Appendix H

Floodplain Delineation

Grijalva Park – Santiago Creek Floodplain Delineation

Prepared For:

City of Orange

Prepared By:

RBF CONSULTING

PLANNING ■ DESIGN ■ CONSTRUCTION

Contact Person:
Rebecca Kinney, RCE 58797

Date:
July 11, 2005

JN 10104274

Table of Contents

List of Exhibits

List of Tables

1.0 BACKGROUND

RBF Consulting has been retained by the City of Orange to prepare a floodplain study for Grijalva Park adjacent to Santiago Creek. The City is currently in the CEQA process for developing additional park amenities on an old landfill adjacent to Santiago Creek. Grijalva Park is located east of the 55 Freeway at the corner of McPherson and Spring Street. As part of the remediation associated with the landfill, excavation and fill will occur within the Santiago Creek 100-year floodplain.

This report describes the existing floodplain, the proposed improvements and the impacts the proposed improvements will have on the Santiago Creek 100-year floodplain.

2.0 PROJECT AREA DESCRIPTION

The project site consists of a polygon shaped property bounded by Santiago Creek along the western edge and Prospect Street to the east. The approximate 27-acre project site is currently undeveloped vacant land with few unimproved dirt roads that traverse the project site. Elevations on-site range from approximately 220 feet above mean sea level (msl) to approximately 280 feet above msl. Surrounding land uses consist of residential uses to the north, open space/recreational uses to the east, commercial uses to the south, and residential uses to the west.

Santiago Creek has a drainage area of approximately 102 square miles and is a tributary of the Santa Ana River. The drainage area above the site is approximately 96 square miles. This study focuses on the unimproved portion of the creek just downstream of the concrete lined channel. Upstream of the concrete lined section are the Blue Diamond-Bond Pits that are currently owned an operated, as recharge basins, by Orange County Water District. Currently, any course sediments are being trapped within the recharge basins.

As the creek transitions from a concrete lined channel to an unimproved channel, both engineered rock bank protection and natural stream armoring in the form of a cobble bed is evident. The site inspection revealed that on the eastern bank adjacent to the proposed amphitheater the channel has steep side slopes (greater than 2:1) and the flow-line of the channel is adjacent to the toe of the slope. See Exhibit 1 for the location of the study.

3.0 PREVIOUS FLOODPLAIN MAPPING AND FIS

Published Flood Insurance Rate Maps (FIRM) identifying flood hazard zones are available for the City of Orange since it is a participant in the National Flood Insurance Program (NFIP) administered by the Federal Emergency Management Agency (FEMA). Communities participating in the NFIP must adopt and enforce minimum floodplain management standards including identification of flood hazard areas and flooding risks. Participating in the NFIP allows communities to purchase low cost insurance protection against losses from flooding. The portion of Santiago Creek within the study area is located within a special flood hazard as shown on FIRM panels 06059CO162H effective date February 18, 2004. The area is mapped as a Zone AE (based flood elevation are determined) with a mapped floodway adjacent to the Grijalva Park Expansion. Exhibit 2 shows the existing mapped floodplain

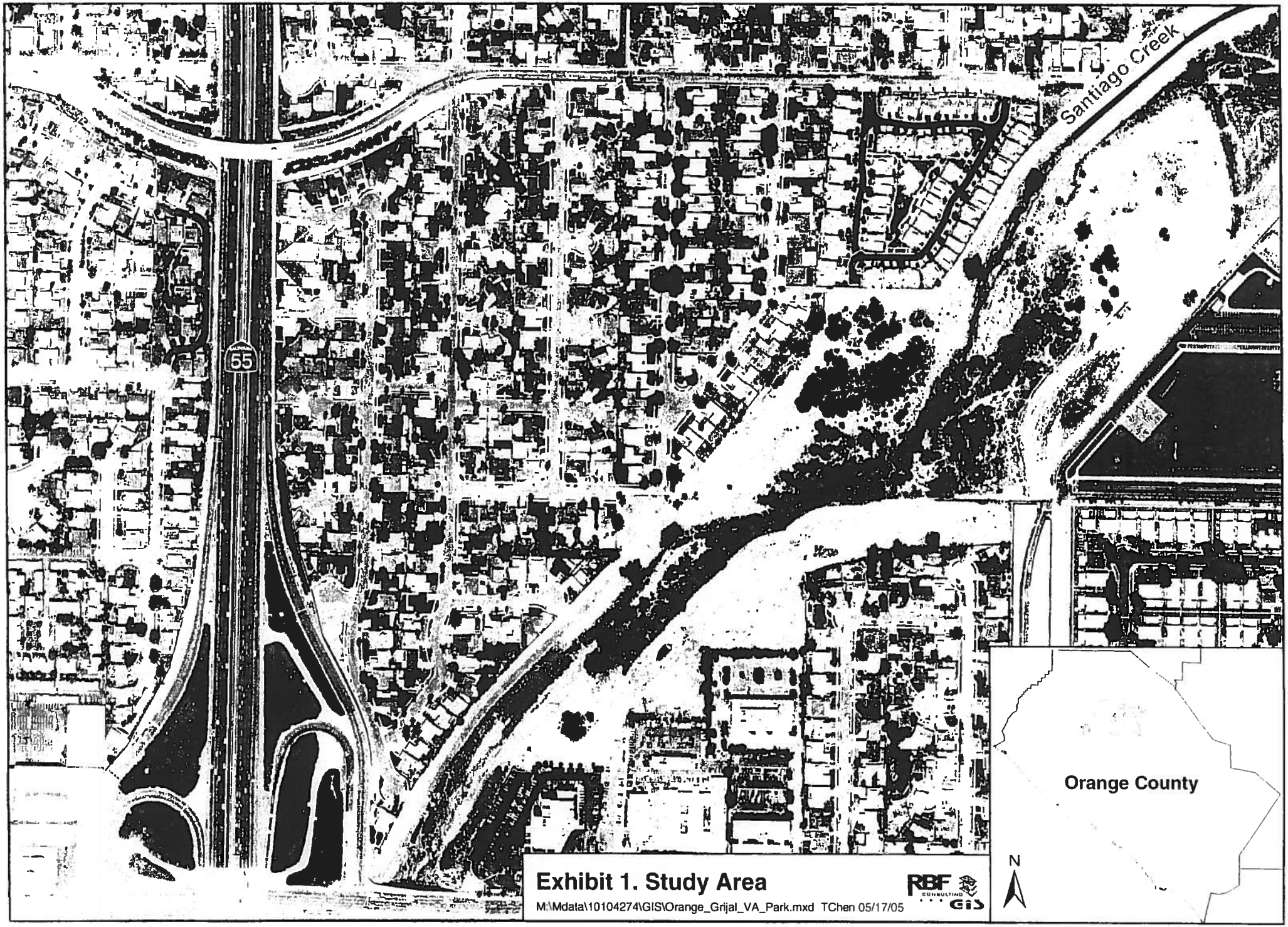


Exhibit 1. Study Area

M:\Mdata\10104274\GIS\Orange_Grijal_VA_Park.mxd TChen 05/17/05

RBF CONSULTING GIS

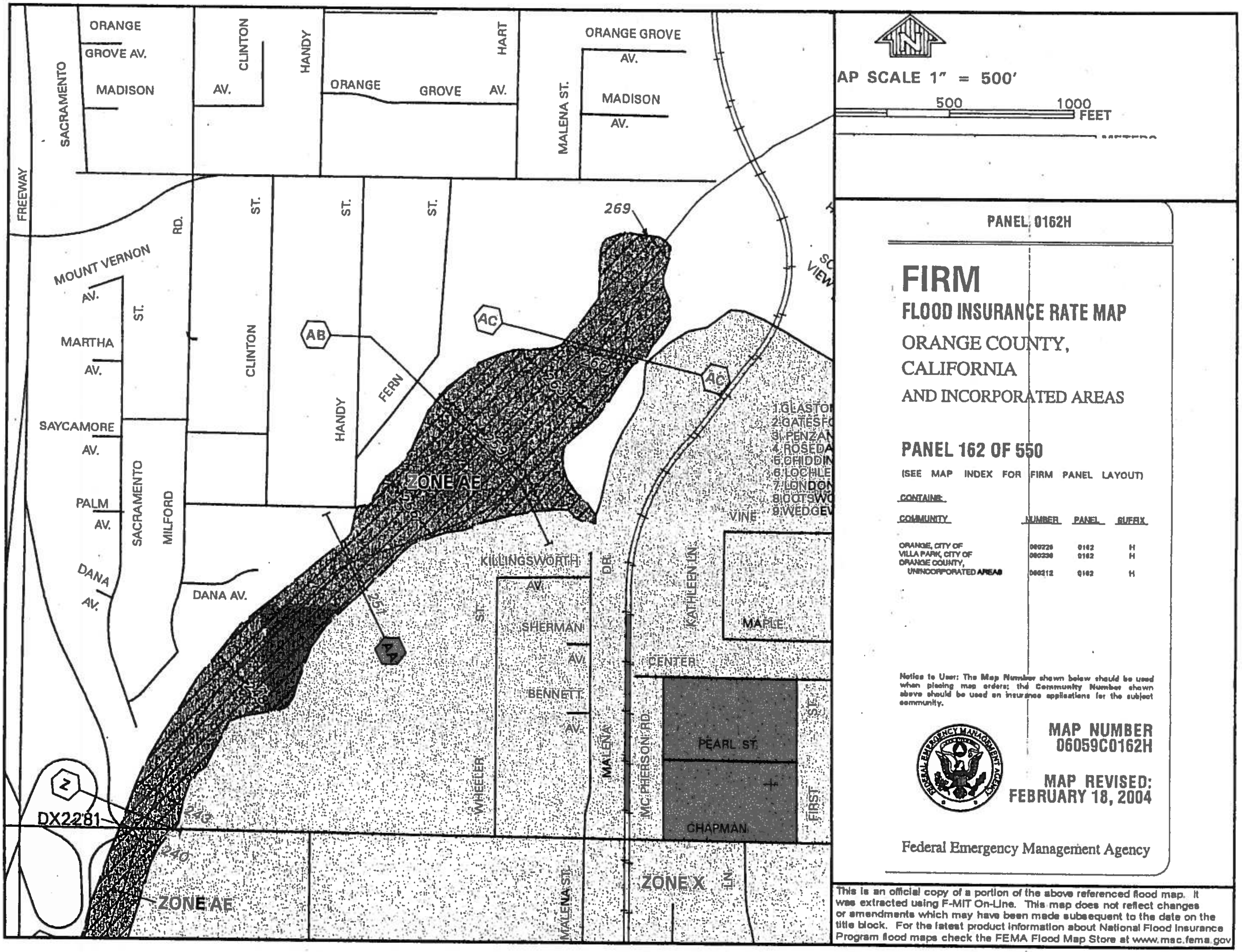

FIRM
FLOOD INSURANCE RATE MAP
ORANGE COUNTY, CALIFORNIA
AND INCORPORATED AREAS
PANEL 0162H
PANEL 162 OF 550
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)
CONTAINS:
COMMUNITY NUMBER PANEL SUFFIX
ORANGE, CITY OF
VILLA PARK, CITY OF
ORANGE COUNTY, UNINCORPORATED AREAS
Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.
MAP NUMBER 06059C0162H
MAP REVISED: FEBRUARY 18, 2004
Federal Emergency Management Agency
This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov
MAP SCALE 1" = 500'
500
1000
FEET
ZONE AE
ZONE X
269
251
243
240
DX2281
FREEWAY
SACRAMENTO
ORANGE GROVE AV.
MADISON
CLINTON AV.
HANDY
ORANGE GROVE AV.
HART
MALENA ST.
MOUNT VERNON AV.
MARTHA AV.
SAYCAMORE AV.
PALM AV.
DANA AV.
MILFORD RD.
FERN
KILLINGSWORTH AV.
SHERMAN AV.
BENNETT AV.
WHEELER ST.
MALENA DR.
MC PHERSON RD.
KATHLEEN LN.
CENTER
PEARL ST.
CHAPMAN
FIRST ST.
MAPLE
VINE

Exhibit 2.

4.0 DESIGN HYDROLOGY

The hydrology used for this floodplain delineation was obtained from the June 1990 US Army Corps of Engineers titled " Santiago Creek Hydrologic Study of Existing Conditions for Flood Insurance Purposes. " The Flood Insurance Study (FIS) prepared by FEMA dated February 18, 2004 also has flowrates for the study reach

Table 1 – Santiago Creek Peak Flowrates	
Study	**100-Year (cfs)**
FEMA FIS	9,040
Corps of Engineers	6,050

5.0 FLOODPLAIN MAPPING HYDRAULIC ANALYSIS

Two conditions were analyzed for the geometry of the channel, the existing ground as shown on the topography provided by the City of Orange and the project condition which includes excavation and fill with rock slope protection adjacent to the amphitheater area. The models where analyzed with both the FIS flowrate and the Corps of Engineers flowrate.

5.1 GENERAL FLOODPLAIN MODELING PROCEDURE

The U.S. Army Corps of Engineers (ACOE) HEC-RAS computer model was used for the models. The model extends from the southern project boundary to the upstream concrete channel. The existing and proposed project models were generated based on topography provided by the City of Orange.

5.2 HYDRAULIC MODEL ASSUMPTIONS

The following guidelines and assumptions were used to develop the various hydraulic analyses with the HEC-2 floodplain and floodway models:

- **Cross section** data used to develop the channel geometry was obtained from the topography provided by the City of Orange. Cross sections were taken looking downstream, with stationing from left to right.

- **Channel roughness** in the hydraulic model was varied depending on channel material and overbank uses. The "n" values for the various materials are given below in Table 3.

Table 2 – Manning's Roughness Coefficients	
Section Material	**Manning's "n" Value**
Channel Vegetation	0.05
Rock Lined Channel	0.035
Concrete Channel	0.016

- **Cross section spacing** varied up to approximately 245 feet in horizontal separation. Cross section placement was concentrated primarily upon the changes in channel geometry or channel roughness.

- **Starting water surface elevations** for the FIS flowrates were based on the Section AB water surface elevation of approximately 258. Because the Corps flowrate is significantly lower than the FIS flowrate, there was no starting water surface elevation available. The starting water surface was assumed to be normal depth with a slope of 0.003.

- **Peak discharge** was based upon the hydrology as outlined in Table 1 of this report.

5.3 Summary of Hydraulic Analysis

The study developed two hydraulic analyses to evaluate the floodplain, which included (1) existing, and (2) project condition models. Hydraulic results for the existing and project models are presented in the table located in Section 5.5.

5.4 Floodplain Boundary Delineation

The calculated limits of the 100-year floodplain for the existing model (for both flowrates) were plotted on "work map" utilizing the results of the HEC-RAS models. The work map is located following this report (Exhibit 3).

5.5 Floodplain Impacts and Discussion of Results

The results of the project hydraulic models indicate a similar floodplain to the existing condition. Table 3 below presents a comparison of 100-year water surface elevations between the existing model, and the project model.

Table 3 – Hydraulic Model Results					
Station	**Existing Corps**	**Project Corps**	**Change Corps**	**Existing FIS**	**Project FIS**
1078	252.44	252.44	0.0	258.00	258
1202	252.81	252.81	0.0	258.07	258.07
1483	252.8	252.8	0.0	258.24	258.24
1645	255.81	255.81	0.0	257.81	257.82
1794	257.6	257.57	-0.03	258.48	258.61
1901	257.48	257.81	0.33	258.39	258.86

Table 3 – Hydraulic Model Results					
Station	Existing Corps	Project Corps	Change Corps	Existing FIS	Project FIS
2014	259.32	259.25	-0.07	260.71	260.52
2178	259.13	259.13	0.0	260.62	260.60
2349	261.22	261.22	0.0	262.75	262.75
2475	263.03	263.03	0.0	264.58	264.57
2555	260.35	260.35	0.0	264.62	264.62
2776	267.04	267.04	0.0	269.23	269.23
3021	268.27	268.27	0.0	270.48	270.46

6.0 PROJECT DESCRIPTION

The Grijalva Park Extension project involves the remediation of a landfill that extends into the 100-year floodplain of Santiago Creek. Also as part of the park extension, some minor fill will be placed along the edge of the 100-year floodplain.

The proposed project would involve the grading of the site; closure of a former onsite landfill (including construction of a landfill cap and slope revetment at Santiago Creek); construction of a 30,000 square foot Gymnasium/Sports Center; a 10,800 square foot Community Building; a 47,300 square foot Aquatic Center (two outdoor pools); a 10,000 square foot skatepark; and a passive use area containing a picnic structure, restroom building, tot-lot, outdoor amphitheater and trails/walkways. Parking areas, internal circulation, and access from Walnut Avenue would also be provided. Improvements within or adjoining Santiago Creek are associated with capping the on-site landfill and the placement of new bank stabilization (e.g., rock rip-rap).

The current floodplain mapping (Exhibit 2) extends into the proposed grading area at the southern portion of the site. The current floodplain mapping does not impact any of the project facilities. However, some grading and landfill removals will impact the mapped floodplain.

In order to provide protection for the new fill slope, rock slope protection will be constructed from approximately channel station 16+00 to 19+50 along the eastern bank (Exhibit 4). For project planning purposes, this analysis assumes that the rock slope protection will have a 5-foot toe down and will extend 2.6 feet up the slope. During the final design of the slope protection, the toe down depth will be refined.

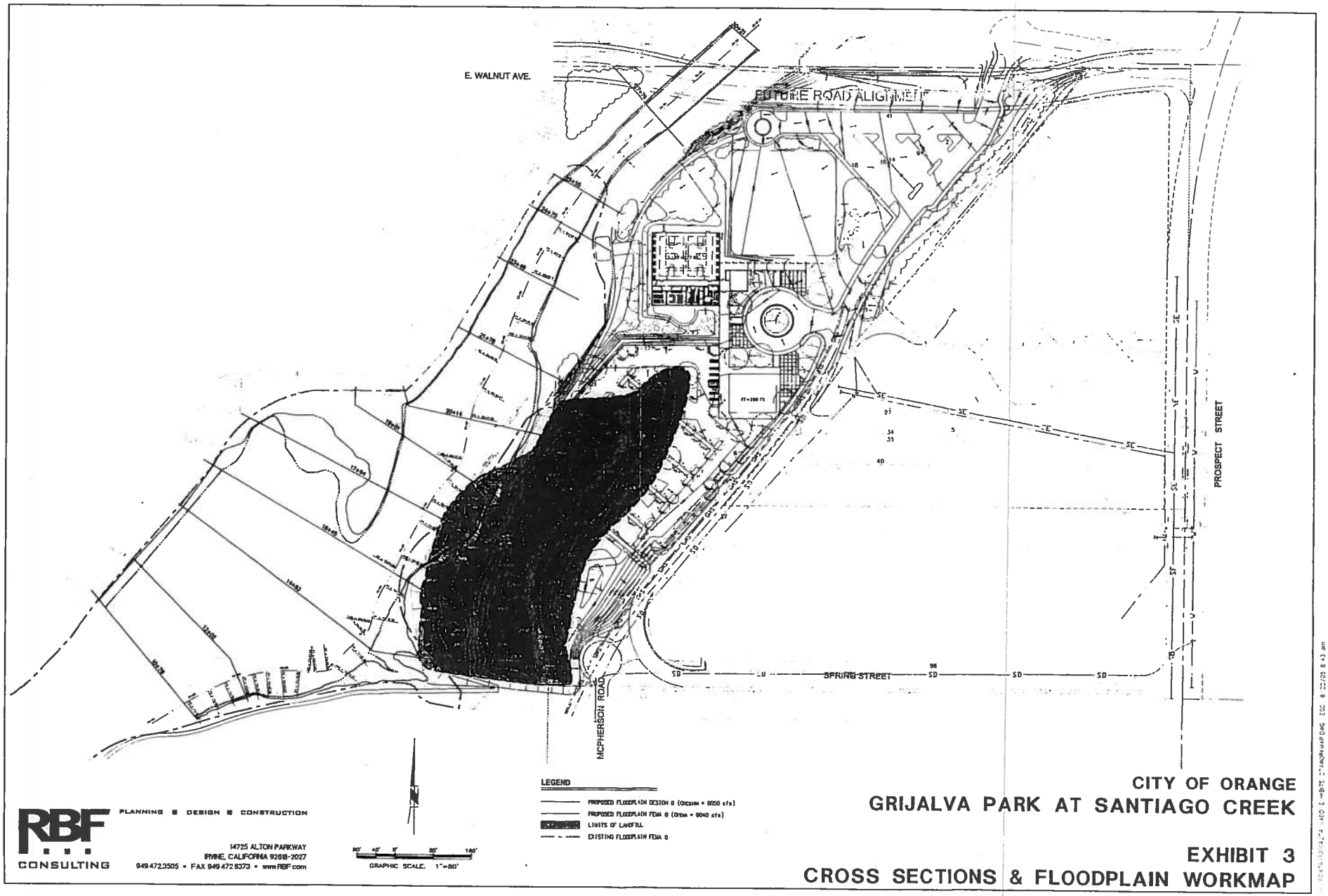
As discussed in the hydrology section of this report, there are two flowrates that were used in this analysis. The rock slope protection design will be based on the velocities associated with the Corps flowrate of 6,050 cfs. However to ease FEMA processing, rock slope protection will be extended up to the FIS water surface elevation. This will provide freeboard for the Corps flowrate while making the floodplain revision process with FEMA easier.

7.0 CONCLUSION

Based on the hydraulic summary provided in Table 3, there are no significant impacts to the Santiago Creek floodplain. The maximum increase in water surface elevation is 0.33 at Station 19+01. The maximum increase in top width is approximately 11 feet at station 19+01. The

changes at this station are due to the grading associated with the landfill removal. The increase in water surface elevation and floodplain top width is not considered a significant impact because the increase is limited to the one section and occurs on City property. Therefore, it does not impact any upstream or downstream land owners in the floodplain. Furthermore, the increases do not impact any habitable structures because they are limited to the channel banks as shown in Exhibit 3.

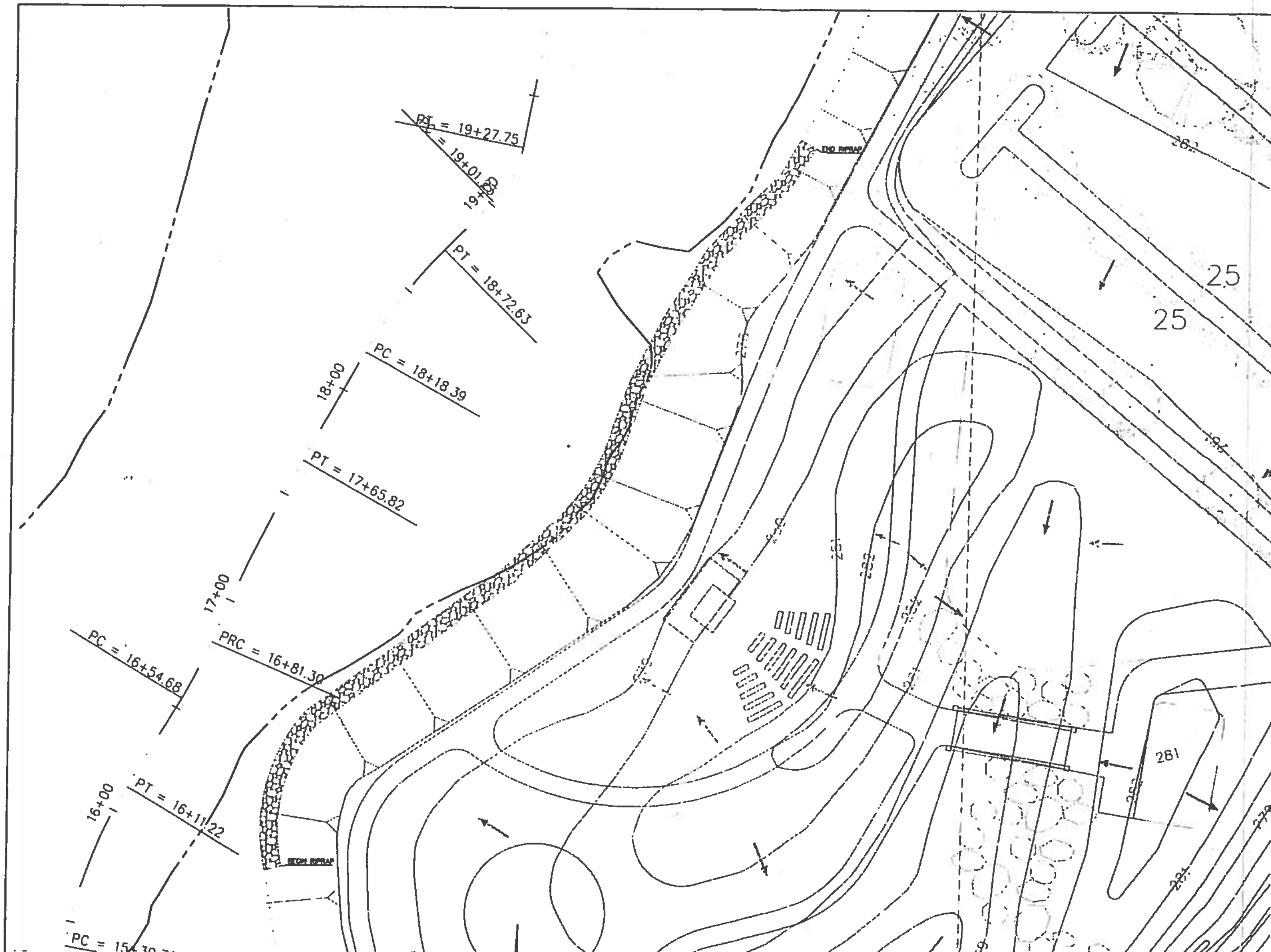
Due to required remedial grading, it is recommended that rock slope protection be installed from station 16+00 to 19+50 to minimize the potential for lateral erosion of the creek bank adjacent to the amphitheater area.

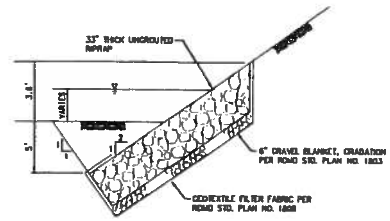


RBF CONSULTING
PLANNING ■ DESIGN ■ CONSTRUCTION
14725 ALTON PARKWAY
IRVINE, CALIFORNIA 92618-2027
949.472.3505 • FAX 949.472.8373 • www.RBF.com

CITY OF ORANGE
GRIJALVA PARK AT SANTIAGO CREEK

EXHIBIT 3
CROSS SECTIONS & FLOODPLAIN WORKMAP





RIPRAP SLOPE PROTECTION
N.T.S.

LEGEND

FLOODPLAIN DESIGN Q (Qdesign = 6050 cfs)

RIPRAP SLOPE PROTECTION

GRAPHIC SCALE: 1"=20'

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IRVINE, CALIFORNIA 92618-2027
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CITY OF ORANGE
GRIJALVA PARK AT SANTIAGO CREEK

EXHIBIT 4
ROCK SLOPE PROTECTION

Appendix A

Existing Condition

HEC-RAS Version 3.1.1 May 2003
U.S. Army Corp of Engineers
Hydrologic Engineering Center
609 Second Street, Suite D
Davis, California 95616-4687
(916) 756-1104

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

PROJECT DATA
Project Title: Santiago Creek at Grijalva Park
Project File : 274.prj
Run Date and Time: 5/17/2005 1:42:38 PM

Project in English units

PLAN DATA

Plan Title: Existing
Plan File : h:\pdata\10104274\Calcs\Strmwater\HEC-RAS\274.p01

Geometry Title: Existing Condition
Geometry File : h:\pdata\10104274\Calcs\Strmwater\HEC-RAS\274.g01

Flow Title : Existing Q100
Flow File : h:\pdata\10104274\Calcs\Strmwater\HEC-RAS\274.f01

Plan Summary Information:

Number of:	Cross Sections	= 13	Mulitple Openings	=	0
	Culverts	= 0	Inline Structures	=	0
	Bridges	= 0	Lateral Structures	=	0

Computational Information

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

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

FLOW DATA

Flow Title: Existing Q100
Flow File : h:\pdata\10104274\Calcs\Strmwater\HEC-RAS\274.f01

Flow Data (cfs)

River	Reach	RS	PF 1	PF 2
274	Main	3021	6050	9040

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
274	Main	PF 1	Critical	Normal S = 0.003
274	Main	PF 2	Critical	Known WS = 258

GEOMETRY DATA

Geometry Title: Existing Condition
Geometry File : h:\pdata\10104274\Calcs\Strmwater\HEC-RAS\274.g01

CROSS SECTION

RIVER: 274
REACH: Main RS: 3021

INPUT
Description:
Station Elevation Data num= 29

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	270.22	4.86	270	5.95	269.47	6.95	269	8.84	268.09
11.09	267	12.32	266.4	13.16	266	15.22	265	17.22	264
18.91	263.15	19.2	263	21.07	262.06	21.4	261.88	22.09	261.54
23.29	261	25.39	260.12	25.67	260	28.22	259	29.22	258.82
32.7	258	55.12	258	57.05	258.72	57.77	259	59.95	259.99
60.35	260.18	60.81	260.4	80.47	270	81.95	271		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.014	4.86	.014	80.47	.014

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
4.86	80.47	249.88	245	239.94	.1	.3

CROSS SECTION

RIVER: 274
REACH: Main RS: 2776

INPUT
Description:
Station Elevation Data num= 94

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	286	1.86	285	2.34	284.59	2.97	284	3.4	283.6
4.05	283	4.49	282.6	5.14	282	5.59	281.59	6.23	281
6.69	280.59	7.28	280	7.94	279.42	8.42	279	8.89	278.58
9.49	278	10.49	277.11	10.6	277	10.75	276.87	11.96	276
13.64	275	15.02	274.17	15.3	274	16.34	273.47	17.22	273
17.77	272.74	19.24	272	21.73	271.51	24.36	271	47.15	270
47.96	269.6	49.16	269	49.81	268.67	51.15	268	52.12	267.5
53.17	267	54.62	266.24	55.12	266	56.35	265.37	57.12	265
57.47	264.81	59.15	264	60.54	263.31	61.17	263	62.86	262.16
63.18	262	63.86	261.69	65.41	261	67.78	260.01	70.41	259
71.29	258.67	73.04	258	98.44	258	98.71	258.12	100.58	259
101.76	259.46	102.95	260	104.43	260.62	105.28	261	106.34	261.42
107.93	262	108.91	262.41	110.09	263	111.33	263.6	112.26	264
113.53	264.62	114.42	265	115.72	265.64	116.58	266	118.27	266.94
118.46	267.05	120.08	268	120.95	268.48	121.94	269	123.91	270
140.62	271	142.76	272	144.78	272.95	147.15	274	148.52	274.69
149.01	274.89	149.27	275	152.13	276	158.98	276.67	162.09	277
190.09	277.86	191.24	277.89	195.93	277.97	197.27	277.99	203.77	277.9
211.94	277.76	216.11	277.63	222.31	277.5	225.32	277.42		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.03	24.36	.014	140.62	.045

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
47.15	123.91	207.75	221	238.12	.1	.3

CROSS SECTION

RIVER: 274
REACH: Main RS: 2555

INPUT
Description:

Station Elevation Data num= 78

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	275	2.51	275	4.38	274.33	7.07	273.46	8.34	273
8.83	272.83	11.45	272	13.51	271.35	14.53	271	30.07	270.39
39.05	270.09	41.93	270	45.8	269.36	46.69	269.22	47.19	269.1
47.36	269	47.67	268.81	49.19	268	50.46	267.24	50.93	267
51.43	266.74	52.66	266	53.08	265.78	54.5	265	54.99	264.73
56.64	264	57.32	263.64	58.73	263	59.98	262.43	60.87	262
61.72	261.57	63.01	261	63.95	260.52	65.17	260	66.17	259.48
67.29	259	69.6	258.08	70.1	257.92	72.96	257	76.51	256.59
85.63	256.37	89.76	256.17	97.5	256	113.87	256	120.01	256.23
130.11	257	130.46	257.16	132.37	258	133.12	258.34	134.59	259
135.72	259.52	136.81	260	138.32	260.68	139.05	261	140.24	261.53
141.32	262	141.92	262.28	143.35	263	144.53	263.66	146.38	264.69
146.92	265	147.66	265.42	149.4	266.39	150.36	267	151.66	267.65
152.29	268	152.87	268.32	154.12	269	155.83	269.79	156.19	270
156.5	270.15	158.11	271	159.13	271.45	160.19	272	161.35	272.52
162.3	273	168.01	273.85	168.45	273.89				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	14.53	.014	41.93	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
41.93	156.19	79.31	80	80.96	.1	.3

CROSS SECTION

RIVER: 274
REACH: Main RS: 2475

INPUT
Description:
Station Elevation Data num= 74

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	274	3.98	274	4.49	273.75	5.88	273	8.17	272.12
8.54	272	11.26	271.3	11.88	271.13	12.21	271	24.77	271
42.58	270.67	43.89	270.66	47.19	270.59	51.62	270.45	53.73	270.42
62.87	270	63.97	269.33	64.42	269	65.18	268.52	66.11	268
67.25	267.2	67.5	267	68.07	266.65	69.1	266	70.59	265
72.07	264	73.63	263.12	73.83	263	75.96	262	77.7	261.26
78.28	261	79.1	260.62	80.17	260.22	80.89	260	81.22	259.9
84.23	259	85.82	258.52	87.52	258	89.45	257.45	90.94	257
92.72	256.6	95.01	256	128.11	255.8	161.21	256	162.54	256.68
163.3	257	163.94	257.29	165.37	258	167.02	258.89	167.29	259
169.09	259.94	169.36	260.1	171.04	261	171.25	261.12	172.86	262
173.94	262.62	174.63	263	176.32	263.92	176.56	264.07	178.23	265
178.43	265.12	180.01	266	180.28	266.17	183.28	267.84	183.55	268
185.15	268.82	185.44	269	185.72	269.16	187.44	270	189.04	270.89
189.42	271.11	191.15	272	193.02	272.99	197.65	273.22		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	11.88	.014	62.87	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
62.87	187.44	125.2	126	129.34	.1	.3

CROSS SECTION

RIVER: 274
REACH: Main RS: 2349

INPUT
Description:
Station Elevation Data num= 90

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	271.96	2.54	272	5.55	272.62	7.41	273	8.7	273.27
10.91	273.71	12.13	273.95	14.55	274.49	16.94	275	35.84	275
37.4	274.12	37.61	274	37.97	273.78	39.31	273	40.88	272.06
41.09	271.93	42.66	271	43.24	270.64	44.33	270	45.06	269.54
45.97	269	46.77	268.51	47.6	268	48.19	267.66	49.45	267
50.93	266.27	51.39	266	52.33	265.48	53.37	265	53.92	264.75
55.66	264	56.43	263.66	58.16	263	59.76	262.32	60.51	262
62.25	261.22	62.79	261	63.63	260.62	65.97	259.57	66.22	259.46
66.86	259.2	67.39	259	67.7	258.89	71.39	258	73.76	257.48
75.9	257	80.1	256.14	80.82	256	82.19	255.91	89.89	255.47
93.05	255.27	111.61	255.38	118.18	255.47	129.37	255.78	133.55	255.88
135.65	255.93	138.64	256	140.01	256.06	145.89	256.39	154.99	256.87
156.38	257	157.17	257.24	159.27	258	161.03	258.81	161.48	259
162.28	259.38	163.92	260.15	165.77	261	167.05	261.68	167.72	262
169.02	262.66	169.76	263	170.99	263.65	171.69	264	173.55	264.95
173.76	265.06	175.61	266	176.39	266.4	177.52	267	178.55	267.54
179.44	268	180.73	268.66	181.39	269	183.31	270	185.24	271
186.63	271.73	187.15	272	188.37	272.64	189.06	273	193.17	273.2

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	39.31	.035	189.06	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
39.31	189.06	196.42	171	169.07	.1	.3

CROSS SECTION

RIVER: 274
REACH: Main RS: 2178

INPUT
Description:
Station Elevation Data num= 74

0	265.29	2.06	265.37	3.91	265.11	4.23	265	6.09	264.01
7.24	263.33	7.67	263	8	262.8	9.15	262	10.62	261.13
10.85	261	12.38	260	13.96	259	16.45	258.01	19.21	257
20.19	256.65	21.93	256	23.81	255.34	26.92	254.13	27.29	254
40.5	254	43.21	254.13	53.29	254.62	55.84	254.65	63.91	254.65
71.48	255	80.14	255	80.89	254.62	83.5	253.27	84.03	253
84.8	252.52	85.86	252	87.38	251.25	87.77	251.08	100.79	250.39
105.2	250.17	108.71	250	110.38	249.7	115.23	249	129.68	248.7
144.13	249	144.88	249.16	145.64	249.34	146.6	249.6	148.98	250
153.99	251	155.5	251.33	157.6	251.36	162.63	251	171.84	251
173.58	251.55	175.67	252	177.7	252.57	179.42	253	183.28	254
186.64	254.28	188.33	254.44	193.92	255	195.74	255.13	207.52	256
210.53	256.47	214.24	257	215.92	257.52	217.77	258	219.92	258.71
220.74	259	222.57	259.56	223.93	260	247.31	260	249.3	259.79
254.72	259	265.64	258.51	276.43	258	413.92	258	424.14	257.77
426.47	257.74	469.49	257.2	481.69	257	519.95	257	520.69	257.35
521.91	258	522.65	258.35	523.92	259	524.55	259.31	525.91	260
526.9	260.42	528.04	261	528.96	261.44	530.07	262	530.88	262.39
532.1	263	533.47	263.82	533.81	264	536.56	264	537.66	263.87
539.74	263.59	545.29	263.41	549.41	263.59	553.91	263.87	555.69	264
558.68	264.76	559.66	265	563.24	266	564.02	266.19	566.31	266.49
566.44	266.5								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.05	80.14	.035	193.92	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
80.14	193.92	150.84	149	135.2	.1	.3

CROSS SECTION

RIVER: 274
REACH: Main RS: 1645

INPUT
Description:
Station Elevation Data num= 117

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	266	20	266	31.43	266.42	32.95	266.47	43.54	266.6
56.41	266.9	60.63	267	76.15	267	77.54	266.37	78.42	266
78.83	265.81	80.55	265	82.09	264.26	82.64	264	83.24	263.72
84.79	263	85.89	262.52	87.11	262	88.09	261.58	89.35	261
90.77	260.33	91.49	260	93.17	259.25	93.72	259	95.67	258.14
95.97	258	96.61	257.7	97.78	257.2	98.28	257	98.67	256.84
100.76	256	101.33	255.75	103.28	255	104.28	254.52	105.21	254
106.24	253.46	107.16	253	108.14	252.48	109.1	252	110.42	251.37
111.12	251	112.52	250.31	113.12	250	114.87	249.21	115.26	249
115.61	248.16	115.75	248	115.87	247.85	116.26	247	152.05	247
152.58	247.36	153.68	248	154.7	248.59	155.32	249	156.11	249.53
156.97	250	158.08	250.72	158.59	251	161.59	251.91	162.92	252.12

167.14	252.58	170.88	253	174.25	253.18	186.29	253.79	190.69	254
202.83	254.41	208.06	254.57	211.4	254.69	222.41	255	226.3	255.27
233.04	255.93	236.22	256.36	240.26	257	243.84	257	245.92	257.08
259.83	257.1	260.89	257.09	267.36	257.06	273.4	257.01	276.43	257
281.19	256.77	295.55	256	303.64	256	306.57	256.57	307.36	256.71
309.26	257	422.66	257	445.26	256.34	456.19	256	486.56	255
500.26	255	526.95	254.74	533.47	255	537.73	255.26	539.06	255.32
540.6	255.37	543.68	255.53	549.76	255.72	552.13	255.75	553.67	255.72
557.92	255.87	559.74	256	564.57	256.49	567.89	257	572.38	257.66
574.65	258	576.02	258.41	578.32	259	580.31	259.48	582.44	260
586.1	261	586.44	261.11	589.23	262	589.85	262.19	591.96	263
593.64	263.34	597.77	263.8						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.05	103.28	.035	222.41	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
103.28	222.41	162.16	162	128.34	.1	.3

CROSS SECTION

RIVER: 274
REACH: Main RS: 1483

INPUT
Description:
Station Elevation Data num= 142

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	266.22	2.46	266	3.07	265.85	5.28	265.23	5.75	265.09
8.88	264.13	9.25	264	11.73	263.23	12.37	263	14.52	262.33
15.41	262	17.24	261.42	18.37	261	20.01	260.42	21.32	260
25.95	259.07	27.22	259	33.73	258.49	34.86	258.52	38.35	258.59
39.68	258.58	41.24	258.59	42.77	258.58	49.01	258.42	58.46	258
61.04	258	65.64	258.65	70.23	259	74.11	259	75.02	258.87
77.65	258.51	79.17	258.29	80.9	258	82.66	257.72	86.2	257
88.76	256.73	90.69	256.54	95.76	256	99.52	255.74	104.53	256
123.2	256	123.95	255.65	125.28	255	126.62	254.39	127.48	254
129.21	253.21	129.74	253	130.24	252.76	131.86	252	132.74	251.61
134.05	251	135.18	250.5	136.26	250	140.87	249.26	142.54	249
145.77	248.63	151.75	248	153.48	247.25	154.13	247	160.07	246.5
166	247	170.02	247.76	171.32	248	180.56	248	181.73	247.72
184.77	247	192.16	247	196.21	247.41	198	247.58	201.64	248
203.24	248.33	206.83	249	210.01	249.5	214.9	250	221.59	250.84
222.88	251	234.57	251	237.03	251.2	247.68	252	256.62	252.54
264.55	253	277.39	253.65	282.95	254	284.73	254.26	288.71	254.73
290.29	254.91	291.45	255	301.33	255	302.72	255.05	317.5	255.11
319.06	255	326.89	254.55	329.88	254.42	336.01	254.44	339.04	254.55
344.85	254.77	350.15	255	355.45	255.16	356.87	255.15	381.57	255.19
384.63	255.15	387.78	255.1	391.06	255.04	392.74	255	484.64	255
488.04	254.95	495.03	254.83	501.73	254.77	504.96	254.73	509.88	254.61

512.6	254.57	514.97	254.51	517.63	254.43	521.42	254.35	531.12	254
540.47	253.33	545.73	253	569.87	252.36	579.57	252.04	581.05	252
591.66	252	603.52	252.78	607.05	253	610.38	253.91	611.03	254.11
614.25	255	614.99	255.23	617.8	256	618.44	256.3	620.37	257
620.99	257.32	622.54	258	623.57	258.54	625.76	259.5	626.83	260
628.21	260.6	629.12	261	631.23	261.86	631.5	262	633.29	262.14
634.34	262.2	634.43	262.21						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.05	131.86	.035	247.68	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
131.86	247.68	295.87	281	185.97	.1	.3

CROSS SECTION

RIVER: 274
REACH: Main RS: 1202

INPUT
Description:
Station Elevation Data num= 117

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	260.76	2.61	260	3.57	259	4.02	258.49	4.46	258
4.94	257.47	5.35	257	5.85	256.45	6.24	256	6.8	255.33
7.13	255	7.87	254.18	8.03	254	8.74	253.21	8.92	253
9.15	252.74	9.82	252	10.07	251.71	10.72	251	11	250.64
11.64	250	12.5	249.66	13.98	249	15.31	248.5	16.45	248
17.9	247.41	19	247	19.9	246.67	21.49	246	22.52	245.64
24.04	245	27.16	244.37	28.63	244	33.08	243.36	34.96	243
36.77	242.07	45.76	242	55.45	241.8	65.13	242	67.34	242.89
67.65	243	68.01	243.11	70.13	244	71.07	244.45	72.24	245
73.19	245.53	74.4	246	76.01	246.79	76.61	247	77.56	247.28
79.04	248	80.49	248.56	81.26	249	82.33	249.53	83.5	250
86.7	250.6	88.63	251	91.91	251.61	95.21	252	100.43	252.22
109.58	252.51	124.71	252.64	125.88	252.62	127.22	252.61	129.27	252.59
131.1	252.58	132.99	252.53	141.65	252.41	168.31	252.81	172.59	252.9
176.7	253	180.82	253.13	182.5	253.15	186.99	253.28	198.15	253.54
199.83	253.54	203.65	253.61	221.32	253.54	228.07	253.33	229.88	253.32
238.19	253	240.72	252.86	257.98	252	260.15	251.91	261.19	251.89
262.41	251.87	274.39	251.46	287.09	251.26	293.24	251.12	297.56	251.07
298.67	251.05	300.57	251.05	302.55	251.04	304.58	251.07	305.74	251.1
331.74	251.24	333.47	251.21	335.29	251.23	337.41	251.3	338.89	251.32
341.18	251.42	347.68	251.78	350.9	252	359.27	252.74	362	253
367.25	253.92	369.4	254.44	371.54	255	375.27	256	376.83	256.53
378.12	257	379.81	257.61	380.83	258	381.96	258.42	383.47	259
386.49	259.44	386.65	259.45						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val

0	.05	13.98	.035	81.26	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
13.98	81.26	114.83	124	121.83	.1	.3

CROSS SECTION

RIVER: 274
REACH: Main RS: 1078

INPUT
Description:
Station Elevation Data num= 88

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4.43	257.82	4.62	257.64	5.25	257.02	7.27	255	7.82	254.45
8.22	254.03	8.53	253.74	9.3	253	10.27	252.06	10.56	251.8
11.3	251	12.28	250.11	12.4	250	12.54	249.9	13.72	249
14.9	248.13	15.09	248	16.34	247.08	17.77	246.02	18.83	245
20.87	244.57	23.67	244	26.39	243.42	28.61	243	30.35	242.7
33.48	242	46.85	241.4	60.22	242	63.32	243	64.39	243.35
66.41	244	69.02	244.82	69.7	245	70.09	245.18	71.56	246
72.63	246.57	73.47	247	74.83	247.5	76	247.91	76.54	248.07
79.23	249	93.2	249.93	96.31	250.11	113.48	251	122.41	251.31
123.53	251.35	144.97	251.45	150.72	251.68	152.11	251.61	157.29	252
162.66	252	163.94	251.86	165.77	251.92	175.17	251.67	177.09	251.64
193.62	251.75	196.31	252	235.42	252	240.76	251.64	242.26	251.52
244.02	251.44	246.62	251.24	247.75	251.17	250.3	251	291.84	251
296.33	251.35	298.05	251.47	301.1	251.72	304.27	252	305.43	252.2
310.11	253	312	253.44	313.73	254	316.44	254.9	316.75	255
317.1	255.13	319.62	256	321.06	256.51	322.36	257	323.66	257.47
325.04	258	326.24	258.44	327.72	259	331.25	259.3	336.82	260
339.42	260	349.85	260.44	351.99	260.47				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4.43	.05	13.72	.035	79.23	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
13.72	79.23	0	0	0	.1	.3

SUMMARY OF MANNING'S N VALUES

River:274

Reach	River Sta.	n1	n2	n3
Main	3021	.014	.014	.014
Main	2776	.03	.014	.045
Main	2555	.035	.014	.035

Main	2475	.035	.014	.035
Main	2349	.035	.035	.035
Main	2178	.05	.035	.035
Main	2014	.035	.035	.035
Main	1901	.05	.035	.035
Main	1794	.05	.035	.05
Main	1645	.05	.035	.05
Main	1483	.05	.035	.05
Main	1202	.05	.035	.05
Main	1078	.05	.035	.05

SUMMARY OF REACH LENGTHS

River: 274

Reach	River Sta.	Left	Channel	Right
Main	3021	249.88	245	239.94
Main	2776	207.75	221	238.12
Main	2555	79.31	80	80.96
Main	2475	125.2	126	129.34
Main	2349	196.42	171	169.07
Main	2178	153.31	164	183.78
Main	2014	131.45	220	89.98
Main	1901	101.85	107	187.46
Main	1794	150.84	149	135.2
Main	1645	162.16	162	128.34
Main	1483	295.87	281	185.97
Main	1202	114.83	124	121.83
Main	1078	0	0	0

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: 274

Reach	River Sta.	Contr.	Expan.
Main	3021	.1	.3
Main	2776	.1	.3
Main	2555	.1	.3
Main	2475	.1	.3
Main	2349	.1	.3
Main	2178	.1	.3
Main	2014	.1	.3
Main	1901	.1	.3
Main	1794	.1	.3

Main	1645	.1	.3
Main	1483	.1	.3
Main	1202	.1	.3
Main	1078	.1	.3

Profile Output Table - Standard Table 1

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude #
Main	3021	PF 1	6050.00	258.00	268.27	267.27	270.70	0.001112	12.50	484.07	68.47	0
Main	3021	PF 2	9040.00	258.00	270.48	269.50	273.53	0.001096	14.02	646.54	81.18	0
Main	2776	PF 1	6050.00	258.00	267.04	267.04	270.28	0.001686	14.45	418.55	65.35	1
Main	2776	PF 2	9040.00	258.00	269.23	269.23	273.12	0.001585	15.83	570.96	73.70	1
Main	2555	PF 1	6050.00	256.00	260.35	262.82	268.69	0.056143	23.17	261.09	73.25	2
Main	2555	PF 2	9040.00	256.00	261.63	264.62	271.52	0.048531	25.23	358.28	78.87	2
Main	2475	PF 1	6050.00	255.80	263.03	261.74	264.59	0.005301	10.01	604.68	100.92	0
Main	2475	PF 2	9040.00	255.80	261.58	263.35	267.53	0.026657	19.57	461.91	95.14	1
Main	2349	PF 1	6050.00	255.27	261.22	261.22	263.58	0.010909	12.34	490.36	103.92	1
Main	2349	PF 2	9040.00	255.27	262.75	262.75	265.71	0.010169	13.82	654.34	110.45	1
Main	2178	PF 1	6050.00	254.50	259.13	259.46	261.29	0.015837	11.81	512.14	155.06	1
Main	2178	PF 2	9040.00	254.50	259.69	260.62	263.20	0.021743	15.04	601.13	160.60	1
Main	2014	PF 1	6050.00	253.00	259.32	257.96	259.96	0.003001	6.69	987.97	257.34	0
Main	2014	PF 2	9040.00	253.00	260.73	258.91	261.47	0.002555	7.30	1360.79	270.09	0
Main	1901	PF 1	6050.00	250.70	257.48		258.94	0.007550	10.00	656.34	184.59	0
Main	1901	PF 2	9040.00	250.70	258.36	258.36	260.46	0.008716	12.10	825.12	201.74	0
Main	1794	PF 1	6050.00	248.70	257.60		258.31	0.002201	7.06	1024.66	282.13	0
Main	1794	PF 2	9040.00	248.70	258.63	256.70	259.62	0.002692	8.58	1430.79	465.00	0
Main	1645	PF 1	6050.00	247.00	255.81	255.81	257.61	0.009074	10.89	607.66	224.60	0
Main	1645	PF 2	9040.00	247.00	257.81		259.08	0.004495	9.77	1317.92	477.04	0
Main	1483	PF 1	6050.00	246.50	252.80	253.58	255.57	0.016871	13.43	475.14	181.29	1
Main	1483	PF 2	9040.00	246.50	258.24		258.54	0.000813	5.31	2685.09	553.28	0
Main	1202	PF 1	6050.00	241.80	252.81	250.22	254.13	0.002843	9.49	807.04	277.49	0
Main	1202	PF 2	9040.00	241.80	258.07		258.38	0.000527	5.57	2694.71	376.63	0
Main	1078	PF 1	6050.00	241.40	252.44	250.13	253.78	0.003000	9.65	840.18	296.93	0
Main	1078	PF 2	9040.00	241.40	258.00	253.20	258.32	0.000525	5.59	2565.23	320.61	0

Profile Output Table - Standard Table 2

Reach	River Sta	Profile	E.G. Elev (ft)	W.S. Elev (ft)	Vel Head (ft)	Frctn Loss (ft)	C & E Loss (ft)	Q Left (cfs)	Q Channel (cfs)	Q Right (cfs)	Top Width (ft)
Main	3021	PF 1	270.70	268.27	2.43	0.33	0.08		6050.00		68.47
Main	3021	PF 2	273.53	270.48	3.05	0.32	0.08	3.10	9036.70	0.20	81.18
Main	2776	PF 1	270.28	267.04	3.24	0.76	0.15		6050.00		65.35
Main	2776	PF 2	273.12	269.23	3.89	0.72	0.15		9040.00		73.70
Main	2555	PF 1	268.69	260.35	8.34	1.08	0.51		6050.00		73.25
Main	2555	PF 2	271.52	261.63	9.89	1.01	0.60		9040.00		78.87
Main	2475	PF 1	264.59	263.03	1.55	0.93	0.08		6050.00		100.92
Main	2475	PF 2	267.53	261.58	5.95	2.81	1.18		9040.00		95.14
Main	2349	PF 1	263.58	261.22	2.36	1.94	0.17		6050.00		103.92
Main	2349	PF 2	265.71	262.75	2.96	1.81	0.22		9040.00		110.45
Main	2178	PF 1	261.29	259.13	2.17	2.23	0.06		6050.00		155.06
Main	2178	PF 2	263.20	259.69	3.51	2.45	0.05		9040.00		160.60
Main	2014	PF 1	259.96	259.32	0.64	0.94	0.08	251.24	5297.08	501.68	257.34
Main	2014	PF 2	261.47	260.73	0.74	0.87	0.14	637.94	7455.33	946.74	270.09
Main	1901	PF 1	258.94	257.48	1.46	0.41	0.23	67.98	5539.10	442.92	184.59
Main	1901	PF 2	260.46	258.36	2.10	0.50	0.32	151.38	8016.90	871.73	201.74
Main	1794	PF 1	258.31	257.60	0.71	0.59	0.11	512.50	5439.07	98.43	282.13
Main	1794	PF 2	259.62	258.63	0.99	0.51	0.03	921.18	7616.09	502.73	465.00
Main	1645	PF 1	257.61	255.81	1.80	1.26	0.09	1.25	5920.28	128.47	224.60
Main	1645	PF 2	259.08	257.81	1.27	0.25	0.29	23.89	7649.75	1366.36	477.04
Main	1483	PF 1	255.57	252.80	2.77	1.95	0.10	1.32	5981.95	66.73	181.29
Main	1483	PF 2	258.54	258.24	0.30	0.16	0.00	174.96	5713.93	3151.11	553.28
Main	1202	PF 1	254.13	252.81	1.32	0.36	0.00	26.49	5705.02	318.49	277.49
Main	1202	PF 2	258.38	258.07	0.31	0.06	0.00	80.56	5315.85	3643.58	376.63
Main	1078	PF 1	253.78	252.44	1.34			13.91	5592.20	443.89	296.93
Main	1078	PF 2	258.32	258.00	0.32			67.65	5275.50	3696.85	320.61

ERRORS WARNINGS AND NOTES

Errors Warnings and Notes for Plan : Existing

River: 274 Reach: Main RS: 3021 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: 274 Reach: Main RS: 3021 Profile: PF 2

```
     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.
River: 274  Reach: Main     RS: 2776     Profile: PF 1
     Warning:The energy equation could not be balanced within the specified number of iterations.  The program used critical depth
             for the water surface and continued on with the calculations.
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
     Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
             the need for additional cross sections.
     Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
             water surface came back below critical depth.  This indicates that there is not a valid subcritical answer.  The
             program defaulted to critical depth.
River: 274  Reach: Main     RS: 2776     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 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: 274  Reach: Main     RS: 2555     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:   Program found supercritical flow starting at this cross section.
River: 274  Reach: Main     RS: 2555     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:   Program found supercritical flow starting at this cross section.
River: 274  Reach: Main     RS: 2475     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: 274  Reach: Main     RS: 2475     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.
River: 274  Reach: Main     RS: 2349     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 energy loss was 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: 274  Reach: Main     RS: 2349     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 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.
River: 274  Reach: Main     RS: 2178     Profile: PF 1
     Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
             the need for additional cross sections.
     Note:   Program found supercritical flow starting at this cross section.
River: 274  Reach: Main     RS: 2178     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: 274  Reach: Main     RS: 2014     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: 274  Reach: Main     RS: 2014     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: 274  Reach: Main     RS: 1901     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: 274  Reach: Main     RS: 1901     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: 274  Reach: Main     RS: 1794     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.
River: 274  Reach: Main     RS: 1794     Profile: PF 2
```

```
     Warning:Divided flow computed for this cross-section.
River: 274  Reach: Main     RS: 1645     Profile: PF 1
     Warning:The energy equation could not be balanced within the specified number of iterations.  The program used critical depth
             for the water surface and continued on with the calculations.
     Warning:Divided flow computed for this cross-section.
     Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
             the need for additional cross sections.
     Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
             water surface came back below critical depth.  This indicates that there is not a valid subcritical answer.  The
             program defaulted to critical depth.
River: 274  Reach: Main     RS: 1645     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: 274  Reach: Main     RS: 1483     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:   Program found supercritical flow starting at this cross section.
River: 274  Reach: Main     RS: 1483     Profile: PF 2
     Warning:Divided flow computed for this cross-section.
River: 274  Reach: Main     RS: 1202     Profile: PF 1
     Warning:Divided flow computed for this cross-section.
     Note:   Hydraulic jump has occurred between this cross section and the previous upstream section.
```

Appendix B

Project Condition

HEC-RAS Version 3.1.1 May 2003
U.S. Army Corp of Engineers
Hydrologic Engineering Center
609 Second Street, Suite D
Davis, California 95616-4687
(916) 756-1104

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

PROJECT DATA
Project Title: Santiago Creek at Grijalva Park
Project File : 274.prj
Run Date and Time: 5/17/2005 3:31:08 PM

Project in English units

PLAN DATA

Plan Title: Project
Plan File : h:\pdata\10104274\Calcs\Strmwater\HEC-RAS\274.p02

Geometry Title: Project Condition
Geometry File : h:\pdata\10104274\Calcs\Strmwater\HEC-RAS\274.g02

Flow Title : Existing Q100
Flow File : h:\pdata\10104274\Calcs\Strmwater\HEC-RAS\274.f01

Plan Summary Information:

Number of:	Cross Sections	= 13	Mulitple Openings	=	0
	Culverts	= 0	Inline Structures	=	0
	Bridges	= 0	Lateral Structures	=	0

Computational Information

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

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

FLOW DATA

Flow Title: Existing Q100
Flow File : h:\pdata\10104274\Calcs\Strmwater\HEC-RAS\274.f01

Flow Data (cfs)

River	Reach	RS	PF 1	PF 2
274	Main	3021	6050	9040

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
274	Main	PF 1	Critical	Normal S = 0.003
274	Main	PF 2	Critical	Known WS = 258

GEOMETRY DATA

Geometry Title: Project Condition
Geometry File : h:\pdata\10104274\Calcs\Strmwater\HEC-RAS\274.g02

CROSS SECTION

RIVER: 274
REACH: Main RS: 3021

INPUT
Description:
Station Elevation Data num= 29

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	270.22	4.86	270	5.95	269.47	6.95	269	8.84	268.09
11.09	267	12.32	266.4	13.16	266	15.22	265	17.22	264
18.91	263.15	19.2	263	21.07	262.06	21.4	261.88	22.09	261.54
23.29	261	25.39	260.12	25.67	260	28.22	259	29.22	258.82
32.7	258	55.12	258	57.05	258.72	57.77	259	59.95	259.99
60.35	260.18	60.81	260.4	80.47	270	81.95	271		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.014	4.86	.014	80.47	.014

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
4.86	80.47	249.88	245	239.94	.1	.3

CROSS SECTION

RIVER: 274
REACH: Main RS: 2776

INPUT
Description:
Station Elevation Data num= 94

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	286	1.86	285	2.34	284.59	2.97	284	3.4	283.6
4.05	283	4.49	282.6	5.14	282	5.59	281.59	6.23	281
6.69	280.59	7.28	280	7.94	279.42	8.42	279	8.89	278.58
9.49	278	10.49	277.11	10.6	277	10.75	276.87	11.96	276
13.64	275	15.02	274.17	15.3	274	16.34	273.47	17.22	273
17.77	272.74	19.24	272	21.73	271.51	24.36	271	47.15	270
47.96	269.6	49.16	269	49.81	268.67	51.15	268	52.12	267.5
53.17	267	54.62	266.24	55.12	266	56.35	265.37	57.12	265
57.47	264.81	59.15	264	60.54	263.31	61.17	263	62.86	262.16
63.18	262	63.86	261.69	65.41	261	67.78	260.01	70.41	259
71.29	258.67	73.04	258	98.44	258	98.71	258.12	100.58	259
101.76	259.46	102.95	260	104.43	260.62	105.28	261	106.34	261.42
107.93	262	108.91	262.41	110.09	263	111.33	263.6	112.26	264
113.53	264.62	114.42	265	115.72	265.64	116.58	266	118.27	266.94
118.46	267.05	120.08	268	120.95	268.48	121.94	269	123.91	270
140.62	271	142.76	272	144.78	272.95	147.15	274	148.52	274.69
149.01	274.89	149.27	275	152.13	276	158.98	276.67	162.09	277
190.09	277.86	191.24	277.89	195.93	277.97	197.27	277.99	203.77	277.9
211.94	277.76	216.11	277.63	222.31	277.5	225.32	277.42		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.03	24.36	.014	140.62	.045

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
47.15	123.91	207.75	221	238.12	.1	.3

CROSS SECTION

RIVER: 274
REACH: Main RS: 2555

INPUT
Description:

Station Elevation Data num= 78

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	275	2.51	275	4.38	274.33	7.07	273.46	8.34	273
8.83	272.83	11.45	272	13.51	271.35	14.53	271	30.07	270.39
39.05	270.09	41.93	270	45.8	269.36	46.69	269.22	47.19	269.1
47.36	269	47.67	268.81	49.19	268	50.46	267.24	50.93	267
51.43	266.74	52.66	266	53.08	265.78	54.5	265	54.99	264.73
56.64	264	57.32	263.64	58.73	263	59.98	262.43	60.87	262
61.72	261.57	63.01	261	63.95	260.52	65.17	260	66.17	259.48
67.29	259	69.6	258.08	70.1	257.92	72.96	257	76.51	256.59
85.63	256.37	89.76	256.17	97.5	256	113.87	256	120.01	256.23
130.11	257	130.46	257.16	132.37	258	133.12	258.34	134.59	259
135.72	259.52	136.81	260	138.32	260.68	139.05	261	140.24	261.53
141.32	262	141.92	262.28	143.35	263	144.53	263.66	146.38	264.69
146.92	265	147.66	265.42	149.4	266.39	150.36	267	151.66	267.65
152.29	268	152.87	268.32	154.12	269	155.83	269.79	156.19	270
156.5	270.15	158.11	271	159.13	271.45	160.19	272	161.35	272.52
162.3	273	168.01	273.85	168.45	273.89				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	14.53	.014	41.93	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
41.93	156.19	79.31	80	80.96	.1	.3

CROSS SECTION

RIVER: 274
REACH: Main RS: 2475

INPUT
Description:
Station Elevation Data num= 74

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	274	3.98	274	4.49	273.75	5.88	273	8.17	272.12
8.54	272	11.26	271.3	11.88	271.13	12.21	271	24.77	271
42.58	270.67	43.89	270.66	47.19	270.59	51.62	270.45	53.73	270.42
62.87	270	63.97	269.33	64.42	269	65.18	268.52	66.11	268
67.25	267.2	67.5	267	68.07	266.65	69.1	266	70.59	265
72.07	264	73.63	263.12	73.83	263	75.96	262	77.7	261.26
78.28	261	79.1	260.62	80.17	260.22	80.89	260	81.22	259.9
84.23	259	85.82	258.52	87.52	258	89.45	257.45	90.94	257
92.72	256.6	95.01	256	128.11	255.8	161.21	256	162.54	256.68
163.3	257	163.94	257.29	165.37	258	167.02	258.89	167.29	259
169.09	259.94	169.36	260.1	171.04	261	171.25	261.12	172.86	262
173.94	262.62	174.63	263	176.32	263.92	176.56	264.07	178.23	265
178.43	265.12	180.01	266	180.28	266.17	183.28	267.84	183.55	268
185.15	268.82	185.44	269	185.72	269.16	187.44	270	189.04	270.89
189.42	271.11	191.15	272	193.02	272.99	197.65	273.22		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	11.88	.014	62.87	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
62.87	187.44	125.2	126	129.34	.1	.3

CROSS SECTION

RIVER: 274
REACH: Main RS: 2349

INPUT
Description:
Station Elevation Data num= 90

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	271.96	2.54	272	5.55	272.62	7.41	273	8.7	273.27
10.91	273.71	12.13	273.95	14.55	274.49	16.94	275	35.84	275
37.4	274.12	37.61	274	37.97	273.78	39.31	273	40.88	272.06
41.09	271.93	42.66	271	43.24	270.64	44.33	270	45.06	269.54
45.97	269	46.77	268.51	47.6	268	48.19	267.66	49.45	267
50.93	266.27	51.39	266	52.33	265.48	53.37	265	53.92	264.75
55.66	264	56.43	263.66	58.16	263	59.76	262.32	60.51	262
62.25	261.22	62.79	261	63.63	260.62	65.97	259.57	66.22	259.46
66.86	259.2	67.39	259	67.7	258.89	71.39	258	73.76	257.48
75.9	257	80.1	256.14	80.82	256	82.19	255.91	89.89	255.47
93.05	255.27	111.61	255.38	118.18	255.47	129.37	255.78	133.55	255.88
135.65	255.93	138.64	256	140.01	256.06	145.89	256.39	154.99	256.87
156.38	257	157.17	257.24	159.27	258	161.03	258.81	161.48	259
162.28	259.38	163.92	260.15	165.77	261	167.05	261.68	167.72	262
169.02	262.66	169.76	263	170.99	263.65	171.69	264	173.55	264.95
173.76	265.06	175.61	266	176.39	266.4	177.52	267	178.55	267.54
179.44	268	180.73	268.66	181.39	269	183.31	270	185.24	271
186.63	271.73	187.15	272	188.37	272.64	189.06	273	193.17	273.2

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	39.31	.035	189.06	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
39.31	189.06	196.42	171	169.07	.1	.3

CROSS SECTION

RIVER: 274
REACH: Main RS: 2178

INPUT
Description:
Station Elevation Data num= 74

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	268.06	2.26	268	14.25	268	15.35	267.74	15.86	267.59
16.95	267.45	18.26	267	20.92	266.29	21.46	266.17	22.2	266
22.71	265.88	23.48	265.68	24.51	265.43	25.34	265.25	26.56	265
27.22	264.85	28.93	264.5	30.2	264.15	30.82	264	32.49	263.72
34.05	263.31	35.12	263.1	35.45	263	36.79	263	40.2	262.16
41.71	262	48.25	262	54.8	261	62.76	260	65.75	259.62
70.33	259	76.05	258.14	77.41	258	92.02	257.17	95.27	257
97.65	257	108.47	256.08	109.79	256	116.08	255.49	122.49	255
157.49	254.5	192.91	255	200.14	255.57	202.21	255.74	204.54	256
208.78	256.3	219.42	257	220.92	257.66	221.78	258	223.34	258.68
224.99	259.34	226.5	260	228.54	261.02	230.7	262	232.91	263
233.17	263.11	234.63	263.68	235.26	264	236.79	264.68	237.47	265
238.91	265.65	239.61	266	241.22	266.75	241.82	267	242.04	267.11
243.93	268	244.59	268.34	245.82	269	247.65	270	248.52	270.48
249.47	271	251.06	271.9	251.24	272	254.18	272.35		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.05	18.26	.035	241.82	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
18.26	241.82	153.31	164	183.78	.1	.3

CROSS SECTION

RIVER: 274
REACH: Main RS: 2014

INPUT
Description:
Station Elevation Data num= 75

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	268.05	1.2	268	3.15	267.28	3.8	267	4.6	266.7
6.43	266	8.36	265.27	9.08	265	10.66	264.4	11.75	264
12.14	263.87	14.49	263	17.57	262.04	20.49	261.13	20.91	261
21.87	260.75	24.6	260	28.83	259.6	35.33	259	39.22	258.74
52.44	258	58.28	257.64	63.45	257.25	66.91	257	73.67	256.5
80.18	256	86.45	255.71	100.67	255	102.97	254.68	107.64	254
110.19	253.77	112.34	253.61	115.5	253.33	121.1	253	162.63	253
170.09	253.57	174.5	254	182.22	254.69	185.47	255	213.54	255.55
234.13	255.86	238	255.91	242.51	256	245.29	256	247.18	256.05
248.79	256.1	256.79	256.36	266.59	256.65	276.49	257	277.93	257.27
280.75	257.48	282.17	257.62	284.49	257.77	286.45	258	287.63	258.59
288.5	259	288.95	259.21	290.56	260	291.44	260.44	293.43	261.41
294.52	261.91	296.64	262.95	298.72	263.97	300.78	264.97	302.85	265.98
305.19	266.98	307.77	268	310.32	269	311.15	269.33	314.39	270.6
315.4	271	317.98	272	324.93	272.84	326.35	273	328.63	273

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val

0	.035	80.18	.035	242.51	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
80.18	242.51	131.45	220	89.98	.1	.3

CROSS SECTION

RIVER: 274
REACH: Main RS: 1901

INPUT
Description:
Station Elevation Data num= 100

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	278	40.46	260	73	257.028	84.25	256	84.58	255.95
91.81	255	92.74	254.76	96.08	254	98.83	253.35	100.46	253
102.66	252.53	104.93	252	113.67	251.23	116.51	251	116.63	251
116.97	251	127.38	251	128.78	251	135.56	251	140.94	251.49
147.37	252	149.19	252.13	151.92	252.34	158.96	252.85	160	252.92
160.89	253	160.98	253	161.2	253	163.63	253.31	165.25	253.51
169.23	254	198.98	254.79	203.1	254.86	203.63	254.87	204.03	254.87
205.49	254.89	205.65	254.89	205.81	254.89	208.64	254.86	215.37	255
226.18	255	234.8	255.4	240.01	255.65	250.35	256	253.61	256.62
255.68	257	258.77	257.57	260.9	258	265.52	258.87	266.26	259
266.68	259	269.41	259	274.16	259	274.53	258.97	275.15	259
280.77	259	294.97	259	297.78	259	299.23	259	306.69	259.55
312.7	260	316.4	260.49	320.26	261	321.06	261	322.79	261
323.95	261	325.46	260.88	326.26	260.85	344.64	260	349.81	260
354.34	260	358.23	260	370.15	260.47	380.91	260.89	382.33	261
383.06	261.23	385.68	262	387.17	262.47	388.97	263	391.83	263.9
392.15	264	392.65	264.16	395.42	265	396.36	265.38	398.03	266
399.71	266.77	400.22	267	401.09	267.4	402.23	268	403.49	268.54
404.44	269	405.85	269.62	406.54	270	406.89	270.18	408.55	271
409.24	271.35	410.55	272	411.98	272.56	412.89	273	418.94	274.38

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.035	40.46	.05	73	.035	198.98	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
73	198.98	93.6	159.26	239.87	.1	.3

CROSS SECTION

RIVER: 274
REACH: Main RS: 1794

INPUT
Description:
Station Elevation Data num= 138

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	278	49.34	256	114.29	251	127.08	250.39	131.48	250.17
132.34	250.13	135	250	135.06	250	136.66	249.7	141.51	249
168.86	249	170.25	249	170.31	249	170.36	249	170.41	249
170.82	249.09	171.16	249.16	171.92	249.34	172.88	249.6	175.26	250
176.22	250.19	180.28	251	181.78	251.33	181.91	251.33	182.17	251.3
183.88	251.36	184.48	251.3	188.91	251	193.87	251	194.69	251
196.31	251	197.24	251	198.12	251	199.86	251.55	201.95	252
203.98	252.57	205.7	253	207.83	253.55	209.56	254	212.92	254.28
214.61	254.44	217.72	254.75	220.21	255	222.02	255.13	233.8	256
236.81	256.47	240.53	257	242.2	257.52	244.05	258	246.21	258.71
247.03	259	248.85	259.56	250.22	260	256.84	260	263.61	260
269.31	260	273.59	260	275.58	259.79	281	259	281.11	259
291.93	258.51	302.71	258	304.52	258	304.9	258	314.57	258
316.47	258	318.62	258	323.01	258	323.73	258	329.49	258
329.6	258	330.07	258	330.53	258	335.56	258	335.75	258
337.78	258	338.65	258	343.48	258	346.31	258	348.81	258
356.05	258	395.38	258	396.51	258	397.68	258	398.63	258
398.73	258	399.59	258	425.49	258	428.96	258	429.22	258
429.58	258	432.77	258	435.63	258	438.25	258	438.66	258
440.2	258	450.43	257.77	452.75	257.74	453.05	257.74	495.77	257.2
507.97	257	510.07	257	511.61	257	514.58	257	533.23	257
546.23	257	546.97	257.35	548.19	258	548.93	258.35	550.2	259
550.83	259.31	552.2	260	553.18	260.42	554.32	261	555.24	261.44
556.35	262	557.16	262.39	558.38	263	559.75	263.82	560.09	264
561.66	264	562.84	264	563.78	263.89	563.94	263.87	566.02	263.59
571.58	263.41	572.36	263.43	575.69	263.59	580.19	263.87	581.97	264
584.96	264.76	585.94	265	586.17	265.06	589.52	266	590.31	266.19
590.92	266.24	592.59	266.49	592.73	266.5				

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.035	49.34	.05	114.29	.035	193.87	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
114.29	193.87	150.84	149	144.98	.1	.3

CROSS SECTION

RIVER: 274
REACH: Main RS: 1645

INPUT
Description:
Station Elevation Data num= 103

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	279	15.34	279	52.2	278	87.11	262	88.09	261.58
89.35	261	90.77	260.33	91.49	260	93.17	259.25	93.72	259
95.67	258.14	95.97	258	96.61	257.7	97.78	257.2	98.28	257
98.67	256.84	100.76	256	101.33	255.75	103.28	255	104.28	254.52
105.21	254	106.24	253.46	107.16	253	108.14	252.48	109.1	252

110.42	251.37	111.12	251	112.52	250.31	113.12	250	114.87	249.21
115.26	249	115.61	248.16	115.75	248	115.87	247.85	116.26	247
152.05	247	152.58	247.36	153.68	248	154.7	248.59	155.32	249
156.11	249.53	156.97	250	158.08	250.72	158.59	251	161.59	251.91
162.92	252.12	167.14	252.58	170.88	253	174.25	253.18	186.29	253.79
190.69	254	202.83	254.41	208.06	254.57	211.4	254.69	222.41	255
226.3	255.27	233.04	255.93	236.22	256.36	240.26	257	243.84	257
245.92	257.08	259.83	257.1	260.89	257.09	267.36	257.06	273.4	257.01
276.43	257	281.19	256.77	295.55	256	303.64	256	306.57	256.57
307.36	256.71	309.26	257	422.66	257	445.26	256.34	456.19	256
486.56	255	500.26	255	526.95	254.74	533.47	255	537.73	255.26
539.06	255.32	540.6	255.37	543.68	255.53	549.76	255.72	552.13	255.75
553.67	255.72	557.92	255.87	559.74	256	564.57	256.49	567.89	257
572.38	257.66	574.65	258	576.02	258.41	578.32	259	580.31	259.48
582.44	260	586.1	261	586.44	261.11	589.23	262	589.85	262.19
591.96	263	593.64	263.34	597.77	263.8				

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.035	87.11	.05	103.28	.035	222.41	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
103.28	222.41	162.16	162	128.34	.1	.3

CROSS SECTION

RIVER: 274
REACH: Main RS: 1483

INPUT
Description:
Station Elevation Data num= 142

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	266.22	2.46	266	3.07	265.85	5.28	265.23	5.75	265.09
8.88	264.13	9.25	264	11.73	263.23	12.37	263	14.52	262.33
15.41	262	17.24	261.42	18.37	261	20.01	260.42	21.32	260
25.95	259.07	27.22	259	33.73	258.49	34.86	258.52	38.35	258.59
39.68	258.58	41.24	258.59	42.77	258.58	49.01	258.42	58.46	258
61.04	258	65.64	258.65	70.23	259	74.11	259	75.02	258.87
77.65	258.51	79.17	258.29	80.9	258	82.66	257.72	86.2	257
88.76	256.73	90.69	256.54	95.76	256	99.52	255.74	104.53	256
123.2	256	123.95	255.65	125.28	255	126.62	254.39	127.48	254
129.21	253.21	129.74	253	130.24	252.76	131.86	252	132.74	251.61
134.05	251	135.18	250.5	136.26	250	140.87	249.26	142.54	249
145.77	248.63	151.75	248	153.48	247.25	154.13	247	160.07	246.5
166	247	170.02	247.76	171.32	248	180.56	248	181.73	247.72
184.77	247	192.16	247	196.21	247.41	198	247.58	201.64	248
203.24	248.33	206.83	249	210.01	249.5	214.9	250	221.59	250.84
222.88	251	234.57	251	237.03	251.2	247.68	252	256.62	252.54
264.55	253	277.39	253.65	282.95	254	284.73	254.26	288.71	254.73
290.29	254.91	291.45	255	301.33	255	302.72	255.05	317.5	255.11

319.06	255	326.89	254.55	329.88	254.42	336.01	254.44	339.04	254.55
344.85	254.77	350.15	255	355.45	255.16	356.87	255.15	381.57	255.19
384.63	255.15	387.78	255.1	391.06	255.04	392.74	255	484.64	255
488.04	254.95	495.03	254.83	501.73	254.77	504.96	254.73	509.88	254.61
512.6	254.57	514.97	254.51	517.63	254.43	521.42	254.35	531.12	254
540.47	253.33	545.73	253	569.87	252.36	579.57	252.04	581.05	252
591.66	252	603.52	252.78	607.05	253	610.38	253.91	611.03	254.11
614.25	255	614.99	255.23	617.8	256	618.44	256.3	620.37	257
620.99	257.32	622.54	258	623.57	258.54	625.76	259.5	626.83	260
628.21	260.6	629.12	261	631.23	261.86	631.5	262	633.29	262.14
634.34	262.2	634.43	262.21						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.05	131.86	.035	247.68	.05

Bank Sta: Left	Right	Lengths: Left Channel		Right	Coeff Contr.	Expan.
131.86	247.68	295.87	281	185.97	.1	.3

CROSS SECTION

RIVER: 274
REACH: Main RS: 1202

INPUT
Description:
Station Elevation Data num= 117

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	260.76	2.61	260	3.57	259	4.02	258.49	4.46	258
4.94	257.47	5.35	257	5.85	256.45	6.24	256	6.8	255.33
7.13	255	7.87	254.18	8.03	254	8.74	253.21	8.92	253
9.15	252.74	9.82	252	10.07	251.71	10.72	251	11	250.64
11.64	250	12.5	249.66	13.98	249	15.31	248.5	16.45	248
17.9	247.41	19	247	19.9	246.67	21.49	246	22.52	245.64
24.04	245	27.16	244.37	28.63	244	33.08	243.36	34.96	243
36.77	242.07	45.76	242	55.45	241.8	65.13	242	67.34	242.89
67.65	243	68.01	243.11	70.13	244	71.07	244.45	72.24	245
73.19	245.53	74.4	246	76.01	246.79	76.61	247	77.56	247.28
79.04	248	80.49	248.56	81.26	249	82.33	249.53	83.5	250
86.7	250.6	88.63	251	91.91	251.61	95.21	252	100.43	252.22
109.58	252.51	124.71	252.64	125.88	252.62	127.22	252.61	129.27	252.59
131.1	252.58	132.99	252.53	141.65	252.41	168.31	252.81	172.59	252.9
176.7	253	180.82	253.13	182.5	253.15	186.99	253.28	198.15	253.54
199.83	253.54	203.65	253.61	221.32	253.54	228.07	253.33	229.88	253.32
238.19	253	240.72	252.86	257.98	252	260.15	251.91	261.19	251.89
262.41	251.87	274.39	251.46	287.09	251.26	293.24	251.12	297.56	251.07
298.67	251.05	300.57	251.05	302.55	251.04	304.58	251.07	305.74	251.1
331.74	251.24	333.47	251.21	335.29	251.23	337.41	251.3	338.89	251.32
341.18	251.42	347.68	251.78	350.9	252	359.27	252.74	362	253
367.25	253.92	369.4	254.44	371.54	255	375.27	.256	376.83	256.53
378.12	257	379.81	257.61	380.83	258	381.96	258.42	383.47	259

386.49 259.44 386.65 259.45

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.05	13.98	.035	81.26	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
13.98	81.26	114.83	124	121.83	.1	.3

CROSS SECTION

RIVER: 274
REACH: Main RS: 1078

INPUT
Description:
Station Elevation Data num= 88

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
4.43	257.82	4.62	257.64	5.25	257.02	7.27	255	7.82	254.45
8.22	254.03	8.53	253.74	9.3	253	10.27	252.06	10.56	251.8
11.3	251	12.28	250.11	12.4	250	12.54	249.9	13.72	249
14.9	248.13	15.09	248	16.34	247.08	17.77	246.02	18.83	245
20.87	244.57	23.67	244	26.39	243.42	28.61	243	30.35	242.7
33.48	242	46.85	241.4	60.22	242	63.32	243	64.39	243.35
66.41	244	69.02	244.82	69.7	245	70.09	245.18	71.56	246
72.63	246.57	73.47	247	74.83	247.5	76	247.91	76.54	248.07
79.23	249	93.2	249.93	96.31	250.11	113.48	251	122.41	251.31
123.53	251.35	144.97	251.45	150.72	251.68	152.11	251.61	157.29	252
162.66	252	163.94	251.86	165.77	251.92	175.17	251.67	177.09	251.64
193.62	251.75	196.31	252	235.42	252	240.76	251.64	242.26	251.52
244.02	251.44	246.62	251.24	247.75	251.17	250.3	251	291.84	251
296.33	251.35	298.05	251.47	301.1	251.72	304.27	252	305.43	252.2
310.11	253	312	253.44	313.73	254	316.44	254.9	316.75	255
317.1	255.13	319.62	256	321.06	256.51	322.36	257	323.66	257.47
325.04	258	326.24	258.44	327.72	259	331.25	259.3	336.82	260
339.42	260	349.85	260.44	351.99	260.47				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
4.43	.05	13.72	.035	79.23	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
13.72	79.23	0	0	0	.1	.3

SUMMARY OF MANNING'S N VALUES

River:274

Reach	River Sta.	n1	n2	n3	n4

Main	3021	.014	.014	.014	
Main	2776	.03	.014	.045	
Main	2555	.035	.014	.035	
Main	2475	.035	.014	.035	
Main	2349	.035	.035	.035	
Main	2178	.05	.035	.035	
Main	2014	.035	.035	.035	
Main	1901	.035	.05	.035	.035
Main	1794	.035	.05	.035	.05
Main	1645	.035	.05	.035	.05
Main	1483	.05	.035	.05	
Main	1202	.05	.035	.05	
Main	1078	.05	.035	.05	

SUMMARY OF REACH LENGTHS

River: 274

Reach	River Sta.	Left	Channel	Right
Main	3021	249.88	245	239.94
Main	2776	207.75	221	238.12
Main	2555	79.31	80	80.96
Main	2475	125.2	126	129.34
Main	2349	196.42	171	169.07
Main	2178	153.31	164	183.78
Main	2014	131.45	220	89.98
Main	1901	93.6	159.26	239.87
Main	1794	150.84	149	144.98
Main	1645	162.16	162	128.34
Main	1483	295.87	281	185.97
Main	1202	114.83	124	121.83
Main	1078	0	0	0

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: 274

Reach	River Sta.	Contr.	Expan.
Main	3021	.1	.3
Main	2776	.1	.3
Main	2555	.1	.3
Main	2475	.1	.3
Main	2349	.1	.3

Main	2178	.1	.3
Main	2014	.1	.3
Main	1901	.1	.3
Main	1794	.1	.3
Main	1645	.1	.3
Main	1483	.1	.3
Main	1202	.1	.3
Main	1078	.1	.3

Profile Output Table - Standard Table 1

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Cl
Main	3021	PF 1	6050.00	258.00	268.26		270.69	0.001118	12.52	483.25	68.42	0.1
Main	3021	PF 2	9040.00	258.00	270.46		273.52	0.001104	14.05	645.17	81.15	0.1
Main	2776	PF 1	6050.00	258.00	267.04	267.04	270.28	0.001686	14.45	418.55	65.35	1.(
Main	2776	PF 2	9040.00	258.00	269.23	269.23	273.12	0.001585	15.83	570.97	73.70	1.(
Main	2555	PF 1	6050.00	256.00	262.82	262.82	265.56	0.010701	13.30	455.04	83.87	1.(
Main	2555	PF 2	9040.00	256.00	264.62	264.62	268.00	0.009986	14.76	612.51	91.02	1.(
Main	2475	PF 1	6050.00	255.80	263.04		264.59	0.005292	10.00	605.04	100.93	0.'
Main	2475	PF 2	9040.00	255.80	264.57		266.74	0.005869	11.84	763.63	106.22	0.'
Main	2349	PF 1	6050.00	255.27	261.22	261.22	263.58	0.010905	12.34	490.41	103.92	1.(
Main	2349	PF 2	9040.00	255.27	262.75	262.75	265.71	0.010167	13.81	654.37	110.45	1.(
Main	2178	PF 1	6050.00	254.50	259.44	259.44	261.24	0.011958	10.77	561.71	158.17	1.(
Main	2178	PF 2	9040.00	254.50	260.60	260.60	262.85	0.011131	12.03	751.68	169.74	1.(
Main	2014	PF 1	6050.00	253.00	259.25		259.91	0.003186	6.82	968.39	256.36	0.!
Main	2014	PF 2	9040.00	253.00	260.52		261.34	0.002899	7.61	1305.64	268.92	0.'
Main	1901	PF 1	6050.00	251.00	257.80		258.98	0.006095	9.09	719.81	195.43	0.'
Main	1901	PF 2	9040.00	251.00	258.86		260.44	0.006292	10.60	934.13	212.45	0.'
Main	1794	PF 1	6050.00	249.00	257.57		258.30	0.002155	7.63	1062.22	277.08	0.'
Main	1794	PF 2	9040.00	249.00	258.61		259.62	0.002671	9.25	1468.04	462.23	0.'
Main	1645	PF 1	6050.00	247.00	255.81	255.81	257.61	0.009065	10.88	607.95	224.69	0.'
Main	1645	PF 2	9040.00	247.00	257.82		259.08	0.004487	9.76	1318.99	477.06	0.(
Main	1483	PF 1	6050.00	246.50	253.86		255.34	0.006809	10.04	696.98	230.03	0.'
Main	1483	PF 2	9040.00	246.50	258.24		258.54	0.000813	5.31	2685.19	553.29	0.
Main	1202	PF 1	6050.00	241.80	252.83		254.14	0.002814	9.46	812.68	279.09	0.'
Main	1202	PF 2	9040.00	241.80	258.07		258.38	0.000527	5.57	2694.39	376.62	0.
Main	1078	PF 1	6050.00	241.40	252.44	250.13	253.78	0.003000	9.65	840.18	296.93	0.

Main	1078	PF 2	9040.00	241.40	258.00	253.20	258.32	0.000525	5.59	2565.23	320.61	0.7

Profile Output Table - Standard Table 2

Reach	River Sta	Profile	E.G. Elev (ft)	W.S. Elev (ft)	Vel Head (ft)	Frctn Loss (ft)	C & E Loss (ft)	Q Left (cfs)	Q Channel (cfs)	Q Right (cfs)	Top Width (ft)
Main	3021	PF 1	270.69	268.26	2.43	0.33	0.08		6050.00		68.42
Main	3021	PF 2	273.52	270.46	3.06	0.32	0.08	2.88	9036.94	0.18	81.15
Main	2776	PF 1	270.28	267.04	3.24	0.76	0.15		6050.00		65.35
Main	2776	PF 2	273.12	269.23	3.89	0.72	0.15		9040.00		73.70
Main	2555	PF 1	265.56	262.82	2.74	0.58	0.36		6050.00		83.87
Main	2555	PF 2	268.00	264.62	3.38	0.60	0.36		9040.00		91.02
Main	2475	PF 1	264.59	263.04	1.55	0.93	0.08		6050.00		100.93
Main	2475	PF 2	266.74	264.57	2.18	0.96	0.08		9040.00		106.22
Main	2349	PF 1	263.58	261.22	2.36	1.95	0.17		6050.00		103.92
Main	2349	PF 2	265.71	262.75	2.96	1.82	0.22		9040.00		110.45
Main	2178	PF 1	261.24	259.44	1.80	0.91	0.34		6050.00		158.17
Main	2178	PF 2	262.85	260.60	2.25	0.84	0.43		9040.00		169.74
Main	2014	PF 1	259.91	259.25	0.66	0.88	0.05	241.81	5315.95	492.24	256.36
Main	2014	PF 2	261.34	260.52	0.81	0.82	0.08	600.59	7515.24	924.17	268.92
Main	1901	PF 1	258.98	257.80	1.18	0.55	0.13	4.06	5224.12	821.82	195.43
Main	1901	PF 2	260.44	258.86	1.58	0.65	0.17	40.48	7498.45	1501.07	212.45
Main	1794	PF 1	258.30	257.57	0.73	0.58	0.11	930.61	4638.55	480.85	277.08
Main	1794	PF 2	259.62	258.61	1.01	0.51	0.03	1529.83	6395.89	1114.28	462.23
Main	1645	PF 1	257.61	255.81	1.80	1.26	0.10	1.26	5919.96	128.78	224.69
Main	1645	PF 2	259.08	257.82	1.27	0.25	0.29	23.92	7647.53	1368.55	477.06
Main	1483	PF 1	255.34	253.86	1.48	1.15	0.05	8.16	5706.36	335.48	230.03
Main	1483	PF 2	258.54	258.24	0.30	0.16	0.00	174.97	5713.83	3151.19	553.29
Main	1202	PF 1	254.14	252.83	1.31	0.36	0.00	26.66	5697.34	326.00	279.09
Main	1202	PF 2	258.38	258.07	0.31	0.06	0.00	80.56	5316.17	3643.27	376.62
Main	1078	PF 1	253.78	252.44	1.34			13.91	5592.20	443.89	296.93
Main	1078	PF 2	258.32	258.00	0.32			67.65	5275.50	3696.85	320.61

ERRORS WARNINGS AND NOTES

Errors Warnings and Notes for Plan : Project

River: 274 Reach: Main RS: 3021 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: 274 Reach: Main RS: 3021 Profile: PF 2
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.
River: 274 Reach: Main RS: 2776 Profile: PF 1
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
River: 274 Reach: Main RS: 2776 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 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: 274 Reach: Main RS: 2555 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: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: 274 Reach: Main RS: 2555 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 energy loss was 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: 274 Reach: Main RS: 2475 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: 274 Reach: Main RS: 2475 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.
River: 274 Reach: Main RS: 2349 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 energy loss was 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: 274 Reach: Main RS: 2349 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 energy loss was 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: 274 Reach: Main RS: 2178 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: 274 Reach: Main RS: 2178 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: 274 Reach: Main RS: 2014 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: 274 Reach: Main RS: 2014 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: 274 Reach: Main RS: 1901 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: 274 Reach: Main RS: 1901 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.

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     Warning:The conveyance ratio (upstream 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: 274  Reach: Main      RS: 1794      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.
River: 274  Reach: Main      RS: 1794      Profile: PF 2
     Warning:Divided flow computed for this cross-section.
River: 274  Reach: Main      RS: 1645      Profile: PF 1
     Warning:The energy equation could not be balanced within the specified number of iterations.  The program used critical depth
             for the water surface and continued on with the calculations.
     Warning:Divided flow computed for this cross-section.
     Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
             the need for additional cross sections.
     Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
             water surface came back below critical depth.  This indicates that there is not a valid subcritical answer.  The
             program defaulted to critical depth.
River: 274  Reach: Main      RS: 1645      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: 274  Reach: Main      RS: 1483      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.
River: 274  Reach: Main      RS: 1483      Profile: PF 2
     Warning:Divided flow computed for this cross-section.
River: 274  Reach: Main      RS: 1202      Profile: PF 1
     Warning:Divided flow computed for this cross-section.
```