REPORT

GREGORY CANYON LANDFILL
WETLANDS RESTORATION

PREPARED FOR:

GREGORY CANYON LIMITED

URS PROJECT NO. 27654025.00020

AUGUST 26, 2008

D R A I N A G E R E P O R T

GREGORY CANYON LANDFILL WETLANDS RESTORATION

Prepared for

Gregory Canyon Limited
3 Embarkadero Center, Suite 2360
San Francisco, CA 94111

Matthew C. Moore

Matthew C. Moore, RCE 56780

August 26, 2008

URS

1615 Murray Canyon Road, Suite 1000
San Diego, CA 92108-4314
619.294.9400 Fax: 619.293.7920

TABLE OF CONTENTS

Section 1 Introduction 1-1

1.1 Background 1-1

Section 2 Project Site Conditions 2-1

2.1 Existing Conditions 2-1
2.2 Proposed Conditions 2-1

Section 3 Hydrology 3-1

3.1 Hydrology Methodology and Criteria 3-1
3.2 Hydrology Results 3-3

Section 4 Hydraulics 4-1

4.1 Hydraulic Methodology and Criteria 4-1
4.2 Hydraulic Results 4-2

Section 5 Conclusions 5-1

Section 6 References 6-1

Figures

Figure 1 Vicinity Map
Figure 2 Hydrology Map
Figure 3 HEC-RAS Sections Map

Appendices

Appendix A Hydrology Calculations
Appendix B Hydraulic Calculations
Appendix C Rip-rap Calculations
Appendix D County HEC-2 Model

cfs	cubic feet per second
EIR	Environmental Impact Report
ft/s	feet per second
GCLWR	Gregory Canyon Landfill Wetlands Restoration
HEC-2	Nolte HEC-2
HEC-RAS	Hydrologic Engineering Center's River Analysis System
I-15	Interstate 15
Tc	Time of Concentration
Ti	initial time of concentration
Tt	travel time

SECTION 1 INTRODUCTION

1.1 BACKGROUND

The Gregory Canyon Landfill Wetlands Restoration (GCLWR) project is the first phase of the construction of the Gregory Canyon Landfill. Due to the environmental requirements in the Environmental Impact Report (EIR), vegetative clearing work in the San Luis Rey River is limited to the months of October through December. To maintain the schedule on the overall Landfill project, the grubbing of the San Luis Rey River at the location of the proposed Gregory Canyon Landfill Bridge and the associated wetlands restoration due to this disturbance will be completed with this project.

The Project is located in north central part of San Diego County near the community of Pala. The GCLWR is north of the community of Valley Center, east of Fallbrook and Interstate 15 (I-15) and west of the community of Pala and the Pala Indian Reservation. It lies approximately 25 miles east of the Pacific Ocean, about three miles east of I-15, and about five miles south of the northern County boundary. The project area is on the south side of Highway 76/Pala Road.

Approximately one acre of the San Luis Rey riverbed will be disturbed by the grubbing operation of cutting vegetation down to its roots. Once bridge construction is complete, this area will grow back to its natural state. The wetlands restoration is approximately 2.3 acres of land to the west of the future bridge. The restoration area is graded to approximately match the conditions of this area in the 1930s. The grading design in this area is minimal and the intention is to allow this area to return back to its natural condition.

SECTION 2 PROJECT SITE CONDITIONS

2.1 EXISTING CONDITIONS

The project site is in a portion of the San Luis Rey riverbed and is part of a vacant dairy operation. The west portion of the site is part of the vacant dairy and is approximately 5 to 7 feet above the river. The dairy fields are overgrown grass area and are graded towards the river so all storm water runoff from this area reaches the river. The San Luis Rey River flows to the southwest in this area and towards Interstate 15.

2.2 PROPOSED CONDITIONS

In the proposed conditions, an approximately one acre swath of land in the San Luis Rey River will be grubbed and allowed to grow back to its natural state once the construction of the bridge is complete. The area to the west of the future bridge is to be graded to widen this section of the river to match conditions in the 1930s. This area will be graded as a wetlands area to encourage native vegetation and create a conducive environment for the native animal species. The vacant dairy area will continue to drain towards the river and the drainage patterns will change slightly based on the wetlands design.

SECTION 3 HYDROLOGY

3.1 HYDROLOGY METHODOLOGY AND CRITERIA

3.1.1 San Luis Rey River

There are no changes to the percent impervious of the project area with the construction of this project. Since there are no changes to the impervious area, the storm water flows used for the San Luis Rey River analysis will be based on the information from the County of San Diego's "Equilibrium Invert" HEC-2 model dated February 5, 1996. See Appendix D for County model. According to the County model, the San Luis Rey River flow is 30,000 cubic feet per second (cfs) for the 100-year storm event.

3.1.2 Wetlands Restoration Area

Design of the proposed storm water runoff is based upon the methodology presented in the following documents:

- San Diego County Hydrology Manual (2003).
- San Diego County Drainage Design Manual (2005).

These documents provide the minimum guidelines for storm frequency, runoff coefficients, time of concentration, and other factors affecting local drainage. The following criteria were used in the analysis of the proposed wetlands drainage facilities:

- Runoff Discharges: 100-year design discharge, which was calculated using the Rational Method calculations per San Diego County Criteria for Rainfall Intensity;
- Time of concentration (Tc): 5 minute minimum;
- Runoff coefficient: 0.40 for vacant land;
- 100-year, 6-hour storm Rainfall = 3.5 inches; and
- 100-year Rainfall Intensity = 9.3 in/hr.

The Rational Method was used for this analysis for the run-on from the drainage area for the wetlands restoration area. A portion of the old dairy farm area is graded towards the wetlands restoration area. This area is assumed to be mostly flat and currently consists of abandoned fields. The runoff will be overland flow and intended to sheet flow over the slopes as it would in a natural condition.

The Rational Method estimates the peak rate of runoff at any location in a watershed as a function of the drainage area, runoff coefficient, and rainfall intensity for duration equal to the time of concentration, which is the time required for water to flow from the most remote point of the basin to the location being analyzed. The Rational Method formula is expressed as follows (San Diego County Hydrology Manual, June 2003):

$$Q=CIA$$

Q = peak discharge, in cubic feet per second (cfs)

C = runoff coefficient, proportion of the rainfall that runs off the surface

I = average rainfall intensity for a duration equal to the Tc for the area, in inches per hour (Note: If the computed Tc is less than 5 minutes, use 5 minutes for computing the peak discharge, Q)

A = Drainage area contributing to the design location, in acres

The Rational Method formula is based on the assumption that for constant rainfall intensity, the peak discharge rate at a point will occur when the raindrop that falls at the most upstream point in the tributary drainage basin arrives at the point of interest.

The runoff coefficients are based on land use and soil type. An appropriate runoff coefficient for the land use was selected for the overall area to be 0.40 for the former dairy field areas.

The rainfall intensity is the rainfall in inches per hour for a duration equal to the Tc for a selected storm frequency. Once a particular storm frequency has been selected for design and a Tc calculated for the drainage area, the rainfall intensity can be calculated using the following equation:

$$I = 7.44P_6D^{-0.645}$$

P_6 = Adjusted 6-hour storm rainfall amount

D = Duration in minutes (use Tc)

The Time of Concentration (Tc) is the time required for runoff to flow from the most remote part of the drainage area to the point of interest. The Tc is composed of two components: initial time of concentration (Ti) and travel time (Tt). The Ti is the time required for runoff to travel across the surface of the most remote subarea in the study. The Tt is the time required for the runoff to flow in a watercourse or series of watercourses from the initial subarea to the point of interest.

The initial time of concentration is typically based on sheet flow at the upstream end of a drainage basin. This type of flow is uniform in the direction perpendicular to the velocity and is very shallow. Since these depths are ¼ of an inch (more or less) in magnitude, the relative roughness is high.

3.2 HYDROLOGY RESULTS

The hydrology map is provided in Appendix A with the hydrology calculations. The results of the analysis indicate the 100-year discharge to the wetlands restoration area from the old dairy area is 9.3 cfs.

SECTION 4 HYDRAULICS

4.1 HYDRAULIC METHODOLOGY AND CRITERIA

4.1.1 Background

Previous hydrology and hydraulic reports for this section of the San Luis Rey River and this project were completed in the EIR process.

The above report relied upon hydrologic calculations provided in the following report:

- "Hydraulic/Hyrology Report for the Gregory Canyon Road Improvement Project, Final Report," by Nolte & Associates, November 1999.

Since the same topography is being used from the above referenced Nolte report, the Nolte HEC-2 (HEC-2) existing conditions will be considered the existing information for this report. The proposed wetlands grading has changed since the Nolte report however, it is still expected that the changes proposed in the grading will have little impact on the San Luis Rey River flood elevations and velocities.

4.1.2 Hydraulic Modeling

Hydrologic Engineering Center's River Analysis System (HEC-RAS) is designed to perform one-dimensional hydraulic calculations for a full network of natural and constructed channels. HEC-RAS is an integrated system of software, designed for interactive use in a multi-tasking, multi-user network environment. The purpose of this analysis is to check for changes to the velocities in the San Luis Rey River due to the proposed grading. The amount of flow in the river will remain unchanged since the project does not propose any changes to the amount of impervious area.

The existing HEC-RAS model presented in this report is based on the HEC-2 model prepared by Nolte and Associates for the EIR in November 1999. The Nolte HEC-2 model used a County of San Diego HEC-2 model (Appendix D) for the San Luis Rey River and updated it with more recent topographical information in the area of the project. The Nolte HEC-2 information was imported into the HEC-RAS program to create our existing condition model.

The proposed conditions HEC-RAS model is a copy of the existing conditions with the new grading information added to the relevant cross-sections. See Exhibit 3 for the HEC-RAS Cross-section Map.

Both existing and proposed conditions are run with the 100-year Q for the San Luis Rey River. No changes in the runoff will be created with this project therefore the Q will not change in the proposed model.

4.2 HYDRAULIC RESULTS

The hydraulic model output is provided in Appendix B. The results show that for the San Luis Rey River, the water surface will decrease a maximum of 0.6 feet during the 100-year storm event with the proposed changes. The velocities during the 100-year storm will increase a maximum of 1 feet per second (ft/s) and the maximum velocity in the restoration area will be 7 ft/sec. While the velocity increased in a few locations, the velocities are not considered erosive to established natural vegetation. To protect the future bridge crossing, rip-rap will be installed along the slope where the bridge will be built. See Appendix C for rip-rap calculations.

SECTION 5 CONCLUSIONS

The intention of this project is to prepare the mitigation area for the future construction of the Gregory Canyon Landfill and to create the wetlands associated with the future construction of the bridge. The wetlands are designed so the area will be restored back to a historical river bank alignment and the river will be allowed to naturally migrate. There is no change in impervious area with the construction of the wetlands, therefore there are no changes to the hydrology of the project site or the river. The HEC-RAS analysis shows a small decrease in the water surface elevation along the river with this project. There was a small increase in the velocities in the river and the maximum velocity in the project area is 7 ft/s. The creation of the wetlands area will not have a negative impact on the hydrologic or hydraulic conditions of this area.

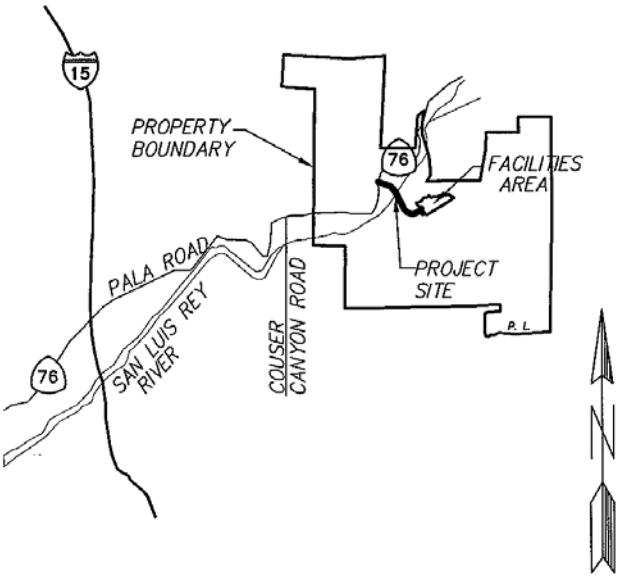
SECTION 6 REFERENCES

Nolte and Associates, " Hydraulic/Hydrology Report for the Gregory Canyon Road Improvement Project, Final Report," November 1999.

San Diego County Hydrology Manual (2003).

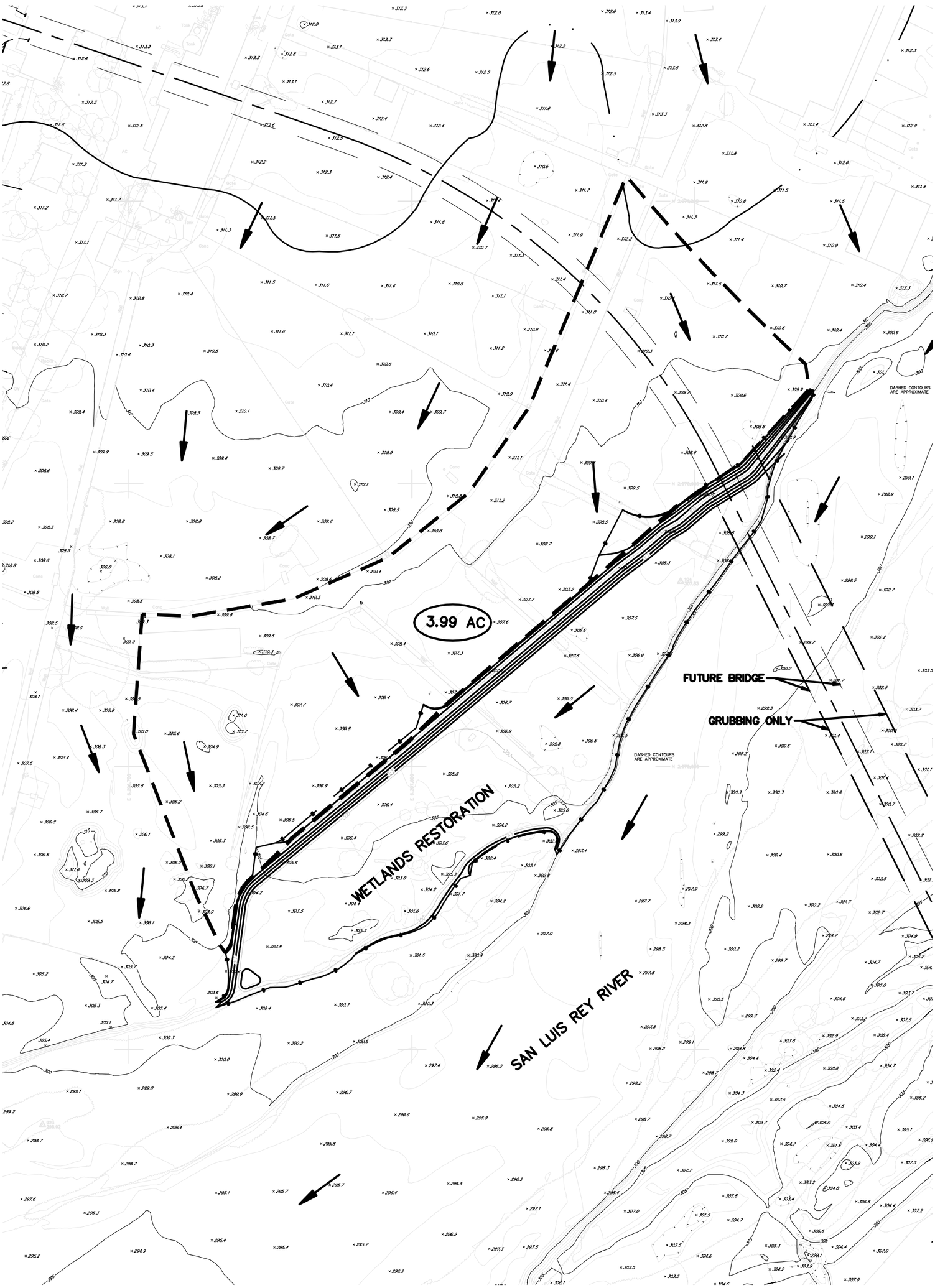
San Diego County Drainage Design Manual (2005).

Figure 1
Vicinity Map



VICINITY MAP

NO SCALE



LEGEND

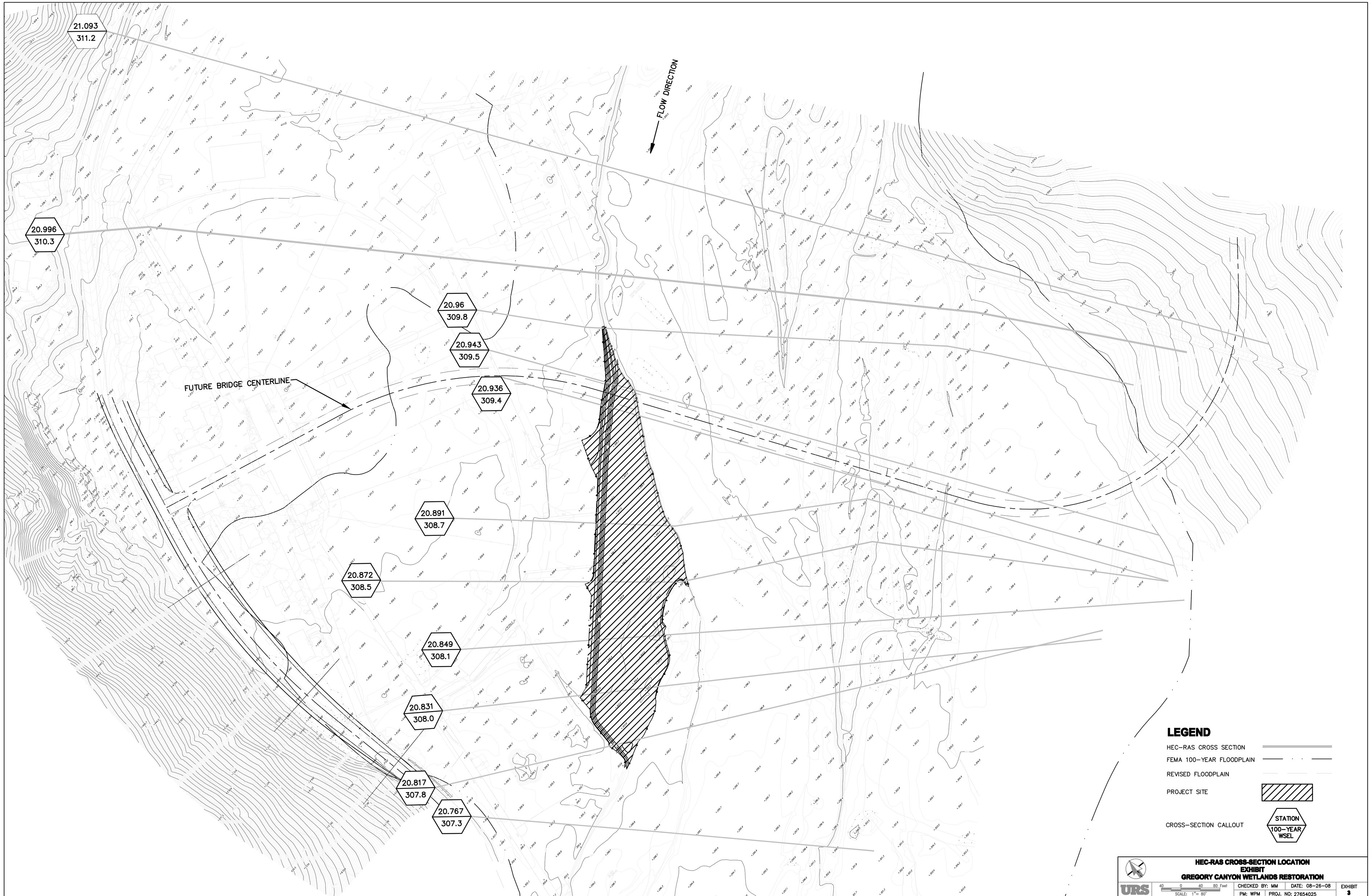
DRAINAGE BOUNDARY

GREGORY CANYON WETLANDS RESTORATION
DRAINAGE EXHIBIT

URS

50' 0 50' 100'
SCALE

CHECKED BY: CKD	DATE: 9-29-08	FIG. NO: 2
PM: MM	PROJ. NO: 27654025	



HEC-RAS CROSS-SECTION LOCATION
EXHIBIT
GREGORY CANYON WETLANDS RESTORATION

J:\27654025 Gregory Canyon LF 404\046 Work in Progress\Wetlands Grading Plans\Water Resources\Drainage Report\Exhibits\HEC-RAS Sections Exh.dwg Nov 02, 2009 - 1:30pm

Subject Gregory Canyon - Dairy Drainage Area

Project No. 27654025

By NR

Checked By Matt Moore

Task No.

File No.

Date 7/29/08

Date 8/26/08

Sheet 1 of 2

Per table 3-1, County of SD Drn Manual

Soil Type: C, land use = Rural $C = 0.30$

Area = 4.0 ac

Per Fig. 3-2, $I = 9.3$ in/hr

$$Q = CIA = 0.30(9.3\text{ in/hr})(4.0\text{ ac})$$
$$= 11.2\text{ cfs}$$

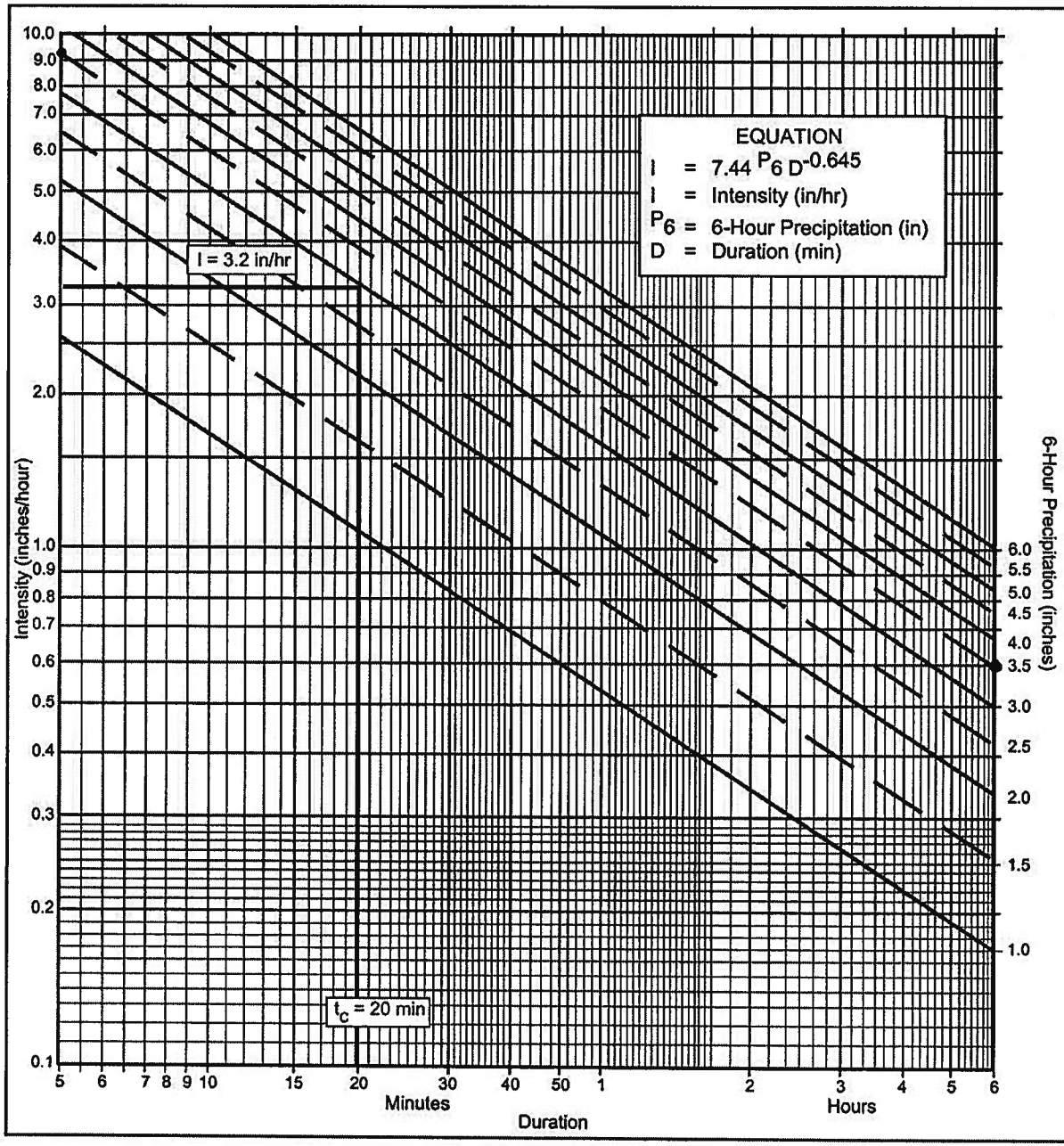
Used minimum T_c, $T_c = 5$ min

URS

Table 3-1
RUNOFF COEFFICIENTS FOR URBAN AREAS

Land Use			Runoff Coefficient "C"			
			Soil Type			
NRCS Elements	County Elements	% IMPER.	A	B	C	D
Undisturbed Natural Terrain (Natural)	Permanent Open Space	0*	0.20	0.25	0.30	0.35
Low Density Residential (LDR)	Residential, 1.0 DU/A or less	10	0.27	0.32	0.36	0.41
Low Density Residential (LDR)	Residential, 2.0 DU/A or less	20	0.34	0.38	0.42	0.46
Low Density Residential (LDR)	Residential, 2.9 DU/A or less	25	0.38	0.41	0.45	0.49
Medium Density Residential (MDR)	Residential, 4.3 DU/A or less	30	0.41	0.45	0.48	0.52
Medium Density Residential (MDR)	Residential, 7.3 DU/A or less	40	0.48	0.51	0.54	0.57
Medium Density Residential (MDR)	Residential, 10.9 DU/A or less	45	0.52	0.54	0.57	0.60
Medium Density Residential (MDR)	Residential, 14.5 DU/A or less	50	0.55	0.58	0.60	0.63
High Density Residential (HDR)	Residential, 24.0 DU/A or less	65	0.66	0.67	0.69	0.71
High Density Residential (HDR)	Residential, 43.0 DU/A or less	80	0.76	0.77	0.78	0.79
Commercial/Industrial (N. Com)	Neighborhood Commercial	80	0.76	0.77	0.78	0.79
Commercial/Industrial (G. Com)	General Commercial	85	0.80	0.80	0.81	0.82
Commercial/Industrial (O.P. Com)	Office Professional/Commercial	90	0.83	0.84	0.84	0.85
Commercial/Industrial (Limited I.)	Limited Industrial	90	0.83	0.84	0.84	0.85
Commercial/Industrial (General I.)	General Industrial	95	0.87	0.87	0.87	0.87

*The values associated with 0% impervious may be used for direct calculation of the runoff coefficient as described in Section 3.1.2 (representing the pervious runoff coefficient, Cp, for the soil type), or for areas that will remain undisturbed in perpetuity. Justification must be given that the area will remain natural forever (e.g., the area is located in Cleveland National Forest).
DU/A = dwelling units per acre
NRCS = National Resources Conservation Service



Directions for Application:

(1) From precipitation maps determine 6 hr and 24 hr amounts for the selected frequency. These maps are included in the County Hydrology Manual (10, 50, and 100 yr maps included in the Design and Procedure Manual).

(2) Adjust 6 hr precipitation (if necessary) so that it is within the range of 45% to 65% of the 24 hr precipitation (not applicaple to Desert).

(3) Plot 6 hr precipitation on the right side of the chart.

(4) Draw a line through the point parallel to the plotted lines.

(5) This line is the intensity-duration curve for the location being analyzed.

Application Form:

(a) Selected frequency 100 year

(b) P_6 = 3.5 in., P_{24} = 6.0, $\frac{P_6}{P_{24}}$ = 0.58 %(2)

(c) Adjusted P_6(2) = ___ in.

(d) t_x = 5 min.

(e) I = 9.3 in./hr.

Note: This chart replaces the Intensity-Duration-Frequency curves used since 1965.

P6	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6
Duration	I	I	I	I	I	I	I	I	I	I	I
5	2.63	3.95	5.27	6.59	7.90	9.22	10.54	11.86	13.17	14.49	15.81
7	2.12	3.18	4.24	5.30	6.36	7.42	8.48	9.54	10.60	11.66	12.72
10	1.68	2.53	3.37	4.21	5.05	5.90	6.74	7.58	8.42	9.27	10.11
15	1.30	1.95	2.59	3.24	3.89	4.54	5.19	5.84	6.49	7.13	7.78
20	1.08	1.62	2.15	2.69	3.23	3.77	4.31	4.85	5.39	5.93	6.46
25	0.93	1.40	1.87	2.33	2.80	3.27	3.73	4.20	4.67	5.13	5.60
30	0.83	1.24	1.66	2.07	2.49	2.90	3.32	3.73	4.15	4.56	4.98
40	0.69	1.03	1.38	1.72	2.07	2.41	2.76	3.10	3.45	3.79	4.13
50	0.60	0.90	1.19	1.49	1.79	2.09	2.39	2.69	2.98	3.28	3.58
60	0.53	0.80	1.06	1.33	1.59	1.86	2.12	2.39	2.65	2.92	3.18
90	0.41	0.61	0.82	1.02	1.23	1.43	1.63	1.84	2.04	2.25	2.45
120	0.34	0.51	0.68	0.85	1.02	1.19	1.36	1.53	1.70	1.87	2.04
150	0.29	0.44	0.59	0.73	0.88	1.03	1.18	1.32	1.47	1.62	1.76
180	0.26	0.39	0.52	0.65	0.78	0.91	1.04	1.18	1.31	1.44	1.57
240	0.22	0.33	0.43	0.54	0.65	0.76	0.87	0.98	1.08	1.19	1.30
300	0.19	0.28	0.38	0.47	0.56	0.66	0.75	0.85	0.94	1.03	1.13
360	0.17	0.25	0.33	0.42	0.50	0.58	0.67	0.75	0.84	0.92	1.00

Intensity-Duration Design Chart - Example

FIGURE

3-2

HEC-RAS Plan: Depth, Velocity, and Shear at the Bridge

River	River Sta	Profile	Q Total (cfs)	Max Channel De (ft)	Velocity Channel (ft/s)	Velocity Total (ft/s)	Shear Channel (lb/sq ft)	Shear Total (lb/sq ft)
San Luis Rey	20.943	2-yr	800	2.58	2.04	1.94	0.24	0.2
San Luis Rey	20.943	5-yr	2000	3.64	2.69	2.56	0.38	0.31
San Luis Rey	20.943	10-yr	4000	4.82	3.35	3.18	0.51	0.41
San Luis Rey	20.943	50-yr	18000	9.31	5.19	4.53	0.95	0.43
San Luis Rey	20.943	100-yr	30000	11.07	6.24	4.94	1.28	0.59

Notes:

1. Cross sections 20.943 and 20.936 bound the proposed bridge location.
2. Hydraulic parameters are based upon existing conditions topography (without proposed bridge).
3. Discharge, Q (in cubic feet per second [cfs]) for 10, 50, 100-year is from the FEMA Flood Insurance Study for San Diego County (2006).
4. Discharge, Q for 2 and 5 year storms was extrapolated using log-log plot of the FEMA FIS discharges.

SAN LUIS REY RIVER - GREGORY CANYON - PROPOSED BRIDGE

River Sta	Profile	Q Total (cfs)	Existing Flow Depth (ft)	Existing Channel Velocity (ft/s)	Existing Channel Shear Stress (lb/sq ft)		Proposed Flow Depth (ft)	Proposed Channel Velocity (ft/s)	Proposed Channel Shear Stress (lb/sq ft)
20.655	2-yr	800	2.13	1.95	0.28		2.13	1.95	0.28
20.655	5-yr	2000	2.83	2.62	0.43		2.83	2.62	0.43
20.655	10-yr	4000	3.58	3.27	0.61		3.58	3.27	0.61
20.655	50-yr	18000	6.16	5.44	1.3		6.16	5.44	1.3
20.655	100-yr	30000	7.6	6.46	1.68		7.6	6.46	1.68
20.767	2-yr	800	4.34	0.66	0.02		4.34	0.66	0.02
20.767	5-yr	2000	5.27	1.28	0.07		5.27	1.28	0.07
20.767	10-yr	4000	6.29	2	0.16		6.29	2	0.16
20.767	50-yr	18000	9.68	4.81	0.78		9.68	4.81	0.78
20.767	100-yr	30000	11.38	6.31	1.26		11.38	6.31	1.26
20.817	2-yr	800	3.36	0.81	0.03		3.36	0.75	0.03
20.817	5-yr	2000	4.34	1.48	0.1		4.34	1.34	0.08
20.817	10-yr	4000	5.42	2.25	0.21		5.42	2.02	0.17
20.817	50-yr	18000	9.05	5.57	1.07		9.03	4.93	0.85
20.817	100-yr	30000	10.93	6.36	1.35		10.91	5.88	1.13
20.831	2-yr	800	3.37	0.98	0.05		3.38	0.94	0.04
20.831	5-yr	2000	4.36	1.82	0.15		4.37	1.64	0.12
20.831	10-yr	4000	5.45	2.78	0.32		5.46	2.42	0.24
20.831	50-yr	18000	9.08	6.59	1.52		9.14	5.42	1.01
20.831	100-yr	30000	11.04	7.07	1.65		11.04	6.17	1.23
20.849	2-yr	800	3.4	1.21	0.08		3.4	1.15	0.07
20.849	5-yr	2000	4.43	2.11	0.21		4.42	1.87	0.16
20.849	10-yr	4000	5.55	3.14	0.43		5.54	2.65	0.3
20.849	50-yr	18000	9.34	6.72	1.59		9.32	5.47	1.05
20.849	100-yr	30000	11.18	7.9	2.05		11.16	6.68	1.46
20.872	2-yr	800	2.49	1.72	0.18		2.49	1.46	0.13
20.872	5-yr	2000	3.57	2.57	0.34		3.54	2.02	0.21
20.872	10-yr	4000	4.75	3.55	0.57		4.7	2.7	0.33
20.872	50-yr	18000	8.76	6.73	1.62		8.63	5.14	0.95
20.872	100-yr	30000	10.7	7.52	1.87		10.54	6.2	1.28
20.891	2-yr	800	2.72	2.12	0.28		2.66	2.17	0.29
20.891	5-yr	2000	3.83	2.83	0.43		3.7	2.52	0.35
20.891	10-yr	4000	5.04	3.69	0.64		4.85	2.96	0.42
20.891	50-yr	18000	9.1	6.99	1.77		8.79	5.05	0.93
20.891	100-yr	30000	11.03	7.56	1.91		10.74	6.39	1.38
20.936	2-yr	800	2.45	1.92	0.24		2.31	2.25	0.29
20.936	5-yr	2000	3.52	2.56	0.35		3.29	2.93	0.43
20.936	10-yr	4000	4.71	3.26	0.49		4.36	3.62	0.58
20.936	50-yr	18000	9.09	5.66	1.14		8.36	5.94	1.25
20.936	100-yr	30000	10.92	6.28	1.31		10.41	6.86	1.55
BRIDGE									
20.943	2-yr	800	2.58	2.04	0.24		2.44	2.24	0.3
20.943	5-yr	2000	3.64	2.69	0.38		3.42	2.91	0.45
20.943	10-yr	4000	4.82	3.35	0.51		4.48	3.59	0.61
20.943	50-yr	18000	9.31	5.19	0.95		8.47	5.81	1.23
20.943	100-yr	30000	11.07	6.24	1.28		10.52	6.65	1.48
20.96	2-yr	800	2.82	1.92	0.2		2.73	1.99	0.21
20.96	5-yr	2000	3.96	3.01	0.45		3.83	3.16	0.5
20.96	10-yr	4000	5.22	3.71	0.71		4.89	4.32	0.86
20.96	50-yr	18000	9.56	5.5	1.14		8.86	6.25	1.51
20.96	100-yr	30000	11.31	6.69	1.56		10.8	7.38	1.94

SAN LUIS REY RIVER - GREGORY CANYON - PROPOSED BRIDGE

River Sta	Profile	Q Total (cfs)	Existing Flow Depth (ft)	Existing Channel Velocity (ft/s)	Existing Channel Shear Stress (lb/sq ft)		Proposed Flow Depth (ft)	Proposed Channel Velocity (ft/s)	Proposed Channel Shear Stress (lb/sq ft)
20.996	2-yr	800	2.03	2.72	0.43		1.97	2.82	0.47
20.996	5-yr	2000	3.28	3.51	0.63		3.19	3.65	0.68
20.996	10-yr	4000	4.65	4.04	0.77		4.36	4.52	0.97
20.996	50-yr	18000	8.88	5.76	1.29		8.33	6.63	1.76
20.996	100-yr	30000	10.66	6.83	1.68		10.28	7.33	1.96
21.093	2-yr	800	1.94	2.89	0.49		1.94	2.89	0.49
21.093	5-yr	2000	3.15	3.87	0.77		3.14	3.9	0.78
21.093	10-yr	4000	4.58	3.98	0.82		4.51	4.1	0.87
21.093	50-yr	18000	8.61	5.62	1.19		8.38	5.92	1.34
21.093	100-yr	30000	10.41	6.61	1.52		10.2	6.87	1.65
21.137	2-yr	800	1.48	4.54	1.52		1.48	4.54	1.52
21.137	5-yr	2000	2.26	5.9	2.09		2.27	5.87	2.06
21.137	10-yr	4000	3.3	7.16	2.64		3.37	6.96	2.47
21.137	50-yr	18000	6.46	10	4.64		6.46	10	4.64
21.137	100-yr	30000	8.01	10.49	4.52		8.01	10.49	4.52
21.246	2-yr	800	2.96	1.69	0.17		2.96	1.69	0.17
21.246	5-yr	2000	4.14	2.05	0.24		4.14	2.05	0.24
21.246	10-yr	4000	5.15	2.56	0.33		5.14	2.57	0.33
21.246	50-yr	18000	8.53	3.53	0.49		8.53	3.53	0.49
21.246	100-yr	30000	9.96	4.15	0.63		9.96	4.15	0.63

Notes:
1. Cross sections 20.943 and 20.936 bound the proposed bridge location.
2. Discharge, Q (in cubic feet per second [cfs]) for 10, 50, 100-year is from the FEMA Flood Insurance Study for San Diego County (2006).
3. Discharge, Q for 2 and 5 year storms was extrapolated using log-log plot of the FEMA FIS discharges.

HEC-RAS Plan: EX River: San Luis Rey Reach: Reach 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)	
Reach 1	20.655	2-yr	800.00	298.00	300.13	299.59	300.19	0.005010	1.95	409.51	457.93	0.36
Reach 1	20.655	5-yr	2000.00	298.00	300.83	300.06	300.93	0.005000	2.62	769.46	573.46	0.39
Reach 1	20.655	10-yr	4000.00	298.00	301.58	300.60	301.75	0.005001	3.27	1234.63	651.14	0.41
Reach 1	20.655	50-yr	18000.00	298.00	304.16	302.64	304.59	0.005007	5.44	3444.01	1014.64	0.47
Reach 1	20.655	100-yr	30000.00	298.00	305.60	303.69	306.19	0.005002	6.46	5151.31	1556.40	0.49
Reach 1	20.767	2-yr	800.00	296.00	300.34		300.34	0.000078	0.66	1283.51	438.46	0.06
Reach 1	20.767	5-yr	2000.00	296.00	301.27		301.29	0.000219	1.28	1714.70	475.44	0.10
Reach 1	20.767	10-yr	4000.00	296.00	302.29		302.35	0.000415	2.00	2241.05	608.84	0.14
Reach 1	20.767	50-yr	18000.00	296.00	305.68		305.97	0.001326	4.81	4418.87	729.83	0.28
Reach 1	20.767	100-yr	30000.00	296.00	307.38		307.87	0.001828	6.31	5835.72	900.83	0.33
Reach 1	20.817	2-yr	800.00	297.00	300.36		300.37	0.000158	0.81	1057.32	386.35	0.08
Reach 1	20.817	5-yr	2000.00	297.00	301.34		301.37	0.000377	1.48	1450.37	411.18	0.13
Reach 1	20.817	10-yr	4000.00	297.00	302.42		302.49	0.000643	2.25	1898.93	418.92	0.17
Reach 1	20.817	50-yr	18000.00	297.00	306.05		306.45	0.002013	5.57	3940.23	813.47	0.33
Reach 1	20.817	100-yr	30000.00	297.00	307.93		308.43	0.002288	6.36	5652.43	999.53	0.36
Reach 1	20.831	2-yr	800.00	297.00	300.37		300.39	0.000261	0.98	817.15	285.76	0.10
Reach 1	20.831	5-yr	2000.00	297.00	301.36		301.41	0.000617	1.82	1111.90	322.49	0.16
Reach 1	20.831	10-yr	4000.00	297.00	302.45		302.57	0.001046	2.78	1502.58	384.91	0.22
Reach 1	20.831	50-yr	18000.00	297.00	306.08		306.68	0.002951	6.59	3357.42	1022.06	0.40
Reach 1	20.831	100-yr	30000.00	297.00	308.04		308.64	0.002681	7.07	5679.15	1347.28	0.40
Reach 1	20.849	2-yr	800.00	297.00	300.40		300.43	0.000505	1.21	663.88	273.53	0.14
Reach 1	20.849	5-yr	2000.00	297.00	301.43		301.49	0.001010	2.11	948.27	283.32	0.20
Reach 1	20.849	10-yr	4000.00	297.00	302.55		302.70	0.001557	3.14	1284.11	325.94	0.26
Reach 1	20.849	50-yr	18000.00	297.00	306.34		306.99	0.003115	6.72	2979.32	680.35	0.41
Reach 1	20.849	100-yr	30000.00	297.00	308.18		308.98	0.003285	7.90	4755.61	1203.83	0.44
Reach 1	20.872	2-yr	800.00	298.00	300.49		300.54	0.001753	1.72	465.85	286.49	0.24
Reach 1	20.872	5-yr	2000.00	298.00	301.57		301.68	0.002030	2.57	778.09	291.26	0.28
Reach 1	20.872	10-yr	4000.00	298.00	302.75		302.95	0.002401	3.55	1130.18	310.98	0.32
Reach 1	20.872	50-yr	18000.00	298.00	306.76		307.39	0.003316	6.73	3054.53	803.26	0.42
Reach 1	20.872	100-yr	30000.00	298.00	308.70		309.40	0.003084	7.52	5124.16	1296.24	0.42
Reach 1	20.891	2-yr	800.00	298.00	300.72		300.79	0.002881	2.12	376.79	244.65	0.30
Reach 1	20.891	5-yr	2000.00	298.00	301.83		301.95	0.003071	2.83	705.53	311.38	0.33

HEC-RAS Plan: EX River: San Luis Rey Reach: Reach 1 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach 1	20.891	10-yr	4000.00	298.00	303.04		303.25	0.002955	3.69	1089.64	334.13	0.35
Reach 1	20.891	50-yr	18000.00	298.00	307.10		307.80	0.003774	6.99	2944.59	824.80	0.45
Reach 1	20.891	100-yr	30000.00	298.00	309.03		309.75	0.003253	7.56	5022.72	1254.22	0.43
Reach 1	20.936	2-yr	800.00	299.00	301.45		301.51	0.003129	1.92	416.26	334.40	0.30
Reach 1	20.936	5-yr	2000.00	299.00	302.52		302.62	0.002479	2.56	786.11	366.47	0.30
Reach 1	20.936	10-yr	4000.00	299.00	303.71		303.87	0.002287	3.26	1261.32	413.72	0.31
Reach 1	20.936	50-yr	18000.00	299.00	308.09		308.53	0.002333	5.66	3730.20	985.10	0.36
Reach 1	20.936	100-yr	30000.00	299.00	309.92		310.41	0.002173	6.28	5944.05	1335.05	0.36
Reach 1	20.943	2-yr	800.00	299.00	301.58		301.64	0.002262	2.04	411.94	296.84	0.27
Reach 1	20.943	5-yr	2000.00	299.00	302.64		302.74	0.002397	2.69	780.36	378.76	0.30
Reach 1	20.943	10-yr	4000.00	299.00	303.82		303.99	0.002220	3.35	1258.76	424.74	0.31
Reach 1	20.943	50-yr	18000.00	299.00	308.31		308.65	0.001856	5.19	3972.07	1067.17	0.32
Reach 1	20.943	100-yr	30000.00	299.00	310.07		310.51	0.002062	6.24	6069.79	1318.67	0.35
Reach 1	20.96	2-yr	800.00	299.00	301.82		301.88	0.001335	1.92	417.55	177.81	0.22
Reach 1	20.96	5-yr	2000.00	299.00	302.96		303.10	0.002543	3.01	676.30	268.09	0.31
Reach 1	20.96	10-yr	4000.00	299.00	304.22		304.43	0.004443	3.71	1096.31	460.24	0.41
Reach 1	20.96	50-yr	18000.00	299.00	308.56		308.98	0.002726	5.50	3559.44	727.86	0.37
Reach 1	20.96	100-yr	30000.00	299.00	310.31		310.91	0.003014	6.69	5104.49	1004.07	0.41
Reach 1	20.996	2-yr	800.00	300.00	302.03		302.14	0.003977	2.72	295.71	211.01	0.36
Reach 1	20.996	5-yr	2000.00	300.00	303.28		303.46	0.003721	3.51	595.95	268.61	0.38
Reach 1	20.996	10-yr	4000.00	300.00	304.65		304.90	0.003667	4.04	1008.69	336.66	0.39
Reach 1	20.996	50-yr	18000.00	300.00	308.88		309.34	0.003456	5.76	3367.50	753.73	0.41
Reach 1	20.996	100-yr	30000.00	300.00	310.66		311.29	0.003519	6.83	4847.21	938.08	0.43
Reach 1	21.093	2-yr	800.00	301.00	302.94		303.07	0.004641	2.89	276.66	161.49	0.39
Reach 1	21.093	5-yr	2000.00	301.00	304.15		304.38	0.004784	3.87	538.13	249.07	0.42
Reach 1	21.093	10-yr	4000.00	301.00	305.58		305.82	0.005053	3.98	1010.44	423.63	0.44
Reach 1	21.093	50-yr	18000.00	301.00	309.61	307.24	310.03	0.002890	5.62	3534.08	764.69	0.38
Reach 1	21.093	100-yr	30000.00	301.00	311.41	308.54	311.99	0.002904	6.61	5067.76	981.60	0.40
Reach 1	21.137	2-yr	800.00	306.10	307.58	307.46	307.90	0.027787	4.54	176.25	201.13	0.85
Reach 1	21.137	5-yr	2000.00	306.10	308.36	308.15	308.90	0.020637	5.90	339.41	209.71	0.82
Reach 1	21.137	10-yr	4000.00	306.10	309.40		310.19	0.016308	7.16	560.04	217.59	0.78
Reach 1	21.137	50-yr	18000.00	306.10	312.56	312.56	314.10	0.020948	10.00	1841.44	642.35	0.94

HEC-RAS Plan: EX River: San Luis Rey Reach: Reach 1 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach 1	21.137	100-yr	30000.00	306.10	314.11	314.11	315.70	0.014212	10.49	3079.30	991.37	0.82
Reach 1	21.246	2-yr	800.00	307.50	310.46	308.86	310.51	0.001754	1.69	473.53	299.10	0.24
Reach 1	21.246	5-yr	2000.00	307.50	311.64	309.66	311.71	0.002080	2.05	976.12	532.21	0.26
Reach 1	21.246	10-yr	4000.00	307.50	312.65	310.67	312.75	0.001969	2.56	1596.15	681.84	0.27
Reach 1	21.246	50-yr	18000.00	307.50	316.03	313.20	316.21	0.001335	3.53	5506.23	1408.24	0.26
Reach 1	21.246	100-yr	30000.00	307.50	317.46	314.57	317.71	0.001382	4.15	7528.09	1426.64	0.27

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


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

PROJECT DATA
Project Title: Gregory Canyon Wetlands Restoration
Project File : gregory.prj
Run Date and Time: 9/29/2009 3:24:05 PM

Project in English units

PLAN DATA

Plan Title: Plan 03
Plan File : j:\27654025 Gregory Canyon LF 404\046 Work in Progress\Wetlands Grading Plans\Water Resources\Drainage Report\HEC-RAS\gregory.p03

Geometry Title: Gregory Canyon Existing Condition
Geometry File : j:\27654025 Gregory Canyon LF 404\046 Work in Progress\Wetlands Grading Plans\Water Resources\Drainage Report\HEC-RAS\gregory.g01

Flow Title : Flow Data
Flow File : j:\27654025 Gregory Canyon LF 404\046 Work in Progress\Wetlands Grading Plans\Water Resources\Drainage Report\HEC-RAS\gregory.f01

Plan Summary Information:

Number of:	Cross Sections	= 14	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: Flow Data
Flow File : j:\27654025 Gregory Canyon LF 404\046 Work in Progress\Wetlands Grading Plans\Water Resources\Drainage Report\HEC-RAS\gregory.f01

Flow Data (cfs)

River	Reach	RS	2-yr	5-yr	10-yr	50-yr	100-yr
San Luis Rey	Reach 1	21.246	800	2000	4000	18000	30000

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
San Luis Rey	Reach 1	2-yr	Normal S = 0.005	Normal S = 0.005
San Luis Rey	Reach 1	5-yr	Normal S = 0.005	Normal S = 0.005
San Luis Rey	Reach 1	10-yr	Normal S = 0.005	Normal S = 0.005
San Luis Rey	Reach 1	50-yr	Normal S = 0.005	Normal S = 0.005
San Luis Rey	Reach 1	100-yr	Normal S = 0.005	Normal S = 0.005

GEOMETRY DATA

Geometry Title: Gregory Canyon Existing Condition
Geometry File : j:\27654025 Gregory Canyon LF 404\046 Work in Progress\Wetlands Grading Plans\Water Resources\Drainage Report\HEC-RAS\gregory.g01

CROSS SECTION

RIVER: San Luis Rey
REACH: Reach 1 RS: 21.246

INPUT
Description: 21.246

Station Elevation Data num= 90

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	321.6	16	320.1	30	319.6	39	319.8	55	319.3
69	318.9	87	318.3	109	318.2	121	319.7	132	320.5
143	322.9	153	324	159	324.9	160	324.8	165	323.2
170	321.9	177	321.9	187	318.3	193	312.8	234	312.8
275	312.8	281	315.8	294	317.6	303	314.4	344	314.8
387	314.9	411	314.6	433	314.6	462	310.8	506	310.9
544	310.9	570	310.9	598	311.4	617	311.8	623	311.9
629	311.9	632	313.3	636	313.3	640	313.3	645	313.2
651	311.9	663	311.5	676	311.3	681	310.7	691	310.7
700	310.7	704	311	710	311.1	714	310.4	733	310.4
753	310.4	774	310.5	905	307.9	967	307.7	1009	307.5
1036	313.5	1054	313.5	1074	313.7	1093	313.4	1106	313.1
1110	311.9	1122	311.9	1126	313.1	1134	311.3	1148	311.9
1171	312	1190	312.2	1200	312.6	1221	312.5	1244	313.3
1270	313.4	1295	313.5	1322	313.5	1345	313.5	1366	313.5
1384	313.7	1413	313.6	1438	314.2	1462	314.3	1493	314.1
1529	314.3	1554	314.1	1574	314.1	1593	314.1	1600	314.1
1610	314.1	1618	318.6	1627	318.6	1642	318.6	1649	320.4

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	433	.05	1036	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
433	1036	450	575	650	.1	.3

CROSS SECTION OUTPUT Profile #2-yr

			Left OB	Channel	Right OB
E.G. Elev (ft)	310.51	Element			
Vel Head (ft)	0.04	Wt. n-Val.		0.050	
W.S. Elev (ft)	310.46	Reach Len. (ft)	450.00	575.00	650.00
Crit W.S. (ft)	308.86	Flow Area (sq ft)		473.53	
E.G. Slope (ft/ft)	0.001754	Area (sq ft)		473.53	
Q Total (cfs)	800.00	Flow (cfs)		800.00	
Top Width (ft)	299.10	Top Width (ft)		299.10	
Vel Total (ft/s)	1.69	Avg. Vel. (ft/s)		1.69	
Max Chl Dpth (ft)	2.96	Hydr. Depth (ft)		1.58	
Conv. Total (cfs)	19100.3	Conv. (cfs)		19100.3	
Length Wtd. (ft)	574.96	Wetted Per. (ft)		299.46	
Min Ch El (ft)	307.50	Shear (lb/sq ft)		0.17	
Alpha	1.00	Stream Power (lb/ft s)		0.29	
Frctn Loss (ft)	2.58	Cum Volume (acre-ft)	0.20	35.74	2.01
C & E Loss (ft)	0.03	Cum SA (acres)	0.49	18.52	1.96

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

section. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #5-yr

E.G. Elev (ft)	311.71	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.07	Wt. n-Val.		0.050	0.035
W.S. Elev (ft)	311.64	Reach Len. (ft)	450.00	575.00	650.00
Crit W.S. (ft)	309.66	Flow Area (sq ft)		974.50	1.62
E.G. Slope (ft/ft)	0.002080	Area (sq ft)		974.50	1.62
Q Total (cfs)	2000.00	Flow (cfs)		1999.04	0.96
Top Width (ft)	532.21	Top Width (ft)		522.74	9.47
Vel Total (ft/s)	2.05	Avg. Vel. (ft/s)		2.05	0.59
Max Chl Dpth (ft)	4.14	Hydr. Depth (ft)		1.86	0.17
Conv. Total (cfs)	43851.6	Conv. (cfs)		43830.6	21.0
Length Wtd. (ft)	574.87	Wetted Per. (ft)		523.39	9.52
Min Ch El (ft)	307.50	Shear (lb/sq ft)		0.24	0.02
Alpha	1.00	Stream Power (lb/ft s)		0.50	0.01
Frctn Loss (ft)	2.76	Cum Volume (acre-ft)	1.35	55.61	4.24
C & E Loss (ft)	0.05	Cum SA (acres)	1.42	21.56	2.74

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

CROSS SECTION OUTPUT Profile #10-yr

E.G. Elev (ft)	312.75	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.10	Wt. n-Val.		0.050	0.035
W.S. Elev (ft)	312.65	Reach Len. (ft)	450.00	575.00	650.00
Crit W.S. (ft)	310.67	Flow Area (sq ft)		1534.73	61.42
E.G. Slope (ft/ft)	0.001969	Area (sq ft)		1534.73	61.42
Q Total (cfs)	4000.00	Flow (cfs)		3923.51	76.49
Top Width (ft)	681.84	Top Width (ft)		567.42	114.42
Vel Total (ft/s)	2.51	Avg. Vel. (ft/s)		2.56	1.25
Max Chl Dpth (ft)	5.15	Hydr. Depth (ft)		2.70	0.54
Conv. Total (cfs)	90151.7	Conv. (cfs)		88427.8	1723.9
Length Wtd. (ft)	575.41	Wetted Per. (ft)		568.50	114.82
Min Ch El (ft)	307.50	Shear (lb/sq ft)		0.33	0.07
Alpha	1.03	Stream Power (lb/ft s)		0.85	0.08
Frctn Loss (ft)	2.50	Cum Volume (acre-ft)	4.15	79.97	7.58
C & E Loss (ft)	0.07	Cum SA (acres)	3.51	24.24	3.85

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.

CROSS SECTION OUTPUT Profile #50-yr

E.G. Elev (ft)	316.21	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.17	Wt. n-Val.	0.040	0.050	0.035
W.S. Elev (ft)	316.03	Reach Len. (ft)	450.00	575.00	650.00
Crit W.S. (ft)	313.20	Flow Area (sq ft)	457.06	3547.50	1501.67
E.G. Slope (ft/ft)	0.001335	Area (sq ft)	457.06	3547.50	1501.67
Q Total (cfs)	18000.00	Flow (cfs)	1070.85	12530.40	4398.74
Top Width (ft)	1408.24	Top Width (ft)	227.80	603.00	577.44
Vel Total (ft/s)	3.27	Avg. Vel. (ft/s)	2.34	3.53	2.93
Max Chl Dpth (ft)	8.53	Hydr. Depth (ft)	2.01	5.88	2.60
Conv. Total (cfs)	492721.1	Conv. (cfs)	29312.9	342999.6	120408.6
Length Wtd. (ft)	580.19	Wetted Per. (ft)	230.07	604.51	578.55
Min Ch El (ft)	307.50	Shear (lb/sq ft)	0.17	0.49	0.22
Alpha	1.04	Stream Power (lb/ft s)	0.39	1.73	0.63
Frctn Loss (ft)	1.97	Cum Volume (acre-ft)	40.95	175.70	33.37
C & E Loss (ft)	0.14	Cum SA (acres)	18.38	29.23	13.27

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.

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	317.71	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.25	Wt. n-Val.	0.040	0.050	0.035
W.S. Elev (ft)	317.46	Reach Len. (ft)	450.00	575.00	650.00
Crit W.S. (ft)	314.57	Flow Area (sq ft)	793.31	4407.64	2327.15
E.G. Slope (ft/ft)	0.001382	Area (sq ft)	793.31	4407.64	2327.15
Q Total (cfs)	30000.00	Flow (cfs)	2435.68	18307.18	9257.14
Top Width (ft)	1426.64	Top Width (ft)	243.67	603.00	579.97
Vel Total (ft/s)	3.99	Avg. Vel. (ft/s)	3.07	4.15	3.98
Max Chl Dpth (ft)	9.96	Hydr. Depth (ft)	3.26	7.31	4.01
Conv. Total (cfs)	807107.9	Conv. (cfs)	65528.7	492529.0	249050.3
Length Wtd. (ft)	584.77	Wetted Per. (ft)	246.84	604.51	581.46
Min Ch El (ft)	307.50	Shear (lb/sq ft)	0.28	0.63	0.35
Alpha	1.02	Stream Power (lb/ft s)	0.85	2.61	1.37
Frctn Loss (ft)	1.88	Cum Volume (acre-ft)	80.89	224.10	64.51
C & E Loss (ft)	0.13	Cum SA (acres)	27.78	29.64	24.63

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.

CROSS SECTION


RIVER: San Luis Rey
REACH: Reach 1            RS: 21.137

INPUT
Description: 21.137
Station Elevation Data    num=      77
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0   342.5       1   342.2       9   338.8      55     307      64     307
      92     307     106   307.6     116   307.5     124   307.1     128   306.5
     147   306.5     161   306.5     181   306.5     196   306.5     224   306.4
     250   306.1     268   309.3     276     310     326   310.3     355   310.8
     378   310.9     401   311.1     415   310.7     428   310.7     450   310.4
     469   310.3     481   310.5     487   310.5     492   310.5     496   311.2
     505   311.2     550   311.8     621   312.1     680   312.4     726   313.2
     732   315.1     740   317.3     746   317.3     752   317.3     758   313.4
     770   313.4     781   313.4     795   313.6     807     313     826     313
     833     316     837   318.5     840   318.6     843   318.7     849   316.9
     859   314.1     914   313.4    1000   313.4    1066   313.5    1103   314.3
    1114   314.3    1130   314.8    1222   315.3    1284   315.7    1334   315.7
    1390   316.5    1399   317.1    1423   317.1    1441   317.4    1459   318.3
    1474   318.5    1476   320.4    1479   320.4    1483   319.3    1486   316.9
    1499   316.9    1509   323.6    1511   324.6    1516   323.9    1520   322.8
    1537   323.9    1540   323.7

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .04      55     .05     550    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            55     550              450     510     530             .1       .3

CROSS SECTION OUTPUT  Profile #2-yr

  E.G. Elev (ft)            307.90    Element                  Left OB    Channel   Right OB
  Vel Head (ft)               0.32    Wt. n-Val.                0.040      0.050
  W.S. Elev (ft)            307.58    Reach Len. (ft)          450.00     510.00     530.00
  Crit W.S. (ft)            307.46    Flow Area (sq ft)          0.24     176.01
  E.G. Slope (ft/ft)      0.027787    Area (sq ft)               0.24     176.01
  Q Total (cfs)             800.00    Flow (cfs)                 0.57     799.43
  Top Width (ft)            201.13    Top Width (ft)             0.83     200.30
  Vel Total (ft/s)            4.54    Avg. Vel. (ft/s)           2.37       4.54
  Max Chl Dpth (ft)           1.48    Hydr. Depth (ft)           0.29       0.88
```

Conv. Total (cfs)	4799.2	Conv. (cfs)	3.4	4795.8	
Length Wtd. (ft)	509.98	Wetted Per. (ft)	1.01	200.50	
Min Ch El (ft)	306.10	Shear (lb/sq ft)	0.41	1.52	
Alpha	1.00	Stream Power (lb/ft s)	0.97	6.92	
Frctn Loss (ft)	4.77	Cum Volume (acre-ft)	0.20	31.45	2.01
C & E Loss (ft)	0.06	Cum SA (acres)	0.48	15.23	1.96

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

CROSS SECTION OUTPUT Profile #5-yr

		Element	Left OB	Channel	Right OB
E.G. Elev (ft)	308.90				
Vel Head (ft)	0.54	Wt. n-Val.	0.040	0.050	
W.S. Elev (ft)	308.36	Reach Len. (ft)	450.00	510.00	530.00
Crit W.S. (ft)	308.15	Flow Area (sq ft)	1.35	338.07	
E.G. Slope (ft/ft)	0.020637	Area (sq ft)	1.35	338.07	
Q Total (cfs)	2000.00	Flow (cfs)	4.89	1995.11	
Top Width (ft)	209.71	Top Width (ft)	1.97	207.74	
Vel Total (ft/s)	5.89	Avg. Vel. (ft/s)	3.63	5.90	
Max Chl Dpth (ft)	2.26	Hydr. Depth (ft)	0.68	1.63	
Conv. Total (cfs)	13922.3	Conv. (cfs)	34.0	13888.3	
Length Wtd. (ft)	508.21	Wetted Per. (ft)	2.40	208.01	
Min Ch El (ft)	306.10	Shear (lb/sq ft)	0.72	2.09	
Alpha	1.00	Stream Power (lb/ft s)	2.62	12.36	
Frctn Loss (ft)	4.43	Cum Volume (acre-ft)	1.34	46.94	4.23
C & E Loss (ft)	0.09	Cum SA (acres)	1.41	16.74	2.67

Warning: The conveyance ratio (upstream 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 #10-yr

		Element	Left OB	Channel	Right OB
E.G. Elev (ft)	310.19				
Vel Head (ft)	0.79	Wt. n-Val.	0.040	0.050	
W.S. Elev (ft)	309.40	Reach Len. (ft)	450.00	510.00	530.00
Crit W.S. (ft)		Flow Area (sq ft)	4.16	555.88	
E.G. Slope (ft/ft)	0.016308	Area (sq ft)	4.16	555.88	
Q Total (cfs)	4000.00	Flow (cfs)	19.55	3980.45	
Top Width (ft)	217.59	Top Width (ft)	3.47	214.12	
Vel Total (ft/s)	7.14	Avg. Vel. (ft/s)	4.70	7.16	
Max Chl Dpth (ft)	3.30	Hydr. Depth (ft)	1.20	2.60	
Conv. Total (cfs)	31322.8	Conv. (cfs)	153.1	31169.7	
Length Wtd. (ft)	505.17	Wetted Per. (ft)	4.22	214.48	

Min Ch El (ft)	306.10	Shear (lb/sq ft)	1.00	2.64	
Alpha	1.00	Stream Power (lb/ft s)	4.72	18.89	
Frctn Loss (ft)	4.21	Cum Volume (acre-ft)	4.13	66.17	7.12
C & E Loss (ft)	0.17	Cum SA (acres)	3.49	19.08	3.00

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 #50-yr

E.G. Elev (ft)	314.10	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.53	Wt. n-Val.	0.040	0.050	0.035
W.S. Elev (ft)	312.56	Reach Len. (ft)	450.00	510.00	530.00
Crit W.S. (ft)	312.56	Flow Area (sq ft)	22.37	1756.47	62.60
E.G. Slope (ft/ft)	0.020948	Area (sq ft)	22.37	1756.47	62.60
Q Total (cfs)	18000.00	Flow (cfs)	208.85	17565.51	225.64
Top Width (ft)	642.35	Top Width (ft)	8.05	495.00	139.31
Vel Total (ft/s)	9.77	Avg. Vel. (ft/s)	9.33	10.00	3.60
Max Chl Dpth (ft)	6.46	Hydr. Depth (ft)	2.78	3.55	0.45
Conv. Total (cfs)	124364.7	Conv. (cfs)	1443.0	121362.8	1559.0
Length Wtd. (ft)	500.16	Wetted Per. (ft)	9.78	495.46	139.31
Min Ch El (ft)	306.10	Shear (lb/sq ft)	2.99	4.64	0.59
Alpha	1.03	Stream Power (lb/ft s)	27.93	46.37	2.12
Frctn Loss (ft)	3.07	Cum Volume (acre-ft)	38.47	140.69	21.70
C & E Loss (ft)	0.33	Cum SA (acres)	17.16	21.98	7.92

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 #100-yr

E.G. Elev (ft)	315.70	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.59	Wt. n-Val.	0.040	0.050	0.035
W.S. Elev (ft)	314.11	Reach Len. (ft)	450.00	510.00	530.00
Crit W.S. (ft)	314.11	Flow Area (sq ft)	36.61	2525.17	517.52

E.G. Slope (ft/ft)	0.014212	Area (sq ft)	36.61	2525.17	517.52
Q Total (cfs)	30000.00	Flow (cfs)	331.71	26494.79	3173.50
Top Width (ft)	991.37	Top Width (ft)	10.29	495.00	486.08
Vel Total (ft/s)	9.74	Avg. Vel. (ft/s)	9.06	10.49	6.13
Max Chl Dpth (ft)	8.01	Hydr. Depth (ft)	3.56	5.10	1.06
Conv. Total (cfs)	251648.6	Conv. (cfs)	2782.5	222245.9	26620.3
Length Wtd. (ft)	499.23	Wetted Per. (ft)	12.51	495.46	486.70
Min Ch El (ft)	306.10	Shear (lb/sq ft)	2.60	4.52	0.94
Alpha	1.08	Stream Power (lb/ft s)	23.52	47.45	5.79
Frctn Loss (ft)	2.75	Cum Volume (acre-ft)	76.60	178.34	43.29
C & E Loss (ft)	0.30	Cum SA (acres)	26.47	22.39	16.68

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.

CROSS SECTION

RIVER: San Luis Rey
REACH: Reach 1 RS: 21.093

INPUT
Description: 21.093
Station Elevation Data num= 96

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	353	28.8999	35	037.83008	34	957.16992	34	777.61987	345
96.84009	343	117.0601	341	125.71	340	147.1499	337	165.3401	335
179.4099	333	188.72	331	210.1499	329	227.9099	328	233.3699	328
254.28	326	278.8899	324	324.76	322	392.03	320	443.6799	318
466.77	317	492.38	315	503.02	314	558.78	311	590.3	310
643.4399	308	651.1	307	659.4299	306	702.8	306	738.34	308
782.41	309	785.58	309	791.71	308	808.97	306	827.01	306
849.3199	307	851.72	307	854.78	306	861.91	303	887.66	303
917.09	304	938.62	305	950.8099	306	961.45	307	965.21	307
974.14	306	976.4	306	997.97	307	1014.29	310	1057.74	312
1058.6	311	1059.47	310	1061.28	308	1064.74	306	1077.96	305
1079.36	305	1183.11	305	1219.34	304	1272.26	301	1396.34	301
1397.96	302	1403.1	305	1404.86	306	1407.23	307	1411.64	309
1413.99	310	1414	310	1481.51	311	1489.65	311	1514.84	311
1591.23	312	1626.49	313	1749.6	314	1896.05	314	1980.1	314

1981.49	314	2080.83	315	2206.58	316	2325.69	316	2332.82	315
2337.19	315	2342.54	316	2353.41	318	2360.41	320	2368.73	323
2390.38	325	2410.61	325	2416.31	325	2419.64	327	2422.65	329
2424.18	330	2431.99	334	2435.77	336	2440.23	337	2451.9	339
2456.99	340								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	1077.96	.05	1404.86	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
1077.96	1404.86	227	215	135	.1	.3

CROSS SECTION OUTPUT Profile #2-yr

E.G. Elev (ft)	303.07	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.13	Wt. n-Val.		0.050	
W.S. Elev (ft)	302.94	Reach Len. (ft)	227.00	215.00	135.00
Crit W.S. (ft)		Flow Area (sq ft)		276.66	
E.G. Slope (ft/ft)	0.004641	Area (sq ft)		276.66	
Q Total (cfs)	800.00	Flow (cfs)		800.00	
Top Width (ft)	161.49	Top Width (ft)		161.49	
Vel Total (ft/s)	2.89	Avg. Vel. (ft/s)		2.89	
Max Chl Dpth (ft)	1.94	Hydr. Depth (ft)		1.71	
Conv. Total (cfs)	11742.9	Conv. (cfs)		11742.9	
Length Wtd. (ft)	214.88	Wetted Per. (ft)		162.08	
Min Ch El (ft)	301.00	Shear (lb/sq ft)		0.49	
Alpha	1.00	Stream Power (lb/ft s)		1.43	
Frctn Loss (ft)	0.92	Cum Volume (acre-ft)	0.20	28.80	2.01
C & E Loss (ft)	0.00	Cum SA (acres)	0.48	13.11	1.96

CROSS SECTION OUTPUT Profile #5-yr

E.G. Elev (ft)	304.38	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.22	Wt. n-Val.	0.040	0.050	
W.S. Elev (ft)	304.15	Reach Len. (ft)	227.00	215.00	135.00
Crit W.S. (ft)		Flow Area (sq ft)	50.74	487.39	
E.G. Slope (ft/ft)	0.004784	Area (sq ft)	50.74	487.39	
Q Total (cfs)	2000.00	Flow (cfs)	114.72	1885.28	
Top Width (ft)	249.07	Top Width (ft)	61.21	187.85	
Vel Total (ft/s)	3.72	Avg. Vel. (ft/s)	2.26	3.87	
Max Chl Dpth (ft)	3.15	Hydr. Depth (ft)	0.83	2.59	
Conv. Total (cfs)	28915.6	Conv. (cfs)	1658.6	27257.1	
Length Wtd. (ft)	215.44	Wetted Per. (ft)	61.47	188.80	
Min Ch El (ft)	301.00	Shear (lb/sq ft)	0.25	0.77	
Alpha	1.04	Stream Power (lb/ft s)	0.56	2.98	
Frctn Loss (ft)	0.91	Cum Volume (acre-ft)	1.07	42.11	4.23
C & E Loss (ft)	0.01	Cum SA (acres)	1.09	14.42	2.67

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT Profile #10-yr

E.G. Elev (ft)	305.82	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.24	Wt. n-Val.	0.040	0.050	
W.S. Elev (ft)	305.58	Reach Len. (ft)	227.00	215.00	135.00
Crit W.S. (ft)		Flow Area (sq ft)	162.71	847.73	
E.G. Slope (ft/ft)	0.005053	Area (sq ft)	162.71	847.73	
Q Total (cfs)	4000.00	Flow (cfs)	623.86	3376.14	
Top Width (ft)	423.63	Top Width (ft)	97.47	326.15	
Vel Total (ft/s)	3.96	Avg. Vel. (ft/s)	3.83	3.98	
Max Chl Dpth (ft)	4.58	Hydr. Depth (ft)	1.67	2.60	
Conv. Total (cfs)	56271.6	Conv. (cfs)	8776.4	47495.2	
Length Wtd. (ft)	216.31	Wetted Per. (ft)	98.08	327.50	
Min Ch El (ft)	301.00	Shear (lb/sq ft)	0.52	0.82	
Alpha	1.00	Stream Power (lb/ft s)	2.01	3.25	
Frctn Loss (ft)	0.93	Cum Volume (acre-ft)	3.26	57.95	7.12
C & E Loss (ft)	0.00	Cum SA (acres)	2.97	15.91	3.00

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT Profile #50-yr

E.G. Elev (ft)	310.03	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.42	Wt. n-Val.	0.040	0.050	0.035
W.S. Elev (ft)	309.61	Reach Len. (ft)	227.00	215.00	135.00
Crit W.S. (ft)	307.24	Flow Area (sq ft)	1353.57	2165.62	14.89
E.G. Slope (ft/ft)	0.002890	Area (sq ft)	1353.57	2165.62	14.89
Q Total (cfs)	18000.00	Flow (cfs)	5784.11	12168.22	47.67
Top Width (ft)	764.69	Top Width (ft)	429.58	326.90	8.21
Vel Total (ft/s)	5.09	Avg. Vel. (ft/s)	4.27	5.62	3.20
Max Chl Dpth (ft)	8.61	Hydr. Depth (ft)	3.15	6.62	1.81
Conv. Total (cfs)	334818.3	Conv. (cfs)	107590.3	226341.3	886.6
Length Wtd. (ft)	217.37	Wetted Per. (ft)	432.52	328.36	8.97
Min Ch El (ft)	301.00	Shear (lb/sq ft)	0.56	1.19	0.30
Alpha	1.05	Stream Power (lb/ft s)	2.41	6.69	0.96
Frctn Loss (ft)	0.69	Cum Volume (acre-ft)	31.36	117.73	21.23
C & E Loss (ft)	0.00	Cum SA (acres)	14.90	17.17	7.03

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	311.99	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.58	Wt. n-Val.	0.040	0.050	0.035
W.S. Elev (ft)	311.41	Reach Len. (ft)	227.00	215.00	135.00
Crit W.S. (ft)	308.54	Flow Area (sq ft)	2200.71	2754.45	112.60
E.G. Slope (ft/ft)	0.002904	Area (sq ft)	2200.71	2754.45	112.60

Q Total (cfs)	30000.00	Flow (cfs)	11567.73	18211.66	220.61
Top Width (ft)	981.60	Top Width (ft)	513.45	326.90	141.25
Vel Total (ft/s)	5.92	Avg. Vel. (ft/s)	5.26	6.61	1.96
Max Chl Dpth (ft)	10.41	Hydr. Depth (ft)	4.29	8.43	0.80
Conv. Total (cfs)	556700.8	Conv. (cfs)	214658.8	337948.2	4093.7
Length Wtd. (ft)	218.40	Wetted Per. (ft)	517.31	328.36	142.10
Min Ch El (ft)	301.00	Shear (lb/sq ft)	0.77	1.52	0.14
Alpha	1.06	Stream Power (lb/ft s)	4.05	10.06	0.28
Frctn Loss (ft)	0.70	Cum Volume (acre-ft)	65.05	147.44	39.45
C & E Loss (ft)	0.01	Cum SA (acres)	23.76	17.58	12.86

Warning: Divided flow computed for this cross-section.

CROSS SECTION

RIVER: San Luis Rey
REACH: Reach 1 RS: 20.996

INPUT
Description: 20.996
Station Elevation Data num= 93

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	335	8.48999	33416.53979		33324.68994		33240.31982		330
84.07983	325	100.1099	323108.8298		322122.6899		321143.5598		319
153.6799	318	165.3298	317175.4299		317185.1599		317222.5398		316
263.46	314	292.2	313318.9399		312344.6799		311379.9899		310
466.4899	309	474.1499	308488.7599		307494.9099		306510.2299		306
512.1599	307	514.09	308	564.2	308579.6899		308597.7899		308
673.4399	307	673.4899	307720.5599		306732.3899		305	736.21	304
757.6599	303	773.9099	302788.3599		302797.2699		302	797.33	302
813.7799	302	822.97	303	825.2	304827.4199		305831.6899		306
843.3199	308	852.59	309857.2899		311859.6699		312862.0199		313
865.0399	313	873.6299	312874.2599		311874.8099		310	875.47	309
878.4999	306	900.2999	304	932.84	305934.0599		305	1022.08	305
1028.05	304	1045.36	303	1064.5	302	1071.34	301	1114.79	300
1190.37	300	1204.54	300	1231.57	301	1234.37	302	1236.79	303
1238.71	304	1244.22	308	1245.45	309	1246.67	310	1347.52	311
1475.72	312	1554.22	313	1733.83	313	1971.22	314	2066.7	315
2122.44	316	2164.42	317	2184.33	318	2212.71	319	2223.54	320
2234.4	321	2257.29	324	2272.52	326	2287.6	328	2295.54	329
2334.75	331	2346.51	332	2351.41	333				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	822.97	.05	1231.57	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
822.97	1231.57	108	115	95	.1	.3

CROSS SECTION OUTPUT Profile #2-yr

E.G. Elev (ft)	302.14	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.11	Wt. n-Val.	0.040	0.050	0.035
W.S. Elev (ft)	302.03	Reach Len. (ft)	108.00	115.00	95.00
Crit W.S. (ft)		Flow Area (sq ft)	1.08	293.15	1.48
E.G. Slope (ft/ft)	0.003977	Area (sq ft)	1.08	293.15	1.48
Q Total (cfs)	800.00	Flow (cfs)	0.23	797.33	2.44
Top Width (ft)	211.01	Top Width (ft)	40.56	167.59	2.87
Vel Total (ft/s)	2.71	Avg. Vel. (ft/s)	0.21	2.72	1.65
Max Chl Dpth (ft)	2.03	Hydr. Depth (ft)	0.03	1.75	0.52
Conv. Total (cfs)	12684.9	Conv. (cfs)	3.6	12642.6	38.7
Length Wtd. (ft)	114.97	Wetted Per. (ft)	40.56	167.69	3.04
Min Ch El (ft)	300.00	Shear (lb/sq ft)	0.01	0.43	0.12
Alpha	1.01	Stream Power (lb/ft s)	0.00	1.18	0.20
Frctn Loss (ft)	0.25	Cum Volume (acre-ft)	0.20	27.40	2.01
C & E Loss (ft)	0.02	Cum SA (acres)	0.37	12.30	1.96

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

CROSS SECTION OUTPUT Profile #5-yr

E.G. Elev (ft)	303.46	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.18	Wt. n-Val.	0.040	0.050	0.035
W.S. Elev (ft)	303.28	Reach Len. (ft)	108.00	115.00	95.00
Crit W.S. (ft)		Flow Area (sq ft)	71.48	517.54	6.93
E.G. Slope (ft/ft)	0.003721	Area (sq ft)	71.48	517.54	6.93
Q Total (cfs)	2000.00	Flow (cfs)	162.20	1818.46	19.34
Top Width (ft)	268.61	Top Width (ft)	71.24	191.62	5.75
Vel Total (ft/s)	3.36	Avg. Vel. (ft/s)	2.27	3.51	2.79
Max Chl Dpth (ft)	3.28	Hydr. Depth (ft)	1.00	2.70	1.20
Conv. Total (cfs)	32785.0	Conv. (cfs)	2658.8	29809.2	317.0
Length Wtd. (ft)	114.58	Wetted Per. (ft)	71.34	191.81	6.19
Min Ch El (ft)	300.00	Shear (lb/sq ft)	0.23	0.63	0.26
Alpha	1.04	Stream Power (lb/ft s)	0.53	2.20	0.73
Frctn Loss (ft)	0.35	Cum Volume (acre-ft)	0.76	39.63	4.22
C & E Loss (ft)	0.01	Cum SA (acres)	0.74	13.49	2.66

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT Profile #10-yr

E.G. Elev (ft)	304.90	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.25	Wt. n-Val.	0.040	0.050	0.035
W.S. Elev (ft)	304.65	Reach Len. (ft)	108.00	115.00	95.00
Crit W.S. (ft)		Flow Area (sq ft)	185.94	806.22	16.53
E.G. Slope (ft/ft)	0.003667	Area (sq ft)	185.94	806.22	16.53

Q Total (cfs)	4000.00	Flow (cfs)	681.31	3254.30	64.39
Top Width (ft)	336.66	Top Width (ft)	89.25	239.38	8.04
Vel Total (ft/s)	3.97	Avg. Vel. (ft/s)	3.66	4.04	3.89
Max Chl Dpth (ft)	4.65	Hydr. Depth (ft)	2.08	3.37	2.06
Conv. Total (cfs)	66058.4	Conv. (cfs)	11251.5	53743.4	1063.4
Length Wtd. (ft)	113.96	Wetted Per. (ft)	89.44	239.98	8.87
Min Ch El (ft)	300.00	Shear (lb/sq ft)	0.48	0.77	0.43
Alpha	1.00	Stream Power (lb/ft s)	1.74	3.10	1.66
Frctn Loss (ft)	0.46	Cum Volume (acre-ft)	2.35	53.87	7.10
C & E Loss (ft)	0.01	Cum SA (acres)	2.48	14.52	2.99

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT Profile #50-yr

E.G. Elev (ft)	309.34	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.46	Wt. n-Val.	0.040	0.050	0.035
W.S. Elev (ft)	308.88	Reach Len. (ft)	108.00	115.00	95.00
Crit W.S. (ft)		Flow Area (sq ft)	987.13	2317.63	62.74
E.G. Slope (ft/ft)	0.003456	Area (sq ft)	987.13	2317.63	62.74
Q Total (cfs)	18000.00	Flow (cfs)	4250.92	13358.95	390.13
Top Width (ft)	753.73	Top Width (ft)	355.54	384.46	13.73
Vel Total (ft/s)	5.35	Avg. Vel. (ft/s)	4.31	5.76	6.22
Max Chl Dpth (ft)	8.88	Hydr. Depth (ft)	2.78	6.03	4.57
Conv. Total (cfs)	306179.9	Conv. (cfs)	72308.1	227235.7	6636.1
Length Wtd. (ft)	113.33	Wetted Per. (ft)	356.50	386.75	15.96
Min Ch El (ft)	300.00	Shear (lb/sq ft)	0.60	1.29	0.85
Alpha	1.05	Stream Power (lb/ft s)	2.57	7.45	5.28
Frctn Loss (ft)	0.35	Cum Volume (acre-ft)	25.26	106.67	21.11
C & E Loss (ft)	0.01	Cum SA (acres)	12.86	15.42	6.99

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	311.29	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.63	Wt. n-Val.	0.040	0.050	0.035
W.S. Elev (ft)	310.66	Reach Len. (ft)	108.00	115.00	95.00
Crit W.S. (ft)		Flow Area (sq ft)	1728.84	3007.82	110.56
E.G. Slope (ft/ft)	0.003519	Area (sq ft)	1728.84	3007.82	110.56
Q Total (cfs)	30000.00	Flow (cfs)	9115.44	20549.95	334.60
Top Width (ft)	938.08	Top Width (ft)	466.15	390.63	81.29
Vel Total (ft/s)	6.19	Avg. Vel. (ft/s)	5.27	6.83	3.03
Max Chl Dpth (ft)	10.66	Hydr. Depth (ft)	3.71	7.70	1.36
Conv. Total (cfs)	505718.2	Conv. (cfs)	153661.5	346416.1	5640.5
Length Wtd. (ft)	112.96	Wetted Per. (ft)	467.13	394.25	83.92
Min Ch El (ft)	300.00	Shear (lb/sq ft)	0.81	1.68	0.29
Alpha	1.06	Stream Power (lb/ft s)	4.29	11.45	0.88
Frctn Loss (ft)	0.37	Cum Volume (acre-ft)	54.81	133.22	39.11

C & E Loss (ft)	0.01	Cum SA (acres)	21.21	15.81	12.52

Warning: Divided flow computed for this cross-section.

CROSS SECTION

RIVER: San Luis Rey
REACH: Reach 1 RS: 20.96

INPUT
Description: 20.96
Station Elevation Data num= 73

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	3187.560059	31715.23999		31633.15002		314 46.7301		313	
69.19006	312122.7301	311 173.36		310 219.89		309 358.92		309	
374.9301	308377.2001	307 379.64		306 394.42		306397.2401		307	
399.8101	308 431.92	308 452.42		307 474.6		306 478.72		302	
483.73	305 487.27	306 490.92		307 517.79		308 524.09		308	
554.4	307561.1301	306 586.39		306590.1201		306 616.47		305	
622.9501	304626.8801	303 641.92		303 654.83		303 690.97		302	
716.91	302 718.86	303 726.72		308728.5701		309730.1801		310	
731.39	311733.4501	312 733.46		312 734.89		312 735.61		311	
736.71	310 737.6	309738.5001		308 739.27		307 740.34		306	
742.11	305743.9501	304800.7401		304883.4601		304 892.86		303	
914.53	302 923.54	301941.0701		300949.5901		299 1043.15		299	
1085.68	300 1091.75	301 1094.43		302 1097.03		303 1098.29		304	
1099.52	305 1100.92	306 1102.18		307 1103.39		308 1104.64		309	
1136.06	310 1236.5	311 1358.92		312					

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	690.97	.05	1099.52	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
690.97	1099.52	140	140	235	.1	.3

CROSS SECTION OUTPUT Profile #2-yr

E.G. Elev (ft)	301.88	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.06	Wt. n-Val.		0.050	
W.S. Elev (ft)	301.82	Reach Len. (ft)	140.00	140.00	235.00
Crit W.S. (ft)		Flow Area (sq ft)		417.55	
E.G. Slope (ft/ft)	0.001335	Area (sq ft)		417.55	
Q Total (cfs)	800.00	Flow (cfs)		800.00	
Top Width (ft)	177.81	Top Width (ft)		177.81	
Vel Total (ft/s)	1.92	Avg. Vel. (ft/s)		1.92	
Max Chl Dpth (ft)	2.82	Hydr. Depth (ft)		2.35	
Conv. Total (cfs)	21892.4	Conv. (cfs)		21892.4	
Length Wtd. (ft)	140.00	Wetted Per. (ft)		178.18	

Min Ch El (ft)	299.00	Shear (lb/sq ft)		0.20	
Alpha	1.00	Stream Power (lb/ft s)		0.37	
Frctn Loss (ft)	0.24	Cum Volume (acre-ft)	0.19	26.46	2.01
C & E Loss (ft)	0.00	Cum SA (acres)	0.32	11.84	1.96

CROSS SECTION OUTPUT Profile #5-yr

			Left OB	Channel	Right OB
E.G. Elev (ft)	303.10	Element			
Vel Head (ft)	0.14	Wt. n-Val.	0.040	0.050	
W.S. Elev (ft)	302.96	Reach Len. (ft)	140.00	140.00	235.00
Crit W.S. (ft)		Flow Area (sq ft)	17.78	658.52	
E.G. Slope (ft/ft)	0.002543	Area (sq ft)	17.78	658.52	
Q Total (cfs)	2000.00	Flow (cfs)	20.18	1979.83	
Top Width (ft)	268.09	Top Width (ft)	37.17	230.93	
Vel Total (ft/s)	2.96	Avg. Vel. (ft/s)	1.13	3.01	
Max Chl Dpth (ft)	3.96	Hydr. Depth (ft)	0.48	2.85	
Conv. Total (cfs)	39657.7	Conv. (cfs)	400.1	39257.7	
Length Wtd. (ft)	140.01	Wetted Per. (ft)	37.83	231.78	
Min Ch El (ft)	299.00	Shear (lb/sq ft)	0.07	0.45	
Alpha	1.02	Stream Power (lb/ft s)	0.08	1.36	
Frctn Loss (ft)	0.35	Cum Volume (acre-ft)	0.65	38.08	4.21
C & E Loss (ft)	0.01	Cum SA (acres)	0.61	12.93	2.66

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT Profile #10-yr

			Left OB	Channel	Right OB
E.G. Elev (ft)	304.43	Element			
Vel Head (ft)	0.21	Wt. n-Val.	0.040	0.050	
W.S. Elev (ft)	304.22	Reach Len. (ft)	140.00	140.00	235.00
Crit W.S. (ft)		Flow Area (sq ft)	105.77	990.54	
E.G. Slope (ft/ft)	0.004443	Area (sq ft)	105.77	990.54	
Q Total (cfs)	4000.00	Flow (cfs)	325.88	3674.12	
Top Width (ft)	460.24	Top Width (ft)	75.42	384.82	
Vel Total (ft/s)	3.65	Avg. Vel. (ft/s)	3.08	3.71	
Max Chl Dpth (ft)	5.22	Hydr. Depth (ft)	1.40	2.57	
Conv. Total (cfs)	60011.6	Conv. (cfs)	4889.1	55122.5	
Length Wtd. (ft)	140.05	Wetted Per. (ft)	77.09	386.57	
Min Ch El (ft)	299.00	Shear (lb/sq ft)	0.38	0.71	
Alpha	1.01	Stream Power (lb/ft s)	1.17	2.64	
Frctn Loss (ft)	0.43	Cum Volume (acre-ft)	1.99	51.50	7.08
C & E Loss (ft)	0.01	Cum SA (acres)	2.28	13.69	2.98

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT Profile #50-yr

			Left OB	Channel	Right OB
E.G. Elev (ft)	308.98	Element			

Vel Head (ft)	0.42	Wt. n-Val.	0.040	0.050	0.035
W.S. Elev (ft)	308.56	Reach Len. (ft)	140.00	140.00	235.00
Crit W.S. (ft)		Flow Area (sq ft)	857.29	2693.79	8.35
E.G. Slope (ft/ft)	0.002726	Area (sq ft)	857.29	2693.79	8.35
Q Total (cfs)	18000.00	Flow (cfs)	3149.25	14827.12	23.63
Top Width (ft)	727.86	Top Width (ft)	324.99	398.31	4.57
Vel Total (ft/s)	5.06	Avg. Vel. (ft/s)	3.67	5.50	2.83
Max Chl Dpth (ft)	9.56	Hydr. Depth (ft)	2.64	6.76	1.83
Conv. Total (cfs)	344758.4	Conv. (cfs)	60318.3	283987.5	452.6
Length Wtd. (ft)	140.32	Wetted Per. (ft)	328.89	403.18	5.79
Min Ch El (ft)	299.00	Shear (lb/sq ft)	0.44	1.14	0.25
Alpha	1.07	Stream Power (lb/ft s)	1.63	6.26	0.69
Frctn Loss (ft)	0.31	Cum Volume (acre-ft)	22.98	100.05	21.03
C & E Loss (ft)	0.03	Cum SA (acres)	12.01	14.38	6.97

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	310.91	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.60	Wt. n-Val.	0.040	0.050	0.035
W.S. Elev (ft)	310.31	Reach Len. (ft)	140.00	140.00	235.00
Crit W.S. (ft)		Flow Area (sq ft)	1660.67	3396.19	47.63
E.G. Slope (ft/ft)	0.003014	Area (sq ft)	1660.67	3396.19	47.63
Q Total (cfs)	30000.00	Flow (cfs)	7186.31	22727.23	86.46
Top Width (ft)	1004.07	Top Width (ft)	533.42	402.74	67.91
Vel Total (ft/s)	5.88	Avg. Vel. (ft/s)	4.33	6.69	1.82
Max Chl Dpth (ft)	11.31	Hydr. Depth (ft)	3.11	8.43	0.70
Conv. Total (cfs)	546407.4	Conv. (cfs)	130888.5	413944.2	1574.7
Length Wtd. (ft)	140.69	Wetted Per. (ft)	537.35	408.89	69.30
Min Ch El (ft)	299.00	Shear (lb/sq ft)	0.58	1.56	0.13
Alpha	1.11	Stream Power (lb/ft s)	2.52	10.46	0.23
Frctn Loss (ft)	0.35	Cum Volume (acre-ft)	50.60	124.76	38.93
C & E Loss (ft)	0.05	Cum SA (acres)	19.97	14.76	12.36

Warning: Divided flow computed for this cross-section.

CROSS SECTION

RIVER: San Luis Rey
REACH: Reach 1 RS: 20.943

INPUT
Description: 20.943 (rev 2008-08-05)
Station Elevation Data num= 54

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	31030.09998		30968.40002		30881.09998	307.598.79993			308
183.2999	308	432.1	307	436.1	306	458.3	306	460.6	307

518.2	307	535.2	307	539.6	307	546.7	306	560.5	306
570	306	580.5	306	583.6	307	588.7	309	591.2	309
594.6	308	603.8	307	610.3	306	617.6	305	642.3	305
667.5	306	675.7	306.8	681.3	306	687.4	305	694.2	304
729.9	303	770.3	302	793.1	301	838	301	855.1	301
869.4	302	875.1	302	953.5	301	964	300	985.7	299.8
1004.6	300	1011.9	300	1031.3	299	1113.8	299	1119.2	300
1122.4	302	1127	305	1130	308	1131.7	309	1170	309
1210.8	309	1312.6	310	1393.7	311	1430.6	311.9		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	875.1	.05	1122.4	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
875.1	1122.4	50	50	50	.1	.3

CROSS SECTION OUTPUT Profile #2-yr

E.G. Elev (ft)	301.64	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.06	Wt. n-Val.	0.040	0.050	
W.S. Elev (ft)	301.58	Reach Len. (ft)	50.00	50.00	50.00
Crit W.S. (ft)		Flow Area (sq ft)	41.93	370.01	
E.G. Slope (ft/ft)	0.002262	Area (sq ft)	41.93	370.01	
Q Total (cfs)	800.00	Flow (cfs)	46.82	753.18	
Top Width (ft)	296.84	Top Width (ft)	83.40	213.44	
Vel Total (ft/s)	1.94	Avg. Vel. (ft/s)	1.12	2.04	
Max Chl Dpth (ft)	2.58	Hydr. Depth (ft)	0.50	1.73	
Conv. Total (cfs)	16821.8	Conv. (cfs)	984.6	15837.2	
Length Wtd. (ft)	50.00	Wetted Per. (ft)	83.43	214.06	
Min Ch El (ft)	299.00	Shear (lb/sq ft)	0.07	0.24	
Alpha	1.05	Stream Power (lb/ft s)	0.08	0.50	
Frctn Loss (ft)	0.13	Cum Volume (acre-ft)	0.13	25.19	2.01
C & E Loss (ft)	0.00	Cum SA (acres)	0.19	11.21	1.96

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT Profile #5-yr

E.G. Elev (ft)	302.74	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.11	Wt. n-Val.	0.040	0.050	0.035
W.S. Elev (ft)	302.64	Reach Len. (ft)	50.00	50.00	50.00
Crit W.S. (ft)		Flow Area (sq ft)	155.33	624.71	0.31
E.G. Slope (ft/ft)	0.002397	Area (sq ft)	155.33	624.71	0.31
Q Total (cfs)	2000.00	Flow (cfs)	317.21	1682.52	0.27
Top Width (ft)	378.76	Top Width (ft)	130.48	247.30	0.97
Vel Total (ft/s)	2.56	Avg. Vel. (ft/s)	2.04	2.69	0.86
Max Chl Dpth (ft)	3.64	Hydr. Depth (ft)	1.19	2.53	0.32
Conv. Total (cfs)	40851.5	Conv. (cfs)	6479.3	34366.7	5.4
Length Wtd. (ft)	50.00	Wetted Per. (ft)	130.55	248.05	1.16

Min Ch El (ft)	299.00	Shear (lb/sq ft)	0.18	0.38	0.04
Alpha	1.03	Stream Power (lb/ft s)	0.36	1.01	0.03
Frctn Loss (ft)	0.12	Cum Volume (acre-ft)	0.37	36.02	4.21
C & E Loss (ft)	0.00	Cum SA (acres)	0.34	12.16	2.65

CROSS SECTION OUTPUT Profile #10-yr

E.G. Elev (ft)	303.99	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.16	Wt. n-Val.	0.040	0.050	0.035
W.S. Elev (ft)	303.82	Reach Len. (ft)	50.00	50.00	50.00
Crit W.S. (ft)		Flow Area (sq ft)	337.44	918.77	2.55
E.G. Slope (ft/ft)	0.002220	Area (sq ft)	337.44	918.77	2.55
Q Total (cfs)	4000.00	Flow (cfs)	915.96	3079.78	4.27
Top Width (ft)	424.74	Top Width (ft)	174.64	247.30	2.80
Vel Total (ft/s)	3.18	Avg. Vel. (ft/s)	2.71	3.35	1.67
Max Chl Dpth (ft)	4.82	Hydr. Depth (ft)	1.93	3.72	0.91
Conv. Total (cfs)	84895.9	Conv. (cfs)	19440.2	65365.0	90.6
Length Wtd. (ft)	50.00	Wetted Per. (ft)	174.72	248.05	3.34
Min Ch El (ft)	299.00	Shear (lb/sq ft)	0.27	0.51	0.11
Alpha	1.02	Stream Power (lb/ft s)	0.73	1.72	0.18
Frctn Loss (ft)	0.11	Cum Volume (acre-ft)	1.28	48.43	7.07
C & E Loss (ft)	0.00	Cum SA (acres)	1.87	12.68	2.97

CROSS SECTION OUTPUT Profile #50-yr

E.G. Elev (ft)	308.65	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.34	Wt. n-Val.	0.040	0.050	0.035
W.S. Elev (ft)	308.31	Reach Len. (ft)	50.00	50.00	50.00
Crit W.S. (ft)		Flow Area (sq ft)	1917.70	2026.77	27.60
E.G. Slope (ft/ft)	0.001856	Area (sq ft)	1917.70	2026.77	27.60
Q Total (cfs)	18000.00	Flow (cfs)	7377.32	10525.54	97.14
Top Width (ft)	1067.17	Top Width (ft)	811.75	247.30	8.12
Vel Total (ft/s)	4.53	Avg. Vel. (ft/s)	3.85	5.19	3.52
Max Chl Dpth (ft)	9.31	Hydr. Depth (ft)	2.36	8.20	3.40
Conv. Total (cfs)	417867.8	Conv. (cfs)	171263.6	244349.2	2255.0
Length Wtd. (ft)	50.00	Wetted Per. (ft)	813.18	248.05	10.34
Min Ch El (ft)	299.00	Shear (lb/sq ft)	0.27	0.95	0.31
Alpha	1.07	Stream Power (lb/ft s)	1.05	4.92	1.09
Frctn Loss (ft)	0.10	Cum Volume (acre-ft)	18.52	92.47	20.93
C & E Loss (ft)	0.01	Cum SA (acres)	10.19	13.35	6.94

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	310.51	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.44	Wt. n-Val.	0.040	0.050	0.035
W.S. Elev (ft)	310.07	Reach Len. (ft)	50.00	50.00	50.00

Crit W.S. (ft)		Flow Area (sq ft)	3417.96	2464.42	187.41
E.G. Slope (ft/ft)	0.002062	Area (sq ft)	3417.96	2464.42	187.41
Q Total (cfs)	30000.00	Flow (cfs)	14281.45	15371.02	347.52
Top Width (ft)	1318.67	Top Width (ft)	875.10	247.30	196.27
Vel Total (ft/s)	4.94	Avg. Vel. (ft/s)	4.18	6.24	1.85
Max Chl Dpth (ft)	11.07	Hydr. Depth (ft)	3.91	9.97	0.95
Conv. Total (cfs)	660608.5	Conv. (cfs)	314481.6	338474.3	7652.6
Length Wtd. (ft)	50.00	Wetted Per. (ft)	876.86	248.05	198.68
Min Ch El (ft)	299.00	Shear (lb/sq ft)	0.50	1.28	0.12
Alpha	1.16	Stream Power (lb/ft s)	2.10	7.98	0.23
Frctn Loss (ft)	0.11	Cum Volume (acre-ft)	42.44	115.35	38.30
C & E Loss (ft)	0.00	Cum SA (acres)	17.71	13.72	11.64

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

CROSS SECTION

RIVER: San Luis Rey
REACH: Reach 1 RS: 20.936

INPUT
Description: 20.936 (rev 2008-08-05)
Station Elevation Data num= 49

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	31023.20007		30967.80005		308	131.8	308	166.3	308.5
259.7001	308	391.9	307.4	471.7	307	475	306	485.1	305
490.5	305	495.8	307	503.1	308	515.5	308	558.3	307
566	306	585.1	306	599.3	307	609.2	306	623.9	306
627.9	307	635.1	307	642.2	306	648.5	305	725.3	305
731	304	736.6	303	740.6	303	756.2	303	801.2	302
813.8	301	844.5	301	873.2	301	884.7	301	929	301.4
964.6	301	989.8	300	1043.5	299	1134.2	299	1139.8	300
1143.6	302	1146.8	304	1149.3	308	1172.1	308.6	1218.4	308.8
1287.8	309	1341.2	310	1403.8	311	1435.9	311.8		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	801.2	.05	1143.6	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
801.2	1143.6	240	240	240	.1	.3

CROSS SECTION OUTPUT Profile #2-yr

E.G. Elev (ft)	301.51	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.06	Wt. n-Val.		0.050	
W.S. Elev (ft)	301.45	Reach Len. (ft)	240.00	240.00	240.00
Crit W.S. (ft)		Flow Area (sq ft)		416.26	
E.G. Slope (ft/ft)	0.003129	Area (sq ft)		416.26	

Q Total (cfs)	800.00	Flow (cfs)		800.00	
Top Width (ft)	334.40	Top Width (ft)		334.40	
Vel Total (ft/s)	1.92	Avg. Vel. (ft/s)		1.92	
Max Chl Dpth (ft)	2.45	Hydr. Depth (ft)		1.24	
Conv. Total (cfs)	14301.1	Conv. (cfs)		14301.1	
Length Wtd. (ft)	240.00	Wetted Per. (ft)		334.89	
Min Ch El (ft)	299.00	Shear (lb/sq ft)		0.24	
Alpha	1.00	Stream Power (lb/ft s)		0.47	
Frctn Loss (ft)	0.72	Cum Volume (acre-ft)	0.10	24.74	2.01
C & E Loss (ft)	0.00	Cum SA (acres)	0.14	10.90	1.96

CROSS SECTION OUTPUT Profile #5-yr

E.G. Elev (ft)	302.62	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.10	Wt. n-Val.	0.040	0.050	0.035
W.S. Elev (ft)	302.52	Reach Len. (ft)	240.00	240.00	240.00
Crit W.S. (ft)		Flow Area (sq ft)	6.00	779.89	0.21
E.G. Slope (ft/ft)	0.002479	Area (sq ft)	6.00	779.89	0.21
Q Total (cfs)	2000.00	Flow (cfs)	4.50	1995.34	0.16
Top Width (ft)	366.47	Top Width (ft)	23.24	342.40	0.83
Vel Total (ft/s)	2.54	Avg. Vel. (ft/s)	0.75	2.56	0.77
Max Chl Dpth (ft)	3.52	Hydr. Depth (ft)	0.26	2.28	0.26
Conv. Total (cfs)	40165.5	Conv. (cfs)	90.4	40071.9	3.3
Length Wtd. (ft)	240.00	Wetted Per. (ft)	23.24	343.06	0.97
Min Ch El (ft)	299.00	Shear (lb/sq ft)	0.04	0.35	0.03
Alpha	1.01	Stream Power (lb/ft s)	0.03	0.90	0.03
Frctn Loss (ft)	0.66	Cum Volume (acre-ft)	0.27	35.21	4.21
C & E Loss (ft)	0.00	Cum SA (acres)	0.25	11.82	2.65

CROSS SECTION OUTPUT Profile #10-yr

E.G. Elev (ft)	303.87	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.16	Wt. n-Val.	0.040	0.050	0.035
W.S. Elev (ft)	303.71	Reach Len. (ft)	240.00	240.00	240.00
Crit W.S. (ft)		Flow Area (sq ft)	69.88	1189.09	2.34
E.G. Slope (ft/ft)	0.002287	Area (sq ft)	69.88	1189.09	2.34
Q Total (cfs)	4000.00	Flow (cfs)	125.61	3870.54	3.84
Top Width (ft)	413.72	Top Width (ft)	68.58	342.40	2.74
Vel Total (ft/s)	3.17	Avg. Vel. (ft/s)	1.80	3.26	1.64
Max Chl Dpth (ft)	4.71	Hydr. Depth (ft)	1.02	3.47	0.86
Conv. Total (cfs)	83643.2	Conv. (cfs)	2626.7	80936.1	80.3
Length Wtd. (ft)	240.00	Wetted Per. (ft)	68.66	343.06	3.23
Min Ch El (ft)	299.00	Shear (lb/sq ft)	0.15	0.49	0.10
Alpha	1.03	Stream Power (lb/ft s)	0.26	1.61	0.17
Frctn Loss (ft)	0.62	Cum Volume (acre-ft)	1.05	47.22	7.07
C & E Loss (ft)	0.00	Cum SA (acres)	1.73	12.34	2.97

CROSS SECTION OUTPUT Profile #50-yr

E.G. Elev (ft)	308.53	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.44	Wt. n-Val.	0.040	0.050	0.035
W.S. Elev (ft)	308.09	Reach Len. (ft)	240.00	240.00	240.00
Crit W.S. (ft)		Flow Area (sq ft)	1019.16	2689.34	21.70
E.G. Slope (ft/ft)	0.002333	Area (sq ft)	1019.16	2689.34	21.70
Q Total (cfs)	18000.00	Flow (cfs)	2699.15	15234.93	65.92
Top Width (ft)	985.10	Top Width (ft)	633.46	342.40	9.24
Vel Total (ft/s)	4.83	Avg. Vel. (ft/s)	2.65	5.66	3.04
Max Chl Dpth (ft)	9.09	Hydr. Depth (ft)	1.61	7.85	2.35
Conv. Total (cfs)	372640.8	Conv. (cfs)	55878.5	315397.6	1364.8
Length Wtd. (ft)	240.00	Wetted Per. (ft)	634.72	343.06	12.03
Min Ch El (ft)	299.00	Shear (lb/sq ft)	0.23	1.14	0.26
Alpha	1.21	Stream Power (lb/ft s)	0.62	6.47	0.80
Frctn Loss (ft)	0.70	Cum Volume (acre-ft)	16.83	89.76	20.90
C & E Loss (ft)	0.03	Cum SA (acres)	9.36	13.01	6.93

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	310.41	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.49	Wt. n-Val.	0.040	0.050	0.035
W.S. Elev (ft)	309.92	Reach Len. (ft)	240.00	240.00	240.00
Crit W.S. (ft)		Flow Area (sq ft)	2410.57	3314.78	218.70
E.G. Slope (ft/ft)	0.002173	Area (sq ft)	2410.57	3314.78	218.70
Q Total (cfs)	30000.00	Flow (cfs)	8703.41	20831.19	465.40
Top Width (ft)	1335.05	Top Width (ft)	799.34	342.40	193.31
Vel Total (ft/s)	5.05	Avg. Vel. (ft/s)	3.61	6.28	2.13
Max Chl Dpth (ft)	10.92	Hydr. Depth (ft)	3.02	9.68	1.13
Conv. Total (cfs)	643596.1	Conv. (cfs)	186716.0	446895.8	9984.3
Length Wtd. (ft)	240.00	Wetted Per. (ft)	800.63	343.06	196.12
Min Ch El (ft)	299.00	Shear (lb/sq ft)	0.41	1.31	0.15
Alpha	1.23	Stream Power (lb/ft s)	1.47	8.24	0.32
Frctn Loss (ft)	0.63	Cum Volume (acre-ft)	39.10	112.03	38.07
C & E Loss (ft)	0.02	Cum SA (acres)	16.75	13.38	11.42

CROSS SECTION

RIVER: San Luis Rey
REACH: Reach 1 RS: 20.891

INPUT
Description: 20.891 (rev 2008-08-04)
Station Elevation Data num= 46

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	30956.80005		30883.30005		308	90	308	186.1	308
296.9	307	326.5	307	389.1	307	408	307	410.5	306

420	305	426.4	305	432.5	307	453.5	307	480.7	307
484.9	306	504.1	306	520.6	306	534.8	303	542.3	303
550	304	557.7	305	564.4	307	579	307	582	306
588	304	596.1	304	617.5	305	620.3	305	661.7	304
669.9	303	681.1	302	687.8	301	714.6	301	829.3	300
879.9	299	901.2	298	986.1	298	993.95	302	1001.1	306
1099.8	307	1209.3	308	1253.5	309	1274.5	310	1319.5	310
1437	310								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	681.1	.05	993.95	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
681.1	993.95	115	110	95	.1	.3

CROSS SECTION OUTPUT Profile #2-yr

E.G. Elev (ft)	300.79	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.07	Wt. n-Val.		0.050	
W.S. Elev (ft)	300.72	Reach Len. (ft)	115.00	110.00	95.00
Crit W.S. (ft)		Flow Area (sq ft)		376.79	
E.G. Slope (ft/ft)	0.002881	Area (sq ft)		376.79	
Q Total (cfs)	800.00	Flow (cfs)		800.00	
Top Width (ft)	244.65	Top Width (ft)		244.65	
Vel Total (ft/s)	2.12	Avg. Vel. (ft/s)		2.12	
Max Chl Dpth (ft)	2.72	Hydr. Depth (ft)		1.54	
Conv. Total (cfs)	14905.2	Conv. (cfs)		14905.2	
Length Wtd. (ft)	110.00	Wetted Per. (ft)		245.34	
Min Ch El (ft)	298.00	Shear (lb/sq ft)		0.28	
Alpha	1.00	Stream Power (lb/ft s)		0.59	
Frctn Loss (ft)	0.24	Cum Volume (acre-ft)	0.10	22.56	2.01
C & E Loss (ft)	0.01	Cum SA (acres)	0.14	9.30	1.96

CROSS SECTION OUTPUT Profile #5-yr

E.G. Elev (ft)	301.95	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.12	Wt. n-Val.		0.050	
W.S. Elev (ft)	301.83	Reach Len. (ft)	115.00	110.00	95.00
Crit W.S. (ft)		Flow Area (sq ft)		705.53	
E.G. Slope (ft/ft)	0.003071	Area (sq ft)		705.53	
Q Total (cfs)	2000.00	Flow (cfs)		2000.00	
Top Width (ft)	311.38	Top Width (ft)		311.38	
Vel Total (ft/s)	2.83	Avg. Vel. (ft/s)		2.83	
Max Chl Dpth (ft)	3.83	Hydr. Depth (ft)		2.27	
Conv. Total (cfs)	36092.5	Conv. (cfs)		36092.5	
Length Wtd. (ft)	110.00	Wetted Per. (ft)		312.40	
Min Ch El (ft)	298.00	Shear (lb/sq ft)		0.43	
Alpha	1.00	Stream Power (lb/ft s)		1.23	
Frctn Loss (ft)	0.27	Cum Volume (acre-ft)	0.26	31.12	4.21

C & E Loss (ft)	0.01	Cum SA (acres)	0.19	10.02	2.65

CROSS SECTION OUTPUT Profile #10-yr

E.G. Elev (ft)	303.25	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.21	Wt. n-Val.	0.040	0.050	0.035
W.S. Elev (ft)	303.04	Reach Len. (ft)	115.00	110.00	95.00
Crit W.S. (ft)		Flow Area (sq ft)	6.27	1082.41	0.96
E.G. Slope (ft/ft)	0.002955	Area (sq ft)	6.27	1082.41	0.96
Q Total (cfs)	4000.00	Flow (cfs)	7.89	3990.81	1.30
Top Width (ft)	334.13	Top Width (ft)	19.43	312.85	1.85
Vel Total (ft/s)	3.67	Avg. Vel. (ft/s)	1.26	3.69	1.36
Max Chl Dpth (ft)	5.04	Hydr. Depth (ft)	0.32	3.46	0.52
Conv. Total (cfs)	73585.9	Conv. (cfs)	145.2	73416.8	23.9
Length Wtd. (ft)	109.99	Wetted Per. (ft)	19.48	313.92	2.12
Min Ch El (ft)	298.00	Shear (lb/sq ft)	0.06	0.64	0.08
Alpha	1.01	Stream Power (lb/ft s)	0.07	2.35	0.11
Frctn Loss (ft)	0.29	Cum Volume (acre-ft)	0.84	40.96	7.06
C & E Loss (ft)	0.00	Cum SA (acres)	1.49	10.54	2.96

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT Profile #50-yr

E.G. Elev (ft)	307.80	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.70	Wt. n-Val.	0.040	0.050	0.035
W.S. Elev (ft)	307.10	Reach Len. (ft)	115.00	110.00	95.00
Crit W.S. (ft)		Flow Area (sq ft)	508.84	2353.90	81.86
E.G. Slope (ft/ft)	0.003774	Area (sq ft)	508.84	2353.90	81.86
Q Total (cfs)	18000.00	Flow (cfs)	1369.52	16462.96	167.52
Top Width (ft)	824.80	Top Width (ft)	395.21	312.85	116.73
Vel Total (ft/s)	6.11	Avg. Vel. (ft/s)	2.69	6.99	2.05
Max Chl Dpth (ft)	9.10	Hydr. Depth (ft)	1.29	7.52	0.70
Conv. Total (cfs)	293013.0	Conv. (cfs)	22293.7	267992.4	2726.9
Length Wtd. (ft)	109.91	Wetted Per. (ft)	397.26	313.92	117.78
Min Ch El (ft)	298.00	Shear (lb/sq ft)	0.30	1.77	0.16
Alpha	1.21	Stream Power (lb/ft s)	0.81	12.36	0.34
Frctn Loss (ft)	0.39	Cum Volume (acre-ft)	12.62	75.87	20.62
C & E Loss (ft)	0.02	Cum SA (acres)	6.52	11.20	6.58

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	309.75	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.72	Wt. n-Val.	0.040	0.050	0.035
W.S. Elev (ft)	309.03	Reach Len. (ft)	115.00	110.00	95.00
Crit W.S. (ft)		Flow Area (sq ft)	1585.74	2959.22	477.76
E.G. Slope (ft/ft)	0.003253	Area (sq ft)	1585.74	2959.22	477.76
Q Total (cfs)	30000.00	Flow (cfs)	5889.38	22381.13	1729.49

Top Width (ft)	1254.22	Top Width (ft)	681.10	312.85	260.27
Vel Total (ft/s)	5.97	Avg. Vel. (ft/s)	3.71	7.56	3.62
Max Chl Dpth (ft)	11.03	Hydr. Depth (ft)	2.33	9.46	1.84
Conv. Total (cfs)	526032.1	Conv. (cfs)	103266.8	392439.7	30325.5
Length Wtd. (ft)	109.65	Wetted Per. (ft)	683.19	313.92	261.33
Min Ch El (ft)	298.00	Shear (lb/sq ft)	0.47	1.91	0.37
Alpha	1.29	Stream Power (lb/ft s)	1.75	14.48	1.34
Frctn Loss (ft)	0.35	Cum Volume (acre-ft)	28.09	94.75	36.15
C & E Loss (ft)	0.01	Cum SA (acres)	12.67	11.57	10.17

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

CROSS SECTION

RIVER: San Luis Rey
REACH: Reach 1 RS: 20.872

INPUT
Description: 20.872 (rev 2008-08-04)
Station Elevation Data num= 58

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	31022.80005	309	46	308	105.9	308	129.5	308	
131.2001	307	136.9	307	143	308215.7001	308325.2001	307		
472.7001	306483.7001	307	486.9	306491.2001	305504.5001	305			
509.3	307	522.3	307538.0001	306562.5001	306566.2001	306			
577.0001	305587.7001	304600.0001	304	626.1	305	632.4	306		
637.9	307	645.6	308649.7001	308657.7001	307	672.3	304		
692.7001	304	703.6	304	731.9	303	736.4	302	741.1	300
787.1	300	840.6	300	850.3	299903.5001	298	1022.1	298	
1023.7	299	1025.5	300	1027.4	301	1029.6	302	1048.7	303
1055.3	304	1072.5	305	1086.4	305	1163.6	306	1197.3	306
1209.3	307	1297.4	308	1338.2	309	1352.8	309	1366.9	310
1398.6	310	1431.5	309	1516.8	309				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	736.4	.05	1029.6	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
736.4	1029.6	105	124	162	.1	.3

CROSS SECTION OUTPUT Profile #2-yr

E.G. Elev (ft)	300.54	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	Wt. n-Val.		0.050	
W.S. Elev (ft)	300.49	Reach Len. (ft)	105.00	124.00	162.00
Crit W.S. (ft)		Flow Area (sq ft)		465.85	
E.G. Slope (ft/ft)	0.001753	Area (sq ft)		465.85	
Q Total (cfs)	800.00	Flow (cfs)		800.00	

Top Width (ft)	286.49	Top Width (ft)		286.49	
Vel Total (ft/s)	1.72	Avg. Vel. (ft/s)		1.72	
Max Chl Dpth (ft)	2.49	Hydr. Depth (ft)		1.63	
Conv. Total (cfs)	19107.0	Conv. (cfs)		19107.0	
Length Wtd. (ft)	124.00	Wetted Per. (ft)		287.32	
Min Ch El (ft)	298.00	Shear (lb/sq ft)		0.18	
Alpha	1.00	Stream Power (lb/ft s)		0.30	
Frctn Loss (ft)	0.11	Cum Volume (acre-ft)	0.10	21.49	2.01
C & E Loss (ft)	0.01	Cum SA (acres)	0.14	8.63	1.96

Warning: The conveyance ratio (upstream 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 #5-yr

		Element	Left OB	Channel	Right OB
E.G. Elev (ft)	301.68				
Vel Head (ft)	0.10	Wt. n-Val.		0.050	
W.S. Elev (ft)	301.57	Reach Len. (ft)	105.00	124.00	162.00
Crit W.S. (ft)		Flow Area (sq ft)		778.09	
E.G. Slope (ft/ft)	0.002030	Area (sq ft)		778.09	
Q Total (cfs)	2000.00	Flow (cfs)		2000.00	
Top Width (ft)	291.26	Top Width (ft)		291.26	
Vel Total (ft/s)	2.57	Avg. Vel. (ft/s)		2.57	
Max Chl Dpth (ft)	3.57	Hydr. Depth (ft)		2.67	
Conv. Total (cfs)	44388.2	Conv. (cfs)		44388.2	
Length Wtd. (ft)	124.00	Wetted Per. (ft)		292.56	
Min Ch El (ft)	298.00	Shear (lb/sq ft)		0.34	
Alpha	1.00	Stream Power (lb/ft s)		0.87	
Frctn Loss (ft)	0.17	Cum Volume (acre-ft)	0.26	29.25	4.21
C & E Loss (ft)	0.01	Cum SA (acres)	0.19	9.26	2.65

CROSS SECTION OUTPUT Profile #10-yr

		Element	Left OB	Channel	Right OB
E.G. Elev (ft)	302.95				
Vel Head (ft)	0.20	Wt. n-Val.	0.040	0.050	0.035
W.S. Elev (ft)	302.75	Reach Len. (ft)	105.00	124.00	162.00
Crit W.S. (ft)		Flow Area (sq ft)	1.28	1123.48	5.42
E.G. Slope (ft/ft)	0.002401	Area (sq ft)	1.28	1123.48	5.42
Q Total (cfs)	4000.00	Flow (cfs)	1.19	3992.93	5.88
Top Width (ft)	310.98	Top Width (ft)	3.39	293.20	14.39
Vel Total (ft/s)	3.54	Avg. Vel. (ft/s)	0.93	3.55	1.08
Max Chl Dpth (ft)	4.75	Hydr. Depth (ft)	0.38	3.83	0.38
Conv. Total (cfs)	81628.1	Conv. (cfs)	24.3	81483.8	119.9
Length Wtd. (ft)	124.07	Wetted Per. (ft)	3.47	294.68	14.41
Min Ch El (ft)	298.00	Shear (lb/sq ft)	0.06	0.57	0.06
Alpha	1.01	Stream Power (lb/ft s)	0.05	2.03	0.06
Frctn Loss (ft)	0.24	Cum Volume (acre-ft)	0.83	38.18	7.05
C & E Loss (ft)	0.01	Cum SA (acres)	1.46	9.77	2.94

CROSS SECTION OUTPUT Profile #50-yr

E.G. Elev (ft)	307.39	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.63	Wt. n-Val.	0.040	0.050	0.035
W.S. Elev (ft)	306.76	Reach Len. (ft)	105.00	124.00	162.00
Crit W.S. (ft)		Flow Area (sq ft)	462.61	2298.93	292.99
E.G. Slope (ft/ft)	0.003316	Area (sq ft)	462.61	2298.93	292.99
Q Total (cfs)	18000.00	Flow (cfs)	1521.78	15475.93	1002.29
Top Width (ft)	803.26	Top Width (ft)	333.21	293.20	176.85
Vel Total (ft/s)	5.89	Avg. Vel. (ft/s)	3.29	6.73	3.42
Max Chl Dpth (ft)	8.76	Hydr. Depth (ft)	1.39	7.84	1.66
Conv. Total (cfs)	312573.8	Conv. (cfs)	26426.0	268742.8	17404.9
Length Wtd. (ft)	125.55	Wetted Per. (ft)	334.53	294.68	177.02
Min Ch El (ft)	298.00	Shear (lb/sq ft)	0.29	1.62	0.34
Alpha	1.17	Stream Power (lb/ft s)	0.94	10.87	1.17
Frctn Loss (ft)	0.40	Cum Volume (acre-ft)	11.34	69.99	20.21
C & E Loss (ft)	0.00	Cum SA (acres)	5.56	10.44	6.26

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	309.40	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.70	Wt. n-Val.	0.040	0.050	0.035
W.S. Elev (ft)	308.70	Reach Len. (ft)	105.00	124.00	162.00
Crit W.S. (ft)		Flow Area (sq ft)	1500.18	2867.23	756.75
E.G. Slope (ft/ft)	0.003084	Area (sq ft)	1500.18	2867.23	756.75
Q Total (cfs)	30000.00	Flow (cfs)	5102.39	21566.20	3331.42
Top Width (ft)	1296.24	Top Width (ft)	706.66	293.20	296.39
Vel Total (ft/s)	5.85	Avg. Vel. (ft/s)	3.40	7.52	4.40
Max Chl Dpth (ft)	10.70	Hydr. Depth (ft)	2.12	9.78	2.55
Conv. Total (cfs)	540230.0	Conv. (cfs)	91882.1	388356.8	59991.1
Length Wtd. (ft)	126.35	Wetted Per. (ft)	708.62	294.68	296.58
Min Ch El (ft)	298.00	Shear (lb/sq ft)	0.41	1.87	0.49
Alpha	1.31	Stream Power (lb/ft s)	1.39	14.09	2.16
Frctn Loss (ft)	0.40	Cum Volume (acre-ft)	24.02	87.39	34.80
C & E Loss (ft)	0.01	Cum SA (acres)	10.84	10.81	9.56

CROSS SECTION

RIVER: San Luis Rey
REACH: Reach 1 RS: 20.849

INPUT
Description: 20.849 (rev 2008-08-01)
STA 1489.1 interpolated
Station Elevation Data num= 54

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	310	172.6	308	320.7	307	504.5	306	507.5	305
529.1	305	532.3	306	549.3	306	571.8	305	585.8	304
598	304	604.5	305	607.1	306	632.4	307	660.9	308
695.4	308	698.6	307	701.9	306	706.2	305	711.8	304
722	303	731.9	302	733.8	301	735.8	300	739.1	299
769.5	299	784.4	299	793	298.8	813.1	298	980.3	297
993.9	298	1001.8	299	1005.7	300	1012.7	301	1021.2	302
1034.4	303	1048.7	303	1069.2	302	1080.7	302	1083.1	303
1085.1	304	1088.8	305	1105.7	305	1110.4	304	1117.1	304
1159	305	1170.6	306	1276.6	307	1323.6	307	1338.1	307
1346	308	1351.1	308	1405.1	309	1489.1	309.5		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	731.9	.05	1021.2	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
731.9	1021.2	102	97	88	.1	.3

CROSS SECTION OUTPUT Profile #2-yr

E.G. Elev (ft)	300.43	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.		0.050	
W.S. Elev (ft)	300.40	Reach Len. (ft)	102.00	97.00	88.00
Crit W.S. (ft)		Flow Area (sq ft)		663.88	
E.G. Slope (ft/ft)	0.000505	Area (sq ft)		663.88	
Q Total (cfs)	800.00	Flow (cfs)		800.00	
Top Width (ft)	273.53	Top Width (ft)		273.53	
Vel Total (ft/s)	1.21	Avg. Vel. (ft/s)		1.21	
Max Chl Dpth (ft)	3.40	Hydr. Depth (ft)		2.43	
Conv. Total (cfs)	35586.6	Conv. (cfs)		35586.6	
Length Wtd. (ft)	97.00	Wetted Per. (ft)		274.05	
Min Ch El (ft)	297.00	Shear (lb/sq ft)		0.08	
Alpha	1.00	Stream Power (lb/ft s)		0.09	
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	0.10	19.88	2.01
C & E Loss (ft)	0.00	Cum SA (acres)	0.14	7.83	1.96

CROSS SECTION OUTPUT Profile #5-yr

E.G. Elev (ft)	301.49	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.07	Wt. n-Val.		0.050	
W.S. Elev (ft)	301.43	Reach Len. (ft)	102.00	97.00	88.00
Crit W.S. (ft)		Flow Area (sq ft)		948.27	
E.G. Slope (ft/ft)	0.001010	Area (sq ft)		948.27	
Q Total (cfs)	2000.00	Flow (cfs)		2000.00	
Top Width (ft)	283.32	Top Width (ft)		283.32	
Vel Total (ft/s)	2.11	Avg. Vel. (ft/s)		2.11	
Max Chl Dpth (ft)	4.43	Hydr. Depth (ft)		3.35	
Conv. Total (cfs)	62933.1	Conv. (cfs)		62933.1	

Length Wtd. (ft)	96.98	Wetted Per. (ft)		284.15	
Min Ch El (ft)	297.00	Shear (lb/sq ft)		0.21	
Alpha	1.00	Stream Power (lb/ft s)		0.44	
Frctn Loss (ft)	0.08	Cum Volume (acre-ft)	0.26	26.79	4.21
C & E Loss (ft)	0.01	Cum SA (acres)	0.19	8.44	2.65

CROSS SECTION OUTPUT Profile #10-yr

E.G. Elev (ft)	302.70	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.15	Wt. n-Val.	0.040	0.050	0.035
W.S. Elev (ft)	302.55	Reach Len. (ft)	102.00	97.00	88.00
Crit W.S. (ft)		Flow Area (sq ft)	1.48	1270.96	11.67
E.G. Slope (ft/ft)	0.001557	Area (sq ft)	1.48	1270.96	11.67
Q Total (cfs)	4000.00	Flow (cfs)	0.91	3988.85	10.24
Top Width (ft)	325.94	Top Width (ft)	5.41	289.30	31.23
Vel Total (ft/s)	3.11	Avg. Vel. (ft/s)	0.62	3.14	0.88
Max Chl Dpth (ft)	5.55	Hydr. Depth (ft)	0.27	4.39	0.37
Conv. Total (cfs)	101363.9	Conv. (cfs)	23.0	101081.3	259.6
Length Wtd. (ft)	96.88	Wetted Per. (ft)	5.44	290.31	31.37
Min Ch El (ft)	297.00	Shear (lb/sq ft)	0.03	0.43	0.04
Alpha	1.01	Stream Power (lb/ft s)	0.02	1.34	0.03
Frctn Loss (ft)	0.12	Cum Volume (acre-ft)	0.82	34.77	7.02
C & E Loss (ft)	0.01	Cum SA (acres)	1.45	8.94	2.85

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT Profile #50-yr

E.G. Elev (ft)	306.99	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.64	Wt. n-Val.	0.040	0.050	0.035
W.S. Elev (ft)	306.34	Reach Len. (ft)	102.00	97.00	88.00
Crit W.S. (ft)		Flow Area (sq ft)	220.97	2369.16	389.19
E.G. Slope (ft/ft)	0.003115	Area (sq ft)	220.97	2369.16	389.19
Q Total (cfs)	18000.00	Flow (cfs)	566.10	15928.01	1505.90
Top Width (ft)	680.35	Top Width (ft)	205.35	289.30	185.70
Vel Total (ft/s)	6.04	Avg. Vel. (ft/s)	2.56	6.72	3.87
Max Chl Dpth (ft)	9.34	Hydr. Depth (ft)	1.08	8.19	2.10
Conv. Total (cfs)	322516.8	Conv. (cfs)	10143.1	285391.8	26982.0
Length Wtd. (ft)	96.43	Wetted Per. (ft)	206.34	290.31	186.50
Min Ch El (ft)	297.00	Shear (lb/sq ft)	0.21	1.59	0.41
Alpha	1.14	Stream Power (lb/ft s)	0.53	10.67	1.57
Frctn Loss (ft)	0.29	Cum Volume (acre-ft)	10.52	63.35	18.94
C & E Loss (ft)	0.01	Cum SA (acres)	4.91	9.61	5.59

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	308.98	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.80	Wt. n-Val.	0.040	0.050	0.035
W.S. Elev (ft)	308.18	Reach Len. (ft)	102.00	97.00	88.00
Crit W.S. (ft)		Flow Area (sq ft)	939.20	2900.91	915.50
E.G. Slope (ft/ft)	0.003285	Area (sq ft)	939.20	2900.91	915.50
Q Total (cfs)	30000.00	Flow (cfs)	2769.69	22923.06	4307.26
Top Width (ft)	1203.83	Top Width (ft)	574.88	289.30	339.65
Vel Total (ft/s)	6.31	Avg. Vel. (ft/s)	2.95	7.90	4.70
Max Chl Dpth (ft)	11.18	Hydr. Depth (ft)	1.63	10.03	2.70
Conv. Total (cfs)	523429.3	Conv. (cfs)	48324.5	399953.3	75151.5
Length Wtd. (ft)	96.04	Wetted Per. (ft)	576.17	290.31	340.51
Min Ch El (ft)	297.00	Shear (lb/sq ft)	0.33	2.05	0.55
Alpha	1.30	Stream Power (lb/ft s)	0.99	16.19	2.59
Frctn Loss (ft)	0.28	Cum Volume (acre-ft)	21.08	79.18	31.69
C & E Loss (ft)	0.06	Cum SA (acres)	9.29	9.98	8.38

CROSS SECTION

RIVER: San Luis Rey
REACH: Reach 1 RS: 20.831

INPUT
Description: STA 1356.7 interpolated
Station Elevation Data num= 52

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	308	239.23	306	340.4	306	363.7999	305	389.2399	305
409.16	305	456.4299	304	458.84	303	462.9899	302	473.1799	302
478.97	303	494.41	304	498.6799	305	502.4	306	506.21	307
510.1	308	526.1699	308	532.3799	307	537.7599	306	546.84	304
548.16	303	549.4399	302	553.6	299	612.7	298	626.3799	297
660.8599	297	674.7999	297	811.4399	297	820.8099	298	825.1299	299
831.03	300	848.21	301	916.1799	302	922.7599	303	926.23	304
943.1	305	1012.03	305	1085.73	305	1104.6	306	1111.97	306
1242.74	306	1247.29	307	1258.46	309	1260.28	309	1262.6	308
1265.37	307	1268.92	306	1270.28	306	1278.67	306	1310.25	306
1340.64	307	1356.7	308						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.045	26.1699	.05	831.03	.05

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
526.1699	831.03	85	75	55	.1	.3

CROSS SECTION OUTPUT Profile #2-yr

E.G. Elev (ft)	300.39	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.01	Wt. n-Val.		0.050	0.050
W.S. Elev (ft)	300.37	Reach Len. (ft)	85.00	75.00	55.00

Crit W.S. (ft)		Flow Area (sq ft)		815.95	1.20
E.G. Slope (ft/ft)	0.000261	Area (sq ft)		815.95	1.20
Q Total (cfs)	800.00	Flow (cfs)		799.81	0.19
Top Width (ft)	285.76	Top Width (ft)		279.34	6.43
Vel Total (ft/s)	0.98	Avg. Vel. (ft/s)		0.98	0.16
Max Chl Dpth (ft)	3.37	Hydr. Depth (ft)		2.92	0.19
Conv. Total (cfs)	49474.8	Conv. (cfs)		49463.1	11.7
Length Wtd. (ft)	73.75	Wetted Per. (ft)		280.08	6.44
Min Ch El (ft)	297.00	Shear (lb/sq ft)		0.05	0.00
Alpha	1.00	Stream Power (lb/ft s)		0.05	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.10	18.24	2.01
C & E Loss (ft)	0.00	Cum SA (acres)	0.14	7.22	1.95

CROSS SECTION OUTPUT Profile #5-yr

E.G. Elev (ft)	301.41	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	Wt. n-Val.		0.050	0.050
W.S. Elev (ft)	301.36	Reach Len. (ft)	85.00	75.00	55.00
Crit W.S. (ft)		Flow Area (sq ft)		1092.63	19.27
E.G. Slope (ft/ft)	0.000617	Area (sq ft)		1092.63	19.27
Q Total (cfs)	2000.00	Flow (cfs)		1991.52	8.49
Top Width (ft)	322.49	Top Width (ft)		280.71	41.79
Vel Total (ft/s)	1.80	Avg. Vel. (ft/s)		1.82	0.44
Max Chl Dpth (ft)	4.36	Hydr. Depth (ft)		3.89	0.46
Conv. Total (cfs)	80488.8	Conv. (cfs)		80147.3	341.5
Length Wtd. (ft)	73.38	Wetted Per. (ft)		281.76	41.82
Min Ch El (ft)	297.00	Shear (lb/sq ft)		0.15	0.02
Alpha	1.02	Stream Power (lb/ft s)		0.27	0.01
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	0.26	24.52	4.19
C & E Loss (ft)	0.01	Cum SA (acres)	0.19	7.81	2.61

CROSS SECTION OUTPUT Profile #10-yr

E.G. Elev (ft)	302.57	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.12	Wt. n-Val.	0.040	0.050	0.050
W.S. Elev (ft)	302.45	Reach Len. (ft)	85.00	75.00	55.00
Crit W.S. (ft)		Flow Area (sq ft)	5.57	1398.40	98.61
E.G. Slope (ft/ft)	0.001046	Area (sq ft)	5.57	1398.40	98.61
Q Total (cfs)	4000.00	Flow (cfs)	3.50	3894.38	102.12
Top Width (ft)	384.91	Top Width (ft)	14.65	282.16	88.10
Vel Total (ft/s)	2.66	Avg. Vel. (ft/s)	0.63	2.78	1.04
Max Chl Dpth (ft)	5.45	Hydr. Depth (ft)	0.38	4.96	1.12
Conv. Total (cfs)	123664.9	Conv. (cfs)	108.1	120399.5	3157.2
Length Wtd. (ft)	72.83	Wetted Per. (ft)	14.74	283.58	88.17
Min Ch El (ft)	297.00	Shear (lb/sq ft)	0.02	0.32	0.07
Alpha	1.07	Stream Power (lb/ft s)	0.02	0.90	0.08
Frctn Loss (ft)	0.06	Cum Volume (acre-ft)	0.82	31.80	6.91
C & E Loss (ft)	0.01	Cum SA (acres)	1.43	8.30	2.73

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT Profile #50-yr

E.G. Elev (ft)	306.68	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.61	Wt. n-Val.	0.040	0.050	0.050
W.S. Elev (ft)	306.08	Reach Len. (ft)	85.00	75.00	55.00
Crit W.S. (ft)		Flow Area (sq ft)	276.54	2437.27	643.60
E.G. Slope (ft/ft)	0.002951	Area (sq ft)	276.54	2437.27	643.60
Q Total (cfs)	18000.00	Flow (cfs)	562.64	16050.00	1387.36
Top Width (ft)	1022.06	Top Width (ft)	272.45	293.67	455.93
Vel Total (ft/s)	5.36	Avg. Vel. (ft/s)	2.03	6.59	2.16
Max Chl Dpth (ft)	9.08	Hydr. Depth (ft)	1.02	8.30	1.41
Conv. Total (cfs)	331349.8	Conv. (cfs)	10357.3	295453.6	25539.0
Length Wtd. (ft)	72.44	Wetted Per. (ft)	273.18	295.85	456.26
Min Ch El (ft)	297.00	Shear (lb/sq ft)	0.19	1.52	0.26
Alpha	1.36	Stream Power (lb/ft s)	0.38	9.99	0.56
Frctn Loss (ft)	0.17	Cum Volume (acre-ft)	9.94	58.00	17.90
C & E Loss (ft)	0.06	Cum SA (acres)	4.35	8.96	4.94

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	308.64	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.60	Wt. n-Val.	0.040	0.050	0.050
W.S. Elev (ft)	308.04	Reach Len. (ft)	85.00	75.00	55.00
Crit W.S. (ft)		Flow Area (sq ft)	1049.61	3024.49	1605.05
E.G. Slope (ft/ft)	0.002681	Area (sq ft)	1049.61	3024.49	1605.05
Q Total (cfs)	30000.00	Flow (cfs)	3194.95	21377.75	5427.30
Top Width (ft)	1347.28	Top Width (ft)	526.17	304.86	516.25
Vel Total (ft/s)	5.28	Avg. Vel. (ft/s)	3.04	7.07	3.38
Max Chl Dpth (ft)	11.04	Hydr. Depth (ft)	1.99	9.92	3.11
Conv. Total (cfs)	579422.9	Conv. (cfs)	61707.6	412891.9	104823.4
Length Wtd. (ft)	71.34	Wetted Per. (ft)	527.19	307.20	517.16
Min Ch El (ft)	297.00	Shear (lb/sq ft)	0.33	1.65	0.52
Alpha	1.39	Stream Power (lb/ft s)	1.01	11.65	1.76
Frctn Loss (ft)	0.18	Cum Volume (acre-ft)	18.75	72.58	29.15
C & E Loss (ft)	0.03	Cum SA (acres)	8.00	9.32	7.52

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

CROSS SECTION

RIVER: San Luis Rey
REACH: Reach 1 RS: 20.817

INPUT
Description: 20.
20.817
Station Elevation Data num= 42

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	306	.00988	306	60.50995	305	126.09	304	130.9399	303
155.14	303	164.2599	304	175.1199	305	182.59	306	188.2399	307
211.08	307	214.9799	306	218.6899	305	220.5699	304	222.09	303
223.6299	302	225.0999	301	226.6199	300	228.15	299	253.1099	298
273.53	297	452.71	297	478.71	297	500.15	297	633.6799	301
639.84	302	644.73	303	702.6199	304	713.6499	305	845.2799	306
848.0599	307	851.1099	308	854.4799	309	858.9	310	872.52	310
879.6599	310	895.9	310	905.9899	309	908.1599	308	910.5099	307
958.9299	307	1056.94	307						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	182.59	.05	500.15	.05

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
182.59	500.15	225	263	330	.1	.3

CROSS SECTION OUTPUT Profile #2-yr

E.G. Elev (ft)	300.37	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.01	Wt. n-Val.		0.050	0.050
W.S. Elev (ft)	300.36	Reach Len. (ft)	225.00	263.00	330.00
Crit W.S. (ft)		Flow Area (sq ft)		868.53	188.79
E.G. Slope (ft/ft)	0.000158	Area (sq ft)		868.53	188.79
Q Total (cfs)	800.00	Flow (cfs)		700.17	99.83
Top Width (ft)	386.35	Top Width (ft)		274.08	112.27
Vel Total (ft/s)	0.76	Avg. Vel. (ft/s)		0.81	0.53
Max Chl Dpth (ft)	3.36	Hydr. Depth (ft)		3.17	1.68
Conv. Total (cfs)	63556.5	Conv. (cfs)		55625.4	7931.1
Length Wtd. (ft)	268.17	Wetted Per. (ft)		274.53	112.32
Min Ch El (ft)	297.00	Shear (lb/sq ft)		0.03	0.02
Alpha	1.05	Stream Power (lb/ft s)		0.03	0.01
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	0.10	16.79	1.89
C & E Loss (ft)	0.00	Cum SA (acres)	0.14	6.74	1.87

CROSS SECTION OUTPUT Profile #5-yr

E.G. Elev (ft)	301.37	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.03	Wt. n-Val.		0.050	0.050
W.S. Elev (ft)	301.34	Reach Len. (ft)	225.00	263.00	330.00
Crit W.S. (ft)		Flow Area (sq ft)		1137.38	313.00
E.G. Slope (ft/ft)	0.000377	Area (sq ft)		1137.38	313.00
Q Total (cfs)	2000.00	Flow (cfs)		1684.89	315.11
Top Width (ft)	411.18	Top Width (ft)		275.55	135.63

Vel Total (ft/s)	1.38	Avg. Vel. (ft/s)		1.48	1.01
Max Chl Dpth (ft)	4.34	Hydr. Depth (ft)		4.13	2.31
Conv. Total (cfs)	103055.3	Conv. (cfs)		86818.6	16236.7
Length Wtd. (ft)	270.61	Wetted Per. (ft)		276.30	135.72
Min Ch El (ft)	297.00	Shear (lb/sq ft)		0.10	0.05
Alpha	1.06	Stream Power (lb/ft s)		0.14	0.05
Frctn Loss (ft)	0.08	Cum Volume (acre-ft)	0.26	22.60	3.98
C & E Loss (ft)	0.00	Cum SA (acres)	0.19	7.34	2.50

CROSS SECTION OUTPUT Profile #10-yr

E.G. Elev (ft)	302.49	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.07	Wt. n-Val.		0.050	0.050
W.S. Elev (ft)	302.42	Reach Len. (ft)	225.00	263.00	330.00
Crit W.S. (ft)		Flow Area (sq ft)		1435.93	463.01
E.G. Slope (ft/ft)	0.000643	Area (sq ft)		1435.93	463.01
Q Total (cfs)	4000.00	Flow (cfs)		3232.34	767.66
Top Width (ft)	418.92	Top Width (ft)		277.17	141.75
Vel Total (ft/s)	2.11	Avg. Vel. (ft/s)		2.25	1.66
Max Chl Dpth (ft)	5.42	Hydr. Depth (ft)		5.18	3.27
Conv. Total (cfs)	157701.8	Conv. (cfs)		127436.6	30265.2
Length Wtd. (ft)	273.11	Wetted Per. (ft)		278.24	141.94
Min Ch El (ft)	297.00	Shear (lb/sq ft)		0.21	0.13
Alpha	1.04	Stream Power (lb/ft s)		0.47	0.22
Frctn Loss (ft)	0.14	Cum Volume (acre-ft)	0.81	29.36	6.56
C & E Loss (ft)	0.00	Cum SA (acres)	1.41	7.82	2.59

CROSS SECTION OUTPUT Profile #50-yr

E.G. Elev (ft)	306.45	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.40	Wt. n-Val.	0.040	0.050	0.050
W.S. Elev (ft)	306.05	Reach Len. (ft)	225.00	263.00	330.00
Crit W.S. (ft)		Flow Area (sq ft)	264.77	2452.57	1222.88
E.G. Slope (ft/ft)	0.002013	Area (sq ft)	264.77	2452.57	1222.88
Q Total (cfs)	18000.00	Flow (cfs)	564.59	13649.42	3785.99
Top Width (ft)	813.47	Top Width (ft)	182.59	285.62	345.26
Vel Total (ft/s)	4.57	Avg. Vel. (ft/s)	2.13	5.57	3.10
Max Chl Dpth (ft)	9.05	Hydr. Depth (ft)	1.45	8.59	3.54
Conv. Total (cfs)	401240.3	Conv. (cfs)	12585.4	304261.0	84394.0
Length Wtd. (ft)	272.47	Wetted Per. (ft)	182.92	287.56	345.57
Min Ch El (ft)	297.00	Shear (lb/sq ft)	0.18	1.07	0.44
Alpha	1.23	Stream Power (lb/ft s)	0.39	5.96	1.38
Frctn Loss (ft)	0.44	Cum Volume (acre-ft)	9.41	53.79	16.72
C & E Loss (ft)	0.03	Cum SA (acres)	3.91	8.46	4.43

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

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	308.43	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.50	Wt. n-Val.	0.040	0.050	0.050
W.S. Elev (ft)	307.93	Reach Len. (ft)	225.00	263.00	330.00
Crit W.S. (ft)		Flow Area (sq ft)	609.34	3025.76	2017.34
E.G. Slope (ft/ft)	0.002288	Area (sq ft)	609.34	3025.76	2017.34
Q Total (cfs)	30000.00	Flow (cfs)	2398.52	19244.59	8356.89
Top Width (ft)	999.53	Top Width (ft)	182.59	317.56	499.38
Vel Total (ft/s)	5.31	Avg. Vel. (ft/s)	3.94	6.36	4.14
Max Chl Dpth (ft)	10.93	Hydr. Depth (ft)	3.34	9.53	4.04
Conv. Total (cfs)	627188.8	Conv. (cfs)	50144.2	402332.9	174711.6
Length Wtd. (ft)	273.63	Wetted Per. (ft)	184.81	319.70	501.13
Min Ch El (ft)	297.00	Shear (lb/sq ft)	0.47	1.35	0.57
Alpha	1.13	Stream Power (lb/ft s)	1.85	8.60	2.38
Frctn Loss (ft)	0.56	Cum Volume (acre-ft)	17.13	67.37	26.86
C & E Loss (ft)	0.00	Cum SA (acres)	7.31	8.78	6.87

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

CROSS SECTION

RIVER: San Luis Rey
REACH: Reach 1 RS: 20.767

INPUT
Description: 20.767
Station Elevation Data num= 29

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	3027.820007		30213.92999		302	126.44	302	133.72	303
154.51	303	156.91	302	159.45	301	165.89	300	178.58	299
182.64	298	188.54	297	220.38	297	247.58	297	251.82	296
457.35	296	465.93	297	468.53	298	471.01	299	586.29	300
633.57	301	635.9	302	637.84	303	639.88	304	641.94	305
767.32	306	848.95	307	896.54	306	900.83	305		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	178.58	.05	465.93	.05

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
178.58	465.93	591	591	591	.1	.3

CROSS SECTION OUTPUT Profile #2-yr

E.G. Elev (ft)	300.34	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.01	Wt. n-Val.	0.040	0.050	0.050
W.S. Elev (ft)	300.34	Reach Len. (ft)	591.00	591.00	591.00

Crit W.S. (ft)		Flow Area (sq ft)	10.97	1161.54	110.99
E.G. Slope (ft/ft)	0.000078	Area (sq ft)	10.97	1161.54	110.99
Q Total (cfs)	800.00	Flow (cfs)	2.93	771.75	25.32
Top Width (ft)	438.46	Top Width (ft)	14.85	287.35	136.25
Vel Total (ft/s)	0.62	Avg. Vel. (ft/s)	0.27	0.66	0.23
Max Chl Dpth (ft)	4.34	Hydr. Depth (ft)	0.74	4.04	0.81
Conv. Total (cfs)	90721.1	Conv. (cfs)	332.2	87517.3	2871.5
Length Wtd. (ft)	591.00	Wetted Per. (ft)	14.92	287.73	136.64
Min Ch El (ft)	296.00	Shear (lb/sq ft)	0.00	0.02	0.00
Alpha	1.10	Stream Power (lb/ft s)	0.00	0.01	0.00
Frctn Loss (ft)	0.15	Cum Volume (acre-ft)	0.07	10.66	0.75
C & E Loss (ft)	0.01	Cum SA (acres)	0.10	5.05	0.93

Warning: The conveyance ratio (upstream 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 #5-yr

		Element	Left OB	Channel	Right OB
E.G. Elev (ft)	301.29				
Vel Head (ft)	0.02	Wt. n-Val.	0.040	0.050	0.050
W.S. Elev (ft)	301.27	Reach Len. (ft)	591.00	591.00	591.00
Crit W.S. (ft)		Flow Area (sq ft)	27.52	1429.94	257.24
E.G. Slope (ft/ft)	0.000219	Area (sq ft)	27.52	1429.94	257.24
Q Total (cfs)	2000.00	Flow (cfs)	18.72	1831.41	149.87
Top Width (ft)	475.44	Top Width (ft)	19.82	287.35	168.27
Vel Total (ft/s)	1.17	Avg. Vel. (ft/s)	0.68	1.28	0.58
Max Chl Dpth (ft)	5.27	Hydr. Depth (ft)	1.39	4.98	1.53
Conv. Total (cfs)	135148.2	Conv. (cfs)	1265.1	123756.0	10127.1
Length Wtd. (ft)	591.00	Wetted Per. (ft)	19.98	287.73	168.72
Min Ch El (ft)	296.00	Shear (lb/sq ft)	0.02	0.07	0.02
Alpha	1.13	Stream Power (lb/ft s)	0.01	0.09	0.01
Frctn Loss (ft)	0.35	Cum Volume (acre-ft)	0.19	14.85	1.82
C & E Loss (ft)	0.01	Cum SA (acres)	0.13	5.64	1.34

Warning: The conveyance ratio (upstream 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 #10-yr

		Element	Left OB	Channel	Right OB
E.G. Elev (ft)	302.35				
Vel Head (ft)	0.06	Wt. n-Val.	0.040	0.050	0.050
W.S. Elev (ft)	302.29	Reach Len. (ft)	591.00	591.00	591.00
Crit W.S. (ft)		Flow Area (sq ft)	86.51	1723.93	430.60
E.G. Slope (ft/ft)	0.000415	Area (sq ft)	86.51	1723.93	430.60
Q Total (cfs)	4000.00	Flow (cfs)	74.52	3443.31	482.18
Top Width (ft)	608.84	Top Width (ft)	150.95	287.35	170.54
Vel Total (ft/s)	1.78	Avg. Vel. (ft/s)	0.86	2.00	1.12
Max Chl Dpth (ft)	6.29	Hydr. Depth (ft)	0.57	6.00	2.52
Conv. Total (cfs)	196329.6	Conv. (cfs)	3657.5	169005.8	23666.3

Length Wtd. (ft)	591.00	Wetted Per. (ft)	151.63	287.73	171.21
Min Ch El (ft)	296.00	Shear (lb/sq ft)	0.01	0.16	0.07
Alpha	1.13	Stream Power (lb/ft s)	0.01	0.31	0.07
Frctn Loss (ft)	0.59	Cum Volume (acre-ft)	0.59	19.82	3.17
C & E Loss (ft)	0.01	Cum SA (acres)	1.02	6.12	1.40

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.

CROSS SECTION OUTPUT Profile #50-yr

E.G. Elev (ft)	305.97	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.30	Wt. n-Val.	0.040	0.050	0.050
W.S. Elev (ft)	305.68	Reach Len. (ft)	591.00	591.00	591.00
Crit W.S. (ft)		Flow Area (sq ft)	673.81	2696.46	1048.60
E.G. Slope (ft/ft)	0.001326	Area (sq ft)	673.81	2696.46	1048.60
Q Total (cfs)	18000.00	Flow (cfs)	2174.71	12970.93	2854.36
Top Width (ft)	729.83	Top Width (ft)	178.58	287.35	263.90
Vel Total (ft/s)	4.07	Avg. Vel. (ft/s)	3.23	4.81	2.72
Max Chl Dpth (ft)	9.68	Hydr. Depth (ft)	3.77	9.38	3.97
Conv. Total (cfs)	494304.3	Conv. (cfs)	59720.6	356199.2	78384.5
Length Wtd. (ft)	591.00	Wetted Per. (ft)	182.83	287.73	265.96
Min Ch El (ft)	296.00	Shear (lb/sq ft)	0.31	0.78	0.33
Alpha	1.15	Stream Power (lb/ft s)	0.98	3.73	0.89
Frctn Loss (ft)	1.37	Cum Volume (acre-ft)	6.98	38.24	8.11
C & E Loss (ft)	0.01	Cum SA (acres)	2.98	6.73	2.13

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.

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	307.87	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.50	Wt. n-Val.	0.040	0.050	0.050
W.S. Elev (ft)	307.38	Reach Len. (ft)	591.00	591.00	591.00
Crit W.S. (ft)		Flow Area (sq ft)	977.08	3184.45	1674.19
E.G. Slope (ft/ft)	0.001828	Area (sq ft)	977.08	3184.45	1674.19
Q Total (cfs)	30000.00	Flow (cfs)	4713.79	20092.12	5194.09
Top Width (ft)	900.83	Top Width (ft)	178.58	287.35	434.90
Vel Total (ft/s)	5.14	Avg. Vel. (ft/s)	4.82	6.31	3.10
Max Chl Dpth (ft)	11.38	Hydr. Depth (ft)	5.47	11.08	3.85
Conv. Total (cfs)	701760.5	Conv. (cfs)	110265.1	469995.3	121500.1
Length Wtd. (ft)	591.00	Wetted Per. (ft)	184.53	287.73	438.72

Min Ch El (ft)	296.00	Shear (lb/sq ft)	0.60	1.26	0.44
Alpha	1.21	Stream Power (lb/ft s)	2.91	7.97	1.35
Frctn Loss (ft)	1.68	Cum Volume (acre-ft)	13.03	48.63	12.88
C & E Loss (ft)	0.01	Cum SA (acres)	6.38	6.96	3.34

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.

CROSS SECTION

RIVER: San Luis Rey
REACH: Reach 1 RS: 20.655

INPUT
Description: 20.655
Station Elevation Data num= 82

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	324.6	0	323.8	9	324.9	23	320.6	31	318.6
48	318.7	60	315.8	90	311.8	125	308.6	163	306.2
203	305.1	222	304.7	242	303.8	291	303.7	307	303.4
319	303.3	334	303.5	344	304	356	304.5	369	304.5
383	304.8	390	305.7	416	305.6	435	305.1	491	305.8
500	305.1	512	305.1	514	305.9	535	306.5	577	306.2
587	307.2	594	307.2	596	306.8	622	306.3	635	306.3
643	305.3	695	305.6	699	306.3	714	306.2	715	305.6
722	305.6	759	305.2	930	305.1	979	305.5	993	305
1009	303.4	1028	302	1085	301.8	1132	301.7	1136	302.9
1148	302.2	1392	298.7	1430	299.6	1447	299.6	1458	299.9
1469	300.3	1493	301	1516	302.4	1534	303.7	1547	304.7
1559	305	1571	304.7	1590	299.7	1724	298.8	1767	298.8
1775	298.1	1795	298	1799	299.4	1841	300	1860	300.4
1864	298.8	1882	298.6	1886	300.1	1919	300.9	1966	310.2
1977	309.4	1991	309	2003	307.3	2010	306.5	2017	311
2024	312.4	2029	313.6						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	1148	.05	1886	.05

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
1148	1886	0	0	0	.1	.3

CROSS SECTION OUTPUT Profile #2-yr

E.G. Elev (ft)	300.19	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.06	Wt. n-Val.		0.050	0.050

W.S. Elev (ft)	300.13	Reach Len. (ft)		
Crit W.S. (ft)	299.59	Flow Area (sq ft)	409.49	0.02
E.G. Slope (ft/ft)	0.005010	Area (sq ft)	409.49	0.02
Q Total (cfs)	800.00	Flow (cfs)	800.00	0.00
Top Width (ft)	457.93	Top Width (ft)	456.58	1.35
Vel Total (ft/s)	1.95	Avg. Vel. (ft/s)	1.95	0.14
Max Chl Dpth (ft)	2.13	Hydr. Depth (ft)	0.90	0.02
Conv. Total (cfs)	11302.8	Conv. (cfs)	11302.7	0.0
Length Wtd. (ft)		Wetted Per. (ft)	457.47	1.35
Min Ch El (ft)	298.00	Shear (lb/sq ft)	0.28	0.01
Alpha	1.00	Stream Power (lb/ft s)	0.55	0.00
Frctn Loss (ft)		Cum Volume (acre-ft)		
C & E Loss (ft)		Cum SA (acres)		

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT Profile #5-yr

			Left OB	Channel	Right OB
E.G. Elev (ft)	300.93	Element			
Vel Head (ft)	0.11	Wt. n-Val.		0.050	0.050
W.S. Elev (ft)	300.83	Reach Len. (ft)			
Crit W.S. (ft)	300.06	Flow Area (sq ft)		758.59	10.87
E.G. Slope (ft/ft)	0.005000	Area (sq ft)		758.59	10.87
Q Total (cfs)	2000.00	Flow (cfs)		1988.38	11.62
Top Width (ft)	573.46	Top Width (ft)		543.51	29.94
Vel Total (ft/s)	2.60	Avg. Vel. (ft/s)		2.62	1.07
Max Chl Dpth (ft)	2.83	Hydr. Depth (ft)		1.40	0.36
Conv. Total (cfs)	28283.7	Conv. (cfs)		28119.4	164.3
Length Wtd. (ft)		Wetted Per. (ft)		544.57	29.95
Min Ch El (ft)	298.00	Shear (lb/sq ft)		0.43	0.11
Alpha	1.01	Stream Power (lb/ft s)		1.14	0.12
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT Profile #10-yr

			Left OB	Channel	Right OB
E.G. Elev (ft)	301.75	Element			
Vel Head (ft)	0.16	Wt. n-Val.		0.050	0.050
W.S. Elev (ft)	301.58	Reach Len. (ft)			
Crit W.S. (ft)	300.60	Flow Area (sq ft)		1197.73	36.90
E.G. Slope (ft/ft)	0.005001	Area (sq ft)		1197.73	36.90
Q Total (cfs)	4000.00	Flow (cfs)		3921.91	78.09
Top Width (ft)	651.14	Top Width (ft)		614.69	36.45
Vel Total (ft/s)	3.24	Avg. Vel. (ft/s)		3.27	2.12
Max Chl Dpth (ft)	3.58	Hydr. Depth (ft)		1.95	1.01
Conv. Total (cfs)	56562.7	Conv. (cfs)		55458.4	1104.3
Length Wtd. (ft)		Wetted Per. (ft)		615.86	36.53

Min Ch El (ft)	298.00	Shear (lb/sq ft)	0.61	0.32
Alpha	1.01	Stream Power (lb/ft s)	1.99	0.67
Frctn Loss (ft)		Cum Volume (acre-ft)		
C & E Loss (ft)		Cum SA (acres)		

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT Profile #50-yr

E.G. Elev (ft)	304.59	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.44	Wt. n-Val.	0.040	0.050	0.050
W.S. Elev (ft)	304.16	Reach Len. (ft)			
Crit W.S. (ft)	302.64	Flow Area (sq ft)	355.61	2940.89	147.51
E.G. Slope (ft/ft)	0.005007	Area (sq ft)	355.61	2940.89	147.51
Q Total (cfs)	18000.00	Flow (cfs)	1356.43	16003.73	639.84
Top Width (ft)	1014.64	Top Width (ft)	260.29	704.88	49.46
Vel Total (ft/s)	5.23	Avg. Vel. (ft/s)	3.81	5.44	4.34
Max Chl Dpth (ft)	6.16	Hydr. Depth (ft)	1.37	4.17	2.98
Conv. Total (cfs)	254373.4	Conv. (cfs)	19168.8	226162.4	9042.1
Length Wtd. (ft)		Wetted Per. (ft)	260.61	706.49	49.79
Min Ch El (ft)	298.00	Shear (lb/sq ft)	0.43	1.30	0.93
Alpha	1.03	Stream Power (lb/ft s)	1.63	7.08	4.02
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	306.19	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.59	Wt. n-Val.	0.040	0.050	0.050
W.S. Elev (ft)	305.60	Reach Len. (ft)			
Crit W.S. (ft)	303.69	Flow Area (sq ft)	943.95	3983.48	223.89
E.G. Slope (ft/ft)	0.005002	Area (sq ft)	943.95	3983.48	223.89
Q Total (cfs)	30000.00	Flow (cfs)	3106.75	25724.47	1168.78
Top Width (ft)	1556.40	Top Width (ft)	761.67	738.00	56.73
Vel Total (ft/s)	5.82	Avg. Vel. (ft/s)	3.29	6.46	5.22
Max Chl Dpth (ft)	7.60	Hydr. Depth (ft)	1.24	5.40	3.95
Conv. Total (cfs)	424163.5	Conv. (cfs)	43925.7	363712.8	16525.1
Length Wtd. (ft)		Wetted Per. (ft)	762.26	739.70	57.20
Min Ch El (ft)	298.00	Shear (lb/sq ft)	0.39	1.68	1.22
Alpha	1.12	Stream Power (lb/ft s)	1.27	10.86	6.38
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

Warning: Divided flow computed for this cross-section.

SUMMARY OF MANNING'S N VALUES

River:San Luis Rey

Reach	River Sta.	n1	n2	n3
Reach 1	21.246	.04	.05	.035
Reach 1	21.137	.04	.05	.035
Reach 1	21.093	.04	.05	.035
Reach 1	20.996	.04	.05	.035
Reach 1	20.96	.04	.05	.035
Reach 1	20.943	.04	.05	.035
Reach 1	20.936	.04	.05	.035
Reach 1	20.891	.04	.05	.035
Reach 1	20.872	.04	.05	.035
Reach 1	20.849	.04	.05	.035
Reach 1	20.831	.04	.05	.05
Reach 1	20.817	.04	.05	.05
Reach 1	20.767	.04	.05	.05
Reach 1	20.655	.04	.05	.05

SUMMARY OF REACH LENGTHS

River: San Luis Rey

Reach	River Sta.	Left	Channel	Right
Reach 1	21.246	450	575	650
Reach 1	21.137	450	510	530
Reach 1	21.093	227	215	135
Reach 1	20.996	108	115	95
Reach 1	20.96	140	140	235
Reach 1	20.943	50	50	50
Reach 1	20.936	240	240	240
Reach 1	20.891	115	110	95
Reach 1	20.872	105	124	162
Reach 1	20.849	102	97	88
Reach 1	20.831	85	75	55
Reach 1	20.817	225	263	330
Reach 1	20.767	591	591	591
Reach 1	20.655	0	0	0

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: San Luis Rey

Reach	River Sta.	Contr.	Expan.
Reach 1	21.246	.1	.3
Reach 1	21.137	.1	.3
Reach 1	21.093	.1	.3
Reach 1	20.996	.1	.3
Reach 1	20.96	.1	.3
Reach 1	20.943	.1	.3
Reach 1	20.936	.1	.3
Reach 1	20.891	.1	.3
Reach 1	20.872	.1	.3
Reach 1	20.849	.1	.3
Reach 1	20.831	.1	.3
Reach 1	20.817	.1	.3
Reach 1	20.767	.1	.3
Reach 1	20.655	.1	.3

HEC-RAS Plan: PR River: San Luis Rey Reach: Reach 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)	
Reach 1	20.655	2-yr	800.00	298.00	300.13	299.59	300.19	0.005010	1.95	409.51	457.93	0.36
Reach 1	20.655	5-yr	2000.00	298.00	300.83	300.06	300.93	0.005000	2.62	769.46	573.46	0.39
Reach 1	20.655	10-yr	4000.00	298.00	301.58	300.60	301.75	0.005001	3.27	1234.63	651.14	0.41
Reach 1	20.655	50-yr	18000.00	298.00	304.16	302.64	304.59	0.005007	5.44	3444.01	1014.64	0.47
Reach 1	20.655	100-yr	30000.00	298.00	305.60	303.69	306.19	0.005002	6.46	5151.31	1556.40	0.49
Reach 1	20.767	2-yr	800.00	296.00	300.34		300.34	0.000078	0.66	1283.51	438.46	0.06
Reach 1	20.767	5-yr	2000.00	296.00	301.27		301.29	0.000219	1.28	1714.70	475.44	0.10
Reach 1	20.767	10-yr	4000.00	296.00	302.29		302.35	0.000415	2.00	2241.05	608.84	0.14
Reach 1	20.767	50-yr	18000.00	296.00	305.68		305.97	0.001326	4.81	4418.85	729.83	0.28
Reach 1	20.767	100-yr	30000.00	296.00	307.38		307.87	0.001828	6.31	5835.72	900.83	0.33
Reach 1	20.817	2-yr	800.00	297.00	300.36		300.37	0.000165	0.75	1091.76	427.66	0.08
Reach 1	20.817	5-yr	2000.00	297.00	301.34		301.37	0.000375	1.34	1528.18	456.66	0.13
Reach 1	20.817	10-yr	4000.00	297.00	302.42		302.48	0.000607	2.02	2026.41	466.19	0.17
Reach 1	20.817	50-yr	18000.00	297.00	306.03		306.39	0.001670	4.93	4118.21	918.67	0.30
Reach 1	20.817	100-yr	30000.00	297.00	307.91		308.36	0.001806	5.88	6320.21	1436.76	0.33
Reach 1	20.831	2-yr	800.00	297.00	300.38		300.39	0.000241	0.94	905.16	409.32	0.10
Reach 1	20.831	5-yr	2000.00	297.00	301.37		301.41	0.000500	1.64	1321.22	425.19	0.15
Reach 1	20.831	10-yr	4000.00	297.00	302.46		302.54	0.000784	2.42	1793.75	444.72	0.19
Reach 1	20.831	50-yr	18000.00	297.00	306.14		306.53	0.001886	5.42	3847.86	1032.37	0.32
Reach 1	20.831	100-yr	30000.00	297.00	308.04		308.50	0.001872	6.17	6107.28	1347.28	0.33
Reach 1	20.849	2-yr	800.00	297.00	300.40		300.42	0.000464	1.15	739.13	401.82	0.13
Reach 1	20.849	5-yr	2000.00	297.00	301.42		301.47	0.000792	1.87	1155.46	417.75	0.18
Reach 1	20.849	10-yr	4000.00	297.00	302.54		302.63	0.001111	2.65	1640.39	459.10	0.22
Reach 1	20.849	50-yr	18000.00	297.00	306.32		306.72	0.002070	5.47	3694.69	695.58	0.34
Reach 1	20.849	100-yr	30000.00	297.00	308.16		308.73	0.002352	6.68	5468.88	1201.17	0.37
Reach 1	20.872	2-yr	800.00	298.00	300.49		300.52	0.001277	1.46	589.52	428.08	0.20
Reach 1	20.872	5-yr	2000.00	298.00	301.54		301.60	0.001275	2.02	1049.71	443.01	0.22
Reach 1	20.872	10-yr	4000.00	298.00	302.70		302.80	0.001416	2.70	1576.10	469.82	0.24
Reach 1	20.872	50-yr	18000.00	298.00	306.63		306.99	0.001983	5.14	3854.25	790.36	0.33
Reach 1	20.872	100-yr	30000.00	298.00	308.54		309.03	0.002147	6.20	5832.82	1285.94	0.35
Reach 1	20.891	2-yr	800.00	298.00	300.66		300.73	0.003035	2.17	379.26	311.32	0.31
Reach 1	20.891	5-yr	2000.00	298.00	301.70		301.80	0.002595	2.52	809.72	444.09	0.30

HEC-RAS Plan: PR River: San Luis Rey Reach: Reach 1 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach 1	20.891	10-yr	4000.00	298.00	302.85		302.99	0.002053	2.96	1327.73	460.62	0.29
Reach 1	20.891	50-yr	18000.00	298.00	306.79		307.23	0.002082	5.05	3552.46	669.89	0.33
Reach 1	20.891	100-yr	30000.00	298.00	308.74		309.29	0.002422	6.39	5496.04	1227.51	0.37
Reach 1	20.936	2-yr	800.00	299.00	301.31		301.38	0.002418	2.25	392.96	370.51	0.29
Reach 1	20.936	5-yr	2000.00	299.00	302.29		302.40	0.002362	2.93	782.86	414.07	0.30
Reach 1	20.936	10-yr	4000.00	299.00	303.36		303.53	0.002369	3.62	1260.04	471.72	0.32
Reach 1	20.936	50-yr	18000.00	299.00	307.36		307.78	0.002520	5.94	3538.97	775.83	0.37
Reach 1	20.936	100-yr	30000.00	299.00	309.41		309.89	0.002479	6.86	5793.38	1295.85	0.38
Reach 1	20.943	2-yr	800.00	299.00	301.44		301.51	0.002839	2.24	377.78	300.93	0.30
Reach 1	20.943	5-yr	2000.00	299.00	302.42		302.54	0.003151	2.91	737.90	408.67	0.34
Reach 1	20.943	10-yr	4000.00	299.00	303.48		303.66	0.002890	3.59	1197.24	452.63	0.34
Reach 1	20.943	50-yr	18000.00	299.00	307.47		307.92	0.002678	5.81	3440.26	848.40	0.38
Reach 1	20.943	100-yr	30000.00	299.00	309.52		310.02	0.002526	6.65	5692.50	1249.72	0.38
Reach 1	20.96	2-yr	800.00	299.00	301.73		301.80	0.001502	1.99	402.12	176.79	0.23
Reach 1	20.96	5-yr	2000.00	299.00	302.83		302.98	0.002931	3.16	641.53	259.52	0.34
Reach 1	20.96	10-yr	4000.00	299.00	303.89		304.17	0.003843	4.32	959.94	315.55	0.40
Reach 1	20.96	50-yr	18000.00	299.00	307.86		308.42	0.004027	6.25	3060.15	666.02	0.45
Reach 1	20.96	100-yr	30000.00	299.00	309.80		310.54	0.003967	7.38	4612.79	940.42	0.46
Reach 1	20.996	2-yr	800.00	300.00	301.97		302.09	0.004443	2.82	284.48	169.55	0.38
Reach 1	20.996	5-yr	2000.00	300.00	303.19		303.39	0.004144	3.65	573.39	264.98	0.40
Reach 1	20.996	10-yr	4000.00	300.00	304.36		304.66	0.004736	4.52	911.81	319.89	0.44
Reach 1	20.996	50-yr	18000.00	300.00	308.33		308.94	0.005080	6.63	2959.06	743.27	0.50
Reach 1	20.996	100-yr	30000.00	300.00	310.28		311.01	0.004313	7.33	4506.05	886.06	0.48
Reach 1	21.093	2-yr	800.00	301.00	302.94		303.07	0.004640	2.89	276.68	161.49	0.39
Reach 1	21.093	5-yr	2000.00	301.00	304.14		304.36	0.004875	3.90	534.09	248.06	0.43
Reach 1	21.093	10-yr	4000.00	301.00	305.51		305.77	0.005527	4.10	982.48	421.67	0.45
Reach 1	21.093	50-yr	18000.00	301.00	309.38	307.24	309.85	0.003369	5.92	3358.48	756.55	0.41
Reach 1	21.093	100-yr	30000.00	301.00	311.20	308.54	311.83	0.003236	6.87	4869.42	957.55	0.42
Reach 1	21.137	2-yr	800.00	306.10	307.58	307.46	307.90	0.027797	4.54	176.23	201.11	0.85
Reach 1	21.137	5-yr	2000.00	306.10	308.37	308.15	308.91	0.020225	5.87	341.51	209.78	0.81
Reach 1	21.137	10-yr	4000.00	306.10	309.47		310.22	0.014911	6.96	576.28	218.55	0.75
Reach 1	21.137	50-yr	18000.00	306.10	312.56	312.56	314.10	0.020948	10.00	1841.44	642.35	0.94

HEC-RAS Plan: PR River: San Luis Rey Reach: Reach 1 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach 1	21.137	100-yr	30000.00	306.10	314.11	314.11	315.70	0.014212	10.49	3079.30	991.37	0.82
Reach 1	21.246	2-yr	800.00	307.50	310.46	308.86	310.51	0.001754	1.69	473.53	299.10	0.24
Reach 1	21.246	5-yr	2000.00	307.50	311.64	309.66	311.70	0.002089	2.05	974.74	531.90	0.27
Reach 1	21.246	10-yr	4000.00	307.50	312.64	310.67	312.74	0.001994	2.57	1589.32	681.25	0.28
Reach 1	21.246	50-yr	18000.00	307.50	316.03	313.20	316.21	0.001335	3.53	5505.97	1408.23	0.26
Reach 1	21.246	100-yr	30000.00	307.50	317.46	314.57	317.71	0.001381	4.15	7529.10	1426.65	0.27

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


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

PROJECT DATA
Project Title: Gregory Canyon Wetlands Restoration
Project File : gregory.prj
Run Date and Time: 11/2/2009 1:25:45 PM

Project in English units

PLAN DATA

Plan Title: Proposed
Plan File : j:\27654025 Gregory Canyon LF 404\046 Work in Progress\Wetlands Grading Plans\Water Resources\Drainage Report\HEC-RAS\gregory.p01

Geometry Title: Gregory Canyon Proposed Condition
Geometry File : j:\27654025 Gregory Canyon LF 404\046 Work in Progress\Wetlands Grading Plans\Water Resources\Drainage Report\HEC-RAS\gregory.g03

Flow Title : Flow Data
Flow File : j:\27654025 Gregory Canyon LF 404\046 Work in Progress\Wetlands Grading Plans\Water Resources\Drainage Report\HEC-RAS\gregory.f01

Plan Summary Information:

Number of:	Cross Sections	= 14	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: Flow Data
Flow File : j:\27654025 Gregory Canyon LF 404\046 Work in Progress\Wetlands Grading Plans\Water Resources\Drainage Report\HEC-RAS\gregory.f01

Flow Data (cfs)

River	Reach	RS	2-yr	5-yr	10-yr	50-yr	100-yr
San Luis Rey	Reach 1	21.246	800	2000	4000	18000	30000

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
San Luis Rey	Reach 1	2-yr	Normal S = 0.005	Normal S = 0.005

San Luis Rey	Reach 1	5-yr	Normal S = 0.005	Normal S = 0.005
San Luis Rey	Reach 1	10-yr	Normal S = 0.005	Normal S = 0.005
San Luis Rey	Reach 1	50-yr	Normal S = 0.005	Normal S = 0.005
San Luis Rey	Reach 1	100-yr	Normal S = 0.005	Normal S = 0.005

GEOMETRY DATA

Geometry Title: Gregory Canyon Proposed Condition
Geometry File : j:\27654025 Gregory Canyon LF 404\046 Work in Progress\Wetlands Grading Plans\Water Resources\Drainage Report\HEC-RAS\gregory.g03

CROSS SECTION

RIVER: San Luis Rey
REACH: Reach 1 RS: 21.246

INPUT
Description: 21.246
Station Elevation Data num= 90

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	321.6	16	320.1	30	319.6	39	319.8	55	319.3
69	318.9	87	318.3	109	318.2	121	319.7	132	320.5
143	322.9	153	324	159	324.9	160	324.8	165	323.2
170	321.9	177	321.9	187	318.3	193	312.8	234	312.8
275	312.8	281	315.8	294	317.6	303	314.4	344	314.8
387	314.9	411	314.6	433	314.6	462	310.8	506	310.9
544	310.9	570	310.9	598	311.4	617	311.8	623	311.9
629	311.9	632	313.3	636	313.3	640	313.3	645	313.2
651	311.9	663	311.5	676	311.3	681	310.7	691	310.7
700	310.7	704	311	710	311.1	714	310.4	733	310.4
753	310.4	774	310.5	905	307.9	967	307.7	1009	307.5
1036	313.5	1054	313.5	1074	313.7	1093	313.4	1106	313.1
1110	311.9	1122	311.9	1126	313.1	1134	311.3	1148	311.9
1171	312	1190	312.2	1200	312.6	1221	312.5	1244	313.3
1270	313.4	1295	313.5	1322	313.5	1345	313.5	1366	313.5
1384	313.7	1413	313.6	1438	314.2	1462	314.3	1493	314.1
1529	314.3	1554	314.1	1574	314.1	1593	314.1	1600	314.1

1610	314.1	1618	318.6	1627	318.6	1642	318.6	1649	320.4

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	433	.05	1036	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
433	1036	450	575	650	.1	.3

CROSS SECTION OUTPUT Profile #2-yr

E.G. Elev (ft)	310.51	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.04	Wt. n-Val.		0.050	
W.S. Elev (ft)	310.46	Reach Len. (ft)	450.00	575.00	650.00
Crit W.S. (ft)	308.86	Flow Area (sq ft)		473.53	
E.G. Slope (ft/ft)	0.001754	Area (sq ft)		473.53	
Q Total (cfs)	800.00	Flow (cfs)		800.00	
Top Width (ft)	299.10	Top Width (ft)		299.10	
Vel Total (ft/s)	1.69	Avg. Vel. (ft/s)		1.69	
Max Chl Dpth (ft)	2.96	Hydr. Depth (ft)		1.58	
Conv. Total (cfs)	19100.3	Conv. (cfs)		19100.3	
Length Wtd. (ft)	574.96	Wetted Per. (ft)		299.46	
Min Ch El (ft)	307.50	Shear (lb/sq ft)		0.17	
Alpha	1.00	Stream Power (lb/ft s)		0.29	
Frctn Loss (ft)	2.58	Cum Volume (acre-ft)	0.28	36.00	2.23
C & E Loss (ft)	0.03	Cum SA (acres)	0.77	18.38	3.18

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

CROSS SECTION OUTPUT Profile #5-yr

E.G. Elev (ft)	311.70	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.07	Wt. n-Val.		0.050	0.035
W.S. Elev (ft)	311.64	Reach Len. (ft)	450.00	575.00	650.00
Crit W.S. (ft)	309.66	Flow Area (sq ft)		973.14	1.59
E.G. Slope (ft/ft)	0.002089	Area (sq ft)		973.14	1.59

Q Total (cfs)	2000.00	Flow (cfs)		1999.06	0.94
Top Width (ft)	531.90	Top Width (ft)		522.50	9.40
Vel Total (ft/s)	2.05	Avg. Vel. (ft/s)		2.05	0.59
Max Chl Dpth (ft)	4.14	Hydr. Depth (ft)		1.86	0.17
Conv. Total (cfs)	43762.6	Conv. (cfs)		43742.0	20.6
Length Wtd. (ft)	574.86	Wetted Per. (ft)		523.16	9.45
Min Ch El (ft)	307.50	Shear (lb/sq ft)		0.24	0.02
Alpha	1.00	Stream Power (lb/ft s)		0.50	0.01
Frctn Loss (ft)	2.75	Cum Volume (acre-ft)	1.86	55.47	5.92
C & E Loss (ft)	0.05	Cum SA (acres)	1.89	21.50	4.19

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

CROSS SECTION OUTPUT Profile #10-yr

E.G. Elev (ft)	312.74	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.10	Wt. n-Val.		0.050	0.035
W.S. Elev (ft)	312.64	Reach Len. (ft)	450.00	575.00	650.00
Crit W.S. (ft)	310.67	Flow Area (sq ft)		1529.05	60.28
E.G. Slope (ft/ft)	0.001994	Area (sq ft)		1529.05	60.28
Q Total (cfs)	4000.00	Flow (cfs)		3925.21	74.79
Top Width (ft)	681.25	Top Width (ft)		567.23	114.03
Vel Total (ft/s)	2.52	Avg. Vel. (ft/s)		2.57	1.24
Max Chl Dpth (ft)	5.14	Hydr. Depth (ft)		2.70	0.53
Conv. Total (cfs)	89578.1	Conv. (cfs)		87903.1	1674.9
Length Wtd. (ft)	575.38	Wetted Per. (ft)		568.31	114.42
Min Ch El (ft)	307.50	Shear (lb/sq ft)		0.33	0.07
Alpha	1.03	Stream Power (lb/ft s)		0.86	0.08
Frctn Loss (ft)	2.46	Cum Volume (acre-ft)	4.93	79.06	10.87
C & E Loss (ft)	0.06	Cum SA (acres)	3.95	23.74	5.27

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.

CROSS SECTION OUTPUT Profile #50-yr

E.G. Elev (ft)	316.21	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.17	Wt. n-Val.	0.040	0.050	0.035
W.S. Elev (ft)	316.03	Reach Len. (ft)	450.00	575.00	650.00
Crit W.S. (ft)	313.20	Flow Area (sq ft)	457.01	3547.39	1501.56
E.G. Slope (ft/ft)	0.001335	Area (sq ft)	457.01	3547.39	1501.56
Q Total (cfs)	18000.00	Flow (cfs)	1070.80	12530.66	4398.55
Top Width (ft)	1408.23	Top Width (ft)	227.80	603.00	577.44
Vel Total (ft/s)	3.27	Avg. Vel. (ft/s)	2.34	3.53	2.93
Max Chl Dpth (ft)	8.53	Hydr. Depth (ft)	2.01	5.88	2.60
Conv. Total (cfs)	492685.4	Conv. (cfs)	29309.2	342981.8	120394.5
Length Wtd. (ft)	580.19	Wetted Per. (ft)	230.07	604.51	578.55
Min Ch El (ft)	307.50	Shear (lb/sq ft)	0.17	0.49	0.22
Alpha	1.04	Stream Power (lb/ft s)	0.39	1.73	0.63
Frctn Loss (ft)	1.97	Cum Volume (acre-ft)	39.48	171.87	40.57
C & E Loss (ft)	0.14	Cum SA (acres)	16.75	29.13	13.31

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

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	317.71	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.25	Wt. n-Val.	0.040	0.050	0.035
W.S. Elev (ft)	317.46	Reach Len. (ft)	450.00	575.00	650.00
Crit W.S. (ft)	314.57	Flow Area (sq ft)	793.49	4408.06	2327.55
E.G. Slope (ft/ft)	0.001381	Area (sq ft)	793.49	4408.06	2327.55
Q Total (cfs)	30000.00	Flow (cfs)	2435.95	18306.20	9257.85
Top Width (ft)	1426.65	Top Width (ft)	243.68	603.00	579.97
Vel Total (ft/s)	3.98	Avg. Vel. (ft/s)	3.07	4.15	3.98

Max Chl Dpth (ft)	9.96	Hydr. Depth (ft)	3.26	7.31	4.01
Conv. Total (cfs)	807280.2	Conv. (cfs)	65549.8	492607.8	249122.6
Length Wtd. (ft)	584.77	Wetted Per. (ft)	246.85	604.51	581.46
Min Ch El (ft)	307.50	Shear (lb/sq ft)	0.28	0.63	0.35
Alpha	1.02	Stream Power (lb/ft s)	0.85	2.61	1.37
Frctn Loss (ft)	1.88	Cum Volume (acre-ft)	81.40	220.76	70.61
C & E Loss (ft)	0.13	Cum SA (acres)	29.35	29.41	23.82

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.

CROSS SECTION

RIVER: San Luis Rey
REACH: Reach 1 RS: 21.137

INPUT
Description: 21.137
Station Elevation Data num= 77

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	342.5	1	342.2	9	338.8	55	307	64	307
92	307	106	307.6	116	307.5	124	307.1	128	306.5
147	306.5	161	306.5	181	306.5	196	306.5	224	306.4
250	306.1	268	309.3	276	310	326	310.3	355	310.8
378	310.9	401	311.1	415	310.7	428	310.7	450	310.4
469	310.3	481	310.5	487	310.5	492	310.5	496	311.2
505	311.2	550	311.8	621	312.1	680	312.4	726	313.2
732	315.1	740	317.3	746	317.3	752	317.3	758	313.4
770	313.4	781	313.4	795	313.6	807	313	826	313
833	316	837	318.5	840	318.6	843	318.7	849	316.9
859	314.1	914	313.4	1000	313.4	1066	313.5	1103	314.3
1114	314.3	1130	314.8	1222	315.3	1284	315.7	1334	315.7
1390	316.5	1399	317.1	1423	317.1	1441	317.4	1459	318.3
1474	318.5	1476	320.4	1479	320.4	1483	319.3	1486	316.9

1499	316.9	1509	323.6	1511	324.6	1516	323.9	1520	322.8
1537	323.9	1540	323.7						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	55	.05	550	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
55	550	450	510	530	.1	.3

CROSS SECTION OUTPUT Profile #2-yr

E.G. Elev (ft)	307.90	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.32	Wt. n-Val.	0.040	0.050	
W.S. Elev (ft)	307.58	Reach Len. (ft)	450.00	510.00	530.00
Crit W.S. (ft)	307.46	Flow Area (sq ft)	0.24	175.99	
E.G. Slope (ft/ft)	0.027797	Area (sq ft)	0.24	175.99	
Q Total (cfs)	800.00	Flow (cfs)	0.57	799.43	
Top Width (ft)	201.11	Top Width (ft)	0.83	200.28	
Vel Total (ft/s)	4.54	Avg. Vel. (ft/s)	2.37	4.54	
Max Chl Dpth (ft)	1.48	Hydr. Depth (ft)	0.29	0.88	
Conv. Total (cfs)	4798.4	Conv. (cfs)	3.4	4795.0	
Length Wtd. (ft)	509.98	Wetted Per. (ft)	1.01	200.48	
Min Ch El (ft)	306.10	Shear (lb/sq ft)	0.41	1.52	
Alpha	1.00	Stream Power (lb/ft s)	0.97	6.92	
Frctn Loss (ft)	4.77	Cum Volume (acre-ft)	0.28	31.71	2.23
C & E Loss (ft)	0.06	Cum SA (acres)	0.77	15.08	3.18

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

CROSS SECTION OUTPUT Profile #5-yr

E.G. Elev (ft)	308.91	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.53	Wt. n-Val.	0.040	0.050	
W.S. Elev (ft)	308.37	Reach Len. (ft)	450.00	510.00	530.00
Crit W.S. (ft)	308.15	Flow Area (sq ft)	1.37	340.15	

E.G. Slope (ft/ft)	0.020225	Area (sq ft)	1.37	340.15	
Q Total (cfs)	2000.00	Flow (cfs)	4.93	1995.07	
Top Width (ft)	209.78	Top Width (ft)	1.99	207.79	
Vel Total (ft/s)	5.86	Avg. Vel. (ft/s)	3.61	5.87	
Max Chl Dpth (ft)	2.27	Hydr. Depth (ft)	0.69	1.64	
Conv. Total (cfs)	14063.1	Conv. (cfs)	34.7	14028.4	
Length Wtd. (ft)	508.24	Wetted Per. (ft)	2.42	208.06	
Min Ch El (ft)	306.10	Shear (lb/sq ft)	0.71	2.06	
Alpha	1.00	Stream Power (lb/ft s)	2.58	12.11	
Frctn Loss (ft)	4.46	Cum Volume (acre-ft)	1.85	46.80	5.91
C & E Loss (ft)	0.09	Cum SA (acres)	1.88	16.68	4.12

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was 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 #10-yr

E.G. Elev (ft)	310.22	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.75	Wt. n-Val.	0.040	0.050	
W.S. Elev (ft)	309.47	Reach Len. (ft)	450.00	510.00	530.00
Crit W.S. (ft)		Flow Area (sq ft)	4.42	571.85	
E.G. Slope (ft/ft)	0.014911	Area (sq ft)	4.42	571.85	
Q Total (cfs)	4000.00	Flow (cfs)	20.29	3979.71	
Top Width (ft)	218.55	Top Width (ft)	3.58	214.97	
Vel Total (ft/s)	6.94	Avg. Vel. (ft/s)	4.59	6.96	
Max Chl Dpth (ft)	3.37	Hydr. Depth (ft)	1.24	2.66	
Conv. Total (cfs)	32756.7	Conv. (cfs)	166.1	32590.5	
Length Wtd. (ft)	505.22	Wetted Per. (ft)	4.35	215.33	
Min Ch El (ft)	306.10	Shear (lb/sq ft)	0.95	2.47	
Alpha	1.00	Stream Power (lb/ft s)	4.34	17.21	
Frctn Loss (ft)	4.32	Cum Volume (acre-ft)	4.90	65.19	10.42
C & E Loss (ft)	0.15	Cum SA (acres)	3.94	18.58	4.42

Warning: The conveyance ratio (upstream 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 #50-yr

E.G. Elev (ft)	314.10	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.53	Wt. n-Val.	0.040	0.050	0.035
W.S. Elev (ft)	312.56	Reach Len. (ft)	450.00	510.00	530.00
Crit W.S. (ft)	312.56	Flow Area (sq ft)	22.37	1756.47	62.60
E.G. Slope (ft/ft)	0.020948	Area (sq ft)	22.37	1756.47	62.60
Q Total (cfs)	18000.00	Flow (cfs)	208.85	17565.51	225.64
Top Width (ft)	642.35	Top Width (ft)	8.05	495.00	139.31
Vel Total (ft/s)	9.77	Avg. Vel. (ft/s)	9.33	10.00	3.60
Max Chl Dpth (ft)	6.46	Hydr. Depth (ft)	2.78	3.55	0.45
Conv. Total (cfs)	124364.7	Conv. (cfs)	1443.0	121362.8	1559.0
Length Wtd. (ft)	500.51	Wetted Per. (ft)	9.78	495.46	139.31
Min Ch El (ft)	306.10	Shear (lb/sq ft)	2.99	4.64	0.59
Alpha	1.03	Stream Power (lb/ft s)	27.93	46.37	2.12
Frctn Loss (ft)	3.44	Cum Volume (acre-ft)	37.01	136.87	28.90
C & E Loss (ft)	0.32	Cum SA (acres)	15.54	21.88	7.96

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 #100-yr

E.G. Elev (ft)	315.70	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.59	Wt. n-Val.	0.040	0.050	0.035
W.S. Elev (ft)	314.11	Reach Len. (ft)	450.00	510.00	530.00
Crit W.S. (ft)	314.11	Flow Area (sq ft)	36.61	2525.17	517.52
E.G. Slope (ft/ft)	0.014212	Area (sq ft)	36.61	2525.17	517.52
Q Total (cfs)	30000.00	Flow (cfs)	331.71	26494.79	3173.50

Top Width (ft)	991.37	Top Width (ft)	10.29	495.00	486.08
Vel Total (ft/s)	9.74	Avg. Vel. (ft/s)	9.06	10.49	6.13
Max Chl Dpth (ft)	8.01	Hydr. Depth (ft)	3.56	5.10	1.06
Conv. Total (cfs)	251648.6	Conv. (cfs)	2782.5	222245.9	26620.3
Length Wtd. (ft)	499.39	Wetted Per. (ft)	12.51	495.46	486.70
Min Ch El (ft)	306.10	Shear (lb/sq ft)	2.60	4.52	0.94
Alpha	1.08	Stream Power (lb/ft s)	23.52	47.45	5.79
Frctn Loss (ft)	2.96	Cum Volume (acre-ft)	77.11	175.00	49.38
C & E Loss (ft)	0.29	Cum SA (acres)	28.04	22.16	15.87

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.

CROSS SECTION

RIVER: San Luis Rey
REACH: Reach 1 RS: 21.093

INPUT
Description: 21.093
Station Elevation Data num= 96

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	353	28.8999	350	37.83008	349	57.16992	347	77.61987	345
96.84009	343	117.0601	341	125.71	340	147.1499	337	165.3401	335
179.4099	333	188.72	331	210.1499	329	227.9099	328	233.3699	328
254.28	326	278.8899	324	324.76	322	392.03	320	443.6799	318
466.77	317	492.38	315	503.02	314	558.78	311	590.3	310
643.4399	308	651.1	307	659.4299	306	702.8	306	738.34	308
782.41	309	785.58	309	791.71	308	808.97	306	827.01	306

849.3199	307	851.72	307	854.78	306	861.91	303	887.66	303
917.09	304	938.62	305	950.8099	306	961.45	307	965.21	307
974.14	306	976.4	306	997.97	307	1014.29	310	1057.74	312
1058.6	311	1059.47	310	1061.28	308	1064.74	306	1077.96	305
1079.36	305	1183.11	305	1219.34	304	1272.26	301	1396.34	301
1397.96	302	1403.1	305	1404.86	306	1407.23	307	1411.64	309
1413.99	310	1414	310	1481.51	311	1489.65	311	1514.84	311
1591.23	312	1626.49	313	1749.6	314	1896.05	314	1980.1	314
1981.49	314	2080.83	315	2206.58	316	2325.69	316	2332.82	315
2337.19	315	2342.54	316	2353.41	318	2360.41	320	2368.73	323
2390.38	325	2410.61	325	2416.31	325	2419.64	327	2422.65	329
2424.18	330	2431.99	334	2435.77	336	2440.23	337	2451.9	339
2456.99	340								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	1077.96	.05	1404.86	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
1077.96	1404.86	227	215	135	.1	.3

CROSS SECTION OUTPUT Profile #2-yr

E.G. Elev (ft)	303.07	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.13	Wt. n-Val.		0.050	
W.S. Elev (ft)	302.94	Reach Len. (ft)	227.00	215.00	135.00
Crit W.S. (ft)		Flow Area (sq ft)		276.68	
E.G. Slope (ft/ft)	0.004640	Area (sq ft)		276.68	
Q Total (cfs)	800.00	Flow (cfs)		800.00	
Top Width (ft)	161.49	Top Width (ft)		161.49	
Vel Total (ft/s)	2.89	Avg. Vel. (ft/s)		2.89	
Max Chl Dpth (ft)	1.94	Hydr. Depth (ft)		1.71	
Conv. Total (cfs)	11744.5	Conv. (cfs)		11744.5	
Length Wtd. (ft)	214.89	Wetted Per. (ft)		162.09	
Min Ch El (ft)	301.00	Shear (lb/sq ft)		0.49	
Alpha	1.00	Stream Power (lb/ft s)		1.43	
Frctn Loss (ft)	0.98	Cum Volume (acre-ft)	0.27	29.06	2.23
C & E Loss (ft)	0.00	Cum SA (acres)	0.76	12.96	3.18

CROSS SECTION OUTPUT Profile #5-yr

E.G. Elev (ft)	304.36	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.23	Wt. n-Val.	0.040	0.050	
W.S. Elev (ft)	304.14	Reach Len. (ft)	227.00	215.00	135.00
Crit W.S. (ft)		Flow Area (sq ft)	49.75	484.34	
E.G. Slope (ft/ft)	0.004875	Area (sq ft)	49.75	484.34	
Q Total (cfs)	2000.00	Flow (cfs)	112.53	1887.47	
Top Width (ft)	248.06	Top Width (ft)	60.83	187.23	
Vel Total (ft/s)	3.74	Avg. Vel. (ft/s)	2.26	3.90	
Max Chl Dpth (ft)	3.14	Hydr. Depth (ft)	0.82	2.59	
Conv. Total (cfs)	28644.4	Conv. (cfs)	1611.7	27032.7	
Length Wtd. (ft)	215.42	Wetted Per. (ft)	61.07	188.18	
Min Ch El (ft)	301.00	Shear (lb/sq ft)	0.25	0.78	
Alpha	1.04	Stream Power (lb/ft s)	0.56	3.05	
Frctn Loss (ft)	0.97	Cum Volume (acre-ft)	1.59	41.97	5.91
C & E Loss (ft)	0.01	Cum SA (acres)	1.55	14.37	4.12

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT Profile #10-yr

E.G. Elev (ft)	305.77	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.26	Wt. n-Val.	0.040	0.050	
W.S. Elev (ft)	305.51	Reach Len. (ft)	227.00	215.00	135.00
Crit W.S. (ft)		Flow Area (sq ft)	156.32	826.16	
E.G. Slope (ft/ft)	0.005527	Area (sq ft)	156.32	826.16	
Q Total (cfs)	4000.00	Flow (cfs)	616.75	3383.25	
Top Width (ft)	421.67	Top Width (ft)	95.63	326.04	
Vel Total (ft/s)	4.07	Avg. Vel. (ft/s)	3.95	4.10	
Max Chl Dpth (ft)	4.51	Hydr. Depth (ft)	1.63	2.53	
Conv. Total (cfs)	53806.5	Conv. (cfs)	8296.4	45510.1	
Length Wtd. (ft)	216.24	Wetted Per. (ft)	96.22	327.37	
Min Ch El (ft)	301.00	Shear (lb/sq ft)	0.56	0.87	
Alpha	1.00	Stream Power (lb/ft s)	2.21	3.57	
Frctn Loss (ft)	1.10	Cum Volume (acre-ft)	4.07	57.01	10.42
C & E Loss (ft)	0.00	Cum SA (acres)	3.42	15.42	4.42

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.

CROSS SECTION OUTPUT Profile #50-yr

E.G. Elev (ft)	309.85	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.47	Wt. n-Val.	0.040	0.050	0.035
W.S. Elev (ft)	309.38	Reach Len. (ft)	227.00	215.00	135.00
Crit W.S. (ft)	307.24	Flow Area (sq ft)	1255.27	2090.15	13.06
E.G. Slope (ft/ft)	0.003369	Area (sq ft)	1255.27	2090.15	13.06
Q Total (cfs)	18000.00	Flow (cfs)	5573.93	12382.81	43.26
Top Width (ft)	756.55	Top Width (ft)	421.98	326.90	7.67
Vel Total (ft/s)	5.36	Avg. Vel. (ft/s)	4.44	5.92	3.31
Max Chl Dpth (ft)	8.38	Hydr. Depth (ft)	2.97	6.39	1.70
Conv. Total (cfs)	310129.1	Conv. (cfs)	96035.4	213348.3	745.4
Length Wtd. (ft)	217.08	Wetted Per. (ft)	424.79	328.36	8.38
Min Ch El (ft)	301.00	Shear (lb/sq ft)	0.62	1.34	0.33
Alpha	1.05	Stream Power (lb/ft s)	2.76	7.93	1.09
Frctn Loss (ft)	0.89	Cum Volume (acre-ft)	30.41	114.35	28.44
C & E Loss (ft)	0.01	Cum SA (acres)	13.32	17.07	7.07

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	311.83	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.62	Wt. n-Val.	0.040	0.050	0.035
W.S. Elev (ft)	311.20	Reach Len. (ft)	227.00	215.00	135.00
Crit W.S. (ft)	308.54	Flow Area (sq ft)	2096.54	2687.58	85.31
E.G. Slope (ft/ft)	0.003236	Area (sq ft)	2096.54	2687.58	85.31
Q Total (cfs)	30000.00	Flow (cfs)	11388.59	18452.95	158.46
Top Width (ft)	957.55	Top Width (ft)	505.03	326.90	125.62
Vel Total (ft/s)	6.16	Avg. Vel. (ft/s)	5.43	6.87	1.86
Max Chl Dpth (ft)	10.20	Hydr. Depth (ft)	4.15	8.22	0.68
Conv. Total (cfs)	527371.4	Conv. (cfs)	200200.6	324385.2	2785.6
Length Wtd. (ft)	218.30	Wetted Per. (ft)	508.78	328.36	126.47
Min Ch El (ft)	301.00	Shear (lb/sq ft)	0.83	1.65	0.14
Alpha	1.06	Stream Power (lb/ft s)	4.52	11.35	0.25
Frctn Loss (ft)	0.81	Cum Volume (acre-ft)	66.09	144.49	45.72
C & E Loss (ft)	0.01	Cum SA (acres)	25.38	17.35	12.15

Warning: Divided flow computed for this cross-section.

CROSS SECTION

RIVER: San Luis Rey
REACH: Reach 1 RS: 20.996

INPUT
Description: 20.996
Station Elevation Data num= 93

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	335	8.48999	33	416.53979	33	324.68994	33	240.31982	330
84.07983	325	100.1099	323	108.8298	322	122.6899	321	143.5598	319
153.6799	318	165.3298	317	175.4299	317	185.1599	317	222.5398	316
263.46	314	292.2	313	318.9399	312	344.6799	311	379.9899	310
466.4899	309	474.1499	308	488.7599	307	494.9099	306	510.2299	306
512.1599	307	514.09	308	564.2	308	579.6899	308	597.7899	308
673.4399	307	673.4899	307	720.5599	306	732.3899	305	736.21	304
757.6599	303	773.9099	302	788.3599	302	797.2699	302	797.33	302
813.7799	302	822.97	303	825.2	304	827.4199	305	831.6899	306
843.3199	308	852.59	309	857.2899	311	859.6699	312	862.0199	313
865.0399	313	873.6299	312	874.2599	311	874.8099	310	875.47	309
878.4999	306	900.2999	304	932.84	305	934.0599	305	1022.08	305
1028.05	304	1045.36	303	1064.5	302	1071.34	301	1114.79	300
1190.37	300	1204.54	300	1231.57	301	1234.37	302	1236.79	303
1238.71	304	1244.22	308	1245.45	309	1246.67	310	1347.52	311
1475.72	312	1554.22	313	1733.83	313	1971.22	314	2066.7	315
2122.44	316	2164.42	317	2184.33	318	2212.71	319	2223.54	320
2234.4	321	2257.29	324	2272.52	326	2287.6	328	2295.54	329
2334.75	331	2346.51	332	2351.41	333				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	822.97	.05	1231.57	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
822.97	1231.57	108	115	95	.1	.3

CROSS SECTION OUTPUT Profile #2-yr

E.G. Elev (ft)	302.09	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.12	Wt. n-Val.		0.050	0.035
W.S. Elev (ft)	301.97	Reach Len. (ft)	108.00	115.00	95.00
Crit W.S. (ft)		Flow Area (sq ft)		283.17	1.31
E.G. Slope (ft/ft)	0.004443	Area (sq ft)		283.17	1.31
Q Total (cfs)	800.00	Flow (cfs)		797.81	2.19
Top Width (ft)	169.55	Top Width (ft)		166.85	2.71
Vel Total (ft/s)	2.81	Avg. Vel. (ft/s)		2.82	1.68
Max Chl Dpth (ft)	1.97	Hydr. Depth (ft)		1.70	0.48
Conv. Total (cfs)	12002.0	Conv. (cfs)		11969.1	32.9
Length Wtd. (ft)	114.97	Wetted Per. (ft)		166.95	2.88
Min Ch El (ft)	300.00	Shear (lb/sq ft)		0.47	0.13
Alpha	1.00	Stream Power (lb/ft s)		1.33	0.21
Frctn Loss (ft)	0.28	Cum Volume (acre-ft)	0.27	27.68	2.22
C & E Loss (ft)	0.02	Cum SA (acres)	0.76	12.15	3.18

Warning: The conveyance ratio (upstream 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 #5-yr

E.G. Elev (ft)	303.39	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.20	Wt. n-Val.	0.040	0.050	0.035
W.S. Elev (ft)	303.19	Reach Len. (ft)	108.00	115.00	95.00
Crit W.S. (ft)		Flow Area (sq ft)	65.53	501.41	6.45
E.G. Slope (ft/ft)	0.004144	Area (sq ft)	65.53	501.41	6.45
Q Total (cfs)	2000.00	Flow (cfs)	150.65	1830.87	18.47
Top Width (ft)	264.98	Top Width (ft)	69.43	189.96	5.59
Vel Total (ft/s)	3.49	Avg. Vel. (ft/s)	2.30	3.65	2.86
Max Chl Dpth (ft)	3.19	Hydr. Depth (ft)	0.94	2.64	1.15
Conv. Total (cfs)	31070.0	Conv. (cfs)	2340.4	28442.6	287.0
Length Wtd. (ft)	114.62	Wetted Per. (ft)	69.52	190.14	6.01
Min Ch El (ft)	300.00	Shear (lb/sq ft)	0.24	0.68	0.28
Alpha	1.04	Stream Power (lb/ft s)	0.56	2.49	0.80
Frctn Loss (ft)	0.40	Cum Volume (acre-ft)	1.29	39.54	5.90
C & E Loss (ft)	0.01	Cum SA (acres)	1.22	13.44	4.11

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT Profile #10-yr

E.G. Elev (ft)	304.66	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.30	Wt. n-Val.	0.040	0.050	0.035
W.S. Elev (ft)	304.36	Reach Len. (ft)	108.00	115.00	95.00
Crit W.S. (ft)		Flow Area (sq ft)	159.77	737.82	14.22
E.G. Slope (ft/ft)	0.004736	Area (sq ft)	159.77	737.82	14.22
Q Total (cfs)	4000.00	Flow (cfs)	606.61	3334.20	59.19
Top Width (ft)	319.89	Top Width (ft)	88.12	224.14	7.63
Vel Total (ft/s)	4.39	Avg. Vel. (ft/s)	3.80	4.52	4.16
Max Chl Dpth (ft)	4.36	Hydr. Depth (ft)	1.81	3.29	1.86
Conv. Total (cfs)	58123.4	Conv. (cfs)	8814.5	48448.8	860.1
Length Wtd. (ft)	114.15	Wetted Per. (ft)	88.27	224.64	8.36
Min Ch El (ft)	300.00	Shear (lb/sq ft)	0.54	0.97	0.50
Alpha	1.01	Stream Power (lb/ft s)	2.03	4.39	2.09
Frctn Loss (ft)	0.49	Cum Volume (acre-ft)	3.25	53.15	10.40
C & E Loss (ft)	0.01	Cum SA (acres)	2.94	14.06	4.41

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT Profile #50-yr

E.G. Elev (ft)	308.94	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.61	Wt. n-Val.	0.040	0.050	0.035
W.S. Elev (ft)	308.33	Reach Len. (ft)	108.00	115.00	95.00
Crit W.S. (ft)		Flow Area (sq ft)	794.25	2109.37	55.43
E.G. Slope (ft/ft)	0.005080	Area (sq ft)	794.25	2109.37	55.43
Q Total (cfs)	18000.00	Flow (cfs)	3615.69	13984.99	399.32
Top Width (ft)	743.27	Top Width (ft)	351.36	378.85	13.06
Vel Total (ft/s)	6.08	Avg. Vel. (ft/s)	4.55	6.63	7.20
Max Chl Dpth (ft)	8.33	Hydr. Depth (ft)	2.26	5.57	4.25
Conv. Total (cfs)	252555.4	Conv. (cfs)	50731.2	196221.4	5602.9
Length Wtd. (ft)	113.50	Wetted Per. (ft)	352.28	380.89	15.09
Min Ch El (ft)	300.00	Shear (lb/sq ft)	0.71	1.76	1.16
Alpha	1.07	Stream Power (lb/ft s)	3.25	11.64	8.39
Frctn Loss (ft)	0.51	Cum Volume (acre-ft)	25.07	103.98	28.33
C & E Loss (ft)	0.02	Cum SA (acres)	11.30	15.33	7.04

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	311.01	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.73	Wt. n-Val.	0.040	0.050	0.035
W.S. Elev (ft)	310.28	Reach Len. (ft)	108.00	115.00	95.00
Crit W.S. (ft)		Flow Area (sq ft)	1556.94	2861.90	87.20
E.G. Slope (ft/ft)	0.004313	Area (sq ft)	1556.94	2861.90	87.20
Q Total (cfs)	30000.00	Flow (cfs)	8638.86	20989.76	371.38
Top Width (ft)	886.06	Top Width (ft)	452.95	389.55	43.57
Vel Total (ft/s)	6.66	Avg. Vel. (ft/s)	5.55	7.33	4.26
Max Chl Dpth (ft)	10.28	Hydr. Depth (ft)	3.44	7.35	2.00
Conv. Total (cfs)	456808.4	Conv. (cfs)	131543.5	319610.0	5655.0
Length Wtd. (ft)	113.11	Wetted Per. (ft)	453.92	392.87	46.20
Min Ch El (ft)	300.00	Shear (lb/sq ft)	0.92	1.96	0.51
Alpha	1.05	Stream Power (lb/ft s)	5.12	14.39	2.16
Frctn Loss (ft)	0.47	Cum Volume (acre-ft)	56.58	130.79	45.45
C & E Loss (ft)	0.00	Cum SA (acres)	22.88	15.58	11.88

Warning: Divided flow computed for this cross-section.

CROSS SECTION

RIVER: San Luis Rey
REACH: Reach 1 RS: 20.96

INPUT
Description: 20.96
Station Elevation Data num= 73

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	3187.560059	31715.23999		31633.15002		314 46.7301		313	
69.19006	312122.7301	311 173.36		310 219.89		309 358.92		309	
374.9301	308377.2001	307 379.64		306 394.42		306397.2401		307	
399.8101	308 431.92	308 452.42		307 474.6		306 478.72		302	
483.73	305 487.27	306 490.92		307 517.79		308 524.09		308	
554.4	307561.1301	306 586.39		306590.1201		306 616.47		305	
622.9501	304626.8801	303 641.92		303 654.83		303 690.97		302	
716.91	302 718.86	303 726.72		308728.5701		309730.1801		310	

731.39	311	733.4501	312	733.46	312	734.89	312	735.61	311
736.71	310	737.6	309	738.5001	308	739.27	307	740.34	306
742.11	305	743.9501	304	800.7401	304	883.4601	304	892.86	303
914.53	302	923.54	301	941.0701	300	949.5901	299	1043.15	299
1085.68	300	1091.75	301	1094.43	302	1097.03	303	1098.29	304
1099.52	305	1100.92	306	1102.18	307	1103.39	308	1104.64	309
1136.06	310	1236.5	311	1358.92	312				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	690.97	.05	1099.52	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
690.97	1099.52	140	140	235	.1	.3

CROSS SECTION OUTPUT Profile #2-yr

E.G. Elev (ft)	301.80	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.06	Wt. n-Val.		0.050	
W.S. Elev (ft)	301.73	Reach Len. (ft)	140.00	140.00	235.00
Crit W.S. (ft)		Flow Area (sq ft)		402.12	
E.G. Slope (ft/ft)	0.001502	Area (sq ft)		402.12	
Q Total (cfs)	800.00	Flow (cfs)		800.00	
Top Width (ft)	176.79	Top Width (ft)		176.79	
Vel Total (ft/s)	1.99	Avg. Vel. (ft/s)		1.99	
Max Chl Dpth (ft)	2.73	Hydr. Depth (ft)		2.27	
Conv. Total (cfs)	20640.8	Conv. (cfs)		20640.8	
Length Wtd. (ft)	140.26	Wetted Per. (ft)		177.14	
Min Ch El (ft)	299.00	Shear (lb/sq ft)		0.21	
Alpha	1.00	Stream Power (lb/ft s)		0.42	
Frctn Loss (ft)	0.28	Cum Volume (acre-ft)	0.27	26.78	2.22
C & E Loss (ft)	0.00	Cum SA (acres)	0.76	11.70	3.17

CROSS SECTION OUTPUT Profile #5-yr

E.G. Elev (ft)	302.98	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.15	Wt. n-Val.	0.040	0.050	
W.S. Elev (ft)	302.83	Reach Len. (ft)	140.00	140.00	235.00
Crit W.S. (ft)		Flow Area (sq ft)	13.22	628.31	
E.G. Slope (ft/ft)	0.002931	Area (sq ft)	13.22	628.31	

Q Total (cfs)	2000.00	Flow (cfs)	14.59	1985.41	
Top Width (ft)	259.52	Top Width (ft)	32.05	227.47	
Vel Total (ft/s)	3.12	Avg. Vel. (ft/s)	1.10	3.16	
Max Chl Dpth (ft)	3.83	Hydr. Depth (ft)	0.41	2.76	
Conv. Total (cfs)	36943.4	Conv. (cfs)	269.4	36673.9	
Length Wtd. (ft)	141.52	Wetted Per. (ft)	32.62	228.26	
Min Ch El (ft)	299.00	Shear (lb/sq ft)	0.07	0.50	
Alpha	1.02	Stream Power (lb/ft s)	0.08	1.59	
Frctn Loss (ft)	0.43	Cum Volume (acre-ft)	1.19	38.05	5.89
C & E Loss (ft)	0.01	Cum SA (acres)	1.09	12.89	4.11

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT Profile #10-yr

E.G. Elev (ft)	304.17	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.28	Wt. n-Val.	0.040	0.050	
W.S. Elev (ft)	303.89	Reach Len. (ft)	140.00	140.00	235.00
Crit W.S. (ft)		Flow Area (sq ft)	81.16	878.78	
E.G. Slope (ft/ft)	0.003843	Area (sq ft)	81.16	878.78	
Q Total (cfs)	4000.00	Flow (cfs)	199.71	3800.29	
Top Width (ft)	315.55	Top Width (ft)	72.66	242.89	
Vel Total (ft/s)	4.17	Avg. Vel. (ft/s)	2.46	4.32	
Max Chl Dpth (ft)	4.89	Hydr. Depth (ft)	1.12	3.62	
Conv. Total (cfs)	64520.7	Conv. (cfs)	3221.3	61299.4	
Length Wtd. (ft)	142.42	Wetted Per. (ft)	74.07	244.37	
Min Ch El (ft)	299.00	Shear (lb/sq ft)	0.26	0.86	
Alpha	1.04	Stream Power (lb/ft s)	0.65	3.73	
Frctn Loss (ft)	0.47	Cum Volume (acre-ft)	2.95	51.01	10.38
C & E Loss (ft)	0.03	Cum SA (acres)	2.75	13.44	4.40

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT Profile #50-yr

E.G. Elev (ft)	308.42	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.56	Wt. n-Val.	0.040	0.050	0.035
W.S. Elev (ft)	307.86	Reach Len. (ft)	140.00	140.00	235.00
Crit W.S. (ft)		Flow Area (sq ft)	639.50	2415.19	5.46

E.G. Slope (ft/ft)	0.004027	Area (sq ft)	639.50	2415.19	5.46
Q Total (cfs)	18000.00	Flow (cfs)	2900.74	15082.96	16.30
Top Width (ft)	666.02	Top Width (ft)	265.89	396.44	3.70
Vel Total (ft/s)	5.88	Avg. Vel. (ft/s)	4.54	6.25	2.99
Max Chl Dpth (ft)	8.86	Hydr. Depth (ft)	2.41	6.09	1.48
Conv. Total (cfs)	283643.9	Conv. (cfs)	45709.9	237677.2	256.8
Length Wtd. (ft)	143.31	Wetted Per. (ft)	269.71	400.81	4.68
Min Ch El (ft)	299.00	Shear (lb/sq ft)	0.60	1.51	0.29
Alpha	1.04	Stream Power (lb/ft s)	2.70	9.46	0.88
Frctn Loss (ft)	0.47	Cum Volume (acre-ft)	23.29	98.01	28.27
C & E Loss (ft)	0.03	Cum SA (acres)	10.53	14.30	7.02

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	310.54	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.73	Wt. n-Val.	0.040	0.050	0.035
W.S. Elev (ft)	309.80	Reach Len. (ft)	140.00	140.00	235.00
Crit W.S. (ft)		Flow Area (sq ft)	1396.13	3191.89	24.77
E.G. Slope (ft/ft)	0.003967	Area (sq ft)	1396.13	3191.89	24.77
Q Total (cfs)	30000.00	Flow (cfs)	6372.18	23571.73	56.09
Top Width (ft)	940.42	Top Width (ft)	508.50	401.53	30.39
Vel Total (ft/s)	6.50	Avg. Vel. (ft/s)	4.56	7.38	2.26
Max Chl Dpth (ft)	10.80	Hydr. Depth (ft)	2.75	7.95	0.82
Conv. Total (cfs)	476311.2	Conv. (cfs)	101171.4	374249.3	890.6
Length Wtd. (ft)	143.39	Wetted Per. (ft)	512.42	407.30	31.78
Min Ch El (ft)	299.00	Shear (lb/sq ft)	0.67	1.94	0.19
Alpha	1.12	Stream Power (lb/ft s)	3.08	14.33	0.44
Frctn Loss (ft)	0.45	Cum Volume (acre-ft)	52.91	122.80	45.33
C & E Loss (ft)	0.07	Cum SA (acres)	21.69	14.53	11.80

Warning: Divided flow computed for this cross-section.

CROSS SECTION

RIVER: San Luis Rey
REACH: Reach 1 RS: 20.943

INPUT
Description: Beg. Prop. Grd
Station Elevation Data num= 53

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	310	30.09998	309	68.29993	308	81.09998	307	598.79993	308
183.2999	308	432.1	307	436.1	306	458.3	306	460.6	307
518.2	307	535.2	307	539.6	307	546.7	306	560.5	306
570	306	580.5	306	583.6	307	588.7	309	591.2	309
594.6	308	603.8	307	610.3	306	617.6	305	642.3	305
667.5	306	675.7	306.8	681.3	306	687.4	305	694.2	304
729.9	303	770.3	302	793.1	301	838	301	854.8	301
869.4	302	875.1	302	953.5	301	964	300	985.7	299.8
1004.6	300	1011.9	300	1031.3	299	1113.8	299	1119.2	300
1122.71	302	1153.37	300.92	1157.82	301	1181.87	309	1210.8	309
1312.6	310	1393.7	311	1430.6	311.9				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	875.1	.05	1181.87	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
875.1	1122.71	50	50	50	.1	.3

CROSS SECTION OUTPUT Profile #2-yr

E.G. Elev (ft)	301.51	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.07	Wt. n-Val.	0.040	0.050	0.050
W.S. Elev (ft)	301.44	Reach Len. (ft)	50.00	50.00	50.00
Crit W.S. (ft)		Flow Area (sq ft)	30.51	341.07	6.20
E.G. Slope (ft/ft)	0.002839	Area (sq ft)	30.51	341.07	6.20
Q Total (cfs)	800.00	Flow (cfs)	32.29	763.29	4.42
Top Width (ft)	300.93	Top Width (ft)	78.03	202.46	20.43
Vel Total (ft/s)	2.12	Avg. Vel. (ft/s)	1.06	2.24	0.71
Max Chl Dpth (ft)	2.44	Hydr. Depth (ft)	0.39	1.68	0.30
Conv. Total (cfs)	15013.3	Conv. (cfs)	606.0	14324.3	82.9
Length Wtd. (ft)	50.00	Wetted Per. (ft)	78.06	203.01	20.51
Min Ch El (ft)	299.00	Shear (lb/sq ft)	0.07	0.30	0.05
Alpha	1.08	Stream Power (lb/ft s)	0.07	0.67	0.04
Frctn Loss (ft)	0.13	Cum Volume (acre-ft)	0.23	25.58	2.21
C & E Loss (ft)	0.00	Cum SA (acres)	0.64	11.09	3.12

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT Profile #5-yr

E.G. Elev (ft)	302.54	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.12	Wt. n-Val.	0.040	0.050	0.050
W.S. Elev (ft)	302.42	Reach Len. (ft)	50.00	50.00	50.00
Crit W.S. (ft)		Flow Area (sq ft)	127.72	571.30	38.88
E.G. Slope (ft/ft)	0.003151	Area (sq ft)	127.72	571.30	38.88
Q Total (cfs)	2000.00	Flow (cfs)	274.99	1660.96	64.05
Top Width (ft)	408.67	Top Width (ft)	121.68	247.61	39.37
Vel Total (ft/s)	2.71	Avg. Vel. (ft/s)	2.15	2.91	1.65
Max Chl Dpth (ft)	3.42	Hydr. Depth (ft)	1.05	2.31	0.99
Conv. Total (cfs)	35628.7	Conv. (cfs)	4898.8	29589.0	1140.9
Length Wtd. (ft)	50.00	Wetted Per. (ft)	121.74	248.31	39.62
Min Ch El (ft)	299.00	Shear (lb/sq ft)	0.21	0.45	0.19
Alpha	1.05	Stream Power (lb/ft s)	0.44	1.32	0.32
Frctn Loss (ft)	0.14	Cum Volume (acre-ft)	0.96	36.12	5.78
C & E Loss (ft)	0.00	Cum SA (acres)	0.84	12.13	4.00

CROSS SECTION OUTPUT Profile #10-yr

E.G. Elev (ft)	303.66	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.18	Wt. n-Val.	0.040	0.050	0.050
W.S. Elev (ft)	303.48	Reach Len. (ft)	50.00	50.00	50.00
Crit W.S. (ft)		Flow Area (sq ft)	279.70	835.03	82.52
E.G. Slope (ft/ft)	0.002890	Area (sq ft)	279.70	835.03	82.52
Q Total (cfs)	4000.00	Flow (cfs)	802.13	2994.28	203.59
Top Width (ft)	452.63	Top Width (ft)	162.44	247.61	42.57
Vel Total (ft/s)	3.34	Avg. Vel. (ft/s)	2.87	3.59	2.47
Max Chl Dpth (ft)	4.48	Hydr. Depth (ft)	1.72	3.37	1.94
Conv. Total (cfs)	74409.2	Conv. (cfs)	14921.4	55700.5	3787.3
Length Wtd. (ft)	50.00	Wetted Per. (ft)	162.52	248.31	43.00
Min Ch El (ft)	299.00	Shear (lb/sq ft)	0.31	0.61	0.35
Alpha	1.04	Stream Power (lb/ft s)	0.89	2.18	0.85
Frctn Loss (ft)	0.13	Cum Volume (acre-ft)	2.37	48.26	10.16
C & E Loss (ft)	0.00	Cum SA (acres)	2.37	12.65	4.28

CROSS SECTION OUTPUT Profile #50-yr

E.G. Elev (ft)	307.92	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.44	Wt. n-Val.	0.040	0.050	0.050
W.S. Elev (ft)	307.47	Reach Len. (ft)	50.00	50.00	50.00
Crit W.S. (ft)		Flow Area (sq ft)	1340.74	1823.16	276.36
E.G. Slope (ft/ft)	0.002678	Area (sq ft)	1340.74	1823.16	276.36
Q Total (cfs)	18000.00	Flow (cfs)	6169.97	10592.67	1237.36
Top Width (ft)	848.40	Top Width (ft)	546.22	247.61	54.57
Vel Total (ft/s)	5.23	Avg. Vel. (ft/s)	4.60	5.81	4.48
Max Chl Dpth (ft)	8.47	Hydr. Depth (ft)	2.45	7.36	5.06
Conv. Total (cfs)	347803.7	Conv. (cfs)	119218.8	204676.1	23908.9
Length Wtd. (ft)	50.00	Wetted Per. (ft)	547.39	248.31	55.64
Min Ch El (ft)	299.00	Shear (lb/sq ft)	0.41	1.23	0.83
Alpha	1.04	Stream Power (lb/ft s)	1.88	7.13	3.72
Frctn Loss (ft)	0.13	Cum Volume (acre-ft)	20.11	91.20	27.51
C & E Loss (ft)	0.01	Cum SA (acres)	9.23	13.27	6.86

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	310.02	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.50	Wt. n-Val.	0.040	0.050	0.050
W.S. Elev (ft)	309.52	Reach Len. (ft)	50.00	50.00	50.00
Crit W.S. (ft)		Flow Area (sq ft)	2938.65	2330.66	423.19
E.G. Slope (ft/ft)	0.002526	Area (sq ft)	2938.65	2330.66	423.19
Q Total (cfs)	30000.00	Flow (cfs)	12424.49	15490.56	2084.94
Top Width (ft)	1249.72	Top Width (ft)	860.75	247.61	141.36
Vel Total (ft/s)	5.27	Avg. Vel. (ft/s)	4.23	6.65	4.93
Max Chl Dpth (ft)	10.52	Hydr. Depth (ft)	3.41	9.41	2.99
Conv. Total (cfs)	596867.2	Conv. (cfs)	247192.4	308193.6	41481.2
Length Wtd. (ft)	50.00	Wetted Per. (ft)	862.42	248.31	142.68
Min Ch El (ft)	299.00	Shear (lb/sq ft)	0.54	1.48	0.47
Alpha	1.15	Stream Power (lb/ft s)	2.27	9.84	2.30
Frctn Loss (ft)	0.13	Cum Volume (acre-ft)	45.95	113.93	44.12
C & E Loss (ft)	0.00	Cum SA (acres)	19.49	13.49	11.34

CROSS SECTION

RIVER: San Luis Rey
REACH: Reach 1 RS: 20.936

INPUT
Description:
Station Elevation Data num= 49

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	31023.20007		30967.80005		308	131.8	308	166.3	308.5
259.7001	308	391.9	307.4	471.7	307	475	306	485.1	305
490.5	305	495.8	307	503.1	308	515.5	308	558.3	307
566	306	585.1	306	599.3	307	609.2	306	623.9	306
627.9	307	635.1	307	642.2	306	648.5	305	725.3	305
731	304	736.6	303	740.6	303	756.2	303	801.2	302
813.8	301	844.5	301	873.2	301	884.7	301	929	301.4
964.6	301	989.8	300	1043.5	299	1134.2	299	1139.8	300
1141.89	301	1179.39	300.8	1198.29	301	1201.29	302	1223.37	308
1287.93	309	1341.2	310	1403.8	311	1435.9	311.8		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	964.6	.05	1223.37	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
964.6	1141.89	240	240	240	.1	.3

CROSS SECTION OUTPUT Profile #2-yr

E.G. Elev (ft)	301.38	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.07	Wt. n-Val.	0.040	0.050	0.050
W.S. Elev (ft)	301.31	Reach Len. (ft)	240.00	240.00	240.00
Crit W.S. (ft)		Flow Area (sq ft)	31.65	338.26	23.04
E.G. Slope (ft/ft)	0.002418	Area (sq ft)	31.65	338.26	23.04
Q Total (cfs)	800.00	Flow (cfs)	22.25	759.41	18.33
Top Width (ft)	370.51	Top Width (ft)	135.90	177.29	57.32
Vel Total (ft/s)	2.04	Avg. Vel. (ft/s)	0.70	2.25	0.80
Max Chl Dpth (ft)	2.31	Hydr. Depth (ft)	0.23	1.91	0.40
Conv. Total (cfs)	16269.5	Conv. (cfs)	452.5	15444.1	372.8
Length Wtd. (ft)	240.00	Wetted Per. (ft)	135.91	177.63	57.37

Min Ch El (ft)	299.00	Shear (lb/sq ft)	0.04	0.29	0.06
Alpha	1.16	Stream Power (lb/ft s)	0.02	0.65	0.05
Frctn Loss (ft)	0.65	Cum Volume (acre-ft)	0.19	25.19	2.19
C & E Loss (ft)	0.00	Cum SA (acres)	0.51	10.87	3.07

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT Profile #5-yr

E.G. Elev (ft)	302.40	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.11	Wt. n-Val.	0.040	0.050	0.050
W.S. Elev (ft)	302.29	Reach Len. (ft)	240.00	240.00	240.00
Crit W.S. (ft)		Flow Area (sq ft)	189.90	512.20	80.75
E.G. Slope (ft/ft)	0.002362	Area (sq ft)	189.90	512.20	80.75
Q Total (cfs)	2000.00	Flow (cfs)	360.17	1498.69	141.14
Top Width (ft)	414.07	Top Width (ft)	176.32	177.29	60.46
Vel Total (ft/s)	2.55	Avg. Vel. (ft/s)	1.90	2.93	1.75
Max Chl Dpth (ft)	3.29	Hydr. Depth (ft)	1.08	2.89	1.34
Conv. Total (cfs)	41152.5	Conv. (cfs)	7411.0	30837.3	2904.1
Length Wtd. (ft)	240.00	Wetted Per. (ft)	176.37	177.63	60.66
Min Ch El (ft)	299.00	Shear (lb/sq ft)	0.16	0.43	0.20
Alpha	1.12	Stream Power (lb/ft s)	0.30	1.24	0.34
Frctn Loss (ft)	0.59	Cum Volume (acre-ft)	0.78	35.50	5.72
C & E Loss (ft)	0.01	Cum SA (acres)	0.67	11.88	3.94

CROSS SECTION OUTPUT Profile #10-yr

E.G. Elev (ft)	303.53	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.17	Wt. n-Val.	0.040	0.050	0.050
W.S. Elev (ft)	303.36	Reach Len. (ft)	240.00	240.00	240.00
Crit W.S. (ft)		Flow Area (sq ft)	409.68	702.57	147.79
E.G. Slope (ft/ft)	0.002369	Area (sq ft)	409.68	702.57	147.79
Q Total (cfs)	4000.00	Flow (cfs)	1088.05	2541.41	370.54
Top Width (ft)	471.72	Top Width (ft)	230.02	177.29	64.41
Vel Total (ft/s)	3.17	Avg. Vel. (ft/s)	2.66	3.62	2.51
Max Chl Dpth (ft)	4.36	Hydr. Depth (ft)	1.78	3.96	2.29
Conv. Total (cfs)	82188.0	Conv. (cfs)	22356.1	52218.3	7613.6
Length Wtd. (ft)	240.00	Wetted Per. (ft)	230.11	177.63	64.75
Min Ch El (ft)	299.00	Shear (lb/sq ft)	0.26	0.58	0.34

Alpha	1.07	Stream Power (lb/ft s)	0.70	2.12	0.85
Frctn Loss (ft)	0.53	Cum Volume (acre-ft)	1.97	47.38	10.03
C & E Loss (ft)	0.01	Cum SA (acres)	2.14	12.41	4.22

CROSS SECTION OUTPUT Profile #50-yr

E.G. Elev (ft)	307.78	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.42	Wt. n-Val.	0.040	0.050	0.050
W.S. Elev (ft)	307.36	Reach Len. (ft)	240.00	240.00	240.00
Crit W.S. (ft)		Flow Area (sq ft)	1693.47	1410.97	434.52
E.G. Slope (ft/ft)	0.002520	Area (sq ft)	1693.47	1410.97	434.52
Q Total (cfs)	18000.00	Flow (cfs)	7616.80	8379.99	2003.21
Top Width (ft)	775.83	Top Width (ft)	519.43	177.29	79.11
Vel Total (ft/s)	5.09	Avg. Vel. (ft/s)	4.50	5.94	4.61
Max Chl Dpth (ft)	8.36	Hydr. Depth (ft)	3.26	7.96	5.49
Conv. Total (cfs)	358564.1	Conv. (cfs)	151728.4	166931.3	39904.4
Length Wtd. (ft)	240.00	Wetted Per. (ft)	520.68	177.63	79.99
Min Ch El (ft)	299.00	Shear (lb/sq ft)	0.51	1.25	0.85
Alpha	1.06	Stream Power (lb/ft s)	2.30	7.42	3.94
Frctn Loss (ft)	0.55	Cum Volume (acre-ft)	18.37	89.34	27.10
C & E Loss (ft)	0.00	Cum SA (acres)	8.62	13.02	6.78

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	309.89	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.48	Wt. n-Val.	0.040	0.050	0.050
W.S. Elev (ft)	309.41	Reach Len. (ft)	240.00	240.00	240.00
Crit W.S. (ft)		Flow Area (sq ft)	3355.14	1774.46	663.78
E.G. Slope (ft/ft)	0.002479	Area (sq ft)	3355.14	1774.46	663.78
Q Total (cfs)	30000.00	Flow (cfs)	14370.92	12179.28	3449.80
Top Width (ft)	1295.85	Top Width (ft)	950.84	177.29	167.72
Vel Total (ft/s)	5.18	Avg. Vel. (ft/s)	4.28	6.86	5.20
Max Chl Dpth (ft)	10.41	Hydr. Depth (ft)	3.53	10.01	3.96
Conv. Total (cfs)	602489.2	Conv. (cfs)	288610.8	244596.2	69282.2
Length Wtd. (ft)	240.00	Wetted Per. (ft)	952.16	177.63	168.69
Min Ch El (ft)	299.00	Shear (lb/sq ft)	0.55	1.55	0.61
Alpha	1.16	Stream Power (lb/ft s)	2.34	10.61	3.17

Frctn Loss (ft)	0.59	Cum Volume (acre-ft)	42.34	111.57	43.49
C & E Loss (ft)	0.01	Cum SA (acres)	18.45	13.25	11.16

CROSS SECTION

RIVER: San Luis Rey
REACH: Reach 1 RS: 20.891

INPUT
Description:
Station Elevation Data num= 49

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	30956.80005		30883.30005		308	90	308	186.1	308
296.9	307	326.5	307	389.1	307	408	307	410.5	306
420	305	426.4	305	432.5	307	453.5	307	480.7	307
484.9	306	504.1	306	520.6	306	534.8	303	542.3	303
550	304	557.7	305	564.4	307	579	307	582	306
588	304	596.1	304	617.5	305	620.3	305	661.7	304
669.9	303	681.1	302	687.8	301	714.6	301	829.3	300
879.9	299	901.2	298	986.1	298	993.95	302	997.4	301
1070.33	300.22	1126.65	301	1144.65	307	1145.67	307.48	1209.3	308
1253.5	309	1274.5	310	1319.5	310	1437	310		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	681.1	.05	993.95	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
681.1	993.95	115	110	95	.1	.3

CROSS SECTION OUTPUT Profile #2-yr

E.G. Elev (ft)	300.73	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.07	Wt. n-Val.		0.050	0.035
W.S. Elev (ft)	300.66	Reach Len. (ft)	115.00	110.00	95.00
Crit W.S. (ft)		Flow Area (sq ft)		363.04	16.22
E.G. Slope (ft/ft)	0.003035	Area (sq ft)		363.04	16.22
Q Total (cfs)	800.00	Flow (cfs)		786.13	13.87
Top Width (ft)	311.32	Top Width (ft)		238.01	73.32

Vel Total (ft/s)	2.11	Avg. Vel. (ft/s)		2.17	0.86
Max Chl Dpth (ft)	2.66	Hydr. Depth (ft)		1.53	0.22
Conv. Total (cfs)	14521.4	Conv. (cfs)		14269.5	251.9
Length Wtd. (ft)	108.69	Wetted Per. (ft)		238.68	73.32
Min Ch El (ft)	298.00	Shear (lb/sq ft)		0.29	0.04
Alpha	1.04	Stream Power (lb/ft s)		0.62	0.04
Frctn Loss (ft)	0.20	Cum Volume (acre-ft)	0.10	23.26	2.08
C & E Loss (ft)	0.01	Cum SA (acres)	0.14	9.73	2.71

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

CROSS SECTION OUTPUT Profile #5-yr

		Element	Left OB	Channel	Right OB
E.G. Elev (ft)	301.80				
Vel Head (ft)	0.10	Wt. n-Val.		0.050	0.035
W.S. Elev (ft)	301.70	Reach Len. (ft)	115.00	110.00	95.00
Crit W.S. (ft)		Flow Area (sq ft)		666.60	143.12
E.G. Slope (ft/ft)	0.002595	Area (sq ft)		666.60	143.12
Q Total (cfs)	2000.00	Flow (cfs)		1676.63	323.37
Top Width (ft)	444.09	Top Width (ft)		310.29	133.80
Vel Total (ft/s)	2.47	Avg. Vel. (ft/s)		2.52	2.26
Max Chl Dpth (ft)	3.70	Hydr. Depth (ft)		2.15	1.07
Conv. Total (cfs)	39261.7	Conv. (cfs)		32913.7	6348.0
Length Wtd. (ft)	107.09	Wetted Per. (ft)		311.27	134.02
Min Ch El (ft)	298.00	Shear (lb/sq ft)		0.35	0.17
Alpha	1.00	Stream Power (lb/ft s)		0.87	0.39
Frctn Loss (ft)	0.19	Cum Volume (acre-ft)	0.26	32.25	5.10
C & E Loss (ft)	0.01	Cum SA (acres)	0.19	10.54	3.41

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT Profile #10-yr

		Element	Left OB	Channel	Right OB
E.G. Elev (ft)	302.99				
Vel Head (ft)	0.14	Wt. n-Val.	0.040	0.050	0.035
W.S. Elev (ft)	302.85	Reach Len. (ft)	115.00	110.00	95.00
Crit W.S. (ft)		Flow Area (sq ft)	4.04	1024.41	299.28

E.G. Slope (ft/ft)	0.002053	Area (sq ft)	4.04	1024.41	299.28
Q Total (cfs)	4000.00	Flow (cfs)	3.84	3034.82	961.34
Top Width (ft)	460.62	Top Width (ft)	9.52	312.85	138.25
Vel Total (ft/s)	3.01	Avg. Vel. (ft/s)	0.95	2.96	3.21
Max Chl Dpth (ft)	4.85	Hydr. Depth (ft)	0.42	3.27	2.16
Conv. Total (cfs)	88279.2	Conv. (cfs)	84.7	66977.9	21216.6
Length Wtd. (ft)	106.29	Wetted Per. (ft)	9.56	313.92	138.70
Min Ch El (ft)	298.00	Shear (lb/sq ft)	0.05	0.42	0.28
Alpha	1.01	Stream Power (lb/ft s)	0.05	1.24	0.89
Frctn Loss (ft)	0.18	Cum Volume (acre-ft)	0.83	42.62	8.80
C & E Loss (ft)	0.01	Cum SA (acres)	1.48	11.06	3.66

CROSS SECTION OUTPUT Profile #50-yr

E.G. Elev (ft)	307.23	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.44	Wt. n-Val.	0.040	0.050	0.035
W.S. Elev (ft)	306.79	Reach Len. (ft)	115.00	110.00	95.00
Crit W.S. (ft)		Flow Area (sq ft)	426.84	2257.93	867.70
E.G. Slope (ft/ft)	0.002082	Area (sq ft)	426.84	2257.93	867.70
Q Total (cfs)	18000.00	Flow (cfs)	1203.39	11408.25	5388.37
Top Width (ft)	669.89	Top Width (ft)	206.96	312.85	150.08
Vel Total (ft/s)	5.07	Avg. Vel. (ft/s)	2.82	5.05	6.21
Max Chl Dpth (ft)	8.79	Hydr. Depth (ft)	2.06	7.22	5.78
Conv. Total (cfs)	394499.5	Conv. (cfs)	26374.2	250030.5	118094.8
Length Wtd. (ft)	105.85	Wetted Per. (ft)	208.84	313.92	151.17
Min Ch El (ft)	298.00	Shear (lb/sq ft)	0.27	0.93	0.75
Alpha	1.10	Stream Power (lb/ft s)	0.75	4.72	4.63
Frctn Loss (ft)	0.22	Cum Volume (acre-ft)	12.53	79.24	23.51
C & E Loss (ft)	0.02	Cum SA (acres)	6.62	11.67	6.15

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	309.29	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.55	Wt. n-Val.	0.040	0.050	0.035
W.S. Elev (ft)	308.74	Reach Len. (ft)	115.00	110.00	95.00
Crit W.S. (ft)		Flow Area (sq ft)	1389.02	2868.00	1239.03
E.G. Slope (ft/ft)	0.002422	Area (sq ft)	1389.02	2868.00	1239.03

Q Total (cfs)	30000.00	Flow (cfs)	4134.34	18329.50	7536.16
Top Width (ft)	1227.51	Top Width (ft)	666.48	312.85	248.18
Vel Total (ft/s)	5.46	Avg. Vel. (ft/s)	2.98	6.39	6.08
Max Chl Dpth (ft)	10.74	Hydr. Depth (ft)	2.08	9.17	4.99
Conv. Total (cfs)	609647.3	Conv. (cfs)	84016.2	372484.3	153146.7
Length Wtd. (ft)	106.58	Wetted Per. (ft)	668.54	313.92	249.42
Min Ch El (ft)	298.00	Shear (lb/sq ft)	0.31	1.38	0.75
Alpha	1.19	Stream Power (lb/ft s)	0.93	8.83	4.57
Frctn Loss (ft)	0.24	Cum Volume (acre-ft)	29.27	98.78	38.25
C & E Loss (ft)	0.02	Cum SA (acres)	14.00	11.90	10.02

CROSS SECTION

RIVER: San Luis Rey
REACH: Reach 1 RS: 20.872

INPUT
Description:
Station Elevation Data num= 60

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	31022.80005	309	46	308	105.9	308	129.5	308	
131.2001	307	136.9	307	143	308215.7001	308325.2001	307		
472.7001	306483.7001	307	486.9	306491.2001	305504.5001	305			
509.3	307	522.3	307538.0001	306562.5001	306566.2001	306			
577.0001	305587.7001	304600.0001	304	626.1	305	632.4	306		
637.9	307	645.6	308649.7001	308657.7001	307	672.3	304		
692.7001	304	703.6	304	731.9	303	736.4	302	741.1	300
787.1	300	840.6	300	850.3	299903.5001	298	1022.1	298	
1022.81	299.2	1024.68	300	1030.02	302	1038.99	302.43	1046.19	302
1053.79	300	1129.29	299.13	1190.19	300	1197.99	301	1200.99	302
1213.01	306	1222.35	307	1297.4	308	1338.2	309	1352.8	309
1366.9	310	1398.6	310	1431.5	309	1516.8	309	1651.8	310

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	736.4	.05	1213.01	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
736.4	1030.02	105	124	162	.1	.3

CROSS SECTION OUTPUT Profile #2-yr

E.G. Elev (ft)	300.52	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.03	Wt. n-Val.		0.050	0.050
W.S. Elev (ft)	300.49	Reach Len. (ft)	105.00	124.00	162.00
Crit W.S. (ft)		Flow Area (sq ft)		462.35	127.17
E.G. Slope (ft/ft)	0.001277	Area (sq ft)		462.35	127.17
Q Total (cfs)	800.00	Flow (cfs)		674.61	125.39
Top Width (ft)	428.08	Top Width (ft)		286.03	142.05
Vel Total (ft/s)	1.36	Avg. Vel. (ft/s)		1.46	0.99
Max Chl Dpth (ft)	2.49	Hydr. Depth (ft)		1.62	0.90
Conv. Total (cfs)	22385.7	Conv. (cfs)		18877.1	3508.6
Length Wtd. (ft)	127.79	Wetted Per. (ft)		287.12	142.16
Min Ch El (ft)	298.00	Shear (lb/sq ft)		0.13	0.07
Alpha	1.06	Stream Power (lb/ft s)		0.19	0.07
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)	0.10	22.22	1.92
C & E Loss (ft)	0.00	Cum SA (acres)	0.14	9.07	2.48

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

CROSS SECTION OUTPUT Profile #5-yr

E.G. Elev (ft)	301.60	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.06	Wt. n-Val.		0.050	0.050
W.S. Elev (ft)	301.54	Reach Len. (ft)	105.00	124.00	162.00
Crit W.S. (ft)		Flow Area (sq ft)		766.92	282.79
E.G. Slope (ft/ft)	0.001275	Area (sq ft)		766.92	282.79
Q Total (cfs)	2000.00	Flow (cfs)		1546.20	453.80
Top Width (ft)	443.01	Top Width (ft)		291.32	151.69
Vel Total (ft/s)	1.91	Avg. Vel. (ft/s)		2.02	1.60
Max Chl Dpth (ft)	3.54	Hydr. Depth (ft)		2.63	1.86
Conv. Total (cfs)	56014.5	Conv. (cfs)		43304.7	12709.8
Length Wtd. (ft)	130.54	Wetted Per. (ft)		292.83	152.05
Min Ch El (ft)	298.00	Shear (lb/sq ft)		0.21	0.15
Alpha	1.03	Stream Power (lb/ft s)		0.42	0.24
Frctn Loss (ft)	0.13	Cum Volume (acre-ft)	0.26	30.44	4.63
C & E Loss (ft)	0.00	Cum SA (acres)	0.19	9.78	3.10

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT Profile #10-yr

E.G. Elev (ft)	302.80	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.10	Wt. n-Val.	0.040	0.050	0.050
W.S. Elev (ft)	302.70	Reach Len. (ft)	105.00	124.00	162.00
Crit W.S. (ft)		Flow Area (sq ft)	1.09	1105.58	469.43
E.G. Slope (ft/ft)	0.001416	Area (sq ft)	1.09	1105.58	469.43
Q Total (cfs)	4000.00	Flow (cfs)	0.75	2980.79	1018.47
Top Width (ft)	469.82	Top Width (ft)	3.14	293.62	173.07
Vel Total (ft/s)	2.54	Avg. Vel. (ft/s)	0.68	2.70	2.17
Max Chl Dpth (ft)	4.70	Hydr. Depth (ft)	0.35	3.77	2.71
Conv. Total (cfs)	106306.8	Conv. (cfs)	19.8	79219.5	27067.5
Length Wtd. (ft)	131.90	Wetted Per. (ft)	3.22	295.30	173.70
Min Ch El (ft)	298.00	Shear (lb/sq ft)	0.03	0.33	0.24
Alpha	1.03	Stream Power (lb/ft s)	0.02	0.89	0.52
Frctn Loss (ft)	0.16	Cum Volume (acre-ft)	0.83	39.93	7.96
C & E Loss (ft)	0.00	Cum SA (acres)	1.47	10.29	3.32

CROSS SECTION OUTPUT Profile #50-yr

E.G. Elev (ft)	306.99	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.37	Wt. n-Val.	0.040	0.050	0.050
W.S. Elev (ft)	306.63	Reach Len. (ft)	105.00	124.00	162.00
Crit W.S. (ft)		Flow Area (sq ft)	419.90	2260.00	1174.35
E.G. Slope (ft/ft)	0.001983	Area (sq ft)	419.90	2260.00	1174.35
Q Total (cfs)	18000.00	Flow (cfs)	1054.44	11614.14	5331.42
Top Width (ft)	790.36	Top Width (ft)	307.88	293.62	188.87
Vel Total (ft/s)	4.67	Avg. Vel. (ft/s)	2.51	5.14	4.54
Max Chl Dpth (ft)	8.63	Hydr. Depth (ft)	1.36	7.70	6.22
Conv. Total (cfs)	404250.9	Conv. (cfs)	23681.0	260834.8	119735.1
Length Wtd. (ft)	133.73	Wetted Per. (ft)	309.11	295.30	190.07
Min Ch El (ft)	298.00	Shear (lb/sq ft)	0.17	0.95	0.76
Alpha	1.08	Stream Power (lb/ft s)	0.42	4.87	3.47
Frctn Loss (ft)	0.27	Cum Volume (acre-ft)	11.41	73.53	21.28
C & E Loss (ft)	0.00	Cum SA (acres)	5.94	10.91	5.78

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	309.03	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.49	Wt. n-Val.	0.040	0.050	0.050
W.S. Elev (ft)	308.54	Reach Len. (ft)	105.00	124.00	162.00
Crit W.S. (ft)		Flow Area (sq ft)	1386.72	2820.97	1625.13
E.G. Slope (ft/ft)	0.002147	Area (sq ft)	1386.72	2820.97	1625.13
Q Total (cfs)	30000.00	Flow (cfs)	3747.23	17487.16	8765.61
Top Width (ft)	1285.94	Top Width (ft)	702.92	293.62	289.40
Vel Total (ft/s)	5.14	Avg. Vel. (ft/s)	2.70	6.20	5.39
Max Chl Dpth (ft)	10.54	Hydr. Depth (ft)	1.97	9.61	5.62
Conv. Total (cfs)	647515.3	Conv. (cfs)	80879.7	377440.1	189195.5
Length Wtd. (ft)	132.93	Wetted Per. (ft)	704.88	295.30	290.63
Min Ch El (ft)	298.00	Shear (lb/sq ft)	0.26	1.28	0.75
Alpha	1.20	Stream Power (lb/ft s)	0.71	7.94	4.04
Frctn Loss (ft)	0.30	Cum Volume (acre-ft)	25.60	91.60	35.13
C & E Loss (ft)	0.01	Cum SA (acres)	12.19	11.13	9.43

CROSS SECTION

RIVER: San Luis Rey
REACH: Reach 1 RS: 20.849

INPUT
Description: STA 1489.1 interpolated
Station Elevation Data num= 52

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	310	172.6	308	320.7	307	504.5	306	507.5	305
529.1	305	532.3	306	549.3	306	571.8	305	585.8	304
598	304	604.5	305	607.1	306	632.4	307	660.9	308
695.4	308	698.6	307	701.9	306	706.2	305	711.8	304
722	303	731.9	302	733.8	301	735.8	300	739.1	299
769.5	299	784.4	299	793.1	298.8	813.1	298	980.3	297
993.9	298	1001.8	299	1005.7	300	1012.7	301	1021.2	302
1034.4	303	1048.7	303	1069.2	302	1076.06	302	1079.02	301
1082.17	300	1144.4	299.61	1207.99	300	1226.14	306	1229.14	306.56

1276.6	307	1323.6	307	1338.1	307	1346	308	1351.1	308
1405.1	309	1489.1	309.5						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	731.9	.05	1229.14	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
731.9	1021.2	102	97	88	.1	.3

CROSS SECTION OUTPUT Profile #2-yr

E.G. Elev (ft)	300.42	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.		0.050	0.050
W.S. Elev (ft)	300.40	Reach Len. (ft)	102.00	97.00	88.00
Crit W.S. (ft)		Flow Area (sq ft)		663.52	75.60
E.G. Slope (ft/ft)	0.000464	Area (sq ft)		663.52	75.60
Q Total (cfs)	800.00	Flow (cfs)		766.00	34.00
Top Width (ft)	401.82	Top Width (ft)		273.52	128.30
Vel Total (ft/s)	1.08	Avg. Vel. (ft/s)		1.15	0.45
Max Chl Dpth (ft)	3.40	Hydr. Depth (ft)		2.43	0.59
Conv. Total (cfs)	37134.3	Conv. (cfs)		35556.2	1578.2
Length Wtd. (ft)	96.63	Wetted Per. (ft)		274.04	128.43
Min Ch El (ft)	297.00	Shear (lb/sq ft)		0.07	0.02
Alpha	1.10	Stream Power (lb/ft s)		0.08	0.01
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	0.10	20.62	1.55
C & E Loss (ft)	0.00	Cum SA (acres)	0.14	8.27	1.98

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT Profile #5-yr

E.G. Elev (ft)	301.47	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	Wt. n-Val.		0.050	0.050
W.S. Elev (ft)	301.42	Reach Len. (ft)	102.00	97.00	88.00
Crit W.S. (ft)		Flow Area (sq ft)		946.29	209.18
E.G. Slope (ft/ft)	0.000792	Area (sq ft)		946.29	209.18
Q Total (cfs)	2000.00	Flow (cfs)		1765.64	234.36
Top Width (ft)	417.75	Top Width (ft)		283.25	134.50
Vel Total (ft/s)	1.73	Avg. Vel. (ft/s)		1.87	1.12

Max Chl Dpth (ft)	4.42	Hydr. Depth (ft)		3.34	1.56
Conv. Total (cfs)	71050.1	Conv. (cfs)		62724.2	8325.8
Length Wtd. (ft)	96.01	Wetted Per. (ft)		284.08	134.95
Min Ch El (ft)	297.00	Shear (lb/sq ft)		0.16	0.08
Alpha	1.07	Stream Power (lb/ft s)		0.31	0.09
Frctn Loss (ft)	0.06	Cum Volume (acre-ft)	0.26	28.00	3.72
C & E Loss (ft)	0.00	Cum SA (acres)	0.19	8.96	2.56

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT Profile #10-yr

			Left OB	Channel	Right OB
E.G. Elev (ft)	302.63	Element			
Vel Head (ft)	0.10	Wt. n-Val.	0.040	0.050	0.050
W.S. Elev (ft)	302.54	Reach Len. (ft)	102.00	97.00	88.00
Crit W.S. (ft)		Flow Area (sq ft)	1.42	1267.72	371.25
E.G. Slope (ft/ft)	0.001111	Area (sq ft)	1.42	1267.72	371.25
Q Total (cfs)	4000.00	Flow (cfs)	0.73	3354.60	644.67
Top Width (ft)	459.10	Top Width (ft)	5.30	289.30	164.50
Vel Total (ft/s)	2.44	Avg. Vel. (ft/s)	0.51	2.65	1.74
Max Chl Dpth (ft)	5.54	Hydr. Depth (ft)	0.27	4.38	2.26
Conv. Total (cfs)	120017.3	Conv. (cfs)	21.8	100652.5	19342.9
Length Wtd. (ft)	95.59	Wetted Per. (ft)	5.33	290.31	165.27
Min Ch El (ft)	297.00	Shear (lb/sq ft)	0.02	0.30	0.16
Alpha	1.07	Stream Power (lb/ft s)	0.01	0.80	0.27
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)	0.83	36.55	6.39
C & E Loss (ft)	0.00	Cum SA (acres)	1.46	9.46	2.70

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT Profile #50-yr

			Left OB	Channel	Right OB
E.G. Elev (ft)	306.72	Element			
Vel Head (ft)	0.40	Wt. n-Val.	0.040	0.050	0.050
W.S. Elev (ft)	306.32	Reach Len. (ft)	102.00	97.00	88.00
Crit W.S. (ft)		Flow Area (sq ft)	215.54	2361.35	1117.80
E.G. Slope (ft/ft)	0.002070	Area (sq ft)	215.54	2361.35	1117.80
Q Total (cfs)	18000.00	Flow (cfs)	450.75	12912.59	4636.66
Top Width (ft)	695.58	Top Width (ft)	199.65	289.30	206.63

Vel Total (ft/s)	4.87	Avg. Vel. (ft/s)	2.09	5.47	4.15
Max Chl Dpth (ft)	9.32	Hydr. Depth (ft)	1.08	8.16	5.41
Conv. Total (cfs)	395649.3	Conv. (cfs)	9907.7	283825.4	101916.2
Length Wtd. (ft)	94.91	Wetted Per. (ft)	200.64	290.31	208.01
Min Ch El (ft)	297.00	Shear (lb/sq ft)	0.14	1.05	0.69
Alpha	1.10	Stream Power (lb/ft s)	0.29	5.75	2.88
Frctn Loss (ft)	0.19	Cum Volume (acre-ft)	10.64	66.96	17.02
C & E Loss (ft)	0.00	Cum SA (acres)	5.33	10.08	5.05

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	308.73	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.57	Wt. n-Val.	0.040	0.050	0.049
W.S. Elev (ft)	308.16	Reach Len. (ft)	102.00	97.00	88.00
Crit W.S. (ft)		Flow Area (sq ft)	928.29	2895.36	1645.24
E.G. Slope (ft/ft)	0.002352	Area (sq ft)	928.29	2895.36	1645.24
Q Total (cfs)	30000.00	Flow (cfs)	2302.68	19334.07	8363.25
Top Width (ft)	1201.17	Top Width (ft)	573.24	289.30	338.62
Vel Total (ft/s)	5.49	Avg. Vel. (ft/s)	2.48	6.68	5.08
Max Chl Dpth (ft)	11.16	Hydr. Depth (ft)	1.62	10.01	4.86
Conv. Total (cfs)	618615.8	Conv. (cfs)	47482.4	398678.7	172454.7
Length Wtd. (ft)	94.84	Wetted Per. (ft)	574.53	290.31	340.09
Min Ch El (ft)	297.00	Shear (lb/sq ft)	0.24	1.46	0.71
Alpha	1.21	Stream Power (lb/ft s)	0.59	9.78	3.61
Frctn Loss (ft)	0.20	Cum Volume (acre-ft)	22.81	83.46	29.05
C & E Loss (ft)	0.03	Cum SA (acres)	10.65	10.30	8.26

CROSS SECTION

RIVER: San Luis Rey
REACH: Reach 1 RS: 20.831

INPUT
Description:
Station Elevation Data num= 54

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev

```
       0     308  239.23     306   340.4     306363.7999     305389.2399     305
  409.16     305456.4299     304  458.84     303462.9899     302473.1799     302
  478.97     303  494.41     304498.6799     305   502.4     306  506.21     307
   510.1     308526.1699     308532.3799     307537.7599     306  546.84     304
  548.16     303549.4399     302   553.6     299   612.7     298626.3799     297
660.8599     297674.7999     297811.4399     297820.8099     298825.1299     299
  831.03     300  845.64  300.86846.6599     301  850.21     300909.3199  299.31
  971.35     300986.5699     305 1003.85     305 1012.03     305 1085.73     305
  1104.6     306 1111.97     306 1242.74     306 1247.29     307 1258.46     309
 1260.28     309  1262.6     308 1265.37     307 1268.92     306 1270.28     306
 1278.67     306 1310.25     306 1340.64     307  1356.7     308

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0     .04549.4399     .05986.5699    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
      549.4399  831.03               85      75      55             .1       .3

CROSS SECTION OUTPUT  Profile #2-yr

  E.G. Elev (ft)            300.39    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               0.01    Wt. n-Val.                            0.050      0.050
  W.S. Elev (ft)            300.38    Reach Len. (ft)            85.00      75.00      55.00
  Crit W.S. (ft)                      Flow Area (sq ft)                    816.27      88.89
  E.G. Slope (ft/ft)      0.000241    Area (sq ft)                         816.27      88.89
  Q Total (cfs)             800.00    Flow (cfs)                           767.68      32.32
  Top Width (ft)            409.32    Top Width (ft)                       279.34     129.99
  Vel Total (ft/s)            0.88    Avg. Vel. (ft/s)                       0.94       0.36
  Max Chl Dpth (ft)           3.38    Hydr. Depth (ft)                       2.92       0.68
  Conv. Total (cfs)        51578.3    Conv. (cfs)                         49494.7     2083.5
  Length Wtd. (ft)           74.45    Wetted Per. (ft)                     280.08     130.12
  Min Ch El (ft)            297.00    Shear (lb/sq ft)                       0.04       0.01
  Alpha                       1.09    Stream Power (lb/ft s)                 0.04       0.00
  Frctn Loss (ft)             0.01    Cum Volume (acre-ft)        0.10      18.97       1.38
  C & E Loss (ft)             0.00    Cum SA (acres)              0.14       7.65       1.71


Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT  Profile #5-yr
```

E.G. Elev (ft)	301.41	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.04	Wt. n-Val.		0.050	0.050
W.S. Elev (ft)	301.37	Reach Len. (ft)	85.00	75.00	55.00
Crit W.S. (ft)		Flow Area (sq ft)		1093.86	227.37
E.G. Slope (ft/ft)	0.000500	Area (sq ft)		1093.86	227.37
Q Total (cfs)	2000.00	Flow (cfs)		1795.91	204.09
Top Width (ft)	425.19	Top Width (ft)		280.71	144.48
Vel Total (ft/s)	1.51	Avg. Vel. (ft/s)		1.64	0.90
Max Chl Dpth (ft)	4.37	Hydr. Depth (ft)		3.90	1.57
Conv. Total (cfs)	89420.7	Conv. (cfs)		80295.7	9125.0
Length Wtd. (ft)	73.67	Wetted Per. (ft)		281.77	144.88
Min Ch El (ft)	297.00	Shear (lb/sq ft)		0.12	0.05
Alpha	1.09	Stream Power (lb/ft s)		0.20	0.04
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	0.26	25.73	3.28
C & E Loss (ft)	0.00	Cum SA (acres)	0.19	8.33	2.28

CROSS SECTION OUTPUT Profile #10-yr

E.G. Elev (ft)	302.54	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.08	Wt. n-Val.	0.040	0.050	0.050
W.S. Elev (ft)	302.46	Reach Len. (ft)	85.00	75.00	55.00
Crit W.S. (ft)		Flow Area (sq ft)	5.85	1400.99	386.91
E.G. Slope (ft/ft)	0.000784	Area (sq ft)	5.85	1400.99	386.91
Q Total (cfs)	4000.00	Flow (cfs)	3.19	3386.95	609.86
Top Width (ft)	444.72	Top Width (ft)	15.33	281.59	147.80
Vel Total (ft/s)	2.23	Avg. Vel. (ft/s)	0.55	2.42	1.58
Max Chl Dpth (ft)	5.46	Hydr. Depth (ft)	0.38	4.98	2.62
Conv. Total (cfs)	142875.6	Conv. (cfs)	113.9	120978.2	21783.6
Length Wtd. (ft)	73.04	Wetted Per. (ft)	15.58	282.86	148.38
Min Ch El (ft)	297.00	Shear (lb/sq ft)	0.02	0.24	0.13
Alpha	1.07	Stream Power (lb/ft s)	0.01	0.59	0.20
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)	0.82	33.58	5.63
C & E Loss (ft)	0.01	Cum SA (acres)	1.43	8.83	2.38

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT Profile #50-yr

E.G. Elev (ft)	306.53	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.39	Wt. n-Val.	0.040	0.050	0.049
W.S. Elev (ft)	306.14	Reach Len. (ft)	85.00	75.00	55.00
Crit W.S. (ft)		Flow Area (sq ft)	312.07	2436.87	1098.91
E.G. Slope (ft/ft)	0.001886	Area (sq ft)	312.07	2436.87	1098.91
Q Total (cfs)	18000.00	Flow (cfs)	525.04	13217.78	4257.18
Top Width (ft)	1032.37	Top Width (ft)	292.47	281.59	458.31
Vel Total (ft/s)	4.68	Avg. Vel. (ft/s)	1.68	5.42	3.87
Max Chl Dpth (ft)	9.14	Hydr. Depth (ft)	1.07	8.65	2.40
Conv. Total (cfs)	414460.5	Conv. (cfs)	12089.5	304347.1	98023.9
Length Wtd. (ft)	72.39	Wetted Per. (ft)	294.12	282.86	459.35
Min Ch El (ft)	297.00	Shear (lb/sq ft)	0.12	1.01	0.28
Alpha	1.15	Stream Power (lb/ft s)	0.21	5.50	1.09
Frctn Loss (ft)	0.13	Cum Volume (acre-ft)	10.02	61.61	14.78
C & E Loss (ft)	0.01	Cum SA (acres)	4.75	9.44	4.38

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	308.50	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.46	Wt. n-Val.	0.040	0.050	0.046
W.S. Elev (ft)	308.04	Reach Len. (ft)	85.00	75.00	55.00
Crit W.S. (ft)		Flow Area (sq ft)	1102.29	2972.42	2032.57
E.G. Slope (ft/ft)	0.001872	Area (sq ft)	1102.29	2972.42	2032.57
Q Total (cfs)	30000.00	Flow (cfs)	2811.10	18336.87	8852.04
Top Width (ft)	1347.28	Top Width (ft)	549.44	281.59	516.25
Vel Total (ft/s)	4.91	Avg. Vel. (ft/s)	2.55	6.17	4.36
Max Chl Dpth (ft)	11.04	Hydr. Depth (ft)	2.01	10.56	3.94
Conv. Total (cfs)	693365.7	Conv. (cfs)	64970.6	423805.2	204589.9
Length Wtd. (ft)	71.97	Wetted Per. (ft)	551.53	282.86	517.87
Min Ch El (ft)	297.00	Shear (lb/sq ft)	0.23	1.23	0.46
Alpha	1.22	Stream Power (lb/ft s)	0.60	7.58	2.00
Frctn Loss (ft)	0.13	Cum Volume (acre-ft)	20.44	76.93	25.33
C & E Loss (ft)	0.00	Cum SA (acres)	9.34	9.67	7.40

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

CROSS SECTION

RIVER: San Luis Rey
REACH: Reach 1 RS: 20.817

INPUT
Description: 20.817
Station Elevation Data num= 56

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	308	246.4	306	338.9	306	338.91	306	399.41	305
464.99	304	469.84	303	494.04	303	503.16	304	514.02	305
521.49	306	527.14	307	549.98	307	553.88	306	557.59	305
559.47	304	560.99	303	562.53	302	564	301	565.52	300
567.05	299	592.01	298	612.43	297	791.61	297	817.61	297
839.05	297	972.58	301	975.19	302.88	983.03	300	1004.12	299
1022.16	300	1031.8	303	1041.52	304	1052.55	305	1184.18	306
1186.96	307	1190.01	308	1193.38	309	1197.8	310	1211.42	310
1218.56	310	1234.8	310	1244.89	309	1247.06	308	1249.41	307
1297.83	307	1395.84	307	1490.24	307	1493.64	306	1497.34	305
1500.34	305	1502.04	306	1503.94	307	1505.94	308	1508.14	309
1510.14	310								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	562.53	.05	975.19	.05

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
562.53	975.19	225	263	330	.1	.3

CROSS SECTION OUTPUT Profile #2-yr

E.G. Elev (ft)	300.37	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.01	Wt. n-Val.		0.050	0.050
W.S. Elev (ft)	300.36	Reach Len. (ft)	225.00	263.00	330.00
Crit W.S. (ft)		Flow Area (sq ft)		1057.57	34.19
E.G. Slope (ft/ft)	0.000165	Area (sq ft)		1057.57	34.19
Q Total (cfs)	800.00	Flow (cfs)		788.53	11.47
Top Width (ft)	427.66	Top Width (ft)		386.37	41.29
Vel Total (ft/s)	0.73	Avg. Vel. (ft/s)		0.75	0.34
Max Chl Dpth (ft)	3.36	Hydr. Depth (ft)		2.74	0.83

Conv. Total (cfs)	62339.2	Conv. (cfs)		61445.6	893.5
Length Wtd. (ft)	264.47	Wetted Per. (ft)		386.87	41.46
Min Ch El (ft)	297.00	Shear (lb/sq ft)		0.03	0.01
Alpha	1.02	Stream Power (lb/ft s)		0.02	0.00
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	0.10	17.36	1.30
C & E Loss (ft)	0.00	Cum SA (acres)	0.14	7.08	1.61

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

CROSS SECTION OUTPUT Profile #5-yr

E.G. Elev (ft)	301.37	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.03	Wt. n-Val.		0.050	0.050
W.S. Elev (ft)	301.34	Reach Len. (ft)	225.00	263.00	330.00
Crit W.S. (ft)		Flow Area (sq ft)		1450.72	77.46
E.G. Slope (ft/ft)	0.000375	Area (sq ft)		1450.72	77.46
Q Total (cfs)	2000.00	Flow (cfs)		1938.28	61.72
Top Width (ft)	456.66	Top Width (ft)		409.56	47.10
Vel Total (ft/s)	1.31	Avg. Vel. (ft/s)		1.34	0.80
Max Chl Dpth (ft)	4.34	Hydr. Depth (ft)		3.54	1.64
Conv. Total (cfs)	103217.1	Conv. (cfs)		100031.9	3185.2
Length Wtd. (ft)	266.37	Wetted Per. (ft)		410.48	47.60
Min Ch El (ft)	297.00	Shear (lb/sq ft)		0.08	0.04
Alpha	1.02	Stream Power (lb/ft s)		0.11	0.03
Frctn Loss (ft)	0.08	Cum Volume (acre-ft)	0.26	23.54	3.09
C & E Loss (ft)	0.00	Cum SA (acres)	0.19	7.74	2.16

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT Profile #10-yr

E.G. Elev (ft)	302.48	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.06	Wt. n-Val.	0.040	0.050	0.050
W.S. Elev (ft)	302.42	Reach Len. (ft)	225.00	263.00	330.00
Crit W.S. (ft)		Flow Area (sq ft)	0.14	1894.49	131.78
E.G. Slope (ft/ft)	0.000607	Area (sq ft)	0.14	1894.49	131.78
Q Total (cfs)	4000.00	Flow (cfs)	0.04	3825.86	174.10

Top Width (ft)	466.19	Top Width (ft)	0.65	412.03	53.51
Vel Total (ft/s)	1.97	Avg. Vel. (ft/s)	0.29	2.02	1.32
Max Chl Dpth (ft)	5.42	Hydr. Depth (ft)	0.21	4.60	2.46
Conv. Total (cfs)	162378.8	Conv. (cfs)	1.6	155309.8	7067.4
Length Wtd. (ft)	268.14	Wetted Per. (ft)	0.78	413.49	54.36
Min Ch El (ft)	297.00	Shear (lb/sq ft)	0.01	0.17	0.09
Alpha	1.02	Stream Power (lb/ft s)	0.00	0.35	0.12
Frctn Loss (ft)	0.13	Cum Volume (acre-ft)	0.81	30.74	5.30
C & E Loss (ft)	0.00	Cum SA (acres)	1.42	8.23	2.25

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT Profile #50-yr

E.G. Elev (ft)	306.39	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.35	Wt. n-Val.	0.040	0.050	0.050
W.S. Elev (ft)	306.03	Reach Len. (ft)	225.00	263.00	330.00
Crit W.S. (ft)		Flow Area (sq ft)	279.95	3384.88	453.38
E.G. Slope (ft/ft)	0.001670	Area (sq ft)	279.95	3384.88	453.38
Q Total (cfs)	18000.00	Flow (cfs)	417.45	16677.94	904.61
Top Width (ft)	918.67	Top Width (ft)	288.34	412.66	217.67
Vel Total (ft/s)	4.37	Avg. Vel. (ft/s)	1.49	4.93	2.00
Max Chl Dpth (ft)	9.03	Hydr. Depth (ft)	0.97	8.20	2.08
Conv. Total (cfs)	440421.1	Conv. (cfs)	10214.2	408073.0	22133.9
Length Wtd. (ft)	267.26	Wetted Per. (ft)	289.61	414.28	219.21
Min Ch El (ft)	297.00	Shear (lb/sq ft)	0.10	0.85	0.22
Alpha	1.19	Stream Power (lb/ft s)	0.15	4.20	0.43
Frctn Loss (ft)	0.40	Cum Volume (acre-ft)	9.45	56.60	13.80
C & E Loss (ft)	0.02	Cum SA (acres)	4.18	8.84	3.95

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	308.36	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.46	Wt. n-Val.	0.040	0.050	0.050
W.S. Elev (ft)	307.91	Reach Len. (ft)	225.00	263.00	330.00
Crit W.S. (ft)		Flow Area (sq ft)	1069.36	4157.56	1093.29
E.G. Slope (ft/ft)	0.001806	Area (sq ft)	1069.36	4157.56	1093.29

Q Total (cfs)	30000.00	Flow (cfs)	2621.46	24428.22	2950.32
Top Width (ft)	1436.76	Top Width (ft)	551.09	412.66	473.01
Vel Total (ft/s)	4.75	Avg. Vel. (ft/s)	2.45	5.88	2.70
Max Chl Dpth (ft)	10.91	Hydr. Depth (ft)	1.94	10.08	2.31
Conv. Total (cfs)	705980.2	Conv. (cfs)	61689.9	574861.4	69428.9
Length Wtd. (ft)	267.45	Wetted Per. (ft)	552.57	414.28	475.65
Min Ch El (ft)	297.00	Shear (lb/sq ft)	0.22	1.13	0.26
Alpha	1.30	Stream Power (lb/ft s)	0.53	6.65	0.70
Frctn Loss (ft)	0.49	Cum Volume (acre-ft)	18.32	70.79	23.36
C & E Loss (ft)	0.00	Cum SA (acres)	8.26	9.07	6.77

Warning: Divided flow computed for this cross-section.

CROSS SECTION

RIVER: San Luis Rey
REACH: Reach 1 RS: 20.767

INPUT
Description: 20.767
Station Elevation Data num= 29

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	3027.820007		30213.92999		302	126.44	302	133.72	303
154.51	303	156.91	302	159.45	301	165.89	300	178.58	299
182.64	298	188.54	297	220.38	297	247.58	297	251.82	296
457.35	296	465.93	297	468.53	298	471.01	299	586.29	300
633.57	301	635.9	302	637.84	303	639.88	304	641.94	305
767.32	306	848.95	307	896.54	306	900.83	305		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	178.58	.05	465.93	.05

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
178.58	465.93	591	591	591	.1	.3

CROSS SECTION OUTPUT Profile #2-yr

E.G. Elev (ft)	300.34	Element	Left OB	Channel	Right OB

Vel Head (ft)	0.01	Wt. n-Val.	0.040	0.050	0.050
W.S. Elev (ft)	300.34	Reach Len. (ft)	591.00	591.00	591.00
Crit W.S. (ft)		Flow Area (sq ft)	10.97	1161.54	110.99
E.G. Slope (ft/ft)	0.000078	Area (sq ft)	10.97	1161.54	110.99
Q Total (cfs)	800.00	Flow (cfs)	2.93	771.75	25.32
Top Width (ft)	438.46	Top Width (ft)	14.85	287.35	136.25
Vel Total (ft/s)	0.62	Avg. Vel. (ft/s)	0.27	0.66	0.23
Max Chl Dpth (ft)	4.34	Hydr. Depth (ft)	0.74	4.04	0.81
Conv. Total (cfs)	90721.1	Conv. (cfs)	332.2	87517.3	2871.5
Length Wtd. (ft)	591.00	Wetted Per. (ft)	14.92	287.73	136.64
Min Ch El (ft)	296.00	Shear (lb/sq ft)	0.00	0.02	0.00
Alpha	1.10	Stream Power (lb/ft s)	0.00	0.01	0.00
Frctn Loss (ft)	0.15	Cum Volume (acre-ft)	0.07	10.66	0.75
C & E Loss (ft)	0.01	Cum SA (acres)	0.10	5.05	0.93

Warning: The conveyance ratio (upstream 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 #5-yr

E.G. Elev (ft)	301.29	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.	0.040	0.050	0.050
W.S. Elev (ft)	301.27	Reach Len. (ft)	591.00	591.00	591.00
Crit W.S. (ft)		Flow Area (sq ft)	27.52	1429.94	257.24
E.G. Slope (ft/ft)	0.000219	Area (sq ft)	27.52	1429.94	257.24
Q Total (cfs)	2000.00	Flow (cfs)	18.72	1831.41	149.87
Top Width (ft)	475.44	Top Width (ft)	19.82	287.35	168.27
Vel Total (ft/s)	1.17	Avg. Vel. (ft/s)	0.68	1.28	0.58
Max Chl Dpth (ft)	5.27	Hydr. Depth (ft)	1.39	4.98	1.53
Conv. Total (cfs)	135148.2	Conv. (cfs)	1265.1	123756.0	10127.1
Length Wtd. (ft)	591.00	Wetted Per. (ft)	19.98	287.73	168.72
Min Ch El (ft)	296.00	Shear (lb/sq ft)	0.02	0.07	0.02
Alpha	1.13	Stream Power (lb/ft s)	0.01	0.09	0.01
Frctn Loss (ft)	0.35	Cum Volume (acre-ft)	0.19	14.85	1.82
C & E Loss (ft)	0.01	Cum SA (acres)	0.13	5.64	1.34

Warning: The conveyance ratio (upstream 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 #10-yr

E.G. Elev (ft)	302.35	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.06	Wt. n-Val.	0.040	0.050	0.050
W.S. Elev (ft)	302.29	Reach Len. (ft)	591.00	591.00	591.00
Crit W.S. (ft)		Flow Area (sq ft)	86.51	1723.93	430.60
E.G. Slope (ft/ft)	0.000415	Area (sq ft)	86.51	1723.93	430.60
Q Total (cfs)	4000.00	Flow (cfs)	74.52	3443.31	482.18
Top Width (ft)	608.84	Top Width (ft)	150.95	287.35	170.54
Vel Total (ft/s)	1.78	Avg. Vel. (ft/s)	0.86	2.00	1.12
Max Chl Dpth (ft)	6.29	Hydr. Depth (ft)	0.57	6.00	2.52
Conv. Total (cfs)	196329.6	Conv. (cfs)	3657.5	169005.8	23666.3
Length Wtd. (ft)	591.00	Wetted Per. (ft)	151.63	287.73	171.21
Min Ch El (ft)	296.00	Shear (lb/sq ft)	0.01	0.16	0.07
Alpha	1.13	Stream Power (lb/ft s)	0.01	0.31	0.07
Frctn Loss (ft)	0.59	Cum Volume (acre-ft)	0.59	19.82	3.17
C & E Loss (ft)	0.01	Cum SA (acres)	1.02	6.12	1.40

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.

CROSS SECTION OUTPUT Profile #50-yr

E.G. Elev (ft)	305.97	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.30	Wt. n-Val.	0.040	0.050	0.050
W.S. Elev (ft)	305.68	Reach Len. (ft)	591.00	591.00	591.00
Crit W.S. (ft)		Flow Area (sq ft)	673.80	2696.46	1048.59
E.G. Slope (ft/ft)	0.001326	Area (sq ft)	673.80	2696.46	1048.59
Q Total (cfs)	18000.00	Flow (cfs)	2174.70	12970.94	2854.37
Top Width (ft)	729.83	Top Width (ft)	178.58	287.35	263.90
Vel Total (ft/s)	4.07	Avg. Vel. (ft/s)	3.23	4.81	2.72
Max Chl Dpth (ft)	9.68	Hydr. Depth (ft)	3.77	9.38	3.97
Conv. Total (cfs)	494301.4	Conv. (cfs)	59719.8	356197.3	78384.3
Length Wtd. (ft)	591.00	Wetted Per. (ft)	182.83	287.73	265.96
Min Ch El (ft)	296.00	Shear (lb/sq ft)	0.31	0.78	0.33
Alpha	1.15	Stream Power (lb/ft s)	0.98	3.73	0.89
Frctn Loss (ft)	1.37	Cum Volume (acre-ft)	6.98	38.24	8.11
C & E Loss (ft)	0.01	Cum SA (acres)	2.98	6.73	2.13

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.

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	307.87	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.50	Wt. n-Val.	0.040	0.050	0.050
W.S. Elev (ft)	307.38	Reach Len. (ft)	591.00	591.00	591.00
Crit W.S. (ft)		Flow Area (sq ft)	977.08	3184.45	1674.19
E.G. Slope (ft/ft)	0.001828	Area (sq ft)	977.08	3184.45	1674.19
Q Total (cfs)	30000.00	Flow (cfs)	4713.79	20092.12	5194.09
Top Width (ft)	900.83	Top Width (ft)	178.58	287.35	434.90
Vel Total (ft/s)	5.14	Avg. Vel. (ft/s)	4.82	6.31	3.10
Max Chl Dpth (ft)	11.38	Hydr. Depth (ft)	5.47	11.08	3.85
Conv. Total (cfs)	701760.5	Conv. (cfs)	110265.1	469995.3	121500.1
Length Wtd. (ft)	591.00	Wetted Per. (ft)	184.53	287.73	438.72
Min Ch El (ft)	296.00	Shear (lb/sq ft)	0.60	1.26	0.44
Alpha	1.21	Stream Power (lb/ft s)	2.91	7.97	1.35
Frctn Loss (ft)	1.68	Cum Volume (acre-ft)	13.03	48.63	12.88
C & E Loss (ft)	0.01	Cum SA (acres)	6.38	6.96	3.34

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.

CROSS SECTION

RIVER: San Luis Rey
REACH: Reach 1 RS: 20.655

INPUT

Description: 20.655

Station Elevation Data num= 82

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	324.6	0	323.8	9	324.9	23	320.6	31	318.6
48	318.7	60	315.8	90	311.8	125	308.6	163	306.2
203	305.1	222	304.7	242	303.8	291	303.7	307	303.4
319	303.3	334	303.5	344	304	356	304.5	369	304.5
383	304.8	390	305.7	416	305.6	435	305.1	491	305.8
500	305.1	512	305.1	514	305.9	535	306.5	577	306.2
587	307.2	594	307.2	596	306.8	622	306.3	635	306.3
643	305.3	695	305.6	699	306.3	714	306.2	715	305.6
722	305.6	759	305.2	930	305.1	979	305.5	993	305
1009	303.4	1028	302	1085	301.8	1132	301.7	1136	302.9
1148	302.2	1392	298.7	1430	299.6	1447	299.6	1458	299.9
1469	300.3	1493	301	1516	302.4	1534	303.7	1547	304.7
1559	305	1571	304.7	1590	299.7	1724	298.8	1767	298.8
1775	298.1	1795	298	1799	299.4	1841	300	1860	300.4
1864	298.8	1882	298.6	1886	300.1	1919	300.9	1966	310.2
1977	309.4	1991	309	2003	307.3	2010	306.5	2017	311
2024	312.4	2029	313.6						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	1148	.05	1886	.05

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
1148	1886	0	0	0	.1	.3

CROSS SECTION OUTPUT Profile #2-yr

			Left OB	Channel	Right OB
E.G. Elev (ft)	300.19	Element			
Vel Head (ft)	0.06	Wt. n-Val.		0.050	0.050
W.S. Elev (ft)	300.13	Reach Len. (ft)			
Crit W.S. (ft)	299.59	Flow Area (sq ft)		409.49	0.02
E.G. Slope (ft/ft)	0.005010	Area (sq ft)		409.49	0.02
Q Total (cfs)	800.00	Flow (cfs)		800.00	0.00
Top Width (ft)	457.93	Top Width (ft)		456.58	1.35
Vel Total (ft/s)	1.95	Avg. Vel. (ft/s)		1.95	0.14
Max Chl Dpth (ft)	2.13	Hydr. Depth (ft)		0.90	0.02
Conv. Total (cfs)	11302.8	Conv. (cfs)		11302.7	0.0
Length Wtd. (ft)		Wetted Per. (ft)		457.47	1.35

Min Ch El (ft)	298.00	Shear (lb/sq ft)	0.28	0.01
Alpha	1.00	Stream Power (lb/ft s)	0.55	0.00
Frctn Loss (ft)		Cum Volume (acre-ft)		
C & E Loss (ft)		Cum SA (acres)		

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT Profile #5-yr

			Left OB	Channel	Right OB
E.G. Elev (ft)	300.93	Element			
Vel Head (ft)	0.11	Wt. n-Val.		0.050	0.050
W.S. Elev (ft)	300.83	Reach Len. (ft)			
Crit W.S. (ft)	300.06	Flow Area (sq ft)		758.59	10.87
E.G. Slope (ft/ft)	0.005000	Area (sq ft)		758.59	10.87
Q Total (cfs)	2000.00	Flow (cfs)		1988.38	11.62
Top Width (ft)	573.46	Top Width (ft)		543.51	29.94
Vel Total (ft/s)	2.60	Avg. Vel. (ft/s)		2.62	1.07
Max Chl Dpth (ft)	2.83	Hydr. Depth (ft)		1.40	0.36
Conv. Total (cfs)	28283.7	Conv. (cfs)		28119.4	164.3
Length Wtd. (ft)		Wetted Per. (ft)		544.57	29.95
Min Ch El (ft)	298.00	Shear (lb/sq ft)		0.43	0.11
Alpha	1.01	Stream Power (lb/ft s)		1.14	0.12
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT Profile #10-yr

			Left OB	Channel	Right OB
E.G. Elev (ft)	301.75	Element			
Vel Head (ft)	0.16	Wt. n-Val.		0.050	0.050
W.S. Elev (ft)	301.58	Reach Len. (ft)			
Crit W.S. (ft)	300.60	Flow Area (sq ft)		1197.73	36.90
E.G. Slope (ft/ft)	0.005001	Area (sq ft)		1197.73	36.90
Q Total (cfs)	4000.00	Flow (cfs)		3921.91	78.09
Top Width (ft)	651.14	Top Width (ft)		614.69	36.45
Vel Total (ft/s)	3.24	Avg. Vel. (ft/s)		3.27	2.12
Max Chl Dpth (ft)	3.58	Hydr. Depth (ft)		1.95	1.01
Conv. Total (cfs)	56562.7	Conv. (cfs)		55458.4	1104.3

Length Wtd. (ft)		Wetted Per. (ft)	615.86	36.53
Min Ch El (ft)	298.00	Shear (lb/sq ft)	0.61	0.32
Alpha	1.01	Stream Power (lb/ft s)	1.99	0.67
Frctn Loss (ft)		Cum Volume (acre-ft)		
C & E Loss (ft)		Cum SA (acres)		

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT Profile #50-yr

E.G. Elev (ft)	304.59	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.44	Wt. n-Val.	0.040	0.050	0.050
W.S. Elev (ft)	304.16	Reach Len. (ft)			
Crit W.S. (ft)	302.64	Flow Area (sq ft)	355.61	2940.89	147.51
E.G. Slope (ft/ft)	0.005007	Area (sq ft)	355.61	2940.89	147.51
Q Total (cfs)	18000.00	Flow (cfs)	1356.43	16003.73	639.84
Top Width (ft)	1014.64	Top Width (ft)	260.29	704.88	49.46
Vel Total (ft/s)	5.23	Avg. Vel. (ft/s)	3.81	5.44	4.34
Max Chl Dpth (ft)	6.16	Hydr. Depth (ft)	1.37	4.17	2.98
Conv. Total (cfs)	254373.4	Conv. (cfs)	19168.8	226162.4	9042.1
Length Wtd. (ft)		Wetted Per. (ft)	260.61	706.49	49.79
Min Ch El (ft)	298.00	Shear (lb/sq ft)	0.43	1.30	0.93
Alpha	1.03	Stream Power (lb/ft s)	1.63	7.08	4.02
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	306.19	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.59	Wt. n-Val.	0.040	0.050	0.050
W.S. Elev (ft)	305.60	Reach Len. (ft)			
Crit W.S. (ft)	303.69	Flow Area (sq ft)	943.95	3983.48	223.89
E.G. Slope (ft/ft)	0.005002	Area (sq ft)	943.95	3983.48	223.89
Q Total (cfs)	30000.00	Flow (cfs)	3106.75	25724.47	1168.78
Top Width (ft)	1556.40	Top Width (ft)	761.67	738.00	56.73
Vel Total (ft/s)	5.82	Avg. Vel. (ft/s)	3.29	6.46	5.22
Max Chl Dpth (ft)	7.60	Hydr. Depth (ft)	1.24	5.40	3.95

Conv. Total (cfs)	424163.5	Conv. (cfs)	43925.7	363712.8	16525.1
Length Wtd. (ft)		Wetted Per. (ft)	762.26	739.70	57.20
Min Ch El (ft)	298.00	Shear (lb/sq ft)	0.39	1.68	1.22
Alpha	1.12	Stream Power (lb/ft s)	1.27	10.86	6.38
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

Warning: Divided flow computed for this cross-section.

SUMMARY OF MANNING'S N VALUES

River:San Luis Rey

Reach	River Sta.	n1	n2	n3
Reach 1	21.246	.04	.05	.035
Reach 1	21.137	.04	.05	.035
Reach 1	21.093	.04	.05	.035
Reach 1	20.996	.04	.05	.035
Reach 1	20.96	.04	.05	.035
Reach 1	20.943	.04	.05	.035
Reach 1	20.936	.04	.05	.035
Reach 1	20.891	.04	.05	.035
Reach 1	20.872	.04	.05	.035
Reach 1	20.849	.04	.05	.035
Reach 1	20.831	.04	.05	.035
Reach 1	20.817	.04	.05	.05
Reach 1	20.767	.04	.05	.05
Reach 1	20.655	.04	.05	.05

SUMMARY OF REACH LENGTHS

River: San Luis Rey

Reach	River Sta.	Left	Channel	Right

Reach 1	21.246	450	575	650
Reach 1	21.137	450	510	530
Reach 1	21.093	227	215	135
Reach 1	20.996	108	115	95
Reach 1	20.96	140	140	235
Reach 1	20.943	50	50	50
Reach 1	20.936	240	240	240
Reach 1	20.891	115	110	95
Reach 1	20.872	105	124	162
Reach 1	20.849	102	97	88
Reach 1	20.831	85	75	55
Reach 1	20.817	225	263	330
Reach 1	20.767	591	591	591
Reach 1	20.655	0	0	0

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: San Luis Rey

Reach	River Sta.	Contr.	Expan.
Reach 1	21.246	.1	.3
Reach 1	21.137	.1	.3
Reach 1	21.093	.1	.3
Reach 1	20.996	.1	.3
Reach 1	20.96	.1	.3
Reach 1	20.943	.1	.3
Reach 1	20.936	.1	.3
Reach 1	20.891	.1	.3
Reach 1	20.872	.1	.3
Reach 1	20.849	.1	.3
Reach 1	20.831	.1	.3
Reach 1	20.817	.1	.3
Reach 1	20.767	.1	.3
Reach 1	20.655	.1	.3

Subject Kip Kap

By NR

Date 8/6/08

Checked By Matt Moore

Date 8/26/08

Project No. 27654025

Task No.

File No.

Sheet 1 of 1

Per Table 5-2, SD County Drn Manual

Highest Velocity = 7 ft/s

Rock Gradation = No. 2 Backing
6-10 ft/s

Per table 5-5, min thickness for
No. 2 Backing = 1.25' => Use 3' thickness

- Extend toe of riprap 3' below channel bed
- Thickness of blanket below channel bed = $3d_{50}$

No 2 Backing $d_{50} = 0.7'$

$\Rightarrow 3 \times 0.7 = 2.1'$ below channel bed

Eq 5-6, SD County Drn Design Manual

$$W = \frac{0.00002\, V_A^6\, SG}{(SG-1)^3 \sin^3(\beta-\alpha)} = \frac{0.00002\left[0.67(7\,ft/s)\right]^6 (2.5)}{(2.5-1)^3 \sin^3(70^\circ - 48^\circ)} = 0.53$$

3.24

$W = 0.16$ lb

∴ No 2 Backing OK

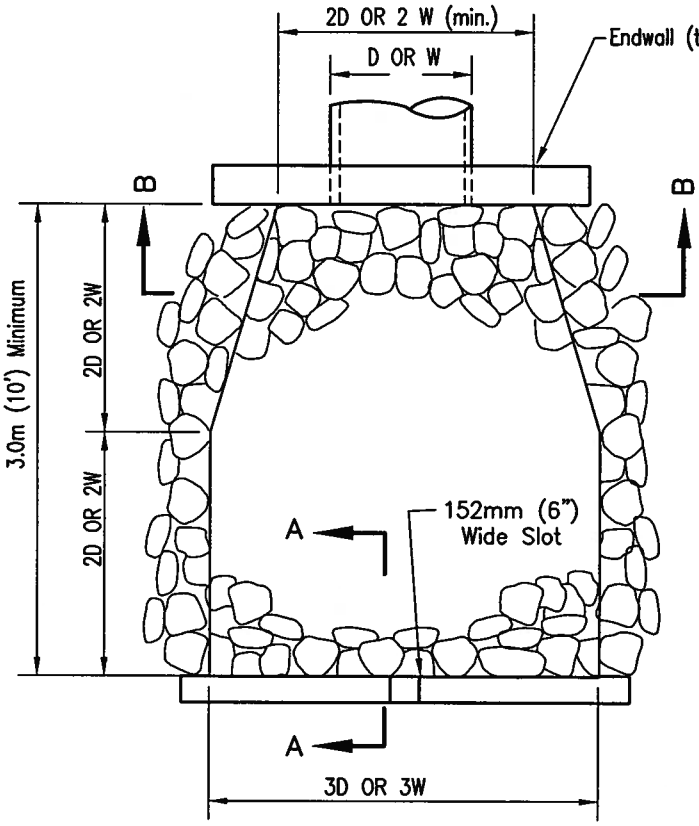
$V_A = KV_m$ $K = 0.67$ (parallel flow) $V_m = 7$ ft/s per Hec-Ras

$SG_{riprap} = 2.5$ per Design of Small Dams

$\beta = 70^\circ$ per County SD Drn Design Manual

$\alpha = 48^\circ$ - measured from plans

URS

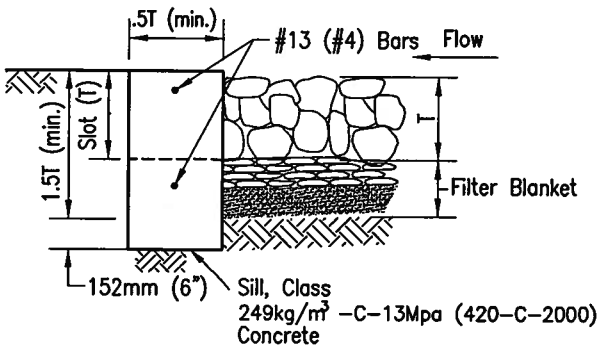


PLAN

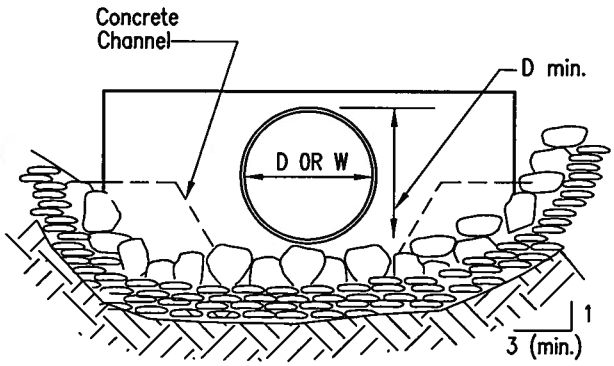
Design Velocity m/sec (ft/sec)*	Rock Classification	T (min)
1.8–3 (6–10)	No. 2 Backing	320mm (1.1ft)
3–3.7 (10–12)	220 kg (1/4 ton)	823mm (2.7ft)
3.7–4.3 (12–14)	450 kg (1/2 ton)	1.1m (3.5ft)
4.3–4.9 (14–16)	900 kg (1 ton)	1.3m (4.4ft)
4.9–5.5 (16–18)	1.8 tonne (2 ton)	1.6m (5.4ft)

*over 5.5 mps (18 fps) requires special design

D = Pipe Diameter
W = Bottom Width of Channel



SECTION A–A



SECTION B–B

NOTES

1. Plans shall specify:
   A) Rock Class and thickness (T).
   B) Filter material, number of layers and thickness.
2. Rip rap shall be either quarry stone or broken concrete (if shown on the plans.) Cobbles are not acceptable.
3. Rip rap shall be placed over filter blanket which may be either granular material or filter fabric (woven filter slit film fabric shall not be used).
4. See Regional Supplement Amendments for selection of filter blanket.
5. Rip rap energy dissipators shall be designated as either Type 1 or Type 2. Type 1 shall be with concrete sill; Type 2 shall be without sill.

Revision	By	Approved	Date
ORIGINAL		Kercheval	12/75
Add Metric		T. Stanton	03/03
Add Rip Rap Table		S. Brady	04/06

SAN DIEGO REGIONAL STANDARD DRAWING

RIP RAP ENERGY DISSIPATOR

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

04/27/2006

Chairperson R.C.E. 19246 Date

DRAWING NUMBER D-40

```
1*********************************************
 *  HEC-2 WATER SURFACE PROFILES             *
 *                                           *
 *  Version   4.6.2;  May 1991               *
 *                                           *
 *  RUN DATE    17MAR99    TIME   11:18:41   *
 *********************************************
```

```
*****************************************
*  U.S. ARMY CORPS OF ENGINEERS         *
*  HYDROLOGIC ENGINEERING CENTER        *
*  609 SECOND STREET, SUITE D           *
*  DAVIS, CALIFORNIA 95616-4687         *
*          (916) 756-1104               *
*****************************************
```

```
X     X  XXXXXXX   XXXXX              XXXXX
X     X  X        X     X            X     X
X     X  X        X                        X
XXXXXXX  XXXX     X          XXXXX    XXXXX
X     X  X        X                  X
X     X  X        X     X            X
X     X  XXXXXXX   XXXXX             XXXXXXX
```

```
1
   17MAR99      11:18:41                                                                    PAGE    1
```

THIS RUN EXECUTED 17MAR99 11:18:41

```
*************************************
 HEC-2 WATER SURFACE PROFILES

 Version   4.6.2;  May 1991
*************************************
```

```
T1      SAN LUIS REY RIVER STUDY      FLOODWAY
T2      FOR SD COUNTY WATER AUTHORITY AND COUNTY OF SAN DIEGO
T3      100-YR FLOOD, FEBRUARY 1994   MODIFIED 2-5-96 BY COUNTY OF SAN DIEGO
T4      MODIFIED JANUARY 1998 BY NOLTE FOR GREGORY CANYON ANALYSIS
T5      ORIGINAL FILE : SLR.DHS   NOLTE FILE : GRCYNFW.DAT

J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

       0        2         0         0         0         0       0.0   30000.0    305.28

J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

       1        0        -1       0.0       0.0       0.0       0.0      -6.0       0.0        15

J3  VARIABLE CODES FOR SUMMARY PRINTOUT

      38        1        50        43        42        21        22        27        28        53
      54        4                 150                 200
```

ET			9.1						87	1100
NC	0.05	0.04	0.05	0.1	0.3					
X1	20.655	82	143.0	881.0	500.0	600.0	550.0	1.0	0.0	0
X3	0	299.7	0.0	0.0	0.0	1100.0	0.0	0.0	0.0	
GR	313.6	0.0	312.4	5.0	311.0	12.0	306.5	19.0	307.3	26.0
GR	309.0	38.0	309.4	52.0	310.2	63.0	300.9	110.0	300.1	143.0
GR	298.6	147.0	298.8	165.0	300.4	169.0	300.0	188.0	299.4	230.0
GR	298.0	234.0	298.1	254.0	298.8	262.0	298.8	305.0	299.7	439.0
GR	304.7	458.0	305.0	470.0	304.7	482.0	303.7	495.0	302.4	513.0
GR	301.0	536.0	300.3	560.0	299.9	571.0	299.6	582.0	299.6	599.0
GR	298.7	637.0	302.2	881.0	302.9	893.0	301.7	897.0	301.8	944.0
GR	302.0	1001.0	303.4	1020.0	305.0	1036.0	305.5	1050.0	305.1	1099.0
GR	305.2	1270.0	305.6	1307.0	305.6	1314.0	306.2	1315.0	306.3	1330.0
GR	305.6	1334.0	305.3	1386.0	306.3	1394.0	306.3	1407.0	306.8	1433.0
GR	307.2	1435.0	307.2	1442.0	306.2	1452.0	306.5	1494.0	305.9	1515.0
GR	305.1	1517.0	305.1	1529.0	305.8	1538.0	305.1	1594.0	305.6	1613.0
GR	305.7	1639.0	304.8	1646.0	304.5	1660.0	304.5	1673.0	304.0	1685.0
GR	303.5	1695.0	303.3	1710.0	303.4	1722.0	303.7	1738.0	303.8	1787.0
GR	304.7	1807.0	305.1	1826.0	306.2	1866.0	308.6	1904.0	311.8	1939.0
GR	315.8	1969.0	318.7	1981.0	318.6	1998.0	320.6	2006.0	324.9	2020.0
GR	323.8	2029.0	324.6	2029.0						

1

ET			9.1						125	1050
X1	20.749	71	321.0	1014.0	400.0	750.0	500.0	1.0	0.0	0
X3	0	300.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
GR	310.3	0.0	309.5	17.0	309.1	25.0	302.8	30.0	303.2	36.0
GR	303.3	42.0	306.6	49.0	305.9	67.0	305.8	89.0	305.0	125.0
GR	305.2	155.0	304.7	182.0	303.4	186.0	303.6	198.0	304.6	215.0
GR	304.9	227.0	304.8	250.0	304.7	278.0	304.8	321.0	300.5	328.0
GR	301.0	342.0	301.6	348.0	301.6	353.0	301.3	357.0	300.3	360.0
GR	301.1	393.0	302.7	403.0	302.4	409.0	301.5	416.0	301.5	438.0
GR	304.6	447.0	304.0	472.0	302.1	576.0	302.1	599.0	302.1	628.0
GR	301.1	632.0	301.3	641.0	301.3	650.0	302.7	658.0	302.6	668.0
GR	301.9	764.0	302.2	793.0	303.1	1014.0	305.6	1085.0	307.6	1101.0
GR	309.1	1111.0	309.3	1116.0	308.5	1117.0	309.1	1125.0	311.0	1132.0
GR	311.0	1136.0	310.3	1139.0	310.4	1162.0	310.8	1194.0	310.8	1248.0
GR	310.2	1293.0	309.8	1351.0	309.0	1431.0	308.7	1526.0	308.2	1596.0
GR	308.1	1627.0	308.2	1645.0	308.4	1654.0	308.4	1752.0	307.3	1806.0
GR	307.3	1850.0	308.9	1886.0	311.4	1934.0	314.4	1971.0	315.5	1986.0
GR	316.3	1986.0								
NC	0.035	0.04	0.05	0.0	0.0					
ET		7.1	9.1				0	1200	250	1200
X1	20.852	75	641.0	1078.0	450.0	700.0	540.0	1.0	0.0	0
X3	0	300.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
GR	312.4	0.0	312.4	2.0	312.3	14.0	304.9	26.0	304.9	36.0
GR	307.7	41.0	308.0	79.0	308.6	96.0	308.6	112.0	308.1	138.0
GR	307.9	188.0	307.9	210.0	309.1	216.0	310.1	224.0	307.6	229.0
GR	306.9	238.0	306.1	250.0	306.7	277.0	306.7	297.0	306.7	322.0

GR	305.0	324.0	305.0	330.0	305.8	333.0	305.1	364.0	305.2	402.0
GR	304.7	470.0	304.8	538.0	304.9	552.0	304.4	560.0	304.4	571.0
GR	305.2	580.0	305.4	593.0	305.4	605.0	304.9	622.0	305.1	641.0
GR	303.5	680.0	303.5	844.0	303.5	903.0	307.5	910.0	308.0	916.0
GR	307.6	924.0	307.7	932.0	307.6	939.0	303.0	965.0	303.0	1016.0
GR	303.0	1031.0	303.0	1071.0	305.3	1078.0	305.9	1099.0	306.4	1123.0
GR	306.1	1151.0	306.3	1162.0	306.4	1187.0	306.0	1221.0	305.9	1242.0
GR	305.9	1268.0	306.8	1291.0	306.8	1318.0	307.3	1343.0	307.3	1381.0
GR	308.2	1400.0	307.9	1423.0	307.5	1444.0	308.0	1477.0	307.5	1522.0
GR	307.5	1558.0	307.5	1581.0	308.1	1598.0	309.3	1619.0	311.6	1696.0
GR	312.6	1735.0	315.9	1760.0	319.8	1782.0	324.0	1796.0	323.5	1797.0
ET		7.1	9.1				0	1754.0	986	1754
X1	20.953	98	1117.0	1754.0	650.0	400.0	535.0	1.0	0.0	0
X3	0	301.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
GR	319.0	0.0	318.8	3.0	316.8	18.0	316.6	36.0	315.6	55.0
GR	314.1	86.0	314.1	114.0	314.1	203.0	314.7	218.0	314.7	228.0
GR	314.6	266.0	314.7	287.0	314.3	330.0	313.9	346.0	313.5	369.0
GR	313.9	401.0	313.5	433.0	313.5	463.0	313.6	473.0	313.6	505.0
GR	313.2	549.0	312.7	598.0	311.7	638.0	311.2	657.0	311.2	662.0
GR	311.5	665.0	311.3	694.0	311.5	742.0	311.2	777.0	311.6	795.0
GR	312.3	803.0	312.7	811.0	312.3	820.0	312.1	833.0	311.6	845.0
GR	311.5	864.0	310.6	891.0	309.9	933.0	309.5	986.0	309.2	1032.0
GR	309.0	1063.0	309.1	1082.0	308.6	1117.0	307.8	1170.0	307.0	1204.0
GR	306.6	1217.0	305.8	1226.0	305.1	1233.0	305.4	1242.0	306.1	1251.0
GR	306.1	1261.0	305.9	1278.0	306.1	1295.0	306.3	1308.0	306.3	1316.0

1

GR	306.7	1327.0	306.6	1335.0	313.9	1341.0	314.0	1347.0	313.6	1354.0
GR	311.0	1358.0	311.0	1372.0	311.0	1384.0	304.9	1399.0	304.6	1413.0
GR	304.9	1414.0	304.9	1501.0	304.9	1572.0	308.6	1585.0	308.8	1597.0
GR	307.0	1658.0	308.1	1689.0	308.0	1705.0	308.0	1722.0	308.0	1729.0
GR	308.1	1737.0	308.1	1754.0	308.1	1775.0	308.1	1797.0	307.5	1829.0
GR	307.7	1865.0	308.1	1883.0	307.9	1897.0	307.5	1913.0	308.2	1944.0
GR	308.9	1967.0	309.0	1995.0	309.0	2018.0	309.7	2037.0	310.2	2057.0
GR	311.0	2076.0	313.1	2094.0	315.4	2119.0	317.1	2146.0	319.9	2178.0
GR	321.7	2199.0	322.6	2208.0	322.8	2208.0				

FIRST SAN DEIGO AQUEDUCT CROSSING

ET		7.1	9.1				0	1530	616	1530
X1	21.040	68	825.0	1530.0	650.0	380.0	460.0	1.0	0.0	0
X3	0	302.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
GR	316.0	0.0	316.2	0.0	316.3	0.0	315.4	54.0	315.0	82.0
GR	315.1	104.0	314.7	126.0	314.7	153.0	314.8	172.0	314.2	192.0
GR	314.1	216.0	314.0	234.0	314.5	238.0	314.4	249.0	314.4	258.0
GR	313.9	263.0	313.6	309.0	312.8	349.0	312.8	393.0	312.8	439.0
GR	311.9	467.0	312.0	477.0	313.4	481.0	313.4	506.0	313.3	537.0
GR	311.8	584.0	312.5	616.0	312.4	629.0	311.8	645.0	310.8	664.0
GR	311.5	685.0	311.1	704.0	310.1	714.0	310.8	752.0	310.4	788.0
GR	309.9	825.0	309.4	874.0	308.6	927.0	308.7	970.0	308.5	1003.0

GR	308.2	1033.0	308.1	1063.0	307.5	1080.0	307.3	1094.0	307.3	1111.0
GR	307.3	1116.0	311.4	1122.0	311.4	1130.0	311.4	1141.0	311.6	1168.0
GR	307.9	1186.0	305.6	1209.0	304.3	1218.0	304.3	1291.0	304.3	1365.0
GR	305.2	1367.0	305.1	1385.0	305.8	1408.0	306.1	1428.0	307.3	1437.0
GR	308.2	1449.0	308.2	1472.0	309.3	1530.0	311.5	1622.0	315.9	1689.0
GR	320.0	1720.0	321.3	1727.0	316.3	1727.0				
ET			9.1						560	1490
X1	21.137	77	990.0	1485.0	450.0	530.0	510.0	1.0	0.0	0
X3	0	306.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
GR	323.7	0.0	323.9	3.0	322.8	20.0	323.9	24.0	324.6	29.0
GR	323.6	31.0	316.9	41.0	316.9	54.0	319.3	57.0	320.4	61.0
GR	320.4	64.0	318.5	66.0	318.3	81.0	317.4	99.0	317.1	117.0
GR	317.1	141.0	316.5	150.0	315.7	206.0	315.7	256.0	315.3	318.0
GR	314.8	410.0	314.3	426.0	314.3	437.0	313.5	474.0	313.4	540.0
GR	313.4	626.0	314.1	681.0	316.9	691.0	318.7	697.0	318.6	700.0
GR	318.5	703.0	316.0	707.0	313.0	714.0	313.0	733.0	313.6	745.0
GR	313.4	759.0	313.4	770.0	313.4	782.0	317.3	788.0	317.3	794.0
GR	317.3	800.0	315.1	808.0	313.2	814.0	312.4	860.0	312.1	919.0
GR	311.8	990.0	311.2	1035.0	311.2	1044.0	310.5	1048.0	310.5	1053.0
GR	310.5	1059.0	310.3	1071.0	310.4	1090.0	310.7	1112.0	310.7	1125.0
GR	311.1	1139.0	310.9	1162.0	310.8	1185.0	310.3	1214.0	310.0	1264.0
GR	309.3	1272.0	306.1	1290.0	306.4	1316.0	306.5	1344.0	306.5	1359.0
GR	306.5	1379.0	306.5	1393.0	306.5	1412.0	307.1	1416.0	307.5	1424.0
GR	307.6	1434.0	307.0	1448.0	307.0	1476.0	307.0	1485.0	338.8	1531.0
GR	342.2	1539.0	342.5	1540.0						

D/S OF FENTON'S LARGE PIT

1

17MAR99 11:18:41 PAGE 4

ET			9.1						33	1461
X1	21.246	90	613.0	1216.0	450.0	650.0	575.0	1.0	0.0	0
X3	0	309.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
GR	320.4	0.0	318.6	7.0	318.6	22.0	318.6	31.0	314.1	39.0
GR	314.1	49.0	314.1	56.0	314.1	75.0	314.1	95.0	314.3	120.0
GR	314.3	156.0	314.3	187.0	314.2	211.0	313.6	236.0	313.7	265.0
GR	313.5	283.0	313.5	304.0	313.5	327.0	313.5	354.0	313.4	379.0
GR	313.3	405.0	312.5	428.0	312.6	449.0	312.2	459.0	312.0	478.0
GR	311.9	501.0	311.3	515.0	313.1	523.0	311.9	527.0	311.9	539.0
GR	313.1	543.0	313.4	556.0	313.7	575.0	313.5	595.0	313.5	613.0
GR	307.5	640.0	307.7	682.0	307.9	744.0	310.5	875.0	310.4	896.0
GR	310.4	916.0	310.4	935.0	311.1	939.0	311.0	945.0	310.7	949.0
GR	310.7	958.0	310.7	968.0	311.3	973.0	311.5	986.0	311.9	998.0
GR	313.2	1004.0	313.3	1009.0	313.3	1013.0	313.3	1017.0	311.9	1020.0
GR	311.9	1026.0	311.8	1032.0	311.4	1051.0	310.9	1079.0	310.9	1105.0
GR	310.9	1143.0	310.8	1187.0	314.6	1216.0	314.6	1238.0	314.9	1262.0
GR	314.8	1305.0	314.4	1346.0	317.6	1355.0	315.8	1368.0	312.8	1374.0
GR	312.8	1415.0	312.8	1456.0	318.3	1462.0	321.9	1472.0	321.9	1479.0
GR	323.2	1484.0	324.8	1489.0	324.9	1490.0	324.0	1496.0	322.9	1506.0
GR	320.5	1517.0	319.7	1528.0	318.2	1540.0	318.3	1562.0	318.9	1580.0

```
GR    319.3     1594.0     319.8     1610.0     319.6     1619.0     320.1     1633.0     321.6     1649.0

ET                          9.1                                                              32        1543
NC     0.04       0.04     0.03        0.0       0.0
X1   21.359         80    689.0     1549.0     380.0      800.0     600.0       1.0       0.0         0
X3        0      313.0      0.0        0.0       0.0        0.0       0.0       0.0       0.0
GR    338.9        0.0    331.1        8.0     316.6       35.0     316.6      57.0     316.6      66.0
GR    314.7       71.0    314.8       85.0     314.9      127.0     314.9     150.0     315.5     175.0
GR    315.5      197.0    319.9      204.0     321.8      211.0     321.8     222.0     321.8     235.0
GR    316.7      246.0    313.4      258.0     313.6      279.0     313.6     296.0     313.6     318.0
GR    313.2      330.0    313.3      350.0     312.9      377.0     311.5     395.0     310.3     415.0
GR    309.8      429.0    309.8      443.0     309.8      461.0     309.8     494.0     312.0     509.0
GR    311.9      538.0    314.6      580.0     317.6      586.0     320.4     590.0     320.7     596.0
GR    317.3      600.0    314.6      604.0     314.3      618.0     315.3     638.0     315.8     647.0
GR    317.0      655.0    317.4      669.0     317.3      689.0     316.8     701.0     316.8     713.0
GR    317.5      725.0    317.5      748.0     317.9      773.0     318.0     793.0     317.6     811.0
GR    318.0      828.0    317.8      844.0     316.8      855.0     315.7     875.0     315.2     893.0
GR    315.3      911.0    319.4      915.0     314.9      923.0     312.8     925.0     294.0     965.0
GR    292.8      980.0    293.8     1040.0     294.0     1110.0     294.0    1180.0     294.0    1240.0
GR    294.0     1310.0    294.0     1420.0     294.0     1500.0     321.7    1549.0     324.5    1555.0
GR    328.7     1561.0    332.0     1565.0     331.9     1569.0     331.9    1573.0     326.8    1577.0
GR    323.1     1586.0    320.9     1595.0     321.6     1609.0     321.3    1632.0     320.4    1632.0
1
   17MAR99      11:18:41                                                                                PAGE    5

    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
    Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
    TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
    SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST

 *PROF 1
0

 CCHV=     .100 CEHV=     .300
 *SECNO 20.655

 3265 DIVIDED FLOW

 3470 ENCROACHMENT STATIONS=          .0    1100.0  TYPE=      1  TARGET=     1099.999
     20.655      5.58    305.28       .00    305.28    306.07       .79       .00       .00    300.10
    30000.0    1345.4   25415.4    3239.2     206.2    3522.9     472.8        .0        .0    302.20
        .00      6.52      7.21      6.85      .050      .050      .040      .000    299.70     87.86
    .007344      500.      550.      600.         0         0         0       .00    979.02   1100.00

 FLOW DISTRIBUTION FOR SECNO=     20.66          CWSEL=    305.28

 STA=       88.      110.      143.      881.      893.      897.      944.     1001.     1020.     1036.     1100.
   PER Q=       .7       3.8      84.7        .7        .3       4.1       4.6       1.0        .2        .0
    AREA=     48.5     157.7    3522.9      32.8      11.9     165.9     192.7      49.0      17.3       3.3
     VEL=      4.2       7.2       7.2       6.2       6.4       7.4       7.2       6.0       3.3        .7
```

```
  DEPTH=      2.2      4.8      4.8      2.7      3.0      3.5      3.4      2.6      1.1       .1

*SECNO 20.749

3265 DIVIDED FLOW

    20.749      7.84    308.24       .00       .00    308.74       .50      2.64       .03    304.80
   30000.0    4083.0   24130.5    1786.5     981.4    4058.9     381.2      56.3      13.7    303.10
       .03      4.16      5.95      4.69      .050      .050      .040      .000    300.40     25.68
   .003807      400.      500.      750.         3         0         0       .00   1247.18   1871.14

FLOW DISTRIBUTION FOR SECNO=     20.75          CWSEL=    308.24

STA=      26.     125.     198.     278.     321.    1014.    1085.    1871.
  PER Q=      3.7      3.7      4.1      2.1     80.4      5.2       .7
   AREA=    286.8    256.6    287.9    150.1   4058.9    276.2    105.1
    VEL=      3.8      4.3      4.3      4.2      5.9      5.7      2.1
  DEPTH=      2.9      3.5      3.6      3.5      5.9      3.9       .1

1
   17MAR99      11:18:41                                                                          PAGE    6

    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
    Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
    TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
    SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST

*SECNO 20.852

3265 DIVIDED FLOW

    20.852      6.98    309.98       .00       .00    310.46       .48      1.72       .00    305.10
   30000.0   13816.3   14152.2    2031.5    2325.7    2666.2     420.7     121.5      28.3    305.30
       .05      5.94      5.31      4.83      .035      .050      .040      .000    303.00     17.76
   .002878      450.      540.      700.         3         0         0       .00   1168.04   1187.00

FLOW DISTRIBUTION FOR SECNO=     20.85          CWSEL=    309.98

STA=      18.      96.     250.     322.     364.     402.     470.     538.     571.     605.     641.    1078.    1123.
  PER Q=      3.0      3.6      4.2      4.0      4.0      7.6      8.1      4.1      3.5      3.9     47.2      3.1
   AREA=    199.6    293.2    244.3    192.3    183.5    342.1    355.7    175.8    162.4    176.7   2666.2    183.9
    VEL=      4.6      3.7      5.1      6.2      6.5      6.7      6.9      7.0      6.5      6.6      5.3      5.1
  DEPTH=      2.6      1.9      3.4      4.6      4.8      5.0      5.2      5.3      4.8      4.9      6.1      4.1

STA=    1123.    1187.
  PER Q=      3.6
   AREA=    236.8
    VEL=      4.6
  DEPTH=      3.7
```

```
*SECNO 20.953

3265 DIVIDED FLOW


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .64

    20.953      7.56    312.16       .00       .00    313.01       .85      2.43       .11    308.60
   30000.0    4823.4   25176.6        .0     782.3    3310.0        .0     183.3      43.5    308.10
       .07      6.17      7.61      6.95      .035      .050      .040      .000    304.60    619.60
   .007099      650.      535.      400.         2         0         0       .00   1090.05   1754.00

FLOW DISTRIBUTION FOR SECNO=     20.95          CWSEL=    312.16

STA=     620.     933.    1032.    1082.    1117.    1754.
  PER Q=      3.2      5.9      3.9      3.1     83.9
   AREA=    252.9    259.6    153.9    115.8   3310.0
    VEL=      3.8      6.8      7.6      7.9      7.6
  DEPTH=       .8      2.6      3.1      3.3      5.3

1
   17MAR99      11:18:41                                                                                    PAGE     7

    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
    Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
    TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
    SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST

*SECNO 21.040

3265 DIVIDED FLOW


3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.80

    21.040     10.16    314.46       .00       .00    314.84       .37      1.78       .05    309.90
   30000.0    5090.4   24909.6        .1    1312.4    4912.8        .0     242.4      58.7    309.30
       .10      3.88      5.07      4.61      .035      .050      .040      .000    304.30    183.22
   .002196      650.      460.      380.         2         0         0       .00   1342.47   1530.00

FLOW DISTRIBUTION FOR SECNO=     21.04          CWSEL=    314.46

STA=     183.     481.     664.     752.     825.    1530.    1530.
  PER Q=      3.0      3.8      5.1      5.1     83.0       .0
   AREA=    343.8    349.2    320.8    298.7   4912.8       .0
    VEL=      2.7      3.3      4.7      5.1      5.1      4.6
  DEPTH=      1.2      1.9      3.6      4.1      7.0      2.6

*SECNO 21.137
```

3265 DIVIDED FLOW

21.137	9.63	315.73	.00	.00	316.36	.62	1.45	.08	311.80
30000.0	7339.6	22354.9	305.4	1446.9	3327.5	55.2	305.2	73.0	307.00
.12	5.07	6.72	5.53	.035	.050	.040	.000	306.10	203.50
.004032	450.	510.	530.	2	0	0	.00	1253.27	1497.64

FLOW DISTRIBUTION FOR SECNO= 21.14 CWSEL= 315.73

STA=	203.	540.	626.	745.	860.	919.	990.	1485.	1498.
PER Q=	4.1	3.2	3.1	4.0	4.2	5.9	74.5	1.0	
AREA=	333.0	200.9	203.9	234.5	205.7	268.8	3327.5	55.2	
VEL=	3.7	4.7	4.5	5.1	6.2	6.5	6.7	5.5	
DEPTH=	1.0	2.3	1.7	2.0	3.5	3.8	6.7	4.4	

*SECNO 21.246

1

17MAR99 11:18:41 PAGE 8

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

3265 DIVIDED FLOW

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.60

21.246	7.82	317.42	.00	.00	317.69	.27	1.30	.04	313.50
30000.0	9911.5	17408.9	2679.6	2296.8	4104.7	783.4	379.9	89.0	314.60
.16	4.32	4.24	3.42	.035	.050	.040	.000	309.60	33.10
.001583	450.	575.	650.	2	0	0	.00	1426.12	1461.04

FLOW DISTRIBUTION FOR SECNO= 21.25 CWSEL= 317.42

STA=	33.	120.	211.	283.	354.	428.	478.	515.	556.	613.	1216.	1346.	1456.
PER Q=	3.4	3.4	3.6	3.9	4.5	4.2	3.7	3.3	3.1	58.0	3.4	5.5	
AREA=	276.1	285.0	266.0	278.2	308.9	253.5	207.2	201.5	220.4	4104.7	352.1	419.7	
VEL=	3.7	3.6	4.0	4.2	4.4	5.0	5.3	4.9	4.2	4.2	2.9	3.9	
DEPTH=	3.2	3.1	3.7	3.9	4.2	5.1	5.6	4.9	3.9	6.8	2.7	3.8	

STA=	1456.	1461.
PER Q=	.1	
AREA=	11.6	
VEL=	2.1	
DEPTH=	2.3	

*SECNO 21.359

3265 DIVIDED FLOW

21.359	5.25	318.25	.00	.00	318.68	.42	.94	.05	317.30
30000.0	10338.0	19662.0	.0	2358.4	3498.4	.0	459.7	106.4	321.70
.19	4.38	5.62	.00	.040	.030	.000	.000	313.00	31.93
.001968	380.	600.	800.	2	0	0	.00	1454.53	1542.89

FLOW DISTRIBUTION FOR SECNO= 21.36 CWSEL= 318.25

STA=	32.	150.	279.	330.	370.	415.	461.	509.	555.	638.	689.	1549.
PER Q=	3.9	3.6	3.7	3.3	3.9	4.0	4.2	4.0	3.4	.6	65.5	
AREA=	335.2	283.3	239.4	203.2	234.8	241.4	251.9	242.0	255.7	71.7	3498.4	
VEL=	3.5	3.8	4.6	4.8	5.0	5.0	5.0	5.0	4.0	2.3	5.6	
DEPTH=	2.8	2.2	4.7	5.0	5.2	5.2	5.2	5.2	3.1	1.4	4.1	

1

T1 SAN LUIS REY RIVER STUDY FLOODWAY
T2 FOR SD COUNTY WATER AUTHORITY AND COUNTY OF SAN DIEGO
T3 100-YR FLOOD, FEBRUARY 1994 MODIFIED 2-5-96 BY COUNTY OF SAN DIEGO
T4 MODIFIED JANUARY 1998 BY NOLTE FOR GREGORY CANYON ANALYSIS
T5 ORIGINAL FILE : SLR.DHS NOLTE FILE : GRCYNFW.DAT

J1	ICHECK	INQ	NINV	IDIR	STRT	METRIC	HVINS	Q	WSEL	FQ
	0	3	0	0	0	0	0.0	30000.0	305.47	

J2	NPROF	IPLOT	PRFVS	XSECV	XSECH	FN	ALLDC	IBW	CHNIM	ITRACE
	15	0	-1	0.0	0.0	0.0	0.0	-6.0	0.0	

1

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*PROF 2
0

CCHV= .100 CEHV= .300
*SECNO 20.655

```
3265 DIVIDED FLOW

3470 ENCROACHMENT STATIONS=          .0    1100.0  TYPE=      1  TARGET=     1099.999
    20.655      5.77    305.47       .00    305.28    306.20       .73       .00       .00    300.10
   30000.0    1349.8   25309.2    3341.0     216.8    3663.1     510.8        .0        .0    302.20
       .00      6.23      6.91      6.54      .050      .050      .040      .000    299.70     86.90
   .006394      500.      550.      600.         0         0         0       .00   1008.58   1100.00

*SECNO 20.749

3470 ENCROACHMENT STATIONS=       125.0    1050.0  TYPE=      1  TARGET=      925.000
    20.749      7.87    308.27       .00    308.24    308.86       .59      2.65       .01    304.80
   30000.0    3176.0   25809.0    1015.1     700.1    4078.4     163.2      54.4      11.5    303.10
       .02      4.54      6.33      6.22      .050      .050      .040      .000    300.40    125.00
   .004286      400.      500.      750.         3         0         0       .00    925.00   1050.00

*SECNO 20.852

3470 ENCROACHMENT STATIONS=       250.0    1200.0  TYPE=      1  TARGET=      950.000
    20.852      7.16    310.16       .00    309.98    310.70       .55      1.84       .00    305.10
   30000.0   12598.1   14952.2    2449.7    1901.7    2743.1     489.7     115.4      22.8    305.30
       .05      6.62      5.45      5.00      .035      .050      .040      .000    303.00    250.00
   .002921      450.      540.      700.         3         0         0       .00    950.00   1200.00

*SECNO 20.953

3265 DIVIDED FLOW

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =   .63

3470 ENCROACHMENT STATIONS=       986.0    1754.0  TYPE=      1  TARGET=      768.000
1
   17MAR99      11:18:41                                                                                    PAGE   11

    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
    Q          QLOB       QCH        QROB       ALDB       ACH        AROB       VOL        TWA        R-BANK ELEV
    TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
    SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST

    20.953      7.73    312.33       .00    312.16    313.28       .95      2.45       .12    308.60
   30000.0    3288.2   26711.8        .0     421.0    3413.7        .0     172.8      33.8 100000.00
       .07      7.81      7.82       .00      .035      .050      .000      .000    304.60    986.00
   .007283      650.      535.      400.         2         0         0       .00    751.75   1754.00

*SECNO 21.040
```

```
3301 HV CHANGED MORE THAN HVINS

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.82

3470 ENCROACHMENT STATIONS=      616.0    1530.0  TYPE=      1  TARGET=      914.000
    21.040      10.39    314.69       .00    314.46    315.10       .41      1.77       .05    309.90
   30000.0    3875.7   26124.3        .0     790.8    5072.1        .0     226.6      43.3 100000.00
       .09       4.90      5.15       .00      .035      .050      .000      .000    304.30    616.00
   .002193      650.      460.      380.         2         0         0       .00    914.00   1530.00

*SECNO 21.137

3265 DIVIDED FLOW

3470 ENCROACHMENT STATIONS=      560.0    1490.0  TYPE=      1  TARGET=      930.000
    21.137       9.85    315.95       .00    315.73    316.62       .67      1.44       .08    311.80
   30000.0    6519.1   23301.0     179.9    1148.9    3431.4      36.1     286.7      53.5    307.00
       .12       5.67      6.79      4.99      .035      .050      .040      .000    306.10    560.00
   .003954      450.      510.      530.         2         0         0       .00    891.45   1490.00

*SECNO 21.246

3302 WARNING:  CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE,  KRATIO =  1.68

3470 ENCROACHMENT STATIONS=       33.0    1461.0  TYPE=      1  TARGET=     1428.000
    21.246       8.00    317.60       .00    317.42    317.86       .25      1.20       .04    313.50
   30000.0   10071.2   17174.8    2753.9    2404.2    4216.4     828.6     361.9      67.6    314.60
       .15       4.19      4.07      3.32      .035      .050      .040      .000    309.60     33.00
   .001409      450.      575.      650.         2         0         0       .00   1428.00   1461.00

1
   17MAR99      11:18:41                                                                                    PAGE   12

    SECNO      DEPTH      CWSEL      CRIWS      WSELK      EG         HV         HL         OLOSS      L-BANK ELEV
    Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA        R-BANK ELEV
    TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN      SSTA
    SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID     ENDST

*SECNO 21.359

3265 DIVIDED FLOW

3470 ENCROACHMENT STATIONS=       32.0    1543.0  TYPE=      1  TARGET=     1511.000
```

21.359	5.35	318.35	.00	318.25	318.76	.40	.85	.04	317.30
30000.0	10330.3	19669.7	.0	2417.9	3582.3	.0	444.3	85.0	100000.00
.18	4.27	5.49	.00	.040	.030	.000	.000	313.00	32.00
.001821	380.	600.	800.	2	0	0	.00	1455.47	1543.00

1

THIS RUN EXECUTED 17MAR99 11:18:42

****
HEC-2 WATER SURFACE PROFILES

Version 4.6.2; May 1991
****

NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

100-YR FLOOD, FEBRUARY 1

SUMMARY PRINTOUT

	SECNO	CWSEL	DIFWSP	Q	ELMIN	STCHL	STCHR	STENCL	STENCR	SSTA	ENDST	TOPWID
	20.655	305.28	.00	30000.00	299.70	143.00	881.00	.00	1100.00	87.86	1100.00	979.02
	20.655	305.47	.19	30000.00	299.70	143.00	881.00	.00	1100.00	86.90	1100.00	1008.58
	20.749	308.24	.00	30000.00	300.40	321.00	1014.00	.00	.00	25.68	1871.14	1247.18
	20.749	308.27	.03	30000.00	300.40	321.00	1014.00	125.00	1050.00	125.00	1050.00	925.00
	20.852	309.98	.00	30000.00	303.00	641.00	1078.00	.00	1200.00	17.76	1187.00	1168.04
	20.852	310.16	.18	30000.00	303.00	641.00	1078.00	250.00	1200.00	250.00	1200.00	950.00
*	20.953	312.16	.00	30000.00	304.60	1117.00	1754.00	.00	1754.00	619.60	1754.00	1090.05
*	20.953	312.33	.17	30000.00	304.60	1117.00	1754.00	986.00	1754.00	986.00	1754.00	751.75
*	21.040	314.46	.00	30000.00	304.30	825.00	1530.00	.00	1530.00	183.22	1530.00	1342.47
*	21.040	314.69	.23	30000.00	304.30	825.00	1530.00	616.00	1530.00	616.00	1530.00	914.00
	21.137	315.73	.00	30000.00	306.10	990.00	1485.00	.00	.00	203.50	1497.64	1253.27
	21.137	315.95	.21	30000.00	306.10	990.00	1485.00	560.00	1490.00	560.00	1490.00	891.45
*	21.246	317.42	.00	30000.00	309.60	613.00	1216.00	.00	.00	33.10	1461.04	1426.12
*	21.246	317.60	.19	30000.00	309.60	613.00	1216.00	33.00	1461.00	33.00	1461.00	1428.00
	21.359	318.25	.00	30000.00	313.00	689.00	1549.00	.00	.00	31.93	1542.89	1454.53
	21.359	318.35	.10	30000.00	313.00	689.00	1549.00	32.00	1543.00	32.00	1543.00	1455.47

100-YR FLOOD, FEBRUARY 1

SUMMARY PRINTOUT TABLE 150

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
	20.655	.00	.00	.00	299.70	30000.00	305.28	.00	306.07	73.44	7.21	4201.89	3500.63
	20.655	.00	.00	.00	299.70	30000.00	305.47	.00	306.20	63.94	6.91	4390.72	3751.61
	20.749	500.00	.00	.00	300.40	30000.00	308.24	.00	308.74	38.07	5.95	5421.50	4861.98
	20.749	500.00	.00	.00	300.40	30000.00	308.27	.00	308.86	42.86	6.33	4941.73	4582.25
	20.852	540.00	.00	.00	303.00	30000.00	309.98	.00	310.46	28.78	5.31	5412.59	5592.50
	20.852	540.00	.00	.00	303.00	30000.00	310.16	.00	310.70	29.21	5.45	5134.56	5550.37
*	20.953	535.00	.00	.00	304.60	30000.00	312.16	.00	313.01	70.99	7.61	4092.35	3560.71
*	20.953	535.00	.00	.00	304.60	30000.00	312.33	.00	313.28	72.83	7.82	3834.68	3515.39
*	21.040	460.00	.00	.00	304.30	30000.00	314.46	.00	314.84	21.96	5.07	6225.24	6402.46
*	21.040	460.00	.00	.00	304.30	30000.00	314.69	.00	315.10	21.93	5.15	5862.90	6405.72
	21.137	510.00	.00	.00	306.10	30000.00	315.73	.00	316.36	40.32	6.72	4829.60	4724.51
	21.137	510.00	.00	.00	306.10	30000.00	315.95	.00	316.62	39.54	6.79	4616.37	4770.85
*	21.246	575.00	.00	.00	309.60	30000.00	317.42	.00	317.69	15.83	4.24	7184.87	7540.72
*	21.246	575.00	.00	.00	309.60	30000.00	317.60	.00	317.86	14.09	4.07	7449.22	7993.28
	21.359	600.00	.00	.00	313.00	30000.00	318.25	.00	318.68	19.68	5.62	5856.73	6763.25
	21.359	600.00	.00	.00	313.00	30000.00	318.35	.00	318.76	18.21	5.49	6000.19	7030.26

100-YR FLOOD, FEBRUARY 1

SUMMARY PRINTOUT TABLE 150

SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
20.655	30000.00	305.28	.00	.00	.00	979.02	.00
20.655	30000.00	305.47	.19	.00	.19	1008.58	.00
20.749	30000.00	308.24	.00	2.96	.00	1247.18	500.00
20.749	30000.00	308.27	.03	2.80	.03	925.00	500.00
20.852	30000.00	309.98	.00	1.74	.00	1168.04	540.00
20.852	30000.00	310.16	.18	1.89	.18	950.00	540.00

*	20.953	30000.00	312.16	.00	2.18	.00	1090.05	535.00
*	20.953	30000.00	312.33	.17	2.17	.17	751.75	535.00
*	21.040	30000.00	314.46	.00	2.31	.00	1342.47	460.00
*	21.040	30000.00	314.69	.23	2.36	.23	914.00	460.00
	21.137	30000.00	315.73	.00	1.27	.00	1253.27	510.00
	21.137	30000.00	315.95	.21	1.26	.21	891.45	510.00
*	21.246	30000.00	317.42	.00	1.68	.00	1426.12	575.00
*	21.246	30000.00	317.60	.19	1.66	.19	1428.00	575.00
	21.359	30000.00	318.25	.00	.84	.00	1454.53	600.00
	21.359	30000.00	318.35	.10	.75	.10	1455.47	600.00

SUMMARY OF ERRORS AND SPECIAL NOTES

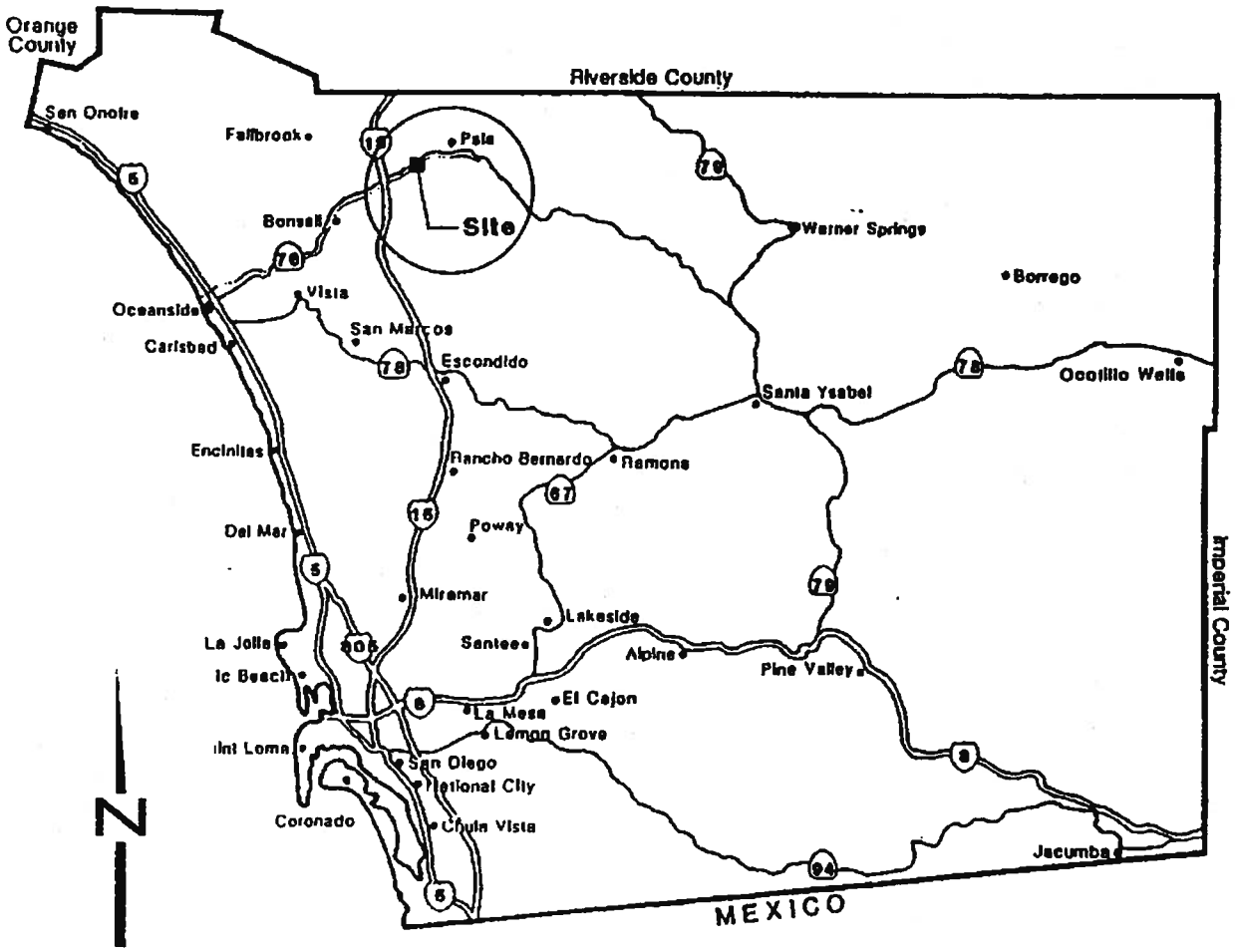
WARNING SECNO= 20.953 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO= 20.953 PROFILE= 2 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 21.040 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO= 21.040 PROFILE= 2 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 21.246 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO= 21.246 PROFILE= 2 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

FLOODWAY DATA, 100-YR FLOOD, FEBRUARY 1
PROFILE NO. 2

STATION	FLOODWAY WIDTH	FLOODWAY SECTION AREA	FLOODWAY MEAN VELOCITY	WATER SURFACE ELEVATION WITH FLOODWAY	WITHOUT FLOODWAY	DIFFERENCE
20.655	1013.	4391.	6.8	305.5	305.3	.2
20.749	925.	4942.	6.1	308.2	308.2	.0
20.852	950.	5135.	5.8	310.2	310.0	.2
20.953	768.	3835.	7.8	312.4	312.2	.2
21.040	914.	5863.	5.1	314.7	314.5	.2
21.137	930.	4616.	6.5	315.9	315.7	.2

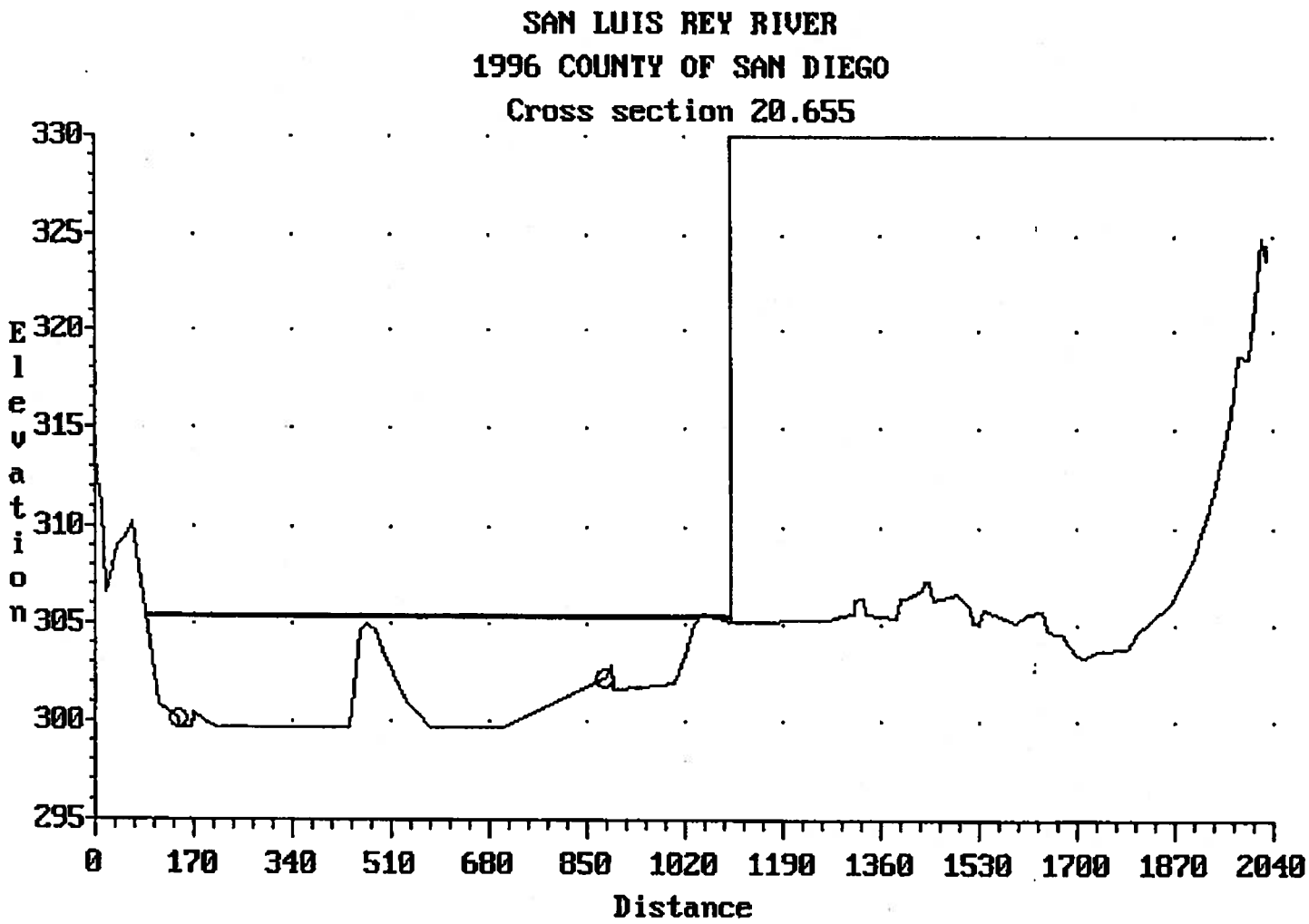


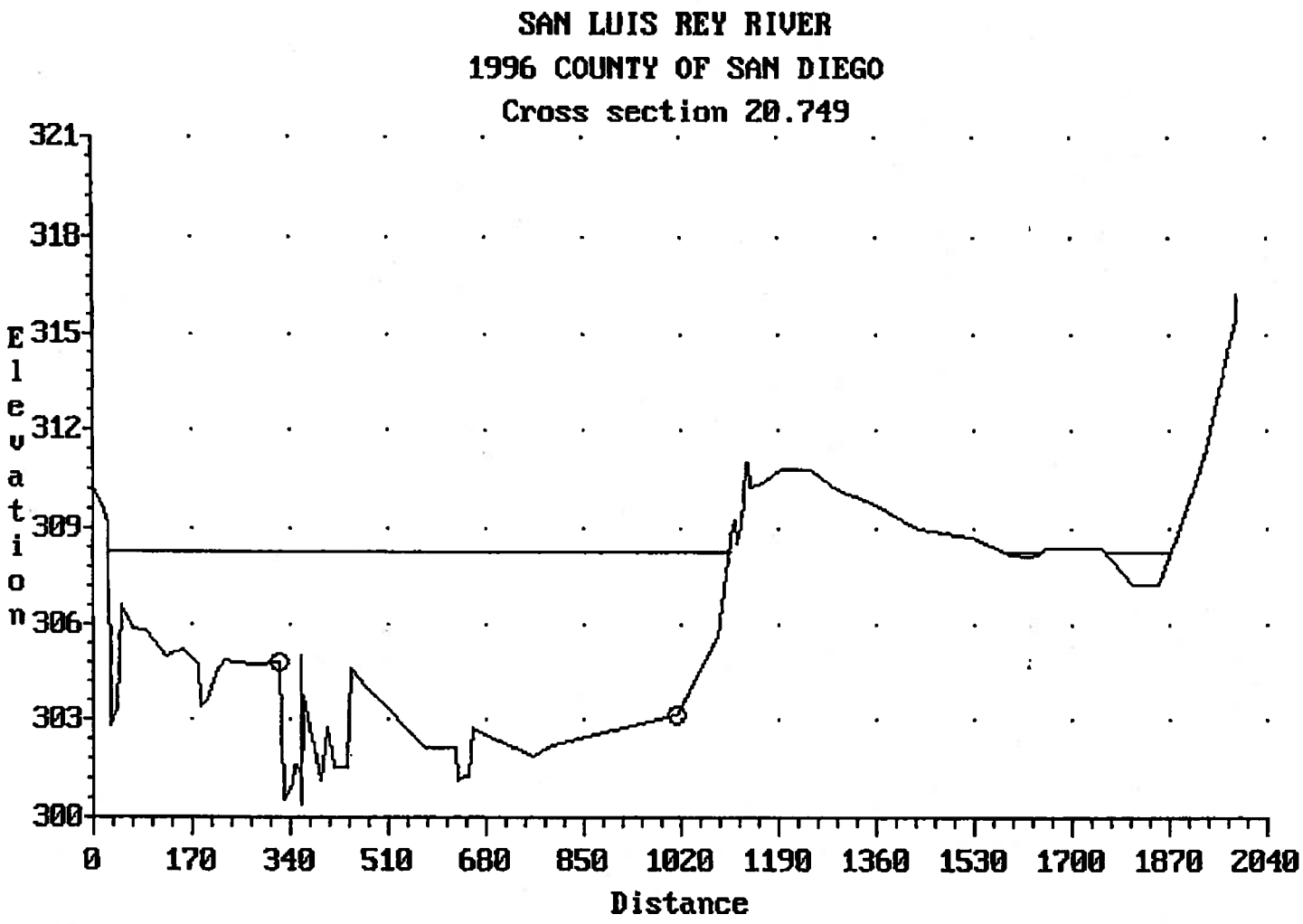
NOT TO SCALE

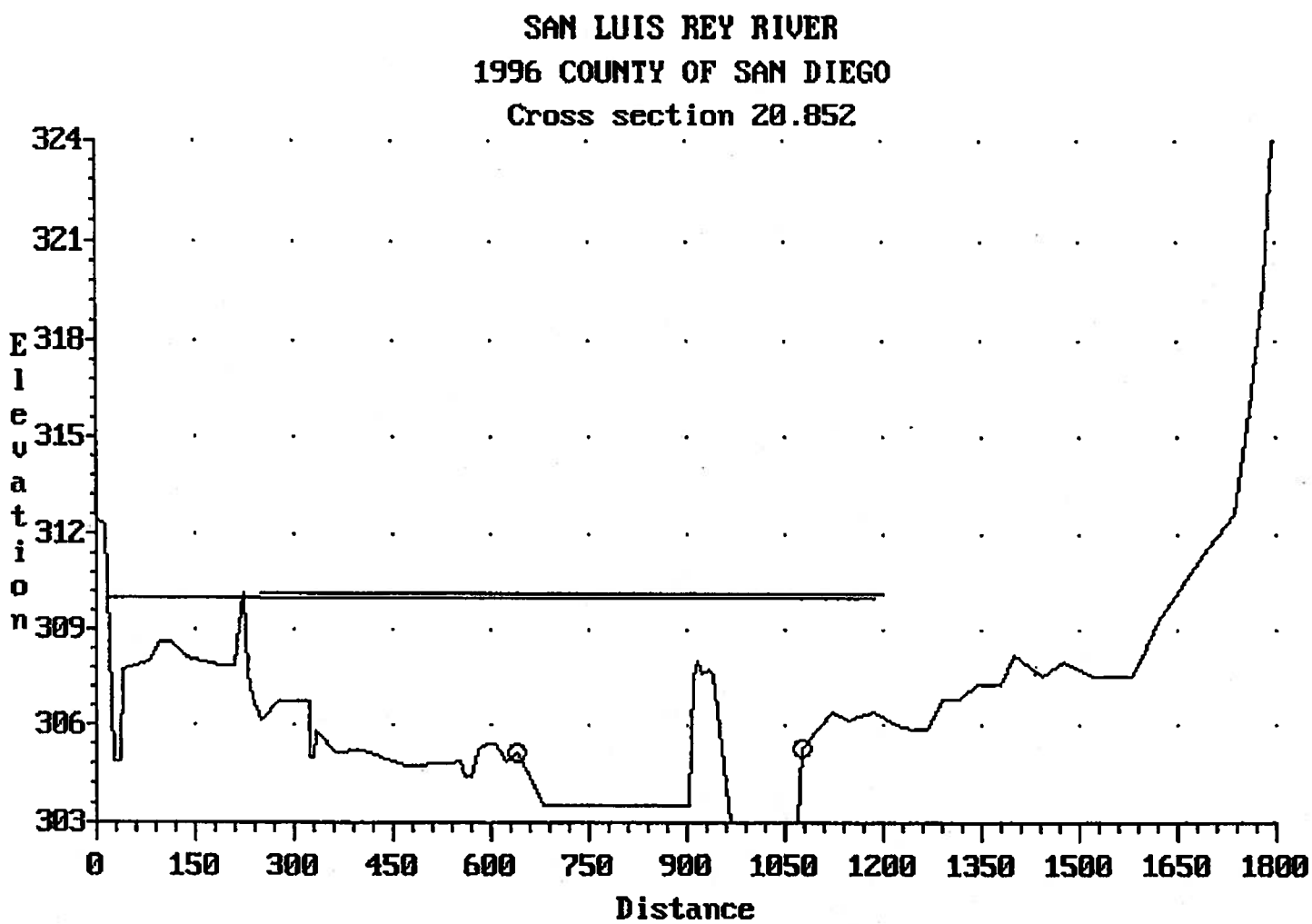
NOLTE
BEYOND ENGINEERING

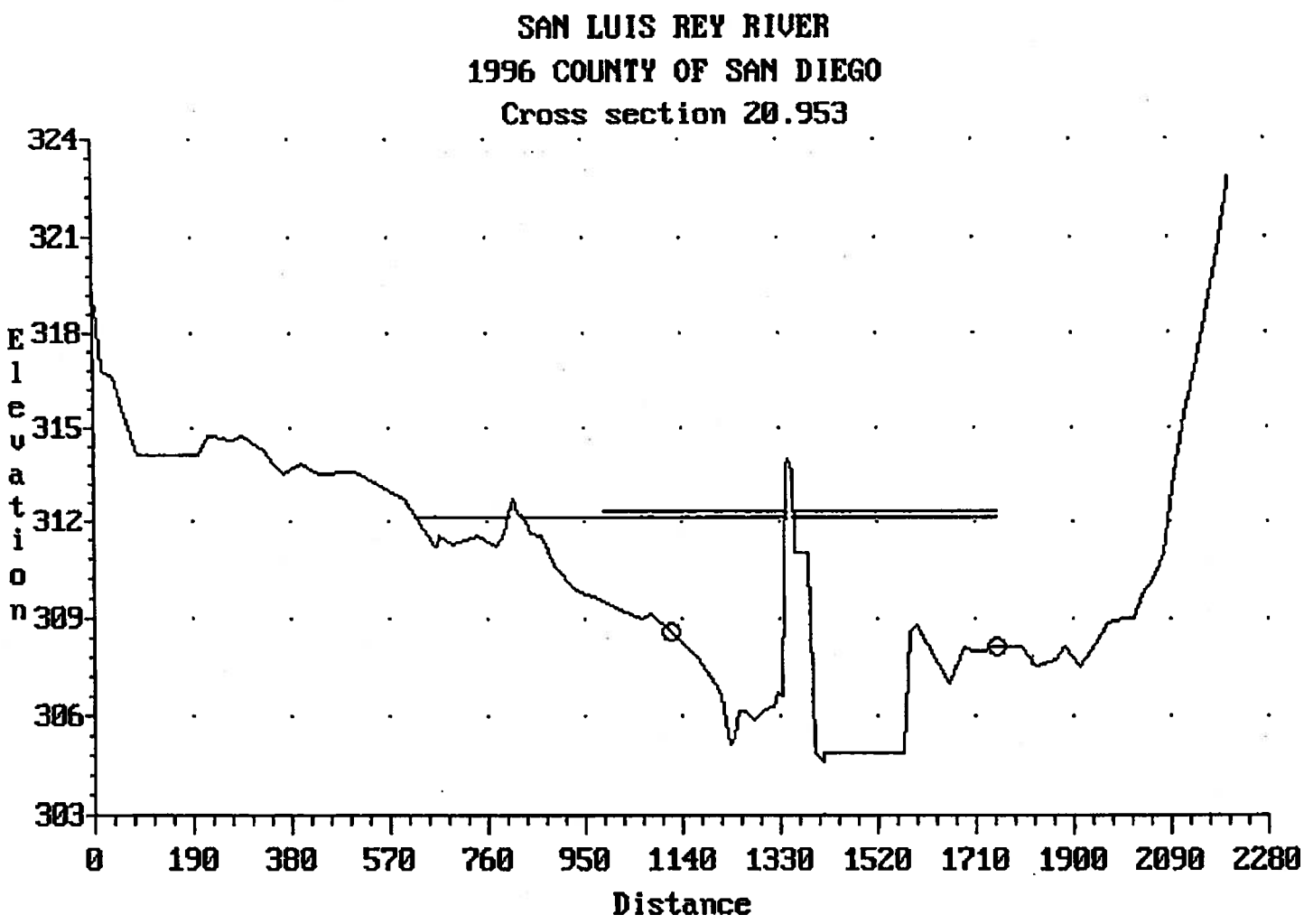
FIGURE 1
VICINITY MAP

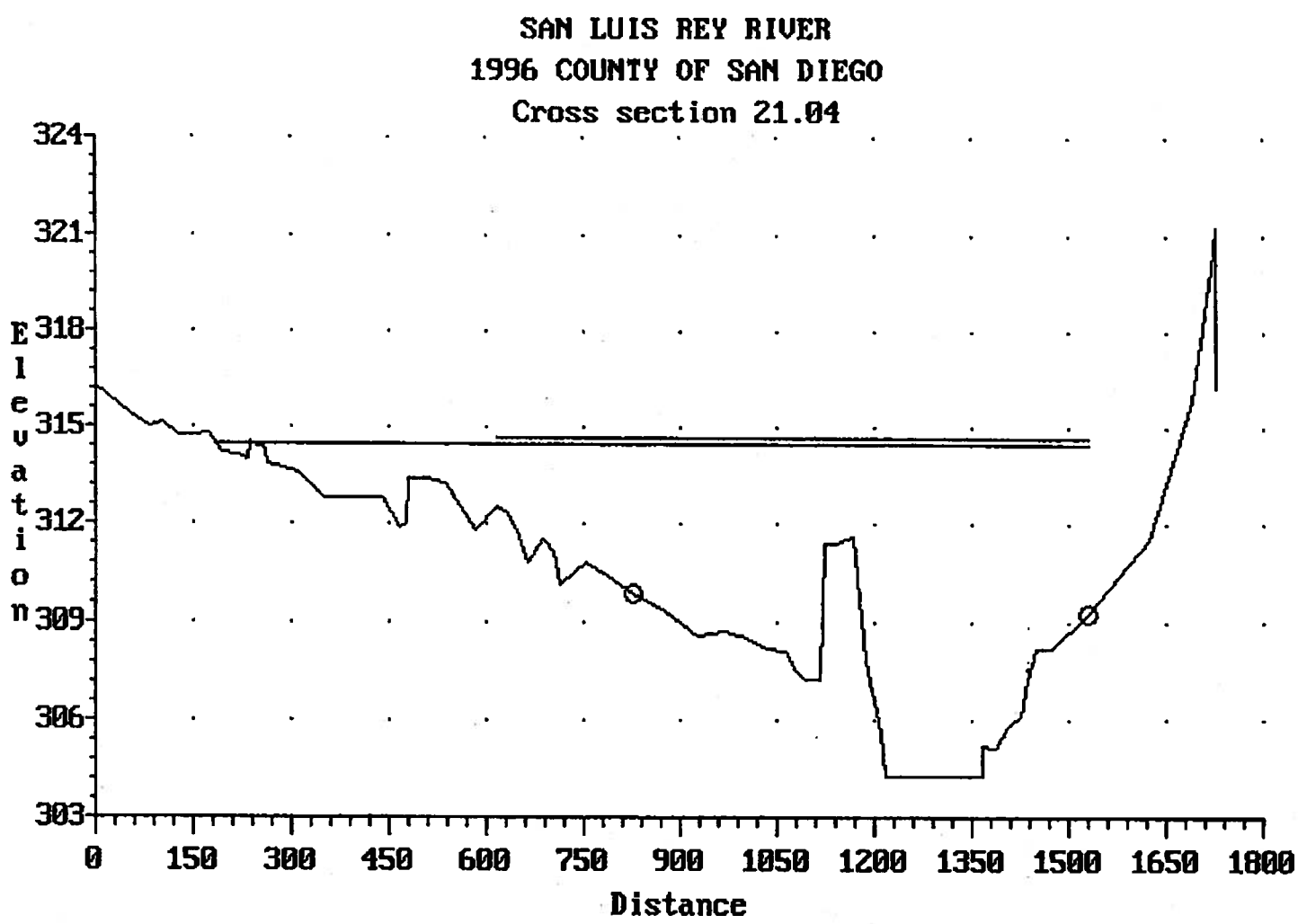
21.246	1428.	7449.	4.0	317.6	317.4	.2
21.359	1511.	6000.	5.0	318.4	318.3	.1


SAN LUIS REY RIVER
1996 COUNTY OF SAN DIEGO
Cross section 20.655
Elevation
330
325
320
315
310
305
300
295
0
170
340
510
680
850
1020
1190
1360
1530
1700
1870
2040
Distance

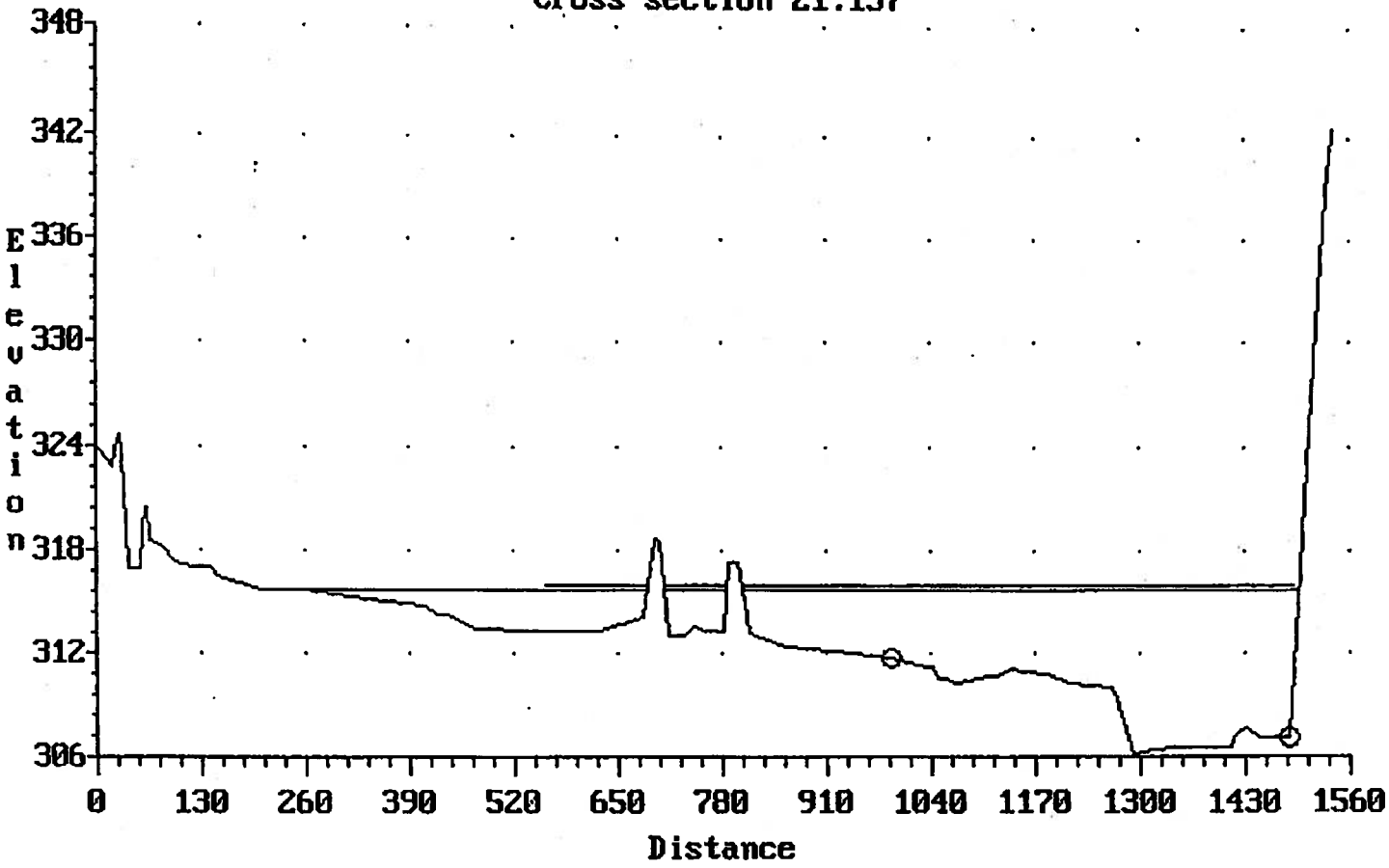

SAN LUIS REY RIVER
1996 COUNTY OF SAN DIEGO
Cross section 20.749
Elevation
321
318
315
312
309
306
303
300
0
170
340
510
680
850
1020
1190
1360
1530
1700
1870
2040
Distance

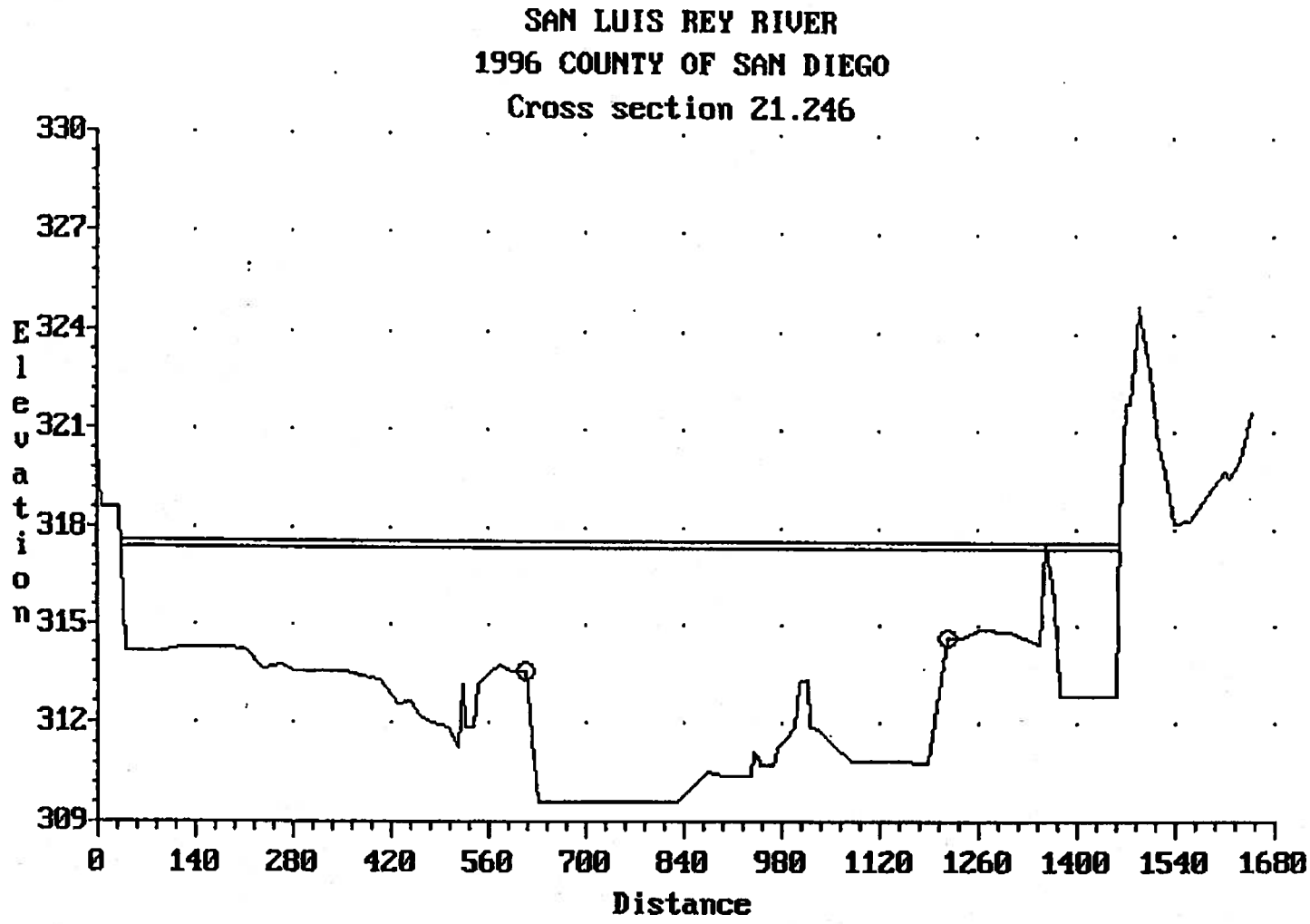

SAN LUIS REY RIVER
1996 COUNTY OF SAN DIEGO
Cross section 20.852
Elevation
324
321
318
315
312
309
306
303
0
150
300
450
600
750
900
1050
1200
1350
1500
1650
1800
Distance


SAN LUIS REY RIVER
1996 COUNTY OF SAN DIEGO
Cross section 20.953
Elevation
324
321
318
315
312
309
306
303
0
190
380
570
760
950
1140
1330
1520
1710
1900
2090
2280
Distance


SAN LUIS REY RIVER
1996 COUNTY OF SAN DIEGO
Cross section 21.04
Elevation
324
321
318
315
312
309
306
303
0
150
300
450
600
750
900
1050
1200
1350
1500
1650
1800
Distance

SAN LUIS REY RIVER
1996 COUNTY OF SAN DIEGO
Cross section 21.137




SAN LUIS REY RIVER
1996 COUNTY OF SAN DIEGO
Cross section 21.246
Elevation
330
327
324
321
318
315
312
309
0
140
280
420
560
700
840
980
1120
1260
1400
1540
1680
Distance