* Sols Wash   * 0.859       * PF 1         *   14413.00 *  2068.66 *  2074.86 *  2074.63 *  2075.78 *
0.010145 *     8.46 *  1888.96 *   838.32 *       0.70 *
* Sols Wash   * 0.859       * PF 2         *    7019.00 *  2068.66 *  2072.75 *  2072.53 *  2073.87 *
0.012990 *     8.35 *   826.39 *   295.18 *       0.83 *
*             *          *          *             *          *          *          *          *
*             *          *          *             *
* Sols Wash   * 0.779       * PF 1         *   14413.00 *  2063.23 *  2071.23 *  2071.23 *  2072.82 *
0.007794 *    11.51 *  1532.76 *   671.03 *       0.89 *
* Sols Wash   * 0.779       * PF 2         *    7019.00 *  2063.23 *  2069.45 *  2069.00 *  2070.50 *
0.007807 *     8.93 *   878.82 *   303.45 *       0.83 *
*             *          *          *             *          *          *          *          *
*             *          *          *             *
* Sols Wash   * 0.717       * PF 1         *   14459.00 *  2062.06 *  2069.93 *  2068.95 *  2070.62 *
0.003246 *     7.09 *  2781.02 *  1346.48 *       0.56 *
* Sols Wash   * 0.717       * PF 2         *    7019.00 *  2062.06 *  2068.01 *  2066.76 *  2068.61 *
0.003789 *     6.24 *  1139.75 *   743.54 *       0.57 *
*             *          *          *             *          *          *          *          *
*             *          *          *             *
* Sols Wash   * 0.660       * PF 1         *   14459.00 *  2059.96 *  2067.60 *  2067.60 *  2069.20 *
0.005895 *    10.98 *  2296.28 *  1347.32 *       0.77 *
* Sols Wash   * 0.660       * PF 2         *    7019.00 *  2059.96 *  2064.95 *  2064.95 *  2066.71 *
0.010434 *    10.68 *   700.75 *   372.49 *       0.95 *
*             *          *          *             *          *          *          *          *
*             *          *          *             *
* Sols Wash   * 0.606       * PF 1         *   14459.00 *  2057.40 *  2066.12 *  2064.07 *  2066.99 *
0.002165 *     7.87 *  2804.58 *  1192.64 *       0.52 *
* Sols Wash   * 0.606       * PF 2         *    7019.00 *  2057.40 *  2062.82 *  2061.84 *  2063.78 *
0.004678 *     7.87 *   891.37 *   227.37 *       0.70 *
*             *          *          *             *          *          *          *          *
*             *          *          *             *
* Sols Wash   * 0.541       * PF 1         *   13090.00 *  2054.68 *  2065.43 *  2062.07 *  2066.40 *
0.001376 *     8.12 *  2076.43 *  1564.71 *       0.48 *
* Sols Wash   * 0.541       * PF 2         *    7019.00 *  2054.68 *  2060.39 *  2059.87 *  2062.00 *
0.005376 *    10.18 *   689.33 *   163.40 *       0.84 *
*             *          *          *             *          *          *          *          *
*             *          *          *             *
* Sols Wash   * 0.497       * PF 1         *   13090.00 *  2053.13 *  2065.29 *  2059.92 *  2066.13 *
0.000805 *     7.34 *  1782.61 *  1186.33 *       0.38 *
* Sols Wash   * 0.497       * PF 2         *    7019.00 *  2053.13 *  2060.39 *  2057.91 *  2061.14 *
0.001520 *     6.93 *  1013.47 *   208.98 *       0.48 *
*             *          *          *             *          *          *          *          *
*             *          *          *             *
* Sols Wash   * 0.486       *              *      Bridge *          *          *          *          *
*             *          *          *             *
*             *          *          *             *          *          *          *          *
*             *          *          *             *
* Sols Wash   * 0.474       * PF 1         *   13090.00 *  2052.35 *  2059.93 *  2058.95 *  2062.09 *
0.004050 *    11.80 *  1109.65 *   301.93 *       0.79 *
* Sols Wash   * 0.474       * PF 2         *    7019.00 *  2052.35 *  2058.36 *  2056.94 *  2059.40 *
0.002758 *     8.19 *   856.70 *   220.46 *       0.63 *
*             *          *          *             *          *          *          *          *
*             *          *          *             *
* Sols Wash   * 0.445       * PF 1         *   13090.00 *  2051.07 *  2059.49 *  2058.64 *  2061.09 *
0.005577 *    10.28 *  1346.71 *  1135.21 *       0.73 *
* Sols Wash   * 0.445       * PF 2         *    7019.00 *  2051.07 *  2057.91 *  2056.42 *  2058.81 *
0.004347 *     7.62 *   928.53 *   520.88 *       0.62 *
*             *          *          *             *          *          *          *          *
*             *          *          *             *
* Sols Wash   * 0.425       * PF 1         *   13090.00 *  2049.78 *  2059.20 *  2057.72 *  2060.50 *
0.004026 *     9.38 *  1487.00 *  1243.32 *       0.63 *
* Sols Wash   * 0.425       * PF 2         *    7019.00 *  2049.78 *  2057.65 *  2055.25 *  2058.38 *
0.002947 *     6.89 *  1031.17 *   737.00 *       0.52 *
*             *          *          *             *          *          *          *          *
*             *          *          *             *
* Sols Wash   * 0.351       * PF 1         *   13090.00 *  2048.42 *  2056.89 *  2056.89 *  2058.43 *
0.006048 *    11.12 *  1407.82 *  1182.84 *       0.82 *
* Sols Wash   * 0.351       * PF 2         *    7019.00 *  2048.42 *  2055.69 *  2055.69 *  2056.80 *
0.005191 *     9.11 *   939.61 *  1176.79 *       0.74 *
*             *          *          *             *          *          *          *          *
*             *          *          *             *
* Sols Wash   * 0.286       * PF 1         *   13090.00 *  2044.81 *  2053.78 *  2054.30 *  2055.93 *
0.010077 *    13.10 *  1280.27 *   433.11 *       0.93 *
* Sols Wash   * 0.286       * PF 2         *    7019.00 *  2044.81 *  2054.03 *  2053.08 *  2054.54 *
0.002359 *     6.46 *  1386.77 *   434.29 *       0.45 *
```

```
*            *            *            *            *            *            *            *            *
     *            *            *            *            *
* Sols Wash   * 0.243       * PF 1                   *   13090.00 *  2042.39 *  2048.99 *  2050.09 *  2052.63 *
0.024599 *    18.05 *   968.43 *   505.16 *       1.42 *
* Sols Wash   * 0.243       * PF 2                   *    7019.00 *  2042.39 *  2054.23 *  2048.99 *  2054.31 *
0.000189 *     2.54 *  3157.25 *   636.41 *       0.14 *
*            *            *            *            *            *            *            *            *
     *            *            *            *            *
* Sols Wash   * 0.187       * PF 1                   *   13090.00 *  2041.85 *  2049.40 *  2047.85 *  2050.28 *
0.003481 *     8.78 *  2028.76 *   622.08 *       0.60 *
* Sols Wash   * 0.187       * PF 2                   *    7019.00 *  2041.85 *  2054.20 *  2046.39 *  2054.27 *
0.000115 *     2.29 *  3912.20 *   723.04 *       0.12 *
*            *            *            *            *            *            *            *            *
     *            *            *            *            *
* Sols Wash   * 0.140       * PF 1                   *   13090.00 *  2040.28 *  2046.98 *  2046.87 *  2048.91 *
0.008800 *    11.71 *  1312.59 *   435.22 *       0.93 *
* Sols Wash   * 0.140       * PF 2                   *    7019.00 *  2040.28 *  2054.17 *  2045.38 *  2054.24 *
0.000097 *     2.25 *  3705.13 *   543.97 *       0.11 *
*            *            *            *            *            *            *            *            *
     *            *            *            *            *
* Sols Wash   * 0.109       * PF 1                   *   13090.00 *  2039.57 *  2045.57 *  2045.57 *  2047.55 *
0.007692 *    11.51 *  1277.65 *   547.94 *       0.95 *
* Sols Wash   * 0.109       * PF 2                   *    7019.00 *  2039.57 *  2054.17 *  2044.20 *  2054.23 *
0.000049 *     1.91 *  4158.81 *   547.94 *       0.09 *
*****************************************************************************************************************
*****************************************************

*****************************************************************************

ERRORS WARNINGS AND NOTES
Errors Warnings and Notes for Plan : Sols Wash

River: Sols Wash  Reach: Sols Wash     RS: 1.246     Profile: PF 1
     Warning:Divided flow computed for this cross-section.
     Note:   Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, water surface was
             used.
River: Sols Wash  Reach: Sols Wash     RS: 1.246     Profile: PF 2
     Warning:Divided flow computed for this cross-section.
     Note:   Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, water surface was
             used.
River: Sols Wash  Reach: Sols Wash     RS: 1.175     Profile: PF 1
     Warning:Divided flow computed for this cross-section.
     Warning:The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
additional cross sections.
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7
or greater than 1.4.
             This may indicate the need for additional cross sections.
     Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate
             the need for additional cross sections.
     Note:   Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, water surface was
             used.
River: Sols Wash  Reach: Sols Wash     RS: 1.175     Profile: PF 2
     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.
     Note:   Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, water surface was
             used.
     Note:   Hydraulic jump has occurred between this cross section and the previous upstream section.
River: Sols Wash  Reach: Sols Wash     RS: 1.112     Profile: PF 1
     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.
     Note:   Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, water surface was
             used.
River: Sols Wash  Reach: Sols Wash     RS: 1.112     Profile: PF 2
     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.
     Note:   Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, water surface was
```

```
            used.
River: Sols Wash  Reach: Sols Wash     RS: 1.025     Profile: PF 1
     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.
     Note:   Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, water surface was
            used.
River: Sols Wash  Reach: Sols Wash     RS: 1.025     Profile: PF 2
     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.
     Note:   Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, water surface was
            used.
River: Sols Wash  Reach: Sols Wash     RS: 0.941     Profile: PF 1
     Warning:Divided flow computed for this cross-section.
     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.
     Note:   Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, water surface was
            used.
     Note:   Hydraulic jump has occurred between this cross section and the previous upstream section.
River: Sols Wash  Reach: Sols Wash     RS: 0.941     Profile: PF 2
     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.
     Note:   Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, water surface was
            used.
River: Sols Wash  Reach: Sols Wash     RS: 0.859     Profile: PF 1
     Warning:Divided flow computed for this cross-section.
     Warning:The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
additional cross sections.
     Warning:The 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.
River: Sols Wash  Reach: Sols Wash     RS: 0.859     Profile: PF 2
     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.
     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.
River: Sols Wash  Reach: Sols Wash     RS: 0.779     Profile: PF 1
     Warning:The energy equation could not be balanced within the specified number of iterations.  The
program used critical depth
            for the water surface and continued on with the calculations.
     Warning:Divided flow computed for this cross-section.
     Warning:The cross-section end points had to be extended vertically for the computed water surface.
     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.
     Note:   Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, water surface was
            used.
River: Sols Wash  Reach: Sols Wash     RS: 0.779     Profile: PF 2
     Warning:Divided flow computed for this cross-section.
```

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

River: Sols Wash Reach: Sols Wash RS: 0.717 Profile: PF 1
Warning:Divided flow computed for this cross-section.
Warning:The cross-section end points had to be extended vertically for the computed water surface.
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.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was
used.

River: Sols Wash Reach: Sols Wash RS: 0.717 Profile: PF 2
Warning:Divided flow computed for this cross-section.
Warning:The cross-section end points had to be extended vertically for the computed water surface.
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, water surface was
used.

River: Sols Wash Reach: Sols Wash RS: 0.660 Profile: PF 1
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning:Divided flow computed for this cross-section.
Warning:The 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.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was
used.

River: Sols Wash Reach: Sols Wash RS: 0.660 Profile: PF 2
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 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.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was
used.

River: Sols Wash Reach: Sols Wash RS: 0.606 Profile: PF 1
Warning:Divided flow computed for this cross-section.
Warning:The cross-section end points had to be extended vertically for the computed water surface.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was
used.
River: Sols Wash Reach: Sols Wash RS: 0.606 Profile: PF 2
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.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was
used.
River: Sols Wash Reach: Sols Wash RS: 0.541 Profile: PF 1
Warning:Divided flow computed for this cross-section.
Warning:The cross-section end points had to be extended vertically for the computed water surface.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was
used.
River: Sols Wash Reach: Sols Wash RS: 0.541 Profile: PF 2
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.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was
used.
River: Sols Wash Reach: Sols Wash RS: 0.497 Profile: PF 1
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
River: Sols Wash Reach: Sols Wash RS: 0.497 Profile: PF 2
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
River: Sols Wash Reach: Sols Wash RS: 0.486 Profile: PF 1
Note: The momentum method has computed a class B profile.
Note: The downstream water surface is below the minimum elevation for pressure flow. The sluice gate equations were used
for pressure flow.
River: Sols Wash Reach: Sols Wash RS: 0.486 Profile: PF 1 Upstream
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
River: Sols Wash Reach: Sols Wash RS: 0.486 Profile: PF 1 Downstream
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
River: Sols Wash Reach: Sols Wash RS: 0.486 Profile: PF 2 Upstream
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
River: Sols Wash Reach: Sols Wash RS: 0.486 Profile: PF 2 Downstream
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
River: Sols Wash Reach: Sols Wash RS: 0.474 Profile: PF 1
Warning:Divided flow computed for this cross-section.
Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
River: Sols Wash Reach: Sols Wash RS: 0.474 Profile: PF 2
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
River: Sols Wash Reach: Sols Wash RS: 0.445 Profile: PF 1
Warning:The cross-section end points had to be extended vertically for the computed water surface.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was
used.
River: Sols Wash Reach: Sols Wash RS: 0.445 Profile: PF 2
Warning:Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was
used.
River: Sols Wash Reach: Sols Wash RS: 0.425 Profile: PF 1
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.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was
used.
River: Sols Wash Reach: Sols Wash RS: 0.425 Profile: PF 2

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.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was
used.
River: Sols Wash Reach: Sols Wash RS: 0.351 Profile: PF 1
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning:The 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.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was
used.
River: Sols Wash Reach: Sols Wash RS: 0.351 Profile: PF 2
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 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.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was
used.
River: Sols Wash Reach: Sols Wash RS: 0.286 Profile: PF 1
Warning:The cross-section end points had to be extended vertically for the computed water surface.
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.
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.
River: Sols Wash Reach: Sols Wash RS: 0.286 Profile: PF 2
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.
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.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
River: Sols Wash Reach: Sols Wash RS: 0.243 Profile: PF 1
Warning:The cross-section end points had to be extended vertically for the computed water surface.
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: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.

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

River: Sols Wash Reach: Sols Wash RS: 0.243 Profile: PF 2

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

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.

River: Sols Wash Reach: Sols Wash RS: 0.187 Profile: PF 1

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

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

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

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

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

River: Sols Wash Reach: Sols Wash RS: 0.187 Profile: PF 2

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

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

River: Sols Wash Reach: Sols Wash RS: 0.140 Profile: PF 1

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.

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.

River: Sols Wash Reach: Sols Wash RS: 0.140 Profile: PF 2

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

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.

River: Sols Wash Reach: Sols Wash RS: 0.109 Profile: PF 1

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

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

River: Sols Wash Reach: Sols Wash RS: 0.109 Profile: PF 2

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

Appendix D.2

SOLS WASH HEC-RAS MODEL – PROPOSED CONDITIONS

Sols Wash
Super Elevation

Source:
1) FCDMC - Drainage Design Manual, Volume II - Hydraulics (28 January 1996)
2) USACE - Hydraulic Design of Flood Control Channels (1 July 1991)

Super Elevation

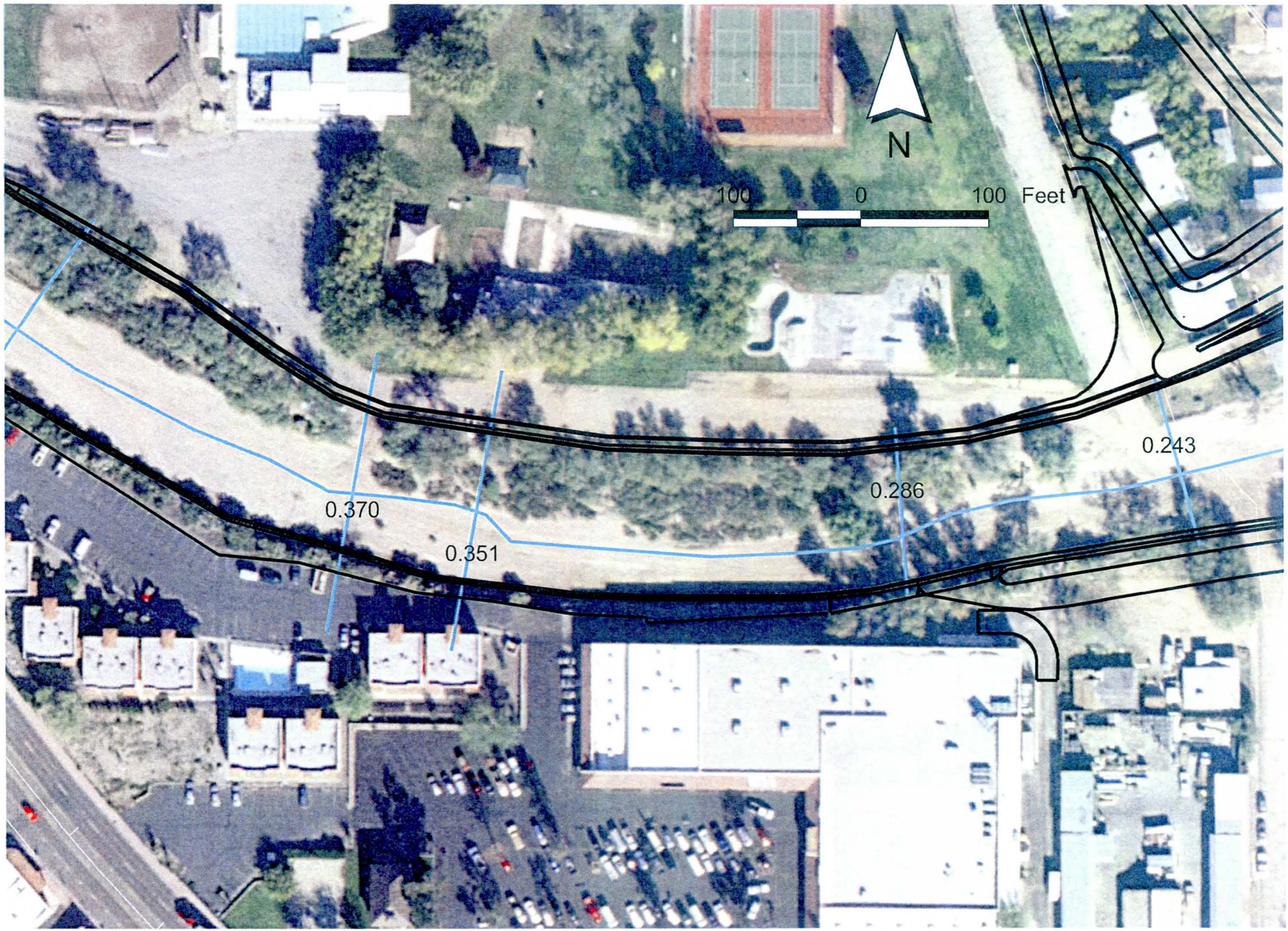
1) FCDMC equation: $y_{delta} = (V^2 * T) / (g * Rc)$

or 2) USACE equation: $y_{delta} = C * (V^2 * T) / (g * Rc)$

where C = 0.5 for channels that have tranquil flow with a rectangular shape and a simple circular curve. (Fr < 0.9)
where C = 1.0 for channels that have rapid flow with a rectangular shape and a simple circular curve. (Fr>1.1)

Cross Section	Wash Radius of Curvature {Rc} [ft]	Velocity {V} [ft/s]	Top Width of Channel {T} [ft]	WSEL (ft)	FCDMC Super Elevation $\{y_{delta}\}$ [ft]	USACE Super Elevation Coefficient	USACE Super Elevation $\{y_{delta}\}$ [ft]	10-yr WSEL including Super Elevation [ft][1]	100-Yr WSEL including Super Elevation [ft][1]
0.370	900	10.7	137	2059.4	0.54	0.5	0.27	-	2059.96
0.351	900	15.1	141	2057.9	0.44	1.0	1.11	-	2058.36
0.286	900	19.6	117	2052.8	0.26	1.0	1.55	-	2053.04
0.286	900	7.8	117	2053.9	0.35	0.5	0.12	2054.10	-
0.243	900	21.6	117	2048.4	0.15	1.0	1.88	-	2048.57
0.243	900	5.0	128	2054.1	0.62	0.5	0.06	2054.73	-

notes: 1) elevations shown using FCDMC calculated values for super elevation


N
100
0
100 Feet
0.370
0.351
0.286
0.243

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

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

****

PROJECT DATA
Project Title: Sols Wash
Project File : Sols_Wash.prj
Run Date and Time: 9/7/2005 4:56:20 PM

Project in English units

Project Description:
Sols Wash CAR - Future Conditions with 4' Weir modeled with cross sections
Prepared by:
Engineering and Environmental Consultants, Inc.
3003
N. Central Avenue, Suite 600
Phoenix, Arizona 85012
Phone: 602-248-7702
FAX: 602-248-7851
For: Flood Control District of Maricopa County
Sols Wash
CAR - Contract # FCD2003C052
Topographic Mapping Source:

2' Contour
Interval
Discharge information obtained from FEMA

Starting water surface
from West Consultants Model
SR 93 Bypass Project - Hassayampa River
Profile
1: Sols Wash (100-year) & Hassayampa River (10-year WSEL = 2045.31 NAVD 88)
Profile 2: Sols Wash (10-year) & Hassayampa River (100-year WSEL = 2054.17 NAVD 88)

Compared with starting water surface from FEMA Firm Panel 04013C2055 G.
Elev = 2051.3 (NGVD 29), converted to Elev=2053.5 (NAVD 88) by adding 2.2 ft. +/-
Future Conditions Model, with modified bank stations
& bank protection.
Island trimmed/removed to contain 100-yr Q to Sols Wash by
trimming North Wash.
Goldmine Village also trimmed to reduce WSEL at the
breakout point adjacent to the mobile home park.

Study Limits: Sols Wash

Final Model Run Date: September 2005
Model: Sols Wash

****

PLAN DATA

Plan Title: Sols Wash
Plan File : q:\303013.04 Sols Wash\HEC-RAS\Future Conditions-Drop modeled with x-sections\median n value\Sols_Wash.p01

Geometry Title: Sols Wash
Geometry File : q:\303013.04 Sols Wash\HEC-RAS\Future Conditions-Drop modeled with x-sections\median n value\Sols_Wash.g01

Flow Title : Sols Wash
Flow File : q:\303013.04 Sols Wash\HEC-RAS\Future Conditions-Drop modeled with x-sections\median n value\Sols_Wash.f01

Plan Summary Information:

Number of:	Cross Sections =	42	Multiple Openings =	0
	Culverts =	0	Inline Structures =	0
	Bridges =	2	Lateral Structures =	0

Computational Information

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

Computation Options

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

****

FLOW DATA

Flow Title: Sols Wash
Flow File : q:\303013.04 Sols Wash\HEC-RAS\Future Conditions-Drop modeled with x-sections\median n value\Sols_Wash.f01

Flow Data (cfs)

River	Reach	RS	PF 1	PF 2
Sols Wash	Sols Wash South	1.246	9000	4890
Sols Wash	Sols Wash South	1.175	6000	4890
Sols Wash	Sols Wash North	0.441	5413	2129
Sols Wash	Sols Wash North	0.373	8413	2129
Sols Wash	Sols Wash Main	0.779	14459	7019
Sols Wash	Sols Wash Main	0.541	15045	7019
Sols Wash	Sols Wash Main	0.541	15045	7019
Sols Wash	Sols Wash Main	0.541	15045	7019
Sols Wash	Sols Wash Main	0.541	15045	7019
Sols Wash	Sols Wash Main	0.541	15045	7019
Sols Wash	Sols Wash Main	0.541	15045	7019
Sols Wash	Sols Wash Main	0.541	15045	7019
Sols Wash	Sols Wash Main	0.541	15045	7019

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
Sols Wash	Sols Wash South	PF 1	Normal S = 0.01	
Sols Wash	Sols Wash South	PF 2	Normal S = 0.01	
Sols Wash	Sols Wash North	PF 1	Normal S = 0.01	
Sols Wash	Sols Wash North	PF 2	Normal S = 0.01	
Sols Wash	Sols Wash Main	PF 1		Known WS = 2045.31
Sols Wash	Sols Wash Main	PF 2		Known WS = 2054.17

****

GEOMETRY DATA

Geometry Title: Sols Wash
Geometry File : q:\303013.04 Sols Wash\HEC-RAS\Future Conditions-Drop modeled with x-sections\median n value\Sols_Wash.g01

Reach Connection Table

River	Reach	Upstream Boundary	Downstream Boundary
Sols Wash	Sols Wash South		Jct1
Sols Wash	Sols Wash North		Jct1

```
* Sols Wash        Sols Wash Main   *   Jct1              *                    *
*****************************************************************************

JUNCTION INFORMATION

Name: Jct1
Description:
Energy computation Method

    Length across Junction              Tributary
     River           Reach                River           Reach        Length   Angle
Sols Wash       Sols Wash South  to Sols Wash       Sols Wash Main       422
Sols Wash       Sols Wash North  to Sols Wash       Sols Wash Main       520

CROSS SECTION


RIVER: Sols Wash
REACH: Sols Wash South    RS: 1.246

INPUT
Description: Flow was split out to the north branch as it overtopped the island.
Station Elevation Data    num=     250
     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev
*****************************************************************************
  9221.5 2092.33 9227.81 2092.32 9227.92 2092.32 9228.11 2092.31 9235.22 2092.28
 9239.45 2092.28 9242.51 2092.28 9247.65 2092.25 9249.81 2092.25 9251.09 2092.25
  9257.1 2092.23 9262.74 2092.22 9264.39 2092.21 9267.18  2092.2 9271.69 2092.17
 9274.38 2092.16 9278.98 2092.12 9286.02 2092.07 9286.28 2092.07 9286.71 2092.07
 9293.57 2091.96 9297.66  2091.9 9300.86 2091.86 9306.24 2091.72 9308.38 2091.66
 9310.29 2091.58 9317.62  2091.3 9320.53 2091.23 9332.03 2090.81 9345.71 2089.54
 9352.42 2088.91 9372.02 2086.25 9378.52 2085.63 9386.17 2084.79 9391.58 2084.84
 9401.09 2084.86  9402.7 2084.87 9403.89 2084.87 9410.27 2084.89 9414.08 2084.85
 9417.57 2084.81 9423.42 2084.72 9424.86  2084.7 9425.72 2084.68 9432.16 2084.55
 9438.24  2084.5 9451.13  2084.2 9456.22 2085.79 9467.71 2089.37 9472.97 2089.49
 9477.33 2089.66 9490.51 2089.94 9495.57 2090.08  9497.8 2090.15 9501.54 2090.21
  9505.1 2090.25 9507.22 2090.27 9512.39 2090.31  9526.1  2090.2 9531.67 2090.22
 9535.25 2090.22 9546.34 2090.39 9554.03 2090.44 9562.99 2090.54 9568.56 2090.54
  9572.1 2090.58 9573.59  2090.6 9585.33  2090.8 9588.71 2090.85 9592.62  2090.9
 9599.19 2090.89 9599.92 2090.89 9600.35 2090.89 9607.21 2090.85 9611.99 2090.81
  9614.5 2090.79 9618.72 2090.75  9621.8 2090.71 9623.63 2090.69 9629.09 2090.64
 9635.28 2090.59 9636.39 2090.58 9638.25 2090.58 9643.68 2090.56 9646.92 2090.55
 9650.97 2090.56 9657.78 2090.57 9658.27 2090.57 9658.56 2090.57 9665.56  2090.6
  9670.2 2090.62 9672.86 2090.62 9677.31 2090.63 9680.15 2090.64 9681.84 2090.64
 9687.44 2090.63 9693.49 2090.62 9694.74 2090.61 9696.84  2090.6 9702.03 2090.57
 9705.13 2090.55 9709.33 2090.51 9716.37 2090.45 9716.62 2090.45 9716.77 2090.44
 9723.91 2090.37 9728.41 2090.33 9731.21  2090.3  9735.9 2090.27  9738.5 2090.25
 9740.05 2090.24  9745.8 2090.21  9751.7 2090.19 9753.09 2090.18 9755.43 2090.17
 9760.38 2090.16 9763.34 2090.15 9767.68 2090.13 9774.96 2090.11 9774.97 2090.11
 9782.27 2090.09 9786.62 2090.09 9789.56 2090.08 9794.49 2090.07 9796.85 2090.07
 9798.26 2090.07 9804.15 2090.06 9809.91 2090.05 9811.44 2090.05 9814.02 2090.05
 9818.73 2090.04 9821.55 2090.04 9826.03 2090.04 9833.19 2090.04 9833.32 2090.04
 9833.55 2090.04 9840.62 2090.06 9844.83 2090.07 9847.91 2090.07 9853.08 2090.08
  9855.2 2090.08 9856.47 2090.08  9862.5 2090.07 9868.12 2090.05 9869.79 2090.04
 9872.61 2090.03 9877.09 2090.01 9879.76    2090 9884.38 2089.97  9891.4 2089.93
 9891.67 2089.93 9892.14 2089.93 9898.97 2089.85 9903.04  2089.8 9906.26 2089.75
 9911.67 2089.62 9913.56 2089.57 9914.68 2089.53 9920.85 2089.32 9926.32 2089.03
 9928.14 2088.95  9931.2 2088.76 9935.44 2088.48  9943.8 2088.37 9950.29 2088.29
 9958.26 2086.84 9964.76 2084.94  9970.4 2085.18 9979.28 2085.44  9986.5 2085.68
 9989.79 2085.66 9993.79 2085.66 9996.18 2085.67   10000 2085.6810001.08 2085.69
10007.82 2085.7310008.38 2085.7310009.32 2085.7410015.67 2085.7910019.46 2085.82
10022.97 2085.8510028.85 2085.9210030.26 2085.94 10031.1 2085.9510037.55 2086.05
10042.74 2086.1610044.85  2086.210048.38 2086.2810052.14 2086.3710054.38 2086.43
10059.44 2086.5610066.03 2086.7110066.73 2086.7310067.91 2086.7510074.02 2086.88
10077.67 2086.9310081.32    208710087.44 2087.0710088.61 2087.0910089.31 2087.09
10095.91 2087.1610100.95  2087.2 10103.2 2087.2210106.97 2087.2410110.49 2087.26
10112.59 2087.2710117.79 2087.2910124.24 2087.2910125.08 2087.29 10126.5 2087.29
10132.37 2087.2910135.88 2087.2810139.67 2087.2810146.03 2087.2910146.96  2087.3
10147.94  2087.310168.62 2087.3710179.34  2088.310185.85 2088.9910189.51 2089.35
10201.64 2089.3610205.79 2089.0710216.38 2088.4110222.58 2087.76 10244.5 2091.53
10255.25 2092.86 10265.1 2092.7310271.09 2092.7110277.02 2092.9110286.47 2091.58
10326.09 2089.6710329.63  2089.410330.13 2089.4410330.63 2089.4810333.31 2089.92
10348.89 2092.38   10351 2092.5610359.54 2093.0510364.73 2093.9310367.46 2094.47
10375.48 2099.3510394.44 2109.4310407.14 2109.1910415.28 2109.1810416.84 2109.19
10419.45 2109.2110424.13 2109.2610426.92 2109.2610431.43 2109.2510435.51 2109.24

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*****************************************************************************
```

```
  9221.5      .07 9345.71     .035 9472.97      .05 9723.91      .04 9935.44      .03
10189.51      .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
      9898.9710189.51              350     371     350              .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
  9221.5 9599.19    2094       F
10255.2510435.51    2094       F

CROSS SECTION OUTPUT  Profile #PF 1
*****************************************************************************************
* E.G. Elev (ft)          * 2091.70  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    1.69  * Wt. n-Val.              *   0.040  *   0.030  *   0.050  *
* W.S. Elev (ft)          * 2090.01  * Reach Len. (ft)         *  350.00  *  371.00  *  350.00  *
* Crit W.S. (ft)          * 2090.37  * Flow Area (sq ft)       *    1.38  *  838.92  *   51.23  *
* E.G. Slope (ft/ft)      *0.010004  * Area (sq ft)            *  525.43  *  838.92  *   55.51  *
* Q Total (cfs)           * 9000.00  * Flow (cfs)              *    0.83  * 8836.48  *  162.70  *
* Top Width (ft)          *  524.96  * Top Width (ft)          *  173.51  *  290.54  *   60.92  *
* Vel Total (ft/s)        *   10.10  * Avg. Vel. (ft/s)        *    0.60  *   10.53  *    3.18  *
* Max Chl Dpth (ft)       *    5.81  * Hydr. Depth (ft)        *    0.06  *    2.89  *    1.11  *
* Conv. Total (cfs)       * 89983.2  * Conv. (cfs)             *     8.3  * 88348.3  *  1626.7  *
* Length Wtd. (ft)        *  370.51  * Wetted Per. (ft)        *   21.23  *  291.10  *   46.40  *
* Min Ch El (ft)          * 2084.94  * Shear (lb/sq ft)        *    0.04  *    1.80  *    0.69  *
* Alpha                   *    1.07  * Stream Power (lb/ft s)   *    0.02  *   18.96  *    2.19  *
* Frctn Loss (ft)         *          * Cum Volume (acre-ft)     *   66.50  *   39.39  *    1.46  *
* C & E Loss (ft)         *          * Cum SA (acres)           *   34.65  *    7.06  *    1.19  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
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)          * 2090.20  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.84  * Wt. n-Val.              *          *   0.030  *   0.050  *
* W.S. Elev (ft)          * 2089.36  * Reach Len. (ft)         *  350.00  *  371.00  *  350.00  *
* Crit W.S. (ft)          * 2089.08  * Flow Area (sq ft)       *          *  657.47  *   22.67  *
* E.G. Slope (ft/ft)      *0.006453  * Area (sq ft)            *  436.57  *  657.47  *   22.67  *
* Q Total (cfs)           * 4890.00  * Flow (cfs)              *          * 4854.45  *   35.55  *
* Top Width (ft)          *  432.37  * Top Width (ft)          *  120.08  *  269.90  *   42.39  *
* Vel Total (ft/s)        *    7.19  * Avg. Vel. (ft/s)        *          *    7.38  *    1.57  *
* Max Chl Dpth (ft)       *    5.16  * Hydr. Depth (ft)        *          *    2.44  *    0.53  *
* Conv. Total (cfs)       * 60873.5  * Conv. (cfs)             *          * 60430.9  *   442.6  *
* Length Wtd. (ft)        *  370.89  * Wetted Per. (ft)        *          *  270.45  *   42.59  *
* Min Ch El (ft)          * 2084.94  * Shear (lb/sq ft)        *          *    0.98  *    0.21  *
* Alpha                   *    1.05  * Stream Power (lb/ft s)   *          *    7.23  *    0.34  *
* Frctn Loss (ft)         *    2.56  * Cum Volume (acre-ft)     *   48.35  *   31.92  *    0.71  *
* C & E Loss (ft)         *    0.04  * Cum SA (acres)           *   22.99  *    6.92  *    0.90  *
*****************************************************************************************

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.
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: Sols Wash South    RS: 1.175

INPUT
Description:
Station Elevation Data    num=     329
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
 8793.67 2088.83 8794.61 2088.72 8803.13 2087.72 8833.57 2087.72 8835.17 2087.73
 8853.54 2088.16 8853.97 2088.16 8854.78 2088.17 8861.57 2088.28 8866.54 2088.33
 8868.83 2088.34 8872.52 2088.34 8876.09 2088.34 8878.31 2088.34 8883.36 2088.32
 8890.07 2088.28 8890.62 2088.28  8891.5 2088.27 8897.88 2088.22 8901.84 2088.19
 8905.15 2088.16 8910.48 2088.11 8912.41 2088.09 8913.61 2088.08 8919.67 2088.02
 8925.37 2087.97 8926.94 2087.95 8929.46 2087.92  8934.2 2087.87 8937.14 2087.84
 8941.46 2087.79 8948.44 2087.72 8948.72 2087.71  8948.9 2087.71 8955.99 2087.64
```

```
 8960.67 2087.58 8963.25 2087.55 8967.41  2087.5 8970.51 2087.47 8972.43 2087.44
 8977.78 2087.38  8984.2 2087.29 8985.04 2087.28 8986.39 2087.27  8992.3 2087.19
 8995.97 2087.14 8999.57 2087.09 9005.37 2087.01 9006.83 2086.99 9007.73 2086.98
 9014.09  2086.9  9019.5 2086.82 9021.36 2086.79 9024.35 2086.75 9028.62  2086.7
 9031.26 2086.66 9035.88  2086.6 9043.03 2086.51 9043.14 2086.51 9043.33 2086.51
 9050.41 2086.44  9054.8  2086.4 9057.67 2086.38 9062.31 2086.36 9064.93 2086.35
 9066.56 2086.35  9072.2 2086.35 9078.33 2086.37 9079.46 2086.38 9081.29  2086.4
 9086.72 2086.44 9090.09 2086.48 9093.99 2086.52 9100.26  2086.6 9101.25 2086.62
 9101.86 2086.63 9108.51 2086.71 9113.62 2086.78 9115.77  2086.8 9119.24 2086.83
 9123.04 2086.86 9125.39 2086.87  9130.3 2086.88 9137.16 2086.85 9137.56 2086.85
 9138.22 2086.83 9144.83 2086.68 9151.55 2086.58 9161.22 2086.33 9172.83 2083.15
 9180.69 2081.03 9195.37 2081.26 9195.99 2081.26 9202.93 2081.25 9207.75 2081.22
 9210.19  2081.2 9214.14 2081.15 9217.46 2081.11 9219.52 2081.09 9224.72 2081.04
 9231.28 2081.01 9231.98 2081.01 9233.11 2081.01 9239.25 2080.99 9243.05 2080.99
 9248.42 2080.97 9260.69 2081.05 9269.18 2080.24 9280.17 2081.83 9288.87  2083.4
 9293.64 2083.96 9295.53 2083.76 9301.09 2083.27 9306.29 2083.27 9316.54 2083.92
 9318.03 2084.06 9327.47 2084.75 9334.37 2085.41 9340.93 2086.08 9346.99 2086.42
 9348.19 2086.49 9348.94 2086.51 9355.46 2086.69 9360.71 2086.77 9362.72  2086.8
 9365.96 2086.83 9369.98 2086.86 9372.47 2086.87 9377.24 2086.89 9384.24 2086.91
 9384.51 2086.91 9384.94 2086.91 9391.77 2086.92    9396 2086.93 9399.03 2086.93
 9403.92 2086.94  9406.3 2086.94 9407.77 2086.94 9413.56 2086.95 9419.54 2086.95
 9420.82 2086.95  9422.9 2086.95 9428.09 2086.95  9431.3 2086.95 9435.35 2086.94
 9441.88 2086.94 9442.61 2086.94 9443.07 2086.94 9449.88 2086.93 9454.83 2086.93
 9457.14 2086.92 9460.86 2086.92  9464.4 2086.92  9466.6 2086.92 9471.66 2086.92
 9478.36 2086.93 9478.93 2086.93 9479.84 2086.93 9486.19 2086.95 9490.13 2086.96
 9493.45 2086.98 9498.81    2087  9501.9 2087.01 9506.92 2087.04 9513.66 2087.08
 9517.79 2087.11 9524.35 2086.98 9527.23 2086.92 9532.42 2086.95 9535.63 2086.97
 9539.68    2087 9546.21 2087.04 9546.94 2087.04  9547.4 2087.04 9554.21 2087.03
 9559.17 2087.03 9561.47 2087.03 9565.19 2087.03 9568.73 2087.03 9570.93 2087.03
    9576 2087.03  9582.7 2087.03 9583.26 2087.03 9584.17 2087.03 9590.52 2087.03
 9594.46 2087.03 9597.79 2087.03 9603.15 2087.03 9605.05 2087.03 9606.23 2087.03
 9612.31 2087.02 9617.99 2087.01 9619.58 2087.01 9622.13 2087.01 9626.84    2087
 9629.76    2087  9634.1    2087  9641.1    2087 9641.36    2087 9641.53    2087
 9648.63    2087 9653.29    2087 9655.89    2087 9660.08 2086.99 9663.15 2086.99
 9665.06 2086.99 9670.42 2086.97 9676.82 2086.93 9677.68 2086.93 9679.06 2086.92
 9684.94 2086.87 9688.59 2086.84 9692.21 2086.81 9698.04 2086.78 9699.47 2086.77
 9700.35 2086.76 9706.73 2086.76 9712.12 2086.76    9714 2086.76 9717.02 2086.77
 9721.26 2086.79 9723.89  2086.8 9728.52 2086.82 9735.65 2086.86 9735.78 2086.86
    9736 2086.86 9743.05 2086.89 9747.42  2086.9 9750.31 2086.91 9754.98 2086.91
 9757.57 2086.91 9759.18 2086.91 9764.84  2086.9 9770.95 2086.87  9772.1 2086.87
 9773.95 2086.85 9779.36 2086.81 9782.72 2086.78 9786.63 2086.74 9792.93 2086.68
 9793.89 2086.68 9794.48 2086.67 9801.15 2086.59 9806.25 2086.54 9808.41 2086.51
 9811.91 2086.47 9815.68 2086.42 9818.01 2086.39 9822.94 2086.32 9829.78 2086.22
  9830.2 2086.22 9830.89 2086.21 9837.47 2086.11 9841.54 2086.04 9844.73 2085.99
 9849.87 2085.89 9851.99 2085.84 9856.23 2086.01 9870.09  2086.7 9882.22 2084.35
 9884.57 2083.82 9886.37 2083.85 9888.51 2083.89 9902.83 2084.13  9906.8 2084.07
  9910.1 2084.01 9912.14 2083.98 9917.36 2083.92 9923.91 2083.84 9924.62 2083.84
 9925.78 2083.82 9931.89 2083.76 9935.67 2083.71 9939.15 2083.67 9944.76 2083.59
 9946.41 2083.56 9947.44 2083.54 9953.68 2083.42  9959.2 2083.29 9960.94 2083.25
 9963.74 2083.17  9968.2 2083.05 9970.97 2082.97 9975.47 2082.86 9982.72 2082.71
 9989.99 2082.62  9994.5 2082.62 9997.25 2082.61   10000 2082.61 10001.7 2082.62
10004.52 2082.6310006.27 2082.6410011.78 2082.6510018.03 2082.6110019.04  2082.6
10020.68 2082.6310026.31  2082.7 10029.8 2082.6710035.08 2082.5310046.78 2082.51
10053.09  2084.910063.94 2089.2710075.49 2089.2710083.44 2089.07 10084.3 2089.08
10084.95 2089.0910089.24 2088.8810102.14  2088.410104.06 2088.3710111.06 2086.62
10113.74 2086.0410123.99 2088.0110127.85 2088.5410137.82 2091.8910147.85 2095.12
10153.52 2096.9110157.04 2097.9510164.11 2099.8510176.23 2102.7110181.31 2103.38
10189.99 2104.1510197.27 2104.8710201.29  2105.810203.06 2106.4110208.33 2106.39
10212.17 2106.3110213.12 2106.3510219.05 2106.3610232.49 2106.41

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
 8793.67    .069 9161.22     .03 9365.96     .05 9603.15     .04 9870.09     .03
10063.94     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9870.0910063.94              300     337     300              .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
 8793.67 9754.98    2092       F
10063.9410232.49    2092       F

CROSS SECTION OUTPUT  Profile #PF 1
*********************************************************************************************
* E.G. Elev (ft)         * 2088.17  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.34  * Wt. n-Val.              *   0.040  *   0.030  *          *
* W.S. Elev (ft)         * 2086.83  * Reach Len. (ft)        *  300.00  *  337.00  *  300.00  *
* Crit W.S. (ft)         * 2086.74  * Flow Area (sq ft)      *   42.48  *  633.19  *          *
```

E.G. Slope (ft/ft)	0.007107	Area (sq ft)	896.17	633.19	3.06	
Q Total (cfs)	6000.00	Flow (cfs)	78.56	5921.44		
Top Width (ft)	658.51	Top Width (ft)	463.07	187.80	7.64	
Vel Total (ft/s)	8.88	Avg. Vel. (ft/s)	1.85	9.35		
Max Chl Dpth (ft)	6.59	Hydr. Depth (ft)	0.45	3.37		
Conv. Total (cfs)	71173.1	Conv. (cfs)	931.9	70241.3		
Length Wtd. (ft)	336.70	Wetted Per. (ft)	93.63	188.91		
Min Ch El (ft)	2082.51	Shear (lb/sq ft)	0.20	1.49		
Alpha	1.10	Stream Power (lb/ft s)	0.37	13.91		
Frctn Loss (ft)	2.05	Cum Volume (acre-ft)	60.79	33.12	1.23	
C & E Loss (ft)	0.01	Cum SA (acres)	32.09	5.02	0.91	

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.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water
surface was used.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT Profile #PF 2

E.G. Elev (ft)	2087.60	Element	Left OB	Channel	Right OB	
Vel Head (ft)	1.20	Wt. n-Val.	0.040	0.030		
W.S. Elev (ft)	2086.40	Reach Len. (ft)	300.00	337.00	300.00	
Crit W.S. (ft)	2086.24	Flow Area (sq ft)	12.56	552.96		
E.G. Slope (ft/ft)	0.007417	Area (sq ft)	747.90	552.96	0.64	
Q Total (cfs)	4890.00	Flow (cfs)	16.68	4873.32		
Top Width (ft)	450.86	Top Width (ft)	262.12	185.19	3.55	
Vel Total (ft/s)	8.65	Avg. Vel. (ft/s)	1.33	8.81		
Max Chl Dpth (ft)	6.16	Hydr. Depth (ft)	0.27	2.99		
Conv. Total (cfs)	56780.3	Conv. (cfs)	193.6	56587.1		
Length Wtd. (ft)	336.94	Wetted Per. (ft)	47.01	186.19		
Min Ch El (ft)	2082.51	Shear (lb/sq ft)	0.12	1.38		
Alpha	1.04	Stream Power (lb/ft s)	0.16	12.12		
Frctn Loss (ft)	2.18	Cum Volume (acre-ft)	43.60	26.76	0.62	
C & E Loss (ft)	0.01	Cum SA (acres)	21.46	4.98	0.72	

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.
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: Sols Wash South RS: 1.112

INPUT
Description:
Station Elevation Data num= 467

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
8141.93	2091.62	8142.44	2091.59	8142.73	2091.59	8144.06	2091.44	8170.52	2088.44
8177.45	2088.47	8183.84	2088.36	8192.72	2088.2	8196.81	2088.13	8201.95	2088.02
8203.92	2087.99	8205.5	2087.96	8211.04	2087.84	8218.02	2087.71	8218.16	2087.71
8218.27	2087.71	8225.28	2087.58	8231.04	2087.48	8232.39	2087.46	8234.09	2087.44
8239.51	2087.36	8243.82	2087.31	8246.63	2087.28	8250.16	2087.25	8253.74	2087.21
8256.59	2087.18	8260.86	2087.15	8266.24	2087.08	8267.98	2087.07	8269.36	2087.05
8275.1	2087	8282.14	2086.89	8282.21	2086.89	8282.31	2086.89	8289.33	2086.81
8294.91	2086.72	8296.45	2086.7	8298.38	2086.66	8303.56	2086.59	8307.68	2086.5
8310.68	2086.46	8314.45	2086.37	8317.8	2086.3	8320.46	2086.21	8324.92	2086.08
8330.53	2085.8	8332.57	2085.7	8336.37	2085.13	8356.26	2083.05	8364.59	2082.94
8370.75	2081.91	8373.61	2081.98	8386.57	2082.64	8394.08	2083	8403.2	2083.63
8409.87	2083.65	8410.34	2083.64	8438.04	2083.15	8438.07	2083.15	8438.14	2083.15
8468.19	2082.95	8475.8	2082.82	8495.33	2083.5	8499.28	2083.68	8502.84	2083.77
8507.33	2083.92	8509.96	2084	8512.06	2084.06	8517.08	2084.14	8523.4	2084.24
8524.2	2084.25	8524.83	2084.26	8531.31	2084.3	8537.61	2084.32	8538.43	2084.32
8539.47	2084.32	8545.55	2084.3	8550.38	2084.27	8552.67	2084.25	8555.54	2084.23
8559.78	2084.16	8563.15	2084.1	8566.9	2084.03	8571.62	2083.95	8573.8	2083.88
8575.93	2083.89	8585.02	2083.48	8591.39	2083.25	8592.85	2083.2	8593.5	2083.17
8614.25	2083.56	8615.42	2083.55	8619.83	2083.54	8625.06	2083.43	8630.27	2083.32

```
 8639.79 2083.62 8652.59 2083.23 8656.35 2083.37 8664.74 2083.69 8668.05 2083.82
 8673.66 2083.89 8678.11 2083.95 8680.77 2083.99 8684.12 2084.03 8687.89 2084.07
 8690.89  2084.1 8695.01 2084.14  8700.2 2084.19 8702.13 2084.21 8703.66 2084.22
 8709.24 2084.26 8716.27 2084.32 8716.36 2084.32 8716.43 2084.32 8723.48 2084.36
 8729.21 2084.39 8730.59 2084.39 8732.34  2084.4 8737.71 2084.41 8741.98 2084.42
 8744.83 2084.42 8748.41 2084.42 8751.95 2084.42 8754.75 2084.42 8759.06 2084.41
 8764.49 2084.41 8766.18  2084.4 8767.53  2084.4  8773.3 2084.39  8780.3 2084.38
 8780.41 2084.38 8780.56 2084.38 8787.53 2084.38 8793.07 2084.38 8794.65 2084.38
 8796.63 2084.38 8801.77 2084.39 8805.85 2084.41 8808.88 2084.42  8812.7 2084.43
    8816 2084.45 8818.62 2084.46 8823.12 2084.49 8828.78 2084.52 8830.23 2084.53
 8831.39 2084.53 8837.35 2084.57 8844.17 2084.59 8844.47  2084.6 8844.85  2084.6
 8851.59 2084.62 8856.94 2084.63  8858.7 2084.64 8860.92 2084.64 8865.82 2084.65
 8869.71 2084.65 8872.94 2084.66 8876.99 2084.67 8880.05 2084.67 8882.49 2084.68
 8887.17  2084.7 8893.07 2084.72 8894.29 2084.73 8895.26 2084.74 8901.41 2084.76
 8908.03  2084.8 8908.52 2084.81 8909.14 2084.81 8915.64 2084.84 8920.81 2084.86
 8922.76 2084.87 8925.21 2084.88 8929.88 2084.88 8933.58 2084.89 8936.99 2084.89
 8941.28  2084.9 8944.11 2084.89 8946.35 2084.89 8951.23 2084.88 8957.36 2084.88
 8958.34 2084.87 8959.13 2084.87 8965.46 2084.85  8971.9 2084.83 8972.58 2084.83
 8973.43 2084.83 8988.92 2084.53 8991.65 2084.46 8992.63 2084.44 8996.02 2084.45
 9015.04 2084.71 9021.65 2084.72 9022.62  2084.7 9028.97 2084.57 9035.77 2084.68
 9050.67 2084.28 9053.03  2084.3 9058.56 2084.36 9069.86 2084.49 9072.22 2084.48
 9074.09 2084.47 9079.34 2084.46 9085.94 2084.44 9086.45 2084.44 9086.86 2084.44
 9093.57 2084.41 9099.64  2084.4 9100.69  2084.4 9102.01  2084.4  9107.8  2084.4
 9112.41  2084.4 9114.92  2084.4 9118.08 2084.41 9122.04 2084.42 9125.18 2084.43
 9129.16 2084.45 9134.15 2084.47 9136.27 2084.48 9137.96  2084.5 9143.39 2084.51
 9150.23 2084.56 9150.51 2084.56 9150.73 2084.56 9157.62 2084.58  9163.5  2084.6
 9164.74 2084.59  9166.3 2084.57 9171.86  2084.5 9176.28 2084.27 9178.98 2084.11
 9184.16 2083.68 9193.81 2082.94 9212.46 2077.63 9212.96 2077.49 9213.18 2077.43
 9213.42 2077.44  9228.8 2077.91 9230.59 2077.97 9235.91 2078.14  9245.7 2077.94
  9256.3 2077.78 9262.81  2078.3  9271.5 2079.06 9278.46 2079.62 9278.62 2079.63
 9278.81 2079.65 9285.73 2080.25 9291.24 2080.61 9292.85 2080.72 9310.06 2081.36
 9316.97 2081.63 9324.19 2081.79 9328.86 2082.27 9342.55 2083.63 9342.67 2083.64
  9343.1 2083.66 9349.79 2084.09  9355.1 2084.26  9356.9 2084.31 9359.17 2084.34
 9364.02 2084.43 9367.88 2084.47 9371.14  2084.5 9375.24 2084.53 9378.26 2084.55
 9380.65 2084.57 9385.37 2084.59 9391.32 2084.62 9392.49 2084.63 9393.43 2084.63
 9399.61 2084.66  9406.2  2084.7 9406.73  2084.7 9407.39  2084.7 9413.84 2084.72
 9418.97 2084.74 9420.96 2084.75 9423.46 2084.75 9428.08 2084.76 9431.75 2084.76
 9435.19 2084.76 9439.53 2084.77 9442.31 2084.76 9444.52 2084.76 9449.43 2084.76
  9455.6 2084.76 9456.55 2084.76 9457.29 2084.75 9463.66 2084.75 9470.07 2084.75
 9470.78 2084.75 9471.68 2084.75  9477.9 2084.75 9482.84 2084.75 9485.01 2084.76
 9487.75 2084.76 9492.13 2084.77 9495.61 2084.78 9499.25 2084.79 9503.82  2084.8
 9506.37 2084.81 9508.39 2084.82 9513.48 2084.84  9519.9 2084.87  9520.6 2084.87
 9521.16 2084.88 9527.72 2084.91 9533.93 2084.94 9534.83 2084.95 9535.97 2084.95
 9541.95 2084.99 9546.71 2085.01 9549.07 2085.03 9552.04 2085.04 9556.19 2085.07
 9559.48 2085.08  9563.3  2085.1 9568.11 2085.12 9570.42 2085.14 9572.25 2085.14
 9577.54 2085.16 9584.19 2085.18 9584.65 2085.19 9585.03 2085.19 9587.58 2085.19
 9592.32  2085.2 9595.92  2085.2 9600.38  2085.2 9606.34  2085.2 9608.44  2085.2
 9615.57 2085.22 9616.49 2085.22 9616.76 2085.22 9624.55 2085.24 9627.19 2085.25
 9632.61 2085.28 9637.61 2085.31 9640.66 2085.33 9648.03 2085.38 9648.72 2085.38
 9651.07  2085.4 9656.78 2085.43 9658.45 2085.44 9664.83 2085.46 9668.87 2085.48
 9672.89 2085.48  9679.3 2085.47 9680.95 2085.47 9686.57 2085.44    9689 2085.43
 9689.72 2085.43 9697.06 2085.37 9700.14 2085.35 9705.12 2085.31 9710.56 2085.27
 9713.17 2085.26 9720.99 2085.22 9721.23 2085.22 9722.06 2085.22 9729.29  2085.2
 9731.41  2085.2 9737.34  2085.2 9741.83 2085.21  9745.4 2085.23 9752.25 2085.27
 9753.46 2085.29 9757.56 2085.32 9761.51 2085.36 9762.67 2085.38 9769.57 2085.45
  9773.1 2085.49 9777.63 2085.54 9783.52 2085.59 9785.68 2085.61 9793.05 2085.65
 9793.74 2085.66 9793.94 2085.66  9801.8 2085.66 9804.36 2085.66 9809.85 2085.63
 9814.78 2085.58 9817.91 2085.54 9825.21 2085.43 9825.97 2085.41 9828.55 2085.35
 9834.02 2085.22 9835.63 2085.18 9842.08 2085.04 9846.05 2084.94 9850.13  2084.9
 9856.47 2084.75 9858.19 2084.73 9864.04 2084.62 9866.25  2084.6 9866.53 2084.59
 9884.78 2084.14 9887.84 2083.97 9900.43 2082.67 9906.68 2081.42  9912.7 2080.29
 9929.15 2080.93  9930.7 2080.99 9935.04 2081.06 9938.76 2081.13 9939.85 2081.13
 9946.81 2081.15 9950.27 2081.13 9954.87 2081.11 9960.69 2081.04 9962.93 2081.01
 9970.53 2080.84 9970.98 2080.83 9971.12 2080.83 9979.04 2080.54 9981.54 2080.43
  9987.1 2080.14 9991.96 2079.86 9995.15 2079.6910000.01 2079.4610002.38 2079.34
10003.21 2079.3210006.03 2079.3110011.27 2079.2810012.81 2079.2210014.37 2079.14
10024.82 2078.41 10032.5 2077.9710047.91 2087.3710048.43 2087.57 10081.3 2086.91
10089.19 2085.8910091.83  2085.610098.92 2084.8110110.32 2083.65 10111.9 2083.66
10120.02 2083.5610134.07 2084.3210137.87 2084.5910148.01 2085.1210148.27 2085.12
10148.39 2085.1310166.08 2085.7910168.63 2087.4610173.65 2090.5610177.71 2090.41
10182.13 2090.6310196.43  2090.310207.23  2090.510210.04 2090.4810210.08 2090.48
10224.61 2089.7810226.65 2089.7310238.09 2089.3510240.53 2089.2310244.82 2089.08
10252.68 2087.6910263.31 2086.9610267.44 2086.44 10267.8 2086.45 10270.1 2086.54
10271.91 2086.6110273.41 2086.67 10281.3 2086.8310283.16 2086.8910292.82 2086.98
10296.19 2087.0210299.01 2087.11

Manning's n Values        num=       7
     Sta   n Val      Sta   n Val      Sta   n Val      Sta   n Val      Sta   n Val
*******************************************************************************
```

```
 8141.93     .069 8933.58       0 9171.86     .03 9364.02     .05 9600.38     .04
 9864.04     .0310047.91     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
      9884.7810047.91              450     455     450              .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
 8141.93 9793.74    2089       F
   1005010299.01    2089       F

CROSS SECTION OUTPUT  Profile #PF 1
*****************************************************************************************
* E.G. Elev (ft)          * 2086.11  * Element                 *  Left OB  *  Channel  * Right OB *
* Vel Head (ft)           *    1.30  * Wt. n-Val.              *   0.030   *   0.030   *         *
* W.S. Elev (ft)          * 2084.81  * Reach Len. (ft)        *  450.00   *  455.00   *  450.00 *
* Crit W.S. (ft)          * 2084.24  * Flow Area (sq ft)      *    9.57   *  653.45   *         *
* E.G. Slope (ft/ft)      *0.005288  * Area (sq ft)           * 1394.01   *  653.45   *   32.15 *
* Q Total (cfs)           * 6000.00  * Flow (cfs)             *   17.75   * 5982.25   *         *
* Top Width (ft)          * 1333.30  * Top Width (ft)         * 1131.25   *  158.93   *   43.12 *
* Vel Total (ft/s)        *    9.05  * Avg. Vel. (ft/s)       *    1.86   *    9.15   *         *
* Max Chl Dpth (ft)       *    7.38  * Hydr. Depth (ft)       *    0.31   *    4.11   *         *
* Conv. Total (cfs)       * 82511.8  * Conv. (cfs)            *   244.2   * 82267.6   *         *
* Length Wtd. (ft)        *  454.99  * Wetted Per. (ft)       *   30.80   *  161.25   *         *
* Min Ch El (ft)          * 2077.97  * Shear (lb/sq ft)       *    0.10   *    1.34   *         *
* Alpha                   *    1.02  * Stream Power (lb/ft s) *    0.19   *   12.25   *         *
* Frctn Loss (ft)         *    3.00  * Cum Volume (acre-ft)   *   52.91   *   28.15   *    1.11 *
* C & E Loss (ft)         *    0.10  * Cum SA (acres)         *   26.60   *    3.68   *    0.74 *
*****************************************************************************************

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.
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)          * 2085.41  * Element                 *  Left OB  *  Channel  * Right OB *
* Vel Head (ft)           *    1.16  * Wt. n-Val.              *   0.030   *   0.030   *         *
* W.S. Elev (ft)          * 2084.25  * Reach Len. (ft)        *  450.00   *  455.00   *  450.00 *
* Crit W.S. (ft)          * 2083.74  * Flow Area (sq ft)      *    0.24   *  564.85   *         *
* E.G. Slope (ft/ft)      *0.005691  * Area (sq ft)           *  939.56   *  564.85   *   12.29 *
* Q Total (cfs)           * 4890.00  * Flow (cfs)             *    0.13   * 4889.87   *         *
* Top Width (ft)          *  703.35  * Top Width (ft)         *  517.00   *  158.01   *   28.34 *
* Vel Total (ft/s)        *    8.65  * Avg. Vel. (ft/s)       *    0.54   *    8.66   *         *
* Max Chl Dpth (ft)       *    6.82  * Hydr. Depth (ft)       *    0.05   *    3.57   *         *
* Conv. Total (cfs)       * 64820.3  * Conv. (cfs)            *     1.7   * 64818.6   *         *
* Length Wtd. (ft)        *  455.00  * Wetted Per. (ft)       *    4.44   *  160.17   *         *
* Min Ch El (ft)          * 2077.97  * Shear (lb/sq ft)       *    0.02   *    1.25   *         *
* Alpha                   *    1.00  * Stream Power (lb/ft s) *    0.01   *   10.85   *         *
* Frctn Loss (ft)         *    3.21  * Cum Volume (acre-ft)   *   37.78   *   22.44   *    0.58 *
* C & E Loss (ft)         *    0.09  * Cum SA (acres)         *   18.78   *    3.65   *    0.61 *
*****************************************************************************************

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.
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: Sols Wash South     RS: 1.025

INPUT
Description:
Station Elevation Data     num=     364
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
```

```
 8581.07 2092.91 8589.36 2092.41 8600.01 2090.85 8603.58 2090.36 8617.02 2088.47
 8622.85 2087.55 8625.37 2087.02 8629.63  2086.1 8632.67 2085.42 8634.47 2084.98
 8651.42 2079.52 8652.39  2079.2 8652.68  2079.1 8653.34 2078.84 8655.16 2078.35
 8670.36 2074.24 8674.88    2073 8679.99 2073.73 8706.74  2075.9 8712.97 2075.67
  8715.8 2075.64 8720.27 2075.61 8727.42 2075.63 8727.57 2075.63 8727.82 2075.63
 8734.87 2075.67 8739.04 2075.67 8742.17 2075.73 8747.46 2075.89 8749.47 2075.96
 8750.66 2076.02 8756.77 2076.47 8762.28  2076.9 8764.07 2077.07 8767.09 2077.34
 8771.37 2077.75  8773.9 2077.94 8778.67 2078.28 8785.52 2078.66 8785.97 2078.67
 8786.73 2078.69 8793.27 2078.89 8797.14 2078.97 8800.57    2079 8806.37 2079.05
 8807.87 2079.07 8808.75 2079.08 8815.17 2079.13 8820.37 2079.19 8822.47 2079.22
 8826.01 2079.27 8829.77 2079.32 8831.99 2079.35 8837.07 2079.42 8843.61 2079.49
 8844.37  2079.5 8845.65 2079.51 8851.67 2079.56 8855.23 2079.59 8858.97 2079.61
 8865.28 2079.64 8866.27 2079.65 8866.85 2079.65 8873.57 2079.67 8878.47 2079.68
 8880.87 2079.69 8884.92 2079.69 8888.17  2079.7 8890.09  2079.7 8895.47 2079.71
 8901.71 2079.71 8902.77 2079.71 8904.56 2079.71 8910.07 2079.71 8913.33  2079.7
 8917.37  2079.7  8924.2  2079.7 8924.67  2079.7 8924.95  2079.7 8931.97  2079.7
 8936.57 2079.71 8939.27 2079.72 8943.84 2079.73 8946.57 2079.75 8948.19 2079.75
 8953.87  2079.8 8959.81 2079.84 8961.17 2079.85 8963.48 2079.87 8968.47 2079.91
 8971.42 2079.93 8975.77 2079.95 8983.04 2079.98 8983.07 2079.98 8983.11 2079.98
 8990.37    2080 8994.66    2080 8997.67 2080.01 9002.75 2080.02 9004.97 2080.03
 9006.28 2080.03 9012.27 2080.06  9017.9 2080.09 9019.57  2080.1 9022.39 2080.12
 9026.87 2080.16 9029.52 2080.18 9034.17 2080.23 9041.14 2080.31 9041.47 2080.31
 9042.03 2080.32 9048.77 2080.42 9052.76 2080.48 9056.07 2080.53 9061.67 2080.62
 9063.37 2080.65 9064.38 2080.67 9070.67 2080.76    9076 2080.83 9077.97 2080.85
 9081.31 2080.88 9085.27 2080.92 9087.62 2080.94 9092.57 2080.96 9099.24 2080.97
 9099.87 2080.97 9100.94 2080.96 9107.17 2080.94 9110.85 2080.93 9114.47 2080.91
 9120.58 2080.88 9121.77 2080.87 9122.47 2080.86 9129.07 2080.83 9134.09 2080.81
 9136.37 2080.81 9140.22 2080.81 9143.67  2080.8 9145.71  2080.8 9150.97 2080.82
 9157.33 2080.84 9158.27 2080.85 9159.86 2080.86 9165.57  2080.9 9168.95 2080.93
 9172.87 2080.96  9179.5 2081.01 9180.17 2081.02 9180.57 2081.02 9187.47 2081.06
 9192.19 2081.09 9194.77 2081.09 9199.13  2081.1 9202.07 2081.11 9203.81 2081.11
 9209.37 2081.09 9215.43 2081.08 9216.67 2081.07 9218.77 2081.06 9223.97 2081.03
 9227.05 2081.01 9231.27 2080.98 9238.41 2080.93 9238.57 2080.93 9238.67 2080.93
 9245.87 2080.83 9250.29 2080.77 9253.17 2080.74 9258.05 2080.68  9260.7 2080.61
 9267.89 2080.44 9280.11 2080.17 9284.85 2080.09 9287.36 2080.05 9295.46 2079.87
 9307.98 2079.97  9311.2 2079.96 9316.59 2079.95 9321.79 2079.97  9330.7 2079.94
 9331.76 2079.94 9332.38 2079.94 9332.64 2079.94  9332.9 2079.94  9336.6 2079.91
 9340.77 2079.89 9343.24 2079.87 9350.16 2079.82 9351.14 2079.82 9352.29 2079.81
 9353.72  2079.8 9355.55 2079.78 9358.04 2079.77 9361.68 2079.74 9365.69 2079.72
 9368.84 2079.69 9369.74 2079.68 9375.47 2079.33 9378.69 2079.13 9380.28 2079.03
  9381.2 2078.97  9383.4 2078.87 9406.41 2073.46 9410.09 2072.55 9415.02 2072.77
 9428.37 2073.48 9441.07  2072.7 9444.69 2072.53 9446.67 2073.48 9455.72 2077.81
 9469.89 2078.73 9472.17 2078.88 9474.07 2078.98 9479.47  2079.3 9482.67 2079.45
 9486.77 2079.61 9493.71  2079.8 9494.07 2079.81 9494.29 2079.82 9501.37 2079.96
 9505.91 2080.04 9508.67 2080.08 9513.35 2080.13 9515.97 2080.17 9517.53 2080.18
 9523.27 2080.22 9529.15 2080.25 9530.57 2080.26 9532.98 2080.26 9537.87 2080.28
 9540.77 2080.29 9545.17 2080.31 9552.39 2080.35 9552.47 2080.35 9552.62 2080.35
 9559.77 2080.42    9564 2080.45 9567.07 2080.48 9572.26 2080.53 9574.37 2080.55
 9575.62 2080.56 9581.67 2080.62 9587.24 2080.66 9588.97 2080.67  9591.9 2080.69
 9596.27 2080.72 9598.86 2080.74 9603.57 2080.76 9610.48 2080.79 9610.87 2080.79
 9611.54 2080.79 9618.17 2080.81  9622.1 2080.81 9625.47  2080.8 9631.18 2080.79
 9632.77 2080.79 9633.72 2080.78 9640.07 2080.75 9645.34 2080.73 9647.37 2080.72
 9650.81 2080.72 9654.67 2080.71 9656.96 2080.71 9661.97 2080.71 9668.58 2080.72
 9669.27 2080.72 9670.45 2080.72 9676.57 2080.74  9680.2 2080.75 9683.87 2080.76
 9690.09 2080.77 9691.17 2080.78 9691.82 2080.78 9698.48 2080.79 9703.44  2080.8
 9705.77  2080.8 9709.73 2080.81 9713.08 2080.82 9715.05 2080.82 9720.38 2080.83
 9726.67 2080.83 9727.68 2080.83 9729.37 2080.83 9734.98 2080.83 9738.29 2080.83
 9742.28 2080.83 9749.01 2080.82 9749.58 2080.82 9749.91 2080.82 9754.67 2080.82
 9757.01 2080.82 9760.98 2080.82 9764.78 2080.83 9771.67 2080.86 9772.54 2080.86
 9774.84 2080.88  9780.3 2080.91 9782.35 2080.93 9788.06 2080.96 9793.04 2080.99
 9795.82 2080.99  9803.2 2080.99 9803.58 2080.99 9803.73 2080.99 9811.34 2081.06
 9812.64 2081.07 9837.37 2079.32 9839.08 2079.24 9842.93 2078.98 9850.88 2079.51
 9867.85 2080.56 9873.43 2080.75 9878.54 2080.94  9881.2    2081 9888.26 2081.18
 9888.96  2081.2 9889.22 2081.21 9896.72 2081.29 9899.91 2081.32 9904.48 2081.31
  9910.6 2081.31 9912.24 2081.29 9916.61 2081.27    9920 2081.25 9921.28 2081.24
 9927.76 2081.13 9931.97 2081.03 9943.76 2080.39 9951.41 2080.03 9956.66 2078.54
 9972.14 2074.78  9980.8 2075.11 9989.86 2075.64 9996.09 2075.76 9997.62 2075.77
   10000 2075.7810001.67 2075.7910005.38 2075.8110006.78 2075.8110013.14  2075.8
10017.46 2075.78 10020.9 2075.7610028.15 2075.7410032.43  2075.510043.87 2074.81
10046.66 2074.6810048.53 2075.7110064.35 2084.57 10066.4  2084.910068.43 2084.91
10092.84 2083.0410095.56 2082.7810101.15 2082.3610105.99 2082.3310109.68  2082.8
10111.57  2083.510123.99 2088.7710125.63 2089.5210126.98 2090.32 10131.1 2092.55
10137.22 2095.2310145.89 2098.96 10152.7 2099.6810158.21 2100.06

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*****************************************************************************
 8581.07     .15  9383.4    .035 9469.89     .05 9703.44    .067 9951.41    .031
10064.35     .05
```

```
Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
      9951.4110064.35               425     444     425            .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
 8581.07 9899.91    2087       F
 10066.410158.21    2087       F

CROSS SECTION OUTPUT  Profile #PF 1
*****************************************************************************************
* E.G. Elev (ft)         * 2083.01  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    2.28  * Wt. n-Val.              *   0.067  *   0.031  *         *
* W.S. Elev (ft)         * 2080.73  * Reach Len. (ft)         *  425.00  *  444.00  *  425.00  *
* Crit W.S. (ft)         * 2080.73  * Flow Area (sq ft)       *    5.06  *  494.49  *         *
* E.G. Slope (ft/ft)     *0.008452  * Area (sq ft)            * 1642.15  *  494.49  *         *
* Q Total (cfs)          * 6000.00  * Flow (cfs)              *    5.24  * 5994.76  *         *
* Top Width (ft)         *  968.95  * Top Width (ft)          *  862.86  *  106.09  *         *
* Vel Total (ft/s)       *   12.01  * Avg. Vel. (ft/s)        *    1.04  *   12.12  *         *
* Max Chl Dpth (ft)      *    8.20  * Hydr. Depth (ft)        *    0.36  *    4.66  *         *
* Conv. Total (cfs)      * 65263.7  * Conv. (cfs)             *    57.0  * 65206.7  *         *
* Length Wtd. (ft)       *  443.56  * Wetted Per. (ft)        *   13.95  *  108.37  *         *
* Min Ch El (ft)         * 2074.68  * Shear (lb/sq ft)        *    0.19  *    2.41  *         *
* Alpha                  *    1.02  * Stream Power (lb/ft s)   *    0.20  *   29.19  *         *
* Frctn Loss (ft)        *    2.49  * Cum Volume (acre-ft)     *   37.22  *   22.15  *    0.94 *
* C & E Loss (ft)        *    0.31  * Cum SA (acres)           *   16.30  *    2.29  *    0.51 *
*****************************************************************************************

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

         This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical
         depth, the calculated water surface came back below critical depth.  This indicates that there
is
         not a valid subcritical answer.  The program defaulted to critical depth.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, water
         surface was used.

CROSS SECTION OUTPUT  Profile #PF 2
*****************************************************************************************
* E.G. Elev (ft)         * 2082.13  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    2.03  * Wt. n-Val.              *   0.067  *   0.031  *         *
* W.S. Elev (ft)         * 2080.10  * Reach Len. (ft)         *  425.00  *  444.00  *  425.00  *
* Crit W.S. (ft)         * 2080.10  * Flow Area (sq ft)       *    0.05  *  428.03  *         *
* E.G. Slope (ft/ft)     *0.008955  * Area (sq ft)            * 1177.53  *  428.03  *         *
* Q Total (cfs)          * 4890.00  * Flow (cfs)              *    0.01  * 4889.99  *         *
* Top Width (ft)         *  737.11  * Top Width (ft)          *  632.15  *  104.96  *         *
* Vel Total (ft/s)       *   11.42  * Avg. Vel. (ft/s)        *    0.23  *   11.42  *         *
* Max Chl Dpth (ft)      *    7.57  * Hydr. Depth (ft)        *    0.04  *    4.08  *         *
* Conv. Total (cfs)      * 51674.5  * Conv. (cfs)             *     0.1  * 51674.4  *         *
* Length Wtd. (ft)       *  443.65  * Wetted Per. (ft)        *    1.51  *  107.08  *         *
* Min Ch El (ft)         * 2074.68  * Shear (lb/sq ft)        *    0.02  *    2.23  *         *
* Alpha                  *    1.00  * Stream Power (lb/ft s)   *    0.00  *   25.53  *         *
* Frctn Loss (ft)        *    2.65  * Cum Volume (acre-ft)     *   26.85  *   17.25  *    0.51 *
* C & E Loss (ft)        *    0.27  * Cum SA (acres)           *   12.84  *    2.28  *    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 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.
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: Sols Wash South RS: 0.941

INPUT
Description:
Station Elevation Data num= 280

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
8704.3	2089.89	8705.37	2089.89	8715.89	2090.02	8723.7	2089.87	8727.73	2089.74
8739.52	2088.96	8740.06	2088.93	8741.45	2088.62	8750.98	2086.27	8757.95	2083.85
8767.88	2080.03	8777.3	2080.17	8783.52	2080.26	8785.42	2080.21	8789.94	2080.08
8793.06	2080	8794.37	2079.96	8800.7	2079.62	8805.22	2079.37	8808.33	2079.2
8815.74	2078.81	8815.97	2078.8	8816.07	2078.8	8823.61	2078.49	8826.91	2078.36
8831.25	2078.23	8837.76	2078.05	8838.88	2078.02	8841.55	2077.97	8846.52	2077.89
8848.61	2077.85	8854.16	2077.77	8859.46	2077.69	8861.79	2077.65	8867.36	2077.54
8869.43	2077.51	8870.3	2077.49	8877.07	2077.32	8881.15	2077.17	8884.71	2077.04
8892	2076.66	8892.34	2076.64	8893.17	2076.58	8899.98	2076.03	8902.85	2075.64
8907.62	2075.07	8914.62	2073.95	8925.68	2072.06	8929.26	2071.95	8937.51	2071.95
8939.53	2072.26	8960.5	2074.53	8965.73	2074.6	8971.7	2074.92	8982.34	2076.18
8984.71	2076.18	8988.7	2076.15	9005.16	2076.2	9012.17	2075.88	9014.87	2075.42
9026.24	2074.34	9029.13	2074.05	9030.7	2073.96	9040.96	2074.24	9057.03	2074.49
9057.89	2074.64	9060.37	2075.01	9075.37	2075.85	9077.55	2075.87	9078.15	2075.87
9078.91	2075.87	9080.76	2075.89	9092.51	2075.88	9099.68	2076.14	9108.95	2076.53
9113.83	2076.66	9119.79	2076.74	9121.46	2076.76	9125.43	2076.77	9129.1	2076.8
9130.64	2076.81	9136.74	2076.85	9141.49	2076.88	9144.37	2076.9	9151.24	2076.93
9152.01	2076.94	9152.34	2076.94	9152.88	2076.93	9166.5	2076.78	9174.83	2076.53
9192.13	2076.63	9197.68	2076.7	9206.74	2077.1	9217.42	2077.47	9220.75	2077.54
9228.27	2077.56	9228.38	2077.56	9228.66	2077.56	9236.02	2077.56	9239.12	2077.56
9243.66	2077.56	9249.96	2077.59	9251.3	2077.59	9254.47	2077.62	9258.93	2077.64
9260.81	2077.66	9266.57	2077.69	9271.66	2077.73	9274.21	2077.73	9280.27	2077.75
9281.85	2077.75	9282.51	2077.75	9289.48	2077.72	9293.35	2077.7	9297.12	2077.67
9304.2	2077.61	9304.76	2077.61	9306.08	2077.59	9312.53	2077.52	9317.38	2077.42
9324.85	2077.29	9325.84	2077.28	9327.01	2077.26	9328.39	2077.23	9330.09	2077.2
9332.22	2077.16	9335.02	2077.11	9338.77	2077.03	9338.81	2077.03	9338.83	2077.03
9341.58	2077.07	9343.86	2077.1	9345.76	2077.12	9347.37	2077.15	9348.74	2077.16
9353.33	2077.2	9354.83	2077.21	9365.86	2077.35	9369.29	2077.35	9373.49	2077.36
9380.13	2077.36	9381.13	2077.36	9383.5	2077.35	9391.19	2077.34	9395.07	2077.26
9409.11	2077	9421.65	2077.6	9426.95	2077.84	9434.37	2078.03	9434.59	2078.04
9435.12	2078.04	9442.23	2078.12	9445.22	2078.13	9449.87	2078.12	9456.07	2078.06
9457.5	2078.02	9463.06	2077.77	9473.19	2077.31	9477.31	2077.1	9480.4	2077.13
9489.7	2077.04	9511.2	2076.74	9519.43	2076.46	9522.6	2075.26	9530.38	2072.67
9535.7	2071.91	9541.38	2070.76	9558.64	2070.59	9578.68	2070.57	9587.09	2074.25
9589.59	2075.39	9594.01	2075.61	9604.45	2075.91	9605.38	2075.94	9606.37	2075.96
9616.84	2076	9619.23	2075.93	9627.78	2076.11	9633.66	2076.44	9648.44	2077.61
9651.32	2077.72	9656.07	2077.87	9662.17	2078.05	9663.71	2078.08	9667.38	2078.15
9671.35	2078.21	9673.02	2078.24	9678.98	2078.28	9683.86	2078.3	9686.62	2078.3
9693.19	2078.31	9694.26	2078.31	9694.71	2078.31	9701.9	2078.3	9705.56	2078.31
9709.53	2078.3	9716.41	2078.31	9717.17	2078.31	9718.99	2078.3	9724.81	2078.27
9727.25	2078.27	9732.45	2078.21	9738.1	2078.15	9740.08	2078.06	9743.75	2077.89
9754.69	2077.63	9763.14	2077.24	9773.42	2076.61	9775.86	2076.67	9801.2	2077.01
9802	2077.1	9802.79	2077.16	9805.62	2077.41	9810.91	2077.85	9812.38	2077.98
9819.04	2078.27	9822.76	2078.4	9827.16	2078.47	9833.14	2078.52	9835.28	2078.51
9842.98	2078.46	9843.4	2078.45	9843.52	2078.45	9851.52	2078.4	9853.9	2078.39
9859.65	2078.43	9864.28	2078.44	9867.77	2078.48	9874.65	2078.55	9875.89	2078.56
9880.35	2078.61	9884.01	2078.65	9885.03	2078.66	9892.14	2078.63	9895.41	2078.63
9900.26	2078.55	9905.79	2078.46	9908.38	2078.38	9916.17	2078.16	9916.5	2078.15
9917.71	2078.1	9924.63	2077.85	9926.55	2077.78	9932.75	2077.5	9936.93	2077.29
9940.87	2077.08	9947.31	2076.73	9950.27	2076.58	9957.53	2071.75	9978.77	2071.73
9981	2071.42	9981.71	2071.19	9982.61	2071.23	9984.59	2071.3	9999.2	2071.86
10000.01	2071.87	10005.85	2071.93	10009.58	2071.92	10013.97	2071.91	10019.96	2071.87
10022.1	2071.88	10029.8	2071.86	10030.22	2071.85	10030.4	2071.85	10031.06	2072.04
10058.48	2077.21	10063.2	2079.88	10080.96	2080.73	10082.93	2080.81	10083.95	2080.83
10088.88	2080.56	10128.45	2078.75	10138.93	2077.26	10144.52	2076.55	10149.46	2076.67
10158.95	2076.28	10174.94	2077	10176.42	2077.03	10179.25	2077.09	10182.84	2077.17

Manning's n Values num= 8

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
8704.3	.058	8893.17	.034	8982.34	.15	9519.43	.042	9589.59	.076
9701.9	.08	9950.27	.034	10063.2	.032				

```
Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9957.53 10063.2              400     435     400            .1       .3
Ineffective Flow      num=       2
   Sta L   Sta R    Elev  Permanent
  8704.3 9885.03    2082       F
   1008010182.84    2082       F

CROSS SECTION OUTPUT  Profile #PF 1
*****************************************************************************************
* E.G. Elev (ft)         * 2079.97  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.24  * Wt. n-Val.              *   0.043  *   0.034  *          *
* W.S. Elev (ft)         * 2078.72  * Reach Len. (ft)         *  400.00  *  435.00  *  400.00  *
* Crit W.S. (ft)         * 2077.29  * Flow Area (sq ft)       *   84.08  *  627.41  *          *
* E.G. Slope (ft/ft)     *0.004002  * Area (sq ft)            * 2406.96  *  627.41  *   95.70  *
* Q Total (cfs)          * 6000.00  * Flow (cfs)              *  273.40  * 5726.60  *          *
* Top Width (ft)         * 1297.40  * Top Width (ft)          * 1139.58  *  103.62  *   54.20  *
* Vel Total (ft/s)       *    8.43  * Avg. Vel. (ft/s)        *    3.25  *    9.13  *          *
* Max Chl Dpth (ft)      *    8.15  * Hydr. Depth (ft)        *    1.16  *    6.05  *          *
* Conv. Total (cfs)      * 94840.6  * Conv. (cfs)             *  4321.6  * 90519.1  *          *
* Length Wtd. (ft)       *  434.20  * Wetted Per. (ft)        *   74.00  *  104.60  *          *
* Min Ch El (ft)         * 2071.19  * Shear (lb/sq ft)        *    0.28  *    1.50  *          *
* Alpha                  *    1.12  * Stream Power (lb/ft s)  *    0.92  *   13.68  *          *
* Frctn Loss (ft)        *    4.30  * Cum Volume (acre-ft)    *   17.47  *   16.43  *    0.47  *
* C & E Loss (ft)        *    0.07  * Cum SA (acres)          *    6.53  *    1.22  *    0.25  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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, water
         surface was used.

CROSS SECTION OUTPUT  Profile #PF 2
*****************************************************************************************
* E.G. Elev (ft)         * 2079.04  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.13  * Wt. n-Val.              *   0.038  *   0.034  *          *
* W.S. Elev (ft)         * 2077.91  * Reach Len. (ft)         *  400.00  *  435.00  *  400.00  *
* Crit W.S. (ft)         * 2076.62  * Flow Area (sq ft)       *   44.44  *  544.22  *          *
* E.G. Slope (ft/ft)     *0.004257  * Area (sq ft)            * 1584.17  *  544.22  *   54.19  *
* Q Total (cfs)          * 4890.00  * Flow (cfs)              *  181.09  * 4708.91  *          *
* Top Width (ft)         * 1036.36  * Top Width (ft)          *  885.65  *  102.20  *   48.51  *
* Vel Total (ft/s)       *    8.31  * Avg. Vel. (ft/s)        *    4.07  *    8.65  *          *
* Max Chl Dpth (ft)      *    7.34  * Hydr. Depth (ft)        *    1.28  *    5.33  *          *
* Conv. Total (cfs)      * 74946.4  * Conv. (cfs)             *  2775.5  * 72170.9  *          *
* Length Wtd. (ft)       *  434.35  * Wetted Per. (ft)        *   36.17  *  102.96  *          *
* Min Ch El (ft)         * 2071.19  * Shear (lb/sq ft)        *    0.33  *    1.40  *          *
* Alpha                  *    1.05  * Stream Power (lb/ft s)  *    1.33  *   12.15  *          *
* Frctn Loss (ft)        *    4.05  * Cum Volume (acre-ft)    *   13.38  *   12.30  *    0.25  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)          *    5.44  *    1.22  *    0.22  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
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.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.

         This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, water
         surface was used.

CROSS SECTION


RIVER: Sols Wash
REACH: Sols Wash South    RS: 0.859

INPUT
Description:
Station Elevation Data    num=     248
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
```

```
*******************************************************************************
 8749.32 2092.58 8755.11 2092.52 8756.01 2092.52 8760.12 2092.49 8764.41 2092.47
 8765.35 2092.46 8772.81  2092.5 8775.58 2092.51  8781.2  2092.6 8785.82 2092.67
 8793.04 2092.81 8800.87 2092.96 8806.54 2093.06 8810.64  2093.1  8817.7 2091.72
 8826.77 2089.86 8831.58 2088.96 8837.01 2087.94 8839.98  2087.5 8846.99 2085.65
 8852.73    2085 8859.06  2084.8 8863.91 2084.53 8871.45 2084.45 8874.62 2084.38
 8882.31 2084.28    8883 2084.27 8884.44 2084.27 8886.07 2084.25 8886.52 2084.25
 8887.71 2084.25 8889.51 2084.25 8889.61 2084.25 8891.95 2084.49 8902.98 2084.94
 8904.76 2084.89 8909.68 2085.04 8915.95  2085.1 8917.65 2085.17 8923.95 2085.29
 8929.15 2085.21 8932.35 2085.12 8939.38 2084.75 8954.64 2083.88 8959.96 2083.56
 8961.14  2083.5 8966.29  2080.7 8970.66 2078.42  8984.4  2078.4 8992.17 2078.38
 9008.29 2078.14 9011.04 2078.14 9016.32 2078.03 9021.28 2077.98 9024.71  2077.9
 9031.52 2077.73 9033.11 2077.69 9040.37 2077.47 9041.51 2077.44 9041.76 2077.43
  9049.9 2077.09 9051.99 2077.01 9057.11 2076.78  9067.9 2076.28 9074.06 2076.06
 9083.43 2073.11  9100.4 2068.44 9112.86 2068.44 9113.46 2068.44 9113.66 2068.43
 9138.17 2071.82 9141.35 2072.25 9152.44 2072.89 9160.94 2072.95 9164.64 2073.05
 9170.32 2073.36 9184.26 2074.07 9185.08  2074.1 9192.65  2074.3 9195.32 2074.34
 9201.05 2074.36 9205.55 2074.37 9209.45 2074.35 9215.79  2074.3 9217.84 2074.28
 9226.03 2074.15 9226.24 2074.15  9242.5 2073.47 9244.52 2073.42 9247.07 2073.35
 9249.46 2073.29 9253.67 2073.33 9260.58  2073.4 9267.11 2073.46 9273.91 2073.59
 9276.74 2073.63  9278.1 2073.66  9288.8 2073.85    9297 2073.97 9303.49 2073.99
 9317.48 2074.13  9318.3 2074.12 9318.41 2074.11 9320.62 2074.16  9328.4 2074.23
  9335.4 2074.25 9338.64 2074.29  9343.8 2074.28 9348.88 2074.31 9356.81 2074.33
 9359.36 2074.32 9367.33 2074.28 9368.99 2074.26 9369.35 2074.26 9371.44 2074.19
 9385.55  2073.7 9394.35 2073.65 9396.63 2073.61 9400.51 2073.61 9403.23 2073.61
 9408.58 2073.61 9412.08 2073.61 9413.03 2073.61 9421.23 2073.79 9430.78 2074.07
 9447.83 2073.96  9449.5 2073.94 9450.59 2073.97 9469.75 2074.54 9471.73 2074.58
 9478.15 2074.69 9481.96 2074.74 9486.55 2074.79  9492.2 2074.84 9494.94 2074.84
 9502.44 2074.83 9503.34 2074.82 9524.77    2074 9526.34 2073.94 9526.49 2073.93
 9526.53 2073.93 9539.19 2073.89 9543.26 2073.84 9550.75 2073.76 9552.81  2073.7
 9569.17 2068.27 9572.28 2067.24 9588.96 2068.76 9591.49 2068.97 9593.13 2068.95
 9607.17 2068.59 9615.31 2072.11 9617.65 2073.12 9618.89 2073.18 9644.32 2071.16
 9647.74 2070.44 9662.62 2073.04 9664.76 2073.62 9671.38 2073.81 9681.26 2074.19
 9686.71  2074.4 9688.07 2074.42 9694.29 2074.53 9696.47 2074.57 9696.95 2074.58
 9704.87 2074.59 9707.19 2074.59 9713.26 2074.58 9717.42 2074.56 9721.66 2074.57
 9727.66 2074.58 9730.06  2074.6  9737.9 2074.65 9738.45 2074.66 9740.99 2074.68
 9746.85 2074.74 9748.14 2074.75 9755.25 2074.82 9758.37 2074.85 9763.65  2074.9
 9768.61 2074.95 9772.04 2074.99 9778.85 2075.06 9780.44 2075.08  9787.7 2075.16
 9788.84 2075.17 9789.09 2075.17 9797.23 2075.26 9799.32 2075.28 9805.63 2075.34
 9809.56 2075.37 9814.03  2075.4  9819.8 2075.44 9822.42 2075.45 9830.03 2075.51
 9830.82 2075.51 9834.41 2075.54 9834.63 2075.54 9839.41 2075.58 9840.11 2075.58
 9848.31 2075.63  9850.2 2075.64 9857.21 2075.66 9860.29 2075.66 9866.11 2075.66
 9870.38 2075.64 9875.02 2075.62 9880.47 2075.57 9883.92 2075.54 9890.55 2075.43
 9892.82 2075.37 9900.64 2075.15 9901.72 2075.09 9909.81 2074.59 9910.62 2074.54
 9910.73 2074.53 9922.63 2073.26 9938.62 2070.63 9947.45 2068.72  9957.9 2069.04
 9971.26 2069.45 9972.93 2069.45 9981.35 2069.44 9981.84 2069.44 9985.47 2069.42
 9990.74  2069.4 9991.44  2069.4 9999.64 2069.3810000.01 2069.3710001.53 2069.37
10008.54 2069.3810011.62 2069.3910017.44 2069.43 10021.7 2069.4710026.34 2069.52
10031.79  2069.410046.21 2068.8410048.25 2068.7310049.39 2068.6910050.22 2068.66
10054.16 2070.9510065.91 2076.3710078.49 2077.3710091.74 2076.9910099.95 2076.65
10105.37 2076.9410125.96 2077.2210142.32 2075.11

Manning's n Values          num=       5
      Sta   n Val      Sta   n Val      Sta   n Val      Sta   n Val      Sta   n Val
*******************************************************************************
 8749.32     .058 9074.06     .034 9152.44      .15 9552.81     .042 9664.76     .076

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9900.6410065.91              400     424     400              .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
 8749.32 9860.26    2080       F
10078.4910142.32    2080       F

CROSS SECTION OUTPUT  Profile #PF 1
*****************************************************************************************
* E.G. Elev (ft)          * 2075.60  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    1.90  * Wt. n-Val.              *          *    0.076 *          *
* W.S. Elev (ft)          * 2073.69  * Reach Len. (ft)         *  422.00  *   422.00 *  422.00  *
* Crit W.S. (ft)          * 2073.69  * Flow Area (sq ft)       *          *   541.79 *          *
* E.G. Slope (ft/ft)      *0.054431  * Area (sq ft)            *  605.24  *   541.79 *          *
* Q Total (cfs)           * 6000.00  * Flow (cfs)              *          *  6000.00 *          *
* Top Width (ft)          *  423.97  * Top Width (ft)          *  282.44  *   141.53 *          *
* Vel Total (ft/s)        *   11.07  * Avg. Vel. (ft/s)        *          *    11.07 *          *
* Max Chl Dpth (ft)       *    6.45  * Hydr. Depth (ft)        *          *     3.83 *          *
* Conv. Total (cfs)       * 25717.6  * Conv. (cfs)             *          *  25717.6 *          *
* Length Wtd. (ft)        *  422.00  * Wetted Per. (ft)        *          *   143.22 *          *
* Min Ch El (ft)          * 2068.66  * Shear (lb/sq ft)        *          *    12.85 *          *
* Alpha                   *    1.00  * Stream Power (lb/ft s) *          *   142.36 *          *
```

```
* Frctn Loss (ft)        *    3.30  * Cum Volume (acre-ft)   *    3.64  *   10.59  *    0.03  *
* C & E Loss (ft)        *    0.21  * Cum SA (acres)         *          *          *          *
*****************************************************************************************

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 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)         * 2074.98  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.23  * Wt. n-Val.              *          *   0.076  *          *
* W.S. Elev (ft)         * 2073.75  * Reach Len. (ft)        *  422.00  *  422.00  *  422.00  *
* Crit W.S. (ft)         * 2073.16  * Flow Area (sq ft)      *          *  550.41  *          *
* E.G. Slope (ft/ft)     *0.034529  * Area (sq ft)           *  622.91  *  550.41  *          *
* Q Total (cfs)          * 4890.00  * Flow (cfs)             *          * 4890.00  *          *
* Top Width (ft)         *  440.51  * Top Width (ft)          *  298.28  *  142.23  *          *
* Vel Total (ft/s)       *    8.88  * Avg. Vel. (ft/s)        *          *    8.88  *          *
* Max Chl Dpth (ft)      *    6.51  * Hydr. Depth (ft)        *          *    3.87  *          *
* Conv. Total (cfs)      * 26315.7  * Conv. (cfs)             *          * 26315.7  *          *
* Length Wtd. (ft)       *  422.00  * Wetted Per. (ft)        *          *  143.94  *          *
* Min Ch El (ft)         * 2068.66  * Shear (lb/sq ft)        *          *    8.24  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s)  *          *   73.24  *          *
* Frctn Loss (ft)        *    6.25  * Cum Volume (acre-ft)    *    3.24  *    6.83  *          *
* C & E Loss (ft)        *    0.06  * Cum SA (acres)          *          *          *          *
*****************************************************************************************

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.
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: Sols Wash North    RS: 0.441

INPUT
Description: The north channel was widen to take the flow that was overtopping
             the island from the south branch.
Station Elevation Data    num=     250
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
  9221.5 2092.33 9227.81 2092.32 9227.92 2092.32 9228.11 2092.31 9235.22 2092.28
 9239.45 2092.28 9242.51 2092.28 9247.65 2092.25 9249.81 2092.25 9251.09 2092.25
  9257.1 2092.23 9262.74 2092.22 9264.39 2092.21 9267.18  2092.2 9271.69 2092.17
 9274.38 2092.16 9278.98 2092.12 9286.02 2092.07 9286.28 2092.07 9286.71 2092.07
 9293.57 2091.96 9297.66  2091.9 9300.86 2091.86 9306.24 2091.72 9308.38 2091.66
 9310.29 2091.58 9317.62  2091.3 9320.53 2091.23 9332.03 2090.81 9345.71 2089.54
 9352.42 2088.91 9372.02 2086.25 9378.52 2085.63 9386.17 2084.79 9391.58 2084.84
 9401.09 2084.86  9402.7 2084.87 9403.89 2084.87 9410.27 2084.89 9414.08 2084.85
 9417.57 2084.81 9423.42 2084.72 9424.86  2084.7 9425.72 2084.68 9432.16 2084.55
 9438.24  2084.5 9451.13  2084.2 9456.22 2085.79 9467.71 2089.37 9472.97 2089.49
 9477.33 2089.66 9490.51 2089.94 9495.57 2090.08  9497.8 2090.15 9501.54 2090.21
  9505.1 2090.25 9507.22 2090.27 9512.39 2090.31  9526.1  2090.2 9531.67 2090.22
 9535.25 2090.22 9546.34 2090.39 9554.03 2090.44 9562.99 2090.54 9568.56 2090.54
  9572.1 2090.58 9573.59  2090.6 9585.33  2090.8 9588.71 2090.85 9592.62  2090.9
 9599.19 2090.89 9599.92 2090.89 9600.35 2090.89 9607.21 2090.85 9611.99 2090.81
  9614.5 2090.79 9618.72 2090.75  9621.8 2090.71 9623.63 2090.69 9629.09 2090.64
 9635.28 2090.59 9636.39 2090.58 9638.25 2090.58 9643.68 2090.56 9646.92 2090.55
 9650.97 2090.56 9657.78 2090.57 9658.27 2090.57 9658.56 2090.57 9665.56  2090.6
  9670.2 2090.62 9672.86 2090.62 9677.31 2090.63 9680.15 2090.64 9681.84 2090.64
 9687.44 2090.63 9693.49 2090.62 9694.74 2090.61 9696.84  2090.6 9702.03 2090.57
```

```
 9705.13 2090.55 9709.33 2090.51 9716.37 2090.45 9716.62 2090.45 9716.77 2090.44
 9723.91 2090.37 9728.41 2090.33 9731.21  2090.3  9735.9 2090.27  9738.5 2090.25
 9740.05 2090.24  9745.8 2090.21  9751.7 2090.19 9753.09 2090.18 9755.43 2090.17
 9760.38 2090.16 9763.34 2090.15 9767.68 2090.13 9774.96 2090.11 9774.97 2090.11
 9782.27 2090.09 9786.62 2090.09 9789.56 2090.08 9794.49 2090.07 9796.85 2090.07
 9798.26 2090.07 9804.15 2090.06 9809.91 2090.05 9811.44 2090.05 9814.02 2090.05
 9818.73 2090.04 9821.55 2090.04 9826.03 2090.04 9833.19 2090.04 9833.32 2090.04
 9833.55 2090.04 9840.62 2090.06 9844.83 2090.07 9847.91 2090.07 9853.08 2090.08
  9855.2 2090.08 9856.47 2090.08  9862.5 2090.07 9868.12 2090.05 9869.79 2090.04
 9872.61 2090.03 9877.09 2090.01 9879.76    2090 9884.38 2089.97  9891.4 2089.93
 9891.67 2089.93 9892.14 2089.93 9898.97 2089.85 9903.04  2089.8 9906.26 2089.75
 9911.67 2089.62 9913.56 2089.57 9914.68 2089.53 9920.85 2089.32 9926.32 2089.03
 9928.14 2088.95  9931.2 2088.76 9935.44 2088.48  9943.8 2088.37 9950.29 2088.29
 9958.26 2086.84 9964.76 2084.94  9970.4 2085.18 9979.28 2085.44  9986.5 2085.68
 9989.79 2085.66 9993.79 2085.66 9996.18 2085.67   10000 2085.6810001.08 2085.69
10007.82 2085.7310008.38 2085.7310009.32 2085.7410015.67 2085.7910019.46 2085.82
10022.97 2085.8510028.85 2085.9210030.26 2085.94 10031.1 2085.9510037.55 2086.05
10042.74 2086.1610044.85  2086.210048.38 2086.2810052.14 2086.3710054.38 2086.43
10059.44 2086.5610066.03 2086.7110066.73 2086.7310067.91 2086.7510074.02 2086.88
10077.67 2086.9310081.32    208710087.44 2087.0710088.61 2087.0910089.31 2087.09
10095.91 2087.1610100.95  2087.2 10103.2 2087.2210106.97 2087.2410110.49 2087.26
10112.59 2087.2710117.79 2087.2910124.24 2087.2910125.08 2087.29 10126.5 2087.29
10132.37 2087.2910135.88 2087.2810139.67 2087.2810146.03 2087.2910146.96  2087.3
10147.94  2087.310168.62 2087.3710179.34  2088.310185.85 2088.9910189.51 2089.35
10201.64 2089.3610205.79 2089.0710216.38 2088.4110222.58 2087.76 10244.5 2091.53
10255.25 2092.86 10265.1 2092.7310271.09 2092.7110277.02 2092.9110286.47 2091.58
10326.09 2089.6710329.63  2089.410330.13 2089.4410330.63 2089.4810333.31 2089.92
10348.89 2092.38   10351 2092.5610359.54 2093.0510364.73 2093.9310367.46 2094.47
10375.48 2099.3510394.44 2109.4310407.14 2109.1910415.28 2109.1810416.84 2109.19
10419.45 2109.2110424.13 2109.2610426.92 2109.2610431.43 2109.2510435.51 2109.24

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*****************************************************************************
  9221.5     .07 9345.71    .035 9472.97     .05 9723.91     .04 9935.44     .03
10189.51     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9332.03 9467.71              360  359.04     360             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
  9221.5 9332.03    2094       F
 9467.7110435.51    2094       F

CROSS SECTION OUTPUT  Profile #PF 1
*****************************************************************************************
* E.G. Elev (ft)          * 2091.69  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    1.93  * Wt. n-Val.              *          *    0.035 *          *
* W.S. Elev (ft)          * 2089.76  * Reach Len. (ft)        *  360.00  *   359.04 *  360.00  *
* Crit W.S. (ft)          * 2089.76  * Flow Area (sq ft)      *          *   484.94 *          *
* E.G. Slope (ft/ft)      *0.011127  * Area (sq ft)           *          *   484.94 *  810.83  *
* Q Total (cfs)           * 5413.00  * Flow (cfs)             *          *  5413.00 *          *
* Top Width (ft)          *  475.11  * Top Width (ft)         *          *   124.35 *  350.76  *
* Vel Total (ft/s)        *   11.16  * Avg. Vel. (ft/s)       *          *    11.16 *          *
* Max Chl Dpth (ft)       *    5.56  * Hydr. Depth (ft)       *          *     3.90 *          *
* Conv. Total (cfs)       * 51315.9  * Conv. (cfs)            *          *  51315.9 *          *
* Length Wtd. (ft)        *  359.04  * Wetted Per. (ft)       *          *   125.44 *          *
* Min Ch El (ft)          * 2084.20  * Shear (lb/sq ft)       *          *     2.69 *          *
* Alpha                   *    1.00  * Stream Power (lb/ft s) *          *    29.98 *          *
* Frctn Loss (ft)         *    3.29  * Cum Volume (acre-ft)   *   16.11   *    45.98 *   24.79  *
* C & E Loss (ft)         *    0.01  * Cum SA (acres)         *    9.43   *     6.59 *    7.99  *
*****************************************************************************************

Warning: The energy equation could not be balanced within the specified number of iterations.  The
         program selected the water surface that had the least amount of error between computed and
         assumed values.
Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: 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)	2088.79	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.21	Wt. n-Val.		0.035	
W.S. Elev (ft)	2087.57	Reach Len. (ft)	360.00	359.04	360.00
Crit W.S. (ft)	2087.57	Flow Area (sq ft)		240.94	
E.G. Slope (ft/ft)	0.013475	Area (sq ft)		240.94	225.70
Q Total (cfs)	2129.00	Flow (cfs)		2129.00	
Top Width (ft)	316.39	Top Width (ft)		99.67	216.72
Vel Total (ft/s)	8.84	Avg. Vel. (ft/s)		8.84	
Max Chl Dpth (ft)	3.37	Hydr. Depth (ft)		2.42	
Conv. Total (cfs)	18340.7	Conv. (cfs)		18340.7	
Length Wtd. (ft)	359.04	Wetted Per. (ft)		100.35	
Min Ch El (ft)	2084.20	Shear (lb/sq ft)		2.02	
Alpha	1.00	Stream Power (lb/ft s)		17.85	
Frctn Loss (ft)	4.22	Cum Volume (acre-ft)	2.43	20.93	6.22
C & E Loss (ft)	0.07	Cum SA (acres)	1.31	5.22	3.81

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

This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is
not a valid subcritical answer. The program defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water
surface was used.

CROSS SECTION

RIVER: Sols Wash
REACH: Sols Wash North RS: 0.373

INPUT
Description:
Station Elevation Data num= 329

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
8793.67	2088.83	8794.61	2088.72	8803.13	2087.72	8833.57	2087.72	8835.17	2087.73
8853.54	2088.16	8853.97	2088.16	8854.78	2088.17	8861.57	2088.28	8866.54	2088.33
8868.83	2088.34	8872.52	2088.34	8876.09	2088.34	8878.31	2088.34	8883.36	2088.32
8890.07	2088.28	8890.62	2088.28	8891.5	2088.27	8897.88	2088.22	8901.84	2088.19
8905.15	2088.16	8910.48	2088.11	8912.41	2088.09	8913.61	2088.08	8919.67	2088.02
8925.37	2087.97	8926.94	2087.95	8929.46	2087.92	8934.2	2087.87	8937.14	2087.84
8941.46	2087.79	8948.44	2087.72	8948.72	2087.71	8948.9	2087.71	8955.99	2087.64
8960.67	2087.58	8963.25	2087.55	8967.41	2087.5	8970.51	2087.47	8972.43	2087.44
8977.78	2087.38	8984.2	2087.29	8985.04	2087.28	8986.39	2087.27	8992.3	2087.19
8995.97	2087.14	8999.57	2087.09	9005.37	2087.01	9006.83	2086.99	9007.73	2086.98
9014.09	2086.9	9019.5	2086.82	9021.36	2086.79	9024.35	2086.75	9028.62	2086.7
9031.26	2086.66	9035.88	2086.6	9043.03	2086.51	9043.14	2086.51	9043.33	2086.51
9050.41	2086.44	9054.8	2086.4	9057.67	2086.38	9062.31	2086.36	9064.93	2086.35
9066.56	2086.35	9072.2	2086.35	9078.33	2086.37	9079.46	2086.38	9081.29	2086.4
9086.72	2086.44	9090.09	2086.48	9093.99	2086.52	9100.26	2086.6	9101.25	2086.62
9101.86	2086.63	9108.51	2086.71	9113.62	2086.78	9115.77	2086.8	9119.24	2086.83
9123.04	2086.86	9125.39	2086.87	9130.3	2086.88	9137.16	2086.85	9137.56	2086.85
9138.22	2086.83	9144.83	2086.68	9151.55	2086.58	9161.22	2086.33	9172.83	2083.15
9180.69	2081.03	9195.37	2081.26	9195.99	2081.26	9202.93	2081.25	9207.75	2081.22
9210.19	2081.2	9214.14	2081.15	9217.46	2081.11	9219.52	2081.09	9224.72	2081.04
9231.28	2081.01	9231.98	2081.01	9233.11	2081.01	9239.25	2080.99	9243.05	2080.99
9248.42	2080.97	9260.69	2081.05	9269.18	2080.24	9280.17	2081.1	9288.87	2081.1
9293.64	2081.1	9295.53	2081.1	9301.09	2082.5	9306.29	2083.27	9316.54	2083.92
9318.03	2084.06	9327.47	2084.75	9334.37	2085.41	9340.93	2086.08	9346.99	2086.42
9348.19	2086.49	9348.94	2086.51	9355.46	2086.69	9360.71	2086.77	9362.72	2086.8
9365.96	2086.83	9369.98	2086.86	9372.47	2086.87	9377.24	2086.89	9384.24	2086.91
9384.51	2086.91	9384.94	2086.91	9391.77	2086.92	9396	2086.93	9399.03	2086.93
9403.92	2086.94	9406.3	2086.94	9407.77	2086.94	9413.56	2086.95	9419.54	2086.95
9420.82	2086.95	9422.9	2086.95	9428.09	2086.95	9431.3	2086.95	9435.35	2086.94
9441.88	2086.94	9442.61	2086.94	9443.07	2086.94	9449.88	2086.93	9454.83	2086.93
9457.14	2086.92	9460.86	2086.92	9464.4	2086.92	9466.6	2086.92	9471.66	2086.92
9478.36	2086.93	9478.93	2086.93	9479.84	2086.93	9486.19	2086.95	9490.13	2086.96
9493.45	2086.98	9498.81	2087	9501.9	2087.01	9506.92	2087.04	9513.66	2087.08
9517.79	2087.11	9524.35	2086.98	9527.23	2086.92	9532.42	2086.95	9535.63	2086.97

```
 9539.68    2087 9546.21 2087.04 9546.94 2087.04  9547.4 2087.04 9554.21 2087.03
 9559.17 2087.03 9561.47 2087.03 9565.19 2087.03 9568.73 2087.03 9570.93 2087.03
    9576 2087.03  9582.7 2087.03 9583.26 2087.03 9584.17 2087.03 9590.52 2087.03
 9594.46 2087.03 9597.79 2087.03 9603.15 2087.03 9605.05 2087.03 9606.23 2087.03
 9612.31 2087.02 9617.99 2087.01 9619.58 2087.01 9622.13 2087.01 9626.84    2087
 9629.76    2087  9634.1    2087  9641.1    2087 9641.36    2087 9641.53    2087
 9648.63    2087 9653.29    2087 9655.89    2087 9660.08 2086.99 9663.15 2086.99
 9665.06 2086.99 9670.42 2086.97 9676.82 2086.93 9677.68 2086.93 9679.06 2086.92
 9684.94 2086.87 9688.59 2086.84 9692.21 2086.81 9698.04 2086.78 9699.47 2086.77
 9700.35 2086.76 9706.73 2086.76 9712.12 2086.76    9714 2086.76 9717.02 2086.77
 9721.26 2086.79 9723.89  2086.8 9728.52 2086.82 9735.65 2086.86 9735.78 2086.86
    9736 2086.86 9743.05 2086.89 9747.42  2086.9 9750.31 2086.91 9754.98 2086.91
 9757.57 2086.91 9759.18 2086.91 9764.84  2086.9 9770.95 2086.87  9772.1 2086.87
 9773.95 2086.85 9779.36 2086.81 9782.72 2086.78 9786.63 2086.74 9792.93 2086.68
 9793.89 2086.68 9794.48 2086.67 9801.15 2086.59 9806.25 2086.54 9808.41 2086.51
 9811.91 2086.47 9815.68 2086.42 9818.01 2086.39 9822.94 2086.32 9829.78 2086.22
  9830.2 2086.22 9830.89 2086.21 9837.47 2086.11 9841.54 2086.04 9844.73 2085.99
 9849.87 2085.89 9851.99 2085.84 9856.23 2086.01 9870.09  2086.7 9882.22 2084.35
 9884.57 2083.82 9886.37 2083.85 9888.51 2083.89 9902.83 2084.13  9906.8 2084.07
  9910.1 2084.01 9912.14 2083.98 9917.36 2083.92 9923.91 2083.84 9924.62 2083.84
 9925.78 2083.82 9931.89 2083.76 9935.67 2083.71 9939.15 2083.67 9944.76 2083.59
 9946.41 2083.56 9947.44 2083.54 9953.68 2083.42  9959.2 2083.29 9960.94 2083.25
 9963.74 2083.17  9968.2 2083.05 9970.97 2082.97 9975.47 2082.86 9982.72 2082.71
 9989.99 2082.62  9994.5 2082.62 9997.25 2082.61   10000 2082.61 10001.7 2082.62
10004.52 2082.6310006.27 2082.6410011.78 2082.6510018.03 2082.6110019.04  2082.6
10020.68 2082.6310026.31  2082.7 10029.8 2082.6710035.08 2082.5310046.78 2082.51
10053.09  2084.910063.94 2089.2710075.49 2089.2710083.44 2089.07 10084.3 2089.08
10084.95 2089.0910089.24 2088.8810102.14  2088.410104.06 2088.3710111.06 2086.62
10113.74 2086.0410123.99 2088.0110127.85 2088.5410137.82 2091.8910147.85 2095.12
10153.52 2096.9110157.04 2097.9510164.11 2099.8510176.23 2102.7110181.31 2103.38
10189.99 2104.1510197.27 2104.8710201.29  2105.810203.06 2106.4110208.33 2106.39
10212.17 2106.3110213.12 2106.3510219.05 2106.3610232.49 2106.41

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
 8793.67     .069 9161.22     .03 9365.96     .05 9603.15     .04 9870.09     .03
10063.94     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9161.22 9355.46              265  253.44     245             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
 8793.67  9130.3    2090       F
 9355.4610232.49    2090       F

CROSS SECTION OUTPUT  Profile #PF 1
*************************************************************************************
* E.G. Elev (ft)         * 2088.19  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    2.15  * Wt. n-Val.              *          *   0.030  *          *
* W.S. Elev (ft)         * 2086.04  * Reach Len. (ft)         *  265.00  *  253.44  *  245.00  *
* Crit W.S. (ft)         * 2086.18  * Flow Area (sq ft)       *          *  715.41  *          *
* E.G. Slope (ft/ft)     *0.008914  * Area (sq ft)            *          *  715.41  *  488.68  *
* Q Total (cfs)          * 8413.00  * Flow (cfs)              *          * 8413.00  *          *
* Top Width (ft)         *  376.38  * Top Width (ft)          *          *  178.31  *  198.07  *
* Vel Total (ft/s)       *   11.76  * Avg. Vel. (ft/s)        *          *   11.76  *          *
* Max Chl Dpth (ft)      *    5.80  * Hydr. Depth (ft)        *          *    4.01  *          *
* Conv. Total (cfs)      * 89109.3  * Conv. (cfs)             *          * 89109.3  *          *
* Length Wtd. (ft)       *  253.44  * Wetted Per. (ft)        *          *  179.40  *          *
* Min Ch El (ft)         * 2080.24  * Shear (lb/sq ft)        *          *    2.22  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s)  *          *   26.10  *          *
* Frctn Loss (ft)        *    3.48  * Cum Volume (acre-ft)    *   16.11  *   41.03  *   19.42  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)          *    9.43  *    5.34  *    5.72  *
*************************************************************************************

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

         This may indicate the need for additional cross sections.
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)         * 2084.18  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.09  * Wt. n-Val.              *          *   0.030  *          *
```

* W.S. Elev (ft)	* 2083.09	* Reach Len. (ft)	* 265.00	* 253.44	* 245.00	*
* Crit W.S. (ft)	* 2083.19	* Flow Area (sq ft)	*	* 253.88	*	*
* E.G. Slope (ft/ft)	*0.012057	* Area (sq ft)	*	* 253.88	* 34.15	*
* Q Total (cfs)	* 2129.00	* Flow (cfs)	*	* 2129.00	*	*
* Top Width (ft)	* 213.65	* Top Width (ft)	*	* 132.03	* 81.62	*
* Vel Total (ft/s)	* 8.39	* Avg. Vel. (ft/s)	*	* 8.39	*	*
* Max Chl Dpth (ft)	* 2.85	* Hydr. Depth (ft)	*	* 1.92	*	*
* Conv. Total (cfs)	* 19389.3	* Conv. (cfs)	*	* 19389.3	*	*
* Length Wtd. (ft)	* 253.44	* Wetted Per. (ft)	*	* 132.59	*	*
* Min Ch El (ft)	* 2080.24	* Shear (lb/sq ft)	*	* 1.44	*	*
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	* 12.09	*	*
* Frctn Loss (ft)	* 4.57	* Cum Volume (acre-ft)	* 2.43	* 18.89	* 5.14	*
* C & E Loss (ft)	* 0.04	* Cum SA (acres)	* 1.31	* 4.26	* 2.57	*

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.
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: Sols Wash North RS: 0.325

INPUT
Description:
Station Elevation Data num= 467

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
8141.93	2091.62	8142.44	2091.59	8142.73	2091.59	8144.06	2091.44	8170.52	2088.44
8177.45	2088.47	8183.84	2088.36	8192.72	2088.2	8196.81	2088.13	8201.95	2088.02
8203.92	2087.99	8205.5	2087.96	8211.04	2087.84	8218.02	2087.71	8218.16	2087.71
8218.27	2087.71	8225.28	2087.58	8231.04	2087.48	8232.39	2087.46	8234.09	2087.44
8239.51	2087.36	8243.82	2087.31	8246.63	2087.28	8250.16	2087.25	8253.74	2087.21
8256.59	2087.18	8260.86	2087.15	8266.24	2087.08	8267.98	2087.07	8269.36	2087.05
8275.1	2087	8282.14	2086.89	8282.21	2086.89	8282.31	2086.89	8289.33	2086.81
8294.91	2086.72	8296.45	2086.7	8298.38	2086.66	8303.56	2086.59	8307.68	2086.5
8310.68	2086.46	8314.45	2086.37	8317.8	2086.3	8320.46	2086.21	8324.92	2086.08
8330.53	2085.8	8332.57	2085.7	8336.37	2085.13	8356.26	2083.05	8364.59	2082.94
8370.75	2081.91	8373.61	2081.98	8386.57	2082.64	8394.08	2083	8403.2	2083.63
8409.87	2083.65	8410.34	2083.64	8438.04	2083.15	8438.07	2083.15	8438.14	2083.15
8468.19	2082.95	8475.8	2082.82	8495.33	2083.5	8499.28	2083.68	8502.84	2083.77
8507.33	2083.92	8509.96	2084	8512.06	2084.06	8517.08	2084.14	8523.4	2084.24
8524.2	2084.25	8524.83	2084.26	8531.31	2084.3	8537.61	2084.32	8538.43	2084.32
8539.47	2084.32	8545.55	2084.3	8550.38	2084.27	8552.67	2084.25	8555.54	2084.23
8559.78	2084.16	8563.15	2084.1	8566.9	2084.03	8571.62	2083.95	8573.8	2083.88
8575.93	2083.89	8585.02	2083.48	8591.39	2083.25	8592.85	2083.2	8593.5	2083.17
8614.25	2083.56	8615.42	2083.55	8619.83	2083.54	8625.06	2083.43	8630.27	2083.32
8639.79	2083.62	8652.59	2083.23	8656.35	2083.37	8664.74	2083.69	8668.05	2083.82
8673.66	2083.89	8678.11	2083.95	8680.77	2083.99	8684.12	2084.03	8687.89	2084.07
8690.89	2084.1	8695.01	2084.14	8700.2	2084.19	8702.13	2084.21	8703.66	2084.22
8709.24	2084.26	8716.27	2084.32	8716.36	2084.32	8716.43	2084.32	8723.48	2084.36
8729.21	2084.39	8730.59	2084.39	8732.34	2084.4	8737.71	2084.41	8741.98	2084.42
8744.83	2084.42	8748.41	2084.42	8751.95	2084.42	8754.75	2084.42	8759.06	2084.41
8764.49	2084.41	8766.18	2084.4	8767.53	2084.4	8773.3	2084.39	8780.3	2084.38
8780.41	2084.38	8780.56	2084.38	8787.53	2084.38	8793.07	2084.38	8794.65	2084.38
8796.63	2084.38	8801.77	2084.39	8805.85	2084.41	8808.88	2084.42	8812.7	2084.43
8816	2084.45	8818.62	2084.46	8823.12	2084.49	8828.78	2084.52	8830.23	2084.53
8831.39	2084.53	8837.35	2084.57	8844.17	2084.59	8844.47	2084.6	8844.85	2084.6
8851.59	2084.62	8856.94	2084.63	8858.7	2084.64	8860.92	2084.64	8865.82	2084.65
8869.71	2084.65	8872.94	2084.66	8876.99	2084.67	8880.05	2084.67	8882.49	2084.68
8887.17	2084.7	8893.07	2084.72	8894.29	2084.73	8895.26	2084.74	8901.41	2084.76
8908.03	2084.8	8908.52	2084.81	8909.14	2084.81	8915.64	2084.84	8920.81	2084.86
8922.76	2084.87	8925.21	2084.88	8929.88	2084.88	8933.58	2084.89	8936.99	2084.89
8941.28	2084.9	8944.11	2084.89	8946.35	2084.89	8951.23	2084.88	8957.36	2084.88
8958.34	2084.87	8959.13	2084.87	8965.46	2084.85	8971.9	2084.83	8972.58	2084.83
8973.43	2084.83	8988.92	2084.53	8991.65	2084.46	8992.63	2084.44	8996.02	2084.45
9015.04	2084.71	9021.65	2084.72	9022.62	2084.7	9028.97	2084.57	9035.77	2084.68
9050.67	2084.28	9053.03	2084.3	9058.56	2084.36	9069.86	2084.49	9072.22	2084.48
9074.09	2084.47	9079.34	2084.46	9085.94	2084.44	9086.45	2084.44	9086.86	2084.44
9093.57	2084.41	9099.64	2084.4	9100.69	2084.4	9102.01	2084.4	9107.8	2084.4
9112.41	2084.4	9114.92	2084.4	9118.08	2084.41	9122.04	2084.42	9125.18	2084.43
9129.16	2084.45	9134.15	2084.47	9136.27	2084.48	9137.96	2084.5	9143.39	2084.51
9150.23	2084.56	9150.51	2084.56	9150.73	2084.56	9157.62	2084.58	9163.5	2084.6

```
 9164.74 2084.59  9166.3 2084.57 9171.86  2084.5 9176.28 2084.27 9178.98 2084.11
 9184.16 2083.68 9193.81 2082.94 9212.46 2077.63 9212.96 2077.49 9213.18 2077.43
 9213.42 2077.44  9228.8 2077.91 9230.59 2077.97 9235.91 2078.14  9245.7 2077.94
  9256.3 2077.78 9262.81  2078.3  9271.5  2078.3 9278.46  2078.3 9278.62  2078.3
 9278.81  2078.3 9285.73  2078.3 9291.24  2078.3 9292.85  2078.3 9310.06  2078.3
 9316.97 2080.75 9324.19 2081.79 9328.86 2082.27 9342.55 2083.63 9342.67 2083.64
  9343.1 2083.66 9349.79 2084.09  9355.1 2084.26  9356.9 2084.31 9359.17 2084.34
 9364.02 2084.43 9367.88 2084.47 9371.14  2084.5 9375.24 2084.53 9378.26 2084.55
 9380.65 2084.57 9385.37 2084.59 9391.32 2084.62 9392.49 2084.63 9393.43 2084.63
 9399.61 2084.66  9406.2  2084.7 9406.73  2084.7 9407.39  2084.7 9413.84 2084.72
 9418.97 2084.74 9420.96 2084.75 9423.46 2084.75 9428.08 2084.76 9431.75 2084.76
 9435.19 2084.76 9439.53 2084.77 9442.31 2084.76 9444.52 2084.76 9449.43 2084.76
  9455.6 2084.76 9456.55 2084.76 9457.29 2084.75 9463.66 2084.75 9470.07 2084.75
 9470.78 2084.75 9471.68 2084.75  9477.9 2084.75 9482.84 2084.75 9485.01 2084.76
 9487.75 2084.76 9492.13 2084.77 9495.61 2084.78 9499.25 2084.79 9503.82  2084.8
 9506.37 2084.81 9508.39 2084.82 9513.48 2084.84  9519.9 2084.87  9520.6 2084.87
 9521.16 2084.88 9527.72 2084.91 9533.93 2084.94 9534.83 2084.95 9535.97 2084.95
 9541.95 2084.99 9546.71 2085.01 9549.07 2085.03 9552.04 2085.04 9556.19 2085.07
 9559.48 2085.08  9563.3  2085.1 9568.11 2085.12 9570.42 2085.14 9572.25 2085.14
 9577.54 2085.16 9584.19 2085.18 9584.65 2085.19 9585.03 2085.19 9587.58 2085.19
 9592.32  2085.2 9595.92  2085.2 9600.38  2085.2 9606.34  2085.2 9608.44  2085.2
 9615.57 2085.22 9616.49 2085.22 9616.76 2085.22 9624.55 2085.24 9627.19 2085.25
 9632.61 2085.28 9637.61 2085.31 9640.66 2085.33 9648.03 2085.38 9648.72 2085.38
 9651.07  2085.4 9656.78 2085.43 9658.45 2085.44 9664.83 2085.46 9668.87 2085.48
 9672.89 2085.48  9679.3 2085.47 9680.95 2085.47 9686.57 2085.44    9689 2085.43
 9689.72 2085.43 9697.06 2085.37 9700.14 2085.35 9705.12 2085.31 9710.56 2085.27
 9713.17 2085.26 9720.99 2085.22 9721.23 2085.22 9722.06 2085.22 9729.29  2085.2
 9731.41  2085.2 9737.34  2085.2 9741.83 2085.21  9745.4 2085.23 9752.25 2085.27
 9753.46 2085.29 9757.56 2085.32 9761.51 2085.36 9762.67 2085.38 9769.57 2085.45
  9773.1 2085.49 9777.63 2085.54 9783.52 2085.59 9785.68 2085.61 9793.05 2085.65
 9793.74 2085.66 9793.94 2085.66  9801.8 2085.66 9804.36 2085.66 9809.85 2085.63
 9814.78 2085.58 9817.91 2085.54 9825.21 2085.43 9825.97 2085.41 9828.55 2085.35
 9834.02 2085.22 9835.63 2085.18 9842.08 2085.04 9846.05 2084.94 9850.13  2084.9
 9856.47 2084.75 9858.19 2084.73 9864.04 2084.62 9866.25  2084.6 9866.53 2084.59
 9884.78 2084.14 9887.84 2083.97 9900.43 2082.67 9906.68 2081.42  9912.7 2080.29
 9929.15 2080.93  9930.7 2080.99 9935.04 2081.06 9938.76 2081.13 9939.85 2081.13
 9946.81 2081.15 9950.27 2081.13 9954.87 2081.11 9960.69 2081.04 9962.93 2081.01
 9970.53 2080.84 9970.98 2080.83 9971.12 2080.83 9979.04 2080.54 9981.54 2080.43
  9987.1 2080.14 9991.96 2079.86 9995.15 2079.6910000.01 2079.4610002.38 2079.34
10003.21 2079.3210006.03 2079.3110011.27 2079.2810012.81 2079.2210014.37 2079.14
10024.82 2078.41 10032.5 2077.9710047.91 2087.3710048.43 2087.57 10081.3 2086.91
10089.19 2085.8910091.83  2085.610098.92 2084.8110110.32 2083.65 10111.9 2083.66
10120.02 2083.5610134.07 2084.3210137.87 2084.5910148.01 2085.1210148.27 2085.12
10148.39 2085.1310166.08 2085.7910168.63 2087.4610173.65 2090.5610177.71 2090.41
10182.13 2090.6310196.43  2090.310207.23  2090.510210.04 2090.4810210.08 2090.48
10224.61 2089.7810226.65 2089.7310238.09 2089.3510240.53 2089.2310244.82 2089.08
10252.68 2087.6910263.31 2086.9610267.44 2086.44 10267.8 2086.45 10270.1 2086.54
10271.91 2086.6110273.41 2086.67 10281.3 2086.8310283.16 2086.8910292.82 2086.98
10296.19 2087.0210299.01 2087.11

Manning's n Values        num=       7
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
 8141.93     .069 8933.58       0 9171.86     .03 9385.37     .05 9600.38     .04
 9864.04     .0310047.91     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         9163.5 9385.37              450   448.8     450              .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
 8141.93  9163.5    2086       F
 9413.8410299.01    2086       F

CROSS SECTION OUTPUT  Profile #PF 1
*********************************************************************************************
* E.G. Elev (ft)          * 2086.06  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    2.12  * Wt. n-Val.              *          *   0.030  *          *
* W.S. Elev (ft)          * 2083.95  * Reach Len. (ft)        *  450.00  *  448.80  *  450.00  *
* Crit W.S. (ft)          * 2083.91  * Flow Area (sq ft)      *          *  720.66  *          *
* E.G. Slope (ft/ft)      *0.007975  * Area (sq ft)           *  179.14  *  720.66  *  522.60  *
* Q Total (cfs)           * 8413.00  * Flow (cfs)             *          * 8413.00  *          *
* Top Width (ft)          *  607.51  * Top Width (ft)         *  266.83  *  166.64  *  174.04  *
* Vel Total (ft/s)        *   11.67  * Avg. Vel. (ft/s)       *          *   11.67  *          *
* Max Chl Dpth (ft)       *    6.52  * Hydr. Depth (ft)       *          *    4.32  *          *
* Conv. Total (cfs)       * 94206.8  * Conv. (cfs)            *          * 94206.8  *          *
* Length Wtd. (ft)        *  448.80  * Wetted Per. (ft)       *          *  168.08  *          *
* Min Ch El (ft)          * 2077.43  * Shear (lb/sq ft)       *          *    2.13  *          *
* Alpha                   *    1.00  * Stream Power (lb/ft s) *          *   24.92  *          *
* Frctn Loss (ft)         *    3.91  * Cum Volume (acre-ft)   *   15.57  *   36.85  *   16.58  *
```

```
* C & E Loss (ft)        *    0.04  * Cum SA (acres)         *    8.62  *    4.34  *    4.67  *
*****************************************************************************************************

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.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, water
         surface was used.
Note:    Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT  Profile #PF 2
*****************************************************************************************************
* E.G. Elev (ft)         * 2081.58  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.29  * Wt. n-Val.              *          *   0.030  *          *
* W.S. Elev (ft)         * 2080.29  * Reach Len. (ft)         *  450.00  *  448.80  *  450.00  *
* Crit W.S. (ft)         * 2080.46  * Flow Area (sq ft)       *          *  233.33  *          *
* E.G. Slope (ft/ft)     *0.012956  * Area (sq ft)            *          *  233.33  *   57.26  *
* Q Total (cfs)          * 2129.00  * Flow (cfs)              *          * 2129.00  *          *
* Top Width (ft)         *  164.60  * Top Width (ft)           *          *  112.55  *   52.06  *
* Vel Total (ft/s)       *    9.12  * Avg. Vel. (ft/s)         *          *    9.12  *          *
* Max Chl Dpth (ft)      *    2.86  * Hydr. Depth (ft)         *          *    2.07  *          *
* Conv. Total (cfs)      * 18703.9  * Conv. (cfs)              *          * 18703.9  *          *
* Length Wtd. (ft)       *  448.80  * Wetted Per. (ft)         *          *  113.32  *          *
* Min Ch El (ft)         * 2077.43  * Shear (lb/sq ft)         *          *    1.67  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s)   *          *   15.20  *          *
* Frctn Loss (ft)        *    2.79  * Cum Volume (acre-ft)     *    2.43  *   17.47  *    4.88  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)           *    1.31  *    3.55  *    2.20  *
*****************************************************************************************************

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.
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: Sols Wash North     RS: 0.240

INPUT
Description:
Station Elevation Data     num=      364
     Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev
*************************************************************************************
 8581.07 2092.91 8589.36 2092.41 8600.01 2090.85 8603.58 2090.36 8617.02 2088.47
 8622.85 2087.55 8625.37 2087.02 8629.63  2086.1 8632.67 2085.42 8634.47 2084.98
 8651.42 2079.52 8652.39  2079.2 8652.68  2079.1 8653.34 2078.84 8655.16 2078.35
 8670.36 2074.24 8674.88    2073 8679.99 2073.73 8706.74  2075.9 8712.97 2075.67
  8715.8 2075.64 8720.27 2075.61 8727.42 2075.63 8727.57 2075.63 8727.82 2075.63
 8734.87 2075.67 8739.04 2075.67 8742.17 2075.73 8747.46 2075.89 8749.47 2075.96
 8750.66 2076.02 8756.77 2076.47 8762.28  2076.9 8764.07 2077.07 8767.09 2077.34
 8771.37 2077.75  8773.9 2077.94 8778.67 2078.28 8785.52 2078.66 8785.97 2078.67
 8786.73 2078.69 8793.27 2078.89 8797.14 2078.97 8800.57    2079 8806.37 2079.05
 8807.87 2079.07 8808.75 2079.08 8815.17 2079.13 8820.37 2079.19 8822.47 2079.22
 8826.01 2079.27 8829.77 2079.32 8831.99 2079.35 8837.07 2079.42 8843.61 2079.49
 8844.37  2079.5 8845.65 2079.51 8851.67 2079.56 8855.23 2079.59 8858.97 2079.61
 8865.28 2079.64 8866.27 2079.65 8866.85 2079.65 8873.57 2079.67 8878.47 2079.68
 8880.87 2079.69 8884.92 2079.69 8888.17  2079.7 8890.09  2079.7 8895.47 2079.71
 8901.71 2079.71 8902.77 2079.71 8904.56 2079.71 8910.07 2079.71 8913.33  2079.7
 8917.37  2079.7  8924.2  2079.7 8924.67  2079.7 8924.95  2079.7 8931.97  2079.7
 8936.57 2079.71 8939.27 2079.72 8943.84 2079.73 8946.57 2079.75 8948.19 2079.75
 8953.87  2079.8 8959.81 2079.84 8961.17 2079.85 8963.48 2079.87 8968.47 2079.91
 8971.42 2079.93 8975.77 2079.95 8983.04 2079.98 8983.07 2079.98 8983.11 2079.98
 8990.37    2080 8994.66    2080 8997.67 2080.01 9002.75 2080.02 9004.97 2080.03
 9006.28 2080.03 9012.27 2080.06  9017.9 2080.09 9019.57  2080.1 9022.39 2080.12
 9026.87 2080.16 9029.52 2080.18 9034.17 2080.23 9041.14 2080.31 9041.47 2080.31
 9042.03 2080.32 9048.77 2080.42 9052.76 2080.48 9056.07 2080.53 9061.67 2080.62
 9063.37 2080.65 9064.38 2080.67 9070.67 2080.76    9076 2080.83 9077.97 2080.85
 9081.31 2080.88 9085.27 2080.92 9087.62 2080.94 9092.57 2080.96 9099.24 2080.97
 9099.87 2080.97 9100.94 2080.96 9107.17 2080.94 9110.85 2080.93 9114.47 2080.91
```

```
 9120.58 2080.88 9121.77 2080.87 9122.47 2080.86 9129.07 2080.83 9134.09 2080.81
 9136.37 2080.81 9140.22 2080.81 9143.67  2080.8 9145.71  2080.8 9150.97 2080.82
 9157.33 2080.84 9158.27 2080.85 9159.86 2080.86 9165.57  2080.9 9168.95 2080.93
 9172.87 2080.96  9179.5 2081.01 9180.17 2081.02 9180.57 2081.02 9187.47 2081.06
 9192.19 2081.09 9194.77 2081.09 9199.13  2081.1 9202.07 2081.11 9203.81 2081.11
 9209.37 2081.09 9215.43 2081.08 9216.67 2081.07 9218.77 2081.06 9223.97 2081.03
 9227.05 2081.01 9231.27 2080.98 9238.41 2080.93 9238.57 2080.93 9238.67 2080.93
 9245.87 2080.83 9250.29 2080.77 9253.17 2080.74 9258.05 2080.68  9260.7 2080.61
 9267.89 2080.44 9280.11 2080.17 9284.85 2080.09 9287.36 2080.05 9295.46 2079.87
 9307.98 2079.97  9311.2 2079.96 9316.59 2079.95 9321.79 2079.97  9330.7 2079.94
 9331.76 2079.94 9332.38 2079.94 9332.64 2079.94  9332.9 2079.94  9336.6 2079.91
 9340.77 2079.89 9343.24 2079.87 9350.16 2079.82 9351.14 2079.82 9352.29 2079.81
 9353.72  2079.8 9355.55 2079.78 9358.04 2079.77 9361.68 2079.74 9365.69 2079.72
 9368.84 2079.69 9369.74 2079.68 9375.47 2079.33 9378.69 2079.13 9380.28 2079.03
  9381.2 2078.97  9383.4 2078.87 9406.41 2073.46 9410.09 2072.55 9415.02 2072.77
 9428.37 2073.48 9441.07  2072.7 9444.69 2072.53 9446.67 2073.48 9455.72  2073.5
 9469.89  2073.5 9472.17  2073.5 9474.07  2073.5 9479.47  2073.5 9482.67  2073.5
 9486.77  2073.5 9493.71  2073.5 9494.07  2073.5 9494.29  2073.5 9501.37 2079.96
 9505.91 2080.04 9508.67 2080.08 9513.35 2080.13 9515.97 2080.17 9517.53 2080.18
 9523.27 2080.22 9529.15 2080.25 9530.57 2080.26 9532.98 2080.26 9537.87 2080.28
 9540.77 2080.29 9545.17 2080.31 9552.39 2080.35 9552.47 2080.35 9552.62 2080.35
 9559.77 2080.42    9564 2080.45 9567.07 2080.48 9572.26 2080.53 9574.37 2080.55
 9575.62 2080.56 9581.67 2080.62 9587.24 2080.66 9588.97 2080.67  9591.9 2080.69
 9596.27 2080.72 9598.86 2080.74 9603.57 2080.76 9610.48 2080.79 9610.87 2080.79
 9611.54 2080.79 9618.17 2080.81  9622.1 2080.81 9625.47  2080.8 9631.18 2080.79
 9632.77 2080.79 9633.72 2080.78 9640.07 2080.75 9645.34 2080.73 9647.37 2080.72
 9650.81 2080.72 9654.67 2080.71 9656.96 2080.71 9661.97 2080.71 9668.58 2080.72
 9669.27 2080.72 9670.45 2080.72 9676.57 2080.74  9680.2 2080.75 9683.87 2080.76
 9690.09 2080.77 9691.17 2080.78 9691.82 2080.78 9698.48 2080.79 9703.44  2080.8
 9705.77  2080.8 9709.73 2080.81 9713.08 2080.82 9715.05 2080.82 9720.38 2080.83
 9726.67 2080.83 9727.68 2080.83 9729.37 2080.83 9734.98 2080.83 9738.29 2080.83
 9742.28 2080.83 9749.01 2080.82 9749.58 2080.82 9749.91 2080.82 9754.67 2080.82
 9757.01 2080.82 9760.98 2080.82 9764.78 2080.83 9771.67 2080.86 9772.54 2080.86
 9774.84 2080.88  9780.3 2080.91 9782.35 2080.93 9788.06 2080.96 9793.04 2080.99
 9795.82 2080.99  9803.2 2080.99 9803.58 2080.99 9803.73 2080.99 9811.34 2081.06
 9812.64 2081.07 9837.37 2079.32 9839.08 2079.24 9842.93 2078.98 9850.88 2079.51
 9867.85 2080.56 9873.43 2080.75 9878.54 2080.94  9881.2    2081 9888.26 2081.18
 9888.96  2081.2 9889.22 2081.21 9896.72 2081.29 9899.91 2081.32 9904.48 2081.31
  9910.6 2081.31 9912.24 2081.29 9916.61 2081.27    9920 2081.25 9921.28 2081.24
 9927.76 2081.13 9931.97 2081.03 9943.76 2080.39 9951.41 2080.03 9956.66 2078.54
 9972.14 2074.78  9980.8 2075.11 9989.86 2075.64 9996.09 2075.76 9997.62 2075.77
   10000 2075.7810001.67 2075.7910005.38 2075.8110006.78 2075.8110013.14  2075.8
10017.46 2075.78 10020.9 2075.7610028.15 2075.7410032.43  2075.510043.87 2074.81
10046.66 2074.6810048.53 2075.7110064.35 2084.57 10066.4  2084.910068.43 2084.91
10092.84 2083.0410095.56 2082.7810101.15 2082.3610105.99 2082.3310109.68  2082.8
10111.57  2083.510123.99 2088.7710125.63 2089.5210126.98 2090.32 10131.1 2092.55
10137.22 2095.2310145.89 2098.96 10152.7 2099.6810158.21 2100.06

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*****************************************************************************
 8581.07     .15  9383.4    .035 9501.37     .05 9703.44    .067 9951.41    .031
10064.35     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        9369.74 9501.37             380  385.44     390             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
 8581.07 9369.74    2085       F
 9545.1710158.21    2085       F

CROSS SECTION OUTPUT  Profile #PF 1
*****************************************************************************************
* E.G. Elev (ft)          * 2082.12  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    2.51  * Wt. n-Val.              *          *   0.035  *          *
* W.S. Elev (ft)          * 2079.61  * Reach Len. (ft)        *  380.00  *  385.44  *  390.00  *
* Crit W.S. (ft)          * 2079.61  * Flow Area (sq ft)      *          *  661.45  *          *
* E.G. Slope (ft/ft)      *0.009537  * Area (sq ft)           *  516.30  *  661.45  *  382.64  *
* Q Total (cfs)           * 8413.00  * Flow (cfs)             *          * 8413.00  *          *
* Top Width (ft)          *  458.87  * Top Width (ft)         *  207.13  *  130.04  *  121.70  *
* Vel Total (ft/s)        *   12.72  * Avg. Vel. (ft/s)       *          *   12.72  *          *
* Max Chl Dpth (ft)       *    7.08  * Hydr. Depth (ft)       *          *    5.09  *          *
* Conv. Total (cfs)       * 86149.2  * Conv. (cfs)            *          * 86149.2  *          *
* Length Wtd. (ft)        *  385.44  * Wetted Per. (ft)       *          *  133.43  *          *
* Min Ch El (ft)          * 2072.53  * Shear (lb/sq ft)       *          *    2.95  *          *
* Alpha                   *    1.00  * Stream Power (lb/ft s) *          *   37.54  *          *
* Frctn Loss (ft)         *    2.21  * Cum Volume (acre-ft)   *   11.98  *   29.73  *   11.90  *
* C & E Loss (ft)         *    0.50  * Cum SA (acres)         *    6.18  *    2.81  *    3.15  *
*****************************************************************************************
```

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 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.
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)	2077.05	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.16	Wt. n-Val.		0.035	
W.S. Elev (ft)	2075.89	Reach Len. (ft)	380.00	385.44	390.00
Crit W.S. (ft)	2075.84	Flow Area (sq ft)		246.46	
E.G. Slope (ft/ft)	*0.012842	Area (sq ft)	65.36	246.46	34.37
Q Total (cfs)	2129.00	Flow (cfs)		2129.00	
Top Width (ft)	265.16	Top Width (ft)	83.02	100.85	81.30
Vel Total (ft/s)	8.64	Avg. Vel. (ft/s)		8.64	
Max Chl Dpth (ft)	3.36	Hydr. Depth (ft)		2.44	
Conv. Total (cfs)	18786.8	Conv. (cfs)		18786.8	
Length Wtd. (ft)	385.44	Wetted Per. (ft)		102.44	
Min Ch El (ft)	2072.53	Shear (lb/sq ft)		1.93	
Alpha	1.00	Stream Power (lb/ft s)		16.66	
Frctn Loss (ft)	2.95	Cum Volume (acre-ft)	2.09	15.00	4.41
C & E Loss (ft)	0.24	Cum SA (acres)	0.88	2.45	1.51

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, water
surface was used.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION

RIVER: Sols Wash
REACH: Sols Wash North RS: 0.167

INPUT
Description:
Station Elevation Data num= 280

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
8704.3	2089.89	8705.37	2089.89	8715.89	2090.02	8723.7	2089.87	8727.73	2089.74
8739.52	2088.96	8740.06	2088.93	8741.45	2088.62	8750.98	2086.27	8757.95	2083.85
8767.88	2080.03	8777.3	2080.17	8783.52	2080.26	8785.42	2080.21	8789.94	2080.08
8793.06	2080	8794.37	2079.96	8800.7	2079.62	8805.22	2079.37	8808.33	2079.2
8815.74	2078.81	8815.97	2078.8	8816.07	2078.8	8823.61	2078.49	8826.91	2078.36
8831.25	2078.23	8837.76	2078.05	8838.88	2078.02	8841.55	2077.97	8846.52	2077.89
8848.61	2077.85	8854.16	2077.77	8859.46	2077.69	8861.79	2077.65	8867.36	2077.54
8869.43	2077.51	8870.3	2077.49	8877.07	2077.32	8881.15	2077.17	8884.71	2077.04
8892	2076.66	8892.34	2076.64	8893.17	2076.58	8899.98	2076.03	8902.85	2075.64
8907.62	2075.07	8914.62	2073.95	8925.68	2072.06	8929.26	2071.95	8937.51	2071.95
8939.53	2072.26	8960.5	2074.53	8965.73	2074.6	8971.7	2074.92	8982.34	2076.18
8984.71	2076.18	8988.7	2076.15	9005.16	2076.2	9012.17	2075.88	9014.87	2075.42
9026.24	2074.34	9029.13	2074.05	9030.7	2073.96	9040.96	2074.24	9057.03	2074.49
9057.89	2074.64	9060.37	2075.01	9075.37	2075.85	9077.55	2075.87	9078.15	2075.87
9078.91	2075.87	9080.76	2075.89	9092.51	2075.88	9099.68	2076.14	9108.95	2076.53
9113.83	2076.66	9119.79	2076.74	9121.46	2076.76	9125.43	2076.77	9129.1	2076.8
9130.64	2076.81	9136.74	2076.85	9141.49	2076.88	9144.37	2076.9	9151.24	2076.93

```
 9152.01 2076.94 9152.34 2076.94 9152.88 2076.93  9166.5 2076.78 9174.83 2076.53
 9192.13 2076.63 9197.68  2076.7 9206.74  2077.1 9217.42 2077.47 9220.75 2077.54
 9228.27 2077.56 9228.38 2077.56 9228.66 2077.56 9236.02 2077.56 9239.12 2077.56
 9243.66 2077.56 9249.96 2077.59  9251.3 2077.59 9254.47 2077.62 9258.93 2077.64
 9260.81 2077.66 9266.57 2077.69 9271.66 2077.73 9274.21 2077.73 9280.27 2077.75
 9281.85 2077.75 9282.51 2077.75 9289.48 2077.72 9293.35  2077.7 9297.12 2077.67
  9304.2 2077.61 9304.76 2077.61 9306.08 2077.59 9312.53 2077.52 9317.38 2077.42
 9324.85 2077.29 9325.84 2077.28 9327.01 2077.26 9328.39 2077.23 9330.09  2077.2
 9332.22 2077.16 9335.02 2077.11 9338.77 2077.03 9338.81 2077.03 9338.83 2077.03
 9341.58 2077.07 9343.86  2077.1 9345.76 2077.12 9347.37 2077.15 9348.74 2077.16
 9353.33  2077.2 9354.83 2077.21 9365.86 2077.35 9369.29 2077.35 9373.49 2077.36
 9380.13 2077.36 9381.13 2077.36  9383.5 2077.35 9391.19 2077.34 9395.07 2077.26
 9409.11    2077 9421.65  2077.6 9426.95 2077.84 9434.37 2078.03 9434.59 2078.04
 9435.12 2078.04 9442.23 2078.12 9445.22 2078.13 9449.87 2078.12 9456.07 2078.06
  9457.5 2078.02 9463.06 2077.77 9473.19 2077.31 9477.31  2077.1  9480.4 2077.13
  9489.7 2077.04  9511.2 2076.74 9519.43 2076.46  9522.6 2075.26 9530.38 2072.67
  9535.7 2071.91 9541.38 2070.76 9558.64 2070.59 9578.68 2070.57 9587.09  2070.6
 9589.59  2070.6 9594.01  2070.6 9604.45  2070.6 9605.38  2070.6 9606.37  2070.6
 9616.84  2070.6 9619.23  2070.6 9627.78  2070.6 9633.66  2070.6 9648.44  2070.6
 9651.32  2070.6 9656.07  2070.6 9662.17  2070.6 9663.71  2070.6 9667.38  2070.6
 9671.35  2070.6 9673.02  2070.6 9678.98  2070.6 9683.86  2070.6 9686.62    2074
 9693.19 2078.31 9694.26 2078.31 9694.71 2078.31  9701.9  2078.3 9705.56 2078.31
 9709.53  2078.3 9716.41 2078.31 9717.17 2078.31 9718.99  2078.3 9724.81 2078.27
 9727.25 2078.27 9732.45 2078.21  9738.1 2078.15 9740.08 2078.06 9743.75 2077.89
 9754.69 2077.63 9763.14 2077.24 9773.42 2076.61 9775.86 2076.67  9801.2 2077.01
    9802  2077.1 9802.79 2077.16 9805.62 2077.41 9810.91 2077.85 9812.38 2077.98
 9819.04 2078.27 9822.76  2078.4 9827.16 2078.47 9833.14 2078.52 9835.28 2078.51
 9842.98 2078.46  9843.4 2078.45 9843.52 2078.45 9851.52  2078.4  9853.9 2078.39
 9859.65 2078.43 9864.28 2078.44 9867.77 2078.48 9874.65 2078.55 9875.89 2078.56
 9880.35 2078.61 9884.01 2078.65 9885.03 2078.66 9892.14 2078.63 9895.41 2078.63
 9900.26 2078.55 9905.79 2078.46 9908.38 2078.38 9916.17 2078.16  9916.5 2078.15
 9917.71  2078.1 9924.63 2077.85 9926.55 2077.78 9932.75  2077.5 9936.93 2077.29
 9940.87 2077.08 9947.31 2076.73 9950.27 2076.58 9957.53 2076.18 9978.77 2071.73
    9981 2071.42 9981.71 2071.19 9982.61 2071.23 9984.59  2071.3  9999.2 2071.86
10000.01 2071.8710005.85 2071.9310009.58 2071.9210013.97  2071.910019.96 2071.87
 10022.1 2071.88 10029.8 2071.3610030.22 2071.85 10030.4 2071.8510031.06 2072.04
10058.48 2077.21 10063.2 2079.8810080.96 2080.7310082.93  2080.810083.95 2080.83
10088.88 2080.5610128.45 2078.7510138.93 2077.2610144.52 2076.5510149.46 2076.67
10158.95 2076.2810174.94    207710176.42 2077.0310179.25 2077.0910182.84 2077.17

Manning's n Values        num=       8
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*****************************************************************************
  8704.3     .058 8893.17    .034 8982.34     .15 9519.43    .042 9693.19    .076
  9701.9      .08 9957.53    .034 10063.2    .032

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        9511.2 9693.19              375  374.88     375             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
  8704.3 9445.22    2082       F
 9693.1910182.84    2082       F

CROSS SECTION OUTPUT  Profile #PF 1
*******************************************************************************************
* E.G. Elev (ft)          * 2078.47  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.86  * Wt. n-Val.              *   0.150  *   0.042  *         *
* W.S. Elev (ft)          * 2077.61  * Reach Len. (ft)         *  375.00  *  374.88  *  375.00  *
* Crit W.S. (ft)          * 2075.18  * Flow Area (sq ft)       *   24.40  * 1128.16  *         *
* E.G. Slope (ft/ft)      *0.003816  * Area (sq ft)            *  759.48  * 1128.16  *  556.55  *
* Q Total (cfs)           * 8413.00  * Flow (cfs)              *   10.00  * 8403.00  *         *
* Top Width (ft)          *  959.28  * Top Width (ft)           *  550.42  *  180.92  *  227.93  *
* Vel Total (ft/s)        *    7.30  * Avg. Vel. (ft/s)         *    0.41  *    7.45  *         *
* Max Chl Dpth (ft)       *    7.04  * Hydr. Depth (ft)         *    0.55  *    6.24  *         *
* Conv. Total (cfs)       *136190.4  * Conv. (cfs)              *   161.8  *136028.5  *         *
* Length Wtd. (ft)        *  374.88  * Wetted Per. (ft)         *   44.56  *  184.43  *         *
* Min Ch El (ft)          * 2070.57  * Shear (lb/sq ft)         *    0.13  *    1.46  *         *
* Alpha                   *    1.04  * Stream Power (lb/ft s)   *    0.05  *   10.85  *         *
* Frctn Loss (ft)         *    2.57  * Cum Volume (acre-ft)     *    6.41  *   21.82  *    7.70  *
* C & E Loss (ft)         *    0.14  * Cum SA (acres)           *    2.87  *    1.43  *    1.58  *
*******************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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, water
surface was used.

CROSS SECTION OUTPUT Profile #PF 2

E.G. Elev (ft)	2073.87	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.37	Wt. n-Val.		0.042	
W.S. Elev (ft)	2073.49	Reach Len. (ft)	375.00	374.88	375.00
Crit W.S. (ft)	2072.50	Flow Area (sq ft)		434.44	
E.G. Slope (ft/ft)	0.005064	Area (sq ft)	33.88	434.44	104.26
Q Total (cfs)	2129.00	Flow (cfs)		2129.00	
Top Width (ft)	260.33	Top Width (ft)	33.62	158.30	68.41
Vel Total (ft/s)	4.90	Avg. Vel. (ft/s)		4.90	
Max Chl Dpth (ft)	2.92	Hydr. Depth (ft)		2.74	
Conv. Total (cfs)	29916.6	Conv. (cfs)		29916.6	
Length Wtd. (ft)	374.88	Wetted Per. (ft)		159.98	
Min Ch El (ft)	2070.57	Shear (lb/sq ft)		0.86	
Alpha	1.00	Stream Power (lb/ft s)		4.21	
Frctn Loss (ft)	1.47	Cum Volume (acre-ft)	1.66	11.99	3.79
C & E Loss (ft)	0.02	Cum SA (acres)	0.37	1.31	0.84

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.
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: Sols Wash North RS: 0.096

INPUT
Description:
Station Elevation Data num= 248

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
8749.32	2092.58	8755.11	2092.52	8756.01	2092.52	8760.12	2092.49	8764.41	2092.47
8765.35	2092.46	8772.81	2092.5	8775.58	2092.51	8781.2	2092.6	8785.82	2092.67
8793.04	2092.81	8800.87	2092.96	8806.54	2093.06	8810.64	2093.1	8817.7	2091.72
8826.77	2089.86	8831.58	2088.96	8837.01	2087.94	8839.98	2087.5	8846.99	2085.65
8852.73	2085	8859.06	2084.8	8863.91	2084.53	8871.45	2084.45	8874.62	2084.38
8882.31	2084.28	8883	2084.27	8884.44	2084.27	8886.07	2084.25	8886.52	2084.25
8887.71	2084.25	8889.51	2084.25	8889.61	2084.25	8891.95	2084.49	8902.98	2084.94
8904.76	2084.89	8909.68	2085.04	8915.95	2085.1	8917.65	2085.17	8923.95	2085.29
8929.15	2085.21	8932.35	2085.12	8939.38	2084.75	8954.64	2083.88	8959.96	2083.56
8961.14	2083.5	8966.29	2080.7	8970.66	2078.42	8984.4	2078.4	8992.17	2078.38
9008.29	2078.14	9011.04	2078.14	9016.32	2078.03	9021.28	2077.98	9024.71	2077.9
9031.52	2077.73	9033.11	2077.69	9040.37	2077.47	9041.51	2077.44	9041.76	2077.43
9049.9	2077.09	9051.99	2077.01	9057.11	2076.78	9067.9	2076.28	9074.06	2076.06
9083.43	2073.11	9100.4	2068.44	9112.86	2068.44	9113.46	2068.44	9113.66	2068.43
9138.17	2071.82	9141.35	2072.25	9152.44	2072.89	9160.94	2072.95	9164.64	2073.05
9170.32	2073.36	9184.26	2074.07	9185.08	2074.1	9192.65	2074.3	9195.32	2074.34
9201.05	2074.36	9205.55	2074.37	9209.45	2074.35	9215.79	2074.3	9217.84	2074.28
9226.03	2074.15	9226.24	2074.15	9242.5	2073.47	9244.52	2073.42	9247.07	2073.35
9249.46	2073.29	9253.67	2073.33	9260.58	2073.4	9267.11	2073.46	9273.91	2073.59
9276.74	2073.63	9278.1	2073.66	9288.8	2073.85	9297	2073.97	9303.49	2073.99
9317.48	2074.13	9318.3	2074.12	9318.41	2074.11	9320.62	2074.16	9328.4	2074.23
9335.4	2074.25	9338.64	2074.29	9343.8	2074.28	9348.88	2074.31	9356.81	2074.33
9359.36	2074.32	9367.33	2074.28	9368.99	2074.26	9369.35	2074.26	9371.44	2074.19
9385.55	2073.7	9394.35	2073.65	9396.63	2073.61	9400.51	2073.61	9403.23	2073.61
9408.58	2073.61	9412.08	2073.61	9413.03	2073.61	9421.23	2073.79	9430.78	2074.07
9447.83	2073.96	9449.5	2073.94	9450.59	2073.97	9469.75	2074.54	9471.73	2074.58
9478.15	2074.69	9481.96	2074.74	9486.55	2074.79	9492.2	2074.84	9494.94	2074.84
9502.44	2074.83	9503.34	2074.82	9524.77	2074	9526.34	2073.94	9526.49	2073.93
9526.53	2073.93	9539.19	2073.89	9543.26	2073.84	9550.75	2073.76	9552.81	2073.7
9569.17	2068.27	9572.28	2067.24	9588.96	2068.76	9591.49	2068.97	9593.13	2068.95
9607.17	2068.59	9615.31	2068.6	9617.65	2068.6	9618.89	2068.6	9644.32	2068.6
9647.74	2068.6	9662.62	2068.6	9664.76	2068.6	9671.38	2068.6	9681.26	2068.6
9686.71	2068.6	9688.07	2068.6	9694.29	2068.6	9696.47	2068.6	9696.95	2068.6
9704.87	2073	9707.19	2074.59	9713.26	2074.58	9717.42	2074.56	9721.66	2074.57
9727.66	2074.58	9730.06	2074.6	9737.9	2074.65	9738.45	2074.66	9740.99	2074.68

```
 9746.85 2074.74 9748.14 2074.75 9755.25 2074.82 9758.37 2074.85 9763.65  2074.9
 9768.61 2074.95 9772.04 2074.99 9778.85 2075.06 9780.44 2075.08  9787.7 2075.16
 9788.84 2075.17 9789.09 2075.17 9797.23 2075.26 9799.32 2075.28 9805.63 2075.34
 9809.56 2075.37 9814.03  2075.4  9819.8 2075.44 9822.42 2075.45 9830.03 2075.51
 9830.82 2075.51 9834.41 2075.54 9834.71 2075.54 9839.49 2075.58 9840.19 2075.58
 9848.39 2075.63 9850.28 2075.64 9857.29 2075.66 9860.37 2075.66 9866.19 2075.66
 9870.46 2075.64  9875.1 2075.62 9880.55 2075.57    9884 2075.54 9890.63 2075.43
  9892.9 2075.37 9900.72 2075.15  9901.8 2075.09 9909.89 2074.59  9910.7 2074.54
 9910.81 2074.53 9922.71 2073.26  9938.7 2070.63 9947.53 2068.72 9957.98 2069.04
 9971.34 2069.45 9973.01 2069.45 9981.43 2069.44 9981.92 2069.44 9985.55 2069.42
 9990.82  2069.4 9991.52  2069.4 9999.72 2069.3810000.09 2069.3710001.61 2069.37
10008.62 2069.38 10011.7 2069.3910017.52 2069.4310021.78 2069.4710026.42 2069.52
10031.87  2069.410046.29 2068.8410048.33 2068.7310049.47 2068.69 10050.3 2068.66
10054.24 2070.9510065.99 2076.3710078.57 2077.3710091.82 2076.9910100.03 2076.65
10105.45 2076.9410126.04 2077.22 10142.4 2075.11

Manning's n Values        num=       8
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
 8749.32     .058 9074.06     .034 9152.44     .15 9552.81     .042 9707.19     .076
 9857.29      .08 9947.53     .03410046.29     .032

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9550.75 9707.19               525  506.88     490             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
 8749.32 9550.75    2078       F
 9707.19 10142.4    2078       F

CROSS SECTION OUTPUT  Profile #PF 1
*********************************************************************************************
* E.G. Elev (ft)          * 2075.76  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    2.27  * Wt. n-Val.              *          *   0.042  *          *
* W.S. Elev (ft)          * 2073.48  * Reach Len. (ft)        *  520.00  *  520.00  *  520.00  *
* Crit W.S. (ft)          * 2073.48  * Flow Area (sq ft)      *          *  695.17  *          *
* E.G. Slope (ft/ft)      *0.015751  * Area (sq ft)           *  220.88  *  695.17  *  512.22  *
* Q Total (cfs)           * 8413.00  * Flow (cfs)             *          * 8413.00  *          *
* Top Width (ft)          *  407.71  * Top Width (ft)         *  116.51  *  152.11  *  139.10  *
* Vel Total (ft/s)        *   12.10  * Avg. Vel. (ft/s)       *          *   12.10  *          *
* Max Chl Dpth (ft)       *    6.24  * Hydr. Depth (ft)       *          *    4.57  *          *
* Conv. Total (cfs)       * 67034.7  * Conv. (cfs)            *          * 67034.7  *          *
* Length Wtd. (ft)        *  520.00  * Wetted Per. (ft)       *          *  154.49  *          *
* Min Ch El (ft)          * 2067.24  * Shear (lb/sq ft)       *          *    4.42  *          *
* Alpha                   *    1.00  * Stream Power (lb/ft s) *          *   53.55  *          *
* Frctn Loss (ft)         *    3.65  * Cum Volume (acre-ft)   *    2.19  *   13.97  *    3.10  *
* C & E Loss (ft)         *    0.32  * Cum SA (acres)         *          *          *          *
*********************************************************************************************

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 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)          * 2072.37  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.30  * Wt. n-Val.              *          *   0.042  *          *
* W.S. Elev (ft)          * 2072.07  * Reach Len. (ft)        *  520.00  *  520.00  *  520.00  *
* Crit W.S. (ft)          * 2070.56  * Flow Area (sq ft)      *          *  485.37  *          *
* E.G. Slope (ft/ft)      *0.003133  * Area (sq ft)           *  120.11  *  485.37  *  325.32  *
* Q Total (cfs)           * 2129.00  * Flow (cfs)             *          * 2129.00  *          *
* Top Width (ft)          *  325.07  * Top Width (ft)         *   52.84  *  145.49  *  126.74  *
* Vel Total (ft/s)        *    4.39  * Avg. Vel. (ft/s)       *          *    4.39  *          *
* Max Chl Dpth (ft)       *    4.83  * Hydr. Depth (ft)       *          *    3.34  *          *
* Conv. Total (cfs)       * 38033.7  * Conv. (cfs)            *          * 38033.7  *          *
* Length Wtd. (ft)        *  520.00  * Wetted Per. (ft)       *          *  147.25  *          *
* Min Ch El (ft)          * 2067.24  * Shear (lb/sq ft)       *          *    0.64  *          *
* Alpha                   *    1.00  * Stream Power (lb/ft s) *          *    2.83  *          *
```

```
* Frctn Loss (ft)        *    3.62  * Cum Volume (acre-ft)   *    1.00  *    8.03  *    1.94  *
* C & E Loss (ft)        *    0.07  * Cum SA (acres)         *          *          *          *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.

         This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, water
         surface was used.

CROSS SECTION


RIVER: Sols Wash
REACH: Sols Wash Main     RS: 0.779

INPUT
Description: The total flow combines at this cross section and is conveyed
             within the channel.
Station Elevation Data     num=     151
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************************
    9343 2074.98    9344 2074.98    9344 2070.27 9350.05 2069.32 9370.81 2065.99
 9374.26 2066.04 9393.72 2066.34 9396.65 2066.89 9406.92 2068.99 9418.11 2070.57
 9428.53 2070.65 9441.47 2070.75 9443.97 2070.81 9445.39 2070.82  9453.9 2070.95
 9464.67 2071.08 9467.01 2071.15  9474.9 2071.25 9477.13  2071.3  9484.9 2071.38
 9487.25 2071.39  9494.9 2071.42 9497.37 2071.41  9504.9 2071.38 9507.49 2071.35
 9527.76 2070.86 9530.76 2070.78 9532.94 2070.72 9553.61 2071.36  9558.1 2071.45
 9570.08 2071.07 9571.49 2071.04 9573.21 2071.01 9575.18 2070.99 9583.15 2070.87
 9584.73 2070.91 9586.51 2070.95 9588.38 2070.99 9591.21 2071.02 9592.92 2071.07
 9594.61 2071.11 9596.13 2071.13 9608.21 2071.52 9609.26 2071.52 9610.33 2071.56
 9616.46 2071.62  9618.5 2071.61 9624.28 2071.42 9629.14 2071.23 9632.14 2071.22
 9643.45 2070.72 9646.84 2070.52 9654.62 2069.33  9670.4 2065.42 9673.97 2065.55
 9702.59 2065.48 9711.99 2065.53    9743  2065.5  9750.4  2065.5 9754.92  2065.5
 9760.52  2065.5 9764.92  2065.5 9770.64  2065.6 9774.92  2065.5 9780.76  2065.5
 9784.92  2065.5 9790.89  2065.5 9794.92  2065.5 9801.01  2065.5 9804.92  2065.5
 9811.13  2065.5 9814.92  2065.5 9821.25  2065.5 9824.92  2065.5 9831.37  2065.5
 9834.92  2065.5 9841.49  2065.5 9844.92  2065.5 9851.61  2065.5 9854.92  2065.5
 9861.73  2065.5 9864.92  2065.5 9871.85  2065.5 9874.93  2065.5 9881.98  2065.5
 9884.93  2065.5    9888  2065.5 9900.15  2065.5 9910.68  2065.5 9913.27  2065.5
  9916.2  2065.5 9918.99  2065.5 9934.93  2065.5  9942.7  2065.5 9944.93  2065.5
 9952.82  2065.5 9954.93  2065.5 9962.95  2065.5 9964.93  2065.5 9973.07  2065.5
 9974.93  2065.5 9983.19  2065.5 9984.93  2065.5 9993.31 2065.43 9994.93 2065.35
   10000 2065.1310003.43 2064.9810004.93 2064.9210013.55 2064.6410014.94 2064.59
10016.69 2064.57   10034 2064.65 10048.5  2065.5 10068.5 2071.6610072.87 2072.35
10074.94 2072.44 10084.4 2072.5410084.94 2072.5510094.52 2072.4710094.94 2072.46
10104.64 2072.3710104.94 2072.3610114.76 2072.3310114.94 2072.3310124.89 2072.35
10124.94 2072.3510129.78 2072.3810134.94 2072.4110135.01 2072.4110144.94 2072.46
10145.13 2072.4610154.95  2072.510155.25  2072.510164.95  2072.510165.37  2072.5
10174.95 2072.4610175.49 2072.4510184.95 2072.0210192.58 2071.4810201.51 2070.86
 10202.5 2070.7910203.37 2070.7210205.54  2070.610233.33 2069.3410238.25 2069.45
10241.93 2068.5910263.46 2072.3110268.99 2072.8410276.33 2072.6510295.56 2071.98
10317.85 2070.05

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*****************************************************************
    9343    .034 9418.11     .15 9646.84     .03 10068.5    .036

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9629.1410074.94             210   211.2     210            .1        .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
    9343 9629.14    2073       F
10074.9410317.85    2073       F

CROSS SECTION OUTPUT  Profile #PF 1
*****************************************************************************************************
* E.G. Elev (ft)         * 2070.80  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.20  * Wt. n-Val.              *          *    0.030 *          *
* W.S. Elev (ft)         * 2069.60  * Reach Len. (ft)        *  210.00  *   211.20 *  210.00  *
* Crit W.S. (ft)         * 2068.95  * Flow Area (sq ft)      *          *  1645.46 *          *
* E.G. Slope (ft/ft)     *0.004937  * Area (sq ft)           *  146.35  *  1645.46 *    6.80  *
* Q Total (cfs)          *14459.00  * Flow (cfs)             *          * 14459.00 *          *
* Top Width (ft)         *  492.01  * Top Width (ft)         *   62.95  *   408.94 *   20.13  *
```

* Vel Total (ft/s)	*	8.79	* Avg. Vel. (ft/s)	*		*	8.79	*	*
* Max Chl Dpth (ft)	*	5.03	* Hydr. Depth (ft)	*		*	4.02	*	*
* Conv. Total (cfs)	*	205790.4	* Conv. (cfs)	*		*	205790.4	*	*
* Length Wtd. (ft)	*	211.20	* Wetted Per. (ft)	*		*	410.10	*	*
* Min Ch El (ft)	*	2064.57	* Shear (lb/sq ft)	*		*	1.24	*	*
* Alpha	*	1.00	* Stream Power (lb/ft s)	*		*	10.87	*	*
* Frctn Loss (ft)	*	0.63	* Cum Volume (acre-ft)	*	7.70	*	130.06	*	5.24 *
* C & E Loss (ft)	*	0.15	* Cum SA (acres)	*	2.13	*	16.71	*	4.63 *

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #PF 2

* E.G. Elev (ft)	*	2068.68	* Element	*	Left OB	*	Channel	*	Right OB *
* Vel Head (ft)	*	1.03	* Wt. n-Val.	*		*	0.030	*	*
* W.S. Elev (ft)	*	2067.64	* Reach Len. (ft)	*	210.00	*	211.20	*	210.00 *
* Crit W.S. (ft)	*	2067.59	* Flow Area (sq ft)	*		*	859.74	*	*
* E.G. Slope (ft/ft)	*	0.009620	* Area (sq ft)	*	46.67	*	859.74	*	*
* Q Total (cfs)	*	7019.00	* Flow (cfs)	*		*	7019.00	*	*
* Top Width (ft)	*	433.80	* Top Width (ft)	*	39.79	*	394.00	*	*
* Vel Total (ft/s)	*	8.16	* Avg. Vel. (ft/s)	*		*	8.16	*	*
* Max Chl Dpth (ft)	*	3.07	* Hydr. Depth (ft)	*		*	2.18	*	*
* Conv. Total (cfs)	*	71562.4	* Conv. (cfs)	*		*	71562.4	*	*
* Length Wtd. (ft)	*	211.20	* Wetted Per. (ft)	*		*	394.64	*	*
* Min Ch El (ft)	*	2064.57	* Shear (lb/sq ft)	*		*	1.31	*	*
* Alpha	*	1.00	* Stream Power (lb/ft s)	*		*	10.68	*	*
* Frctn Loss (ft)	*	0.98	* Cum Volume (acre-ft)	*	19.22	*	92.94	*	4.39 *
* C & E Loss (ft)	*	0.16	* Cum SA (acres)	*	1.90	*	15.89	*	0.87 *

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, water surface was used.

CROSS SECTION

RIVER: Sols Wash
REACH: Sols Wash Main RS: 0.739

INPUT
Description:
Station Elevation Data num= 63

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9623.36	2069.41	9623.54	2069.41	9627.14	2069.37	9633.59	2069.3	9636.3	2069.25
9643.64	2069.01	9663.51	2068.66	9677.39	2068.26	9685.97	2067.11	9688.65	2066.91
9708.65	2063.67	9726.82	2063.7	9740.49	2063.7	9751.1	2063.7	9772.86	2063.7
9774.25	2063.7	9782.75	2063.7	9784.3	2063.7	9791.9	2063.7	9794.35	2063.7
9801.06	2063.7	9804.4	2063.7	9810.21	2063.7	9814.44	2063.7	9819.36	2063.7
9824.49	2063.7	9828.52	2063.7	9834.54	2063.7	9837.67	2063.7	9844.59	2063.7
9846.82	2063.7	9854.63	2063.7	9864.14	2063.7	9864.43	2063.7	9864.94	2063.7
9865.67	2063.7	9890.14	2063.7	9893.85	2063.7	9922.52	2063.7	9929.2	2063.7
9938.36	2063.7	9947.51	2063.7	9955.11	2063.7	9965.16	2063.7	9972.54	2063.62
9974.97	2063.57	9975.21	2063.57	9984.12	2063.35	9985.25	2063.32	9993.28	2063.21
9995.3	2063.18	9998.15	2062.97	10000	2063.22	10005	2063.7	10029	2063.7
10049	2063.7	10063	2063.7	10083	2071.62	10083.98	2071.61	10085.84	2071.61
10093.05	2071.58	10095.9	2071.56	10098.72	2071.55				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9623.36	.048	9677.39	.03	10083	.04

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

```
      9677.39   10083              115   116.2     115            .1       .3

CROSS SECTION OUTPUT  Profile #PF 1
*****************************************************************************************
* E.G. Elev (ft)         * 2070.02  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.70  * Wt. n-Val.              *   0.048  *   0.030  *          *
* W.S. Elev (ft)         * 2069.32  * Reach Len. (ft)         *  115.00  *  116.20  *  115.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)       *   22.96  * 2142.84  *          *
* E.G. Slope (ft/ft)     *0.001983  * Area (sq ft)            *   22.96  * 2142.84  *          *
* Q Total (cfs)          *14459.00  * Flow (cfs)              *   20.10  *14438.90  *          *
* Top Width (ft)         *  445.12  * Top Width (ft)          *   45.33  *  399.79  *          *
* Vel Total (ft/s)       *    6.68  * Avg. Vel. (ft/s)        *    0.88  *    6.74  *          *
* Max Chl Dpth (ft)      *    6.35  * Hydr. Depth (ft)        *    0.51  *    5.36  *          *
* Conv. Total (cfs)      *324719.6  * Conv. (cfs)             *   451.5  *324268.2  *          *
* Length Wtd. (ft)       *  116.20  * Wetted Per. (ft)        *   45.34  *  401.26  *          *
* Min Ch El (ft)         * 2062.97  * Shear (lb/sq ft)        *    0.06  *    0.66  *          *
* Alpha                  *    1.02  * Stream Power (lb/ft s)  *    0.05  *    4.45  *          *
* Frctn Loss (ft)        *    0.28  * Cum Volume (acre-ft)    *    7.29  *  120.87  *    5.23  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)          *    1.87  *   14.75  *    4.58  *
*****************************************************************************************

CROSS SECTION OUTPUT  Profile #PF 2
*****************************************************************************************
* E.G. Elev (ft)         * 2067.53  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.49  * Wt. n-Val.              *          *   0.030  *          *
* W.S. Elev (ft)         * 2067.04  * Reach Len. (ft)         *  115.00  *  116.20  *  115.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)       *          * 1244.12  *          *
* E.G. Slope (ft/ft)     *0.002720  * Area (sq ft)            *          * 1244.12  *          *
* Q Total (cfs)          * 7019.00  * Flow (cfs)              *          * 7019.00  *          *
* Top Width (ft)         *  384.50  * Top Width (ft)          *          *  384.50  *          *
* Vel Total (ft/s)       *    5.64  * Avg. Vel. (ft/s)        *          *    5.64  *          *
* Max Chl Dpth (ft)      *    4.07  * Hydr. Depth (ft)        *          *    3.24  *          *
* Conv. Total (cfs)      *134584.7  * Conv. (cfs)             *          *134584.7  *          *
* Length Wtd. (ft)       *  116.20  * Wetted Per. (ft)        *          *  385.45  *          *
* Min Ch El (ft)         * 2062.97  * Shear (lb/sq ft)        *          *    0.55  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s)  *          *    3.09  *          *
* Frctn Loss (ft)        *    0.44  * Cum Volume (acre-ft)    *   19.11  *   87.84  *    4.39  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)          *    1.80  *   14.00  *    0.87  *
*****************************************************************************************

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: Sols Wash Main     RS: 0.717

INPUT
Description:
Station Elevation Data    num=     138
      Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev
*****************************************************************************************
     9736     2074     9737     2074  9737.01     2070     9746     2069  9746.01     2066
     9747     2066  9747.01     2063     9755   2063.2  9767.74  2063.53  9768.92  2063.41
  9770.34   2063.4  9772.29   2063.4  9792.53  2063.21  9801.62   2063.6  9807.04   2063.6
     9837   2063.6  9840.25   2063.6  9845.29   2063.6  9854.99   2063.6  9857.44   2063.6
  9865.23   2063.6  9887.56   2063.6  9891.59   2063.6  9899.46   2063.6   9901.9   2063.6
  9907.71  2063.62   9912.2  2063.63  9915.97  2063.64   9922.5  2063.67  9924.23  2063.67
  9931.18  2063.66  9932.48  2063.65  9932.81  2063.65  9940.74  2063.55  9943.11  2063.52
  9948.99   2063.4  9953.41  2063.31  9957.25  2063.22  9963.71  2063.07  9965.51  2063.04
  9972.74   2062.9  9973.76  2062.88  9974.02  2062.87  9982.02  2062.79  9984.32  2062.76
  9990.27  2062.64  9994.62  2062.55    10000  2062.41 10003.98  2062.29 10007.95  2062.18
 10011.12  2062.06 10017.11     2063    10031   2063.5    10051   2063.5  10056.1   2063.5
 10056.44   2063.5    10076   2063.5    10096  2070.54 10097.41  2070.47  10097.6  2070.47
 10097.65  2070.47 10105.86  2070.43 10107.95  2070.42 10114.11  2070.41 10118.25   2070.4
 10122.37  2070.39 10128.56  2070.37 10130.63  2070.36 10138.86  2070.33 10138.88  2070.33
 10138.97  2070.33 10147.14  2070.32 10149.16  2070.31 10155.39  2070.31 10159.47  2070.31
 10163.65  2070.31 10169.77  2070.31 10171.91  2070.31 10180.07  2070.32 10180.16  2070.32
 10180.53  2070.32 10188.42  2070.33 10190.37  2070.33 10196.67  2070.35 10200.68  2070.36
 10204.93  2070.38 10210.98  2070.41 10213.18  2070.42 10221.28  2070.45 10221.44  2070.45
 10222.08  2070.46 10231.58  2070.49 10234.72  2070.48 10241.89  2070.48 10248.41  2070.45
 10252.19  2070.43 10262.11  2070.37 10262.49  2070.37 10263.64  2070.36 10270.98  2070.32
  10272.8  2070.31 10279.23  2070.28  10283.1  2070.26 10287.49  2070.22  10293.4  2070.13
  10299.9  2069.97 10308.84  2069.72 10310.52  2069.66 10318.44  2069.35 10344.14  2066.54
 10357.92  2066.05  10369.2  2066.07 10402.97  2070.83  10407.3  2072.11 10411.14  2071.59
 10429.47  2070.74 10436.87  2070.12 10460.35  2066.63 10483.25  2067.41  10487.2  2067.54
 10489.15  2067.57 10493.89  2067.57 10499.45  2067.57 10502.14  2067.54 10509.76  2067.48
```

```
 10510.4 2067.4610512.98 2067.4210518.65 2067.3410520.06 2067.3210526.91 2067.22
10530.36 2067.1710535.17 2067.1310540.67 2067.0710543.42 2067.0710550.97 2067.05
10551.68 2067.0610554.54 2067.0710554.73 2067.07

Manning's n Values        num=       2
     Sta   n Val     Sta   n Val
*******************************
    9736     .03   10096     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          9737   10096             175  174.24     175             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
   1009610554.73    2072       F

CROSS SECTION OUTPUT  Profile #PF 1
*****************************************************************************************
* E.G. Elev (ft)         * 2069.71  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.99  * Wt. n-Val.              *          *    0.030 *          *
* W.S. Elev (ft)         * 2068.72  * Reach Len. (ft)         *  175.00  *   174.24 *  175.00  *
* Crit W.S. (ft)         * 2067.26  * Flow Area (sq ft)       *          *  1807.54 *          *
* E.G. Slope (ft/ft)     *0.002939  * Area (sq ft)            *          *  1807.54 *  263.69  *
* Q Total (cfs)          *14459.00  * Flow (cfs)              *          *  14459.00 *          *
* Top Width (ft)         *  517.07  * Top Width (ft)          *          *   344.83 *  172.24  *
* Vel Total (ft/s)       *    8.00  * Avg. Vel. (ft/s)        *          *     8.00 *          *
* Max Chl Dpth (ft)      *    6.66  * Hydr. Depth (ft)        *          *     5.24 *          *
* Conv. Total (cfs)      *266717.5  * Conv. (cfs)             *          *  266717.5 *          *
* Length Wtd. (ft)       *  174.24  * Wetted Per. (ft)        *          *   351.52 *          *
* Min Ch El (ft)         * 2062.06  * Shear (lb/sq ft)        *          *     0.94 *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s)  *          *     7.55 *          *
* Frctn Loss (ft)        *    0.53  * Cum Volume (acre-ft)    *    7.26  *   115.60 *    4.88  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)          *    1.81  *    13.76 *    4.35  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
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)         * 2067.06  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.84  * Wt. n-Val.              *          *    0.030 *          *
* W.S. Elev (ft)         * 2066.21  * Reach Len. (ft)         *  175.00  *   174.24 *  175.00  *
* Crit W.S. (ft)         * 2065.77  * Flow Area (sq ft)       *          *   951.97 *          *
* E.G. Slope (ft/ft)     *0.005648  * Area (sq ft)            *          *   951.97 *    2.17  *
* Q Total (cfs)          * 7019.00  * Flow (cfs)              *          *  7019.00 *          *
* Top Width (ft)         *  354.57  * Top Width (ft)          *          *   337.70 *   16.87  *
* Vel Total (ft/s)       *    7.37  * Avg. Vel. (ft/s)        *          *     7.37 *          *
* Max Chl Dpth (ft)      *    4.15  * Hydr. Depth (ft)        *          *     2.82 *          *
* Conv. Total (cfs)      * 93396.3  * Conv. (cfs)             *          *  93396.3 *          *
* Length Wtd. (ft)       *  174.24  * Wetted Per. (ft)        *          *   341.49 *          *
* Min Ch El (ft)         * 2062.06  * Shear (lb/sq ft)        *          *     0.98 *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s)  *          *     7.25 *          *
* Frctn Loss (ft)        *    0.76  * Cum Volume (acre-ft)    *   19.11  *    84.91 *    4.38  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)          *    1.80  *    13.03 *    0.85  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
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: Sols Wash Main      RS: 0.684

INPUT
Description:
Station Elevation Data     num=      52
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
    9869    2074    9870    2074 9870.01    2069    9879    2068 9879.01    2065
    9880    2065 9880.01    2062 9884.41 2061.95 9886.46 2061.85 9914.96  2061.8
 9916.81 2061.64 9922.94 2061.56 9925.13 2061.54 9933.21 2061.52 9933.45 2061.51
 9934.48 2061.52 9941.78 2061.52 9943.48 2061.52  9950.1 2061.48 9953.76 2061.46
```

```
 9958.42 2061.42 9964.03 2061.35 9966.74 2061.34  9974.3 2061.27 9975.06 2061.27
 9978.32 2061.26 9983.38 2061.25 9984.57 2061.25  9991.7 2061.24 9994.84 2061.24
   10000 2061.2410000.02 2061.2410005.25 2061.23 10007.9 2061.2410015.68 2061.25
10015.78 2061.2510015.82 2061.2510023.66 2061.3410026.38 2061.3610031.54 2061.38
10040.61 2061.26   10067  2061.5   10087  2061.510089.77  2061.510094.59  2061.5
   10119  2061.5   10139 2069.4110139.76 2069.4410141.87 2069.4410142.59 2069.44
10149.75 2069.41 10150.6 2069.41

Manning's n Values        num=       2
     Sta   n Val     Sta   n Val
*********************************
    9869     .03   10139     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          9870   10139              125  126.72     125            .1       .3

CROSS SECTION OUTPUT  Profile #PF 1
*****************************************************************************************
* E.G. Elev (ft)         * 2069.16  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.30  * Wt. n-Val.              *          *   0.030  *          *
* W.S. Elev (ft)         * 2067.85  * Reach Len. (ft)        *  125.00  *  126.72  *  125.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *          * 1579.52  *          *
* E.G. Slope (ft/ft)     *0.003131  * Area (sq ft)           *          * 1579.52  *          *
* Q Total (cfs)          *14459.00  * Flow (cfs)             *          *14459.00  *          *
* Top Width (ft)         *  256.06  * Top Width (ft)         *          *  256.06  *          *
* Vel Total (ft/s)       *    9.15  * Avg. Vel. (ft/s)       *          *    9.15  *          *
* Max Chl Dpth (ft)      *    6.62  * Hydr. Depth (ft)       *          *    6.17  *          *
* Conv. Total (cfs)      *258408.8  * Conv. (cfs)            *          *258408.8  *          *
* Length Wtd. (ft)       *  126.72  * Wetted Per. (ft)       *          *  263.12  *          *
* Min Ch El (ft)         * 2061.23  * Shear (lb/sq ft)       *          *    1.17  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *   10.74  *          *
* Frctn Loss (ft)        *    0.45  * Cum Volume (acre-ft)   *    7.26  *  108.83  *    4.35  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *    1.81  *   12.56  *    4.01  *
*****************************************************************************************

CROSS SECTION OUTPUT  Profile #PF 2
*****************************************************************************************
* E.G. Elev (ft)         * 2066.29  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.79  * Wt. n-Val.              *          *   0.030  *          *
* W.S. Elev (ft)         * 2065.49  * Reach Len. (ft)        *  125.00  *  126.72  *  125.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *          *  982.11  *          *
* E.G. Slope (ft/ft)     *0.003437  * Area (sq ft)           *          *  982.11  *          *
* Q Total (cfs)          * 7019.00  * Flow (cfs)             *          * 7019.00  *          *
* Top Width (ft)         *  250.09  * Top Width (ft)         *          *  250.09  *          *
* Vel Total (ft/s)       *    7.15  * Avg. Vel. (ft/s)       *          *    7.15  *          *
* Max Chl Dpth (ft)      *    4.26  * Hydr. Depth (ft)       *          *    3.93  *          *
* Conv. Total (cfs)      *119726.4  * Conv. (cfs)            *          *119726.4  *          *
* Length Wtd. (ft)       *  126.72  * Wetted Per. (ft)       *          *  254.34  *          *
* Min Ch El (ft)         * 2061.23  * Shear (lb/sq ft)       *          *    0.83  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    5.92  *          *
* Frctn Loss (ft)        *    0.66  * Cum Volume (acre-ft)   *   19.11  *   81.04  *    4.38  *
* C & E Loss (ft)        *    0.07  * Cum SA (acres)         *    1.80  *   11.86  *    0.81  *
*****************************************************************************************

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

CROSS SECTION


RIVER: Sols Wash
REACH: Sols Wash Main     RS: 0.660

INPUT
Description:
Station Elevation Data    num=     130
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
    9945 2070.23    9946 2070.23    9946 2064.99 9947.74 2064.52 9955.78 2062.23
 9962.38 2059.96 9975.86 2060.19 9980.86 2060.29 9987.99 2060.35  9989.3 2060.36
 9995.56 2060.42 9997.75 2060.44 9998.21 2060.44   10000 2060.4710006.19 2060.56
10008.42  2060.610014.64 2060.6910018.64 2060.7610023.08 2060.8210048.41 2061.03
 10049.3 2061.0210056.86 2060.9910059.52 2060.97 10065.3 2060.9510069.73 2060.93
10073.75 2060.9510079.95    206110082.19 2061.0510094.31  2061.110103.66 2060.87
10111.85 2060.8510121.65 2060.84   10126 2060.88   10146  2060.910149.74 2060.92
   10169 2060.94   10189 2068.4310190.12 2068.3710191.97 2068.3610192.35 2068.36
10200.41 2068.3610202.57 2068.3610208.85 2068.3710212.79 2068.37 10217.3 2068.38
```

```
10223.01 2068.3810225.74 2068.3810233.23 2068.3710234.19 2068.3710238.76 2068.35
10242.63 2068.3410243.45 2068.3410251.08 2068.3310253.66 2068.3210259.52 2068.33
10263.88 2068.3310267.96 2068.34 10274.1 2068.3510276.41 2068.3510284.32 2068.35
10284.85 2068.36 10287.4 2068.36 10293.3 2068.3610294.54 2068.3610301.74 2068.36
10304.75 2068.3610310.19 2068.3710314.97 2068.3810318.63 2068.3910325.19 2068.41
10327.07 2068.4210335.41 2068.4310335.52 2068.4310336.04 2068.4310343.96 2068.42
10345.63 2068.4210352.41  2068.410355.85 2068.3910360.85 2068.3710366.06 2068.35
 10369.3 2068.3310376.28 2068.3110377.74  2068.310384.68 2068.2810386.18 2068.28
 10386.5 2068.2810394.63 2068.2810396.72 2068.2810403.07 2068.2910406.94 2068.29
10411.52 2068.2910417.16 2068.2910419.96 2068.2910427.37 2068.2710428.41 2068.26
10433.32 2068.2310436.85  2068.210437.59  2068.210445.29 2068.1310447.81  2068.1
10453.74 2068.0410458.03 2067.9910462.18 2067.9610468.25 2067.8910470.63 2067.88
10478.47 2067.8110479.07 2067.8110481.96 2067.7910487.52 2067.7610488.68 2067.74
10495.96 2067.66 10498.9 2067.5810519.58 2066.9210520.34 2066.8710524.48 2066.06
10537.97 2063.4410538.41 2063.4310539.06 2063.3310556.62 2063.27 10559.4 2063.33
10562.93  2063.310570.69 2063.4510585.81 2070.1810588.49 2069.8210600.99 2072.55
10615.02 2071.8210628.23 2071.1310633.99 2070.98 10636.5 2070.9510639.12 2069.86

Manning's n Values        num=       2
     Sta   n Val     Sta   n Val
*********************************
    9945     .03   10189     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          9945   10189              275     283     275            .1       .3
Ineffective Flow     num=        1
   Sta L   Sta R    Elev  Permanent
   1018910639.12    2070       F

CROSS SECTION OUTPUT  Profile #PF 1
*****************************************************************************************
* E.G. Elev (ft)          * 2068.68  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    1.60  * Wt. n-Val.              *          *   0.030  *          *
* W.S. Elev (ft)          * 2067.08  * Reach Len. (ft)        *  275.00  *  283.00  *  275.00  *
* Crit W.S. (ft)          * 2065.96  * Flow Area (sq ft)      *          * 1424.97  *          *
* E.G. Slope (ft/ft)      *0.003977  * Area (sq ft)           *          * 1424.97  *  172.12  *
* Q Total (cfs)           *14459.00  * Flow (cfs)             *          *14459.00  *          *
* Top Width (ft)          *  303.60  * Top Width (ft)         *          *  239.39  *   64.21  *
* Vel Total (ft/s)        *   10.15  * Avg. Vel. (ft/s)       *          *   10.15  *          *
* Max Chl Dpth (ft)       *    7.12  * Hydr. Depth (ft)       *          *    5.95  *          *
* Conv. Total (cfs)       *229288.5  * Conv. (cfs)            *          *229288.5  *          *
* Length Wtd. (ft)        *  283.00  * Wetted Per. (ft)       *          *  243.36  *          *
* Min Ch El (ft)          * 2059.96  * Shear (lb/sq ft)       *          *    1.45  *          *
* Alpha                   *    1.00  * Stream Power (lb/ft s) *          *   14.75  *          *
* Frctn Loss (ft)         *    0.65  * Cum Volume (acre-ft)   *    7.26  *  104.46  *    4.10  *
* C & E Loss (ft)         *    0.20  * Cum SA (acres)         *    1.81  *   11.84  *    3.92  *
*****************************************************************************************

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.
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)          * 2065.55  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    1.53  * Wt. n-Val.              *          *   0.030  *          *
* W.S. Elev (ft)          * 2064.02  * Reach Len. (ft)        *  275.00  *  283.00  *  275.00  *
* Crit W.S. (ft)          * 2064.02  * Flow Area (sq ft)      *          *  707.88  *          *
* E.G. Slope (ft/ft)      *0.008897  * Area (sq ft)           *          *  707.88  *   24.16  *
* Q Total (cfs)           * 7019.00  * Flow (cfs)             *          * 7019.00  *          *
* Top Width (ft)          *  264.76  * Top Width (ft)         *          *  227.75  *   37.01  *
* Vel Total (ft/s)        *    9.92  * Avg. Vel. (ft/s)       *          *    9.92  *          *
* Max Chl Dpth (ft)       *    4.06  * Hydr. Depth (ft)       *          *    3.11  *          *
* Conv. Total (cfs)       * 74412.2  * Conv. (cfs)            *          * 74412.2  *          *
* Length Wtd. (ft)        *          * Wetted Per. (ft)       *          *  228.95  *          *
* Min Ch El (ft)          * 2059.96  * Shear (lb/sq ft)       *          *    1.72  *          *
* Alpha                   *    1.00  * Stream Power (lb/ft s) *          *   17.03  *          *
* Frctn Loss (ft)         *          * Cum Volume (acre-ft)   *   19.11  *   78.58  *    4.34  *
* C & E Loss (ft)         *          * Cum SA (acres)         *    1.80  *   11.16  *    0.76  *
*****************************************************************************************

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

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: Sols Wash Main RS: 0.606

INPUT
Description:
Station Elevation Data num= 147

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9941	2069.82	9942	2069.82	9943	2059.4	9961.36	2057.8	9983.83	2057.4
9991.09	2057.53	9995.72	2057.59	9995.95	2057.59	9997.87	2057.61	10000	2057.64
10004.94	2057.71	10005.79	2057.71	10013.93	2057.81	10015.87	2057.82	10022.92	2057.87
10025.94	2057.89	10031.91	2057.94	10036.01	2057.96	10040.9	2058.01	10046.08	2058.06
10049.89	2058.11	10056.15	2058.18	10058.88	2058.21	10066.23	2058.28	10067.87	2058.29
10076.3	2058.34	10076.86	2058.34	10081.5	2058.28	10085.85	2058.22	10087.7	2058.16
10095.7	2057.91	10099.86	2057.81	10103.09	2057.66	10106.07	2057.85	10111.97	2058
10143	2058.5	10163	2066.5	10175	2066.51	10175.74	2066.51	10177.02	2066.52
10184.73	2066.59	10187.09	2066.61	10193.72	2066.65	10197.17	2066.67	10202.71	2066.69
10207.24	2066.7	10211.7	2066.71	10217.31	2066.71	10220.69	2066.69	10227.38	2066.67
10229.68	2066.66	10237.46	2066.61	10238.67	2066.61	10247.53	2066.55	10247.66	2066.55
10248.76	2066.55	10256.65	2066.51	10257.6	2066.51	10265.64	2066.47	10267.67	2066.45
10274.63	2066.41	10277.74	2066.38	10283.62	2066.34	10287.82	2066.31	10292.61	2066.28
10297.89	2066.25	10301.6	2066.24	10307.96	2066.22	10310.59	2066.22	10318.03	2066.22
10319.58	2066.22	10328.11	2066.23	10328.57	2066.24	10332.39	2066.25	10337.56	2066.26
10338.18	2066.26	10346.54	2066.29	10348.25	2066.31	10355.53	2066.31	10358.32	2066.32
10364.52	2066.33	10368.39	2066.33	10373.51	2066.32	10378.47	2066.31	10382.5	2066.3
10388.54	2066.28	10391.49	2066.27	10398.61	2066.25	10400.48	2066.24	10408.68	2066.23
10409.47	2066.23	10416.02	2066.23	10418.46	2066.23	10418.76	2066.23	10427.45	2066.24
10428.83	2066.24	10436.44	2066.25	10438.9	2066.25	10445.43	2066.24	10448.97	2066.24
10454.42	2066.23	10459.05	2066.22	10463.41	2066.21	10469.12	2066.16	10472.4	2066.13
10479.19	2066.06	10481.39	2066.03	10489.26	2065.91	10490.38	2065.89	10499.33	2065.76
10499.37	2065.76	10499.65	2065.75	10508.36	2065.68	10509.41	2065.67	10517.35	2065.67
10519.48	2065.68	10526.34	2065.72	10529.55	2065.75	10535.33	2065.78	10539.62	2065.81
10544.32	2065.8	10549.7	2065.79	10553.31	2065.72	10559.77	2065.62	10568	2065.35
10570.86	2065.22	10572.22	2065.13	10581.93	2064.76	10588.11	2064.43	10591.37	2064.34
10599	2064.55	10600.83	2064.61	10612.94	2064.42	10617.46	2064.51	10620.29	2064.84
10625.88	2065.22	10628.74	2065.14	10630.26	2065.15	10631.61	2065.74	10634.16	2066.06
10645.63	2071.61	10646.87	2072.07	10647.22	2072.05	10651.23	2073.89	10657.44	2073.9
10684.31	2074.28	10697.73	2074.07						

Manning's n Values num= 2

Sta	n Val	Sta	n Val
9941	.03	10163	.04

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9941	10163	325	344	325	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
10163	10697.73	2070	F

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2067.83	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.93	Wt. n-Val.		0.030	
W.S. Elev (ft)	2066.89	Reach Len. (ft)	325.00	344.00	325.00
Crit W.S. (ft)	2063.43	Flow Area (sq ft)		1865.94	
E.G. Slope (ft/ft)	0.001494	Area (sq ft)		1865.94	406.76
Q Total (cfs)	14459.00	Flow (cfs)		14459.00	
Top Width (ft)	693.60	Top Width (ft)		220.72	472.89
Vel Total (ft/s)	7.75	Avg. Vel. (ft/s)		7.75	
Max Chl Dpth (ft)	9.49	Hydr. Depth (ft)		8.45	
Conv. Total (cfs)	374055.3	Conv. (cfs)		374055.3	
Length Wtd. (ft)	344.00	Wetted Per. (ft)		229.17	
Min Ch El (ft)	2057.40	Shear (lb/sq ft)		0.76	
Alpha	1.00	Stream Power (lb/ft s)		5.89	
Frctn Loss (ft)	0.37	Cum Volume (acre-ft)	7.26	93.77	2.27
C & E Loss (ft)	0.08	Cum SA (acres)	1.81	10.34	2.22

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)	2063.02	Element	Left OB	Channel	Right OB	
Vel Head (ft)	1.63	Wt. n-Val.		0.030		
W.S. Elev (ft)	2061.39	Reach Len. (ft)	325.00	344.00	325.00	
Crit W.S. (ft)	2061.38	Flow Area (sq ft)		684.26		
E.G. Slope (ft/ft)	0.008871	Area (sq ft)		684.26		
Q Total (cfs)	7019.00	Flow (cfs)		7019.00		
Top Width (ft)	207.40	Top Width (ft)		207.40		
Vel Total (ft/s)	10.26	Avg. Vel. (ft/s)		10.26		
Max Chl Dpth (ft)	3.98	Hydr. Depth (ft)		3.30		
Conv. Total (cfs)	74522.0	Conv. (cfs)		74522.0		
Length Wtd. (ft)	344.00	Wetted Per. (ft)		209.86		
Min Ch El (ft)	2057.40	Shear (lb/sq ft)		1.81		
Alpha	1.00	Stream Power (lb/ft s)		18.52		
Frctn Loss (ft)	1.23	Cum Volume (acre-ft)	19.11	74.06	4.27	
C & E Loss (ft)	0.29	Cum SA (acres)	1.80	9.75	0.64	

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, water
surface was used.

CROSS SECTION

RIVER: Sols Wash
REACH: Sols Wash Main RS: 0.541

INPUT
Description: Filled right overbank approximately 2'.
Station Elevation Data num= 36

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9894	2068	9895	2068	9895.01	2062	9904	2061	9904.01	2058
9905	2058	9905.01	2055	9925.29	2054.9	9944.7	2055.38	9946.07	2055.43
9948.29	2055.45	9956.26	2055.45	9960.91	2055.45	9966.44	2055.43	9973.52	2055.45
9976.62	2055.46	9986.14	2055.52	9986.81	2055.53	9989.61	2055.54	9996.99	2055.57
9998.75	2055.58	10000	2055.58	10007.08	2055.61	10008.24	2055.62	10017.13	2055.65
10017.38	2055.65	10019.85	2055.58	10026.52	2055.41	10027.75	2055.37	10043.49	2054.68
10064.7	2055	10083.1	2055	10090	2055	10110	2066.6	10130	2066.75
10145	2066.8								

Manning's n Values num= 2

Sta	n Val	Sta	n Val
9894	.03	10110	.04

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9895	10110	200	231	200	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2067.38	Element	Left OB	Channel	Right OB	
Vel Head (ft)	0.66	Wt. n-Val.		0.030	0.040	
W.S. Elev (ft)	2066.71	Reach Len. (ft)	200.00	231.00	200.00	
Crit W.S. (ft)		Flow Area (sq ft)		2299.77	0.87	
E.G. Slope (ft/ft)	0.000805	Area (sq ft)		2299.77	0.87	
Q Total (cfs)	15045.00	Flow (cfs)		15044.86	0.14	
Top Width (ft)	230.24	Top Width (ft)		215.00	15.24	
Vel Total (ft/s)	6.54	Avg. Vel. (ft/s)		6.54	0.16	
Max Chl Dpth (ft)	12.03	Hydr. Depth (ft)		10.70	0.06	
Conv. Total (cfs)	530397.3	Conv. (cfs)		530392.5	4.8	
Length Wtd. (ft)	231.00	Wetted Per. (ft)		228.89	15.24	
Min Ch El (ft)	2054.68	Shear (lb/sq ft)		0.50	0.00	
Alpha	1.00	Stream Power (lb/ft s)		3.30	0.00	
Frctn Loss (ft)	0.19	Cum Volume (acre-ft)	7.26	77.32	0.75	
C & E Loss (ft)	0.03	Cum SA (acres)	1.81	8.62	0.40	

CROSS SECTION OUTPUT Profile #PF 2

				Left OB	Channel	Right OB
E.G. Elev (ft)	2061.50	Element				
Vel Head (ft)	0.67	Wt. n-Val.			0.030	
W.S. Elev (ft)	2060.83	Reach Len. (ft)		200.00	231.00	200.00
Crit W.S. (ft)		Flow Area (sq ft)			1069.13	
E.G. Slope (ft/ft)	0.001921	Area (sq ft)			1069.13	
Q Total (cfs)	7019.00	Flow (cfs)			7019.00	
Top Width (ft)	196.05	Top Width (ft)			196.05	
Vel Total (ft/s)	6.57	Avg. Vel. (ft/s)			6.57	
Max Chl Dpth (ft)	6.15	Hydr. Depth (ft)			5.45	
Conv. Total (cfs)	160125.9	Conv. (cfs)			160125.9	
Length Wtd. (ft)	231.00	Wetted Per. (ft)			203.33	
Min Ch El (ft)	2054.68	Shear (lb/sq ft)			0.63	
Alpha	1.00	Stream Power (lb/ft s)			4.14	
Frctn Loss (ft)	0.42	Cum Volume (acre-ft)		19.11	67.14	4.27
C & E Loss (ft)	0.01	Cum SA (acres)		1.80	8.16	0.64

CROSS SECTION

RIVER: Sols Wash
REACH: Sols Wash Main RS: 0.497

INPUT
Description:
Station Elevation Data num= 66

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9899	2069.26	9900	2069.26	9900	2064.93	9903.39	2064.93	9911.96	2061.26
9931	2057.45	9943.66	2054.26	9951.99	2054.29	9954.42	2054.29	9958.12	2054.28
9965.18	2054.27	9969.82	2054.29	9975.94	2054.32	9985.24	2054.37	9986.7	2054.38
9987.65	2054.38	9997.45	2054.39	10000	2054.37	10006.61	2054.32	10008.48	2054.31
10010.48	2054.28	10019.58	2054.16	10028.1	2054.04	10030.69	2054.01	10033.46	2053.97
10041.8	2053.84	10049.6	2053.72	10052.9	2053.67	10056.44	2053.62	10064.01	2053.5
10071.09	2053.41	10075.12	2053.34	10079.42	2053.27	10086.22	2053.21	10092.58	2053.18
10097.33	2053.14	10102.4	2053.13	10121.21	2058.63	10126.72	2061.01	10131.08	2061.61
10146.14	2064.81	10168.18	2064.86	10176.73	2065	10190.5	2065.17	10204.11	2065.51
10206.58	2065.54	10208.13	2065.57	10229.32	2066.58	10236.72	2066.81	10245.44	2066.95
10257.87	2067.01	10265.57	2067.11	10277.79	2066.59	10279.67	2066.46	10281.29	2066.65
10294.74	2067.09	10302.76	2067.51	10318.86	2066.32	10330.31	2067.81	10334.85	2067.84
10343.81	2067.77	10353.53	2067.81	10361.19	2068.15	10368.86	2068.26	10372.33	2068.11
10375.72	2068.23								

Manning's n Values num= 2

Sta	n Val	Sta	n Val
9899	.031	10146.14	.065

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9903.39	10146.14	100	124	100	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
9899	9943.7	2069	F
10100.67	10375.72	2069	F

CROSS SECTION OUTPUT Profile #PF 1

				Left OB	Channel	Right OB
E.G. Elev (ft)	2067.16	Element				
Vel Head (ft)	0.95	Wt. n-Val.			0.030	
W.S. Elev (ft)	2066.21	Reach Len. (ft)		2.00	2.00	2.00
Crit W.S. (ft)	2060.52	Flow Area (sq ft)			1926.85	
E.G. Slope (ft/ft)	0.000878	Area (sq ft)		4.34	2534.28	75.54
Q Total (cfs)	15045.00	Flow (cfs)			15045.00	
Top Width (ft)	321.54	Top Width (ft)		3.39	242.75	75.41
Vel Total (ft/s)	7.81	Avg. Vel. (ft/s)			7.81	
Max Chl Dpth (ft)	13.08	Hydr. Depth (ft)			12.28	
Conv. Total (cfs)	507837.8	Conv. (cfs)			507837.8	
Length Wtd. (ft)	2.00	Wetted Per. (ft)			156.98	
Min Ch El (ft)	2053.13	Shear (lb/sq ft)			0.67	
Alpha	1.00	Stream Power (lb/ft s)			5.25	
Frctn Loss (ft)		Cum Volume (acre-ft)		7.25	64.50	0.58
C & E Loss (ft)		Cum SA (acres)		1.80	7.41	0.19

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)	2061.07	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.76	Wt. n-Val.		0.030	
W.S. Elev (ft)	2060.31	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)	2057.90	Flow Area (sq ft)		1000.32	
E.G. Slope (ft/ft)	0.001699	Area (sq ft)		1176.26	
Q Total (cfs)	7019.00	Flow (cfs)		7019.00	
Top Width (ft)	208.37	Top Width (ft)		208.37	
Vel Total (ft/s)	7.02	Avg. Vel. (ft/s)		7.02	
Max Chl Dpth (ft)	7.18	Hydr. Depth (ft)		6.37	
Conv. Total (cfs)	170298.2	Conv. (cfs)		170298.2	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		156.98	
Min Ch El (ft)	2053.13	Shear (lb/sq ft)		0.68	
Alpha	1.00	Stream Power (lb/ft s)		4.74	
Frctn Loss (ft)		Cum Volume (acre-ft)	19.11	61.18	4.27
C & E Loss (ft)		Cum SA (acres)	1.80	7.09	0.64

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

BRIDGE

RIVER: Sols Wash
REACH: Sols Wash Main RS: 0.486

INPUT
Description:
Distance from Upstream XS = 2
Deck/Roadway Width = 120
Weir Coefficient = 2.6
Upstream Deck/Roadway Coordinates
num= 34

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
9849.475	2065.98		9932.45	2066.68		9932.45	2069.39	
9935.98	2069.39		9935.98	2067.89		9943.7	2067.25	2063.13
9948	2067.25	2063.53	9964.32	2067.27	2063.53	9968.62	2067.27	2063.13
9969.87	2067.27	2063.13	9974.17	2067.27	2063.53	9990.82	2067.32	2063.53
9995.13	2067.32	2063.13	9996.38	2067.32	2063.13	10000.68	2067.32	2063.53
10016.95	2067.26	2063.53	10021.25	2067.26	2063.13	10022.5	2067.26	2063.13
10026.8	2067.26	2063.53	10043.77	2067.26	2063.53	10048.07	2067.26	2063.13
10049.32	2067.26	2063.13	10053.62	2067.26	2063.53	10070.21	2067.26	2063.53
10074.5	2067.26	2063.13	10075.76	2067.26	2063.13	10080.06	2067.26	2063.53
10096.38	2067.34	2063.53	10100.67	2067.34	2063.13	10131.53	2068.1	
10131.53	2069.6		10135.06	2069.6		10135.06	2066.2	
10351.86	2068.18							

Upstream Bridge Cross Section Data
Station Elevation Data num= 66

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9899	2069.26	9900	2069.26	9900	2064.93	9903.39	2064.93	9911.96	2061.26
9931	2057.45	9943.66	2054.26	9951.99	2054.29	9954.42	2054.29	9958.12	2054.28
9965.18	2054.27	9969.82	2054.29	9975.94	2054.32	9985.24	2054.37	9986.7	2054.38
9987.65	2054.38	9997.45	2054.39	10000	2054.37	10006.61	2054.32	10008.48	2054.31
10010.48	2054.28	10019.58	2054.16	10028.1	2054.04	10030.69	2054.01	10033.46	2053.97
10041.8	2053.84	10049.6	2053.72	10052.9	2053.67	10056.44	2053.62	10064.01	2053.5
10071.09	2053.41	10075.12	2053.34	10079.42	2053.27	10086.22	2053.21	10092.58	2053.18
10097.33	2053.14	10102.4	2053.13	10121.21	2058.63	10126.72	2061.01	10131.08	2061.61
10146.14	2064.81	10168.18	2064.86	10176.73	2065	10190.5	2065.17	10204.11	2065.51
10206.58	2065.54	10208.13	2065.57	10229.32	2066.58	10236.72	2066.81	10245.44	2066.95
10257.87	2067.01	10265.57	2067.11	10277.79	2066.59	10279.67	2066.46	10281.29	2066.65
10294.74	2067.09	10302.76	2067.5	10318.86	2066.32	10330.31	2067.81	10334.85	2067.84
10343.81	2067.77	10353.53	2067.81	10361.19	2068.15	10368.86	2068.26	10372.33	2068.11
10375.72	2068.23								

Manning's n Values num= 2

Sta	n Val	Sta	n Val
9899	.031	10146.14	.065

Bank Sta: Left Right Coeff Contr. Expan.

```
      9903.3910146.14              .3        .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
    9899  9943.7    2069       F
10100.6710375.72    2069       F

Downstream  Deck/Roadway Coordinates
    num=      36
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
*********************************************************************
9263.961 2063.18        9647.821 2064.18          9906.3 2065.75
  9906.3 2069.15         9909.84 2069.15         9909.84 2067.65
 9917.28  2067.3 2063.13 9921.58  2067.3 2063.53  9939.5 2067.34 2063.53
  9943.8 2067.34 2063.13 9945.05 2067.34 2063.13 9949.35 2067.34 2063.53
 9968.24 2067.31 2063.53 9972.54 2067.31 2063.13 9973.79 2067.31 2063.13
 9978.09 2067.31 2063.53 9994.53 2067.38 2063.53 9998.83 2067.38 2063.13
10000.08 2067.38 2063.1310004.38 2067.38 2063.5310020.96 2067.35 2063.53
10025.26 2067.35 2063.1310026.51 2067.35 2063.1310030.81 2067.35 2063.53
10047.32 2067.34 2063.5310051.62 2067.34 2063.1310052.87 2067.34 2063.13
10057.17 2067.34 2063.5310074.12 2067.27 2063.5310078.41 2067.27 2063.13
10085.75 2067.93        10085.75 2069.43        10089.29 2069.43
10089.29 2066.03        10118.06 2066.18        10334.86 2068.18

Downstream Bridge Cross Section Data
Station Elevation Data    num=      33
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9917.25    2066 9917.28 2055.12 9922.58 2054.16 9934.54 2053.11  9935.2 2053.11
 9935.95 2053.11 9946.26 2053.11 9955.46 2053.12 9957.31 2053.12  9959.4 2053.12
 9968.37 2053.12 9976.37 2053.12 9979.42 2053.12 9982.85 2053.12 9990.48 2053.11
 9997.29 2053.06   10000 2053.0510001.54 2053.04 10006.3 2053.0110012.59 2052.96
 10018.2 2052.9310023.65 2052.8910029.75 2052.84 10034.7 2052.8110039.12 2052.78
10045.76 2052.73 10053.2 2052.6810056.81 2052.6610060.04 2052.6410067.87 2052.58
10076.65 2052.52 10078.4 2052.5110078.42    2066

Manning's n Values        num=       1
     Sta   n Val
****************
 9917.25     .03

Bank Sta: Left   Right    Coeff Contr.   Expan.
       9917.2510078.42              .3        .5

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         = 2067.26
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=9969.245    Downstream=9944.431
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
    1.25  1949.5    1.25  2063.6
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
    1.25  1949.5    1.25  2063.6
Debris Width  =      2.5
Debris Height =     2064

Pier Data
Pier Station     Upstream=9995.747    Downstream=9973.167
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
    1.25  1949.5    1.25  2063.6
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
    1.25  1949.5    1.25  2063.6
Debris Width  =      2.5
Debris Height =     2064
```

```
Pier Data
Pier Station     Upstream=10021.87    Downstream=9999.458
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
    1.25  1949.5    1.25  2063.6
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
    1.25  1949.5    1.25  2063.6
Debris Width  =      2.5
Debris Height =     2064

Pier Data
Pier Station     Upstream=10048.69    Downstream=10025.88
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
    1.25  1949.5    1.25  2063.6
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
    1.25  1949.5    1.25  2063.6
Debris Width  =      2.5
Debris Height =     2064

Pier Data
Pier Station     Upstream=10075.13    Downstream=10052.24
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
    1.25  1949.5    1.25  2063.6
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
    1.25  1949.5    1.25  2063.6
Debris Width  =      2.5
Debris Height =     2064

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
*******************************************************************************************
* E.G. US. (ft)          *    2067.16  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *    2066.21  * E.G. Elev (ft)         *    2067.16  *    2063.87  *
* Q Total (cfs)          *   15045.00  * W.S. Elev (ft)         *    2063.53  *    2062.29  *
* Q Bridge (cfs)         *   15045.00  * Crit W.S. (ft)         *    2060.88  *    2059.71  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *      10.40  *       9.78  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *      10.91  *      10.51  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *    1378.85  *    1432.02  *
* Weir Submerg           *             * Froude # Chl           *       0.62  *       0.61  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *   11767.53  *   11542.16  *
* Min El Weir Flow (ft)  *    2067.28  * Hydr Depth (ft)        *  117661.60  *       9.25  *
* Min El Prs (ft)        *    2063.53  * W.P. Total (ft)        *     433.30  *     246.25  *
* Delta EG (ft)          *       3.29  * Conv. Total (cfs)      *   147754.5  *   229372.0  *
* Delta WS (ft)          *       3.92  * Top Width (ft)         *       0.01  *     154.88  *
* BR Open Area (sq ft)   *    1378.85  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *      10.91  * C & E Loss (ft)        *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *       2.06  *       1.56  *
* Br Sel Method          * Press Only  * Power Total (lb/ft s)  *      22.47  *      16.41  *
```

```
*****************************************************************************************

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.

BRIDGE OUTPUT  Profile #PF 2
*****************************************************************************************
* E.G. US. (ft)          *    2061.07  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *    2060.31  * E.G. Elev (ft)         *    2060.95  *    2059.21  *
* Q Total (cfs)          *    7019.00  * W.S. Elev (ft)         *    2059.94  *    2057.80  *
* Q Bridge (cfs)         *    7019.00  * Crit W.S. (ft)         *    2058.14  *    2057.06  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)      *       6.80  *       5.29  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)       *       8.09  *       9.53  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)      *     867.59  *     736.31  *
* Weir Submerg           *             * Froude # Chl           *       0.58  *       0.77  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)   *    4382.33  *    3841.52  *
* Min El Weir Flow (ft)  *    2067.28  * Hydr Depth (ft)        *       6.01  *       4.75  *
* Min El Prs (ft)        *    2063.53  * W.P. Total (ft)        *     240.15  *     202.09  *
* Delta EG (ft)          *       1.88  * Conv. Total (cfs)      *   101175.3  *    86351.8  *
* Delta WS (ft)          *       2.31  * Top Width (ft)         *     144.51  *     154.89  *
* BR Open Area (sq ft)   *    1378.85  * Frctn Loss (ft)        *             *             *
* BR Open Vel (ft/s)     *       9.53  * C & E Loss (ft)        *             *             *
* Coef of Q              *             * Shear Total (lb/sq ft) *       1.09  *       1.50  *
* Br Sel Method          *   Momentum  * Power Total (lb/ft s)  *       8.78  *      14.33  *
*****************************************************************************************

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: Sols Wash Main      RS: 0.474

INPUT
Description:
Station Elevation Data     num=      33
     Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev
*****************************************************************************************
 9917.25     2066 9917.28 2055.12 9922.58 2054.16 9934.54 2053.11  9935.2 2053.11
 9935.95 2053.11 9946.26 2053.11 9955.46 2053.12 9957.31 2053.12  9959.4 2053.12
 9968.37 2053.12 9976.37 2053.12 9979.42 2053.12 9982.85 2053.12 9990.48 2053.11
 9997.29 2053.06   10000 2053.0510001.54 2053.04 10006.3 2053.0110012.59 2052.96
 10018.2 2052.9310023.65 2052.8910029.75 2052.84 10034.7 2052.8110039.12 2052.78
10045.76 2052.73 10053.2 2052.6810056.81 2052.6610060.04 2052.6410067.87 2052.58
10076.65 2052.52 10078.4 2052.5110078.42     2066

Manning's n Values         num=       1
     Sta   n Val
****************
 9917.25     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9917.2510078.42              125     151     125            .3        .5

CROSS SECTION OUTPUT  Profile #PF 1
*****************************************************************************************
* E.G. Elev (ft)         * 2063.87  * Element              *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.58  * Wt. n-Val.           *          *    0.030  *          *
* W.S. Elev (ft)         * 2062.29  * Reach Len. (ft)      *  125.00  *   151.00  *  125.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)    *          *  1490.29  *          *
* E.G. Slope (ft/ft)     *0.002438  * Area (sq ft)         *          *  1490.29  *          *
* Q Total (cfs)          *15045.00  * Flow (cfs)           *          * 15045.00  *          *
* Top Width (ft)         *  161.15  * Top Width (ft)       *          *   161.15  *          *
* Vel Total (ft/s)       *   10.10  * Avg. Vel. (ft/s)     *          *    10.10  *          *
* Max Chl Dpth (ft)      *    9.78  * Hydr. Depth (ft)     *          *     9.25  *          *
* Conv. Total (cfs)      *304675.3  * Conv. (cfs)          *          * 304675.3  *          *
* Length Wtd. (ft)       *  151.00  * Wetted Per. (ft)     *          *   177.72  *          *
```

```
* Min Ch El (ft)         * 2052.51  * Shear (lb/sq ft)       *          *    1.28  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *   12.89  *          *
* Frctn Loss (ft)        *    0.34  * Cum Volume (acre-ft)   *    7.25  *   60.47  *    0.58  *
* C & E Loss (ft)        *    0.18  * Cum SA (acres)         *    1.80  *    7.18  *    0.19  *
*****************************************************************************************

CROSS SECTION OUTPUT  Profile #PF 2
*****************************************************************************************
* E.G. Elev (ft)         * 2059.19  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.20  * Wt. n-Val.             *          *    0.030  *          *
* W.S. Elev (ft)         * 2057.99  * Reach Len. (ft)        *  125.00  *   151.00  *  125.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *          *   798.14  *          *
* E.G. Slope (ft/ft)     *0.003993  * Area (sq ft)           *          *   798.14  *          *
* Q Total (cfs)          * 7019.00  * Flow (cfs)             *          *  7019.00  *          *
* Top Width (ft)         *  161.14  * Top Width (ft)          *          *   161.14  *          *
* Vel Total (ft/s)       *    8.79  * Avg. Vel. (ft/s)        *          *    8.79  *          *
* Max Chl Dpth (ft)      *    5.48  * Hydr. Depth (ft)        *          *    4.95  *          *
* Conv. Total (cfs)      *111078.9  * Conv. (cfs)            *          *111078.9  *          *
* Length Wtd. (ft)       *  151.00  * Wetted Per. (ft)        *          *   169.46  *          *
* Min Ch El (ft)         * 2052.51  * Shear (lb/sq ft)       *          *    1.17  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *   10.33  *          *
* Frctn Loss (ft)        *    0.45  * Cum Volume (acre-ft)   *   19.11  *   58.89  *    4.27  *
* C & E Loss (ft)        *    0.15  * Cum SA (acres)         *    1.80  *    6.66  *    0.64  *
*****************************************************************************************

CROSS SECTION


RIVER: Sols Wash
REACH: Sols Wash Main      RS: 0.445

INPUT
Description: roadway in left over bank at Elev=2057.4 +/-
parking lot in right
             over bank at Elev=2063+/-
Station Elevation Data     num=      29
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
    9917  2065.5 9917.01 2051.75 9944.02  2051.6  9948.3  2051.4 9962.79 2051.25
 9977.54 2051.07  9981.5  2051.1 9983.25 2051.12 9991.52 2051.19 9992.69  2051.2
   10000 2051.2610001.54 2051.2710002.12 2051.2710011.56 2051.3510011.61 2051.35
   10021 2051.4310021.58 2051.4410030.43 2051.51 10031.6 2051.5210039.87 2051.59
10041.61 2051.61 10055.6 2051.73   10064 2051.7510064.02 2054.75   10065 2054.75
10065.02 2057.75   10115    206210115.02    2063   10116    2063

Manning's n Values         num=       1
     Sta   n Val
****************
    9917     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          991710115.02              100     107     100             .1       .3

CROSS SECTION OUTPUT  Profile #PF 1
*****************************************************************************************
* E.G. Elev (ft)         * 2063.35  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.23  * Wt. n-Val.             *          *    0.030  *          *
* W.S. Elev (ft)         * 2062.13  * Reach Len. (ft)        *  100.00  *   107.00  *  100.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *          *  1690.57  *          *
* E.G. Slope (ft/ft)     *0.002060  * Area (sq ft)           *          *  1690.57  *          *
* Q Total (cfs)          *15045.00  * Flow (cfs)             *          *15045.00  *          *
* Top Width (ft)         *  198.00  * Top Width (ft)          *          *   198.00  *          *
* Vel Total (ft/s)       *    8.90  * Avg. Vel. (ft/s)        *          *    8.90  *          *
* Max Chl Dpth (ft)      *   11.05  * Hydr. Depth (ft)        *          *    8.54  *          *
* Conv. Total (cfs)      *331502.5  * Conv. (cfs)            *          *331502.5  *          *
* Length Wtd. (ft)       *  107.00  * Wetted Per. (ft)        *          *   214.62  *          *
* Min Ch El (ft)         * 2051.07  * Shear (lb/sq ft)       *          *    1.01  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    9.01  *          *
* Frctn Loss (ft)        *    0.20  * Cum Volume (acre-ft)   *    7.25  *   54.96  *    0.58  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)         *    1.80  *    6.56  *    0.19  *
*****************************************************************************************

CROSS SECTION OUTPUT  Profile #PF 2
*****************************************************************************************
* E.G. Elev (ft)         * 2058.60  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.90  * Wt. n-Val.             *          *    0.030  *          *
* W.S. Elev (ft)         * 2057.70  * Reach Len. (ft)        *  100.00  *   107.00  *  100.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *          *   922.98  *          *
* E.G. Slope (ft/ft)     *0.002268  * Area (sq ft)           *          *   922.98  *          *
```

Q Total (cfs)	7019.00	Flow (cfs)		7019.00			
Top Width (ft)	148.01	Top Width (ft)		148.01			
Vel Total (ft/s)	7.60	Avg. Vel. (ft/s)		7.60			
Max Chl Dpth (ft)	6.63	Hydr. Depth (ft)		6.24			
Conv. Total (cfs)	147394.5	Conv. (cfs)		147394.5			
Length Wtd. (ft)	107.00	Wetted Per. (ft)		159.43			
Min Ch El (ft)	2051.07	Shear (lb/sq ft)		0.82			
Alpha	1.00	Stream Power (lb/ft s)		6.23			
Frctn Loss (ft)	0.22	Cum Volume (acre-ft)	19.11	55.91		4.27	
C & E Loss (ft)	0.03	Cum SA (acres)	1.80	6.12		0.64	

CROSS SECTION

RIVER: Sols Wash
REACH: Sols Wash Main RS: 0.425

INPUT
Description:
Station Elevation Data num= 37

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9901	2065.25	9902	2065.25	9902.02	2058	9911	2056.75	9911.02	2053.75
9912	2053.75	9912.02	2050.75	9918.64	2050.7	9920.38	2050.65	9921.58	2050.6
9928.4	2050.55	9931.63	2050.5	9937.52	2050.45	9952.48	2050.4	9957.56	2050.38
9958.86	2050.38	9970.3	2050.25	9980.94	2050.22	9983.11	2050.12	9991.95	2050.02
9992.22	2050.02	9994.92	2049.99	10000	2049.94	10001.34	2049.93	10002	2049.92
10010.46	2049.86	10012.05	2049.84	10019.58	2049.79	10020.78	2049.78	10027.09	2050.22
10043	2050.25	10043.02	2053.25	10044	2053.25	10044.02	2056.25	10066	2060.5
10066.02	2063.55	10067	2063.55						

Manning's n Values num= 1

Sta	n Val
9901	.03

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9902	10066.02	275	291	275	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2063.15	Element	Left OB	Channel	Right OB	
Vel Head (ft)	1.28	Wt. n-Val.		0.030		
W.S. Elev (ft)	2061.86	Reach Len. (ft)	275.00	291.00	275.00	
Crit W.S. (ft)		Flow Area (sq ft)		1656.39		
E.G. Slope (ft/ft)	0.001765	Area (sq ft)		1656.39		
Q Total (cfs)	15045.00	Flow (cfs)		15045.00		
Top Width (ft)	164.00	Top Width (ft)		164.00		
Vel Total (ft/s)	9.08	Avg. Vel. (ft/s)		9.08		
Max Chl Dpth (ft)	12.08	Hydr. Depth (ft)		10.10		
Conv. Total (cfs)	358079.7	Conv. (cfs)		358079.7		
Length Wtd. (ft)	291.00	Wetted Per. (ft)		181.66		
Min Ch El (ft)	2049.78	Shear (lb/sq ft)		1.00		
Alpha	1.00	Stream Power (lb/ft s)		9.13		
Frctn Loss (ft)	0.70	Cum Volume (acre-ft)	7.25	50.85	0.58	
C & E Loss (ft)	0.09	Cum SA (acres)	1.80	6.11	0.19	

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

CROSS SECTION OUTPUT Profile #PF 2

E.G. Elev (ft)	2058.35	Element	Left OB	Channel	Right OB	
Vel Head (ft)	0.81	Wt. n-Val.		0.030		
W.S. Elev (ft)	2057.54	Reach Len. (ft)	275.00	291.00	275.00	
Crit W.S. (ft)		Flow Area (sq ft)		970.52		
E.G. Slope (ft/ft)	0.001887	Area (sq ft)		970.52		
Q Total (cfs)	7019.00	Flow (cfs)		7019.00		
Top Width (ft)	145.35	Top Width (ft)		145.35		
Vel Total (ft/s)	7.23	Avg. Vel. (ft/s)		7.23		
Max Chl Dpth (ft)	7.76	Hydr. Depth (ft)		6.68		
Conv. Total (cfs)	161586.2	Conv. (cfs)		161586.2		
Length Wtd. (ft)	291.00	Wetted Per. (ft)		157.48		
Min Ch El (ft)	2049.78	Shear (lb/sq ft)		0.73		
Alpha	1.00	Stream Power (lb/ft s)		5.25		

```
* Frctn Loss (ft)        *    0.71  * Cum Volume (acre-ft)   *   19.11  *   53.58  *    4.27  *
* C & E Loss (ft)        *    0.05  * Cum SA (acres)         *    1.80  *    5.76  *    0.64  *
*****************************************************************************************************

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

CROSS SECTION


RIVER: Sols Wash
REACH: Sols Wash Main     RS: 0.370

INPUT
Description:
Station Elevation Data    num=      25
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
    9927  2063.5 9927.02    2058    9937  2056.1    9938  2056.1 9938.02  2053.1
    9939  2053.1 9939.02  2050.1 9950.65 2049.64 9953.47  2049.5 9968.23 2049.02
 9979.56    2049 9986.85 2048.93 9990.12  2048.9   10000  2048.810006.19 2048.89
10012.29 2049.1910022.61 2049.8310044.78 2050.11   10048 2050.2510048.02 2053.25
   10049 2053.2510049.02 2056.25   10066    205910066.02    2062   10067    2062

Manning's n Values        num=       1
     Sta   n Val
****************
    9927     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          992710066.02              100     100     100              .1       .3

CROSS SECTION OUTPUT  Profile #PF 1
*****************************************************************************************************
* E.G. Elev (ft)         * 2062.35  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    2.20  * Wt. n-Val.              *          *    0.030  *          *
* W.S. Elev (ft)         * 2060.15  * Reach Len. (ft)         *  100.00  *   100.00  *  100.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)       *          *  1262.96  *          *
* E.G. Slope (ft/ft)     *0.003519  * Area (sq ft)            *          *  1262.96  *          *
* Q Total (cfs)          *15045.00  * Flow (cfs)              *          *15045.00  *          *
* Top Width (ft)         *  139.00  * Top Width (ft)          *          *   139.00  *          *
* Vel Total (ft/s)       *   11.91  * Avg. Vel. (ft/s)        *          *    11.91  *          *
* Max Chl Dpth (ft)      *   11.34  * Hydr. Depth (ft)        *          *     9.09  *          *
* Conv. Total (cfs)      *253624.7  * Conv. (cfs)             *          *253624.7  *          *
* Length Wtd. (ft)       *  100.00  * Wetted Per. (ft)        *          *   154.70  *          *
* Min Ch El (ft)         * 2048.80  * Shear (lb/sq ft)        *          *     1.79  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s)   *          *    21.36  *          *
* Frctn Loss (ft)        *    0.36  * Cum Volume (acre-ft)     *    7.25  *    41.10  *    0.58  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)           *    1.80  *     5.10  *    0.19  *
*****************************************************************************************************

CROSS SECTION OUTPUT  Profile #PF 2
*****************************************************************************************************
* E.G. Elev (ft)         * 2057.59  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.36  * Wt. n-Val.              *          *    0.030  *          *
* W.S. Elev (ft)         * 2056.23  * Reach Len. (ft)         *  100.00  *   100.00  *  100.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)       *          *   751.31  *          *
* E.G. Slope (ft/ft)     *0.003245  * Area (sq ft)            *          *   751.31  *          *
* Q Total (cfs)          * 7019.00  * Flow (cfs)              *          *  7019.00  *          *
* Top Width (ft)         *  112.72  * Top Width (ft)          *          *   112.72  *          *
* Vel Total (ft/s)       *    9.34  * Avg. Vel. (ft/s)        *          *     9.34  *          *
* Max Chl Dpth (ft)      *    7.43  * Hydr. Depth (ft)        *          *     6.67  *          *
* Conv. Total (cfs)      *123216.1  * Conv. (cfs)             *          *123216.1  *          *
* Length Wtd. (ft)       *  100.00  * Wetted Per. (ft)        *          *   124.70  *          *
* Min Ch El (ft)         * 2048.80  * Shear (lb/sq ft)        *          *     1.22  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s)   *          *    11.40  *          *
* Frctn Loss (ft)        *    0.37  * Cum Volume (acre-ft)     *   19.11  *    47.83  *    4.27  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)           *    1.80  *     4.90  *    0.64  *
*****************************************************************************************************

CROSS SECTION


RIVER: Sols Wash
REACH: Sols Wash Main     RS: 0.351

INPUT
Description:
Station Elevation Data    num=      29
```

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9926	2063.5	9927	2063.5	9927.02	2057.5	9936	2056.25	9936.02	2053.25
9937	2053.25	9937.02	2050.25	9940.09	2050.2	9942.93	2050.15	9943	2050.1
9953.33	2050.1	9954.89	2050.05	9970.68	2049.93	9980.92	2049.62	10000	2049.16
10002.15	2049.04	10007.04	2048.7	10007.92	2048.64	10010.85	2048.42	10032.01	2049.71
10041	2050.04	10053	2050.25	10053.02	2053.25	10054	2053.25	10054.02	2056.25
10068	2058	10068.02	2058.92	10069	2058.92	10069.02	2060		

Manning's n Values num= 1

Sta	n Val
9926	.03

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9927	10068.02	325	346	325	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2061.98	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.26	Wt. n-Val.		0.030	0.030
W.S. Elev (ft)	2059.72	Reach Len. (ft)	325.00	346.00	325.00
Crit W.S. (ft)		Flow Area (sq ft)		1246.55	0.79
E.G. Slope (ft/ft)	0.003723	Area (sq ft)		1246.55	0.79
Q Total (cfs)	15045.00	Flow (cfs)		15043.61	1.39
Top Width (ft)	142.00	Top Width (ft)		141.01	1.00
Vel Total (ft/s)	12.06	Avg. Vel. (ft/s)		12.07	1.76
Max Chl Dpth (ft)	11.30	Hydr. Depth (ft)		8.84	0.80
Conv. Total (cfs)	246570.3	Conv. (cfs)		246547.5	22.8
Length Wtd. (ft)	346.00	Wetted Per. (ft)		156.22	1.79
Min Ch El (ft)	2048.42	Shear (lb/sq ft)		1.85	0.10
Alpha	1.00	Stream Power (lb/ft s)		22.38	0.18
Frctn Loss (ft)	1.18	Cum Volume (acre-ft)	7.25	38.22	0.58
C & E Loss (ft)	0.03	Cum SA (acres)	1.80	4.78	0.19

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 OUTPUT Profile #PF 2

E.G. Elev (ft)	2057.21	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.53	Wt. n-Val.		0.030	
W.S. Elev (ft)	2055.67	Reach Len. (ft)	325.00	346.00	325.00
Crit W.S. (ft)		Flow Area (sq ft)		706.89	
E.G. Slope (ft/ft)	0.004153	Area (sq ft)		706.89	
Q Total (cfs)	7019.00	Flow (cfs)		7019.00	
Top Width (ft)	118.01	Top Width (ft)		118.01	
Vel Total (ft/s)	9.93	Avg. Vel. (ft/s)		9.93	
Max Chl Dpth (ft)	7.25	Hydr. Depth (ft)		5.99	
Conv. Total (cfs)	108914.3	Conv. (cfs)		108914.3	
Length Wtd. (ft)	346.00	Wetted Per. (ft)		128.84	
Min Ch El (ft)	2048.42	Shear (lb/sq ft)		1.42	
Alpha	1.00	Stream Power (lb/ft s)		14.13	
Frctn Loss (ft)	1.17	Cum Volume (acre-ft)	19.11	46.16	4.27
C & E Loss (ft)	0.09	Cum SA (acres)	1.80	4.63	0.64

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: Sols Wash Main RS: 0.286

INPUT
Description:
Station Elevation Data num= 27

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9920	2061	9921	2061	9921.02	2055.3	9930	2053.3	9930.02	2050.3
9931	2050.3	9931.02	2047.3	9938.33	2047.3	9941.94	2047.3	9957.84	2047.3
9962.56	2047.3	9984.83	2047.3	9990.86	2047.3	9992.2	2047.3	10000	2047.3
10000.88	2047.3	10002.97	2047.3	10010.91	2047.3	10013.75	2047.3	10020.93	2047.3
10036	2047.3	10036.02	2050.3	10037	2050.3	10037.02	2054.3	10046	2056.3

```
10046.02    2059   10047    2059

Manning's n Values        num=       1
     Sta   n Val
****************
    9920     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          992110046.02               40    44.8      40            .1       .3

CROSS SECTION OUTPUT  Profile #PF 1
*****************************************************************************************
* E.G. Elev (ft)         * 2060.78  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    2.17  * Wt. n-Val.              *          *    0.030 *          *
* W.S. Elev (ft)         * 2058.61  * Reach Len. (ft)        *   40.00  *    44.80 *   40.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *          *  1272.53 *          *
* E.G. Slope (ft/ft)     *0.003117  * Area (sq ft)           *          *  1272.53 *          *
* Q Total (cfs)          *15045.00  * Flow (cfs)             *          *15045.00 *          *
* Top Width (ft)         *  125.01  * Top Width (ft)          *          *   125.01 *          *
* Vel Total (ft/s)       *   11.82  * Avg. Vel. (ft/s)        *          *    11.82 *          *
* Max Chl Dpth (ft)      *   11.31  * Hydr. Depth (ft)        *          *    10.18 *          *
* Conv. Total (cfs)      *269475.7  * Conv. (cfs)             *          *269475.7 *          *
* Length Wtd. (ft)       *   44.80  * Wetted Per. (ft)        *          *   143.95 *          *
* Min Ch El (ft)         * 2047.30  * Shear (lb/sq ft)        *          *     1.72 *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s)  *          *    20.34 *          *
* Frctn Loss (ft)        *    0.15  * Cum Volume (acre-ft)    *    7.25  *    28.21 *    0.57  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)          *    1.80  *     3.72 *    0.19  *
*****************************************************************************************

CROSS SECTION OUTPUT  Profile #PF 2
*****************************************************************************************
* E.G. Elev (ft)         * 2055.94  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.22  * Wt. n-Val.              *          *    0.030 *          *
* W.S. Elev (ft)         * 2054.72  * Reach Len. (ft)        *   40.00  *    44.80 *   40.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *          *   793.04 *          *
* E.G. Slope (ft/ft)     *0.002818  * Area (sq ft)           *          *   793.04 *          *
* Q Total (cfs)          * 7019.00  * Flow (cfs)             *          *  7019.00 *          *
* Top Width (ft)         *  115.29  * Top Width (ft)          *          *   115.29 *          *
* Vel Total (ft/s)       *    8.85  * Avg. Vel. (ft/s)        *          *     8.85 *          *
* Max Chl Dpth (ft)      *    7.42  * Hydr. Depth (ft)        *          *     6.88 *          *
* Conv. Total (cfs)      *132214.5  * Conv. (cfs)             *          *132214.5 *          *
* Length Wtd. (ft)       *   44.80  * Wetted Per. (ft)        *          *   128.42 *          *
* Min Ch El (ft)         * 2047.30  * Shear (lb/sq ft)        *          *     1.09 *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s)  *          *     9.62 *          *
* Frctn Loss (ft)        *    0.13  * Cum Volume (acre-ft)    *   19.11  *    40.20 *    4.27  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)          *    1.80  *     3.71 *    0.64  *
*****************************************************************************************

CROSS SECTION


RIVER: Sols Wash
REACH: Sols Wash Main     RS: .278

INPUT
Description:
Station Elevation Data    num=      66
     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev
*****************************************************************************************
  9919.8  2060.7  9920.8  2060.7 9920.81  2055.3 9929.87  2053.3 9929.89  2050.3
 9930.88  2050.3  9930.9  2047.3 9931.93  2047.3 9931.95  2047.3 9931.98  2047.3
 9934.15  2047.3 9935.76  2047.3 9938.39  2047.3 9939.88  2047.3 9942.09  2047.3
 9943.96  2047.3 9946.87  2047.3 9951.69  2047.3 9958.37  2047.3 9960.61  2047.3
 9962.16  2047.3 9963.21  2047.3 9964.33  2047.3 9965.15  2047.3 9966.54  2047.3
 9967.82  2047.3 9969.97  2047.3 9970.51  2047.3  9971.8  2047.3 9976.69  2047.3
 9978.45  2047.3 9978.66  2047.3 9986.02  2047.3 9987.47  2047.3 9988.14  2047.3
 9990.21  2047.3 9991.85  2047.3 9992.19  2047.3  9992.6  2047.3 9993.57  2047.3
 9993.86  2047.310000.41  2047.310001.55  2047.310002.46  2047.3 10004.6  2047.3
10006.18  2047.310012.73  2047.310015.64  2047.310021.18  2047.3 10021.8  2047.3
10021.86  2047.3 10021.9  2047.310022.99  2047.310023.81  2047.310023.84  2047.3
10026.27  2047.3 10036.8  2047.3 10036.8  2050.3 10037.8  2050.3 10037.8  2053.3
 10038.8  2053.3 10038.8  2056.3 10039.8  2056.3 10039.8  2059.3 10040.8  2059.3
 10040.8  2062.3

Manning's n Values        num=       1
     Sta   n Val
****************
  9919.8     .03
```

```
Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        9920.8 10040.8                40    44.8      40            .1       .3

CROSS SECTION OUTPUT  Profile #PF 1
*****************************************************************************************
* E.G. Elev (ft)         * 2060.61  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    2.37  * Wt. n-Val.              *          *   0.030  *          *
* W.S. Elev (ft)         * 2058.24  * Reach Len. (ft)         *   40.00  *   44.80  *   40.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)       *          * 1217.07  *          *
* E.G. Slope (ft/ft)     *0.003445  * Area (sq ft)            *          * 1217.07  *          *
* Q Total (cfs)          *15045.00  * Flow (cfs)              *          *15045.00  *          *
* Top Width (ft)         *  119.00  * Top Width (ft)          *          *  119.00  *          *
* Vel Total (ft/s)       *   12.36  * Avg. Vel. (ft/s)        *          *   12.36  *          *
* Max Chl Dpth (ft)      *   10.94  * Hydr. Depth (ft)        *          *   10.23  *          *
* Conv. Total (cfs)      *256324.7  * Conv. (cfs)             *          *256324.7  *          *
* Length Wtd. (ft)       *   44.80  * Wetted Per. (ft)        *          *  138.81  *          *
* Min Ch El (ft)         * 2047.30  * Shear (lb/sq ft)        *          *    1.89  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s)  *          *   23.31  *          *
* Frctn Loss (ft)        *    0.17  * Cum Volume (acre-ft)    *    7.25  *   26.93  *    0.57  *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)          *    1.80  *    3.60  *    0.19  *
*****************************************************************************************

CROSS SECTION OUTPUT  Profile #PF 2
*****************************************************************************************
* E.G. Elev (ft)         * 2055.81  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    1.25  * Wt. n-Val.              *          *   0.030  *          *
* W.S. Elev (ft)         * 2054.56  * Reach Len. (ft)         *   40.00  *   44.80  *   40.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)       *          *  782.06  *          *
* E.G. Slope (ft/ft)     *0.002939  * Area (sq ft)            *          *  782.06  *          *
* Q Total (cfs)          * 7019.00  * Flow (cfs)              *          * 7019.00  *          *
* Top Width (ft)         *  114.63  * Top Width (ft)          *          *  114.63  *          *
* Vel Total (ft/s)       *    8.98  * Avg. Vel. (ft/s)        *          *    8.98  *          *
* Max Chl Dpth (ft)      *    7.26  * Hydr. Depth (ft)        *          *    6.82  *          *
* Conv. Total (cfs)      *129471.2  * Conv. (cfs)             *          *129471.2  *          *
* Length Wtd. (ft)       *   44.80  * Wetted Per. (ft)        *          *  127.98  *          *
* Min Ch El (ft)         * 2047.30  * Shear (lb/sq ft)        *          *    1.12  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s)  *          *   10.06  *          *
* Frctn Loss (ft)        *    0.15  * Cum Volume (acre-ft)    *   19.11  *   39.39  *    4.27  *
* C & E Loss (ft)        *    0.02  * Cum SA (acres)          *    1.80  *    3.59  *    0.64  *
*****************************************************************************************

CROSS SECTION


RIVER: Sols Wash
REACH: Sols Wash Main     RS: .269

INPUT
Description:
Station Elevation Data     num=      66
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
  9919.8  2060.7  9920.8  2060.7 9920.81  2055.3 9929.87  2053.3 9929.89  2050.3
 9930.88  2050.3  9930.9  2047.3 9931.93  2047.3 9931.95  2047.3 9931.98  2047.3
 9934.15  2047.3 9935.76  2047.3 9938.39  2047.3 9939.88  2047.3 9942.09  2047.3
 9943.96  2047.3 9946.87  2047.3 9951.69  2047.3 9958.37  2047.3 9960.61  2047.3
 9962.16  2047.3 9963.21  2047.3 9964.33  2047.3 9965.15  2047.3 9966.54  2047.3
 9967.82  2047.3 9969.97  2047.3 9970.51  2047.3  9971.8  2047.3 9976.69  2047.3
 9978.45  2047.3 9978.66  2047.3 9986.02  2047.3 9987.47  2047.3 9988.14  2047.3
 9990.21  2047.3 9991.85  2047.3 9992.19  2047.3  9992.6  2047.3 9993.57  2047.3
 9993.86  2047.310000.41  2047.310001.55  2047.310002.46  2047.3 10004.6  2047.3
10006.18  2047.310012.73  2047.310015.64  2047.310021.18  2047.3 10021.8  2047.3
10021.86  2047.3 10021.9  2047.310022.99  2047.310023.81  2047.310023.84  2047.3
10026.27  2047.3 10034.8  2047.3 10034.8  2050.3 10035.8  2050.3 10035.8  2053.3
 10036.8  2053.3 10036.8  2056.3 10037.8  2056.3 10037.8  2059.3 10038.8  2059.3
 10038.8  2062.3

Manning's n Values         num=       1
     Sta   n Val
****************
  9919.8     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        9920.8 10038.8                40    44.8      40            .1       .3

CROSS SECTION OUTPUT  Profile #PF 1
*****************************************************************************************
* E.G. Elev (ft)         * 2060.39  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    2.81  * Wt. n-Val.              *          *   0.030  *          *
```

W.S. Elev (ft)	2057.59	Reach Len. (ft)	40.00	44.80		40.00
Crit W.S. (ft)		Flow Area (sq ft)		1118.93		
E.G. Slope (ft/ft)	0.004420	Area (sq ft)		1118.93		
Q Total (cfs)	15045.00	Flow (cfs)		15045.00		
Top Width (ft)	116.99	Top Width (ft)		116.99		
Vel Total (ft/s)	13.45	Avg. Vel. (ft/s)		13.45		
Max Chl Dpth (ft)	10.29	Hydr. Depth (ft)		9.56		
Conv. Total (cfs)	226292.9	Conv. (cfs)		226292.9		
Length Wtd. (ft)	44.80	Wetted Per. (ft)		135.62		
Min Ch El (ft)	2047.30	Shear (lb/sq ft)		2.28		
Alpha	1.00	Stream Power (lb/ft s)		30.61		
Frctn Loss (ft)	0.20	Cum Volume (acre-ft)	7.25	25.73		0.57
C & E Loss (ft)	0.00	Cum SA (acres)	1.80	3.48		0.19

CROSS SECTION OUTPUT Profile #PF 2

E.G. Elev (ft)	2055.64	Element	Left OB	Channel		Right OB
Vel Head (ft)	1.45	Wt. n-Val.		0.030		
W.S. Elev (ft)	2054.20	Reach Len. (ft)	40.00	44.80		40.00
Crit W.S. (ft)		Flow Area (sq ft)		727.09		
E.G. Slope (ft/ft)	0.003590	Area (sq ft)		727.09		
Q Total (cfs)	7019.00	Flow (cfs)		7019.00		
Top Width (ft)	110.99	Top Width (ft)		110.99		
Vel Total (ft/s)	9.65	Avg. Vel. (ft/s)		9.65		
Max Chl Dpth (ft)	6.90	Hydr. Depth (ft)		6.55		
Conv. Total (cfs)	117141.3	Conv. (cfs)		117141.3		
Length Wtd. (ft)	44.80	Wetted Per. (ft)		123.94		
Min Ch El (ft)	2047.30	Shear (lb/sq ft)		1.31		
Alpha	1.00	Stream Power (lb/ft s)		12.69		
Frctn Loss (ft)	0.16	Cum Volume (acre-ft)	19.11	38.62		4.27
C & E Loss (ft)	0.00	Cum SA (acres)	1.80	3.47		0.64

CROSS SECTION

RIVER: Sols Wash
REACH: Sols Wash Main RS: .261

INPUT
Description:
Station Elevation Data num= 66

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9919.8	2060.7	9920.8	2060.7	9920.81	2055.3	9929.87	2053.3	9929.89	2050.3
9930.88	2050.3	9930.9	2047.3	9931.93	2047.3	9931.95	2047.3	9931.98	2047.3
9934.15	2047.3	9935.76	2047.3	9938.39	2047.3	9939.88	2047.3	9942.09	2047.3
9943.96	2047.3	9946.87	2047.3	9951.69	2047.3	9958.37	2047.3	9960.61	2047.3
9962.16	2047.3	9963.21	2047.3	9964.33	2047.3	9965.15	2047.3	9966.54	2047.3
9967.82	2047.3	9969.97	2047.3	9970.51	2047.3	9971.8	2047.3	9976.69	2047.3
9978.45	2047.3	9978.66	2047.3	9986.02	2047.3	9987.47	2047.3	9988.14	2047.3
9990.21	2047.3	9991.85	2047.3	9992.19	2047.3	9992.6	2047.3	9993.57	2047.3
9993.86	2047.3	10000.41	2047.3	10001.55	2047.3	10002.46	2047.3	10004.6	2047.3
10006.18	2047.3	10012.73	2047.3	10015.64	2047.3	10021.18	2047.3	10021.8	2047.3
10021.86	2047.3	10021.9	2047.3	10022.99	2047.3	10023.81	2047.3	10023.84	2047.3
10026.27	2047.3	10036.8	2047.3	10036.8	2050.3	10037.8	2050.3	10037.8	2053.3
10038.8	2053.3	10038.8	2056.3	10039.8	2056.3	10039.8	2059.3	10040.8	2059.3
10040.8	2062.3								

Manning's n Values num= 1

Sta	n Val
9919.8	.03

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9920.8	10040.8	40	44.8	40	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2060.19	Element	Left OB	Channel		Right OB
Vel Head (ft)	2.85	Wt. n-Val.		0.030		
W.S. Elev (ft)	2057.34	Reach Len. (ft)	40.00	44.80		40.00
Crit W.S. (ft)		Flow Area (sq ft)		1110.59		
E.G. Slope (ft/ft)	0.004605	Area (sq ft)		1110.59		
Q Total (cfs)	15045.00	Flow (cfs)		15045.00		
Top Width (ft)	118.99	Top Width (ft)		118.99		
Vel Total (ft/s)	13.55	Avg. Vel. (ft/s)		13.55		
Max Chl Dpth (ft)	10.04	Hydr. Depth (ft)		9.33		

Conv. Total (cfs)	221706.5	Conv. (cfs)		221706.5		
Length Wtd. (ft)	44.80	Wetted Per. (ft)		137.26		
Min Ch El (ft)	2047.30	Shear (lb/sq ft)		2.33		
Alpha	1.00	Stream Power (lb/ft s)		31.51		
Frctn Loss (ft)	0.21	Cum Volume (acre-ft)	7.25	24.58	0.57	
C & E Loss (ft)	0.01	Cum SA (acres)	1.80	3.35	0.19	

CROSS SECTION OUTPUT Profile #PF 2

			Left OB	Channel	Right OB
E.G. Elev (ft)	2055.48	Element			
Vel Head (ft)	1.48	Wt. n-Val.		0.030	
W.S. Elev (ft)	2053.99	Reach Len. (ft)	40.00	44.80	40.00
Crit W.S. (ft)		Flow Area (sq ft)		718.21	
E.G. Slope (ft/ft)	0.003775	Area (sq ft)		718.21	
Q Total (cfs)	7019.00	Flow (cfs)		7019.00	
Top Width (ft)	112.08	Top Width (ft)		112.08	
Vel Total (ft/s)	9.77	Avg. Vel. (ft/s)		9.77	
Max Chl Dpth (ft)	6.69	Hydr. Depth (ft)		6.41	
Conv. Total (cfs)	114237.5	Conv. (cfs)		114237.5	
Length Wtd. (ft)	44.80	Wetted Per. (ft)		124.81	
Min Ch El (ft)	2047.30	Shear (lb/sq ft)		1.36	
Alpha	1.00	Stream Power (lb/ft s)		13.25	
Frctn Loss (ft)	0.17	Cum Volume (acre-ft)	19.11	37.87	4.27
C & E Loss (ft)	0.01	Cum SA (acres)	1.80	3.36	0.64

CROSS SECTION

RIVER: Sols Wash
REACH: Sols Wash Main RS: 0.252

INPUT
Description:
Station Elevation Data num= 66

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9919.8	2060.7	9920.8	2060.7	9920.81	2055.3	9929.87	2053.3	9929.89	2050.3
9930.88	2050.3	9930.9	2047.3	9931.93	2047.3	9931.95	2047.3	9931.98	2047.3
9934.15	2047.3	9935.76	2047.3	9938.39	2047.3	9939.88	2047.3	9942.09	2047.3
9943.96	2047.3	9946.87	2047.3	9951.69	2047.3	9958.37	2047.3	9960.61	2047.3
9962.16	2047.3	9963.21	2047.3	9964.33	2047.3	9965.15	2047.3	9966.54	2047.3
9967.82	2047.3	9969.97	2047.3	9970.51	2047.3	9971.8	2047.3	9976.69	2047.3
9978.45	2047.3	9978.66	2047.3	9986.02	2047.3	9987.47	2047.3	9988.14	2047.3
9990.21	2047.3	9991.85	2047.3	9992.19	2047.3	9992.6	2047.3	9993.57	2047.3
9993.86	2047.3	10000.41	2047.3	10001.55	2047.3	10002.46	2047.3	10004.6	2047.3
10006.18	2047.3	10012.73	2047.3	10015.64	2047.3	10021.18	2047.3	10021.8	2047.3
10021.86	2047.3	10021.9	2047.3	10022.99	2047.3	10023.81	2047.3	10023.84	2047.3
10026.27	2047.3	10038.8	2047.3	10038.8	2050.3	10039.8	2050.3	10039.8	2053.3
10040.8	2053.3	10040.8	2056.3	10041.8	2056.3	10041.8	2059.3	10042.8	2059.3
10042.8	2062.3								

Manning's n Values num= 1

Sta	n Val
9919.8	.03

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9920.8	10042.8	40	44.8	40	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2059.98	Element			
Vel Head (ft)	2.94	Wt. n-Val.		0.030	
W.S. Elev (ft)	2057.04	Reach Len. (ft)	40.00	44.80	40.00
Crit W.S. (ft)	2055.79	Flow Area (sq ft)		1094.14	
E.G. Slope (ft/ft)	0.004900	Area (sq ft)		1094.14	
Q Total (cfs)	15045.00	Flow (cfs)		15045.00	
Top Width (ft)	120.99	Top Width (ft)		120.99	
Vel Total (ft/s)	13.75	Avg. Vel. (ft/s)		13.75	
Max Chl Dpth (ft)	9.74	Hydr. Depth (ft)		9.04	
Conv. Total (cfs)	214931.3	Conv. (cfs)		214931.3	
Length Wtd. (ft)	44.80	Wetted Per. (ft)		138.53	
Min Ch El (ft)	2047.30	Shear (lb/sq ft)		2.42	
Alpha	1.00	Stream Power (lb/ft s)		33.22	
Frctn Loss (ft)	0.27	Cum Volume (acre-ft)	7.25	23.45	0.57
C & E Loss (ft)	0.10	Cum SA (acres)	1.80	3.23	0.19

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

CROSS SECTION OUTPUT Profile #PF 2

E.G. Elev (ft)	2055.30	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.54	Wt. n-Val.		0.030	
W.S. Elev (ft)	2053.76	Reach Len. (ft)	40.00	44.80	40.00
Crit W.S. (ft)		Flow Area (sq ft)		705.16	
E.G. Slope (ft/ft)	0.004043	Area (sq ft)		705.16	
Q Total (cfs)	7019.00	Flow (cfs)		7019.00	
Top Width (ft)	113.02	Top Width (ft)		113.02	
Vel Total (ft/s)	9.95	Avg. Vel. (ft/s)		9.95	
Max Chl Dpth (ft)	6.46	Hydr. Depth (ft)		6.24	
Conv. Total (cfs)	110392.3	Conv. (cfs)		110392.3	
Length Wtd. (ft)	44.80	Wetted Per. (ft)		125.49	
Min Ch El (ft)	2047.30	Shear (lb/sq ft)		1.42	
Alpha	1.00	Stream Power (lb/ft s)		14.12	
Frctn Loss (ft)	0.19	Cum Volume (acre-ft)	19.11	37.14	4.27
C & E Loss (ft)	0.01	Cum SA (acres)	1.80	3.24	0.64

CROSS SECTION

RIVER: Sols Wash
REACH: Sols Wash Main RS: 0.249

INPUT
Description: Directly upstream of drop structure. Cross sections were used to modeled the drop structure as opposed to an inline-weir.

Station Elevation Data num= 66

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9919.8	2060.7	9920.8	2060.7	9920.81	2055.3	9929.87	2053.3	9929.89	2050.3
9930.88	2050.3	9930.9	2047.3	9931.93	2047.3	9931.95	2047.3	9931.98	2047.3
9934.15	2047.3	9935.76	2047.3	9938.39	2047.3	9939.88	2047.3	9942.09	2047.3
9943.96	2047.3	9946.87	2047.3	9951.69	2047.3	9958.37	2047.3	9960.61	2047.3
9962.16	2047.3	9963.21	2047.3	9964.33	2047.3	9965.15	2047.3	9966.54	2047.3
9967.82	2047.3	9969.97	2047.3	9970.51	2047.3	9971.8	2047.3	9976.69	2047.3
9978.45	2047.3	9978.66	2047.3	9986.02	2047.3	9987.47	2047.3	9988.14	2047.3
9990.21	2047.3	9991.85	2047.3	9992.19	2047.3	9992.6	2047.3	9993.57	2047.3
9993.86	2047.3	10000.41	2047.3	10001.55	2047.3	10002.46	2047.3	10004.6	2047.3
10006.18	2047.3	10012.73	2047.3	10015.64	2047.3	10021.18	2047.3	10021.8	2047.3
10021.86	2047.3	10021.9	2047.3	10022.99	2047.3	10023.81	2047.3	10023.84	2047.3
10026.27	2047.3	10040.8	2047.3	10040.8	2050.3	10041.8	2050.3	10041.8	2053.3
10042.8	2053.3	10042.8	2056.3	10043.8	2056.3	10043.8	2059.3	10044.8	2059.3
10044.8	2062.3								

Manning's n Values num= 1

Sta	n Val
9919.8	.03

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9920.8	10044.8	10	10	10	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2059.60	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.92	Wt. n-Val.		0.030	
W.S. Elev (ft)	2055.68	Reach Len. (ft)	10.00	10.00	10.00
Crit W.S. (ft)	2055.68	Flow Area (sq ft)		946.84	
E.G. Slope (ft/ft)	0.007812	Area (sq ft)		946.84	
Q Total (cfs)	15045.00	Flow (cfs)		15045.00	
Top Width (ft)	121.99	Top Width (ft)		121.99	
Vel Total (ft/s)	15.89	Avg. Vel. (ft/s)		15.89	
Max Chl Dpth (ft)	8.38	Hydr. Depth (ft)		7.76	
Conv. Total (cfs)	170217.2	Conv. (cfs)		170217.2	
Length Wtd. (ft)	10.00	Wetted Per. (ft)		136.93	
Min Ch El (ft)	2047.30	Shear (lb/sq ft)		3.37	
Alpha	1.00	Stream Power (lb/ft s)		53.59	
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)	7.25	22.40	0.57
C & E Loss (ft)	0.56	Cum SA (acres)	1.80	3.11	0.19

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: 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 OUTPUT Profile #PF 2

E.G. Elev (ft)	2055.10	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.63	Wt. n-Val.		0.030	
W.S. Elev (ft)	2053.47	Reach Len. (ft)	10.00	10.00	10.00
Crit W.S. (ft)		Flow Area (sq ft)		684.24	
E.G. Slope (ft/ft)	0.004485	Area (sq ft)		684.24	
Q Total (cfs)	7019.00	Flow (cfs)		7019.00	
Top Width (ft)	113.68	Top Width (ft)		113.68	
Vel Total (ft/s)	10.26	Avg. Vel. (ft/s)		10.26	
Max Chl Dpth (ft)	6.17	Hydr. Depth (ft)		6.02	
Conv. Total (cfs)	104805.6	Conv. (cfs)		104805.6	
Length Wtd. (ft)	10.00	Wetted Per. (ft)		125.82	
Min Ch El (ft)	2047.30	Shear (lb/sq ft)		1.52	
Alpha	1.00	Stream Power (lb/ft s)		15.62	
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	19.11	36.43	4.27
C & E Loss (ft)	0.37	Cum SA (acres)	1.80	3.13	0.64

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

CROSS SECTION

RIVER: Sols Wash
REACH: Sols Wash Main RS: 0.247

INPUT
Description: Directly downstream of drop structure.
Station Elevation Data num= 38

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9919	2056	9920	2056	9920	2051.8	9929	2048.8	9929.02	2045.8
9930	2045.8	9930.02	2042.8	9933.55	2042.8	9937.4	2042.8	9948.42	2042.8
9958.2	2042.8	9962.29	2042.8	9963.48	2042.8	9973.4	2042.8	9973.69	2042.8
9984.34	2042.8	9985.16	2042.8	9987.66	2042.8	9989.65	2042.8	9992.08	2042.8
10000	2042.8	10006.98	2042.8	10025.14	2042.8	10025.88	2042.8	10031.29	2042.8
10040.27	2042.8	10045	2042.8	10045.02	2045.8	10046	2045.8	10046.02	2048.8
10047	2048.8	10047.02	2051.8	10048	2051.8	10048.02	2054.8	10049	2054.8
10049.02	2057.8	10049.5	2057.8	10055	2058.3				

Manning's n Values num= 1

Sta	n Val
9919	.03

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
992010049.02 20 20 20 .1 .3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2058.74	Element	Left OB	Channel	Right OB
Vel Head (ft)	11.07	Wt. n-Val.		0.030	
W.S. Elev (ft)	2047.67	Reach Len. (ft)	20.00	20.00	20.00
Crit W.S. (ft)	2050.92	Flow Area (sq ft)		563.55	
E.G. Slope (ft/ft)	0.039650	Area (sq ft)		563.55	
Q Total (cfs)	15045.00	Flow (cfs)		15045.00	
Top Width (ft)	117.00	Top Width (ft)		117.00	
Vel Total (ft/s)	26.70	Avg. Vel. (ft/s)		26.70	
Max Chl Dpth (ft)	4.87	Hydr. Depth (ft)		4.82	
Conv. Total (cfs)	75555.9	Conv. (cfs)		75555.9	
Length Wtd. (ft)	20.00	Wetted Per. (ft)		126.54	
Min Ch El (ft)	2042.80	Shear (lb/sq ft)		11.02	
Alpha	1.00	Stream Power (lb/ft s)		294.31	

```
* Frctn Loss (ft)        *    0.15  * Cum Volume (acre-ft)   *    7.25  *   22.23  *    0.57  *
* C & E Loss (ft)        *    0.72  * Cum SA (acres)         *    1.80  *    3.08  *    0.19  *
*****************************************************************************************************

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

CROSS SECTION OUTPUT  Profile #PF 2
*****************************************************************************************************
* E.G. Elev (ft)         * 2054.72  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.40  * Wt. n-Val.              *          *    0.030 *          *
* W.S. Elev (ft)         * 2054.32  * Reach Len. (ft)        *   20.00  *   20.00  *   20.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)      *          * 1385.86  *          *
* E.G. Slope (ft/ft)     *0.000532  * Area (sq ft)           *          * 1385.86  *          *
* Q Total (cfs)          * 7019.00  * Flow (cfs)             *          * 7019.00  *          *
* Top Width (ft)         *  128.02  * Top Width (ft)          *          *  128.02  *          *
* Vel Total (ft/s)       *    5.06  * Avg. Vel. (ft/s)        *          *    5.06  *          *
* Max Chl Dpth (ft)      *   11.52  * Hydr. Depth (ft)        *          *   10.83  *          *
* Conv. Total (cfs)      *304326.0  * Conv. (cfs)             *          *304326.0  *          *
* Length Wtd. (ft)       *   20.00  * Wetted Per. (ft)        *          *  148.46  *          *
* Min Ch El (ft)         * 2042.80  * Shear (lb/sq ft)        *          *    0.31  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s)  *          *    1.57  *          *
* Frctn Loss (ft)        *    0.02  * Cum Volume (acre-ft)    *   19.11  *   36.19  *    4.27  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)          *    1.80  *    3.10  *    0.64  *
*****************************************************************************************************

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: Sols Wash Main      RS: 0.243

INPUT
Description: The n-values are higher to represent the stilling basin with
             energy disippaters.
Station Elevation Data     num=      42
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
    9923  2058.3    9926  2057.8 9926.02  2054.8    9927  2054.8 9927.02  2051.8
    9928  2051.8 9928.02  2048.8    9929  2048.8 9929.02  2045.8    9930  2045.8
 9930.02  2042.8 9933.55  2042.8  9937.4  2042.8 9948.42  2042.8  9958.2  2042.8
 9962.29  2042.8 9963.48  2042.8  9973.4  2042.8 9973.69  2042.8 9984.34  2042.8
 9985.16  2042.8 9987.66  2042.8 9989.65  2042.8 9992.08  2042.8   10000  2042.8
10006.98  2042.810025.14  2042.810025.88  2042.810031.29  2042.810040.27  2042.8
   10041  2042.810041.01  2045.8   10042  2045.810042.01  2048.8   10043  2048.8
10043.01  2051.8   10044  2051.810044.01  2054.8   10045  2054.8   10045  2057.8
   10048  2058.3   10063  2058.3

Manning's n Values         num=       1
     Sta   n Val
****************
    9923     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          9926   10045             47.5   45.83   46.67            .1        .3

CROSS SECTION OUTPUT  Profile #PF 1
*****************************************************************************************************
* E.G. Elev (ft)         * 2056.89  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    8.26  * Wt. n-Val.              *          *    0.050 *          *
* W.S. Elev (ft)         * 2048.63  * Reach Len. (ft)        *   47.50  *   45.83  *   46.67  *
* Crit W.S. (ft)         * 2051.04  * Flow Area (sq ft)      *          *  652.35  *          *
* E.G. Slope (ft/ft)     *0.066157  * Area (sq ft)           *          *  652.35  *          *
* Q Total (cfs)          *15045.00  * Flow (cfs)             *          *15045.00  *          *
* Top Width (ft)         *  113.01  * Top Width (ft)          *          *  113.01  *          *
* Vel Total (ft/s)       *   23.06  * Avg. Vel. (ft/s)        *          *   23.06  *          *
* Max Chl Dpth (ft)      *    5.83  * Hydr. Depth (ft)        *          *    5.77  *          *
* Conv. Total (cfs)      * 58493.0  * Conv. (cfs)             *          * 58493.0  *          *
* Length Wtd. (ft)       *   45.83  * Wetted Per. (ft)        *          *  124.48  *          *
* Min Ch El (ft)         * 2042.80  * Shear (lb/sq ft)        *          *   21.65  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s)  *          *  499.20  *          *
* Frctn Loss (ft)        *    1.01  * Cum Volume (acre-ft)    *    7.25  *   21.95  *    0.57  *
* C & E Loss (ft)        *    0.84  * Cum SA (acres)          *    1.80  *    3.03  *    0.19  *
*****************************************************************************************************
```

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The 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 OUTPUT Profile #PF 2

E.G. Elev (ft)	2054.69	Element	Left OB	Channel	Right OB	
Vel Head (ft)	0.45	Wt. n-Val.		0.050		
W.S. Elev (ft)	2054.24	Reach Len. (ft)	47.50	45.83	46.67	
Crit W.S. (ft)		Flow Area (sq ft)		1302.75		
E.G. Slope (ft/ft)	0.001674	Area (sq ft)		1302.75		
Q Total (cfs)	7019.00	Flow (cfs)		7019.00		
Top Width (ft)	117.00	Top Width (ft)		117.00		
Vel Total (ft/s)	5.39	Avg. Vel. (ft/s)		5.39		
Max Chl Dpth (ft)	11.44	Hydr. Depth (ft)		11.13		
Conv. Total (cfs)	171532.5	Conv. (cfs)		171532.5		
Length Wtd. (ft)	45.83	Wetted Per. (ft)		139.69		
Min Ch El (ft)	2042.80	Shear (lb/sq ft)		0.97		
Alpha	1.00	Stream Power (lb/ft s)		5.25		
Frctn Loss (ft)	0.07	Cum Volume (acre-ft)	19.11	35.57	4.27	
C & E Loss (ft)	0.02	Cum SA (acres)	1.80	3.04	0.64	

CROSS SECTION

RIVER: Sols Wash
REACH: Sols Wash Main RS: 0.234

INPUT
Description: The n-values are higher to represent the stilling basin with energy disippaters.
Station Elevation Data num= 41

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9918	2058.3	9921	2057.8	9921.01	2054.8	9922	2054.8	9922.01	2051.8
9923	2051.8	9923.01	2048.8	9924	2048.8	9924.01	2045.8	9925	2045.8
9925.01	2042.8	9933.55	2042.8	9937.4	2042.8	9948.42	2042.8	9958.2	2042.8
9962.29	2042.8	9963.48	2042.8	9973.4	2042.8	9973.69	2042.8	9984.34	2042.8
9985.16	2042.8	9987.66	2042.8	9989.65	2042.8	9992.08	2042.8	10000	2042.8
10006.98	2042.8	10025.14	2042.8	10025.88	2042.8	10031.29	2042.8	10040.27	2042.8
10046	2042.8	10046.01	2045.8	10047	2045.8	10047.01	2048.8	10048	2048.8
10048.01	2051.8	10049	2051.8	10049.01	2054.8	10050	2054.8	10050.01	2057.8
10053	2058.3								

Manning's n Values num= 1

Sta	n Val
9918	.05

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
992110050.01 47.5 45.83 46.67 .1 .3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2055.04	Element	Left OB	Channel	Right OB	
Vel Head (ft)	2.37	Wt. n-Val.		0.050		
W.S. Elev (ft)	2052.67	Reach Len. (ft)	47.50	45.83	46.67	
Crit W.S. (ft)	2050.60	Flow Area (sq ft)		1217.41		
E.G. Slope (ft/ft)	0.010293	Area (sq ft)		1217.41		
Q Total (cfs)	15045.00	Flow (cfs)		15045.00		
Top Width (ft)	127.00	Top Width (ft)		127.00		
Vel Total (ft/s)	12.36	Avg. Vel. (ft/s)		12.36		
Max Chl Dpth (ft)	9.87	Hydr. Depth (ft)		9.59		
Conv. Total (cfs)	148295.8	Conv. (cfs)		148295.8		
Length Wtd. (ft)	45.83	Wetted Per. (ft)		146.70		
Min Ch El (ft)	2042.80	Shear (lb/sq ft)		5.33		
Alpha	1.00	Stream Power (lb/ft s)		65.90		
Frctn Loss (ft)	0.55	Cum Volume (acre-ft)	7.25	20.97	0.57	
C & E Loss (ft)	0.03	Cum SA (acres)	1.80	2.90	0.19	

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

CROSS SECTION OUTPUT Profile #PF 2

* E.G. Elev (ft)	* 2054.60	* Element	* Left OB	* Channel	* Right OB	*
* Vel Head (ft)	* 0.38	* Wt. n-Val.	*	* 0.050	*	*
* W.S. Elev (ft)	* 2054.22	* Reach Len. (ft)	* 47.50	* 45.83	* 46.67	*
* Crit W.S. (ft)	*	* Flow Area (sq ft)	*	* 1414.45	*	*
* E.G. Slope (ft/ft)	*0.001396	* Area (sq ft)	*	* 1414.45	*	*
* Q Total (cfs)	* 7019.00	* Flow (cfs)	*	* 7019.00	*	*
* Top Width (ft)	* 127.01	* Top Width (ft)	*	* 127.01	*	*
* Vel Total (ft/s)	* 4.96	* Avg. Vel. (ft/s)	*	* 4.96	*	*
* Max Chl Dpth (ft)	* 11.42	* Hydr. Depth (ft)	*	* 11.14	*	*
* Conv. Total (cfs)	*187843.1	* Conv. (cfs)	*	*187843.1	*	*
* Length Wtd. (ft)	* 45.83	* Wetted Per. (ft)	*	* 149.73	*	*
* Min Ch El (ft)	* 2042.80	* Shear (lb/sq ft)	*	* 0.82	*	*
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	* 4.09	*	*
* Frctn Loss (ft)	* 0.06	* Cum Volume (acre-ft)	* 19.11	* 34.14	* 4.27	*
* C & E Loss (ft)	* 0.01	* Cum SA (acres)	* 1.80	* 2.91	* 0.64	*

CROSS SECTION

RIVER: Sols Wash
REACH: Sols Wash Main RS: 0.226

INPUT
Description: The n-values are higher to represent the stilling basin with energy disippaters.

Station Elevation Data num= 42

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9904	2058.3	9910	2057.8	9910.02	2054.8	9911	2054.8	9911.02	2051.8
9928	2051.8	9928.02	2048.8	9929	2048.8	9929.02	2045.8	9930	2045.8
9930.02	2042.8	9933.55	2042.8	9937.4	2042.8	9948.42	2042.8	9958.2	2042.8
9962.29	2042.8	9963.48	2042.8	9973.4	2042.8	9973.69	2042.8	9984.34	2042.8
9985.16	2042.8	9987.66	2042.8	9989.65	2042.8	9992.08	2042.8	10000	2042.8
10006.98	2042.8	10025.14	2042.8	10025.88	2042.8	10031.29	2042.8	10040.27	2042.8
10056	2042.8	10056.01	2045.8	10057	2045.8	10057.01	2048.8	10058	2048.8
10058.01	2051.8	10059	2051.8	10059.01	2054.8	10060	2054.8	10060.01	2057.8
10063	2058.3	10073	2058.3						

Manning's n Values num= 1

Sta	n Val
9904	.05

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
991	010060.01	47.5	45.83	46.67	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

* E.G. Elev (ft)	* 2054.46	* Element	* Left OB	* Channel	* Right OB	*
* Vel Head (ft)	* 2.63	* Wt. n-Val.	*	* 0.050	*	*
* W.S. Elev (ft)	* 2051.83	* Reach Len. (ft)	* 47.50	* 45.83	* 46.67	*
* Crit W.S. (ft)	*	* Flow Area (sq ft)	*	* 1156.22	*	*
* E.G. Slope (ft/ft)	*0.014400	* Area (sq ft)	*	* 1156.22	*	*
* Q Total (cfs)	*15045.00	* Flow (cfs)	*	*15045.00	*	*
* Top Width (ft)	* 147.98	* Top Width (ft)	*	* 147.98	*	*
* Vel Total (ft/s)	* 13.01	* Avg. Vel. (ft/s)	*	* 13.01	*	*
* Max Chl Dpth (ft)	* 9.03	* Hydr. Depth (ft)	*	* 7.81	*	*
* Conv. Total (cfs)	*125373.9	* Conv. (cfs)	*	*125373.9	*	*
* Length Wtd. (ft)	* 45.83	* Wetted Per. (ft)	*	* 165.89	*	*
* Min Ch El (ft)	* 2042.80	* Shear (lb/sq ft)	*	* 6.27	*	*
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	* 81.53	*	*
* Frctn Loss (ft)	* 0.44	* Cum Volume (acre-ft)	* 7.25	* 19.72	* 0.57	*
* C & E Loss (ft)	* 0.34	* Cum SA (acres)	* 1.80	* 2.76	* 0.19	*

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

CROSS SECTION OUTPUT Profile #PF 2

* E.G. Elev (ft)	* 2054.53	* Element	* Left OB	* Channel	* Right OB	*
* Vel Head (ft)	* 0.34	* Wt. n-Val.	*	* 0.050	*	*
* W.S. Elev (ft)	* 2054.19	* Reach Len. (ft)	* 47.50	* 45.83	* 46.67	*
* Crit W.S. (ft)	*	* Flow Area (sq ft)	*	* 1505.53	*	*
* E.G. Slope (ft/ft)	*0.001350	* Area (sq ft)	*	* 1505.53	*	*
* Q Total (cfs)	* 7019.00	* Flow (cfs)	*	* 7019.00	*	*

* Top Width (ft)	* 148.00	* Top Width (ft)	*	* 148.00	*	*
* Vel Total (ft/s)	* 4.66	* Avg. Vel. (ft/s)	*	* 4.66	*	*
* Max Chl Dpth (ft)	* 11.39	* Hydr. Depth (ft)	*	* 10.17	*	*
* Conv. Total (cfs)	*191007.6	* Conv. (cfs)	*	*191007.6	*	*
* Length Wtd. (ft)	* 45.83	* Wetted Per. (ft)	*	* 170.68	*	*
* Min Ch El (ft)	* 2042.80	* Shear (lb/sq ft)	*	* 0.74	*	*
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	* 3.47	*	*
* Frctn Loss (ft)	* 0.05	* Cum Volume (acre-ft)	* 19.11	* 32.61	* 4.27	*
* C & E Loss (ft)	* 0.04	* Cum SA (acres)	* 1.80	* 2.77	* 0.64	*

CROSS SECTION

RIVER: Sols Wash
REACH: Sols Wash Main RS: 0.218

INPUT
Description: The n-values are higher to represent the stilling basin with energy disippaters.
Station Elevation Data num= 42

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9889	2058.3	9895	2057.8	9895.02	2054.8	9896	2054.8	9896.02	2051.8
9897	2051.8	9897.02	2048.8	9914	2048.8	9914.02	2045.8	9915	2045.8
9915.02	2042.8	9933.55	2042.8	9937.4	2042.8	9948.42	2042.8	9958.2	2042.8
9962.29	2042.8	9963.48	2042.8	9973.4	2042.8	9973.69	2042.8	9984.34	2042.8
9985.16	2042.8	9987.66	2042.8	9989.65	2042.8	9992.08	2042.8	10000	2042.8
10006.98	2042.8	10025.14	2042.8	10025.88	2042.8	10031.29	2042.8	10040.27	2042.8
10071	2042.8	10071.01	2045.8	10072	2045.8	10072.01	2048.8	10073	2048.8
10073.01	2051.8	10074	2051.8	10074.01	2054.8	10075	2054.8	10075.01	2057.8
10078	2058.3	10083	2058.3						

Manning's n Values num= 1

Sta	n Val
9889	.05

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9895	10075.01	47.5	45.83	46.67	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

* E.G. Elev (ft)	* 2053.67	* Element	* Left OB	* Channel	* Right OB	*
* Vel Head (ft)	* 1.49	* Wt. n-Val.	*	* 0.050	*	*
* W.S. Elev (ft)	* 2052.18	* Reach Len. (ft)	* 47.50	* 45.83	* 46.67	*
* Crit W.S. (ft)	*	* Flow Area (sq ft)	*	* 1537.70	*	*
* E.G. Slope (ft/ft)	*0.006980	* Area (sq ft)	*	* 1537.70	*	*
* Q Total (cfs)	*15045.00	* Flow (cfs)	*	*15045.00	*	*
* Top Width (ft)	* 177.98	* Top Width (ft)	*	* 177.98	*	*
* Vel Total (ft/s)	* 9.78	* Avg. Vel. (ft/s)	*	* 9.78	*	*
* Max Chl Dpth (ft)	* 9.38	* Hydr. Depth (ft)	*	* 8.64	*	*
* Conv. Total (cfs)	*180078.0	* Conv. (cfs)	*	*180078.0	*	*
* Length Wtd. (ft)	* 45.83	* Wetted Per. (ft)	*	* 196.57	*	*
* Min Ch El (ft)	* 2042.80	* Shear (lb/sq ft)	*	* 3.41	*	*
* Alpha	* 1.00	* Stream Power (lb/ft s)	*	* 33.35	*	*
* Frctn Loss (ft)	* 0.13	* Cum Volume (acre-ft)	* 7.25	* 18.30	* 0.57	*
* C & E Loss (ft)	* 0.15	* Cum SA (acres)	* 1.80	* 2.58	* 0.19	*

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

CROSS SECTION OUTPUT Profile #PF 2

* E.G. Elev (ft)	* 2054.44	* Element	* Left OB	* Channel	* Right OB	*
* Vel Head (ft)	* 0.21	* Wt. n-Val.	*	* 0.050	*	*
* W.S. Elev (ft)	* 2054.23	* Reach Len. (ft)	* 47.50	* 45.83	* 46.67	*
* Crit W.S. (ft)	*	* Flow Area (sq ft)	*	* 1902.77	*	*
* E.G. Slope (ft/ft)	*0.000768	* Area (sq ft)	*	* 1902.77	*	*
* Q Total (cfs)	* 7019.00	* Flow (cfs)	*	* 7019.00	*	*
* Top Width (ft)	* 178.00	* Top Width (ft)	*	* 178.00	*	*
* Vel Total (ft/s)	* 3.69	* Avg. Vel. (ft/s)	*	* 3.69	*	*
* Max Chl Dpth (ft)	* 11.43	* Hydr. Depth (ft)	*	* 10.69	*	*
* Conv. Total (cfs)	*253307.3	* Conv. (cfs)	*	*253307.3	*	*
* Length Wtd. (ft)	* 45.83	* Wetted Per. (ft)	*	* 200.69	*	*
* Min Ch El (ft)	* 2042.80	* Shear (lb/sq ft)	*	* 0.45	*	*

* Alpha	*	1.00	* Stream Power (lb/ft s)	*		*	1.68	*		*
* Frctn Loss (ft)	*	0.01	* Cum Volume (acre-ft)	*	19.11	*	30.81	*	4.27	*
* C & E Loss (ft)	*	0.02	* Cum SA (acres)	*	1.80	*	2.60	*	0.64	*

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: Sols Wash Main RS: 0.209

INPUT
Description:
Station Elevation Data num= 42

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9878	2058.3	9882	2057.8	9882.02	2054.8	9883	2054.8	9883.02	2051.8
9884	2051.8	9884.02	2048.8	9885	2048.8	9885.02	2045.8	9900	2045.8
9900.02	2042.8	9933.55	2042.8	9937.4	2042.8	9948.42	2042.8	9958.2	2042.8
9962.29	2042.8	9963.48	2042.8	9973.4	2042.8	9973.69	2042.8	9984.34	2042.8
9985.16	2042.8	9987.66	2042.8	9989.65	2042.8	9992.08	2042.8	10000	2042.8
10006.98	2042.8	10025.14	2042.8	10025.88	2042.8	10031.29	2042.8	10040.27	2042.8
10086	2042.8	10086.01	2045.8	10087	2045.8	10087.01	2048.8	10088	2048.8
10088.01	2051.8	10089	2051.8	10089.01	2054.8	10090	2054.8	10090.01	2057.8
10094	2058.3	10098	2058.3						

Manning's n Values num= 1

Sta	n Val
9878	.03

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
988210090.01 47.5 45.83 46.67 .1 .3

CROSS SECTION OUTPUT Profile #PF 1

* E.G. Elev (ft)	*	2053.39	* Element	*	Left OB	*	Channel	*	Right OB	*
* Vel Head (ft)	*	0.97	* Wt. n-Val.	*		*	0.030	*		*
* W.S. Elev (ft)	*	2052.41	* Reach Len. (ft)	*	47.50	*	45.83	*	46.67	*
* Crit W.S. (ft)	*		* Flow Area (sq ft)	*		*	1902.38	*		*
* E.G. Slope (ft/ft)	*	0.001481	* Area (sq ft)	*		*	1902.38	*		*
* Q Total (cfs)	*	15045.00	* Flow (cfs)	*		*	15045.00	*		*
* Top Width (ft)	*	205.99	* Top Width (ft)	*		*	205.99	*		*
* Vel Total (ft/s)	*	7.91	* Avg. Vel. (ft/s)	*		*	7.91	*		*
* Max Chl Dpth (ft)	*	9.61	* Hydr. Depth (ft)	*		*	9.24	*		*
* Conv. Total (cfs)	*	390956.9	* Conv. (cfs)	*		*	390956.9	*		*
* Length Wtd. (ft)	*	45.83	* Wetted Per. (ft)	*		*	225.09	*		*
* Min Ch El (ft)	*	2042.80	* Shear (lb/sq ft)	*		*	0.78	*		*
* Alpha	*	1.00	* Stream Power (lb/ft s)	*		*	6.18	*		*
* Frctn Loss (ft)	*	0.06	* Cum Volume (acre-ft)	*	7.25	*	16.49	*	0.57	*
* C & E Loss (ft)	*	0.08	* Cum SA (acres)	*	1.80	*	2.38	*	0.19	*

CROSS SECTION OUTPUT Profile #PF 2

* E.G. Elev (ft)	*	2054.41	* Element	*	Left OB	*	Channel	*	Right OB	*
* Vel Head (ft)	*	0.15	* Wt. n-Val.	*		*	0.030	*		*
* W.S. Elev (ft)	*	2054.26	* Reach Len. (ft)	*	47.50	*	45.83	*	46.67	*
* Crit W.S. (ft)	*		* Flow Area (sq ft)	*		*	2283.09	*		*
* E.G. Slope (ft/ft)	*	0.000179	* Area (sq ft)	*		*	2283.09	*		*
* Q Total (cfs)	*	7019.00	* Flow (cfs)	*		*	7019.00	*		*
* Top Width (ft)	*	206.00	* Top Width (ft)	*		*	206.00	*		*
* Vel Total (ft/s)	*	3.07	* Avg. Vel. (ft/s)	*		*	3.07	*		*
* Max Chl Dpth (ft)	*	11.46	* Hydr. Depth (ft)	*		*	11.08	*		*
* Conv. Total (cfs)	*	524297.7	* Conv. (cfs)	*		*	524297.7	*		*
* Length Wtd. (ft)	*	45.83	* Wetted Per. (ft)	*		*	228.69	*		*
* Min Ch El (ft)	*	2042.80	* Shear (lb/sq ft)	*		*	0.11	*		*
* Alpha	*	1.00	* Stream Power (lb/ft s)	*		*	0.34	*		*
* Frctn Loss (ft)	*	0.01	* Cum Volume (acre-ft)	*	19.11	*	28.61	*	4.27	*
* C & E Loss (ft)	*	0.01	* Cum SA (acres)	*	1.80	*	2.40	*	0.64	*

CROSS SECTION

RIVER: Sols Wash

REACH: Sols Wash Main RS: 0.200

INPUT
Description:
Station Elevation Data num= 70

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9881	2058.4	9886	2057.9	9886.01	2054.9	9887	2054.9	9887.01	2051.9
9888	2051.9	9888.01	2048.9	9889	2048.9	9889.01	2045.9	9890	2045.9
9890.01	2042.9	9915.77	2042.83	9919.14	2042.83	9919.98	2042.82	9928.41	2042.75
9928.88	2042.74	9929.59	2042.74	9932.37	2042.66	9940.04	2042.65	9942	2042.57
9950.5	2042.57	9952.51	2042.53	9955.11	2042.48	9960.96	2042.48	9967.4	2042.4
9973.91	2042.4	9982.85	2042.39	9984.19	2042.39	9985.46	2042.34	9986.05	2042.31
9998.04	2042.31	10007.16	2042.26	10009.48	2042.26	10013.32	2042.28	10015.64	2042.31
10021.21	2042.37	10023.25	2042.39	10024.32	2042.41	10024.41	2042.41	10027.55	2042.41
10030.12	2042.43	10033.27	2042.45	10035.12	2042.47	10035.49	2042.47	10036.96	2042.49
10043.51	2042.54	10046.58	2042.56	10047.67	2042.55	10051.24	2042.53	10052.54	2042.49
10054.31	2042.45	10076.04	2042.48	10076.59	2042.48	10077	2042.49	10083.99	2042.64
10084.3	2042.65	10088.27	2042.82	10090.2	2042.91	10095.61	2042.9	10110	2042.91
10110.01	2045.9	10111	2045.91	10111.01	2048.9	10112	2048.91	10112.01	2051.9
10113	2051.91	10113.01	2054.9	10114	2054.91	10114.01	2057.9	10118	2058.4

Manning's n Values num= 1

Sta	n Val
9881	.03

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
98861	10114.01	47.5	45.83	46.67	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2053.25	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.72	Wt. n-Val.		0.030	
W.S. Elev (ft)	2052.54	Reach Len. (ft)	47.50	45.83	46.67
Crit W.S. (ft)		Flow Area (sq ft)		2214.75	
E.G. Slope (ft/ft)	0.001000	Area (sq ft)		2214.75	
Q Total (cfs)	15045.00	Flow (cfs)		15045.00	
Top Width (ft)	225.99	Top Width (ft)		225.99	
Vel Total (ft/s)	6.79	Avg. Vel. (ft/s)		6.79	
Max Chl Dpth (ft)	10.28	Hydr. Depth (ft)		9.80	
Conv. Total (cfs)	475855.5	Conv. (cfs)		475855.5	
Length Wtd. (ft)	45.83	Wetted Per. (ft)		245.14	
Min Ch El (ft)	2042.26	Shear (lb/sq ft)		0.56	
Alpha	1.00	Stream Power (lb/ft s)		3.83	
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)	7.25	14.32	0.57
C & E Loss (ft)	0.03	Cum SA (acres)	1.80	2.15	0.19

CROSS SECTION OUTPUT Profile #PF 2

E.G. Elev (ft)	2054.39	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.11	Wt. n-Val.		0.030	
W.S. Elev (ft)	2054.28	Reach Len. (ft)	47.50	45.83	46.67
Crit W.S. (ft)		Flow Area (sq ft)		2608.60	
E.G. Slope (ft/ft)	0.000129	Area (sq ft)		2608.60	
Q Total (cfs)	7019.00	Flow (cfs)		7019.00	
Top Width (ft)	226.01	Top Width (ft)		226.01	
Vel Total (ft/s)	2.69	Avg. Vel. (ft/s)		2.69	
Max Chl Dpth (ft)	12.02	Hydr. Depth (ft)		11.54	
Conv. Total (cfs)	619082.6	Conv. (cfs)		619082.6	
Length Wtd. (ft)	45.83	Wetted Per. (ft)		248.72	
Min Ch El (ft)	2042.26	Shear (lb/sq ft)		0.08	
Alpha	1.00	Stream Power (lb/ft s)		0.23	
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	19.11	26.04	4.27
C & E Loss (ft)	0.00	Cum SA (acres)	1.80	2.17	0.64

CROSS SECTION

RIVER: Sols Wash
REACH: Sols Wash Main RS: 0.191

INPUT
Description: Just upstream of the proposed ADOT superbox.
Station Elevation Data num= 70

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev

```
    9873  2058.4    9878  2057.9 9878.01  2054.9    9879  2054.9 9879.01  2051.9
    9880  2051.9 9880.01  2048.9    9881  2048.9 9881.01  2045.9    9882  2045.9
 9882.01  2042.9 9915.77 2042.83 9919.14 2042.83 9919.98 2042.82 9928.41 2042.75
 9928.88 2042.74 9929.59 2042.74 9932.37 2042.66 9940.04 2042.65    9942 2042.57
  9950.5 2042.57 9952.51 2042.53 9955.11 2042.48 9960.96 2042.48  9967.4  2042.4
 9973.91  2042.4 9982.85 2042.39 9984.19 2042.39 9985.46 2042.34 9986.05 2042.31
 9998.04  2042.310007.16 2042.2610009.48 2042.2610013.32 2042.2810015.64 2042.31
10021.21 2042.3710023.25 2042.3910024.32  2042.410024.41  2042.410027.55 2042.41
10030.12 2042.4310033.27 2042.4510035.12 2042.4710035.49 2042.4710036.96 2042.49
10043.51 2042.5410046.58 2042.5610047.67 2042.5510051.24 2042.5310052.54 2042.49
10054.31 2042.4510076.04 2042.4810076.59 2042.48   10077 2042.4910083.99 2042.64
 10084.3 2042.6510088.27 2042.82 10090.2  2042.910095.61  2042.9   10117 2042.91
10117.01  2045.9   10118  2045.910118.01  2048.9   10119  2048.910119.01  2051.9
   10120  2051.910120.01  2054.9   10121  2054.910121.01  2057.9   10125  2058.4

Manning's n Values        num=       1
     Sta   n Val
****************
    9873    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          987810121.01              140     127     135              .3       .5
Skew Angle = 25

CROSS SECTION OUTPUT  Profile #PF 1
*********************************************************************************************
* E.G. Elev (ft)         * 2053.18  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.63  * Wt. n-Val.              *          *    0.035 *          *
* W.S. Elev (ft)         * 2052.55  * Reach Len. (ft)         *   21.00  *   21.00  *   21.00  *
* Crit W.S. (ft)         * 2047.60  * Flow Area (sq ft)       *          * 2362.07  *          *
* E.G. Slope (ft/ft)     *0.001188  * Area (sq ft)            *          * 2362.07  *          *
* Q Total (cfs)          *15045.00  * Flow (cfs)              *          *15045.00  *          *
* Top Width (ft)         *  240.99  * Top Width (ft)          *          *  240.99  *          *
* Vel Total (ft/s)       *    6.37  * Avg. Vel. (ft/s)        *          *    6.37  *          *
* Max Chl Dpth (ft)      *   10.29  * Hydr. Depth (ft)        *          *    9.80  *          *
* Conv. Total (cfs)      *436462.1  * Conv. (cfs)             *          *436462.1  *          *
* Length Wtd. (ft)       *   21.00  * Wetted Per. (ft)        *          *  260.14  *          *
* Min Ch El (ft)         * 2042.26  * Shear (lb/sq ft)        *          *    0.67  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s)  *          *    4.29  *          *
* Frctn Loss (ft)        *    0.04  * Cum Volume (acre-ft)    *    7.25  *   11.92  *    0.57  *
* C & E Loss (ft)        *    0.06  * Cum SA (acres)          *    1.80  *    1.91  *    0.19  *
*********************************************************************************************

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 OUTPUT  Profile #PF 2
*********************************************************************************************
* E.G. Elev (ft)         * 2054.38  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.10  * Wt. n-Val.              *          *    0.035 *          *
* W.S. Elev (ft)         * 2054.28  * Reach Len. (ft)         *   21.00  *   21.00  *   21.00  *
* Crit W.S. (ft)         * 2045.60  * Flow Area (sq ft)       *          * 2780.23  *          *
* E.G. Slope (ft/ft)     *0.000153  * Area (sq ft)            *          * 2780.23  *          *
* Q Total (cfs)          * 7019.00  * Flow (cfs)              *          * 7019.00  *          *
* Top Width (ft)         *  241.01  * Top Width (ft)          *          *  241.01  *          *
* Vel Total (ft/s)       *    2.52  * Avg. Vel. (ft/s)        *          *    2.52  *          *
* Max Chl Dpth (ft)      *   12.02  * Hydr. Depth (ft)        *          *   11.54  *          *
* Conv. Total (cfs)      *567501.9  * Conv. (cfs)             *          *567501.9  *          *
* Length Wtd. (ft)       *   21.00  * Wetted Per. (ft)        *          *  263.72  *          *
* Min Ch El (ft)         * 2042.26  * Shear (lb/sq ft)        *          *    0.10  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s)  *          *    0.25  *          *
* Frctn Loss (ft)        *    0.01  * Cum Volume (acre-ft)    *   19.11  *   23.20  *    4.27  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)          *    1.80  *    1.92  *    0.64  *
*********************************************************************************************

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.

BRIDGE


RIVER: Sols Wash
REACH: Sols Wash Main     RS: 0.187

INPUT
Description:
Distance from Upstream XS =      21
Deck/Roadway Width        =      78
Weir Coefficient          =     2.6
```

```
Bridge Deck/Roadway Skew  =      25
Upstream  Deck/Roadway Coordinates
    num=       4
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
*********************************************************************
9708.216 2056.68        9883.132 2057.86 2056.0310109.71 2058.52 2056.69
10232.63 2058.95

Upstream Bridge Cross Section Data
Station Elevation Data    num=      70
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
    9873  2058.4    9878  2057.9 9878.01  2054.9    9879  2054.9 9879.01  2051.9
    9880  2051.9 9880.01  2048.9    9881  2048.9 9881.01  2045.9    9882  2045.9
 9882.01  2042.9 9915.77 2042.83 9919.14 2042.83 9919.98 2042.82 9928.41 2042.75
 9928.88 2042.74 9929.59 2042.74 9932.37 2042.66 9940.04 2042.65    9942 2042.57
  9950.5 2042.57 9952.51 2042.53 9955.11 2042.48 9960.96 2042.48  9967.4  2042.4
 9973.91  2042.4 9982.85 2042.39 9984.19 2042.39 9985.46 2042.34 9986.05 2042.31
 9998.04  2042.310007.16 2042.2610009.48 2042.2610013.32 2042.2810015.64 2042.31
10021.21 2042.3710023.25 2042.3910024.32  2042.410024.41  2042.410027.55 2042.41
10030.12 2042.4310033.27 2042.4510035.12 2042.4710035.49 2042.4710036.96 2042.49
10043.51 2042.5410046.58 2042.5610047.67 2042.5510051.24 2042.5310052.54 2042.49
10054.31 2042.4510076.04 2042.4810076.59 2042.48   10077 2042.4910083.99 2042.64
 10084.3 2042.6510088.27 2042.82 10090.2  2042.910095.61  2042.9   10117 2042.91
10117.01  2045.9   10118  2045.910118.01  2048.9   10119  2048.910119.01  2051.9
   10120  2051.910120.01  2054.9   10121  2054.910121.01  2057.9   10125  2058.4

Manning's n Values        num=       1
     Sta   n Val
****************
    9873    .035

Bank Sta: Left   Right    Coeff Contr.   Expan.
          987810121.01            .3       .5
Skew Angle = 25

Downstream  Deck/Roadway Coordinates
    num=       4
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
*********************************************************************
9708.216 2056.68        9883.132 2057.86 2056.0310109.71 2058.52 2056.69
10232.63 2058.95

Downstream Bridge Cross Section Data
Station Elevation Data    num=      76
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 9679.48 2045.04 9680.63 2045.03 9680.66 2045.03  9680.8 2045.03 9692.25 2044.93
 9695.18 2044.91 9703.83 2044.82 9709.73 2044.75 9715.41 2044.67 9720.85 2044.52
 9727.52 2044.47  9729.5 2044.44 9730.13 2044.43 9733.47 2044.44 9751.87 2044.39
  9762.6 2044.26 9769.14 2044.18 9773.33 2044.14  9782.5 2044.11 9784.92  2044.1
 9794.34  2044.1  9796.5  2044.1 9797.05  2044.1 9808.08 2044.12  9811.6 2044.13
 9819.66 2044.17 9826.15  2044.2 9831.25 2044.22 9840.71 2044.25 9842.83 2044.25
 9851.12 2044.27 9854.41 2044.27 9855.26 2044.27    9866 2044.27 9869.81 2044.27
 9877.58 2044.23 9884.37 2044.17 9889.17 2044.14 9898.92  2044.1 9900.75  2044.1
 9907.89 2044.11 9912.33 2044.12 9913.48 2044.12 9923.92 2044.14 9928.02 2044.12
  9935.5 2044.02 9953.65 2043.33 9956.77 2043.26 9957.17 2043.19  9957.3 2043.19
 9958.54 2043.09 9979.01 2041.21 9988.89 2041.41 9999.66 2041.3810003.14 2041.45
   10005 2041.4710013.07 2041.5810015.93 2041.6210016.23 2041.6310016.63 2041.63
10026.66 2041.8510034.27 2042.0110037.09 2042.0710040.79 2042.1810047.51 2042.37
10051.74 2042.3110064.72 2042.4510072.08 2046.0110078.45 2048.6710083.54  2048.8
10095.89    204910099.64 2049.0810107.62 2049.1410110.06 2049.1410113.28 2049.13
10117.68  2049.1

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
 9679.48    .055 9928.02    .03510078.45    .021

Bank Sta: Left   Right    Coeff Contr.   Expan.
       9928.0210078.45            .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
 9679.48 9868.07    2055       F
10112.7710117.68    2055       F
Skew Angle = 25

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
```

```
Maximum allowable submergence for weir flow =     .95
Elevation at which weir flow begins          =
Energy head used in spillway design          =
Spillway height used in design               =
Weir crest shape                             = Broad Crested

Number of Piers =  6

Pier Data
Pier Station     Upstream=9909.323    Downstream=9909.323
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
    1.25    2036    1.25  2056.2
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
    1.25    2036    1.25  2056.2
Debris Width  =      2.5
Debris Height =     2057

Pier Data
Pier Station     Upstream=9941.517    Downstream=9941.517
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
    1.25    2036    1.25  2056.5
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
    1.25    2036    1.25  2056.5
Debris Width  =      2.5
Debris Height =     2057

Pier Data
Pier Station     Upstream=9973.708    Downstream=9973.708
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
    1.25    2036    1.25  2056.5
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
    1.25    2036    1.25  2056.5
Debris Width  =      2.5
Debris Height =     2057

Pier Data
Pier Station     Upstream= 10005.9    Downstream= 10005.9
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
    1.25    2036    1.25  2056.5
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
    1.25    2036    1.25  2056.5
Debris Width  =      2.5
Debris Height =     2057

Pier Data
Pier Station     Upstream=10038.09    Downstream=10038.09
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
    1.25    2036    1.25  2056.5
Downstream     num=       2
    Width   Elev    Width   Elev
*********************************
    1.25    2036    1.25  2056.5
Debris Width  =      2.5
Debris Height =     2057

Pier Data
Pier Station     Upstream=10070.28    Downstream=10070.28
Upstream     num=       2
    Width   Elev    Width   Elev
*********************************
    1.25    2036    1.25  2056.7
```

```
Downstream      num=        2
    Width   Elev    Width   Elev
*******************************
    1.25    2036    1.25  2056.7
Debris Width  =      2.5
Debris Height =     2057

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
       Energy
Selected Low Flow Methods = Highest Energy Answer

High Flow Method
       Energy Only

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

BRIDGE OUTPUT  Profile #PF 1
*****************************************************************************************
* E.G. US. (ft)          *    2053.18  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *    2052.55  * E.G. Elev (ft)         *    2053.08  *    2051.96  *
* Q Total (cfs)          *   15045.00  * W.S. Elev (ft)         *    2052.24  *    2049.07  *
* Q Bridge (cfs)         *   15045.00  * Crit W.S. (ft)         *    2047.98  *    2049.07  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)       *       9.98  *       7.86  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)        *       7.33  *      12.99  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)       *    2051.55  *    1157.96  *
* Weir Submerg           *             * Froude # Chl            *       0.42  *       1.00  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)    *   13344.56  *   10015.32  *
* Min El Weir Flow (ft)  *    2057.84  * Hydr Depth (ft)         *       9.68  *       5.54  *
* Min El Prs (ft)        *    2056.69  * W.P. Total (ft)         *     414.22  *     287.78  *
* Delta EG (ft)          *       1.64  * Conv. Total (cfs)       *   253070.4  *   122492.7  *
* Delta WS (ft)          *       4.10  * Top Width (ft)          *     211.97  *     209.05  *
* BR Open Area (sq ft)   *    2756.70  * Frctn Loss (ft)         *       0.50  *       0.34  *
* BR Open Vel (ft/s)     *      12.99  * C & E Loss (ft)         *       0.62  *       0.05  *
* Coef of Q              *             * Shear Total (lb/sq ft)  *       1.09  *       3.79  *
* Br Sel Method          *Energy only  * Power Total (lb/ft s)   *       8.01  *      49.24  *
*****************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
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: The energy equation could not be balanced within the specified number of iterations.  The
         program selected the water surface that had the least amount of error between computed and
         assumed values.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical
         depth, the calculated water surface came back below critical depth.  This indicates that there
is
         not a valid subcritical answer.  The program defaulted to critical depth.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid,
         energy was used.

BRIDGE OUTPUT  Profile #PF 2
*****************************************************************************************
* E.G. US. (ft)          *    2054.38  * Element                *Inside BR US *Inside BR DS *
* W.S. US. (ft)          *    2054.28  * E.G. Elev (ft)         *    2054.37  *    2054.32  *
* Q Total (cfs)          *    7019.00  * W.S. Elev (ft)         *    2054.24  *    2054.16  *
* Q Bridge (cfs)         *    7019.00  * Crit W.S. (ft)         *    2045.81  *    2046.52  *
* Q Weir (cfs)           *             * Max Chl Dpth (ft)       *      11.98  *      12.94  *
* Weir Sta Lft (ft)      *             * Vel Total (ft/s)        *       2.83  *       3.09  *
* Weir Sta Rgt (ft)      *             * Flow Area (sq ft)       *    2475.98  *    2273.22  *
* Weir Submerg           *             * Froude # Chl            *       0.15  *       0.17  *
* Weir Max Depth (ft)    *             * Specif Force (cu ft)    *   15070.82  *   13133.11  *
* Min El Weir Flow (ft)  *    2057.84  * Hydr Depth (ft)         *      11.69  *      10.37  *
* Min El Prs (ft)        *    2056.69  * W.P. Total (ft)         *     454.29  *     369.60  *
* Delta EG (ft)          *       0.09  * Conv. Total (cfs)       *   325549.1  *   315982.8  *
* Delta WS (ft)          *       0.12  * Top Width (ft)          *     211.78  *     219.29  *
* BR Open Area (sq ft)   *    2756.70  * Frctn Loss (ft)         *       0.04  *       0.01  *
* BR Open Vel (ft/s)     *       3.09  * C & E Loss (ft)         *       0.01  *       0.02  *
```

```
* Coef of Q              *              * Shear Total (lb/sq ft) *       0.16  *       0.19  *
* Br Sel Method          *Energy only   * Power Total (lb/ft s)  *       0.45  *       0.59  *
*********************************************************************************************

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid,
         energy was used.

CROSS SECTION


RIVER: Sols Wash
REACH: Sols Wash Main     RS: 0.167

INPUT
Description: Downstream of the proposed ADOT superbox.  Within the Hassayampa
             floodplain.
Station Elevation Data    num=      76
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 9679.48 2045.04 9680.63 2045.03 9680.66 2045.03  9680.8 2045.03 9692.25 2044.93
 9695.18 2044.91 9703.83 2044.82 9709.73 2044.75 9715.41 2044.67 9720.85 2044.52
 9727.52 2044.47  9729.5 2044.44 9730.13 2044.43 9733.47 2044.44 9751.87 2044.39
  9762.6 2044.26 9769.14 2044.18 9773.33 2044.14  9782.5 2044.11 9784.92  2044.1
 9794.34  2044.1  9796.5  2044.1 9797.05  2044.1 9808.08 2044.12  9811.6 2044.13
 9819.66 2044.17 9826.15  2044.2 9831.25 2044.22 9840.71 2044.25 9842.83 2044.25
 9851.12 2044.27 9854.41 2044.27 9855.26 2044.27    9866 2044.27 9869.81 2044.27
 9877.58 2044.23 9884.37 2044.17 9889.17 2044.14 9898.92  2044.1 9900.75  2044.1
 9907.89 2044.11 9912.33 2044.12 9913.48 2044.12 9923.92 2044.14 9928.02 2044.12
  9935.5 2044.02 9953.65 2043.33 9956.77 2043.26 9957.17 2043.19  9957.3 2043.19
 9958.54 2043.09 9979.01 2041.21 9988.89 2041.41 9999.66 2041.3810003.14 2041.45
   10005 2041.4710013.07 2041.3810015.93 2041.6210016.23 2041.6310016.63 2041.63
10026.66 2041.8510034.27 2042.0110037.09 2042.0710040.79 2042.1810047.51 2042.37
10051.74 2042.3110064.72 2042.4510072.08 2046.0110078.45 2048.6710083.54  2048.8
10095.89    204910099.64 2049.0810107.62 2049.1410110.06 2049.1410113.28 2049.13
10117.68  2049.1

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*************************************************
 9679.48    .055 9928.02    .03510078.45    .021

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9928.0210078.45              155     143     155              .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
 9679.48 9868.07    2055       F
10112.7710117.68    2055       F
Skew Angle = 25

CROSS SECTION OUTPUT  Profile #PF 1
*********************************************************************************************
* E.G. Elev (ft)         * 2051.54  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    3.09  * Wt. n-Val.              *   0.055  *   0.035  *          *
* W.S. Elev (ft)         * 2048.45  * Reach Len. (ft)        *  155.00  *  143.00  *  155.00  *
* Crit W.S. (ft)         * 2048.73  * Flow Area (sq ft)      *  257.51  *  880.55  *          *
* E.G. Slope (ft/ft)     *0.011661  * Area (sq ft)           * 1025.35  *  880.55  *          *
* Q Total (cfs)          *15045.00  * Flow (cfs)             * 1985.22  *13059.78  *          *
* Top Width (ft)         *  398.44  * Top Width (ft)         *  248.54  *  149.90  *          *
* Vel Total (ft/s)       *   13.22  * Avg. Vel. (ft/s)       *    7.71  *   14.83  *          *
* Max Chl Dpth (ft)      *    7.24  * Hydr. Depth (ft)       *    4.30  *    5.87  *          *
* Conv. Total (cfs)      *139323.0  * Conv. (cfs)            * 18384.0  *120939.1  *          *
* Length Wtd. (ft)       *  144.57  * Wetted Per. (ft)       *   59.95  *  151.33  *          *
* Min Ch El (ft)         * 2041.21  * Shear (lb/sq ft)       *    3.13  *    4.24  *          *
* Alpha                  *    1.14  * Stream Power (lb/ft s) *   24.11  *   62.83  *          *
* Frctn Loss (ft)        *    0.37  * Cum Volume (acre-ft)   *    6.66  *    7.59  *    0.57  *
* C & E Loss (ft)        *    0.06  * Cum SA (acres)         *    1.67  *    1.39  *    0.16  *
*********************************************************************************************

Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note:    The energy method has computed a class B profile.
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)	* 2054.30	* Element	* Left OB	* Channel	* Right OB	*
* Vel Head (ft)	* 0.13	* Wt. n-Val.	* 0.055	* 0.035	* 0.021	*
* W.S. Elev (ft)	* 2054.16	* Reach Len. (ft)	* 155.00	* 143.00	* 155.00	*
* Crit W.S. (ft)	* 2046.43	* Flow Area (sq ft)	* 600.03	* 1739.96	* 177.99	*
* E.G. Slope (ft/ft)	*0.000207	* Area (sq ft)	* 2445.35	* 1739.96	* 202.76	*
* Q Total (cfs)	* 7019.00	* Flow (cfs)	* 1082.05	* 5394.67	* 542.28	*
* Top Width (ft)	* 438.20	* Top Width (ft)	* 248.54	* 150.43	* 39.23	*
* Vel Total (ft/s)	* 2.79	* Avg. Vel. (ft/s)	* 1.80	* 3.10	* 3.05	*
* Max Chl Dpth (ft)	* 12.95	* Hydr. Depth (ft)	* 10.01	* 11.57	* 5.19	*
* Conv. Total (cfs)	*488375.0	* Conv. (cfs)	* 75287.6	*375355.8	* 37731.6	*
* Length Wtd. (ft)	* 145.60	* Wetted Per. (ft)	* 59.95	* 151.90	* 34.32	*
* Min Ch El (ft)	* 2041.21	* Shear (lb/sq ft)	* 0.13	* 0.15	* 0.07	*
* Alpha	* 1.11	* Stream Power (lb/ft s)	* 0.23	* 0.46	* 0.20	*
* Frctn Loss (ft)	* 0.02	* Cum Volume (acre-ft)	* 17.79	* 17.13	* 4.00	*
* C & E Loss (ft)	* 0.03	* Cum SA (acres)	* 1.67	* 1.40	* 0.59	*

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.
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: Sols Wash Main RS: 0.140

INPUT
Description: Downstream of the proposed ADOT superpox. Within the Hassayampa floodplain.
Station Elevation Data num= 91

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9665.91	2042.73	9670.12	2042.74	9670.84	2042.73	9680.72	2042.7	9686.12	2042.67
9691.33	2042.66	9700.85	2042.63	9701.93	2042.63	9702.52	2042.63	9712.54	2042.64
9718.92	2042.66	9723.15	2042.68	9730.87	2042.72	9733.75	2042.74	9735.33	2042.75
9744.36	2042.8	9751.73	2042.82	9754.96	2042.83	9760.89	2042.84	9765.57	2042.86
9768.13	2042.87	9776.18	2042.92	9784.53	2043.04	9786.78	2043.06	9790.9	2043.16
9797.39	2043.34	9800.93	2043.43	9807.99	2043.64	9817.33	2043.82	9818.6	2043.85
9820.92	2043.89	9829.2	2044	9833.73	2044.04	9839.81	2044.1	9850.13	2044.19
9850.42	2044.2	9850.94	2044.2	9861.02	2044.29	9866.53	2044.32	9871.63	2044.35
9880.95	2044.34	9882.23	2044.33	9882.93	2044.32	9892.84	2044.2	9897.57	2044.18
9900.07	2044.17	9914.3	2043.1	9937.89	2041.18	9950.02	2041.2	9956.47	2041.21
9964.94	2041.13	9967.08	2041.1	9968.11	2041.1	9973.71	2041.05	9986.12	2040.95
9990.06	2040.91	9992.07	2040.8	10000	2040.41	10002.37	2040.31	10002.71	2040.28
10014.87	2040.79	10020.51	2041.12	10028	2041.45	10040.23	2041.82	10046.98	2042.38
10058.25	2043.05	10061.39	2042.99	10069.19	2042.52	10087.23	2044.75	10094.83	2044.06
10106.45	2049.45	10107.53	2049.51	10108.35	2049.55	10109.49	2049.58	10122.73	2049.94
10132.4	2050.03	10132.89	2050.03	10142.82	2049.94	10146.37	2049.86	10153.1	2049.68
10159.84	2049.45	10163.38	2049.31	10173.32	2048.96	10173.65	2048.95	10174.72	2048.91
10183.93	2048.63	10186.8	2048.56	10194.21	2048.37	10200.27	2048.24	10204.49	2048.14
10209.88	2048.04								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9665.91	.063	9897.57	.035	10087.23	.021

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9897.57	10106.45	150	167	150	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
9665.91	9790	2055	F
10135	10209.88	2055	F

CROSS SECTION OUTPUT Profile #PF 1

* E.G. Elev (ft)	* 2049.55	* Element	* Left OB	* Channel	* Right OB	*
* Vel Head (ft)	* 1.86	* Wt. n-Val.	* 0.063	* 0.034	*	*
* W.S. Elev (ft)	* 2047.69	* Reach Len. (ft)	* 150.00	* 167.00	* 150.00	*
* Crit W.S. (ft)	* 2047.25	* Flow Area (sq ft)	* 396.17	* 1137.05	*	*
* E.G. Slope (ft/ft)	*0.007200	* Area (sq ft)	* 1007.14	* 1137.05	*	*
* Q Total (cfs)	*15045.00	* Flow (cfs)	* 1890.74	*13154.26	*	*
* Top Width (ft)	* 436.75	* Top Width (ft)	* 231.66	* 205.09	*	*
* Vel Total (ft/s)	* 9.81	* Avg. Vel. (ft/s)	* 4.77	* 11.57	*	*
* Max Chl Dpth (ft)	* 7.41	* Hydr. Depth (ft)	* 3.68	* 5.54	*	*

```
* Conv. Total (cfs)      *177306.8  * Conv. (cfs)            * 22282.5  *155024.3  *          *
* Length Wtd. (ft)       *  165.06  * Wetted Per. (ft)       *  107.58  *  206.28  *          *
* Min Ch El (ft)         * 2040.28  * Shear (lb/sq ft)       *    1.66  *    2.48  *          *
* Alpha                  *    1.24  * Stream Power (lb/ft s) *    7.90  *   28.66  *          *
* Frctn Loss (ft)        *    1.30  * Cum Volume (acre-ft)   *    3.04  *    4.28  *    0.57  *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)         *    0.81  *    0.80  *    0.16  *
*****************************************************************************************

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

CROSS SECTION OUTPUT  Profile #PF 2
*****************************************************************************************
* E.G. Elev (ft)         * 2054.24  * Element               *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.07  * Wt. n-Val.             *   0.063  *   0.034  *   0.021  *
* W.S. Elev (ft)         * 2054.18  * Reach Len. (ft)        *  150.00  *  167.00  *  150.00  *
* Crit W.S. (ft)         * 2045.38  * Flow Area (sq ft)      * 1093.71  * 2488.20  *  123.90  *
* E.G. Slope (ft/ft)     *0.000097  * Area (sq ft)           * 2509.34  * 2488.20  *  508.76  *
* Q Total (cfs)          * 7019.00  * Flow (cfs)             * 1192.66  * 5596.60  *  229.74  *
* Top Width (ft)         *  543.97  * Top Width (ft)         *  231.66  *  208.88  *  103.43  *
* Vel Total (ft/s)       *    1.89  * Avg. Vel. (ft/s)       *    1.09  *    2.25  *    1.85  *
* Max Chl Dpth (ft)      *   13.89  * Hydr. Depth (ft)       *   10.17  *   11.91  *    4.34  *
* Conv. Total (cfs)      *712453.3  * Conv. (cfs)            *121058.9  *568074.6  * 23319.8  *
* Length Wtd. (ft)       *  163.72  * Wetted Per. (ft)       *  107.58  *  210.46  *   28.56  *
* Min Ch El (ft)         * 2040.28  * Shear (lb/sq ft)       *    0.06  *    0.07  *    0.03  *
* Alpha                  *    1.21  * Stream Power (lb/ft s) *    0.07  *    0.16  *    0.05  *
* Frctn Loss (ft)        *    0.01  * Cum Volume (acre-ft)   *    8.97  *   10.19  *    2.74  *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)         *    0.81  *    0.81  *    0.34  *
*****************************************************************************************

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


RIVER: Sols Wash
REACH: Sols Wash Main     RS: 0.109

INPUT
Description: Downstream of the proposed ADOT superbox.  Within the Hassayampa
             floodplain.
Station Elevation Data    num=      98
     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev
*****************************************************************************
 9653.37 2042.51 9658.91 2042.44 9663.35 2042.39 9665.86 2042.39 9673.98 2042.37
 9682.52 2042.41 9684.62 2042.42 9688.31 2042.43 9695.25 2042.46 9699.18 2042.48
 9705.88  2042.5 9715.84 2042.58 9716.52 2042.58 9717.71  2042.6 9727.15 2042.69
  9732.5 2042.77 9737.79 2042.85  9747.1 2042.99 9748.42 2043.01 9749.16 2043.01
 9759.05 2043.07 9765.82 2043.04 9769.69 2043.02  9776.5 2042.97 9780.32 2042.96
 9782.48 2042.97 9790.96    2043 9799.14 2043.12 9801.59 2043.15  9805.9 2043.24
 9812.22 2043.36  9815.8 2043.43 9822.86 2043.56 9832.46 2043.68 9833.49 2043.69
  9835.3  2043.7 9844.13  2043.7 9849.12 2043.64 9854.76 2043.57  9864.7 2043.33
 9865.39 2043.31 9865.78  2043.3 9876.03 2042.97 9882.44  2042.7 9886.66 2042.52
  9894.1 2042.06 9897.09 2041.88 9897.86 2041.79  9901.2 2041.45 9918.02 2039.74
  9922.9 2039.57 9927.09 2039.62 9933.68  2039.8 9950.05 2040.28 9951.11 2040.33
  9952.9 2040.35  9961.1 2040.43 9965.74 2040.46 9971.73 2040.49  9982.3 2040.53
 9982.37 2040.53  9982.4 2040.53    9993 2040.55 9999.06 2040.5710000.01 2040.57
10003.56 2040.5910013.88 2040.6710013.98 2040.6710014.21 2040.67 10024.4 2040.79
10036.39 2040.9310041.09 2040.9910043.22    204110044.61 2041.0710045.49 2041.11
10049.23 2041.2510066.06  2041.910072.71 2042.1210077.79 2042.2410085.63 2042.34
10108.25 2042.6110118.15 2042.6910121.33 2042.6910128.56 2042.7110131.55 2042.72
10138.98  2042.710146.25 2042.68 10149.4 2042.6710157.04 2042.6210159.82 2042.61
10160.96  2042.610170.23 2042.5110175.67 2042.4610180.65 2042.3910190.38 2042.28
10191.07 2042.2710192.74 2042.2510201.31 2042.15

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

```
 9653.37    .065  9901.2     .0310049.23    .065

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        9894.110108.25                 0       0       0             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
 9653.37    9800    2055       F
   1013510201.31    2055       F

CROSS SECTION OUTPUT  Profile #PF 1
*********************************************************************************************
* E.G. Elev (ft)         * 2048.23  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    2.14  * Wt. n-Val.              *   0.065  *   0.034  *   0.065  *
* W.S. Elev (ft)         * 2046.09  * Reach Len. (ft)         *          *          *          *
* Crit W.S. (ft)         * 2046.09  * Flow Area (sq ft)       *  263.90  * 1097.24  *   91.13  *
* E.G. Slope (ft/ft)     *0.008599  * Area (sq ft)            *  757.86  * 1097.24  *  329.61  *
* Q Total (cfs)          *15045.00  * Flow (cfs)              * 1112.26  *13495.35  *  437.39  *
* Top Width (ft)         *  547.94  * Top Width (ft)          *  240.73  *  214.15  *   93.06  *
* Vel Total (ft/s)       *   10.36  * Avg. Vel. (ft/s)        *    4.21  *   12.30  *    4.80  *
* Max Chl Dpth (ft)      *    6.52  * Hydr. Depth (ft)        *    2.80  *    5.12  *    3.41  *
* Conv. Total (cfs)      *162242.3  * Conv. (cfs)             * 11994.4  *145531.2  *  4716.7  *
* Length Wtd. (ft)       *          * Wetted Per. (ft)        *   94.14  *  214.31  *   26.75  *
* Min Ch El (ft)         * 2039.57  * Shear (lb/sq ft)        *    1.50  *    2.75  *    1.83  *
* Alpha                  *    1.28  * Stream Power (lb/ft s)  *    6.34  *   33.81  *    8.78  *
* 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.
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)         * 2054.23  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.05  * Wt. n-Val.              *   0.065  *   0.035  *   0.065  *
* W.S. Elev (ft)         * 2054.17  * Reach Len. (ft)         *          *          *          *
* Crit W.S. (ft)         * 2044.25  * Flow Area (sq ft)       * 1024.15  * 2827.41  *  307.25  *
* E.G. Slope (ft/ft)     *0.000073  * Area (sq ft)            * 2702.76  * 2827.41  * 1081.46  *
* Q Total (cfs)          * 7019.00  * Flow (cfs)              *  981.82  * 5731.78  *  305.40  *
* Top Width (ft)         *  547.94  * Top Width (ft)          *  240.73  *  214.15  *   93.06  *
* Vel Total (ft/s)       *    1.69  * Avg. Vel. (ft/s)        *    0.96  *    2.03  *    0.99  *
* Max Chl Dpth (ft)      *   14.60  * Hydr. Depth (ft)        *   10.88  *   13.20  *   11.49  *
* Conv. Total (cfs)      *821784.6  * Conv. (cfs)             *114951.6  *671076.9  * 35756.0  *
* Length Wtd. (ft)       *          * Wetted Per. (ft)        *   94.14  *  214.31  *   26.75  *
* Min Ch El (ft)         * 2039.57  * Shear (lb/sq ft)        *    0.05  *    0.06  *    0.05  *
* Alpha                  *    1.24  * Stream Power (lb/ft s)  *    0.05  *    0.12  *    0.05  *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)    *          *          *          *
* C & E Loss (ft)        *          * Cum SA (acres)          *          *          *          *
*********************************************************************************************

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

*****************************************************************************

SUMMARY OF MANNING'S N VALUES

River:Sols Wash
*****************************************************************************************************
**********
*     Reach      *   River Sta.   *   n1    *   n2    *   n3    *   n4    *   n5    *   n6    *   n7    *
  n8    *
*****************************************************************************************************
**********
*Sols Wash South *    1.246       *     .07*     .035*     .05*     .04*     .03*     .05*         *
        *
*Sols Wash South *    1.175       *    .069*      .03*     .05*     .04*     .03*     .05*         *
        *
*Sols Wash South *    1.112       *    .069*        0*     .03*     .05*     .04*     .03*      .05*
        *
*Sols Wash South *    1.025       *     .15*     .035*     .05*    .067*    .031*     .05*         *
        *
*Sols Wash South *    0.941       *    .058*     .034*     .15*    .042*    .076*     .08*     .034*
    .032*
*Sols Wash South *    0.859       *    .058*     .034*     .15*    .042*    .076*        *         *
```

```
*Sols Wash North *    0.441      *      .07*     .035*     .05*     .04*     .03*     .05*        *
*Sols Wash North *    0.373      *     .069*      .03*     .05*     .04*     .03*     .05*        *
*Sols Wash North *    0.325      *     .069*        0*     .03*     .05*     .04*     .03*      .05*
*Sols Wash North *    0.240      *      .15*     .035*     .05*    .067*    .031*     .05*        *
*Sols Wash North *    0.167      *     .058*     .034*     .15*    .042*    .076*     .08*     .034*
*Sols Wash North *    0.096      *     .058*     .034*     .15*    .042*    .076*     .08*     .034*
*Sols Wash Main  *    0.779      *     .034*      .15*     .03*    .036*        *        *        *
*Sols Wash Main  *    0.739      *     .048*      .03*     .04*        *        *        *        *
*Sols Wash Main  *    0.717      *      .03*      .04*        *        *        *        *        *
*Sols Wash Main  *    0.684      *      .03*      .04*        *        *        *        *        *
*Sols Wash Main  *    0.660      *      .03*      .04*        *        *        *        *        *
*Sols Wash Main  *    0.606      *      .03*      .04*        *        *        *        *        *
*Sols Wash Main  *    0.541      *      .03*      .04*        *        *        *        *        *
*Sols Wash Main  *    0.497      *      .03*     .065*        *        *        *        *        *
*Sols Wash Main  *    0.486      *Bridge   *        *        *        *        *        *        *
*Sols Wash Main  *    0.474      *      .03*        *        *        *        *        *        *
*Sols Wash Main  *    0.445      *      .03*        *        *        *        *        *        *
*Sols Wash Main  *    0.425      *      .03*        *        *        *        *        *        *
*Sols Wash Main  *    0.370      *      .03*        *        *        *        *        *        *
*Sols Wash Main  *    0.351      *      .03*        *        *        *        *        *        *
*Sols Wash Main  *    0.286      *      .03*        *        *        *        *        *        *
*Sols Wash Main  *    .278       *      .03*        *        *        *        *        *        *
*Sols Wash Main  *    .269       *      .03*        *        *        *        *        *        *
*Sols Wash Main  *    .261       *      .03*        *        *        *        *        *        *
*Sols Wash Main  *    0.252      *      .03*        *        *        *        *        *        *
*Sols Wash Main  *    0.249      *      .03*        *        *        *        *        *        *
*Sols Wash Main  *    0.247      *      .03*        *        *        *        *        *        *
*Sols Wash Main  *    0.243      *      .05*        *        *        *        *        *        *
*Sols Wash Main  *    0.234      *      .05*        *        *        *        *        *        *
*Sols Wash Main  *    0.226      *      .05*        *        *        *        *        *        *
*Sols Wash Main  *    0.218      *      .05*        *        *        *        *        *        *
*Sols Wash Main  *    0.209      *      .03*        *        *        *        *        *        *
*Sols Wash Main  *    0.200      *      .03*        *        *        *        *        *        *
*Sols Wash Main  *    0.191      *     .035*        *        *        *        *        *        *
*Sols Wash Main  *    0.187      *Bridge   *        *        *        *        *        *        *
*Sols Wash Main  *    0.167      *     .055*     .035*    .021*        *        *        *        *
*Sols Wash Main  *    0.140      *     .063*     .035*    .021*        *        *        *        *
*Sols Wash Main  *    0.109      *     .065*      .03*    .065*        *        *        *        *
*****************************************************************************************************
**********
```

SUMMARY OF REACH LENGTHS

River: Sols Wash

Reach	River Sta.	Left	Channel	Right
Sols Wash South	1.246	350	371	350
Sols Wash South	1.175	300	337	300
Sols Wash South	1.112	450	455	450
Sols Wash South	1.025	425	444	425
Sols Wash South	0.941	400	435	400
Sols Wash South	0.859	400	424	400
Sols Wash North	0.441	360	359.04	360
Sols Wash North	0.373	265	253.44	245
Sols Wash North	0.325	450	448.8	450
Sols Wash North	0.240	380	385.44	390
Sols Wash North	0.167	375	374.88	375
Sols Wash North	0.096	525	506.88	490
Sols Wash Main	0.779	210	211.2	210
Sols Wash Main	0.739	115	116.2	115
Sols Wash Main	0.717	175	174.24	175
Sols Wash Main	0.684	125	126.72	125
Sols Wash Main	0.660	275	283	275
Sols Wash Main	0.606	325	344	325
Sols Wash Main	0.541	200	231	200
Sols Wash Main	0.497	100	124	100
Sols Wash Main	0.486	Bridge		
Sols Wash Main	0.474	125	151	125
Sols Wash Main	0.445	100	107	100
Sols Wash Main	0.425	275	291	275
Sols Wash Main	0.370	100	100	100
Sols Wash Main	0.351	325	346	325
Sols Wash Main	0.286	40	44.8	40
Sols Wash Main	.278	40	44.8	40
Sols Wash Main	.269	40	44.8	40
Sols Wash Main	.261	40	44.8	40
Sols Wash Main	0.252	40	44.8	40
Sols Wash Main	0.249	10	10	10
Sols Wash Main	0.247	20	20	20
Sols Wash Main	0.243	47.5	45.83	46.67
Sols Wash Main	0.234	47.5	45.83	46.67
Sols Wash Main	0.226	47.5	45.83	46.67
Sols Wash Main	0.218	47.5	45.83	46.67
Sols Wash Main	0.209	47.5	45.83	46.67
Sols Wash Main	0.200	47.5	45.83	46.67
Sols Wash Main	0.191	140	127	135
Sols Wash Main	0.187	Bridge		
Sols Wash Main	0.167	155	143	155
Sols Wash Main	0.140	150	167	150
Sols Wash Main	0.109	0	0	0

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: Sols Wash

Reach	River Sta.	Contr.	Expan.
Sols Wash South	1.246	.1	.3
Sols Wash South	1.175	.1	.3
Sols Wash South	1.112	.1	.3
Sols Wash South	1.025	.1	.3
Sols Wash South	0.941	.1	.3
Sols Wash South	0.859	.1	.3
Sols Wash North	0.441	.1	.3
Sols Wash North	0.373	.1	.3
Sols Wash North	0.325	.1	.3
Sols Wash North	0.240	.1	.3
Sols Wash North	0.167	.1	.3
Sols Wash North	0.096	.1	.3
Sols Wash Main	0.779	.1	.3
Sols Wash Main	0.739	.1	.3
Sols Wash Main	0.717	.1	.3
Sols Wash Main	0.684	.1	.3

```
*Sols Wash Main  *    0.660   *       .1*       .3*
*Sols Wash Main  *    0.606   *       .1*       .3*
*Sols Wash Main  *    0.541   *       .1*       .3*
*Sols Wash Main  *    0.497   *       .3*       .5*
*Sols Wash Main  *    0.486   *Bridge   *         *
*Sols Wash Main  *    0.474   *       .3*       .5*
*Sols Wash Main  *    0.445   *       .1*       .3*
*Sols Wash Main  *    0.425   *       .1*       .3*
*Sols Wash Main  *    0.370   *       .1*       .3*
*Sols Wash Main  *    0.351   *       .1*       .3*
*Sols Wash Main  *    0.286   *       .1*       .3*
*Sols Wash Main  *    .278    *       .1*       .3*
*Sols Wash Main  *    .269    *       .1*       .3*
*Sols Wash Main  *    .261    *       .1*       .3*
*Sols Wash Main  *    0.252   *       .1*       .3*
*Sols Wash Main  *    0.249   *       .1*       .3*
*Sols Wash Main  *    0.247   *       .1*       .3*
*Sols Wash Main  *    0.243   *       .1*       .3*
*Sols Wash Main  *    0.234   *       .1*       .3*
*Sols Wash Main  *    0.226   *       .1*       .3*
*Sols Wash Main  *    0.218   *       .1*       .3*
*Sols Wash Main  *    0.209   *       .1*       .3*
*Sols Wash Main  *    0.200   *       .1*       .3*
*Sols Wash Main  *    0.191   *       .3*       .5*
*Sols Wash Main  *    0.187   *Bridge   *         *
*Sols Wash Main  *    0.167   *       .3*       .5*
*Sols Wash Main  *    0.140   *       .1*       .3*
*Sols Wash Main  *    0.109   *       .1*       .3*
*****************************************************

Profile Output Table - Standard Table 1
*****************************************************************************************************************
*****************************************************
* Reach        * River Sta   * Profile     *     Q Total *Min Ch El *W.S. Elev *Crit W.S. *E.G. Elev *E.G.
Slope * Vel Chnl *Flow Area *Top Width *Froude # Chl *
*             *             *             *       (cfs) *     (ft) *     (ft) *     (ft) *     (ft) *
(ft/ft) *   (ft/s) *  (sq ft) *     (ft) *             *
*****************************************************************************************************************
*****************************************************
* Sols Wash South* 1.246       * PF 1        *     9000.00 *  2084.94 *  2090.01 *  2090.37 *  2091.70 *
0.010004 *    10.53 *   891.53 *   524.96 *        1.09 *
* Sols Wash South* 1.246       * PF 2        *     4890.00 *  2084.94 *  2089.36 *  2089.08 *  2090.20 *
0.006453 *     7.38 *   680.14 *   432.37 *        0.83 *
*             *             *             *             *          *          *          *          *
      *          *          *          *          *
* Sols Wash South* 1.175       * PF 1        *     6000.00 *  2082.51 *  2086.83 *  2086.74 *  2088.17 *
0.007107 *     9.35 *   675.67 *   658.51 *        0.90 *
* Sols Wash South* 1.175       * PF 2        *     4890.00 *  2082.51 *  2086.40 *  2086.24 *  2087.60 *
0.007417 *     8.81 *   565.52 *   450.86 *        0.90 *
*             *             *             *             *          *          *          *          *
      *          *          *          *          *
* Sols Wash South* 1.112       * PF 1        *     6000.00 *  2077.97 *  2084.81 *  2084.24 *  2086.11 *
0.005288 *     9.15 *   663.01 *  1333.30 *        0.80 *
* Sols Wash South* 1.112       * PF 2        *     4890.00 *  2077.97 *  2084.25 *  2083.74 *  2085.41 *
0.005691 *     8.66 *   565.09 *   703.35 *        0.81 *
*             *             *             *             *          *          *          *          *
      *          *          *          *          *
* Sols Wash South* 1.025       * PF 1        *     6000.00 *  2074.68 *  2080.73 *  2080.73 *  2083.01 *
0.008452 *    12.12 *   499.55 *   968.95 *        0.99 *
* Sols Wash South* 1.025       * PF 2        *     4890.00 *  2074.68 *  2080.10 *  2080.10 *  2082.13 *
0.008955 *    11.42 *   428.08 *   737.11 *        1.00 *
*             *             *             *             *          *          *          *          *
      *          *          *          *          *
* Sols Wash South* 0.941       * PF 1        *     6000.00 *  2071.19 *  2078.72 *  2077.29 *  2079.97 *
0.004002 *     9.13 *   711.49 *  1297.40 *        0.65 *
* Sols Wash South* 0.941       * PF 2        *     4890.00 *  2071.19 *  2077.91 *  2076.62 *  2079.04 *
0.004257 *     8.65 *   588.67 *  1036.36 *        0.66 *
*             *             *             *             *          *          *          *          *
      *          *          *          *          *
* Sols Wash South* 0.859       * PF 1        *     6000.00 *  2068.66 *  2073.69 *  2073.69 *  2075.60 *
0.054431 *    11.07 *   541.79 *   423.97 *        1.00 *
* Sols Wash South* 0.859       * PF 2        *     4890.00 *  2068.66 *  2073.75 *  2073.16 *  2074.98 *
0.034529 *     8.88 *   550.41 *   440.51 *        0.80 *
*             *             *             *             *          *          *          *          *
      *          *          *          *          *
* Sols Wash North* 0.441       * PF 1        *     5413.00 *  2084.20 *  2089.76 *  2089.76 *  2091.69 *
0.011127 *    11.16 *   484.94 *   475.11 *        1.00 *
* Sols Wash North* 0.441       * PF 2        *     2129.00 *  2084.20 *  2087.57 *  2087.57 *  2088.79 *
0.013475 *     8.84 *   240.94 *   316.39 *        1.00 *
```

```
*          *          *          *          *          *          *          *          *
     *          *          *          *          *
* Sols Wash North* 0.373       * PF 1        *    8413.00 *  2080.24 *  2086.04 *  2086.18 *  2088.19 *
0.008914 *    11.76 *   715.41 *   376.38 *       1.03 *
* Sols Wash North* 0.373       * PF 2        *    2129.00 *  2080.24 *  2083.09 *  2083.19 *  2084.18 *
0.012057 *     8.39 *   253.88 *   213.65 *       1.07 *
*          *          *          *                *          *          *          *          *
     *          *          *          *          *
* Sols Wash North* 0.325       * PF 1        *    8413.00 *  2077.43 *  2083.95 *  2083.91 *  2086.06 *
0.007975 *    11.67 *   720.66 *   607.51 *       0.99 *
* Sols Wash North* 0.325       * PF 2        *    2129.00 *  2077.43 *  2080.29 *  2080.46 *  2081.58 *
0.012956 *     9.12 *   233.33 *   164.60 *       1.12 *
*          *          *          *                *          *          *          *          *
     *          *          *          *          *
* Sols Wash North* 0.240       * PF 1        *    8413.00 *  2072.53 *  2079.61 *  2079.61 *  2082.12 *
0.009537 *    12.72 *   661.45 *   458.87 *       0.99 *
* Sols Wash North* 0.240       * PF 2        *    2129.00 *  2072.53 *  2075.89 *  2075.84 *  2077.05 *
0.012842 *     8.64 *   246.46 *   265.16 *       0.97 *
*          *          *          *                *          *          *          *          *
     *          *          *          *          *
* Sols Wash North* 0.167       * PF 1        *    8413.00 *  2070.57 *  2077.61 *  2075.18 *  2078.47 *
0.003816 *     7.45 *  1152.56 *   959.28 *       0.53 *
* Sols Wash North* 0.167       * PF 2        *    2129.00 *  2070.57 *  2073.49 *  2072.50 *  2073.87 *
0.005064 *     4.90 *   434.44 *   260.33 *       0.52 *
*          *          *          *                *          *          *          *          *
     *          *          *          *          *
* Sols Wash North* 0.096       * PF 1        *    8413.00 *  2067.24 *  2073.48 *  2073.48 *  2075.76 *
0.015751 *    12.10 *   695.17 *   407.71 *       1.00 *
* Sols Wash North* 0.096       * PF 2        *    2129.00 *  2067.24 *  2072.07 *  2070.56 *  2072.37 *
0.003133 *     4.39 *   485.37 *   325.07 *       0.42 *
*          *          *          *                *          *          *          *          *
     *          *          *          *          *
* Sols Wash Main* 0.779       * PF 1        *   14459.00 *  2064.57 *  2069.60 *  2068.95 *  2070.80 *
0.004937 *     8.79 *  1645.46 *   492.01 *       0.77 *
* Sols Wash Main* 0.779       * PF 2        *    7019.00 *  2064.57 *  2067.64 *  2067.59 *  2068.68 *
0.009620 *     8.16 *   859.74 *   433.80 *       0.97 *
*          *          *          *                *          *          *          *          *
     *          *          *          *          *
* Sols Wash Main* 0.739       * PF 1        *   14459.00 *  2062.97 *  2069.32 *          *  2070.02 *
0.001983 *     6.74 *  2165.80 *   445.12 *       0.51 *
* Sols Wash Main* 0.739       * PF 2        *    7019.00 *  2062.97 *  2067.04 *          *  2067.53 *
0.002720 *     5.64 *  1244.12 *   384.50 *       0.55 *
*          *          *          *                *          *          *          *          *
     *          *          *          *          *
* Sols Wash Main* 0.717       * PF 1        *   14459.00 *  2062.06 *  2068.72 *  2067.26 *  2069.71 *
0.002939 *     8.00 *  1807.54 *   517.07 *       0.62 *
* Sols Wash Main* 0.717       * PF 2        *    7019.00 *  2062.06 *  2066.21 *  2065.77 *  2067.06 *
0.005648 *     7.37 *   951.97 *   354.57 *       0.77 *
*          *          *          *                *          *          *          *          *
     *          *          *          *          *
* Sols Wash Main* 0.684       * PF 1        *   14459.00 *  2061.23 *  2067.85 *          *  2069.16 *
0.003131 *     9.15 *  1579.52 *   256.06 *       0.65 *
* Sols Wash Main* 0.684       * PF 2        *    7019.00 *  2061.23 *  2065.49 *          *  2066.29 *
0.003437 *     7.15 *   982.11 *   250.09 *       0.64 *
*          *          *          *                *          *          *          *          *
     *          *          *          *          *
* Sols Wash Main* 0.660       * PF 1        *   14459.00 *  2059.96 *  2067.08 *  2065.96 *  2068.68 *
0.003977 *    10.15 *  1424.97 *   303.60 *       0.73 *
* Sols Wash Main* 0.660       * PF 2        *    7019.00 *  2059.96 *  2064.02 *  2064.02 *  2065.55 *
0.008897 *     9.92 *   707.88 *   264.76 *       0.99 *
*          *          *          *                *          *          *          *          *
     *          *          *          *          *
* Sols Wash Main* 0.606       * PF 1        *   14459.00 *  2057.40 *  2066.89 *  2063.43 *  2067.83 *
0.001494 *     7.75 *  1865.94 *   693.60 *       0.47 *
* Sols Wash Main* 0.606       * PF 2        *    7019.00 *  2057.40 *  2061.39 *  2061.38 *  2063.02 *
0.008871 *    10.26 *   684.26 *   207.40 *       1.00 *
*          *          *          *                *          *          *          *          *
     *          *          *          *          *
* Sols Wash Main* 0.541       * PF 1        *   15045.00 *  2054.68 *  2066.71 *          *  2067.38 *
0.000805 *     6.54 *  2300.64 *   230.24 *       0.35 *
* Sols Wash Main* 0.541       * PF 2        *    7019.00 *  2054.68 *  2060.83 *          *  2061.50 *
0.001921 *     6.57 *  1069.13 *   196.05 *       0.50 *
*          *          *          *                *          *          *          *          *
     *          *          *          *          *
* Sols Wash Main* 0.497       * PF 1        *   15045.00 *  2053.13 *  2066.21 *  2060.52 *  2067.16 *
0.000878 *     7.81 *  1926.85 *   321.54 *       0.39 *
* Sols Wash Main* 0.497       * PF 2        *    7019.00 *  2053.13 *  2060.31 *  2057.90 *  2061.07 *
0.001699 *     7.02 *  1000.32 *   208.37 *       0.49 *
*          *          *          *                *          *          *          *          *
```

```
*          *          *          *          *
* Sols Wash Main* 0.486       *             *      Bridge *          *          *          *          *
*          *          *          *          *
*          *          *          *          *          *          *          *          *          *
*          *          *          *          *
* Sols Wash Main* 0.474       * PF 1        *    15045.00 *  2052.51 *  2062.29 *          *  2063.87 *
0.002438 *    10.10 *  1490.29 *   161.15 *       0.59 *
* Sols Wash Main* 0.474       * PF 2        *     7019.00 *  2052.51 *  2057.99 *          *  2059.19 *
0.003993 *     8.79 *   798.14 *   161.14 *       0.70 *
*          *          *          *          *          *          *          *          *          *
*          *          *          *          *
* Sols Wash Main* 0.445       * PF 1        *    15045.00 *  2051.07 *  2062.13 *          *  2063.35 *
0.002060 *     8.90 *  1690.57 *   198.00 *       0.54 *
* Sols Wash Main* 0.445       * PF 2        *     7019.00 *  2051.07 *  2057.70 *          *  2058.60 *
0.002268 *     7.60 *   922.98 *   148.01 *       0.54 *
*          *          *          *          *          *          *          *          *          *
*          *          *          *          *
* Sols Wash Main* 0.425       * PF 1        *    15045.00 *  2049.78 *  2061.86 *          *  2063.15 *
0.001765 *     9.08 *  1656.39 *   164.00 *       0.50 *
* Sols Wash Main* 0.425       * PF 2        *     7019.00 *  2049.78 *  2057.54 *          *  2058.35 *
0.001887 *     7.23 *   970.52 *   145.35 *       0.49 *
*          *          *          *          *          *          *          *          *          *
*          *          *          *          *
* Sols Wash Main* 0.370       * PF 1        *    15045.00 *  2048.80 *  2060.15 *          *  2062.35 *
0.003519 *    11.91 *  1262.96 *   139.00 *       0.70 *
* Sols Wash Main* 0.370       * PF 2        *     7019.00 *  2048.80 *  2056.23 *          *  2057.59 *
0.003245 *     9.34 *   751.31 *   112.72 *       0.64 *
*          *          *          *          *          *          *          *          *          *
*          *          *          *          *
* Sols Wash Main* 0.351       * PF 1        *    15045.00 *  2048.42 *  2059.72 *          *  2061.98 *
0.005723 *    12.07 *  1247.34 *   142.00 *       0.72 *
* Sols Wash Main* 0.351       * PF 2        *     7019.00 *  2048.42 *  2055.67 *          *  2057.21 *
0.004153 *     9.93 *   706.89 *   118.01 *       0.71 *
*          *          *          *          *          *          *          *          *          *
*          *          *          *          *
* Sols Wash Main* 0.286       * PF 1        *    15045.00 *  2047.30 *  2058.61 *          *  2060.78 *
0.003117 *    11.82 *  1272.53 *   125.01 *       0.65 *
* Sols Wash Main* 0.286       * PF 2        *     7019.00 *  2047.30 *  2054.72 *          *  2055.94 *
0.002818 *     8.85 *   793.04 *   115.29 *       0.59 *
*          *          *          *          *          *          *          *          *          *
*          *          *          *          *
* Sols Wash Main* .278        * PF 1        *    15045.00 *  2047.30 *  2058.24 *          *  2060.61 *
0.003445 *    12.36 *  1217.07 *   119.00 *       0.68 *
* Sols Wash Main* .278        * PF 2        *     7019.00 *  2047.30 *  2054.56 *          *  2055.81 *
0.002939 *     8.98 *   782.06 *   114.63 *       0.61 *
*          *          *          *          *          *          *          *          *          *
*          *          *          *          *
* Sols Wash Main* .269        * PF 1        *    15045.00 *  2047.30 *  2057.59 *          *  2060.39 *
0.004420 *    13.45 *  1118.93 *   116.99 *       0.77 *
* Sols Wash Main* .269        * PF 2        *     7019.00 *  2047.30 *  2054.20 *          *  2055.64 *
0.003590 *     9.65 *   727.09 *   110.99 *       0.66 *
*          *          *          *          *          *          *          *          *          *
*          *          *          *          *
* Sols Wash Main* .261        * PF 1        *    15045.00 *  2047.30 *  2057.34 *          *  2060.19 *
0.004605 *    13.55 *  1110.59 *   118.99 *       0.78 *
* Sols Wash Main* .261        * PF 2        *     7019.00 *  2047.30 *  2053.99 *          *  2055.48 *
0.003775 *     9.77 *   718.21 *   112.08 *       0.68 *
*          *          *          *          *          *          *          *          *          *
*          *          *          *          *
* Sols Wash Main* 0.252       * PF 1        *    15045.00 *  2047.30 *  2057.04 *  2055.79 *  2059.98 *
0.004900 *    13.75 *  1094.14 *   120.99 *       0.81 *
* Sols Wash Main* 0.252       * PF 2        *     7019.00 *  2047.30 *  2053.76 *          *  2055.30 *
0.004043 *     9.95 *   705.16 *   113.02 *       0.70 *
*          *          *          *          *          *          *          *          *          *
*          *          *          *          *
* Sols Wash Main* 0.249       * PF 1        *    15045.00 *  2047.30 *  2055.68 *  2055.68 *  2059.60 *
0.007812 *    15.89 *   946.84 *   121.99 *       1.01 *
* Sols Wash Main* 0.249       * PF 2        *     7019.00 *  2047.30 *  2053.47 *          *  2055.10 *
0.004485 *    10.26 *   684.24 *   113.68 *       0.74 *
*          *          *          *          *          *          *          *          *          *
*          *          *          *          *
* Sols Wash Main* 0.247       * PF 1        *    15045.00 *  2042.80 *  2047.67 *  2050.92 *  2058.74 *
0.039650 *    26.70 *   563.55 *   117.00 *       2.14 *
* Sols Wash Main* 0.247       * PF 2        *     7019.00 *  2042.80 *  2054.32 *          *  2054.72 *
0.000532 *     5.06 *  1385.86 *   128.02 *       0.27 *
*          *          *          *          *          *          *          *          *          *
*          *          *          *          *
* Sols Wash Main* 0.243       * PF 1        *    15045.00 *  2042.80 *  2048.63 *  2051.04 *  2056.89 *
0.066157 *    23.06 *   652.35 *   113.01 *       1.69 *
```

```
* Sols Wash Main* 0.243        * PF 2         *     7019.00 *  2042.80 *  2054.24 *          *  2054.69 *
0.001674 *     5.39 *  1302.75 *   117.00 *       0.28 *
*             *             *             *          *          *          *          *
     *          *          *          *          *
* Sols Wash Main* 0.234        * PF 1         *    15045.00 *  2042.80 *  2052.67 *  2050.60 *  2055.04 *
0.010293 *    12.36 *  1217.41 *   127.00 *       0.70 *
* Sols Wash Main* 0.234        * PF 2         *     7019.00 *  2042.80 *  2054.22 *          *  2054.60 *
0.001396 *     4.96 *  1414.45 *   127.01 *       0.26 *
*             *             *             *          *          *          *          *
     *          *          *          *          *
* Sols Wash Main* 0.226        * PF 1         *    15045.00 *  2042.80 *  2051.83 *          *  2054.46 *
0.014400 *    13.01 *  1156.22 *   147.98 *       0.82 *
* Sols Wash Main* 0.226        * PF 2         *     7019.00 *  2042.80 *  2054.19 *          *  2054.53 *
0.001350 *     4.66 *  1505.53 *   148.00 *       0.26 *
*             *             *             *          *          *          *          *
     *          *          *          *          *
* Sols Wash Main* 0.218        * PF 1         *    15045.00 *  2042.80 *  2052.18 *          *  2053.67 *
0.006980 *     9.78 *  1537.70 *   177.98 *       0.59 *
* Sols Wash Main* 0.218        * PF 2         *     7019.00 *  2042.80 *  2054.23 *          *  2054.44 *
0.000768 *     3.69 *  1902.77 *   178.00 *       0.20 *
*             *             *             *          *          *          *          *
     *          *          *          *          *
* Sols Wash Main* 0.209        * PF 1         *    15045.00 *  2042.80 *  2052.41 *          *  2053.39 *
0.001481 *     7.91 *  1902.38 *   205.99 *       0.46 *
* Sols Wash Main* 0.209        * PF 2         *     7019.00 *  2042.80 *  2054.26 *          *  2054.41 *
0.000179 *     3.07 *  2283.09 *   206.00 *       0.16 *
*             *             *             *          *          *          *          *
     *          *          *          *          *
* Sols Wash Main* 0.200        * PF 1         *    15045.00 *  2042.26 *  2052.54 *          *  2053.25 *
0.001000 *     6.79 *  2214.75 *   225.99 *       0.38 *
* Sols Wash Main* 0.200        * PF 2         *     7019.00 *  2042.26 *  2054.28 *          *  2054.39 *
0.000129 *     2.69 *  2608.60 *   226.01 *       0.14 *
*             *             *             *          *          *          *          *
     *          *          *          *          *
* Sols Wash Main* 0.191        * PF 1         *    15045.00 *  2042.26 *  2052.55 *  2047.60 *  2053.18 *
0.001188 *     6.37 *  2362.07 *   240.99 *       0.36 *
* Sols Wash Main* 0.191        * PF 2         *     7019.00 *  2042.26 *  2054.28 *  2045.60 *  2054.38 *
0.000153 *     2.52 *  2780.23 *   241.01 *       0.13 *
*             *             *             *          *          *          *          *
     *          *          *          *          *
* Sols Wash Main* 0.187        *              *       Bridge *          *          *          *          *
     *          *          *          *          *
*             *             *             *          *          *          *          *
     *          *          *          *          *
* Sols Wash Main* 0.167        * PF 1         *    15045.00 *  2041.21 *  2048.45 *  2048.73 *  2051.54 *
0.011661 *    14.83 *  1138.06 *   398.44 *       1.08 *
* Sols Wash Main* 0.167        * PF 2         *     7019.00 *  2041.21 *  2054.16 *  2046.43 *  2054.30 *
0.000207 *     3.10 *  2517.97 *   438.20 *       0.16 *
*             *             *             *          *          *          *          *
     *          *          *          *          *
* Sols Wash Main* 0.140        * PF 1         *    15045.00 *  2040.28 *  2047.69 *  2047.25 *  2049.55 *
0.007200 *    11.57 *  1533.22 *   436.75 *       0.87 *
* Sols Wash Main* 0.140        * PF 2         *     7019.00 *  2040.28 *  2054.18 *  2045.38 *  2054.24 *
0.000097 *     2.25 *  3705.81 *   543.97 *       0.11 *
*             *             *             *          *          *          *          *
     *          *          *          *          *
* Sols Wash Main* 0.109        * PF 1         *    15045.00 *  2039.57 *  2046.09 *  2046.09 *  2048.23 *
0.008599 *    12.30 *  1452.27 *   547.94 *       0.96 *
* Sols Wash Main* 0.109        * PF 2         *     7019.00 *  2039.57 *  2054.17 *  2044.25 *  2054.23 *
0.000073 *     2.03 *  4158.81 *   547.94 *       0.10 *
*****************************************************************************************************************
*****************************************************
*****************************************************************************

ERRORS WARNINGS AND NOTES
Errors Warnings and Notes for Plan : Sols Wash

River: Sols Wash  Reach: Sols Wash South     RS: 1.246     Profile: PF 1
     Warning:Divided flow computed for this cross-section.
     Note:   Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, water surface was
             used.
River: Sols Wash  Reach: Sols Wash South     RS: 1.246     Profile: PF 2
     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.
     Note:   Multiple critical depths were found at this location.  The critical depth with the lowest,
```

valid, water surface was
used.
River: Sols Wash Reach: Sols Wash South RS: 1.175 Profile: PF 1
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.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was
used.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
River: Sols Wash Reach: Sols Wash South RS: 1.175 Profile: PF 2
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.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was
used.
River: Sols Wash Reach: Sols Wash South RS: 1.112 Profile: PF 1
Warning:Divided flow computed for this cross-section.
Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate
the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was
used.
River: Sols Wash Reach: Sols Wash South RS: 1.112 Profile: PF 2
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.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was
used.
River: Sols Wash Reach: Sols Wash South RS: 1.025 Profile: PF 1
Warning:The energy equation could not be balanced within the specified number of iterations. The program selected the water
surface that had the least amount of error between computed and assumed values.
Warning:Divided flow computed for this cross-section.
Warning:The 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.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was
used.
River: Sols Wash Reach: Sols Wash South RS: 1.025 Profile: PF 2
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 conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate
the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The
program defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest,

valid, water surface was
used.
River: Sols Wash Reach: Sols Wash South RS: 0.941 Profile: PF 1
Warning:Divided flow computed for this cross-section.
Warning:The cross-section end points had to be extended vertically for the computed water surface.
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, water surface was
used.
River: Sols Wash Reach: Sols Wash South RS: 0.941 Profile: PF 2
Warning:Divided flow computed for this cross-section.
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.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate
the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was
used.
River: Sols Wash Reach: Sols Wash South RS: 0.859 Profile: PF 1
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning:Divided flow computed for this cross-section.
Warning:The 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.
River: Sols Wash Reach: Sols Wash South RS: 0.859 Profile: PF 2
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.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was
used.
River: Sols Wash Reach: Sols Wash North RS: 0.441 Profile: PF 1
Warning:The energy equation could not be balanced within the specified number of iterations. The program selected the water
surface that had the least amount of error between computed and assumed values.
Warning:Divided flow computed for this cross-section.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate
the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The
program defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was
used.
River: Sols Wash Reach: Sols Wash North RS: 0.441 Profile: PF 2
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning:Divided flow computed for this cross-section.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross

section. This may indicate
the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The
program defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was
used.
River: Sols Wash Reach: Sols Wash North RS: 0.373 Profile: PF 1
Warning:Divided flow computed for this cross-section.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate
the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was
used.
River: Sols Wash Reach: Sols Wash North RS: 0.373 Profile: PF 2
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.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was
used.
River: Sols Wash Reach: Sols Wash North RS: 0.325 Profile: PF 1
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.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was
used.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
River: Sols Wash Reach: Sols Wash North RS: 0.325 Profile: PF 2
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.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was
used.
River: Sols Wash Reach: Sols Wash North RS: 0.240 Profile: PF 1
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning:Divided flow computed for this cross-section.
Warning:The 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.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was
used.
River: Sols Wash Reach: Sols Wash North RS: 0.240 Profile: PF 2
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, water surface was
used.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
River: Sols Wash Reach: Sols Wash North RS: 0.167 Profile: PF 1
Warning:Divided flow computed for this cross-section.
Warning:The cross-section end points had to be extended vertically for the computed water surface.
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, water surface was
used.
River: Sols Wash Reach: Sols Wash North RS: 0.167 Profile: PF 2
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.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was
used.
River: Sols Wash Reach: Sols Wash North RS: 0.096 Profile: PF 1
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning:Divided flow computed for this cross-section.
Warning:The 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.
River: Sols Wash Reach: Sols Wash North RS: 0.096 Profile: PF 2
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.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was
used.
River: Sols Wash Reach: Sols Wash Main RS: 0.779 Profile: PF 1
Warning:Divided flow computed for this cross-section.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was
used.
River: Sols Wash Reach: Sols Wash Main RS: 0.779 Profile: PF 2
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, water surface was
used.
River: Sols Wash Reach: Sols Wash Main RS: 0.739 Profile: PF 2
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.

This may indicate the need for additional cross sections.
River: Sols Wash Reach: Sols Wash Main RS: 0.717 Profile: PF 1
Warning:Divided flow computed for this cross-section.
Warning:The cross-section end points had to be extended vertically for the computed water surface.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
River: Sols Wash Reach: Sols Wash Main RS: 0.717 Profile: PF 2
Warning:Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
River: Sols Wash Reach: Sols Wash Main RS: 0.684 Profile: PF 2
Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
River: Sols Wash Reach: Sols Wash Main RS: 0.660 Profile: PF 1
Warning:Divided flow computed for this cross-section.
Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
River: Sols Wash Reach: Sols Wash Main RS: 0.660 Profile: PF 2
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.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
River: Sols Wash Reach: Sols Wash Main RS: 0.606 Profile: PF 1
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
River: Sols Wash Reach: Sols Wash Main RS: 0.606 Profile: PF 2
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, water surface was used.
River: Sols Wash Reach: Sols Wash Main RS: 0.497 Profile: PF 1
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
River: Sols Wash Reach: Sols Wash Main RS: 0.497 Profile: PF 2
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
River: Sols Wash Reach: Sols Wash Main RS: 0.486 Profile: PF 1
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.
River: Sols Wash Reach: Sols Wash Main RS: 0.486 Profile: PF 1 Upstream
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
River: Sols Wash Reach: Sols Wash Main RS: 0.486 Profile: PF 2 Upstream
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
River: Sols Wash Reach: Sols Wash Main RS: 0.425 Profile: PF 1
Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for

additional cross sections.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
River: Sols Wash Reach: Sols Wash Main RS: 0.425 Profile: PF 2
Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
River: Sols Wash Reach: Sols Wash Main RS: 0.351 Profile: PF 1
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate
the need for additional cross sections.
River: Sols Wash Reach: Sols Wash Main RS: 0.351 Profile: PF 2
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate
the need for additional cross sections.
River: Sols Wash Reach: Sols Wash Main RS: 0.252 Profile: PF 1
Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
River: Sols Wash Reach: Sols Wash Main RS: 0.249 Profile: PF 1
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning:The 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.
River: Sols Wash Reach: Sols Wash Main RS: 0.249 Profile: PF 2
Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
River: Sols Wash Reach: Sols Wash Main RS: 0.247 Profile: PF 1
Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
River: Sols Wash Reach: Sols Wash Main RS: 0.247 Profile: PF 2
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
River: Sols Wash Reach: Sols Wash Main RS: 0.243 Profile: PF 1
Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate
the need for additional cross sections.
River: Sols Wash Reach: Sols Wash Main RS: 0.234 Profile: PF 1
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
River: Sols Wash Reach: Sols Wash Main RS: 0.226 Profile: PF 1
Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
River: Sols Wash Reach: Sols Wash Main RS: 0.218 Profile: PF 1
Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
River: Sols Wash Reach: Sols Wash Main RS: 0.218 Profile: PF 2
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
River: Sols Wash Reach: Sols Wash Main RS: 0.191 Profile: PF 1
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

River: Sols Wash Reach: Sols Wash Main RS: 0.191 Profile: PF 2
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
River: Sols Wash Reach: Sols Wash Main RS: 0.187 Profile: PF 1 Upstream
Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate
the need for additional cross sections.
River: Sols Wash Reach: Sols Wash Main RS: 0.187 Profile: PF 1 Downstream
Warning:The energy equation could not be balanced within the specified number of iterations. The program selected the water
surface that had the least amount of error between computed and assumed values.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The
program defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
River: Sols Wash Reach: Sols Wash Main RS: 0.187 Profile: PF 2 Downstream
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
River: Sols Wash Reach: Sols Wash Main RS: 0.167 Profile: PF 1
Warning:The cross-section end points had to be extended vertically for the computed water surface.
Note: The energy method has computed a class B profile.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
River: Sols Wash Reach: Sols Wash Main RS: 0.167 Profile: PF 2
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.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
River: Sols Wash Reach: Sols Wash Main RS: 0.140 Profile: PF 1
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.
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.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
River: Sols Wash Reach: Sols Wash Main RS: 0.140 Profile: PF 2
Warning:The cross-section end points had to be extended vertically for the computed water surface.
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.
River: Sols Wash Reach: Sols Wash Main RS: 0.109 Profile: PF 1
Warning:User specified water surface is not possible for the specified flow regime. The program used critical depth as the
starting water surface.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was
used.
River: Sols Wash Reach: Sols Wash Main RS: 0.109 Profile: PF 2
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was
used.

Appendix D.3

HOSPITAL WASH HEC-RAS MODEL

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

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

****

PROJECT DATA
Project Title: Hospital Wash
Project File : Hospital_Wash.prj
Run Date and Time: 9/8/2005 8:21:55 AM

Project in English units

Project Description:
Sols Wash CAR
Prepared by:
Engineering and Environmental Consultants,
Inc.
3003 N. Central Avenue, Suite 600
Phoenix, Arizona 85012
Phone:
602-248-7702 FAX: 602-248-7851
For: Flood Control District of Maricopa
County
Sols Wash CAR - Contract # 2003C052
Topographic Mapping Source:

2'
Contour Interval
Discharge information obtained from EEC HEC-1 Model
Study
Limits: Hospital Wash
Final Model Run Date: September 2005
Model: Hospital
Wash Existing Conditions
        Profile 1 - Existing Conditions - 100-year in
Hospital Wash and 10-yr flow in Sols
        Profile 2 - Future Conditions - 100-year
in Hospital Wash and 10-yr flow in Sols
Note - Starting WSE elevations taken
from EEC Sols Wash models
There are no improvements along Hospital Wash.

****

PLAN DATA

Plan Title: Hospital Wash
Plan File : q:\303013.04 Sols Wash\HEC-RAS\Hospital Wash\Hospital_Wash.p01

Geometry Title: Hospital Wash
Geometry File : q:\303013.04 Sols Wash\HEC-RAS\Hospital Wash\Hospital_Wash.g01

Flow Title : Hospital Wash
Flow File : q:\303013.04 Sols Wash\HEC-RAS\Hospital Wash\Hospital_Wash.f01

Plan Summary Information:
Number of: Cross Sections = 6 Multiple Openings = 0
            Culverts   = 0 Inline Structures = 0
            Bridges   = 0 Lateral Structures = 0

Computational Information
    Water surface calculation tolerance = 0.01
    Critical depth calculation tolerance = 0.01
    Maximum number of iterations   = 20

```
    Maximum difference tolerance          =  0.3
    Flow tolerance factor                 =  0.001

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

*******************************************************************************

FLOW DATA

Flow Title: Hospital Wash
Flow File : q:\303013.04 Sols Wash\HEC-RAS\Hospital Wash\Hospital_Wash.f01

Flow Data (cfs)
*****************************************************************************
* River           Reach           RS      *            PF 1            PF 2 *
* Hospital Wash   Hospital Wash   0.388   *             500             500 *
*****************************************************************************

Boundary Conditions
*****************************************************************************************************************
* River           Reach           Profile          *          Upstream                  Downstream    *
*****************************************************************************************************************
* Hospital Wash   Hospital Wash   PF 1             *        Normal S = 0.02          Known WS = 2068 *
* Hospital Wash   Hospital Wash   PF 2             *        Normal S = 0.02         Known WS = 2066.2 *
*****************************************************************************************************************

*******************************************************************************

GEOMETRY DATA

Geometry Title: Hospital Wash
Geometry File : q:\303013.04 Sols Wash\HEC-RAS\Hospital Wash\Hospital_Wash.g01

CROSS SECTION


RIVER: Hospital Wash
REACH: Hospital Wash      RS: 0.388

INPUT
Description:
Station Elevation Data    num=      40
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
 9971.31 2084.74 9975.34 2083.83 9979.72 2082.75 9989.88  2078.9 9998.91  2075.3
   10000 2075.5210003.58 2076.25 10013.1 2077.5310016.84 2078.0910029.39 2079.53
10032.75 2079.6410035.66  2079.8 10047.4 2080.28 10053.8  2080.510063.09    2081
10065.98 2081.0710072.66 2081.2910075.99 2081.3610082.24  2081.5   10086 2081.58
10091.82 2081.7310096.01 2081.84 10101.4 2081.9910106.02 2082.1310110.98 2082.28
10116.03 2082.4410120.56 2082.5710126.04 2082.7510130.14 2082.8810136.05 2083.07
10139.72 2083.1810146.06 2083.3810149.29 2083.4710156.07 2083.6510158.87 2083.71
10166.08 2083.8710168.45 2083.9110176.09 2084.0310178.03 2084.05 10186.1 2084.14

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
 9971.31     .06 9979.72    .04910029.39    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9979.7210029.39              185     238     300            .1        .3

CROSS SECTION OUTPUT  Profile #PF 1
*****************************************************************************************************************
* E.G. Elev (ft)          * 2080.05  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.91  * Wt. n-Val.              *          *    0.049 *          *
* W.S. Elev (ft)          * 2079.13  * Reach Len. (ft)         *  185.00  *   238.00 *   300.00 *
* Crit W.S. (ft)          * 2079.13  * Flow Area (sq ft)       *          *    65.19 *          *
* E.G. Slope (ft/ft)      *0.030808  * Area (sq ft)            *          *    65.19 *          *
* Q Total (cfs)           *  500.00  * Flow (cfs)              *          *   500.00 *          *
* Top Width (ft)          *   36.68  * Top Width (ft)          *          *    36.68 *          *
* Vel Total (ft/s)        *    7.67  * Avg. Vel. (ft/s)        *          *     7.67 *          *
* Max Chl Dpth (ft)       *    3.83  * Hydr. Depth (ft)        *          *     1.78 *          *
* Conv. Total (cfs)       *  2848.6  * Conv. (cfs)             *          *   2848.6 *          *
* Length Wtd. (ft)        *  249.80  * Wetted Per. (ft)        *          *    37.69 *          *
```

```
* Min Ch El (ft)         * 2075.30  * Shear (lb/sq ft)       *          *    3.33  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *   25.51  *          *
* Frctn Loss (ft)        *    2.09  * Cum Volume (acre-ft)   *          *    3.28  *    0.71  *
* C & E Loss (ft)        *    0.23  * Cum SA (acres)         *          *    1.56  *    0.54  *
*****************************************************************************************

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 OUTPUT  Profile #PF 2
*****************************************************************************************
* E.G. Elev (ft)         * 2080.05  * Element                *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.90  * Wt. n-Val.             *          *    0.049  *          *
* W.S. Elev (ft)         * 2079.15  * Reach Len. (ft)        *  185.00  *   238.00  *   300.00  *
* Crit W.S. (ft)         * 2079.15  * Flow Area (sq ft)      *          *    65.71  *          *
* E.G. Slope (ft/ft)     *0.030177  * Area (sq ft)           *          *    65.71  *          *
* Q Total (cfs)          *  500.00  * Flow (cfs)             *          *   500.00  *          *
* Top Width (ft)         *   36.84  * Top Width (ft)         *          *    36.84  *          *
* Vel Total (ft/s)       *    7.61  * Avg. Vel. (ft/s)       *          *     7.61  *          *
* Max Chl Dpth (ft)      *    3.85  * Hydr. Depth (ft)       *          *     1.78  *          *
* Conv. Total (cfs)      *  2878.3  * Conv. (cfs)            *          *   2878.3  *          *
* Length Wtd. (ft)       *  249.80  * Wetted Per. (ft)       *          *    37.86  *          *
* Min Ch El (ft)         * 2075.30  * Shear (lb/sq ft)       *          *     3.27  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *    24.88  *          *
* Frctn Loss (ft)        *    2.08  * Cum Volume (acre-ft)   *          *     3.28  *    0.71  *
* C & E Loss (ft)        *    0.23  * Cum SA (acres)         *          *     1.56  *    0.54  *
*****************************************************************************************

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: Hospital Wash
REACH: Hospital Wash      RS: 0.343

INPUT
Description:
Station Elevation Data    num=      54
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
 9948.07 2080.51 9952.51 2079.44 9961.57 2079.42 9978.88 2077.83 9982.04 2077.62
 9983.06 2077.56  9985.5 2076.89 9999.99    2073   10000    2073 10018.1 2075.69
10019.68 2075.9210022.02 2076.04 10025.1 2075.9510040.58 2075.5810044.27 2075.58
10050.34 2075.6210051.55 2075.6310052.28 2075.6310058.82 2075.6910063.97  2075.7
 10066.1 2075.7410069.62 2075.8110073.38 2075.9310075.67 2076.0310080.66 2076.31
10087.37 2076.7310087.94 2076.77 10088.9 2076.8310095.22 2077.3710099.06 2077.65
 10102.5 2077.9310108.18 2078.2910109.78  2078.410110.76 2078.4510117.06 2078.82
10122.45 2079.0610124.34 2079.1510127.46 2079.2610131.62 2079.4110134.15 2079.47
 10138.9  2079.610145.85 2079.7410146.18 2079.7510146.74 2079.7610153.46 2079.86
10157.54 2079.9210160.74 2079.9510166.02    208010168.02 2080.0210169.24 2080.03
 10175.3 2080.0810180.94 2080.1310182.58 2080.1410182.96 2080.14

Manning's n Values        num=       3
```

```
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
 9948.07     .06 9982.04    .04910022.02    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9982.0410022.02              385     388     350            .1       .3

CROSS SECTION OUTPUT  Profile #PF 1
*****************************************************************************************
* E.G. Elev (ft)         * 2077.41  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.13  * Wt. n-Val.              *          *    0.049 *    0.055 *
* W.S. Elev (ft)         * 2077.27  * Reach Len. (ft)         *  385.00  *  388.00  *  350.00  *
* Crit W.S. (ft)         * 2076.42  * Flow Area (sq ft)       *          *   92.44  *   94.93  *
* E.G. Slope (ft/ft)     *0.003821  * Area (sq ft)            *          *   92.44  *   94.93  *
* Q Total (cfs)          *  500.00  * Flow (cfs)              *          *  309.62  *  190.38  *
* Top Width (ft)         *  110.00  * Top Width (ft)          *          *   37.92  *   72.08  *
* Vel Total (ft/s)       *    2.67  * Avg. Vel. (ft/s)         *          *    3.35  *    2.01  *
* Max Chl Dpth (ft)      *    4.27  * Hydr. Depth (ft)         *          *    2.44  *    1.32  *
* Conv. Total (cfs)      *  8088.4  * Conv. (cfs)              *          *  5008.6  *  3079.8  *
* Length Wtd. (ft)       *  380.77  * Wetted Per. (ft)         *          *   38.70  *   72.13  *
* Min Ch El (ft)         * 2073.00  * Shear (lb/sq ft)         *          *    0.57  *    0.31  *
* Alpha                  *    1.19  * Stream Power (lb/ft s)   *          *    1.91  *    0.63  *
* Frctn Loss (ft)        *    2.57  * Cum Volume (acre-ft)     *          *    2.85  *    0.38  *
* C & E Loss (ft)        *    0.07  * Cum SA (acres)           *          *    1.36  *    0.29  *
*****************************************************************************************

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

CROSS SECTION OUTPUT  Profile #PF 2
*****************************************************************************************
* E.G. Elev (ft)         * 2077.41  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.13  * Wt. n-Val.              *          *    0.049 *    0.055 *
* W.S. Elev (ft)         * 2077.27  * Reach Len. (ft)         *  385.00  *  388.00  *  350.00  *
* Crit W.S. (ft)         * 2076.42  * Flow Area (sq ft)       *          *   92.41  *   94.87  *
* E.G. Slope (ft/ft)     *0.003826  * Area (sq ft)            *          *   92.41  *   94.87  *
* Q Total (cfs)          *  500.00  * Flow (cfs)              *          *  309.66  *  190.34  *
* Top Width (ft)         *  109.99  * Top Width (ft)          *          *   37.92  *   72.07  *
* Vel Total (ft/s)       *    2.67  * Avg. Vel. (ft/s)         *          *    3.35  *    2.01  *
* Max Chl Dpth (ft)      *    4.27  * Hydr. Depth (ft)         *          *    2.44  *    1.32  *
* Conv. Total (cfs)      *  8083.6  * Conv. (cfs)              *          *  5006.4  *  3077.2  *
* Length Wtd. (ft)       *  380.77  * Wetted Per. (ft)         *          *   38.70  *   72.13  *
* Min Ch El (ft)         * 2073.00  * Shear (lb/sq ft)         *          *    0.57  *    0.31  *
* Alpha                  *    1.19  * Stream Power (lb/ft s)   *          *    1.91  *    0.63  *
* Frctn Loss (ft)        *    2.57  * Cum Volume (acre-ft)     *          *    2.85  *    0.38  *
* C & E Loss (ft)        *    0.07  * Cum SA (acres)           *          *    1.36  *    0.29  *
*****************************************************************************************

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

CROSS SECTION


RIVER: Hospital Wash
REACH: Hospital Wash       RS: 0.270

INPUT
Description:
Station Elevation Data    num=      44
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 9930.04 2080.24 9939.44 2077.77 9942.69 2077.35 9950.29 2076.51 9950.33 2076.51
 9950.41  2076.5 9957.96 2075.81 9961.14 2075.56 9965.59  2075.1    9972 2074.44
  9976.9 2073.61 9988.48 2071.51  9998.2  2071.6   10000  2071.610001.32  2071.6
10012.85 2073.0510018.51 2073.8610034.98 2075.8810036.51  2075.910037.75 2075.87
10050.48 2074.6110060.38 2074.4610063.02 2074.3710072.26 2074.5410073.19 2074.55
```

```
10075.11 2074.6710077.68 2074.8510082.52 2075.1710085.68 2075.3810087.71 2075.58
10095.38 2075.9410102.22 2076.22 10104.9 2076.2610110.65 2076.3510113.07 2076.42
10119.02 2076.5410123.94 2076.5910130.65 2076.69 10134.7 2076.6710135.47 2076.67
10144.06  2076.710147.07 2076.66 10152.3 2076.6810161.95 2076.52

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
 9930.04    .058 9965.59    .03410034.98     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9965.5910034.98              235     289     325             .1       .3

CROSS SECTION OUTPUT  Profile #PF 1
*****************************************************************************************
* E.G. Elev (ft)         * 2074.77  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.80  * Wt. n-Val.              *          *   0.034  *          *
* W.S. Elev (ft)         * 2073.98  * Reach Len. (ft)        *  235.00  *  289.00  *  325.00  *
* Crit W.S. (ft)         * 2073.98  * Flow Area (sq ft)      *          *   69.87  *          *
* E.G. Slope (ft/ft)     *0.014964  * Area (sq ft)           *          *   69.87  *          *
* Q Total (cfs)          *  500.00  * Flow (cfs)             *          *  500.00  *          *
* Top Width (ft)         *   44.75  * Top Width (ft)         *          *   44.75  *          *
* Vel Total (ft/s)       *    7.16  * Avg. Vel. (ft/s)       *          *    7.16  *          *
* Max Chl Dpth (ft)      *    2.47  * Hydr. Depth (ft)       *          *    1.56  *          *
* Conv. Total (cfs)      *  4087.5  * Conv. (cfs)            *          *  4087.5  *          *
* Length Wtd. (ft)       *  289.00  * Wetted Per. (ft)       *          *   45.12  *          *
* Min Ch El (ft)         * 2071.51  * Shear (lb/sq ft)       *          *    1.45  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *   10.35  *          *
* Frctn Loss (ft)        *    2.11  * Cum Volume (acre-ft)   *          *    2.13  *          *
* C & E Loss (ft)        *    0.13  * Cum SA (acres)         *          *    0.99  *          *
*****************************************************************************************

Warning: The energy equation could not be balanced within the specified number of iterations.  The
         program selected the water surface that had the least amount of error between computed and
         assumed values.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.

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

CROSS SECTION OUTPUT  Profile #PF 2
*****************************************************************************************
* E.G. Elev (ft)         * 2074.77  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.79  * Wt. n-Val.              *          *   0.034  *          *
* W.S. Elev (ft)         * 2073.98  * Reach Len. (ft)        *  235.00  *  289.00  *  325.00  *
* Crit W.S. (ft)         * 2073.98  * Flow Area (sq ft)      *          *   69.95  *          *
* E.G. Slope (ft/ft)     *0.014920  * Area (sq ft)           *          *   69.95  *          *
* Q Total (cfs)          *  500.00  * Flow (cfs)             *          *  500.00  *          *
* Top Width (ft)         *   44.77  * Top Width (ft)         *          *   44.77  *          *
* Vel Total (ft/s)       *    7.15  * Avg. Vel. (ft/s)       *          *    7.15  *          *
* Max Chl Dpth (ft)      *    2.47  * Hydr. Depth (ft)       *          *    1.56  *          *
* Conv. Total (cfs)      *  4093.4  * Conv. (cfs)            *          *  4093.4  *          *
* Length Wtd. (ft)       *  289.00  * Wetted Per. (ft)       *          *   45.15  *          *
* Min Ch El (ft)         * 2071.51  * Shear (lb/sq ft)       *          *    1.44  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s) *          *   10.32  *          *
* Frctn Loss (ft)        *    2.11  * Cum Volume (acre-ft)   *          *    2.13  *          *
* C & E Loss (ft)        *    0.13  * Cum SA (acres)         *          *    0.99  *          *
*****************************************************************************************

Warning: The energy equation could not be balanced within the specified number of iterations.  The
         program selected the water surface that had the least amount of error between computed and
         assumed values.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
         0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.

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

CROSS SECTION
```

```
RIVER: Hospital Wash
REACH: Hospital Wash       RS: 0.215

INPUT
Description:
Station Elevation Data     num=      28
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
 9924.09 2076.92 9933.95 2076.61 9937.95 2076.52  9946.6 2076.29 9951.62 2076.16
 9954.75 2076.02 9958.69 2075.81 9964.71 2075.39 9977.11 2074.33 9992.26 2069.78
 9998.59 2068.0910000.01 2068.0510008.75 2067.8210011.57 2067.7710013.31 2068.08
10038.33  2072.510044.68 2072.8910051.53 2072.9410056.34 2073.1110070.27    2074
10073.89  2074.210078.91 2074.41 10084.1 2074.5410085.99 2074.5910087.81 2074.62
10093.06 2074.6910098.47 2074.7110100.13 2074.72

Manning's n Values         num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*************************************************
 9924.09    .058 9977.11    .03410038.33     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9977.1110038.33               330     324     320             .1       .3

CROSS SECTION OUTPUT  Profile #PF 1
*****************************************************************************************
* E.G. Elev (ft)          * 2071.77  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.37  * Wt. n-Val.              *          *    0.034 *          *
* W.S. Elev (ft)          * 2071.40  * Reach Len. (ft)         *  330.00  *   324.00 *   320.00 *
* Crit W.S. (ft)          * 2070.51  * Flow Area (sq ft)       *          *   102.16 *          *
* E.G. Slope (ft/ft)      *0.004325  * Area (sq ft)            *          *   102.16 *          *
* Q Total (cfs)           *  500.00  * Flow (cfs)              *          *   500.00 *          *
* Top Width (ft)          *   45.19  * Top Width (ft)          *          *    45.19 *          *
* Vel Total (ft/s)        *    4.89  * Avg. Vel. (ft/s)        *          *     4.89 *          *
* Max Chl Dpth (ft)       *    3.62  * Hydr. Depth (ft)        *          *     2.26 *          *
* Conv. Total (cfs)       *  7602.7  * Conv. (cfs)             *          *   7602.7 *          *
* Length Wtd. (ft)        *  324.00  * Wetted Per. (ft)        *          *    45.97 *          *
* Min Ch El (ft)          * 2067.77  * Shear (lb/sq ft)        *          *     0.60 *          *
* Alpha                   *    1.00  * Stream Power (lb/ft s)  *          *     2.94 *          *
* Frctn Loss (ft)         *    0.99  * Cum Volume (acre-ft)    *          *     1.56 *          *
* C & E Loss (ft)         *    0.04  * Cum SA (acres)          *          *     0.69 *          *
*****************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.

         This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT  Profile #PF 2
*****************************************************************************************
* E.G. Elev (ft)          * 2071.77  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.37  * Wt. n-Val.              *          *    0.034 *          *
* W.S. Elev (ft)          * 2071.39  * Reach Len. (ft)         *  330.00  *   324.00 *   320.00 *
* Crit W.S. (ft)          * 2070.51  * Flow Area (sq ft)       *          *   102.14 *          *
* E.G. Slope (ft/ft)      *0.004328  * Area (sq ft)            *          *   102.14 *          *
* Q Total (cfs)           *  500.00  * Flow (cfs)              *          *   500.00 *          *
* Top Width (ft)          *   45.19  * Top Width (ft)          *          *    45.19 *          *
* Vel Total (ft/s)        *    4.90  * Avg. Vel. (ft/s)        *          *     4.90 *          *
* Max Chl Dpth (ft)       *    3.62  * Hydr. Depth (ft)        *          *     2.26 *          *
* Conv. Total (cfs)       *  7600.5  * Conv. (cfs)             *          *   7600.5 *          *
* Length Wtd. (ft)        *  324.00  * Wetted Per. (ft)        *          *    45.97 *          *
* Min Ch El (ft)          * 2067.77  * Shear (lb/sq ft)        *          *     0.60 *          *
* Alpha                   *    1.00  * Stream Power (lb/ft s)  *          *     2.94 *          *
* Frctn Loss (ft)         *    0.99  * Cum Volume (acre-ft)    *          *     1.56 *          *
* C & E Loss (ft)         *    0.04  * Cum SA (acres)          *          *     0.69 *          *
*****************************************************************************************

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.

         This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: Hospital Wash
REACH: Hospital Wash       RS: 0.154

INPUT
Description:
Station Elevation Data     num=      47
```

```
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
  9876.3 2071.01 9877.76 2071.01 9883.43 2071.01 9890.34    2071 9890.57    2071
 9890.87    2071  9897.7 2070.99 9902.91 2070.98 9904.84 2070.97 9907.36 2070.97
 9911.97 2070.96 9915.49 2070.96 9919.11 2070.96 9923.85 2070.95 9926.24 2070.95
 9928.07 2070.95 9933.38 2070.95 9940.34 2070.95 9940.51 2070.95 9940.64 2070.95
 9947.65 2070.94 9953.22 2070.93 9954.78 2070.92 9956.84  2070.9 9961.92 2070.84
    9968 2070.76 9981.51 2070.59 9984.52  2069.9   10000    206610000.06 2065.99
10005.01  2066.110013.44 2066.3410020.19 2068.7110039.54 2071.3610042.36 2071.34
 10045.6 2071.4810061.81 2072.0110066.39  2072.110068.94 2072.1510072.29 2072.19
10076.08 2072.2310078.97 2072.2510083.21 2072.2910088.78 2072.3210090.35 2072.33
10091.54 2072.3210097.48 2072.33

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*************************************************
  9876.3    .058 9981.51    .03410039.54     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9981.5110039.54               300     299     285             .1       .3

CROSS SECTION OUTPUT  Profile #PF 1
*****************************************************************************************
* E.G. Elev (ft)          * 2070.73  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.23  * Wt. n-Val.              *          *   0.034  *          *
* W.S. Elev (ft)          * 2070.51  * Reach Len. (ft)         *  300.00  *  299.00  *  285.00  *
* Crit W.S. (ft)          * 2068.91  * Flow Area (sq ft)       *          *  130.78  *          *
* E.G. Slope (ft/ft)      *0.002267  * Area (sq ft)            *          *  130.78  *          *
* Q Total (cfs)           *  500.00  * Flow (cfs)              *          *  500.00  *          *
* Top Width (ft)          *   51.43  * Top Width (ft)          *          *   51.43  *          *
* Vel Total (ft/s)        *    3.82  * Avg. Vel. (ft/s)        *          *    3.82  *          *
* Max Chl Dpth (ft)       *    4.52  * Hydr. Depth (ft)        *          *    2.54  *          *
* Conv. Total (cfs)       * 10500.8  * Conv. (cfs)             *          * 10500.8  *          *
* Length Wtd. (ft)        *  299.00  * Wetted Per. (ft)        *          *   52.52  *          *
* Min Ch El (ft)          * 2065.99  * Shear (lb/sq ft)        *          *    0.35  *          *
* Alpha                   *    1.00  * Stream Power (lb/ft s)  *          *    1.35  *          *
* Frctn Loss (ft)         *    1.41  * Cum Volume (acre-ft)    *          *    0.69  *          *
* C & E Loss (ft)         *    0.06  * Cum SA (acres)          *          *    0.33  *          *
*****************************************************************************************

Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for
         additional cross sections.
Warning: The 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 OUTPUT  Profile #PF 2
*****************************************************************************************
* E.G. Elev (ft)          * 2070.73  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.23  * Wt. n-Val.              *          *   0.034  *          *
* W.S. Elev (ft)          * 2070.51  * Reach Len. (ft)         *  300.00  *  299.00  *  285.00  *
* Crit W.S. (ft)          *          * Flow Area (sq ft)       *          *  130.68  *          *
* E.G. Slope (ft/ft)      *0.002272  * Area (sq ft)            *          *  130.68  *          *
* Q Total (cfs)           *  500.00  * Flow (cfs)              *          *  500.00  *          *
* Top Width (ft)          *   51.41  * Top Width (ft)          *          *   51.41  *          *
* Vel Total (ft/s)        *    3.83  * Avg. Vel. (ft/s)        *          *    3.83  *          *
* Max Chl Dpth (ft)       *    4.51  * Hydr. Depth (ft)        *          *    2.54  *          *
* Conv. Total (cfs)       * 10490.5  * Conv. (cfs)             *          * 10490.5  *          *
* Length Wtd. (ft)        *  299.00  * Wetted Per. (ft)        *          *   52.50  *          *
* Min Ch El (ft)          * 2065.99  * Shear (lb/sq ft)        *          *    0.35  *          *
* Alpha                   *    1.00  * Stream Power (lb/ft s)  *          *    1.35  *          *
* Frctn Loss (ft)         *    1.41  * Cum Volume (acre-ft)    *          *    0.69  *          *
* C & E Loss (ft)         *    0.06  * Cum SA (acres)          *          *    0.33  *          *
*****************************************************************************************

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

REACH: Hospital Wash RS: 0.097

INPUT
Description:
Station Elevation Data num= 37

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9903.72	2069.77	9910.63	2069.77	9910.8	2069.77	9911	2069.77	9917.89	2069.76
9923.91	2069.74	9924.98	2069.74	9926.2	2069.73	9932.07	2069.71	9937.19	2069.67
9939.15	2069.66	9941.41	2069.64	9946.24	2069.59	9950.46	2069.54	9953.33	2069.5
9956.61	2069.44	9960.41	2069.38	9978.35	2069.01	9979.86	2068.98	9980.44	2068.97
9988.27	2067.63	9998.6	2065.87	9999.59	2065.73	10000	2065.74	10000.3	2065.74
10027.1	2067.88	10031.45	2069.22	10037.43	2069.56	10056.17	2070.17	10066.69	2070.09
10081	2069.91	10088.76	2070.24	10093.33	2070.39	10100.54	2070.89	10102.81	2070.97
10108.04	2071.17	10110.31	2071.21						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9903.72	.058	9979.86	.034	10031.45	.05

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9979.86	10031.45	510	512	495	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2069.27	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.78	Wt. n-Val.		0.034	
W.S. Elev (ft)	2068.49	Reach Len. (ft)			
Crit W.S. (ft)	2068.49	Flow Area (sq ft)		70.33	
E.G. Slope (ft/ft)	0.015128	Area (sq ft)		70.33	
Q Total (cfs)	500.00	Flow (cfs)		500.00	
Top Width (ft)	45.82	Top Width (ft)		45.82	
Vel Total (ft/s)	7.11	Avg. Vel. (ft/s)		7.11	
Max Chl Dpth (ft)	2.76	Hydr. Depth (ft)		1.53	
Conv. Total (cfs)	4065.2	Conv. (cfs)		4065.2	
Length Wtd. (ft)		Wetted Per. (ft)		46.23	
Min Ch El (ft)	2065.73	Shear (lb/sq ft)		1.44	
Alpha	1.00	Stream Power (lb/ft s)		10.21	
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)	2069.27	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.78	Wt. n-Val.		0.034	
W.S. Elev (ft)	2068.49	Reach Len. (ft)			
Crit W.S. (ft)	2068.49	Flow Area (sq ft)		70.53	
E.G. Slope (ft/ft)	0.015002	Area (sq ft)		70.53	
Q Total (cfs)	500.00	Flow (cfs)		500.00	
Top Width (ft)	45.87	Top Width (ft)		45.87	
Vel Total (ft/s)	7.09	Avg. Vel. (ft/s)		7.09	
Max Chl Dpth (ft)	2.76	Hydr. Depth (ft)		1.54	
Conv. Total (cfs)	4082.2	Conv. (cfs)		4082.2	
Length Wtd. (ft)		Wetted Per. (ft)		46.27	
Min Ch El (ft)	2065.73	Shear (lb/sq ft)		1.43	
Alpha	1.00	Stream Power (lb/ft s)		10.12	
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.

SUMMARY OF MANNING'S N VALUES

River:Hospital Wash

Reach	River Sta.	n1	n2	n3
Hospital Wash	0.388	.06	.049	.055
Hospital Wash	0.343	.06	.049	.055
Hospital Wash	0.270	.058	.034	.05

*Hospital Wash	0.215	.058*	.034*	.05*
*Hospital Wash	0.154	.058*	.034*	.05*
*Hospital Wash	0.097	.058*	.034*	.05*

SUMMARY OF REACH LENGTHS

River: Hospital Wash

Reach	River Sta.	Left	Channel	Right
*Hospital Wash	0.388	185*	238*	300*
*Hospital Wash	0.343	385*	388*	350*
*Hospital Wash	0.270	235*	289*	325*
*Hospital Wash	0.215	330*	324*	320*
*Hospital Wash	0.154	300*	299*	285*
*Hospital Wash	0.097	510*	512*	495*

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: Hospital Wash

Reach	River Sta.	Contr.	Expan.
*Hospital Wash	0.388	.1*	.3*
*Hospital Wash	0.343	.1*	.3*
*Hospital Wash	0.270	.1*	.3*
*Hospital Wash	0.215	.1*	.3*
*Hospital Wash	0.154	.1*	.3*
*Hospital Wash	0.097	.1*	.3*

Profile Output Table - Standard Table 1

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
* Hospital Wash*	0.388	* PF 1	500.00	2075.30	2079.13	2079.13	2080.05	0.030808	7.67	65.19	36.68	1.01
* Hospital Wash*	0.388	* PF 2	500.00	2075.30	2079.15	2079.15	2080.05	0.030177	7.61	65.71	36.84	1.00
* Hospital Wash*	0.343	* PF 1	500.00	2073.00	2077.27	2076.42	2077.41	0.003821	3.35	187.37	110.00	0.38
* Hospital Wash*	0.343	* PF 2	500.00	2073.00	2077.27	2076.42	2077.41	0.003826	3.35	187.28	109.99	0.38
* Hospital Wash*	0.270	* PF 1	500.00	2071.51	2073.98	2073.98	2074.77	0.014964	7.16	69.87	44.75	1.01
* Hospital Wash*	0.270	* PF 2	500.00	2071.51	2073.98	2073.98	2074.77	0.014920	7.15	69.95	44.77	1.01
* Hospital Wash*	0.215	* PF 1	500.00	2067.77	2071.40	2070.51	2071.77	0.004325	4.89	102.16	45.19	0.57
* Hospital Wash*	0.215	* PF 2	500.00	2067.77	2071.39	2070.51	2071.77	0.004328	4.90	102.14	45.19	0.57
* Hospital Wash*	0.154	* PF 1	500.00	2065.99	2070.51	2068.91	2070.73	0.002267	3.82	130.78	51.43	0.42
* Hospital Wash*	0.154	* PF 2	500.00	2065.99	2070.51	*	2070.73	0.002272	3.83	130.68	51.41	0.42
* Hospital Wash*	0.097	* PF 1	500.00	2065.73	2068.49	2068.49	2069.27	0.015128	7.11	70.33	45.82	1.01
* Hospital Wash*	0.097	* PF 2	500.00	2065.73	2068.49	2068.49	2069.27					

0.015002 * 7.09 * 70.53 * 45.87 * 1.01 *
****
****

****

ERRORS WARNINGS AND NOTES
Errors Warnings and Notes for Plan : HospitalWash

River: Hospital Wash Reach: Hospital Wash RS: 0.388 Profile: PF 1
Warning:The energy equation could not be balanced within the specified number of iterations. The program selected the water
surface that had the least amount of error between computed and assumed values.
Warning:The 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.
River: Hospital Wash Reach: Hospital Wash RS: 0.388 Profile: PF 2
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.
River: Hospital Wash Reach: Hospital Wash RS: 0.343 Profile: PF 1
Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate
the need for additional cross sections.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
River: Hospital Wash Reach: Hospital Wash RS: 0.343 Profile: PF 2
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: Hydraulic jump has occurred between this cross section and the previous upstream section.
River: Hospital Wash Reach: Hospital Wash RS: 0.270 Profile: PF 1
Warning:The energy equation could not be balanced within the specified number of iterations. The program selected the water
surface that had the least amount of error between computed and assumed values.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate
the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The
program defaulted to critical depth.
River: Hospital Wash Reach: Hospital Wash RS: 0.270 Profile: PF 2

Warning:The energy equation could not be balanced within the specified number of iterations. The program selected the water
surface that had the least amount of error between computed and assumed values.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate
the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The
program defaulted to critical depth.
River: Hospital Wash Reach: Hospital Wash RS: 0.215 Profile: PF 1
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate
the need for additional cross sections.
River: Hospital Wash Reach: Hospital Wash RS: 0.215 Profile: PF 2
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate
the need for additional cross sections.
River: Hospital Wash Reach: Hospital Wash RS: 0.154 Profile: PF 1
Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate
the need for additional cross sections.
River: Hospital Wash Reach: Hospital Wash RS: 0.154 Profile: PF 2
Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate
the need for additional cross sections.
River: Hospital Wash Reach: Hospital Wash RS: 0.097 Profile: PF 1
Warning:User specified water surface is not possible for the specified flow regime. The program used critical depth as the
starting water surface.
River: Hospital Wash Reach: Hospital Wash RS: 0.097 Profile: PF 2
Warning:User specified water surface is not possible for the specified flow regime. The program used critical depth as the
starting water surface.

Appendix E

HYDRAULIC CALCULATIONS – PROPOSED CONDITIONS

Appendix E.1

STATION 11+12 TO 27+16

Appendix E.1

The following Appendix contains Hydraulic calculations performed during the design of Sols Wash improvements between the Tegner Street Bridge and the proposed ADOT SR-93 Bypass Bridge.

Calculations Include:

- Local Detention Basin Volume Calculations
- Local Detention Basin Discharge Pipe Calculations
- Drop Structure Calculations
- Channel Freeboard Calculations
- Scour Calculations
- Bank Details

Sols Wash
Local Detention Basin
Volume Calculation

FCD 2003C052

1/1

Local Drainage Area Detention Basin

Contour Elevation [ft]	Area [acres]	Depth [ft]	Volume [acre-ft]	Accumulatvie Volume [acre-ft]
2043	1.03	0	0.0	0.0
2046	1.58	3	3.9	3.9
2048	2.38	2	3.9	7.8
2050	2.86	2	5.2	13.1
2051	3.50	1	3.2	16.2

1) Invert of detention basin is 2043 at outlet pipes
2) includes overflow volume from east end of Coffinger Park

Culvert Calculator Report
2-48" Pipes

Local Detention Basin
Discharge Pipes

Solve For: Discharge

Culvert Summary					
Allowable HW Elevation	2,050.00	ft	Headwater Depth/Height	1.27	
Computed Headwater Elev:	2,049.10	ft	Discharge	196.02	cfs
Inlet Control HW Elev.	2,048.74	ft	Tailwater Elevation	2,048.40	ft
Outlet Control HW Elev.	2,049.10	ft	Control Type	Outlet Control	

Grades					
Upstream Invert	2,044.00	ft	Downstream Invert	2,043.50	ft
Length	100.00	ft	Constructed Slope	0.014000	ft/ft

Hydraulic Profile					
Profile	CompositePressureProfileS1		Depth, Downstream	4.90	ft
Slope Type	N/A		Normal Depth	2.18	ft
Flow Regime	Subcritical		Critical Depth	3.00	ft
Velocity Downstream	7.80	ft/s	Critical Slope	0.005596	ft/ft

Section					
Section Shape	Circular		Mannings Coefficient	0.013	
Section Material	Concrete		Span	4.00	ft
Section Size	48 inch		Rise	4.00	ft
Number Sections	2				

Outlet Control Properties					
Outlet Control HW Elev.	2,049.10	ft	Upstream Velocity Head	0.95	ft
Ke	0.20		Entrance Loss	0.19	ft

Inlet Control Properties					
Inlet Control HW Elev.	2,048.74	ft	Flow Control	N/A	
Inlet Type	Beveled ring, 33.7° bevels		Area Full	25.1	ft^2
K	0.00180		HDS 5 Chart	3	
M	2.50000		HDS 5 Scale	B	
C	0.02430		Equation Form	1	
Y	0.83000				

Rating Table Report
2-48" Pipes

Range Data:			
	Minimum	Maximum	Increment
Discharge	0.00	400.00	10.00 cfs

Discharge (cfs)	HW Elev. (ft)
0.00	2,048.40
10.00	2,048.40
20.00	2,048.40
30.00	2,048.40
40.00	2,048.40
50.00	2,048.40
60.00	2,048.40
70.00	2,048.40
80.00	2,048.40
90.00	2,048.40
100.00	2,048.40
110.00	2,048.40
120.00	2,048.40
130.00	2,048.40
140.00	2,048.40
150.00	2,048.44
160.00	2,048.57
170.00	2,048.70
180.00	2,048.85
190.00	2,049.00
200.00	2,049.17
210.00	2,049.34
220.00	2,049.52
230.00	2,049.70
240.00	2,049.90
250.00	2,050.10
260.00	2,050.31
270.00	2,050.54
280.00	2,050.76
290.00	2,051.00
300.00	2,051.25
310.00	2,051.50
320.00	2,051.76
330.00	2,052.03
340.00	2,052.31
350.00	2,052.60
360.00	2,052.90
370.00	2,053.20
380.00	2,053.51
390.00	2,053.83
400.00	2,054.16

Project Title Sols Wash Project No. 303013.04 Date 8/4/05

Subject Drop structure Prepared By LAV Checked By _____ Page 1/2

Reference Source : FCDMC Drainage Design Manual Vol. II Chapter 7

Vertical Drop System

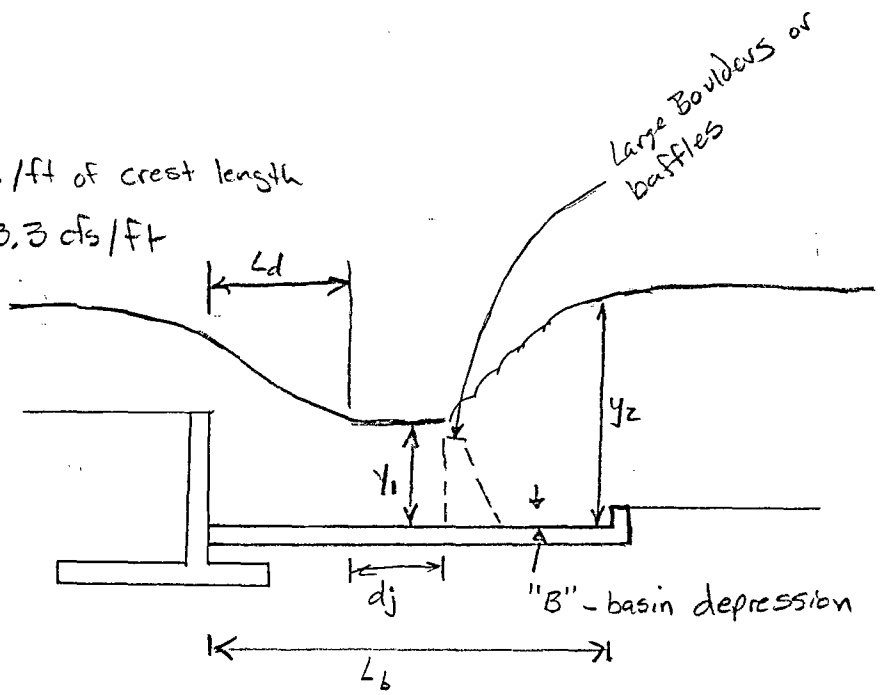
$Y_f = 4.0$ ft

$Q_c = 15{,}045$ cfs

crest length = 105 ft

q_c = cfs/ft of crest length

$q_c = 143.3$ cfs/ft



① $D_n = q_c^2 / (g\, Y_f^3)$

$= \dfrac{(143.3)^2}{(32.2)(4)^3}$

$= \underline{9.97}$ ←

② $y_p = 1.0(D_n^{0.22})(4.0)$

$= \underline{6.63 \text{ ft}}$ ←

③ $y_1 = 0.54(D_n^{0.425})(4.0)$

$= \underline{5.7 \text{ ft}}$ ←

④ $y_2 = 1.66(D_n^{0.27})(4.0)$

$= \underline{12.4 \text{ ft}}$ ←

⑤ $L_d = 4.3(D_n^{0.27})(4.0)$

$= \underline{32.0 \text{ ft}}$ ←

D_j = Assumed as $\emptyset$, use energy Dissipators.

$L_b \geq L_d + D_j + 9.6 Y_2$

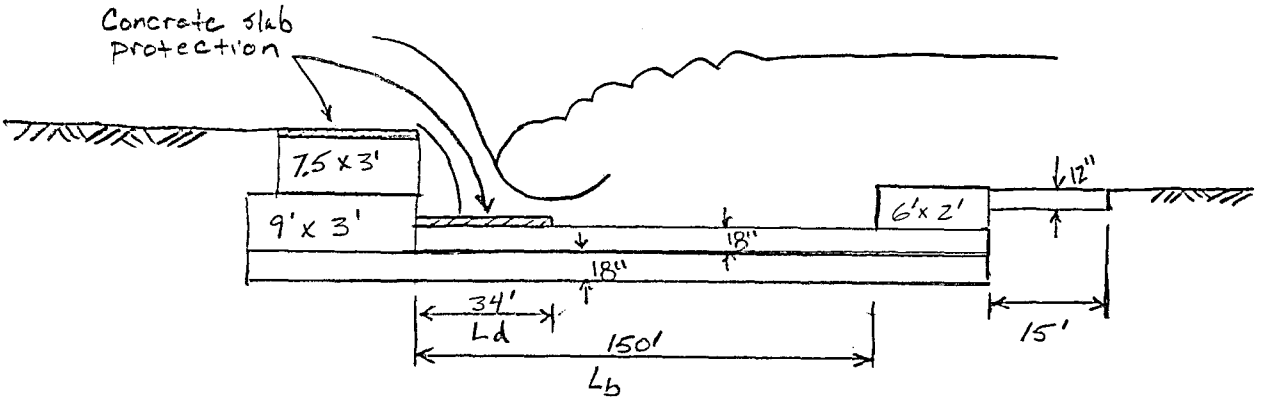
$\geq 32.0 + 0 + 9.6(12.4)$

$L_b \geq 151.04$ ft use $\underline{150 \text{ ft}}$ ←

Project Title Solis Wash Project No. 303013.04 Date 9/6/05

Subject Drop Structure Prepared By LAV Checked By _____ Page 2/2

Drop Structure Design - using Gabion baskets



Sols Wash
Super Elevation

Source:
1) FCDMC - Drainage Design Manual, Volume II - Hydraulics (28 January 1996)
2) USACE - Hydraulic Design of Flood Control Channels (1 July 1991)

Super Elevation

1) FCDMC equation: $y_{delta} = (V^2*T) / (g*Rc)$ {FCDMC >= USACE; therefore use FCDMC method.}

or 2) USACE equation: $y_{delta} = C*(V^2*T) / (g*Rc)$

where C = 0.5 for channels that have tranquil flow with a rectangular shape and a simple circular curve. (Fr < 0.9)
where C = 1.0 for channels that have rapid flow with a rectangular shape and a simple circular curve. (Fr>1.1)

Cross Section	Wash Radius of Curvature {Rc} [ft]	Velocity {V} [ft/s]	Top Width of Channel {T} [ft]	Min. Channel Elev. (ft)	WSEL (ft)	FCDMC Super Elevation {y_{delta}} [ft]	10-yr WSEL including Super Elevation [ft][1]	100-Yr WSEL including Super Elevation [ft][1]	Freeboard[2] Requirement {FCDMC} [ft]	Alternate Freeboard[2] due to Wave Runup [ft]	100-Yr/10-Yr WSEL including S.E. and F.B. [ft][3]	Bank Height including SE & FB or SE & Alt FB [ft]
0.474	-			2052.51	2062.29	0		2062.29	2.84	2.41	2065.13	12.62
0.445	-			2051.07	2062.13	0		2062.13	3.07	1.87	2065.20	14.13
0.425	-			2049.78	2061.86	0		2061.86	3.34	1.95	2065.20	15.42
0.370	900	11.9	139	2048.8	2060.15	0.68	-	2060.83	3.39	3.35	2064.22	15.42
0.351	900	12.1	142	2048.42	2059.72	0.72	-	2060.44	3.39	3.44	2063.88	15.46
0.286	900	11.8	125	2047.3	2058.61	0.60	-	2059.21	3.37	3.30	2062.58	15.28
0.286	900	8.9	125	2047.3	2054.72	0.34	2055.06	-	2.16	1.85	2057.22	
0.252	900	13.8	121	2047.3	2057.04	0.79	-	2057.83	3.17	4.47	2062.30	15.00
0.252	900	10.0	113	2047.3	2053.76	0.39	2054.15	-	2.00	2.34	2056.48	
0.243	900	23.1	113	2044.3	2048.63	2.07	-	2050.70	3.52	12.56	2063.27	18.97
0.243	900	5.4	117	2044.3	2054.24	0.12	2054.36	-	2.99	0.60	2057.35	
0.199	-			2042.26	2051.84	0	-	2051.84	2.75	1.09	2054.59	
0.199	-			2042.26	2054.24	0	2054.24	-	3.03	0.17	2057.27	15.01
0.191	-			2042.25	2051.91	0	-	2051.91	2.73	1.94	2054.64	
0.191	-			2042.25	2054.25	0	2054.25	-	3.03	0.30	2057.28	15.03

notes: 1) elevations shown using FCDMC calculated values for super elevation
2) from Freeborad spreadsheet
3) higher of the 100-yr or 10-yr WSELs is denoted in red.

Sols Wash - Downtown Wickenburg Flood Hazard Mitigation Project

Freeboard requirements based upon several sources for Sols Wash downstream of the Tegner Street Bridge
values used in the Super Elevation Freeboard Table

Reference:
1) FCDMC - Drainage Design Manual, Volume II - Hydraulics (28 January 1996)
2) Wave based freeboard - Garde and Ranga (1985) and Kennedy (1961)
3) USACE - Hydraulic Design of Flood Control Channels (1 July 1991)

---

1) Freeboard Required by FCDMC (in addition to super elevation)

Cross Section	Depth {Y} [ft]	Velocity {V} [ft/s]	Freeboard {FB} [ft]
0.474	9.78	10.1	2.8
0.445	11.06	8.9	3.1
0.425	12.08	9.1	3.3
0.370	11.35	11.9	3.4
0.351	11.30	12.1	3.4
0.286[1]	11.31	11.8	3.4
0.286[2]	7.42	8.9	2.2
0.252[1]	9.74	13.8	3.2
0.252[2]	6.46	10.0	2.0
0.243[1]	5.83	23.1	3.5
0.243[2]	11.52	5.4	3.0
0.199[1]	10.28	6.8	2.7
0.199[2]	12.02	2.7	3.0
0.191[1]	10.29	6.4	2.7
0.191[2]	12.02	2.5	3.0

1) FCDMC equation: $FB = 0.25(Y+V^2/2g)$

notes: 1) 100-year flow in Sols Wash
2) 10-year flow in Sols Wash
3) minimum for rigid channels shall be 1' for subcritical and 2' for supercritical flows

2) Alternate Freeboard Requirement (sand wave runup freeboard)

Cross Section	Maximum Channel Depth {Y} [ft]	Velocity [ft]	Sand Wave Amplitude [ft]	Water Surface Wave Amplitude [ft]	Wave Based Freeboard [ft]
0.474	9.78	10.10	2.8	4.8	2.4
0.445	11.06	8.9	2.1	3.7	1.9
0.425	12.08	9.1	2.2	3.9	1.9
0.370	11.35	11.9	3.8	6.7	3.4
0.351	11.30	12.1	3.9	6.9	3.4
0.286[1]	11.31	11.8	3.8	6.6	3.3
0.286[2]	7.42	8.9	2.1	3.7	1.9
0.252[1]	9.74	13.8	5.1	8.9	4.5
0.252[2]	6.46	10.0	2.7	4.7	2.3
0.243[1]	5.83	23.1	14.4	25.1	12.6
0.243[2]	11.52	5.1	0.7	1.2	0.6
0.199[1]	10.28	6.8	1.2	2.2	1.1
0.199[2]	12.02	2.7	0.2	0.3	0.2
0.191[1]	10.29	6.4	1.1	1.9	1.0
0.191[2]	12.02	2.5	0.2	0.3	0.2

1) Sand Wave Amplitude: $SWA = 0.027*V^2$
page 105 of Garde and Ranga (1985) and Kennedy (1961)

2) Water Surface Wave Amplitude: WSWA = SWA*C
where C is a coefficient = 1.75
based on Chien and Wan (1998), page 200

3) Wave Based Freeboard: Fwb = WSWA/2
half the WSWA.

notes: 1) 100-year flow in Sols Wash
2) 10-year flow in Sols Wash

3) USACE

1) approximate requirements for concrete lined channels
   - rectangular channel — 2 feet
   - trapezoidal channel — 2.5 feet
2) approximate requirements for rip-rap lined channels — 2.5 feet
3) approximate requirements for earthen levees — 3 feet

Project Title _____ Project No. _____ Date 9/7

Subject Scour Depth @ 0.351 Prepared By CTG Checked By _____ Page 1/1

General Scour

$$y_{gs} = Y_{max}\left[\frac{0.0685\, V_m^{0.8}}{Y_h^{0.4}\, S_e^{0.3}} - 1\right]$$

$Y_{max} = 11.3$ ft

$V_m = 12.1$ fps

$Y_h = 3.8$ ft

$S_e = 0.0037$

$y_{gs} = 1.5$ ft

Bend Scour

$$y_{bs} = \left[\frac{0.0685\, y_{max}\, V^{0.8}}{y_h^{0.4}\, S_e^{0.3}}\right]\left[2.1\left(\sin^2(\alpha/2)/\cos\alpha\right)^{.2} - 1\right]$$

$y_{max} = 11.3'$

$V = 12.1$ fps

$y_h = 3.8'$

$S_e = 0.0037$

$\alpha = 30°$

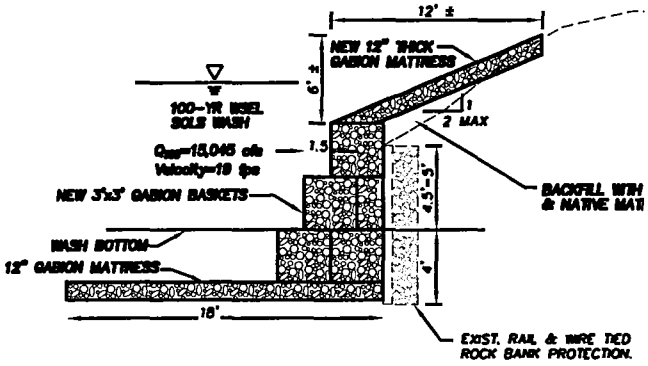
$y_{bs} = 3.3$ ft

Bed Form Scour (taken from West Analysis)

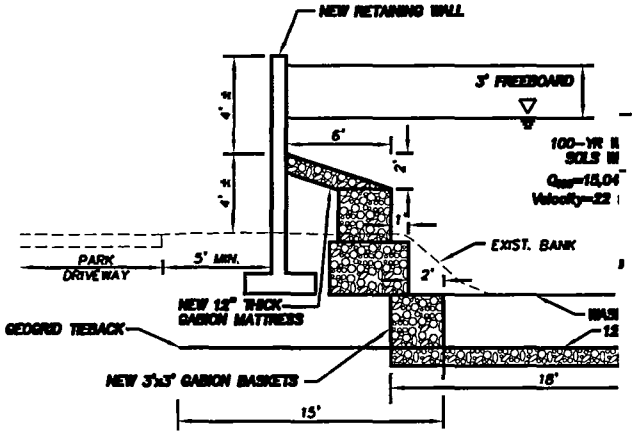
$y_{bf} = 2.0'$

Total Scour = 6.8'

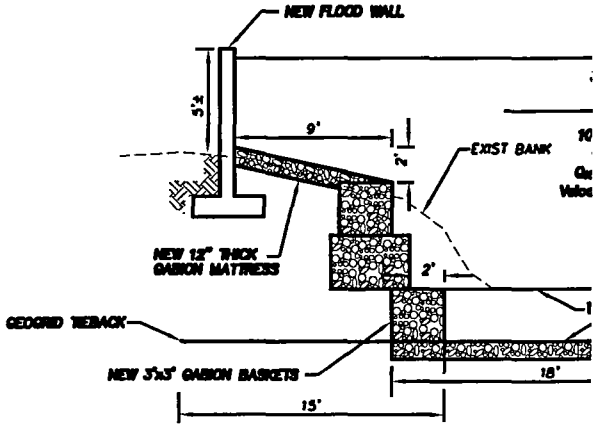
Note: Based on West report, Sol's Wash assumed to be aggrading wash.



SOLS WASH (SOUTH BANK)
STA. 16+05 TO 17+26



SOLS WASH (NORTH BANK)
STA. 14+60 TO 16+10



SOLS WASH (NORTH BANK
STA. 28+62 TO 38+83

NO.	REVISION	BY	DATE
2			
1			

FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY

WICKENBURG DOWNTOWN FLOODING HAZARD MITIGATION PROJECT

CONTRACT NO.: FCD 2003C052
(Assignment No. 4)

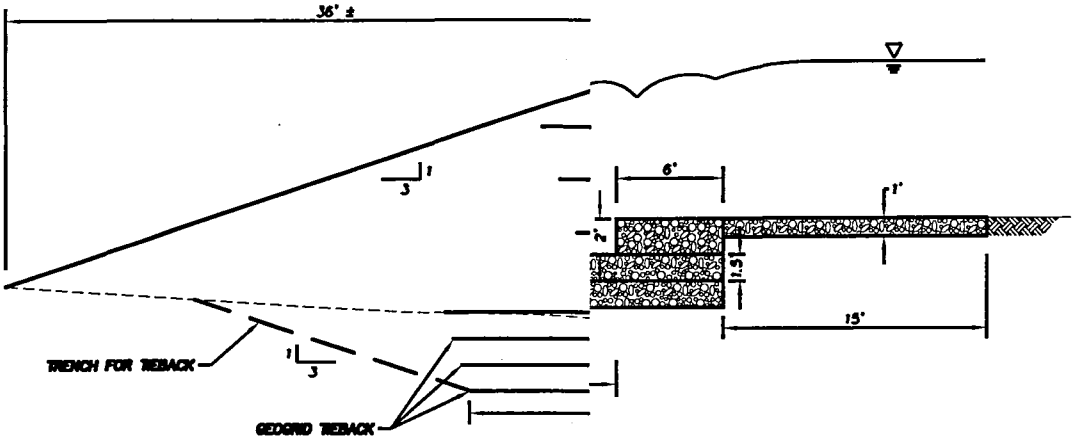
PRELIMINARY NOT FOR CONSTRUCTION

eec ENGINEERING & ENVIRONMENTAL CONSULTANTS, INC.
3003 N. CENTRAL AVE., SUITE 600
PHOENIX, AZ 85012-2905

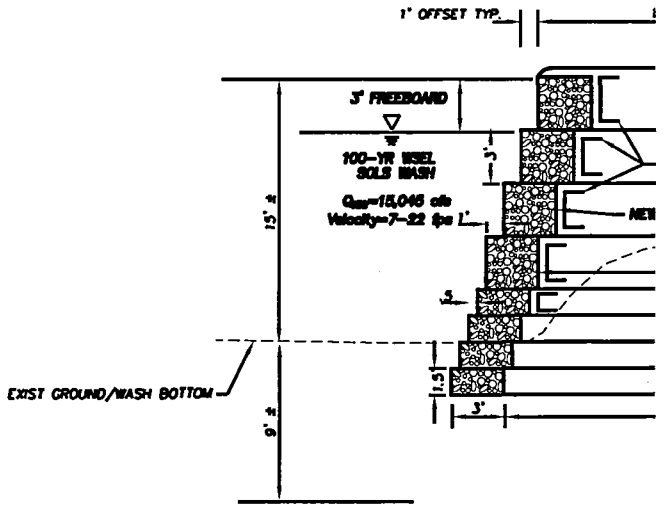
	BY	DATE
DESIGN	LAV/CTG	6/2005
DESIGN CHK.	LAV	6/2005
PLANS	KLH	6/2005
PLANS CHK.	MTG/LAV	6/2005

SHEET 7 OF 8

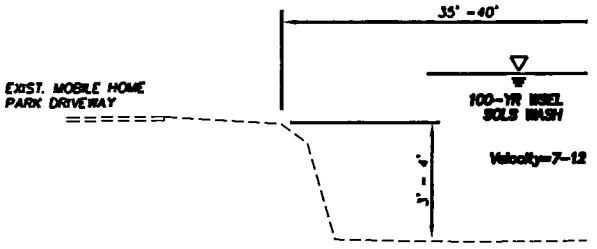
N:\303013.04\DWG\303013-04sections.dwg, 9/9/2005 10:33:39 AM, SAVIN PCL 5c.pc3



SOLS W STRUCTURE)
STA. 14+75



SOLS
ST



SOLS
FROM CONF
(MAIN) TO UPS

NO.	REVISION	BY	DATE
2			
1			

FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY

WICKENBURG DOWNTOWN FLOODING HAZARD MITIGATION PROJECT

CONTRACT NO.: FCD 2003C052
(Assignment No. 4)

PRELIMINARY
NOT FOR CONSTRUCTION

ENGINEERING & ENVIRONMENTAL CONSULTANTS, INC.
3003 N. CENTRAL AVE., SUITE 600
PHOENIX, AZ 85012-2905

	BY	DATE
DESIGN	LAV/CTG	6/2005
DESIGN CHK.	LAV	6/2005
PLANS	KLH	6/2005
PLANS CHK.	MTG/LAV	6/2005

SHEET 8 OF 8

N:\303013.04\DWG\303013-04sections.dwg, 9/9/2005 10:33:01 AM, SAVIN PCL 5c.pc3

Appendix E.2

STATION 27+17 TO 43+73

Project Title Sols Wash Project No. 303013.04 Date 9/7/05

Subject Goldmine Village Trim Prepared By LAV Checked By _____ Page _____

Determine the Volume of Soil to be trimmed from the bank along Goldmine Village.

IMPACTED AREA = 1.4 Acres

Determine Average Depth (based upon Contour Data)

	Depth
STA: 28+00	8'
STA: 32+00	7'
STA: 36+00	7'
STA: 40+00	7'
STA: 44+00	6'

Ave Depth = 7.0'

Volume of Soil to be Removed

$$1.4\ Ac * \frac{43560\ ft^2}{1\ Ac} * 7.0\ ft\ \frac{1\ CY}{27\ ft^3} \simeq \underline{\underline{15{,}800\ CY.}}$$

Appendix E.2

The following Appendix contains Hydraulic calculations performed during the design of Sols Wash improvements between the upstream end of Gold Mine Village and the Tegner Street Bridge.

Calculations Include:

- Goldmine Village Bank Trimming Area and Volume
- Channel Freeboard Calcualtions
- Scour Calculations
- Bank Details

Sols Wash - Downtown Wickenburg Flood Hazard Mitigation Project

Freeboard requirements based upon several sources for Sols Wash downstream of the Tegner Street Bridge
values used in the Super Elevation Freeboard Table

Reference:
1) FCDMC - Drainage Design Manual, Volume II - Hydraulics (28 January 1996)
2) Wave based freeboard
3) USACE - Hydraulic Design of Flood Control Channels (1 July 1991)

---

1) Freeboard Required by FCDMC (in addition to super elevation)

Cross Section ID	Depth {Y} [ft]	Velocity {V} [ft/s]	Freeboard {FB} [ft]
0.779	5.03	8.8	1.6
0.739	6.35	6.7	1.8
0.717	6.66	8.0	1.9
0.684	6.62	9.2	2.0
0.66	7.12	10.2	2.2
0.606	9.49	7.8	2.6
0.541	12.03	6.5	3.2
0.497	13.08	7.8	3.5

1) FCDMC equation: FB = 0.25(Y+V2/2g)

notes: 1) 100-year flow in Sols Wash
2) 10-year flow in Sols Wash
3) minimum for rigid channels shall be 1' for subcritical and 2' for supercritical flows

2) Alternate Freeboard Requirement (sand wave runup freeboard)

Cross Section ID	Maximum Channel Depth {Y} [ft]	Velocity [ft]	Sand Wave Amplitude [ft]	Water Surface Wave Amplitude [ft]	Wave Based Freeboard [ft]
0.779	5.03	8.8	2.1	3.7	1.8
0.739	6.35	6.7	1.2	2.1	1.1
0.717	6.66	8.0	1.7	3.0	1.5
0.684	6.62	9.2	2.3	4.0	2.0
0.66	7.12	10.2	2.8	4.9	2.4
0.606	9.49	7.8	1.6	2.8	1.4
0.541	12.03	6.5	1.2	2.0	1.0
0.497	13.08	7.8	1.6	2.9	1.4

1) Sand Wave Amplitude: $SWA = 0.027*V^2$

2) Water Surface Wave Amplitude: WSWA = SWA*C
where C is a coefficient = 1.75

3) Wave Based Freeboard: Fwb = WSWA/2

3) USACE

1) approximate requirements for concrete lined channels
   - rectangular channel — 2 feet
   - trapezoidal channel — 2.5 feet
2) approximate requirements for rip-rap lined channels — 2.5 feet
3) approximate requirements for earthen levees — 3 feet

Project Title _____ Project No. _____ Date 9/7

Subject Scour Depth @ 0.000 Prepared By CTG Checked By _____ Page 1/1

General Scour

$$y_{gs} = Y_{max}\left[\frac{0.0685\, V_m^{0.3}}{y_h^{0.4}\, S_e^{0.3}} - 1\right]$$

$y_{max} = 7.1$ ft

$V_m = 10.2$ fps

$y_h = 5.9$ ft

$S_e = 0.0040$

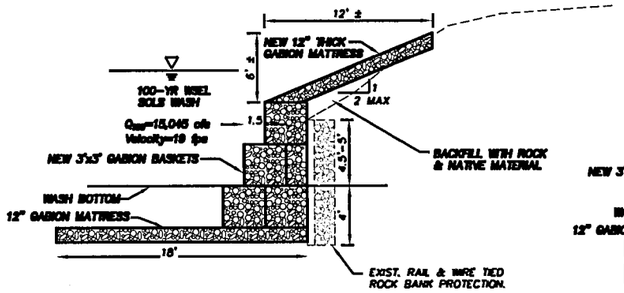
$y_{gs} = 0.9$ ft

Bed Form Scour (taken from West Analysis)

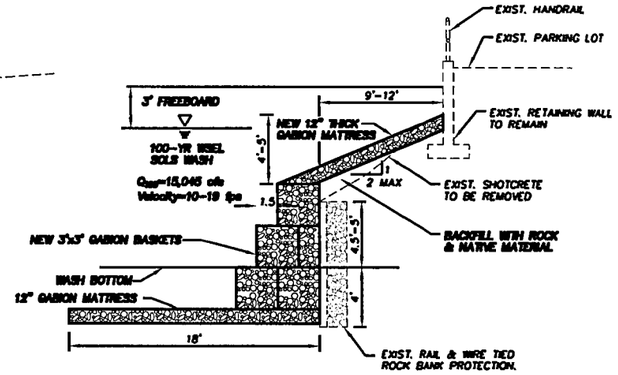
$y_{br} = 2.0$ ft

Total Scour = 2.9 ft

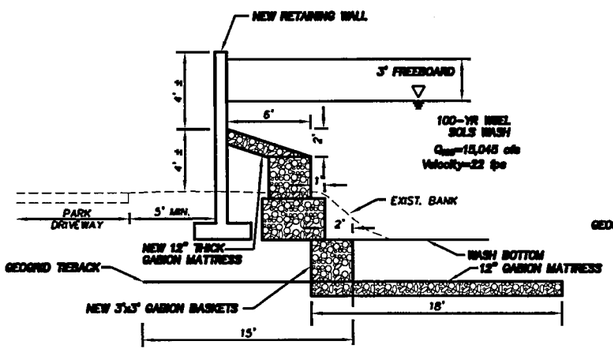
* Note: Based on West report, Soil Wash assumed to be upgrading sand.



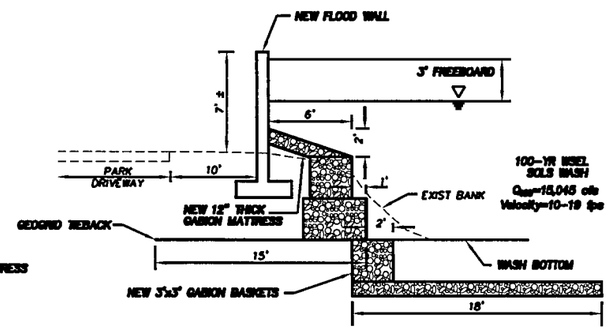
SOLS WASH (SOUTH BANK)
STA. 16+05 TO 17+26



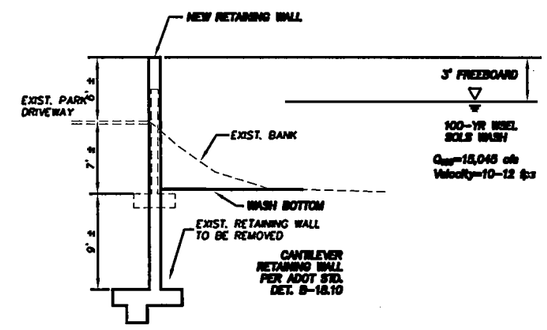
SOLS WASH (SOUTH BANK)
STA. 17+26 TO 25+50



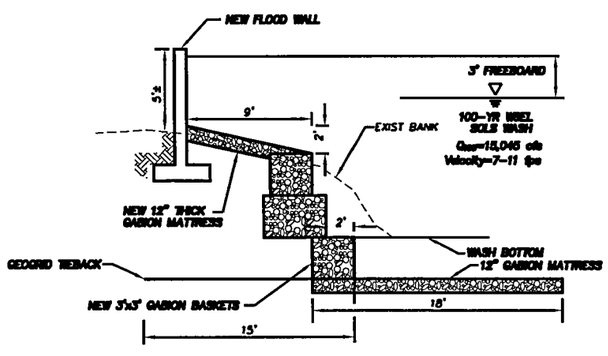
SOLS WASH (NORTH BANK)
STA. 14+60 TO 16+10



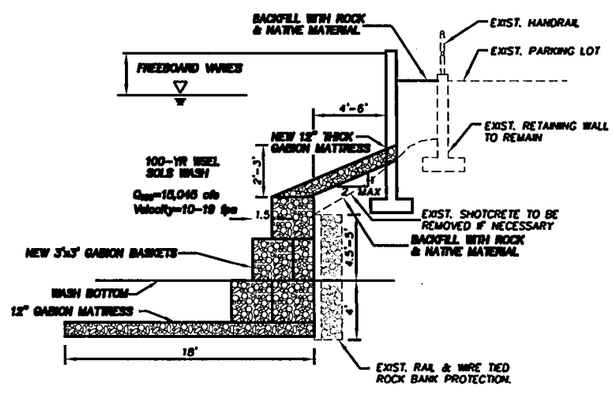
SOLS WASH (NORTH BANK)
STA. 16+10 TO 24+26



SOLS WASH (NORTH BANK)
STA. 24+26 TO 27+16



SOLS WASH (NORTH BANK)
STA. 28+62 TO 38+83



SOLS WASH (SOUTH BANK)
STA. 18+50 TO 23+65

NO.	REVISION	BY	DATE
2			
1			

FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY

WICKENBURG DOWNTOWN FLOODING HAZARD MITIGATION PROJECT

CONTRACT NO.: FCD 2003C052
(Assignment No. 4)

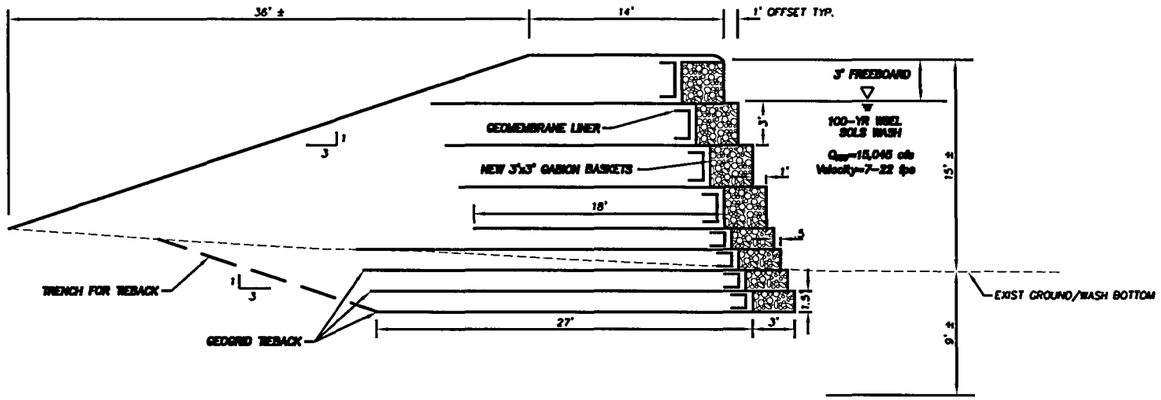
PRELIMINARY NOT FOR CONSTRUCTION

eec ENGINEERING & ENVIRONMENTAL CONSULTANTS, INC.
3003 N. CENTRAL AVE., SUITE 600
PHOENIX, AZ 85012-2905

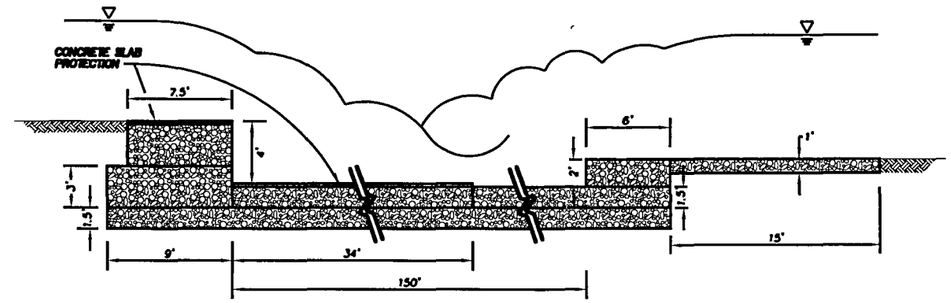
	BY	DATE
DESIGN	LAV/CTG	6/2005
DESIGN CHK.	LAV	6/2005
PLANS	KLH	6/2005
PLANS CHK.	MTG/LAV	6/2005

SHEET 7 of 8

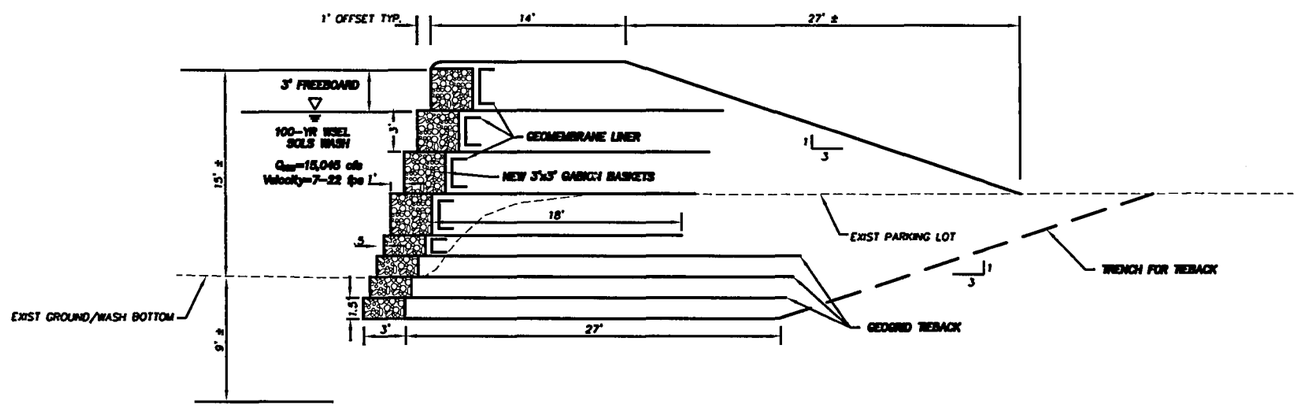
N:\303013.04\DWG\303013-04sections.dwg, 9/8/2005 10:33:39 AM, SAVIN PCL 5c.pc3



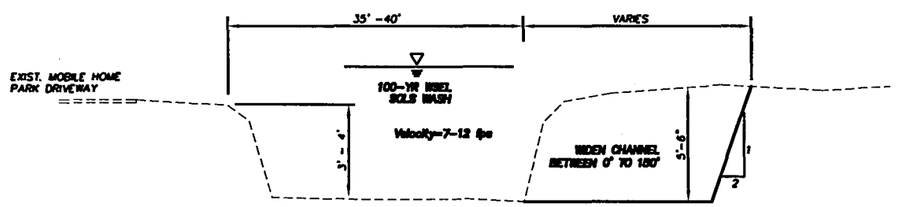
SOLS WASH (NORTH BANK)
STA. 12+20 TO 14+60



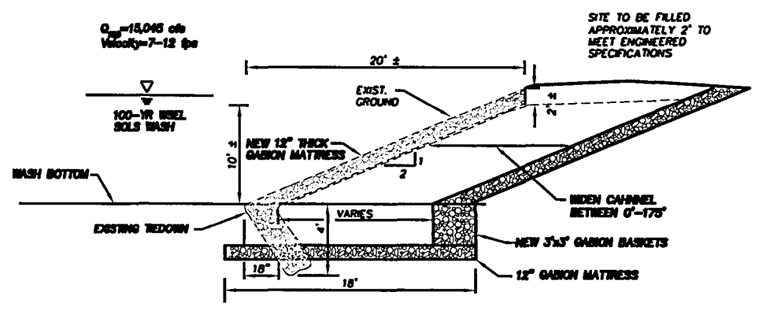
SOLS WASH (DROP STRUCTURE)
STA. 13+25 TO 14+75



SOLS WASH (SOUTH BANK)
STA. 11+12 TO 16+05



SOLS WASH (NORTH PRONG)
FROM CONFLUENCE WITH SOLS WASH
(MAIN) TO UPSTREAM OF TRAILER PARK



SOLS WASH (SOUTH BANK)
STA. 27+17 TO 43+73

NO.	REVISION	BY	DATE
2			
1			

FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY

WICKENBURG DOWNTOWN
FLOODING HAZARD
MITIGATION PROJECT

CONTRACT NO.: FCD 2003C052
(Assignment No. 4)

PRELIMINARY
NOT FOR CONSTRUCTION

ENGINEERING & ENVIRONMENTAL CONSULTANTS, INC.
3003 N. CENTRAL AVE., SUITE 600
PHOENIX, AZ 85012-2905

	BY	DATE
DESIGN	LAV/CTG	6/2005
DESIGN CHK.	LAV	6/2005
PLANS	KLH	6/2005
PLANS CHK.	MTG/LAV	6/2005

SHEET 8 OF 8

N:\303013.04\DWG\303013-04sections.dwg, 9/9/2005 10:33:01 AM, SAVIN PCL 5c.pc3

Appendix E.3
ISLAND TRIMMING

Appendix E.3

The following Appendix contains Hydraulic calculations performed during the design of Sols Wash improvements. Specifically, the Island Trimming.

Calculations Include:

- Island Trimming Area and Volume

eec

Project Title Sols Wash Project No. 303013.04 Date 9/7/05

Subject Island Trimming Prepared By LAU Checked By _____ Page _____

Determine the Volume of soil to be Trimmed from the Island in Sols Wash.

Impacted Area = 6.23 Acres + 0.33 = 6.56 Acres

Determine Average Depth (from Contours)

1/4	4'
1/2	4'
3/4	5'
4	3'

Ave Depth = 4.0 ft

Volume of soil to be Removed

$$6.56 \text{ Acres} \frac{43560 \text{ ft}^2}{1 \text{ Acre}} \times 4.0 \text{ ft} \frac{1 \text{ CY}}{27 \text{ ft}^3} \simeq 42{,}300 \text{ C.Y.}$$

Appendix F
COST ESTIMATES

PRELIMINARY COST ESTIMATE
Project No.: 303013.04
Project Name: Sols Wash

Sols Wash - Island Trim

Clearing and removing part of the island

Item No.	Item Description	Unit	Unit Price	Quantity	Amount
1	Clear and Grub	ACRE	$6,500.00	6.6	$ 42,900.00
2	Soil Removal, 6.6 acres with an average depth of 5 feet	CY	$5.00	53250	$ 266,250.00
					$ -
					$ -
					$ -
					$ -
					$ -
					$ -
					$ -
					$ -

Sub Total	$ 309,150.00
Contingencies (30%)	$ 92,745.00
TOTAL	**$ 401,900.00**

Summary of Costs
for Preliminary Improvement Plans
Sols Wash, Wickenburg, Arizona

Location			Cost Estimate [$]
Sols Wash - SR-93 to Tegner Street Bridge			
North Bank - Sta. 12+20 to 14+60		$	182,200.00
South Bank - Sta. 11+12 to 16+05		$	411,200.00
North Bank - Sta. 14+60 to 21+00		$	655,100.00
South Bank - Sta. 16+05 to 17+26		$	99,600.00
North Bank - Sta. 21+00 to 24+26		$	240,900.00
South Bank - Sta. 17+26 to 25+50		$	743,800.00
North Bank - Sta. 24+26 to 27+16		$	489,900.00
Detention Basin (13+00)		$	111,200.00
Drop Structure (14+75)		$	369,600.00
	subtotal	**$**	**3,303,500.00**
Sols Wash - Tegner Street Bridge to u/s of Goldmine Village			
North Bank - Sta. 28+62 to 38+83		$	829,900.00
South Bank - Sta. 27+17 to 43+73		$	1,382,900.00
Tegner Street Bridge Abutment and Parapet Wall		$	29,600.00
	subtotal	**$**	**2,242,400.00**
Sols Wash - Reach 2			
Island Trimming		$	401,900.00
	subtotal		**$401,900.00**
	Total	**$**	**5,947,800.00**

1) includes 30% for contingencies

PRELIMINARY COST ESTIMATE
Project No.: 303013.04
Project Name: Sols Wash

Sols Wash - North Bank (Station 12+20 To 14+60)

Gabion Baskets, Length = 240'

Item No.	Item Description	Unit	Unit Price	Quantity	Amount
1	Gabion Baskets (6.5 - 3'x3' Baskets), includes filter fabric, excavation and tiebacks	CY	$125.00	520	$ 65,000.00
2	Earthen Levee, compacted fill	CY	$10.00	4900	$ 49,000.00
3	Remove Tree, 12" diameter and larger	EA	$600.00	5	$ 3,000.00
4	Gabion Blanket 1 - 12" mattress)	CY	$125.00	185	$ 23,125.00
					$ -
					$ -
					$ -
					$ -
					$ -

Sub Total	**$ 140,125.00**
Contingencies (30%)	*$ 42,037.50*
TOTAL	**$ 182,200.00**

PRELIMINARY COST ESTIMATE
Project No.: 303013.04
Project Name: Sols Wash

Sols Wash - South Bank (Station 11+12 To 16+05)

Gabion Baskets, Length = 493'

Item No.	Item Description	Unit	Unit Price	Quantity		Amount
1	Gabion Baskets (6.5 - 3'x3' Baskets), includes filter fabric, excavation and tiebacks	CY	$125.00	1070	$	133,750.00
2	Earthen Levee, compacted fill	CY	$10.00	12600	$	126,000.00
3	Remove Tree, 12" diameter and larger	EA	$600.00	14	$	8,400.00
4	Gabion Mattress 12"	CY	$125.00	385	$	48,125.00
					$	-
					$	-

Sub Total	**$**	**316,275.00**
Contingencies (30%)	*$*	*94,882.50*
TOTAL	**$**	**411,200.00**

PRELIMINARY COST ESTIMATE
Project No.: 303013.04
Project Name: Sols Wash

Sols Wash - North Bank (Station 14+60 To 21+00)

Gabion Baskets and Retaining Wall combo, Length = 640'

Item No.	Item Description	Unit	Unit Price	Quantity		Amount
1	Gabion Baskets (3.5 - 3'x3' Baskets), includes filter fabric, excavation and tiebacks	CY	$125.00	745	$	93,125.00
2	Gabion Mattresses, 12" thick	CY	$125.00	425	$	53,125.00
3	Reinforced concrete retaining wall, per ADOT Std. Det. B-18.10 (Avg. height = 12')	SF	$42.53	7680	$	326,660.00
4	Remove Tree, 12" diameter and larger	EA	$600.00	10	$	6,000.00
5	Excavate and Backfill for tie-back	CY	$10.00	2500	$	25,000.00
					$	-
					$	-
	Sub Total				$	**503,910.00**
	Contingencies (30%)				*$*	*151,173.00*
	TOTAL				**$**	**655,100.00**

Retaining Wall Cost (by CY of concrete and Lbs of steel)

Item No.	Item Description	Unit	Unit Price	Quantity		Amount
1	Class 'S' Concrete for retaining wall per ADOT Std. Det. B-18.10, (height = 12 ft)	CY	$580.00	513	$	297,540.00
2	Reinforcing steel for retaining wall per ADOT Std. Det. B-18.10, (height=12 ft)	LBS	$0.70	41600	$	29,120.00
					$	-
					$	-
	Sub Total				$	**326,660.00**
	Cost of Retaining Wall per Square Foot				**$**	**42.53**

PRELIMINARY COST ESTIMATE
Project No.: 303013.04
Project Name: Sols Wash

Sols Wash - South Bank (Station 16+05 To 17+26)

Gabion Baskets, Length = 121'

Item No.	Item Description	Unit	Unit Price	Quantity		Amount
1	Gabion Baskets (4.5 - 3'x3' Baskets), includes filter fabric and excavation	CY	$125.00	180	$	22,500.00
2	Gabion Mattresses, 12" thick	CY	$125.00	135	$	16,875.00
3	Remove Tree, 12" diameter and larger	EA	$600.00	4	$	2,400.00
4	Retaining Wall, ADOT Std. Det. B 18-10, (average height 7')	SF	$29.05	1200	$	34,864.50
					$	-
					$	-
					$	-
					$	-
					$	-
					$	-
	Sub Total				$	**76,639.50**
	Contingencies (30%)				*$*	*22,991.85*
	TOTAL				**$**	**99,600.00**

Retaining Wall Cost (by CY of concrete and Lbs of steel)

Item No.	Item Description	Unit	Unit Price	Quantity		Amount
1	Class 'S' Concrete for retaining wall per ADOT Std. Det. B-18.10, (height = 7 ft)	CY	$580.00	55	$	31,900.00
2	Reinforcing steel for retaining wall per ADOT Std. Det. B-18.10, (height=7 ft)	LBS	$0.70	4235	$	2,964.50
					$	-
					$	-
	Sub Total				$	**34,864.50**
	Cost of Retaining Wall per Square Foot				**$**	**29.05**

PRELIMINARY COST ESTIMATE
Project No.: 303013.04
Project Name: Sols Wash

Sols Wash - North Bank (Station 21+00 to 24+26)

Gabion Baskets and Flood Wall, Length = 326' (Average wall height = 9')

Item No.	Item Description	Unit	Unit Price	Quantity	Amount
1	Gabion Baskets (3.5 - 3'x3' Baskets), includes filter fabric, excavation and tiebacks	CY	$125.00	380	$ 47,500.00
2	Gabion Mattresses, 12" thick	CY	$125.00	217	$ 27,125.00
3	CMU Block Flood Wall, concrete and steel reinforced, with spread footing	SF	$30.00	2930	$ 87,900.00
4	Remove Tree, 12" diameter and larger	EA	$600.00	20	$ 12,000.00
5	Excavate and Backfill for tie-back	CY	$10.00	1080	$ 10,800.00
					$ -
					$ -

Sub Total	**$ 185,325.00**
Contingencies (30%)	*$ 55,597.50*
TOTAL	**$ 240,900.00**

PRELIMINARY COST ESTIMATE
Project No.: 303013.04
Project Name: Sols Wash

Sols Wash - South Bank (Station 17+26 To 25+50)

Gabion Baskets, Length = 824 ft.

Item No.	Item Description	Unit	Unit Price	Quantity		Amount
1	Gabion Baskets (4.5 - 3'x3' Baskets), includes filter fabric and excavation	CY	$125.00	1240	$	155,000.00
2	Gabion Mattresses, 12" thick	CY	$125.00	700	$	87,500.00
3	Remove Tree, 12" diameter and larger	EA	$600.00	18	$	10,800.00
4	Retaining Wall, ADOT Std. Det. B-18.10, (average height 9 ft)	SF	$42.97	7420	$	318,856.00
					$	-
					$	-
					$	-
					$	-
					$	-
					$	-

Sub Total	$	**572,156.00**
Contingencies (30%)	*$*	*171,646.80*
TOTAL	**$**	**743,800.00**

Retaining Wall Cost (by CY of concrete and Lbs of steel)

Item No.	Item Description	Unit	Unit Price	Quantity		Amount
1	Class 'S' Concrete for retaining wall per ADOT Std. Det. B-18.10, (height = 9 ft)	CY	$580.00	505	$	292,900.00
2	Reinforcing steel for retaining wall per ADOT Std. Det. B-18.10, (height=9 ft)	LBS	$0.70	37080	$	25,956.00
					$	-
					$	-

Sub Total	$	**318,856.00**
Cost of Retaining Wall per Square Foot	**$**	**42.97**

PRELIMINARY COST ESTIMATE
Project No.: 303013.04
Project Name: Sols Wash

Sols Wash - North Bank (Station 24+26 To 27+16)

Retaining Wall, Length = 293'

Item No.	Item Description	Unit	Unit Price	Quantity		Amount
1	Remove existing concrete walls	LF	$20.00	305	$	6,100.00
2	Reinforced concrete retaining wall per ADOT Std. Det. B-18.10, (height = 22 ft)	SF	$56.40	6446	$	363,554.40
3	Remove Tree, 12" diameter and larger	EA	$600.00	12	$	7,200.00
					$	-
					$	-
					$	-
					$	-
	Sub Total				$	**376,854.40**
	Contingencies (30%)				*$*	*113,056.32*
	TOTAL				**$**	**489,900.00**

Retaining Wall Cost (by CY of concrete and Lbs of steel)

Item No.	Item Description	Unit	Unit Price	Quantity		Amount
1	Class 'S' Concrete for retaining wall per ADOT Std. Det. B-18.10, (height = 22 ft)	CY	$580.00	556	$	322,480.00
2	Reinforcing steel for retaining wall per ADOT Std. Det. B-18.10, (height=22 ft)	LBS	$0.70	58600	$	41,020.00
					$	-
					$	-
	Sub Total				$	**363,500.00**
	Cost of Retaining Wall per Square Foot				**$**	**56.39**

PRELIMINARY COST ESTIMATE
Project No.: 303013.04
Project Name: Sols Wash

Sols Wash - Detention Basin between River Street and Proposed US-93 (Sta. 13+00)
Detention Basin for Local Drainage Area, with discharge pipes to Sols Wash

Item No.	Item Description	Unit	Unit Price	Quantity	Amount
1	Clear and Grubbing	JOB	$2,000.00	1	$ 2,000.00
2	Excavation	CY	$5.00	6300	$ 31,500.00
3	Remove Tree, 12" diameter and larger	EA	$600.00	20	$ 12,000.00
4	48" Concrete Pipes	LF	$150.00	200	$ 30,000.00
5	Inlet Headwall	EA	$4,000.00	1	$ 4,000.00
6	Outlet Headwall with flap gates	EA	$6,000.00	1	$ 6,000.00
					$ -
					$ -
					$ -
					$ -

Sub Total	**$ 85,500.00**
Contingencies (30%)	*$ 25,650.00*
TOTAL	**$ 111,200.00**

PRELIMINARY COST ESTIMATE
Project No.: 303013.04
Project Name: Sols Wash

Sols Wash - Drop Structure at River Street (Sta. 14+75)

Crest length = 105 ft, Stilling basin length = 150 ft

Item No.	Item Description	Unit	Unit Price	Quantity	Amount
1	Gabion Baskets (9'x3' Basket), includes filter fabric, excavation and backfill, L=105'	CY	$125.00	105	$ 13,125.00
2	Gabion Baskets (7.5'x3' Basket), includes filter fabric, excavation and backfill, L=105'	CY	$125.00	90	$ 11,250.00
3	Gabion Baskets (6'x2' Basket), includes filter fabric, excavation and backfill, L=105'	CY	$125.00	45	$ 5,625.00
4	Gabion Mattress (18" thick), includes filter fabric, excavation and backfill, (321'x105')	CY	$125.00	1875	$ 234,375.00
5	Gabion Mattress (12" thick), includes filter fabric, excavation and backfill, (15'x105')	CY	$125.00	60	$ 7,500.00
6	Concrete Slab Protection along crest (7.5' x 105' x 3")	SF	$3.00	790	$ 2,370.00
7	Concrete Slab Protection along impact zone (32' x 105' x 3")	SF	$3.00	3360	$ 10,080.00
					$ -
					$ -
					$ -

Sub Total	**$ 284,325.00**
Contingencies (30%)	*$ 85,297.50*
TOTAL	**$ 369,600.00**

PRELIMINARY COST ESTIMATE
Project No.: 303013.04
Project Name: Sols Wash

Sols Wash - North Bank (Station 28+62 To 38+83)

Gabion Baskests and Flood Wall, Length = 1021' (Average wall height = 8'

Item No.	Item Description	Unit	Unit Price	Quantity		Amount
1	Gabion Baskets (3.5 - 3'x3' Baskets), includes filter fabric, excavation and tiebacks	CY	$125.00	1190	$	148,750.00
2	Gabion Mattresses, 12" thick	CY	$125.00	1020	$	127,500.00
3	CMU Block Flood Wall, concrete and steel reinforced, with spread footing	SF	$30.00	8160	$	244,800.00
4	Remove Tree, 12" diameter and larger	EA	$600.00	38	$	22,800.00
5	Excavate and Backfill for tie-back	CY	$10.00	9450	$	94,500.00

Sub Total	**$**	**638,350.00**
Contingencies (30%)	*$*	*191,505.00*
TOTAL	**$**	**829,900.00**

PRELIMINARY COST ESTIMATE
Project No.: 303013.04
Project Name: Sols Wash

Sols Wash - South Bank (Station 27+17 To 43+73)

Gabion Baskets, Length = 1656 ft.

Item No.	Item Description	Unit	Unit Price	Quantity		Amount
1	Removal of existing Gabions (salvage rock for new Gabions)	CY	$15.00	1185	$	17,775.00
2	Gabion Baskets (1-3'x3' Baskets), includes filter fabric, excavation, backfill and tieback	CY	$125.00	552	$	69,000.00
3	Gabion Mattresses, 12" thick	CY	$125.00	1960	$	245,000.00
4	CMU Block Flood Wall, conc. & steel reinfor., w/spread footing, H=3.5 to 7', L=1486'	SF	$30.00	7800	$	234,000.00
5	Concrete Curb, H_{ave} = 1.5', L =170'	SF	$10.00	340	$	3,400.00
6	Drainage Excavation	CY	$5.00	19200	$	96,000.00
7	Relocate well site	JOB	$150,000.00	1	$	150,000.00
8	Remove existing headwall	JOB	$5,000.00	1	$	5,000.00
9	Remove concrete pipes	LF	$40.00	215	$	8,600.00
10	Install new headwall	JOB	$25,000.00	1	$	25,000.00
11	Land Acquisition	ACRE	$150,000.00	1.4	$	210,000.00
					$	-
					$	-

Sub Total	**$**	**1,063,775.00**
Contingencies (30%)	*$*	*319,132.50*
TOTAL	**$**	**1,382,900.00**

PRELIMINARY COST ESTIMATE
Project No.: 303013.04
Project Name: Sols Wash

Sols Wash - Raise the Parapet Wall and the Bridge Abutment on the upstream side of the Tegner St. Bridge

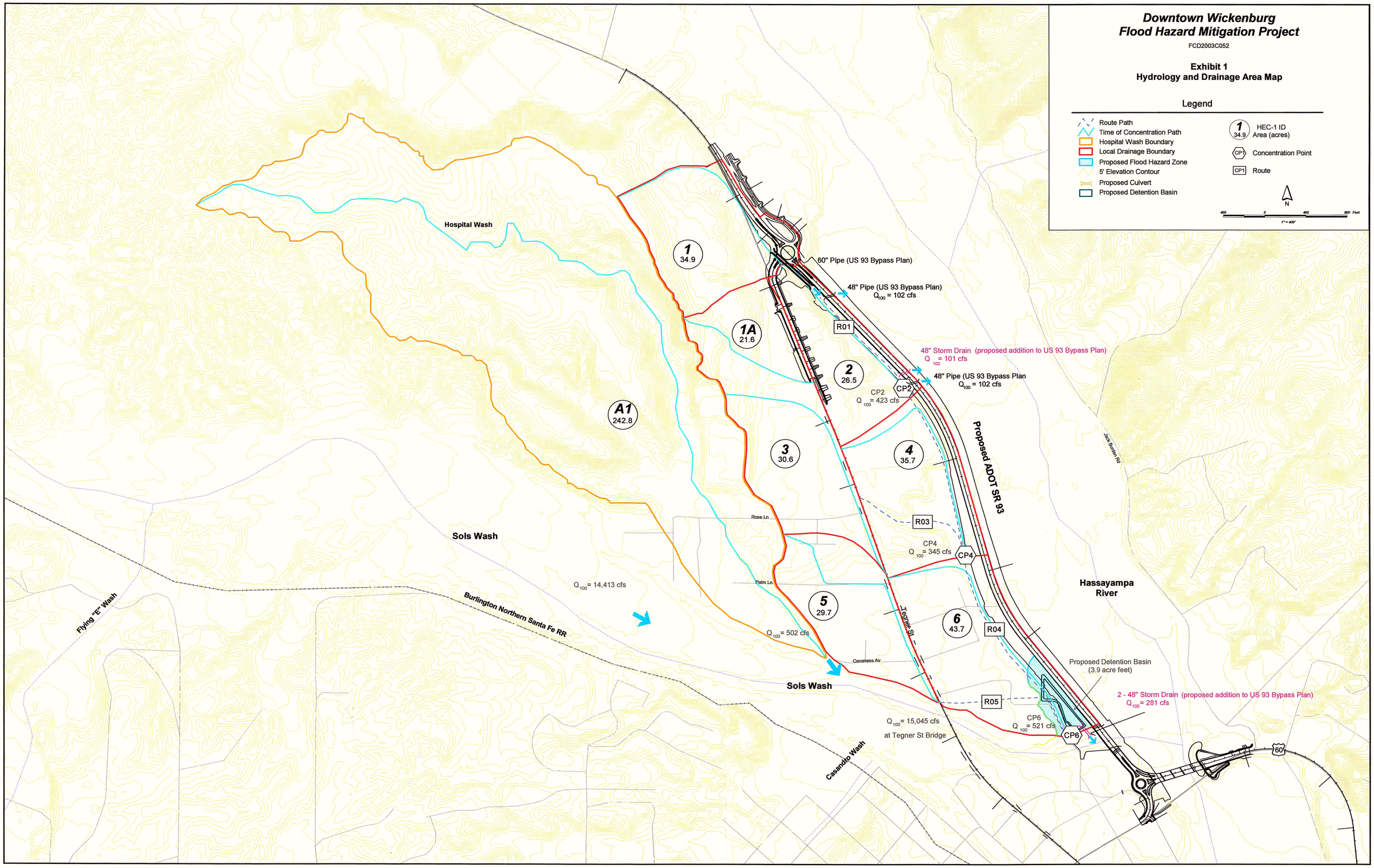
Item No.	Item Description	Unit	Unit Price	Quantity		Amount
1	Raise Bridge Parapet Wall Height 2', concrete and reinforcing steel, 250 LF	SF	$40.00	500	$	20,000.00
2	Raise Bridge Abutment Wall Height 2', concrete and reinforcing steel, 55 LF	SF	$25.00	110	$	2,750.00
					$	-
					$	-
					$	-
					$	-
					$	-
					$	-
					$	-
					$	-

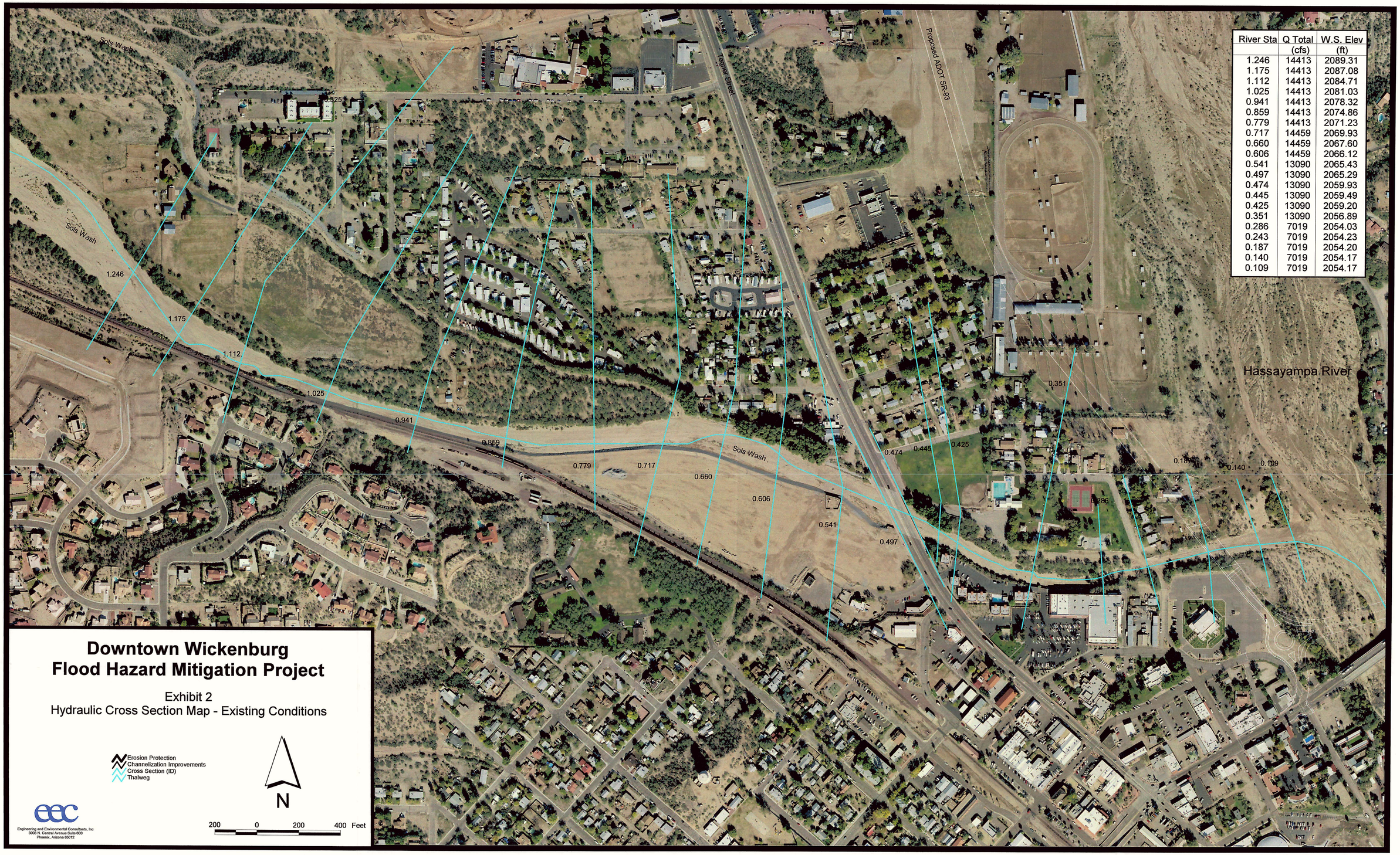
Sub Total	$	22,750.00
Contingencies (30%)	$	6,825.00
TOTAL	**$**	**29,600.00**

Downtown Wickenburg
Flood Hazard Mitigation Project

FCD2003C052

Exhibit 1
Hydrology and Drainage Area Map



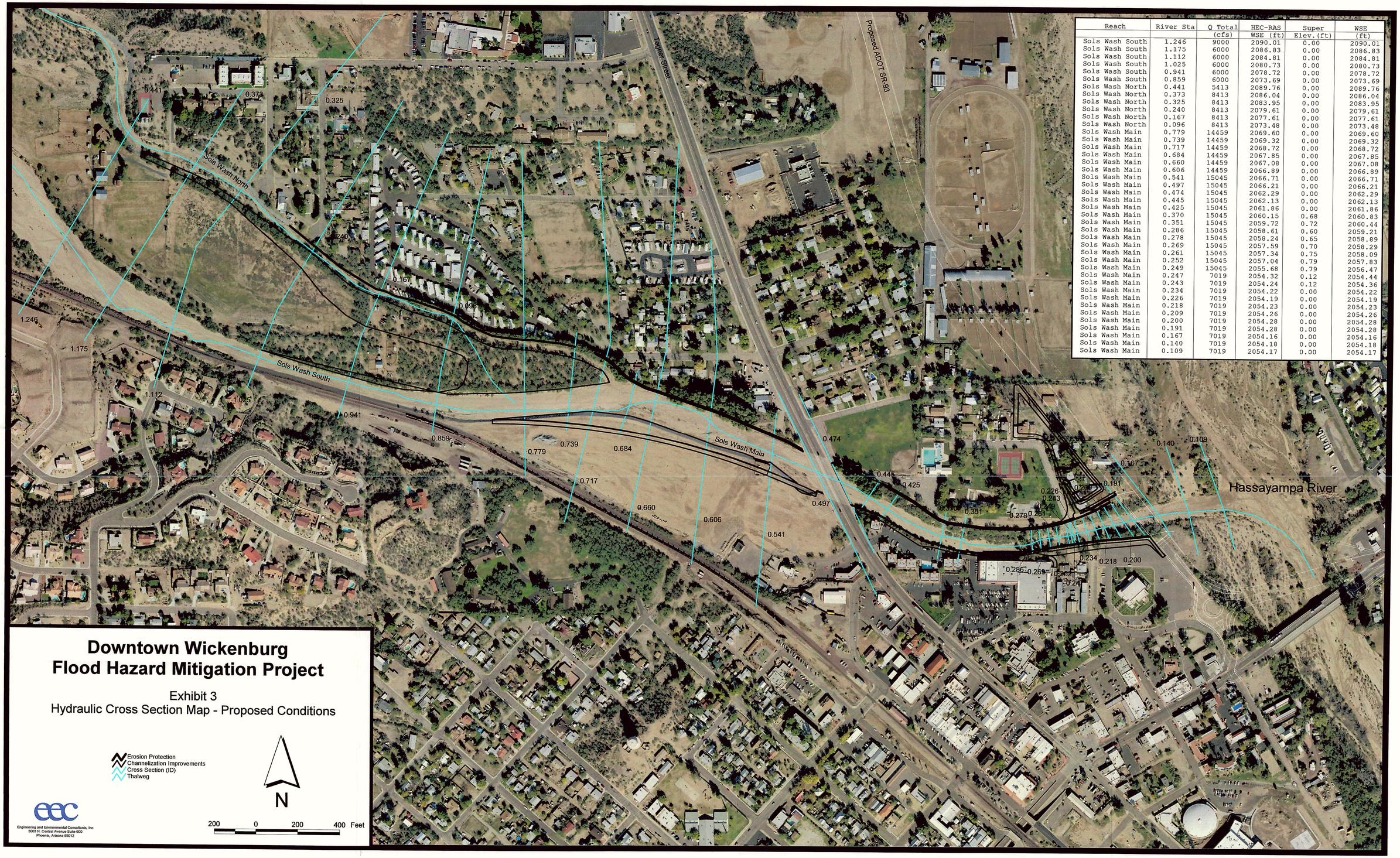


River Sta	Q Total (cfs)	W.S. Elev (ft)
1.246	14413	2089.31
1.175	14413	2087.08
1.112	14413	2084.71
1.025	14413	2081.03
0.941	14413	2078.32
0.859	14413	2074.86
0.779	14413	2071.23
0.717	14459	2069.93
0.660	14459	2067.60
0.606	14459	2066.12
0.541	13090	2065.43
0.497	13090	2065.29
0.474	13090	2059.93
0.445	13090	2059.49
0.425	13090	2059.20
0.351	13090	2056.89
0.286	7019	2054.03
0.243	7019	2054.23
0.187	7019	2054.20
0.140	7019	2054.17
0.109	7019	2054.17

Downtown Wickenburg Flood Hazard Mitigation Project

Exhibit 2

Hydraulic Cross Section Map - Existing Conditions



Reach	River Sta	Q Total (cfs)	HEC-RAS WSE (ft)	Super Elev. (ft)	WSE (ft)
Sols Wash South	1.246	9000	2090.01	0.00	2090.01
Sols Wash South	1.175	6000	2086.83	0.00	2086.83
Sols Wash South	1.112	6000	2084.81	0.00	2084.81
Sols Wash South	1.025	6000	2080.73	0.00	2080.73
Sols Wash South	0.941	6000	2078.72	0.00	2078.72
Sols Wash South	0.859	6000	2073.69	0.00	2073.69
Sols Wash North	0.441	5413	2089.76	0.00	2089.76
Sols Wash North	0.373	8413	2086.04	0.00	2086.04
Sols Wash North	0.325	8413	2083.95	0.00	2083.95
Sols Wash North	0.240	8413	2079.61	0.00	2079.61
Sols Wash North	0.167	8413	2077.61	0.00	2077.61
Sols Wash North	0.096	8413	2073.48	0.00	2073.48
Sols Wash Main	0.779	14459	2069.60	0.00	2069.60
Sols Wash Main	0.739	14459	2069.32	0.00	2069.32
Sols Wash Main	0.717	14459	2068.72	0.00	2068.72
Sols Wash Main	0.684	14459	2067.85	0.00	2067.85
Sols Wash Main	0.660	14459	2067.08	0.00	2067.08
Sols Wash Main	0.606	14459	2066.89	0.00	2066.89
Sols Wash Main	0.541	15045	2066.71	0.00	2066.71
Sols Wash Main	0.497	15045	2066.21	0.00	2066.21
Sols Wash Main	0.474	15045	2062.29	0.00	2062.29
Sols Wash Main	0.445	15045	2062.13	0.00	2062.13
Sols Wash Main	0.425	15045	2061.86	0.00	2061.86
Sols Wash Main	0.370	15045	2060.15	0.68	2060.83
Sols Wash Main	0.351	15045	2059.72	0.72	2060.44
Sols Wash Main	0.286	15045	2058.61	0.60	2059.21
Sols Wash Main	0.278	15045	2058.24	0.65	2058.89
Sols Wash Main	0.269	15045	2057.59	0.70	2058.29
Sols Wash Main	0.261	15045	2057.34	0.75	2058.09
Sols Wash Main	0.252	15045	2057.04	0.79	2057.83
Sols Wash Main	0.249	15045	2055.68	0.79	2056.47
Sols Wash Main	0.247	7019	2054.32	0.12	2054.44
Sols Wash Main	0.243	7019	2054.24	0.12	2054.36
Sols Wash Main	0.234	7019	2054.22	0.00	2054.22
Sols Wash Main	0.226	7019	2054.19	0.00	2054.19
Sols Wash Main	0.218	7019	2054.23	0.00	2054.23
Sols Wash Main	0.209	7019	2054.26	0.00	2054.26
Sols Wash Main	0.200	7019	2054.28	0.00	2054.28
Sols Wash Main	0.191	7019	2054.28	0.00	2054.28
Sols Wash Main	0.167	7019	2054.16	0.00	2054.16
Sols Wash Main	0.140	7019	2054.18	0.00	2054.18
Sols Wash Main	0.109	7019	2054.17	0.00	2054.17

Downtown Wickenburg Flood Hazard Mitigation Project

Exhibit 3

Hydraulic Cross Section Map - Proposed Conditions

Erosion Protection
Channelization Improvements
Cross Section (ID)
Thalweg

N

200 0 200 400 Feet

Engineering and Environmental Consultants, Inc
3003 N. Central Avenue Suite 600
Phoenix, Arizona 85012