INTERSTATE 5 NORTH COAST FLOODPLAIN STUDIES

PREPARED FOR:

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Book 3 of 3

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SECTION 9

Buena Vista Lagoon Location Hydraulic Study



SECTION 9: BUENA VISTA LAGOON LOCATION HYDRAULIC STUDY

9.0 PROJECT LOCATION AND VICINITY MAP



Figure 1: Project Vicinity Map

The Buena Vista Lagoon is located in a coastal wetland between the cities of Oceanside and Carlsbad, approximately 37 miles north of the City of San Diego (Thomas Bros. page 1167, F-5).

This study was prepared for Caltrans for the purpose of determining impacts to the Buena Vista Lagoon 100-year floodplain resulting from the proposed improvements to Interstate 5 (I-5).

This study specifically addresses the following:

1) The Buena Vista Lagoon 100-year floodplain as it presently exists,

2) The Buena Vista Lagoon 100-year floodplain after the I-5 Bridge has been replaced,

3) Performing a risk assessment associated with any possible floodplain encroachment.

The replacement of the existing I-5 Bridge (No. 57-0277) requires that the bridge be widened from 184 feet to 259.4 feet. The proposed bridge would also be 14.4 feet longer on each end for a total of 131.2 feet. In addition, the two rows of piers would be relocated. The piers would be set 12.5 feet further apart, creating a wider channel underneath the bridge.

9.1 DESCRIPTION OF LAGOON AND WATERSHED

The Buena Vista Lagoon (Hydrologic Unit 904.10-904.63), located within the Carlsbad Watershed, covers a watershed area of 210 square miles. The watershed extends from Lake Wohford to the Pacific Ocean (Figure 2).



Figure 2: Regional Basin Area

Seasonal flows in Buena Vista Creek are typical of most coastal drainages in San Diego County. However, artisan springs provide for some surface flow even during the summer dry season. During wet winter weather or flood events, surface flow increases significantly. Natural surface flows are currently augmented by urban and agricultural runoff.

The Buena Vista Lagoon was originally an intermittent tidal system. However, a weir was constructed in 1940 across the mouth of the lagoon to eliminate tidal flow. The result was that Buena Vista Lagoon now functions as a freshwater lake with a fringing freshwater marsh.

Most of the recreational uses are focused along the lower portions of Buena Vista Creek and around Buena Vista Lagoon, which is heavily used as a bird watching location. The Buena Vista Audubon Society operates a nature Center at the eastern end of the Lagoon. Some of the largest areas of freshwater marsh habitat in San Diego County are present around Buena Vista Lagoon. Sedimentation could pose a long-term threat to the freshwater marsh and open water mosaic that currently exist at the lagoon.

9.2 FLOODPLAIN MODELING METHODOLOGY

The area of analysis ranges from approximately 3,300 feet upstream to 4,600 feet downstream of the I-5 crossing. During a 100-year storm event, 8,500 cfs would flow from a 1,500 foot wide channel through the opening beneath the I-5 Bridge. Channel bottom elevations range from -7 feet to 7 feet using the North American Vertical Datum of 1988 (NAVD 88).

Within the study limits, the I-5 Bridge serves as one of three major constriction points in the lagoon. Once past the I-5 Bridge, the lagoon opens up to approximately 2,000 feet wide before it narrows again to flow beneath Carlsbad Boulevard Culvert and the North County Transit District (NCTD) Railroad Bridge. The model terminates downstream at the Pacific Ocean.

9.3 HEC-RAS INPUT

The HEC-RAS River Analysis System v3.1.3 is a graphically based computer program which has been developed by the U.S. Army Corps of Engineers Hydrologic Engineering Center. Input required by the software included channel cross sectional geometry, channel roughness coefficients, starting water surface elevations, and a 100-year storm event discharge. For this study, HEC-RAS was analyzed using the Standard Step Method under subcritical flow conditions.

9.3.1 Cross Sectional Geometry

The majority of the cross sections were placed perpendicular to the channel flow path. Some cross sections were skewed to allow channel reach lengths to accurately model the channel. To better define the channel terrain, the cross sections were placed closely together at locations where islands, depressions, expansions/contractions, and bridges occur.

Buena Vista Lagoon is a FEMA Zone A, indicating it is not a studied floodplain. The hydraulic model was based on the topography obtained from Everest International Consultants, Inc., dated April 2004 (NAVD 88). All results are provided in English units using NAVD 88.

9.3.1.1 Bridges

Three bridges affect the WSE of the lagoon within the I-5 corridor study area. They include the NCTD Railroad Bridge Carlsbad Boulevard Bridge, and the I-5 Bridge.

The Bridges are modeled at the following cross sections:

- Cross section #1050 – NCTD Railroad Bridge
- Cross section #1600 – Carlsbad Boulevard Culvert Bridge
- Cross section #4700 – I-5 Bridge

Expansion/ contraction coefficients (0.1 and 0.3) are utilized throughout the modeled reach to represent energy losses due to gradual transitions in the geometry of the lagoon channel. The coefficients are adjusted for more significant expansions and contractions as the lagoon narrows at each of the bridges. The I-5 and Carlsbad Boulevard Bridges

(0.5 and 0.5) have abrupt transitions while the NCTD Railroad Bridge (0.3 and 0.5) is not as constricting. The Momentum Equation is used to simulate the effect of the bridge on the channel flow.

The existing bridges were modeled from as-builts (see Appendix C), and information gathered in the field. The Buena Vista Creek Bridge (Replace) Advance Planning Study, dated Nov-2004, was used to model the proposed replacement I-5 Bridge. In addition, the smaller diameter piers were modeled as twice their diameters. This approach was used to account for debris which could catch on the bridge piers and provide additional blockage to the flow.



Figure 3: NCTD Railroad Bridge.

The furthest downstream bridge is the NCTD Railroad Bridge (Figure 3) which spans the lagoon approximately 1,050 feet upstream of the Pacific Ocean. The railroad bridge is supported just above the floodplain by nine rows of 1 foot columns. The railroad bridge piers were modeled as 2 foot diameter piers to account for debris.



Figure 4: NCTD Railroad Bridge, looking west.



Figure 5: Carlsbad Boulevard Culvert Bridge.

Carlsbad Boulevard is the next crossing upstream. The lagoon passes beneath the road through a 30'x 14' Reinforced Box Culvert. This crossing is a major constriction point, and the floodplain would rise approximately 4 feet about the surface of the road during a 100 year storm.



Figure 6: I-5 Bridge.

The existing I-5 Bridge would be widened to approximately 257 ft and lengthened to approximately 131 feet. For the existing condition, two rows of piers continue though the

entire width of the bridge. The existing rows consist of forty piers in each row. The proposed replacement bridge would consist of two rows of piers, with sixteen piers in each row. The existing and proposed bridge piers were modeled as 2.5 feet in diameter to account for debris. The extended opening under the freeway would reduce the existing constriction and the floodplain upstream would be lowered.



Figure 7: I-5 Bridge piers.

9.3.1.2 Ineffective Flow Areas

The cross section exhibits in Appendix A show the ineffective flow areas for the post project conditions. Ineffective flow areas were used to model the pooling that would occur in each of the lagoon's sections. The constriction and expansion zones upstream and downstream of the I-5 Bridge and NCTD Railroad Bridge are modeled as areas of ineffective flow.

9.3.1.3 Flood Insurance Study (FIS) Cross Sections

No detailed hydraulic analyses have been performed in this area and no base floodplain elevation has been determined as shown in the Flood Insurance Rate Map (FIRM) in Appendix 'A'.

9.3.1.4 Existing Floodplain Conditions

Several hydraulic models were developed to determine the most accurate methods in which to depict the floodplain of the Buena Vista Lagoon. The floodplain in the vicinity of the I-5 Bridge is a Zone A. No backup data is available for the original development of the floodplain, and no base flood elevations have been established by FEMA for Zone A floodplains. An existing conditions model was created from gathered topography, bridge as-builts and field investigations. This existing conditions model was used for comparison with the proposed bridge improvements.

9.3.2 Manning's Roughness Coefficient

Each cross section contains a left overbank, main channel, and right overbank, which represent the different regions of the waterway in terms of roughness coefficients. The main channel is the base of the waterway, typically the low flow region of the lagoon. Manning's Roughness Coefficients were obtained from *Haestad Methods, Floodplain Modeling Using HEC-RAS, first edition (2003),* and through field verification. The left and right overbanks represent the more vegetated side slopes of the lagoon. The right overbank contains mostly high grass pastures, scattered brush and heavy weeds (0.035). The left overbank has similar vegetation, and yields the same Manning's Roughness Coefficient (0.035). The lagoon channel has several protrusions in its bottom and is occupied by thick reeds and other vegetation. However, during a major flood event where water depths and velocities are much greater, roughness throughout the channel would be lower due to washout of the vegetation. A Manning's value of 0.030 was selected for the main channel, a waterway with a top width greater than 100 feet (Chow, 1959).



Figure 3: Floodplain with high grass



Figure 4: Major stream with top width over 100 ft

9.3.3 Starting Water Elevation

The model was analyzed in a subcritical flow regime. The lagoon ties into the Pacific Ocean at a FEMA zone VE, which has a determined base flood elevation. The downstream starting water surface elevation was input as 11.19 ft (NAVD 88). Ineffective flow areas, low flow

regions with velocities close or equal to zero, were used in the model near the constriction points. The entire 100-year flow passes through the lagoon at a slow, almost stagnant rate.

9.3.4 Discharge

Based on FIS data, *Table 4 – Summary of Discharge: Buena Vista Creek – Upstream of Interstate Highway 5*, 8,500 cfs was selected as the 100-year flood discharge.

9.4 HEC-RAS OUTPUT

The water surface elevations, which are displayed in the appendices and output of this study, are based on flooding that would occur during a 100-year storm. Appendix B contains water surface elevations, channel velocities, top widths, Froude Numbers, and bottom elevations for each cross section. Water surface elevations decreased immediately after the I-5 Bridge due to the sudden contraction and expansion formed in the lagoon by the existing I-5 Bridge. Since Buena Vista Lagoon is a fairly flat waterway, the water surface elevations remain uniform upstream and downstream of the bridge. In effect, the lagoon's flat bottom lacks the change in elevation to achieve higher flow velocities and thus produces a level water surface profile. As shown in Table A, no significant increase to the existing 100-year floodplain would occur from the I-5 bridge replacement. The replacement bridge would result in a lowering of the floodplain upstream the I-5 Bridge by approximately 6 inches.

Table A: Floodplain Comparison

River Station	Q Total	Existing W.S. Elevation	Proposed W.S. Elevation	Change in Elevation	Existing Top Width	Proposed Top Width	Change in Width
	(cfs)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)
7947	8500	15.75	15.26	-0.49	934.46	912.6	-21.86
7865	8500	15.76	15.28	-0.48	1205.4	1193.87	-11.53
7697	8500	15.77	15.29	-0.48	1208.66	1200.76	-7.90
7483	8500	15.76	15.28	-0.48	1260.07	1255.28	-4.79
7282	8500	15.76	15.28	-0.48	1415.89	1406.2	-9.69
7136	8500	15.76	15.28	-0.48	1554.97	1544.01	-10.96
6964	8500	15.76	15.28	-0.48	1585.09	1582.05	-3.04
6803	8500	15.76	15.28	-0.48	1610.37	1585.69	-24.68
6648	8500	15.76	15.28	-0.48	1686.39	1677.56	-8.83
6511	8500	15.76	15.28	-0.48	1655.38	1639.75	-15.63
6381	8500	15.76	15.28	-0.48	1608.53	1594.83	-13.70
6279	8500	15.76	15.28	-0.48	1595.29	1562.22	-33.07
6168	8500	15.76	15.28	-0.48	1547.69	1544.9	-2.79
6060	8500	15.76	15.28	-0.48	1562.11	1559.88	-2.23
5939	8500	15.76	15.28	-0.48	1561.86	1559.71	-2.15
5816	8500	15.76	15.28	-0.48	1559.09	1557.32	-1.77
5670	8500	15.76	15.28	-0.48	1519.46	1513.41	-6.05
5522	8500	15.76	15.28	-0.48	1489.76	1487.18	-2.58
5368	8500	15.76	15.28	-0.48	1460.43	1457.99	-2.44
5244	8500	15.76	15.28	-0.48	1314.36	1311.03	-3.33

5089	8500	15.76	15.27	**-0.49**	1237.75	1234.37	**-3.38**
4974	8500	15.75	15.26	**-0.49**	1114.1	1110.44	**-3.66**
4887	8500	15.18	14.64	**-0.54**	924.71	905.96	**-18.75**
4867*	8500	14.81	N/A	**N/A**	913.65	N/A	**N/A**
4700	8500	**I-5 Bridge**					
4607	8500	12.95	13.13	**0.18**	560.83	568.41	**7.58**
4529	8500	13.89	13.89	**0.00**	789.07	789.07	**0.00**
4400	8500	13.92	13.92	**0.00**	887.72	887.72	**0.00**
4288	8500	13.93	13.93	**0.00**	1261.72	1261.72	**0.00**
4110	8500	13.93	13.93	**0.00**	1199.97	1199.97	**0.00**
3872	8500	13.93	13.93	**0.00**	1359.49	1359.49	**0.00**
3623	8500	13.93	13.93	**0.00**	1442.3	1442.3	**0.00**
3420	8500	13.93	13.93	**0.00**	1682.14	1682.14	**0.00**
3149	8500	13.93	13.93	**0.00**	1789.06	1789.06	**0.00**
2862	8500	13.93	13.93	**0.00**	1816.98	1816.98	**0.00**
2630	8500	13.93	13.93	**0.00**	1782.09	1782.09	**0.00**
2447	8500	13.93	13.93	**0.00**	1745.88	1745.88	**0.00**
2292	8500	13.93	13.93	**0.00**	1668.46	1668.46	**0.00**
2123	8500	13.93	13.93	**0.00**	1695.11	1695.11	**0.00**
2005	8500	13.93	13.93	**0.00**	1892.59	1892.59	**0.00**
1859	8500	13.93	13.93	**0.00**	1815.9	1815.9	**0.00**
1780	8500	13.93	13.93	**0.00**	1755.61	1755.61	**0.00**
1681	8500	13.92	13.92	**0.00**	1737.24	1737.24	**0.00**
1647	8500	13.82	13.82	**0.00**	1677.12	1677.12	**0.00**
1600	8500	**Carlsbad Boulevard Culvert Bridge**					
1580	8500	13.74	13.74	**0.00**	1740.14	1740.14	**0.00**
1311	8500	13.79	13.79	**0.00**	1742.06	1742.06	**0.00**
1078	8500	13.69	13.69	**0.00**	408.41	408.41	**0.00**
1050	8500	**NCTD Railroad Bridge**					
1039	8500	13.69	13.69	**0.00**	383.33	383.33	**0.00**
726	8500	13.73	13.73	**0.00**	1667.25	1667.25	**0.00**
397	8500	13.42	13.42	**0.00**	1528.37	1528.37	**0.00**
180	8500	12.00	12.00	**0.00**	568.21	568.21	**0.00**
0	8500	11.19	11.19	**0.00**	1429.65	1429.65	**0.00**

* Cross section only in existing model

9.4.1 Warning Messages

Warning messages encountered during the proposed model include the following:

The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections, displayed at cross sections #180, #397, #4607, #4700, and #4974. This message is common at constrictions such as bridges and additional cross sections are not normally added.

The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections, displayed at cross sections #180, #397, #726, #1039, #1050, #1078, #1311, #1580, #1681,

#1780, #4288, #4400, #4529, #4607, #4700, #4974, #5089, #7697, #7865, and #7947. Even with cross sections spaced closely together, portions of Buena Vista Lagoon change rapidly around constriction points and bridges. This caused the conveyance to change rapidly, prompting the warning message.

For the final momentum answer at the bridge, the upstream energy was computed lower than the downstream energy. This is not physically possible; the momentum answer has been disregarded, displayed at cross section #4700. The Energy (standard step) method was used for this cross section.

Divided flow computed for this cross, displayed at cross sections #1681, #7865, and #7947. This occurred because of islands forming within the floodplain during the 100-yr storm.

The energy loss was greater than 1.0 ft (0.3 m) between the current and previous cross section. This may indicate the need for additional cross sections, displayed at cross section #180. This message is occurring because of the rapid changes of cross sections at the mouth of the lagoon due to flow constriction.

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, displayed at cross section #180. The flow is constricting at this cross section and it causes the velocity to increase and the subcritical flow to approach critical depth.

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. This warning displayed for cross section #180. Multiple trials were completed to test the sensitivity of the starting water surface elevation of the model and its affect on this warning message. The NCTD Railroad Bridge and I-5 Bridge are the major controlling factors affecting the floodplain, water surface elevations, within the lagoon. This warning can be ignored at the downstream end of the model.

The sluice gate calculations did not converge during the pressure flow only calculation, displayed at cross section #1050. This message occurred because the culvert underneath Carlsbad Boulevard would undergo pressure flow along with weir flow over the road. Therefore, the pressure flow was not the controlling factor of the water surface elevation above Carlsbad Boulevard during the 100-yr storm.

9.5 RISK ASSESSMENT

Within the Buena Vista Lagoon, the widening to the I-5 Bridge would cause a decrease to flood water elevations upstream. The impacts to the floodplain would not be considered a significant or longitudinal encroachment. Since the 100-year flood would still be contained within the lagoon boundaries, there would be no increased risk to life or property associated with the proposed improvements. No additional roadways would flood upstream from the proposed I-5 Bridge widening. Therefore, no transportation routes will be interrupted or terminated beyond existing conditions.

Additionally, no floodplain values will be adversely impacted without mitigation. Natural and beneficial floodplain values, as defined in Chapter 17 "Definitions" in the Caltrans Standard Environmental Reference (SER), include fish, wildlife, plants, outdoor recreation, aquaculture, forestry, etc., that are found within a designated floodplain. Listed below are the beneficial uses of the Buena Vista Lagoon obtained from the Water Quality Control Plan for the San Diego Basin along with a short description and determination of impacts.

- Contact and non-contact water recreation. Includes the uses of water for recreational activities involving proximity to water and contact with water, where ingestion of water is reasonably possible. These uses include, but are not limited to, swimming, wading, water-skiing, skin and SCUBA diving, diving, surfing, white water activities, fishing, use of natural hot springs, picnicking, sunbathing, hiking, beachcombing, camping, boating, tidepool and marine life study, hunting, sightseeing, or aesthetic enjoyment in conjunction with the above activities. It is unlikely that water recreation along the Buena Vista Lagoon would take place in the immediate vicinity of the I-5 Bridge, however, the proposed conditions would not alter the amount of water recreation that may occur within the lagoon.

- Preservation of biological habitats of special significance. Included uses of water that support designated areas or habitats, such as established refuges, parks, sanctuaries, ecological reserves, or Areas of Special Biological Significance (ASBS), where the preservation or enhancement of natural resources requires special protection. The construction areas associated with the bridge widening may impact a limited amount of biological habitats. Currently, a Natural Environment Study (NES) is being prepared to support the I-5 North Coast Widening Project. The NES will assess if any biological habitats of special significance may be impacted and what mitigation measures, if any, are needed.

- Estuarine habitat. Includes uses of water that support estuarine ecosystems including, but not limited to, preservations or enhancement of estuarine habitats, vegetation, fish, shellfish, or wildlife (e.g., estuarine mammals, waterfowl, shorebirds). The NES will assess if any estuarine habitat may be impacted and what mitigation measures, if any, are needed.

- Wildlife habitat. This includes uses of water that supports terrestrial ecosystems including, but not limited to, preservation and enhancement of terrestrial habitats, vegetation, wildlife, or wildlife water and food sources. The NES will assess if any wildlife habitat may be impacted and what mitigation measures, if any, are needed.

- Rare, threatened, or endangered species. Included uses of water that support habitats necessary, at least in part, for the survival and successful maintenance of plant or animal species established under the state or federal law as rare, threatened or endangered. The NES will assess if any rare, threatened or endangered species may be impacted and what mitigation measures, if any, are needed.

- Marine habitat. Included uses of water that support marine ecosystems including, but not limited to, preservation or enhancement of marine habitats, vegetation such as kelp, fish, shellfish, or wildlife (e.g., marine mammals, shorebirds). The NES will assess if any marine habitat may be impacted and what mitigation measures, if any, are needed.

- Warm freshwater habitat. This includes uses of water that support warm water ecosystems including, but not limited to, preservation or enhancement of aquatic habitats, vegetation, fish or wildlife, including invertebrates. The NES will assess if any warm freshwater habitat may be impacted and what mitigation measures, if any, are needed.

The proposed bridge replacement has been designed to minimize disturbance to the floodplain. The bridge design has been through several iterations to select an alternative which is compatible with floodplain development and least harmful to the environment, while maintaining feasibility for improving I-5. Efforts should be made to limit the footprint of the construction site and reduce construction time in order to minimize impacts to natural and beneficial floodplain values, hazards to human life, and property loss.

9.6 SUMMARY AND CONCLUSION

The overall schematic of the lagoon during the 100-year storm can be described as a slow moving water body with relatively no change in waters surface elevations. Constriction points at the I-5, Carlsbad Boulevard, and NCTD Railroad Bridges regulate the majority of lagoon flow. Water surface elevations upstream of the I-5 Bridge remain uniform due to the flatness of the lagoon bottom. The I-5 replacement bridge will lower the upstream 100-yr floodplain water surface elevation approximately one half of a foot. Downstream of the I-5 Bridge, water surface elevations remained the same. The NCTD Railroad Bridge controls the water surface elevations in the section of the lagoon. The proposed replacement bridge of I-5 would improve the ability of the Buena Vista Lagoon to convey the 100-yr storm event.

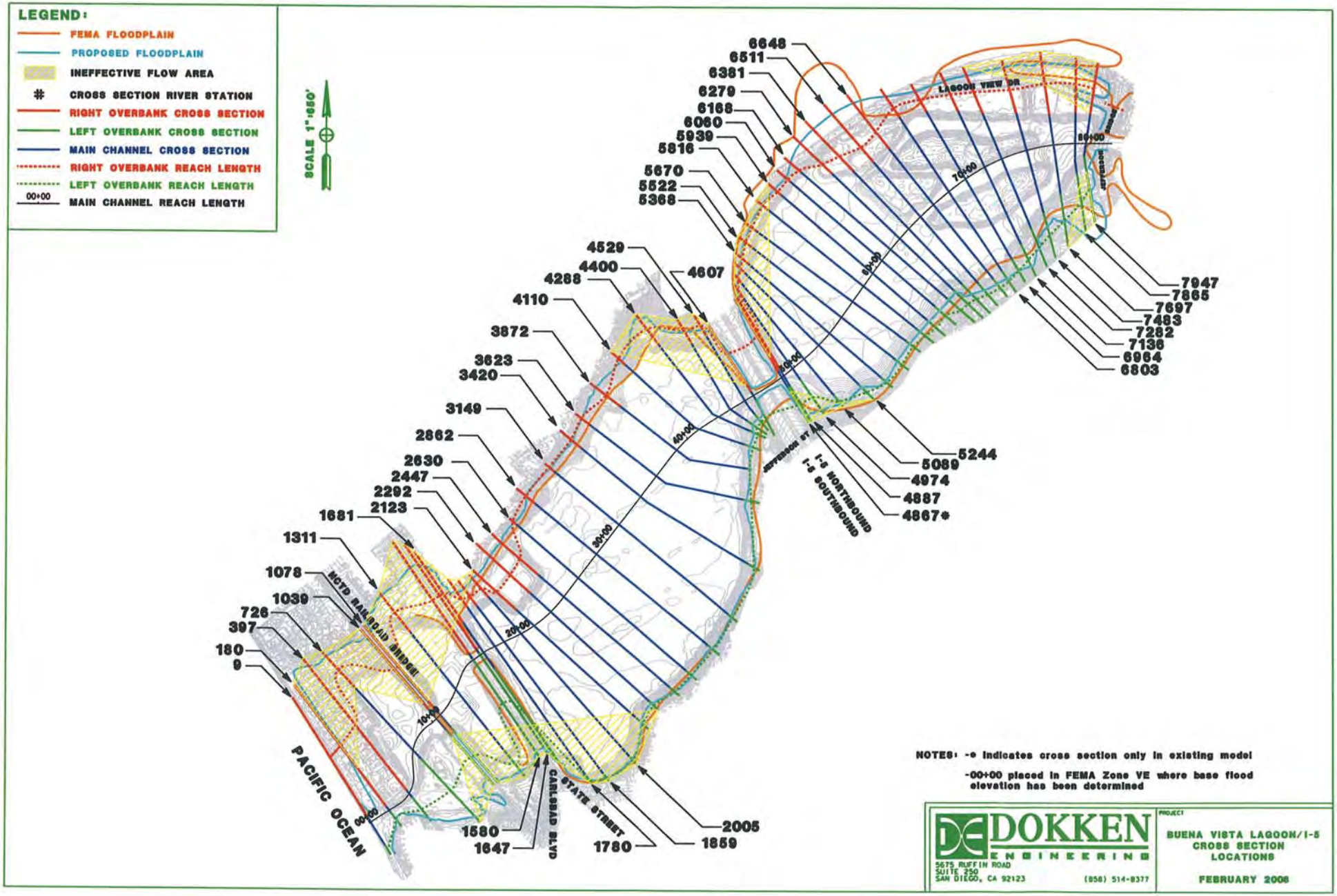
APPENDIX 'A'

Cross Section Locations Exhibits

Flood Insurance Rate Map (FIRM)

Summary of Discharges


LEGEND:
FEMA FLOODPLAIN
PROPOSED FLOODPLAIN
INEFFECTIVE FLOW AREA
CROSS SECTION RIVER STATION
RIGHT OVERBANK CROSS SECTION
LEFT OVERBANK CROSS SECTION
MAIN CHANNEL CROSS SECTION
RIGHT OVERBANK REACH LENGTH
LEFT OVERBANK REACH LENGTH
00+00 MAIN CHANNEL REACH LENGTH
SCALE 1"=650'
6648
6511
6381
6279
6168
6060
5939
5818
5670
5622
5388
4520
4400
4288
4110
4607
3872
3623
3420
3149
2862
2630
2447
2292
2123
1881
1311
1078
1039
726
397
180
9
1680
1647
1730
2005
1859
5244
5088
4974
4887
4867
7947
7865
7697
7483
7282
7135
6964
6803
80+00
70+00
60+00
50+00
40+00
30+00
20+00
10+00
LAGOON VIEW DR
PACIFIC OCEAN
CARLSBAD BLVD
SANTA FE ST
Laguna Drive
Kronos Avenue
NOTES: -e indicates cross section only in existing model
-00+00 placed in FEMA Zone VE where base flood elevation has been determined
DOKKEN ENGINEERING
5675 RUFFIN ROAD
SUITE 250
SAN DIEGO, CA 92123
(858) 514-6377
PROJECT
BUENA VISTA LAGOON/I-5
CROSS SECTION
LOCATIONS
FEBRUARY 2008



NOTES: -e indicates cross section only in existing model

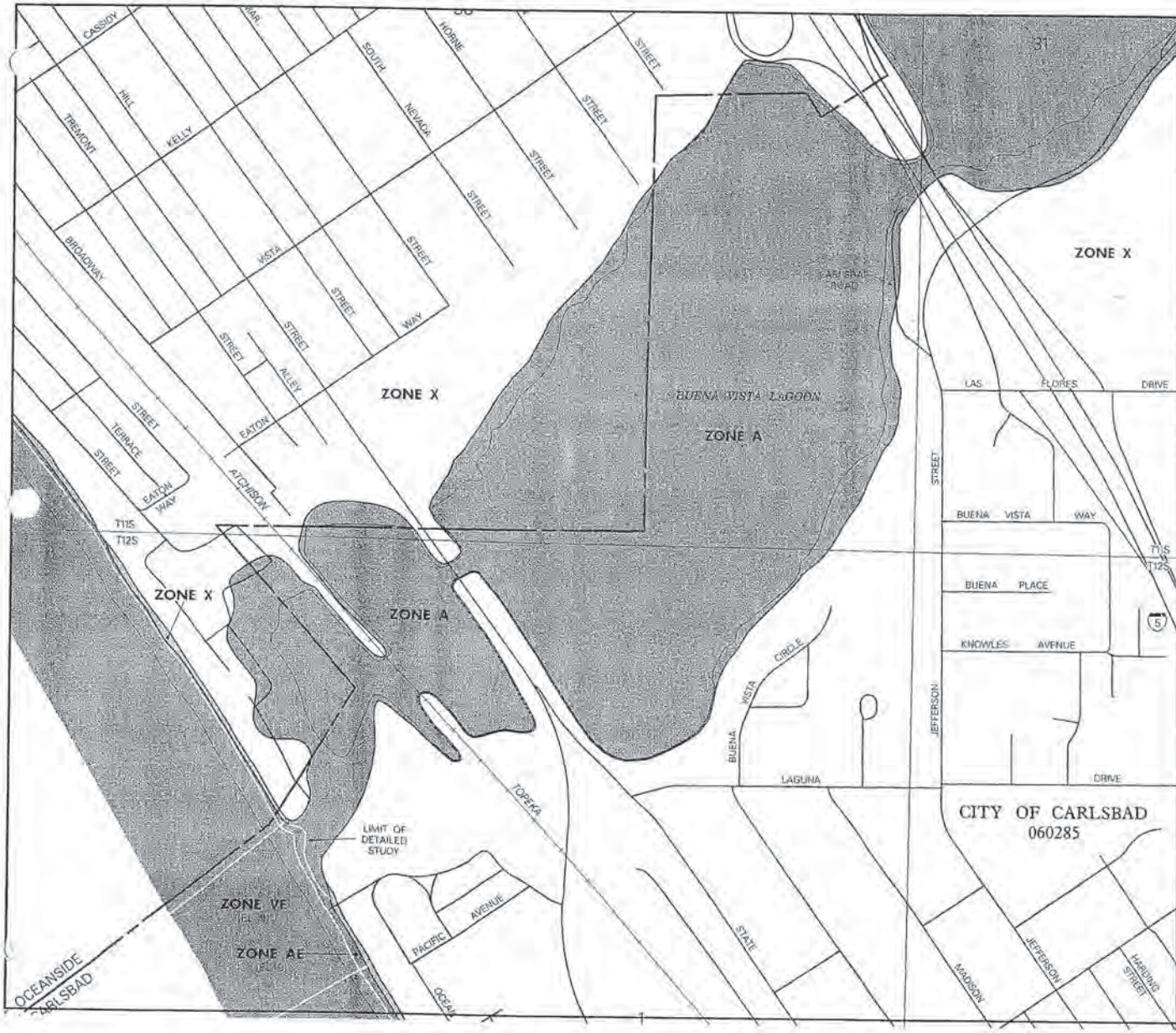
-00+00 placed in FEMA Zone VE where base flood elevation has been determined

DOKKEN ENGINEERING
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PROJECT

BUENA VISTA LAGOON/I-5
CROSS SECTION
LOCATIONS

FEBRUARY 2006



APPROXIMATE SCALE IN FEET

500 0 500

NATIONAL FLOOD INSURANCE PROGRAM

FIRM

FLOOD INSURANCE RATE MAP

SAN DIEGO COUNTY, CALIFORNIA AND INCORPORATED AREAS

PANEL 761 OF 2375

(SEE MAP INDEX FOR PANELS NOT PRINTED)

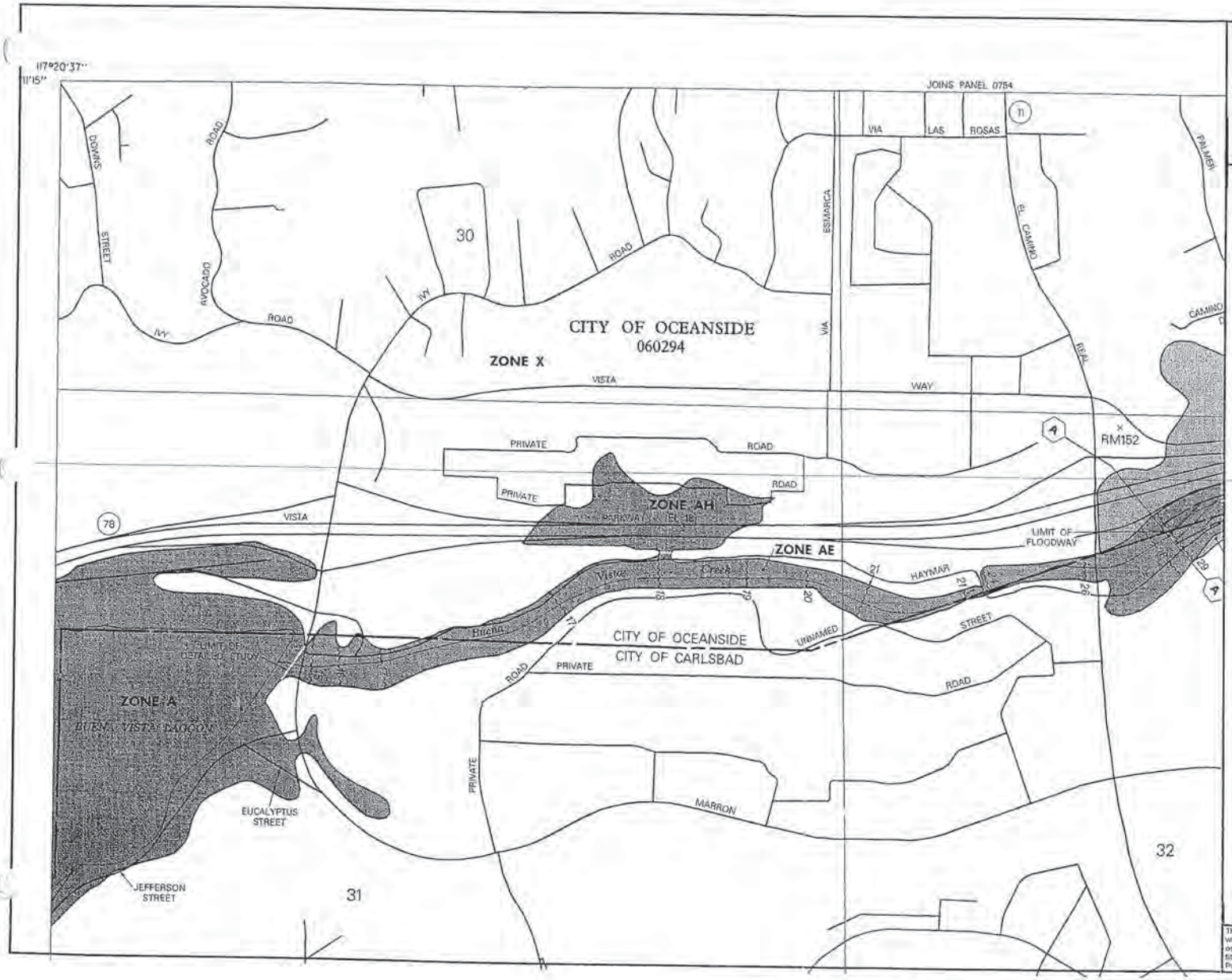
CONTAINS: COMMUNITY	NUMBER	PANEL	SUFFIX
CARLSBAD, CITY OF	060285	0761	F
OCEANSIDE, CITY OF	060294	0761	F

MAP NUMBER
06073C0761 F

EFFECTIVE DATE:
JUNE 19, 1997

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov



APPROXIMATE SCALE IN FEET

500 0 500

NATIONAL FLOOD INSURANCE PROGRAM

FIRM

FLOOD INSURANCE RATE MAP

SAN DIEGO COUNTY, CALIFORNIA AND INCORPORATED AREAS

PANEL 762 OF 2375

(SEE MAP INDEX FOR PANELS NOT PRINTED)

CONTAINS: COMMUNITY	NUMBER	PANEL	SUFFIX
CARLSBAD, CITY OF	060285	0762	F
OCEANSIDE, CITY OF	060294	0762	F

MAP NUMBER
06073C0762 F

EFFECTIVE DATE:
JUNE 19, 1997

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

Table 4. Summary of Discharges

Flooding Source and Location	Drainage Area (Square Miles)	Peak Discharges (cfs) 10-Year	50-Year	100-Year	500-Year
Agua Hedionda Creek					
At Confluence with Buena Creek	6.3	1,600	4,800	7,000	15,500
2,200 Feet Upstream of Rancho Carlsbad Drive	16.5	--[1]	--[1]	7,810	--[1]
Upstream of Calavera Creek	17.3	--[1]	--[1]	8,080	--[1]
At El Camino Real	23.8	--[1]	--[1]	9,850	--[1]
Beaver Hollow Creek					
Approximately 1,200 Feet Downstream of Beaver Hollow Road	5.0	--[1]	--[1]	4,000	--[1]
Beeler Creek					
At U.S. Geological Survey (USGS) Gage on Downstream Side of Pomerado Road	5.5	700	2,400	3,600	9,200
Borrego Palm Canyon					
At Apex of Alluvial Fan	23.3	3,100	7,700	10,650	14,800
Box Canyon					
At Apex of Alluvial Fan	5.9	850	2,600	3,850	4,950
Broadway Creek					
At Mouth	3.8	500	1,200	1,600	4,200
Buena Creek					
At Mouth	6.3	1,880	3,520	4,100	5,420
At Buena Creek Road	1.5	--[1]	--[1]	1,980	--[1]
Buena Vista Creek					
Upstream of Interstate Highway 5	20.8	2,000	5,600	8,500	19,000
At Sunset Drive	15.9	1,700	5,100	8,000	18,000
At Hacienda Drive	9.8	1,500	4,900	7,300	16,000
At Confluence with Tributary 1	7.7	1,490	3,390	4,290	5,680
At Confluence with Tributary 2	5.1	1,030	2,280	2,840	3,730
At Confluence with Tributary 4	4.0	860	1,850	2,300	2,910
At Intersection of Vista Way and Arcadia Avenue	0.2	40	100	130	170

[1]Data Not Available

APPENDIX 'B'

Results Summary

HEC-RAS Cross Section Input/Output

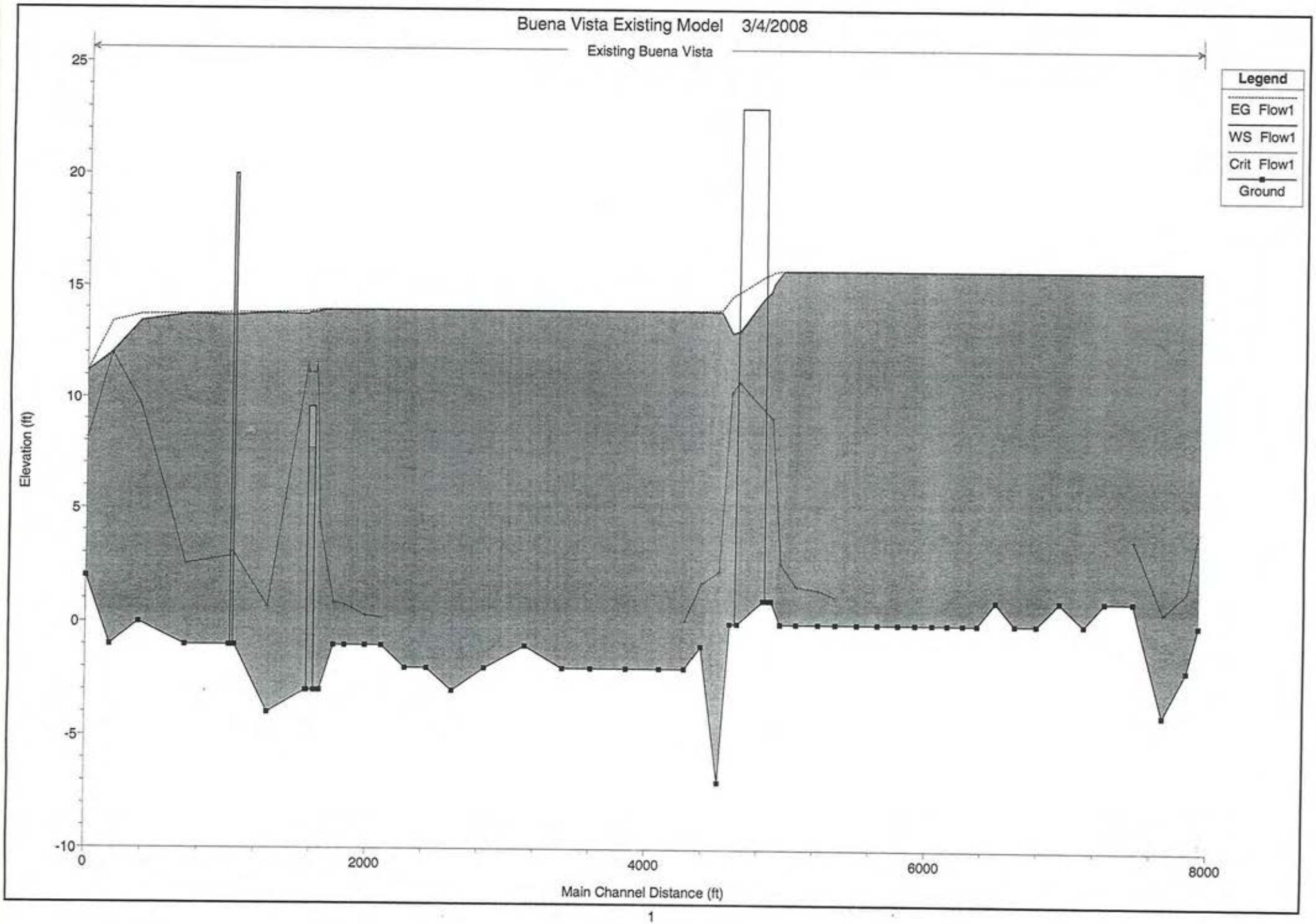
Existing
Proposed

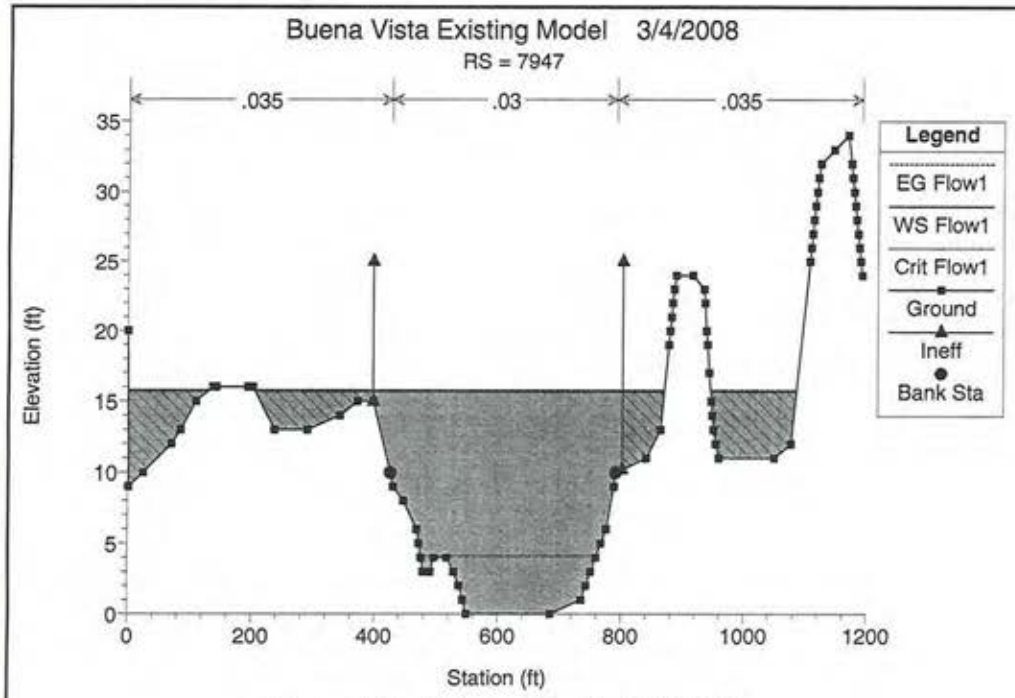
DOKKEN ENGINEERING
www.dokkenengineering.com

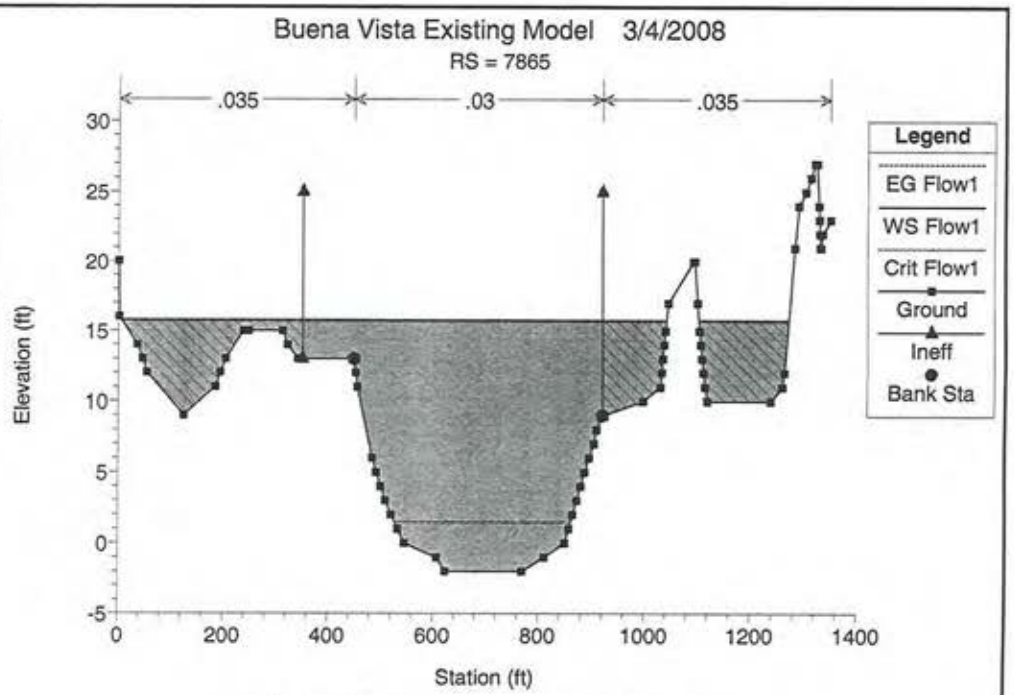
EXISTING

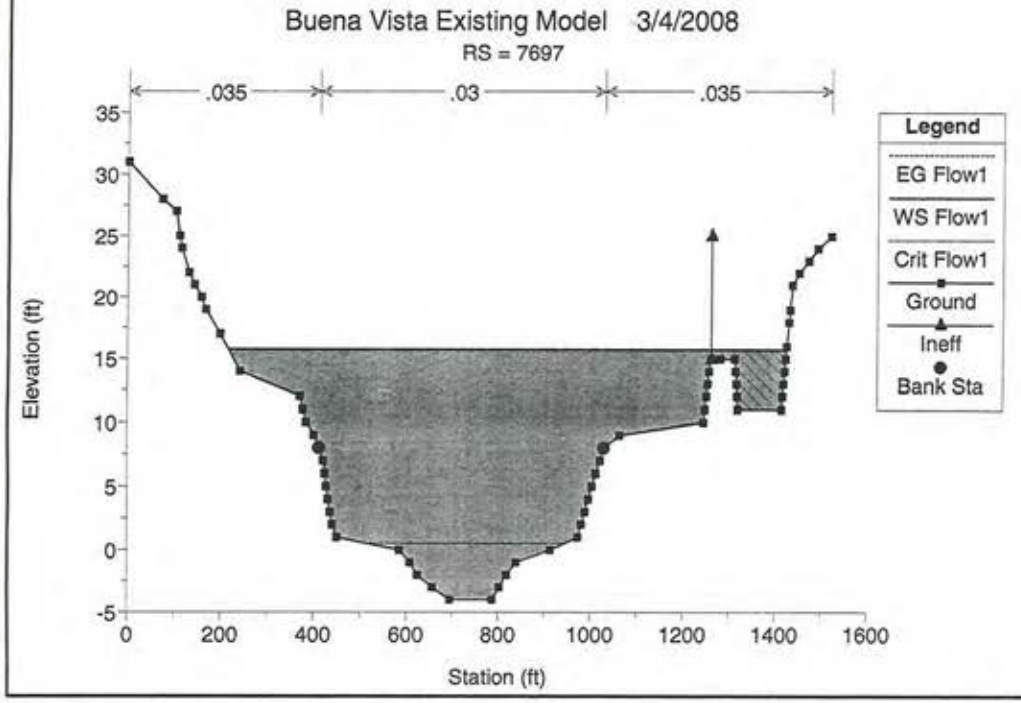
HEC-RAS Plan: ExistingBV River: Existing Reach: Buena Vista Profile: Flow1

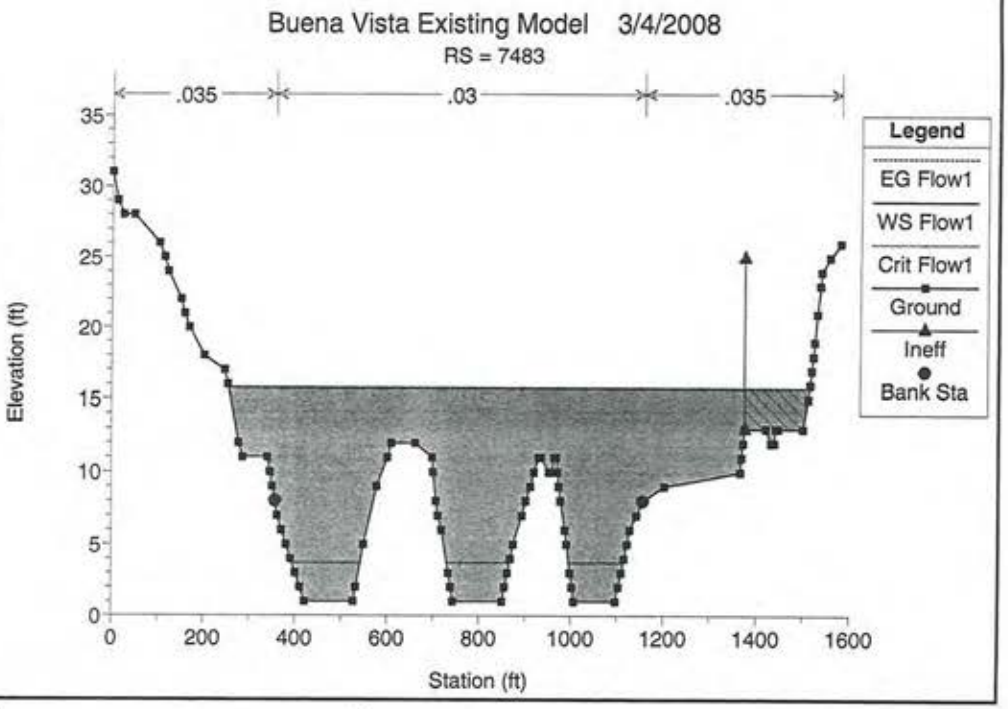
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Buena Vista	7947	Flow1	8500.00	0.00	15.75	4.12	15.79	0.000038	1.72	5028.66	934.46	0.08
Buena Vista	7865	Flow1	8500.00	-2.00	15.76	1.50	15.78	0.000016	1.19	7315.54	1205.40	0.05
Buena Vista	7697	Flow1	8500.00	-4.00	15.77	0.56	15.78	0.000006	0.79	12049.31	1208.66	0.03
Buena Vista	7483	Flow1	8500.00	1.00	15.76	3.73	15.78	0.000013	0.87	10529.84	1260.07	0.05
Buena Vista	7282	Flow1	8500.00	1.00	15.76		15.77	0.000010	0.76	12255.38	1415.89	0.04
Buena Vista	7136	Flow1	8500.00	0.00	15.76		15.77	0.000007	0.64	14270.92	1554.97	0.03
Buena Vista	6964	Flow1	8500.00	1.00	15.76		15.77	0.000006	0.59	14985.79	1585.09	0.03
Buena Vista	6803	Flow1	8500.00	0.00	15.76		15.77	0.000004	0.51	17030.76	1610.37	0.03
Buena Vista	6648	Flow1	8500.00	0.00	15.76		15.77	0.000004	0.52	17427.74	1686.39	0.03
Buena Vista	6511	Flow1	8500.00	1.00	15.76		15.77	0.000004	0.51	17746.60	1655.38	0.03
Buena Vista	6381	Flow1	8500.00	0.00	15.76		15.77	0.000003	0.48	19045.38	1608.53	0.02
Buena Vista	6279	Flow1	8500.00	0.00	15.76		15.77	0.000002	0.42	21452.93	1595.29	0.02
Buena Vista	6168	Flow1	8500.00	0.00	15.76		15.77	0.000002	0.38	22629.76	1547.69	0.02
Buena Vista	6060	Flow1	8500.00	0.00	15.76		15.77	0.000002	0.38	22710.90	1562.11	0.02
Buena Vista	5939	Flow1	8500.00	0.00	15.76		15.77	0.000002	0.38	22700.15	1561.86	0.02
Buena Vista	5816	Flow1	8500.00	0.00	15.76		15.77	0.000002	0.37	22956.98	1559.09	0.02
Buena Vista	5670	Flow1	8500.00	0.00	15.76		15.76	0.000002	0.38	22445.93	1519.46	0.02
Buena Vista	5522	Flow1	8500.00	0.00	15.76		15.76	0.000002	0.39	21750.33	1489.76	0.02
Buena Vista	5368	Flow1	8500.00	0.00	15.76	1.18	15.76	0.000002	0.41	20945.81	1460.43	0.02
Buena Vista	5244	Flow1	8500.00	0.00	15.76	1.50	15.76	0.000002	0.48	17839.00	1314.36	0.02
Buena Vista	5089	Flow1	8500.00	0.00	15.76	1.64	15.76	0.000004	0.60	14413.73	1237.75	0.03
Buena Vista	4974	Flow1	8500.00	0.00	15.75	2.66	15.76	0.000012	1.04	8721.34	1114.10	0.05
Buena Vista	4887	Flow1	8500.00	1.00	15.18	9.13	15.71	0.000567	5.82	1460.17	924.71	0.31
Buena Vista	4867	Flow1	8500.00	1.00	14.81	9.24	15.61	0.000823	7.18	1184.18	913.65	0.37
Buena Vista	4700		Bridge									
Buena Vista	4607	Flow1	8500.00	0.00	12.95	10.29	14.62	0.002103	10.80	909.32	560.83	0.57
Buena Vista	4529	Flow1	8500.00	-7.00	13.89	2.28	13.97	0.000066	2.19	3975.31	789.07	0.11
Buena Vista	4400	Flow1	8500.00	-1.00	13.92	1.75	13.95	0.000024	1.36	6320.95	887.72	0.07
Buena Vista	4288	Flow1	8500.00	-2.00	13.93	0.12	13.94	0.000007	0.76	11273.59	1261.72	0.03
Buena Vista	4110	Flow1	8500.00	-2.00	13.93		13.94	0.000003	0.49	17378.68	1199.97	0.02
Buena Vista	3872	Flow1	8500.00	-2.00	13.93		13.94	0.000003	0.49	18241.63	1359.49	0.02
Buena Vista	3623	Flow1	8500.00	-2.00	13.93		13.94	0.000002	0.42	20622.91	1442.30	0.02
Buena Vista	3420	Flow1	8500.00	-2.00	13.93		13.94	0.000001	0.36	23988.75	1682.14	0.02
Buena Vista	3149	Flow1	8500.00	-1.00	13.93		13.94	0.000001	0.33	25674.53	1789.06	0.02
Buena Vista	2862	Flow1	8500.00	-2.00	13.93		13.94	0.000001	0.32	26544.78	1816.98	0.01
Buena Vista	2630	Flow1	8500.00	-3.00	13.93		13.94	0.000001	0.32	26648.20	1782.09	0.01
Buena Vista	2447	Flow1	8500.00	-2.00	13.93		13.93	0.000002	0.40	22623.41	1745.88	0.02
Buena Vista	2292	Flow1	8500.00	-2.00	13.93		13.93	0.000002	0.42	21576.38	1668.46	0.02
Buena Vista	2123	Flow1	8500.00	-1.00	13.93	0.22	13.93	0.000002	0.45	20302.66	1695.11	0.02
Buena Vista	2005	Flow1	8500.00	-1.00	13.93	0.31	13.93	0.000002	0.46	19173.12	1892.59	0.02
Buena Vista	1859	Flow1	8500.00	-1.00	13.93	0.77	13.93	0.000003	0.53	16430.98	1815.90	0.02
Buena Vista	1780	Flow1	8500.00	-1.00	13.93	0.85	13.93	0.000004	0.55	15549.74	1755.61	0.03
Buena Vista	1681	Flow1	8500.00	-3.00	13.92	4.36	13.93	0.000012	0.88	10962.95	1737.24	0.05
Buena Vista	1647	Flow1	8500.00	-3.00	13.82	11.60	13.92	0.000258	4.02	4273.20	1677.12	0.20
Buena Vista	1600		Bridge									
Buena Vista	1580	Flow1	8500.00	-3.00	13.74	11.45	13.86	0.000265	4.17	4020.62	1740.14	0.20
Buena Vista	1311	Flow1	8500.00	-4.00	13.79	0.67	13.80	0.000010	0.93	9126.33	1742.06	0.04
Buena Vista	1078	Flow1	8500.00	-1.00	13.69	2.92	13.79	0.000076	2.55	3557.91	408.41	0.12
Buena Vista	1050		Bridge									
Buena Vista	1039	Flow1	8500.00	-1.00	13.69	2.86	13.78	0.000073	2.45	3601.48	383.33	0.12
Buena Vista	726	Flow1	8500.00	-1.00	13.73	2.55	13.75	0.000011	0.87	10474.23	1667.25	0.04
Buena Vista	397	Flow1	8500.00	0.00	13.42	9.69	13.71	0.000566	5.41	2902.33	1528.37	0.30
Buena Vista	180	Flow1	8500.00	-1.00	12.00	12.00	13.39	0.002352	10.76	1351.05	568.21	0.59
Buena Vista	0	Flow1	8500.00	2.00	11.19	8.16	11.23	0.000137	1.98	6152.88	1429.65	0.14

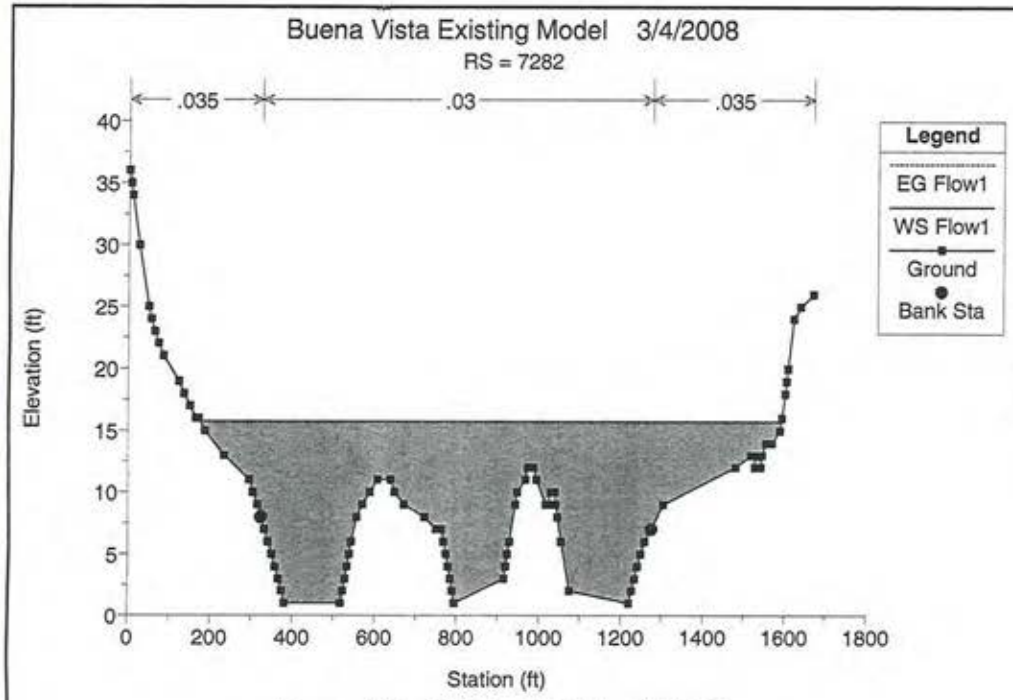

Buena Vista Existing Model 3/4/2008
Existing Buena Vista
Legend
EG Flow1
WS Flow1
Crit Flow1
Ground
Elevation (ft)
25
20
15
10
5
0
-5
-10
0
2000
4000
6000
8000
Main Channel Distance (ft)

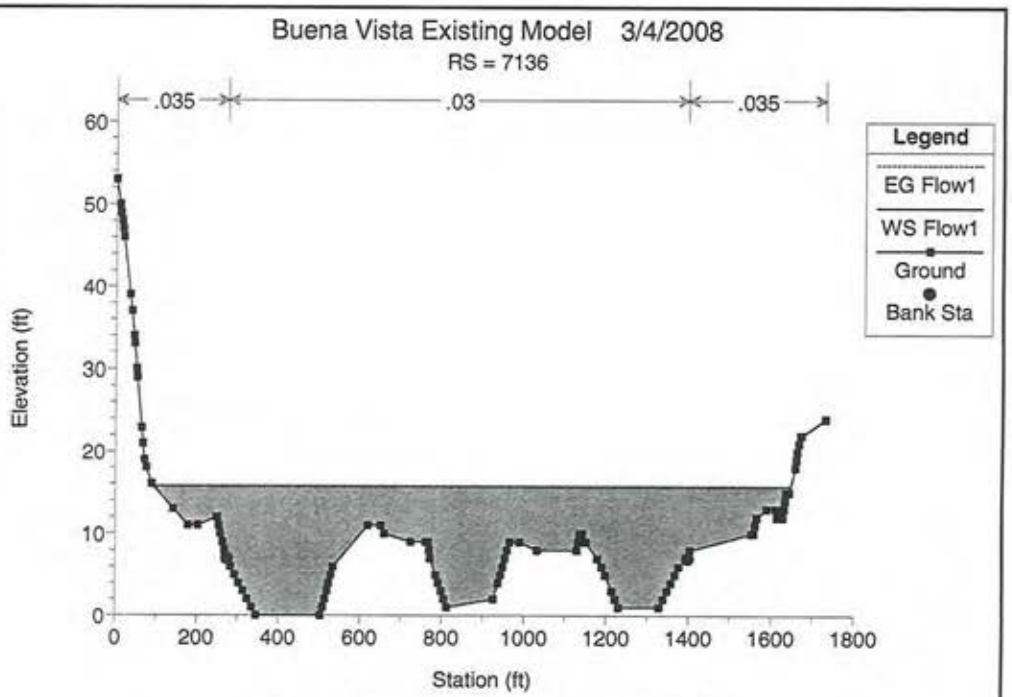

Buena Vista Existing Model 3/4/2008
RS = 7947
.035
.03
.035
Legend
EG Flow1
WS Flow1
Crit Flow1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

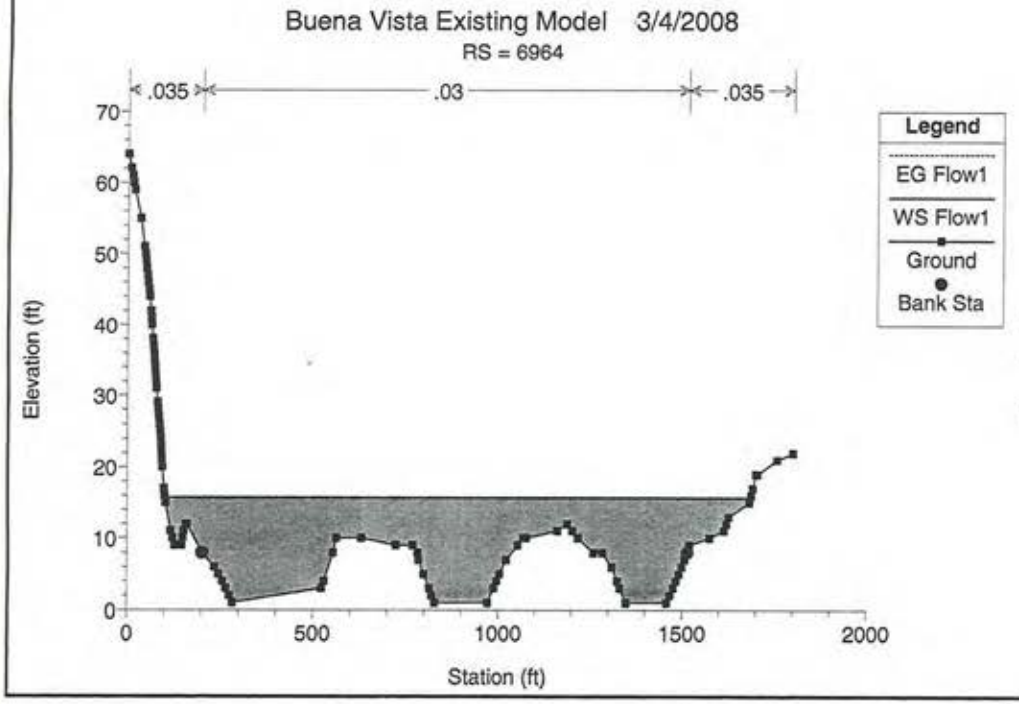

Buena Vista Existing Model 3/4/2008
RS = 7865
.035
.03
.035
Legend
EG Flow1
WS Flow1
Crit Flow1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

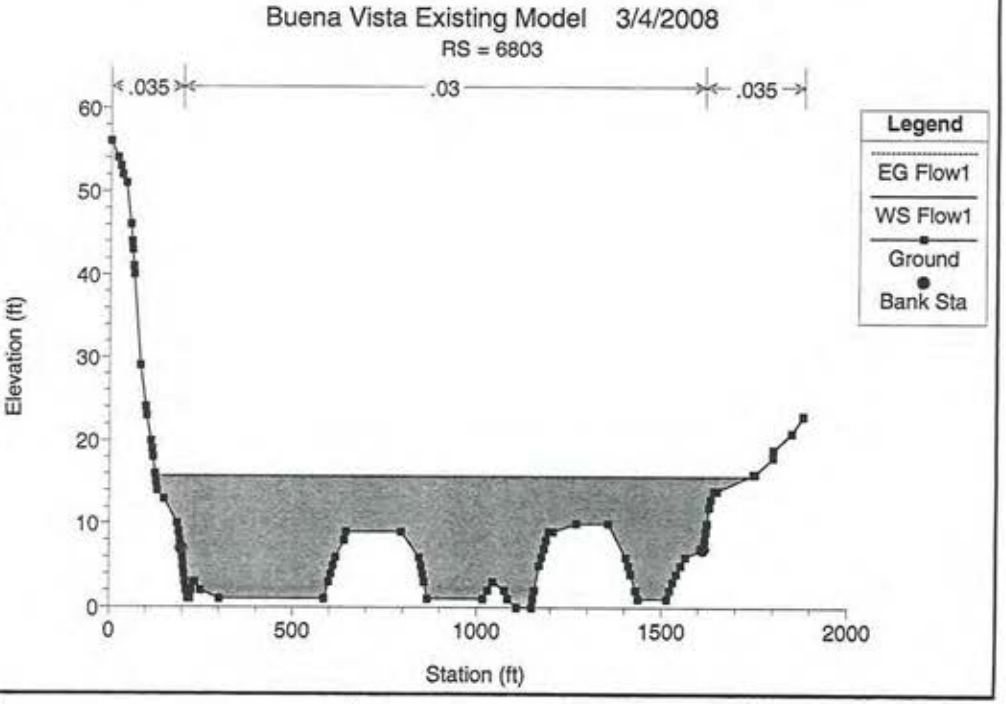

Buena Vista Existing Model 3/4/2008
RS = 7697
.035
.03
.035
Legend
EG Flow1
WS Flow1
Crit Flow1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

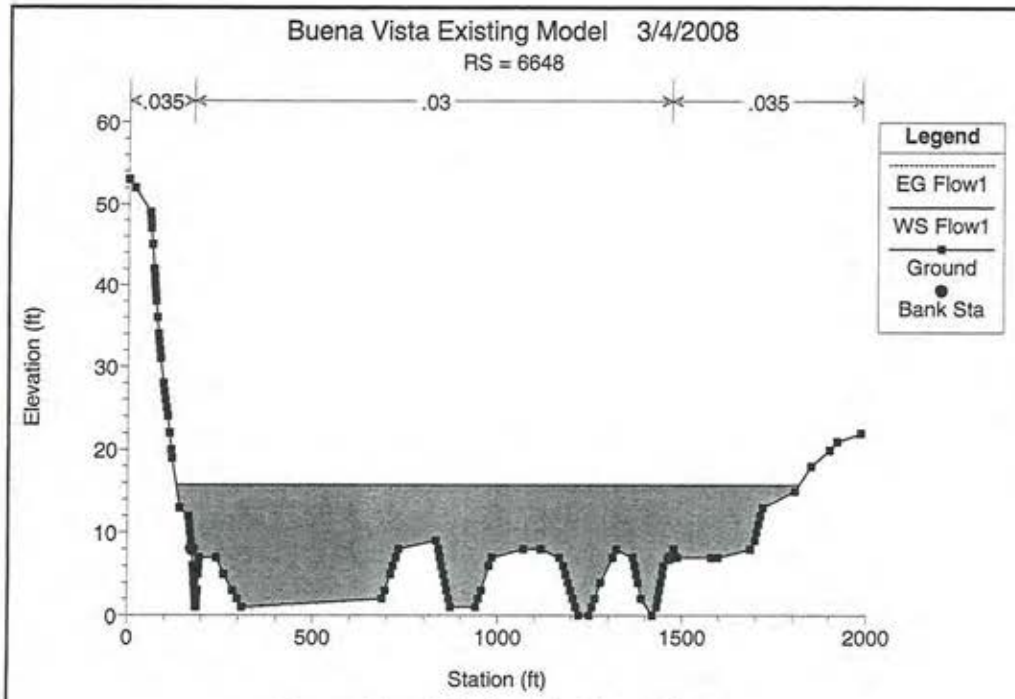

Buena Vista Existing Model 3/4/2008
RS = 7483
.035
.03
.035
Legend
EG Flow1
WS Flow1
Crit Flow1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

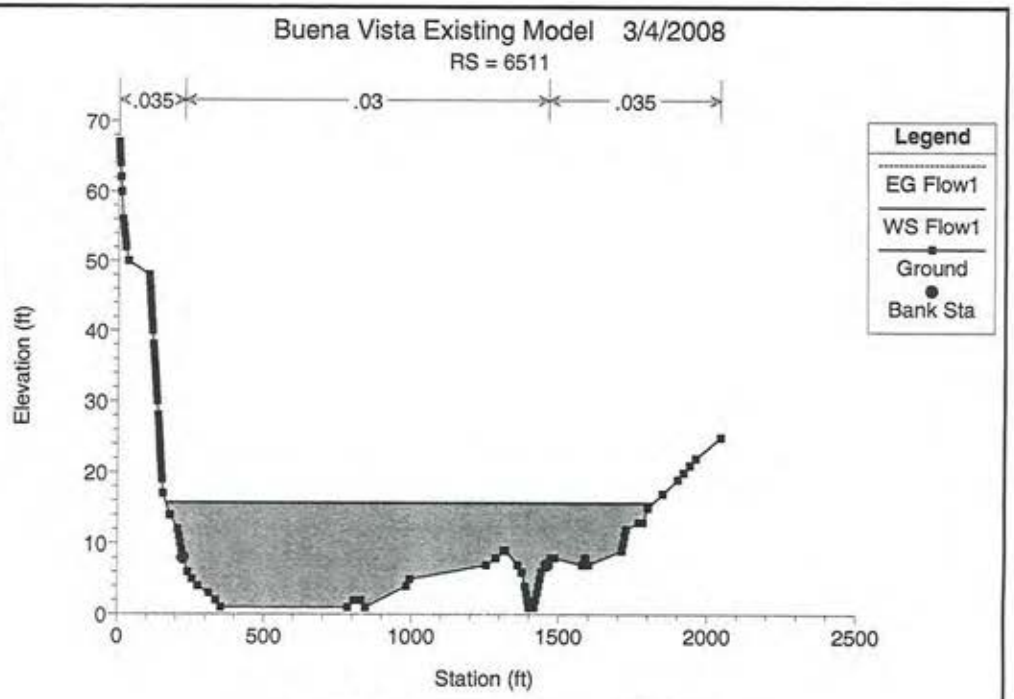

Buena Vista Existing Model 3/4/2008
RS = 7282
.035
.03
.035
Legend
EG Flow1
WS Flow1
Ground
Bank Sta
Elevation (ft)
Station (ft)

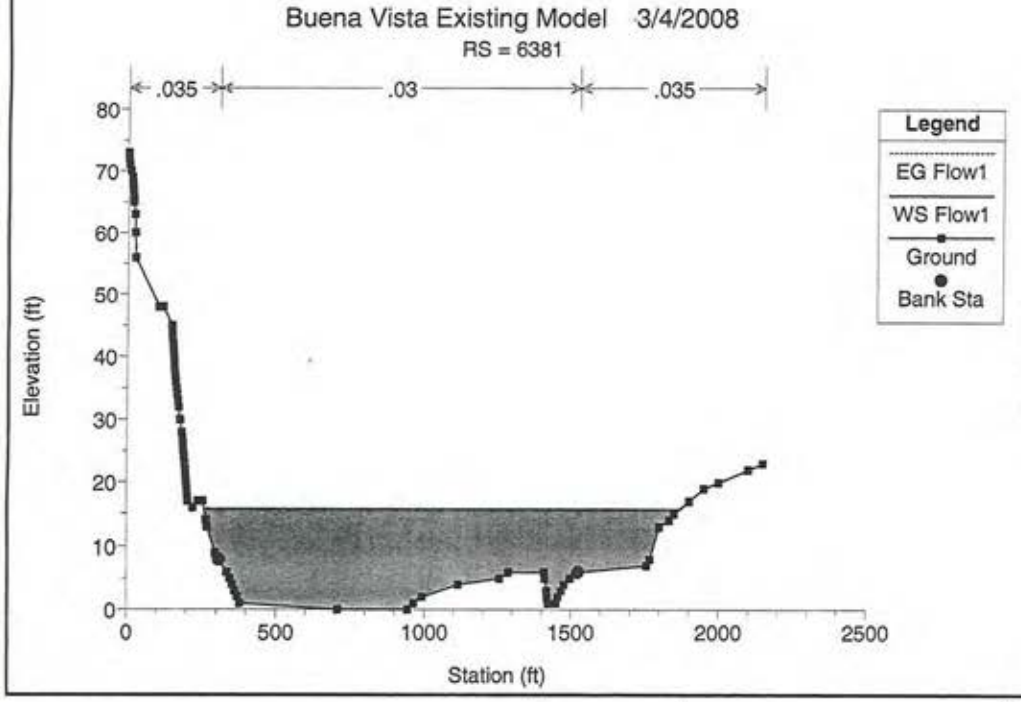

Buena Vista Existing Model 3/4/2008
RS = 7136
.035
.03
.035
Legend
EG Flow1
WS Flow1
Ground
Bank Sta
Elevation (ft)
Station (ft)

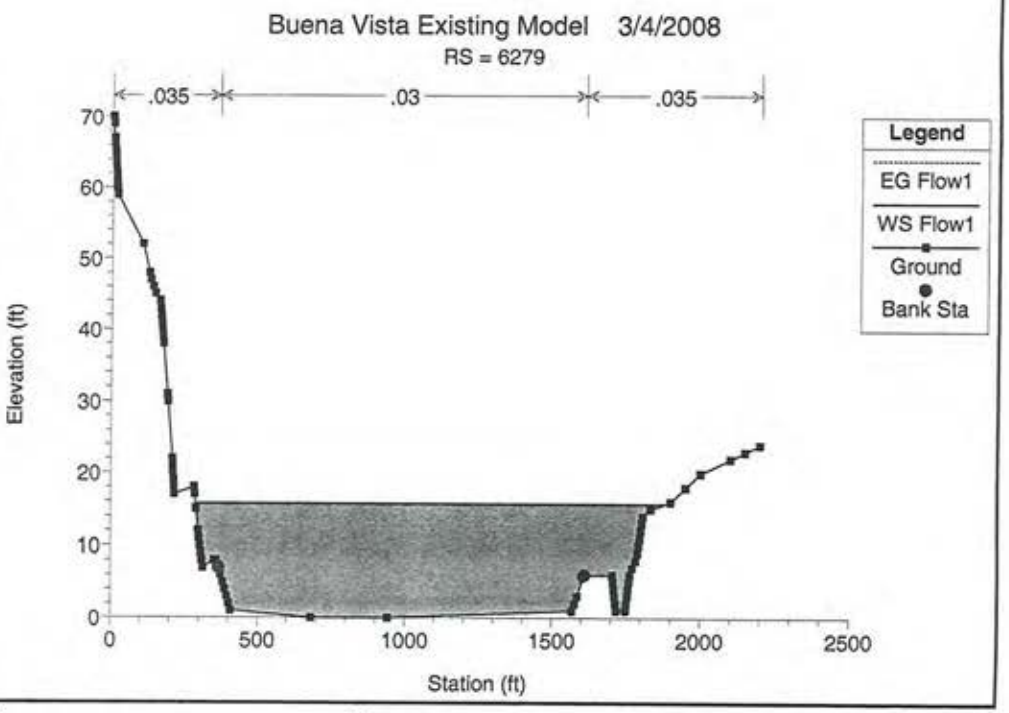

Buena Vista Existing Model 3/4/2008
RS = 6964
.035
.03
.035
Legend
EG Flow1
WS Flow1
Ground
Bank Sta
Elevation (ft)
Station (ft)

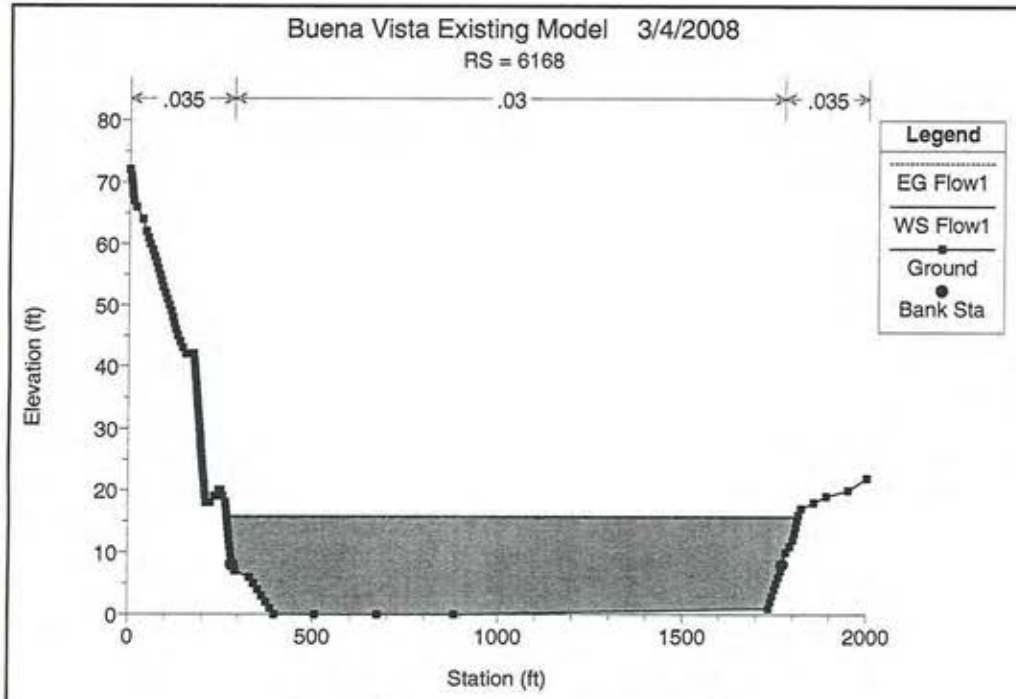

Buena Vista Existing Model 3/4/2008
RS = 6803
.035
.03
.035
Legend
EG Flow1
WS Flow1
Ground
Bank Sta
Elevation (ft)
Station (ft)

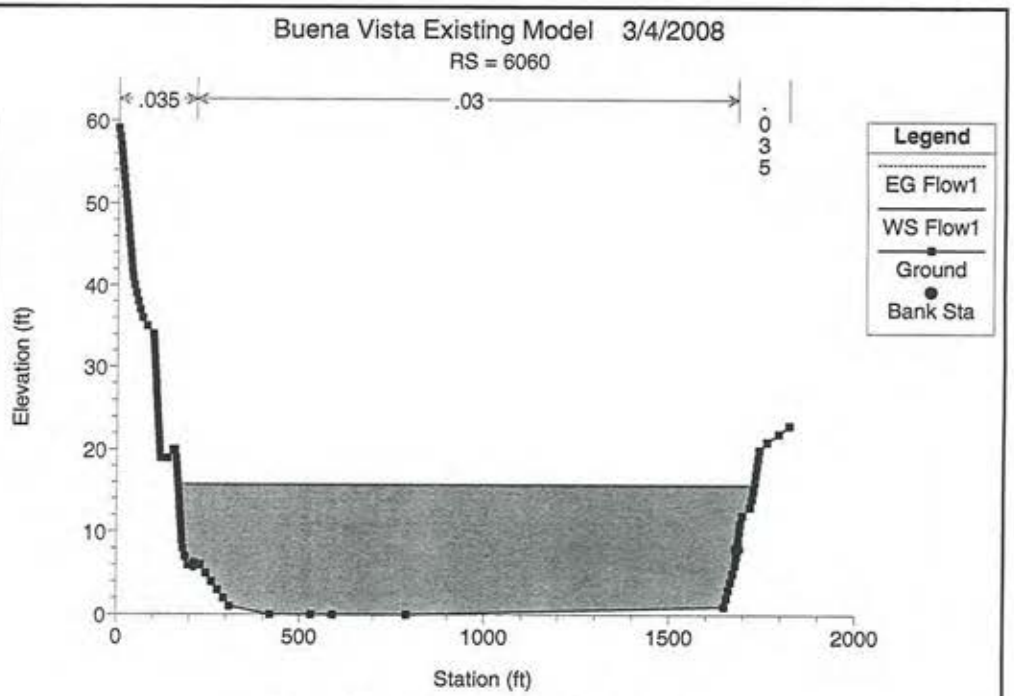

Buena Vista Existing Model 3/4/2008
RS = 6648
.035
.03
.035
Legend
EG Flow1
WS Flow1
Ground
Bank Sta
Elevation (ft)
Station (ft)

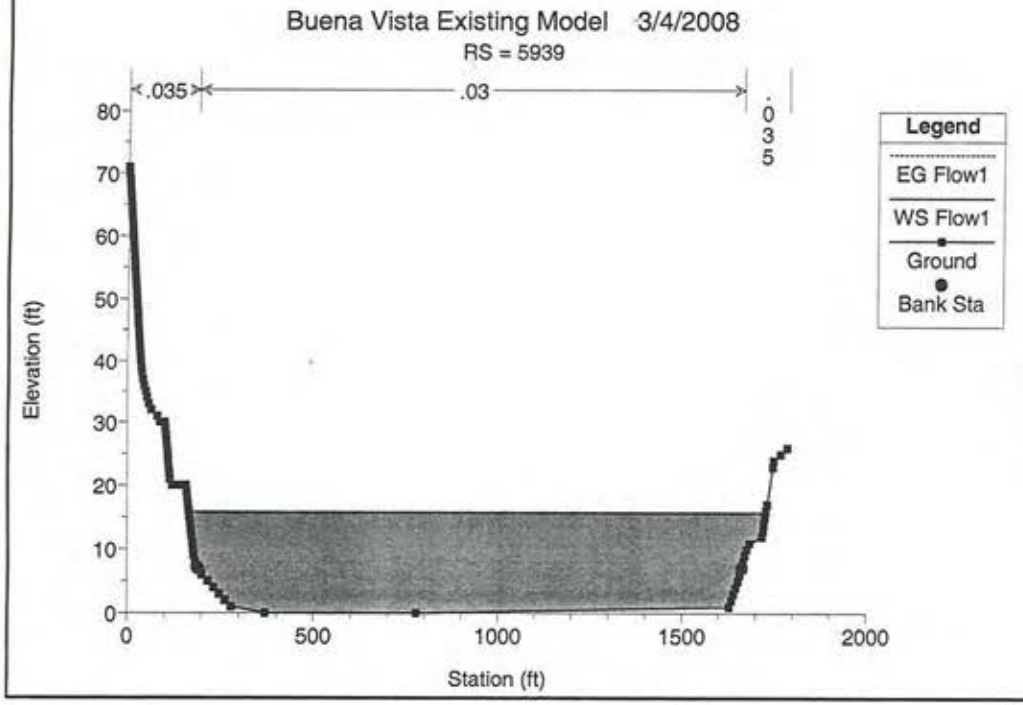

Buena Vista Existing Model 3/4/2008
RS = 6511
.035
.03
.035
Legend
EG Flow1
WS Flow1
Ground
Bank Sta
Elevation (ft)
Station (ft)

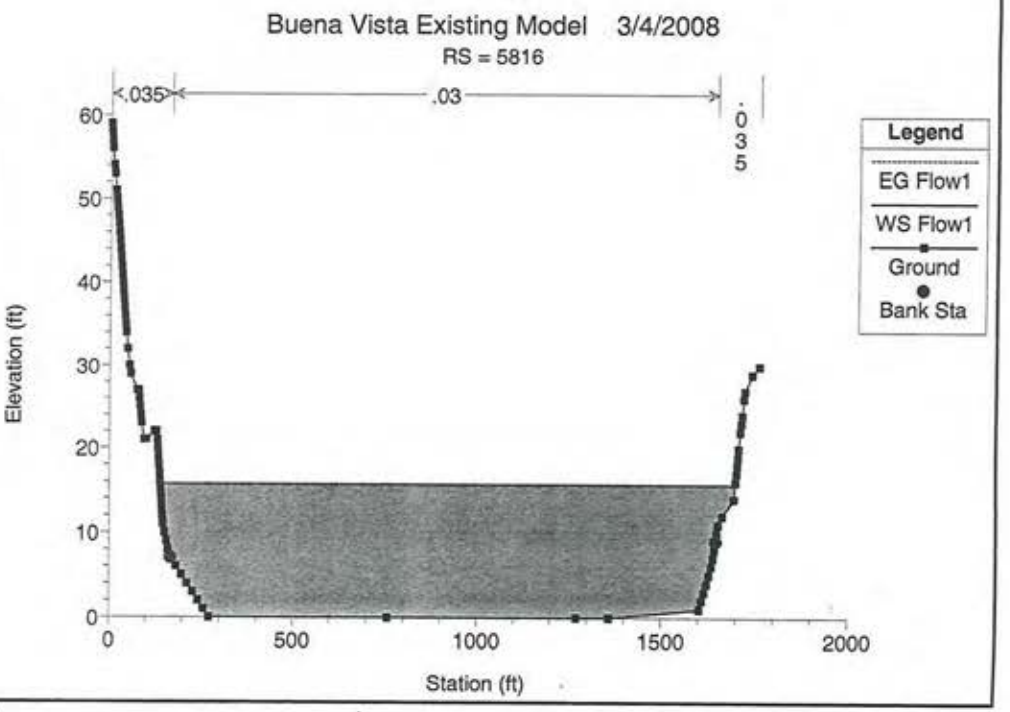

Buena Vista Existing Model 3/4/2008
RS = 6381
.035
.03
.035
Legend
EG Flow1
WS Flow1
Ground
Bank Sta
Elevation (ft)
Station (ft)

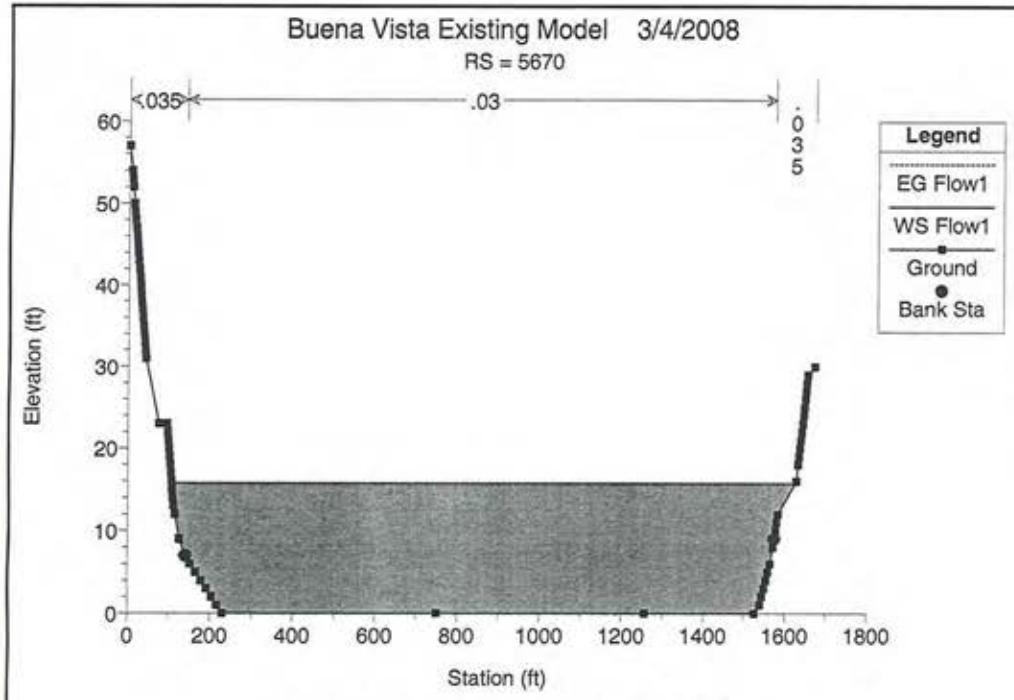

Buena Vista Existing Model 3/4/2008
RS = 6279
.035
.03
.035
Legend
EG Flow1
WS Flow1
Ground
Bank Sta
Elevation (ft)
Station (ft)

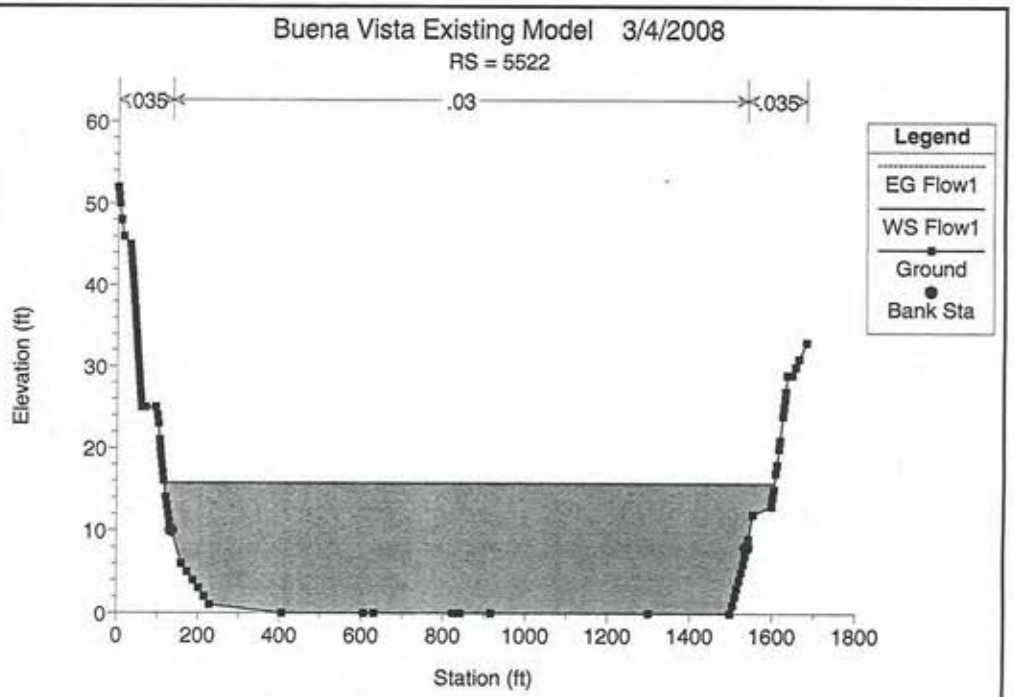

Buena Vista Existing Model 3/4/2008
RS = 6168
.035
.03
.035
Legend
EG Flow1
WS Flow1
Ground
Bank Sta
Elevation (ft)
Station (ft)
0
10
20
30
40
50
60
70
80
0
500
1000
1500
2000

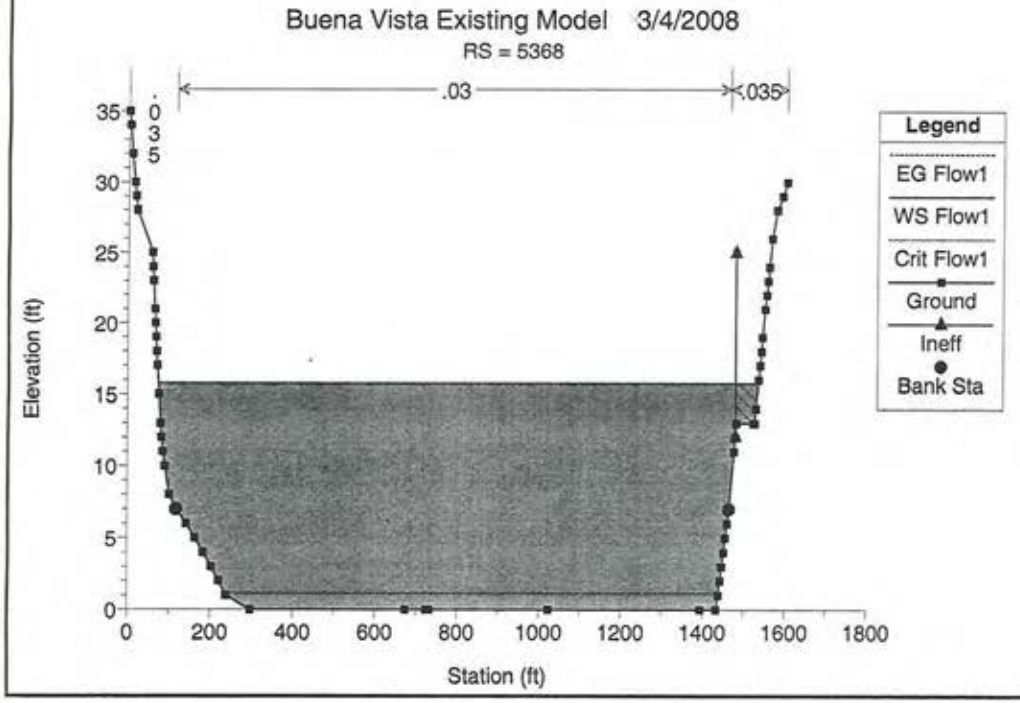

Buena Vista Existing Model 3/4/2008
RS = 6060
.035
.03
.035
Legend
EG Flow1
WS Flow1
Ground
Bank Sta
Elevation (ft)
Station (ft)
0
10
20
30
40
50
60
0
500
1000
1500
2000

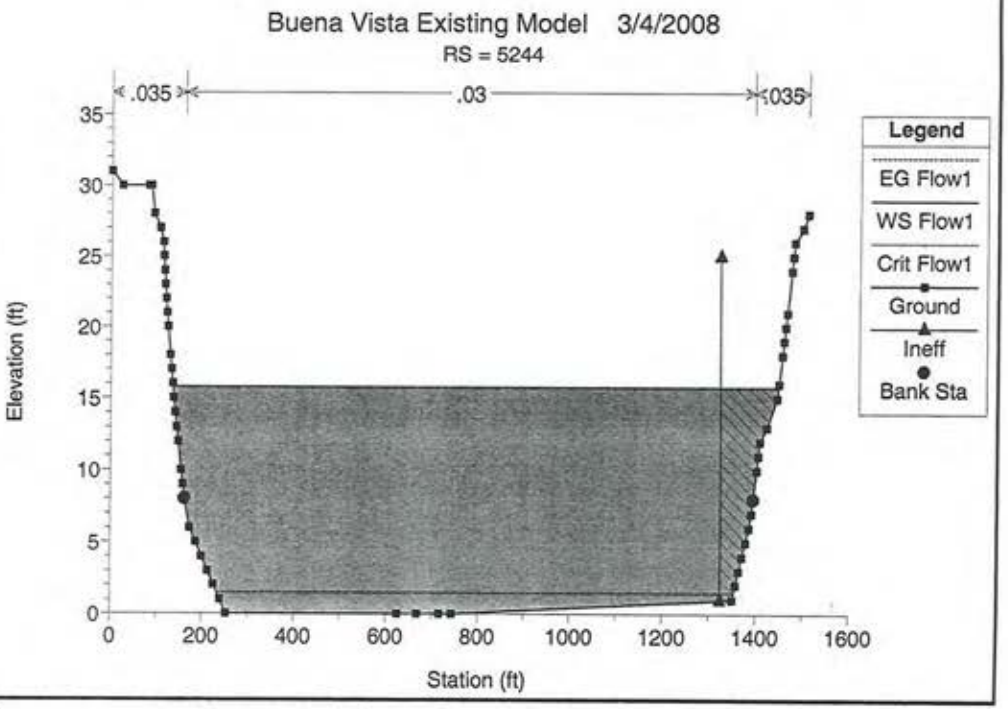

Buena Vista Existing Model 3/4/2008
RS = 5939
.035
.03
.035
Legend
EG Flow1
WS Flow1
Ground
Bank Sta
Elevation (ft)
Station (ft)
0
10
20
30
40
50
60
70
80
0
500
1000
1500
2000

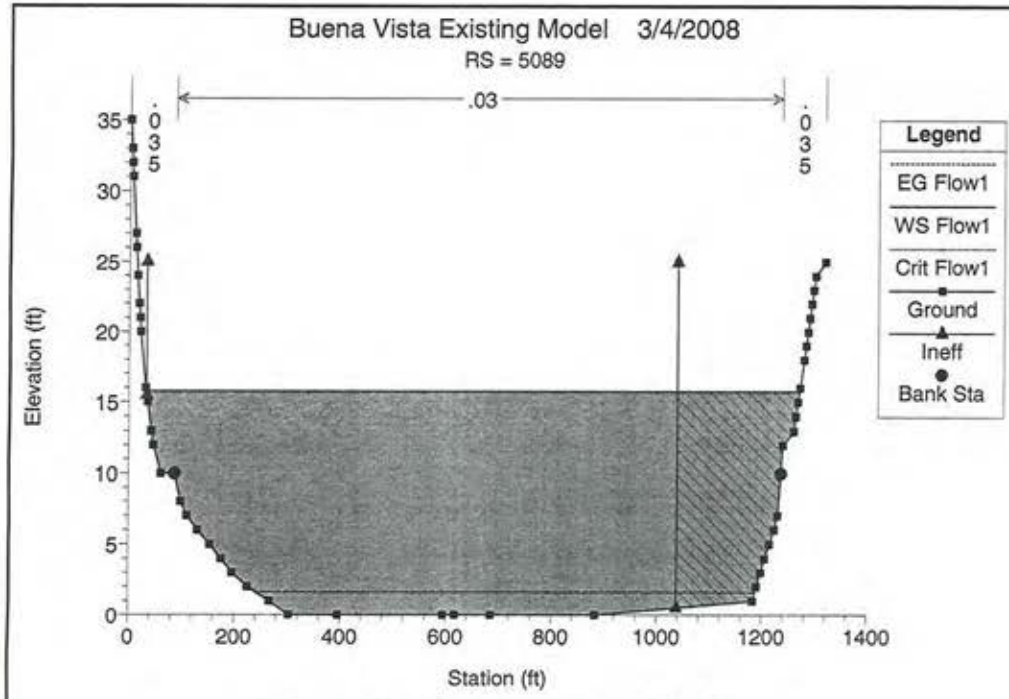

Buena Vista Existing Model 3/4/2008
RS = 5816
.035
.03
.035
Legend
EG Flow1
WS Flow1
Ground
Bank Sta
Elevation (ft)
Station (ft)
0
10
20
30
40
50
60
0
500
1000
1500
2000

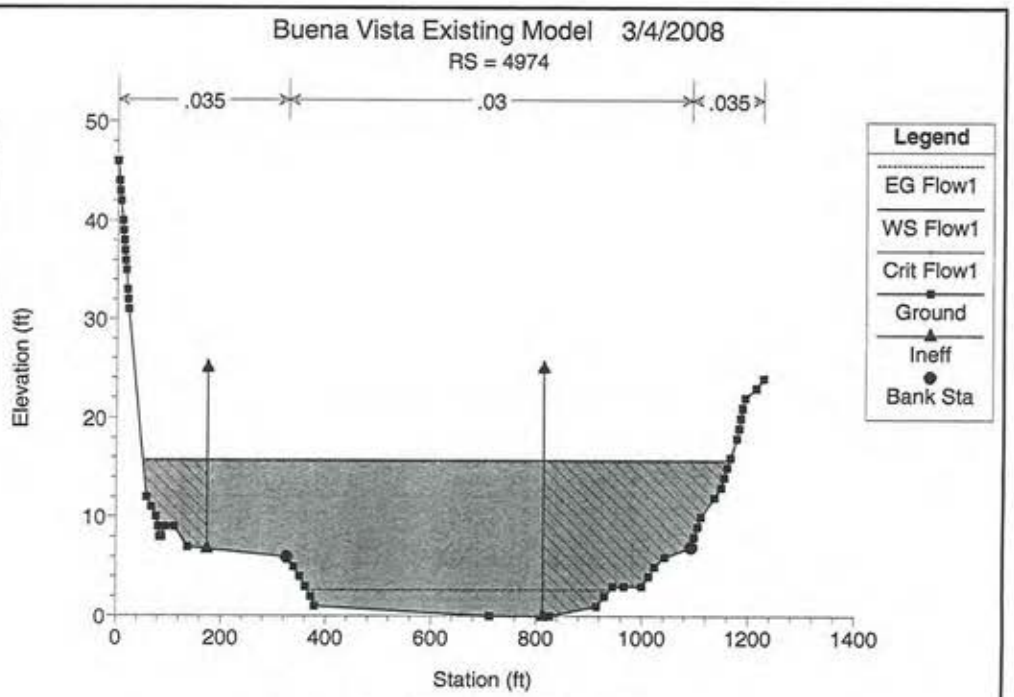

Buena Vista Existing Model 3/4/2008
RS = 5670
.035
.03
.035
Legend
EG Flow1
WS Flow1
Ground
Bank Sta
Elevation (ft)
Station (ft)

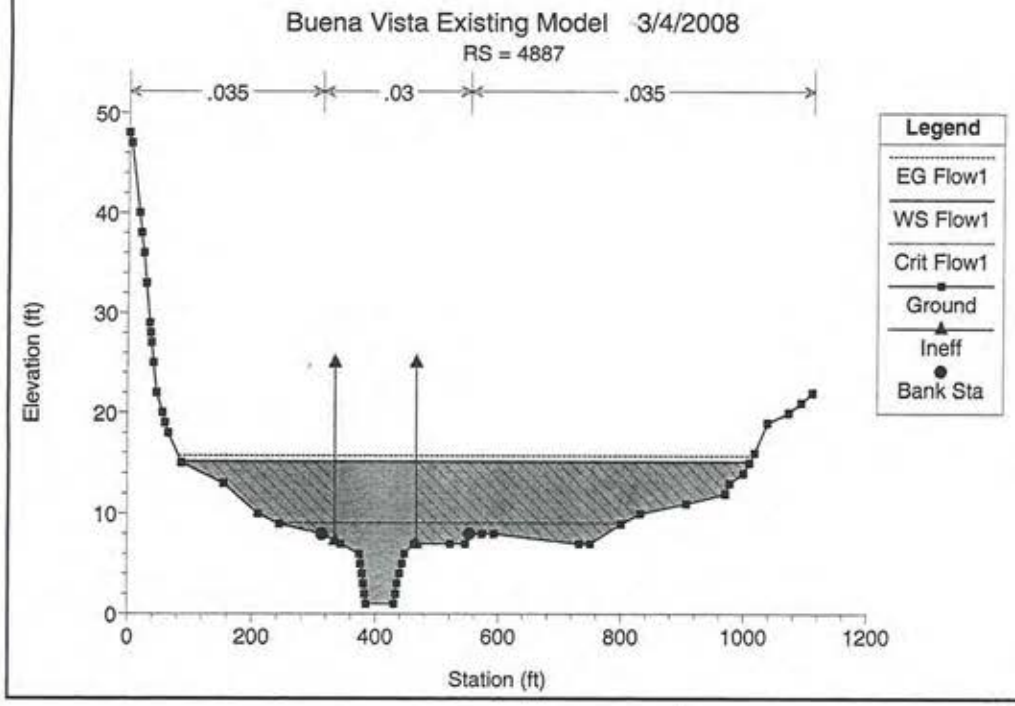

Buena Vista Existing Model 3/4/2008
RS = 5522
.035
.03
.035
Legend
EG Flow1
WS Flow1
Ground
Bank Sta
Elevation (ft)
Station (ft)

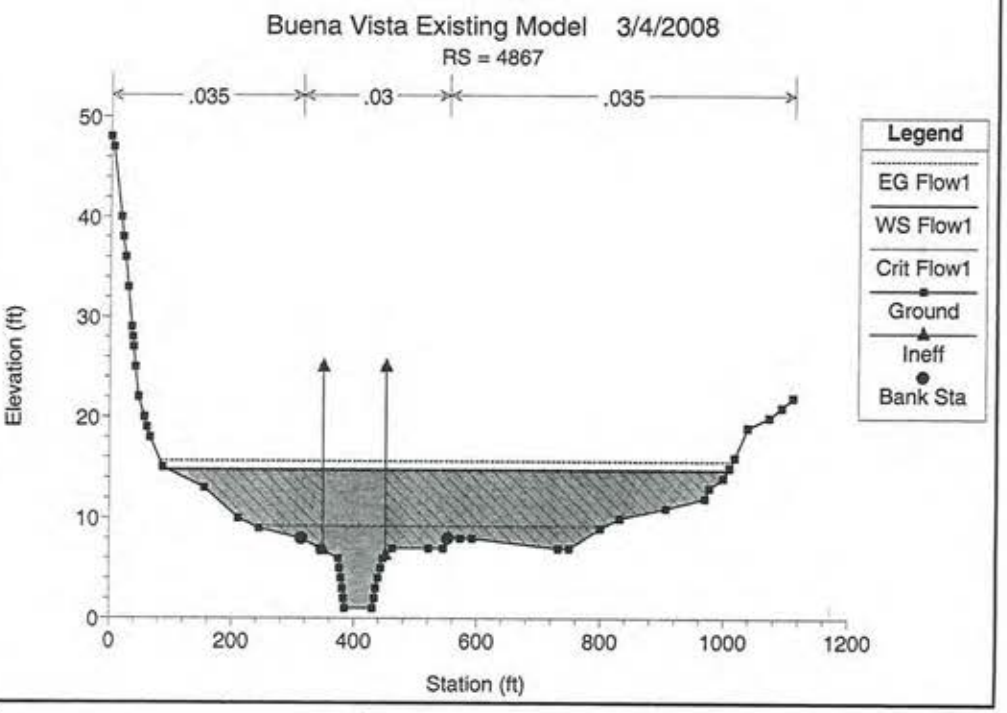

Buena Vista Existing Model 3/4/2008
RS = 5368
.03
.035
.035
Legend
EG Flow1
WS Flow1
Crit Flow1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

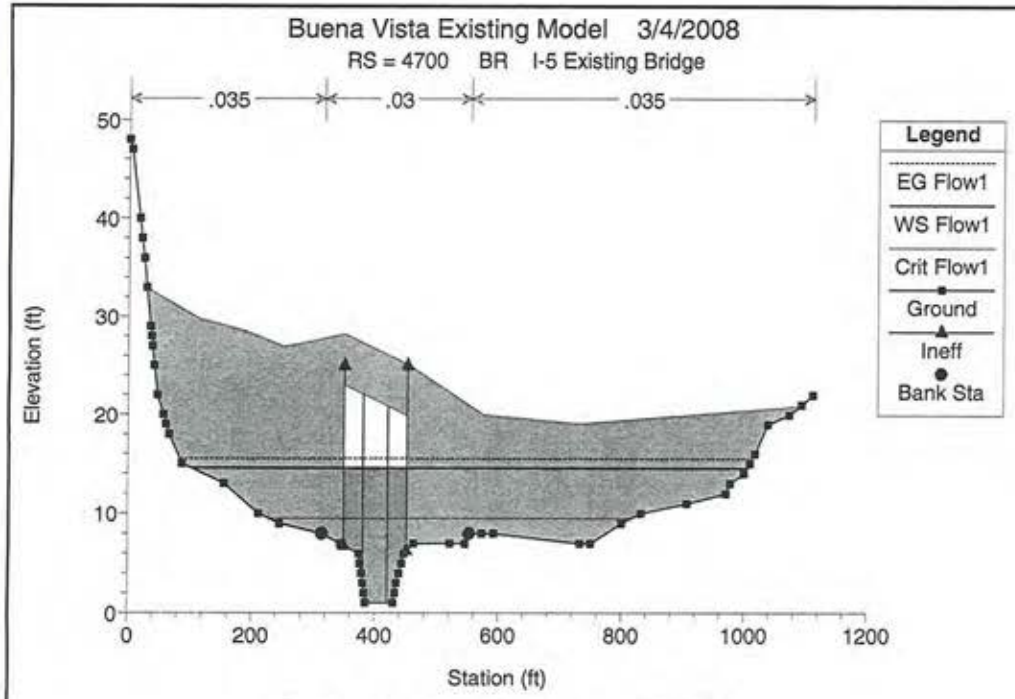

Buena Vista Existing Model 3/4/2008
RS = 5244
.035
.03
.035
Legend
EG Flow1
WS Flow1
Crit Flow1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

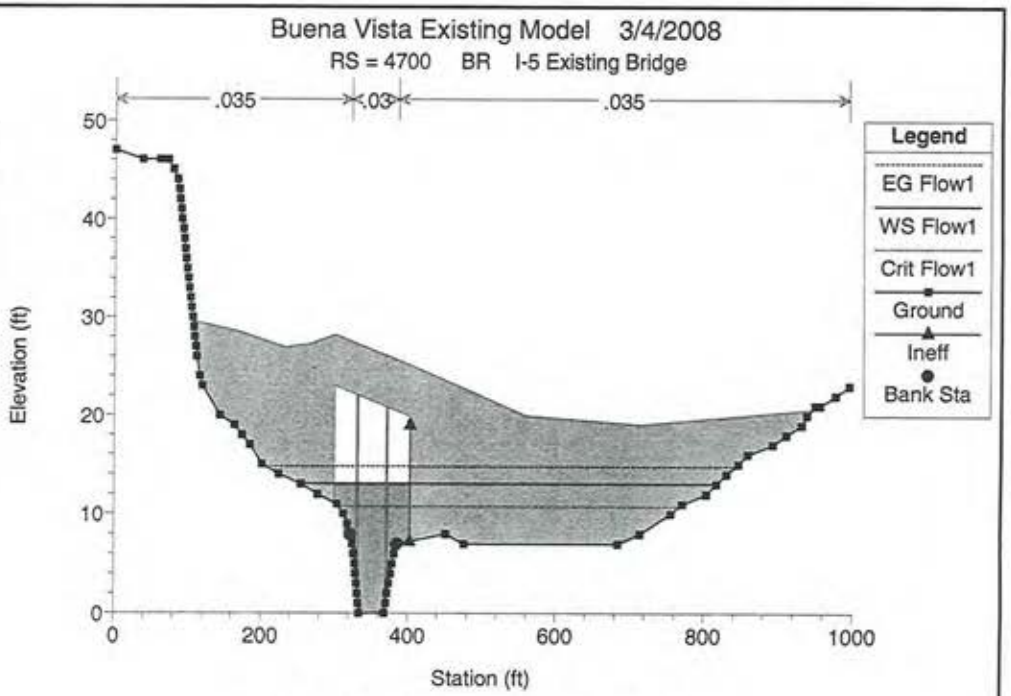

Buena Vista Existing Model 3/4/2008
RS = 5089
.035
.03
.035
Elevation (ft)
Station (ft)
Legend
EG Flow1
WS Flow1
Crit Flow1
Ground
Ineff
Bank Sta

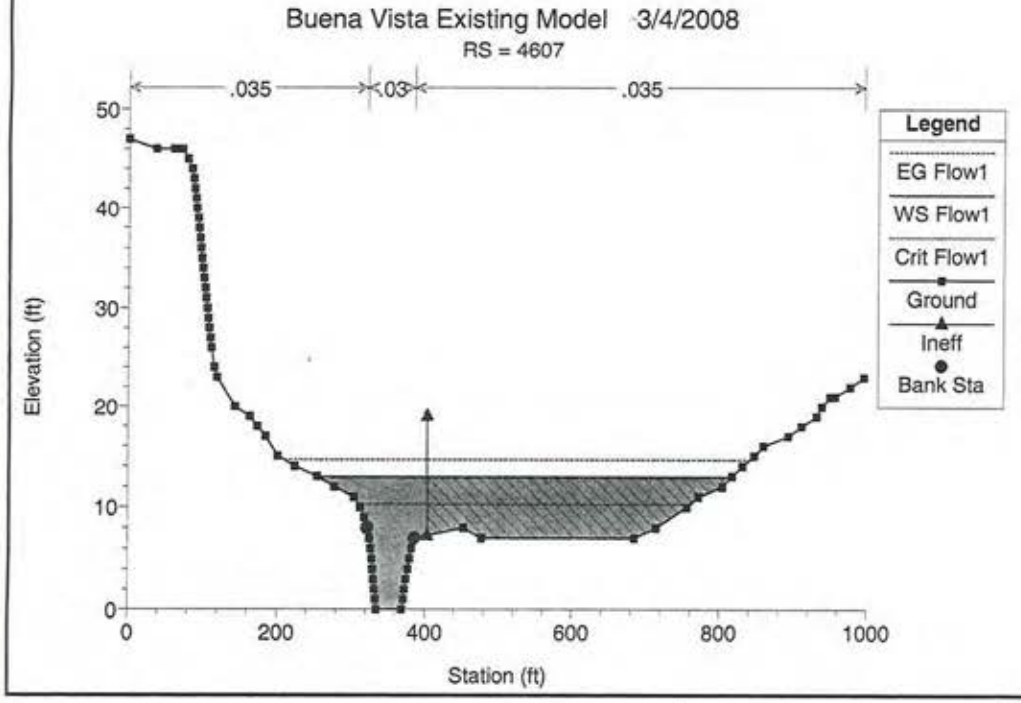

Buena Vista Existing Model 3/4/2008
RS = 4974
.035
.03
.035
Elevation (ft)
Station (ft)
Legend
EG Flow1
WS Flow1
Crit Flow1
Ground
Ineff
Bank Sta

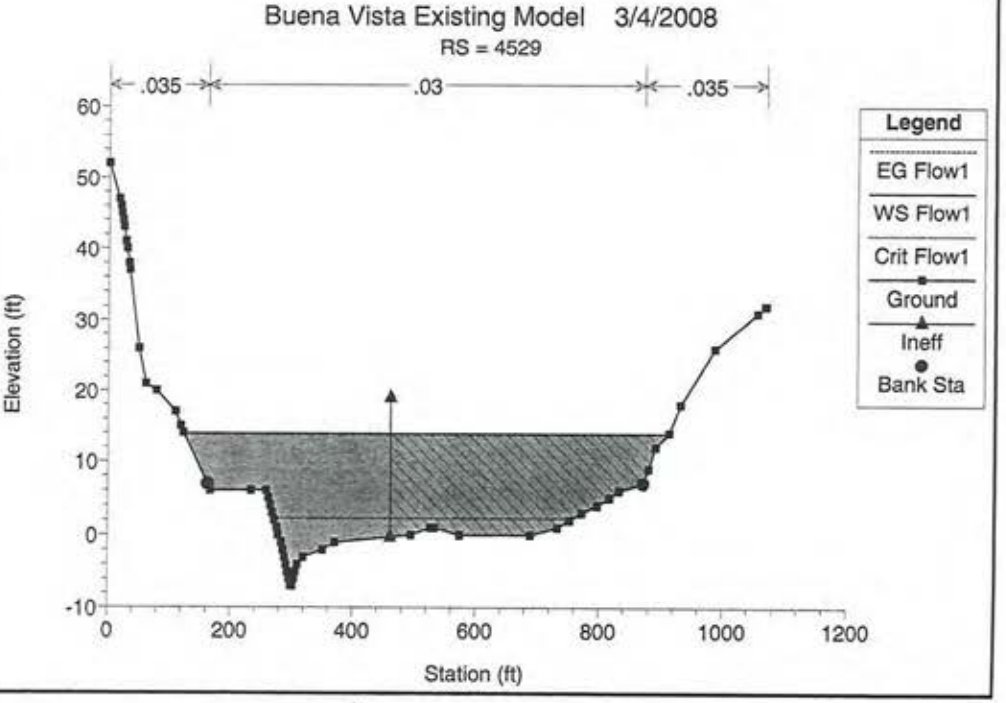

Buena Vista Existing Model 3/4/2008
RS = 4887
.035
.03
.035
Elevation (ft)
Station (ft)
Legend
EG Flow1
WS Flow1
Crit Flow1
Ground
Ineff
Bank Sta

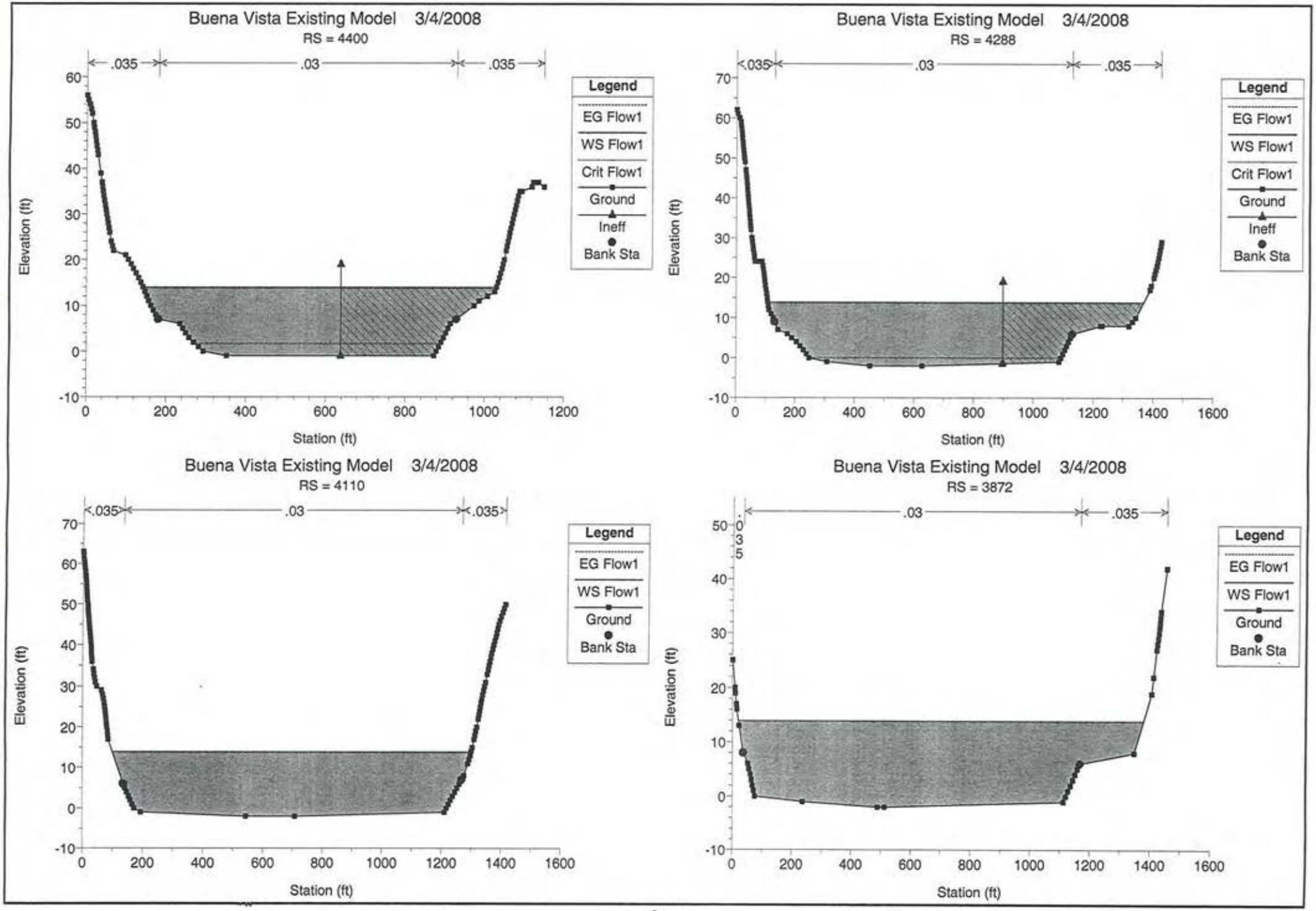

Buena Vista Existing Model 3/4/2008
RS = 4867
.035
.03
.035
Elevation (ft)
Station (ft)
Legend
EG Flow1
WS Flow1
Crit Flow1
Ground
Ineff
Bank Sta

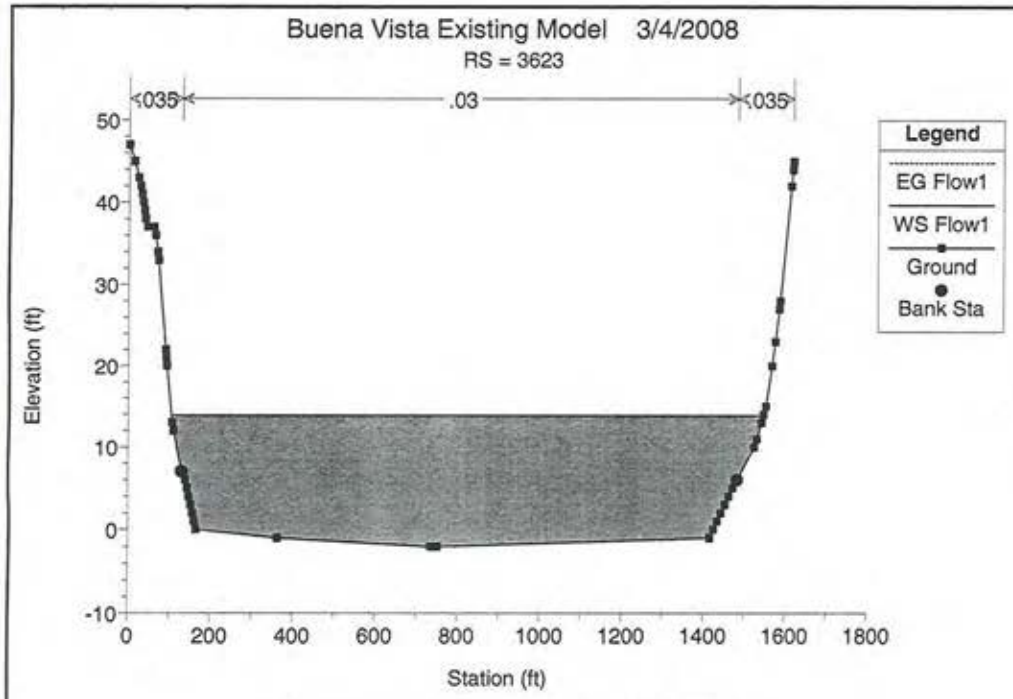

Buena Vista Existing Model 3/4/2008
RS = 4700 BR I-5 Existing Bridge
.035
.03
.035
Legend
EG Flow1
WS Flow1
Crit Flow1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

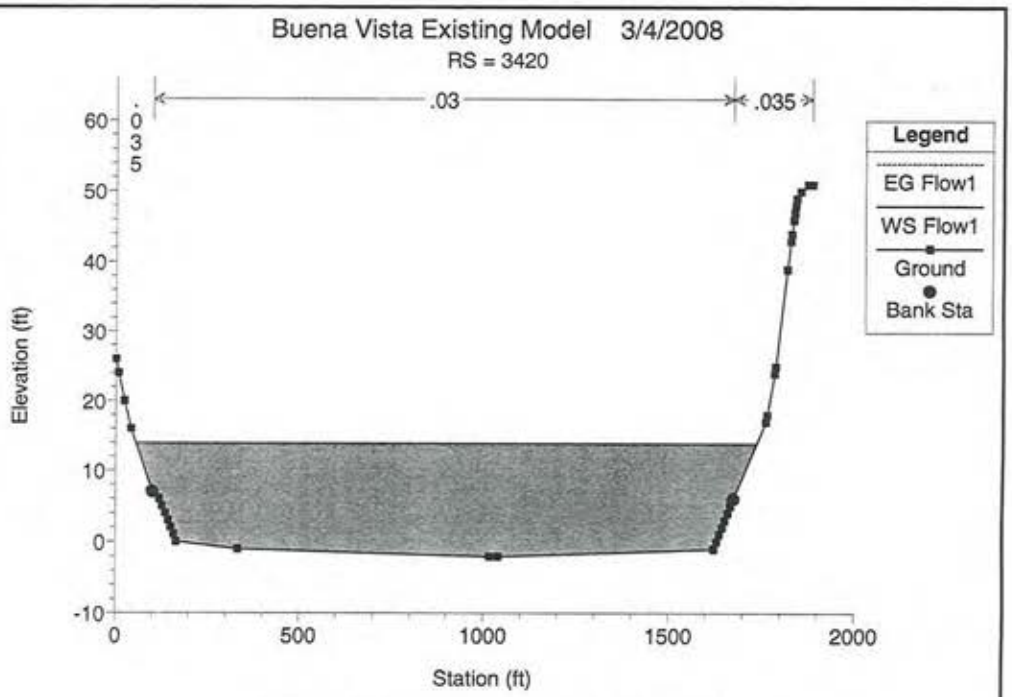

Buena Vista Existing Model 3/4/2008
RS = 4700 BR I-5 Existing Bridge
.035
.03
.035
Legend
EG Flow1
WS Flow1
Crit Flow1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

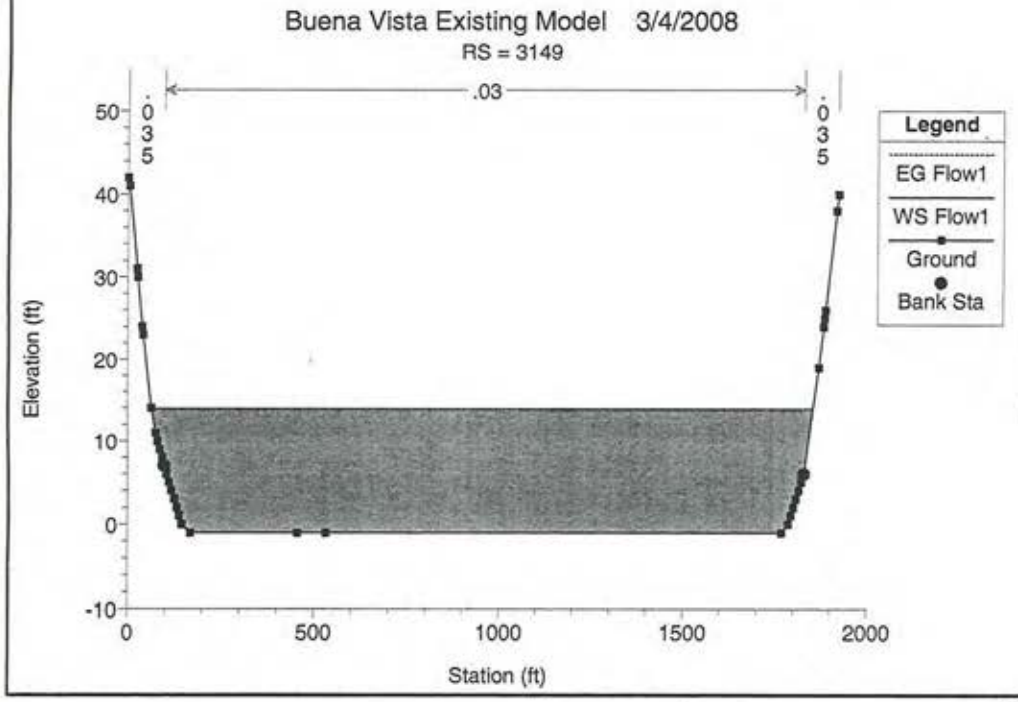

Buena Vista Existing Model 3/4/2008
RS = 4607
.035
.03
.035
Legend
EG Flow1
WS Flow1
Crit Flow1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

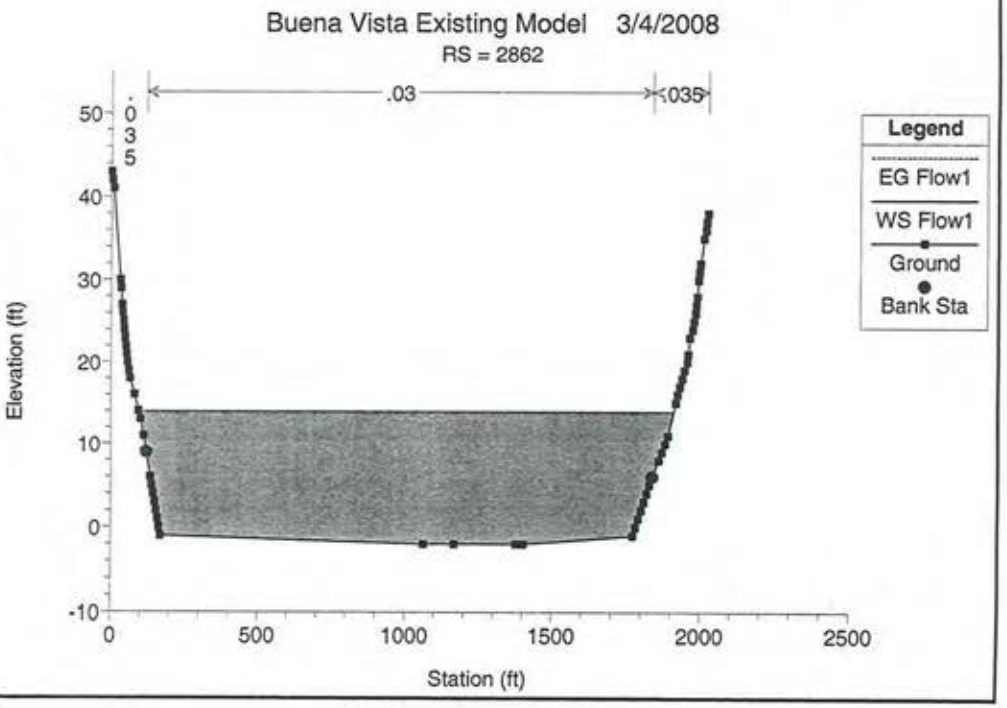

Buena Vista Existing Model 3/4/2008
RS = 4529
.035
.03
.035
Legend
EG Flow1
WS Flow1
Crit Flow1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

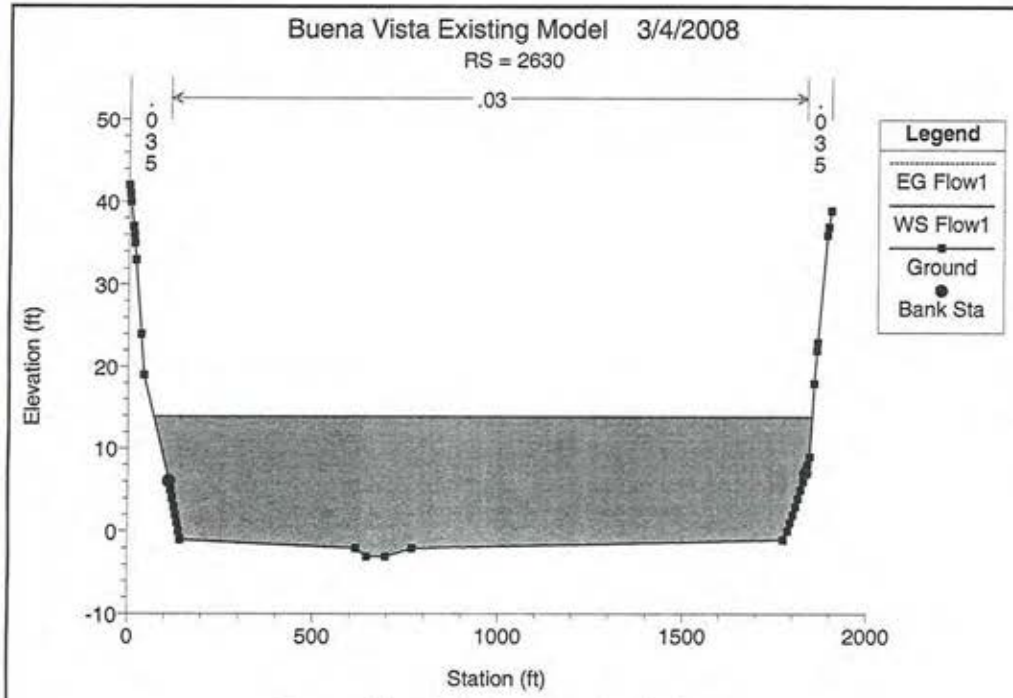

Buena Vista Existing Model 3/4/2008
RS = 4400
.035
.03
.035
Legend
EG Flow1
WS Flow1
Crit Flow1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Buena Vista Existing Model 3/4/2008
RS = 4288
.035
.03
.035
Legend
EG Flow1
WS Flow1
Crit Flow1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Buena Vista Existing Model 3/4/2008
RS = 4110
.035
.03
.035
Legend
EG Flow1
WS Flow1
Ground
Bank Sta
Elevation (ft)
Station (ft)
Buena Vista Existing Model 3/4/2008
RS = 3872
.03
.035
Legend
EG Flow1
WS Flow1
Ground
Bank Sta
Elevation (ft)
Station (ft)

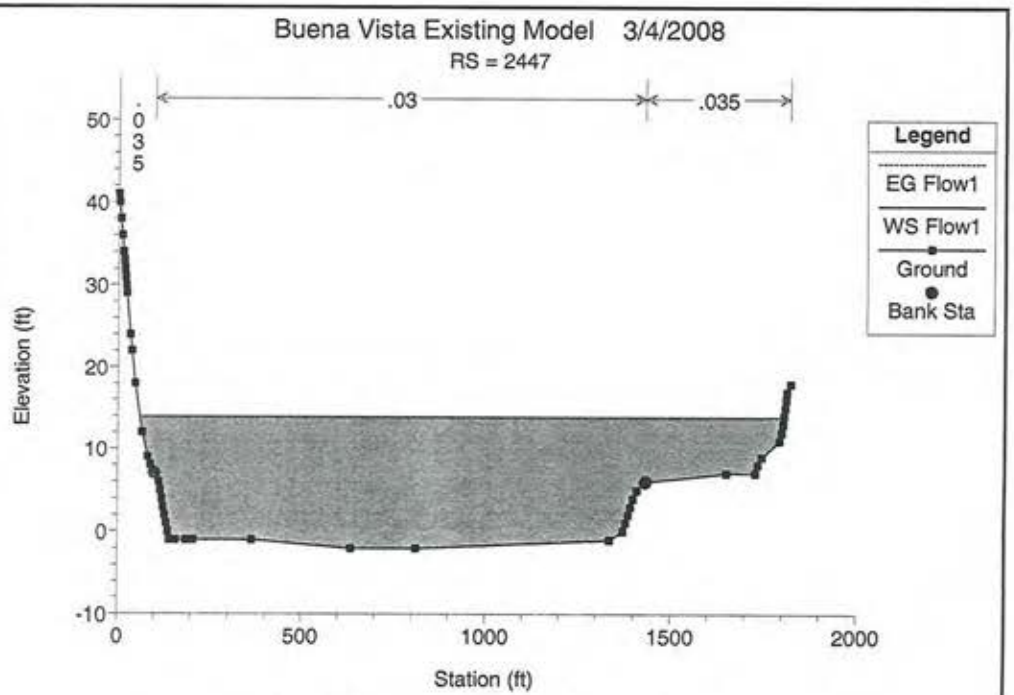

Buena Vista Existing Model 3/4/2008
RS = 3623
.035
.03
.035
Legend
EG Flow1
WS Flow1
Ground
Bank Sta
Elevation (ft)
Station (ft)

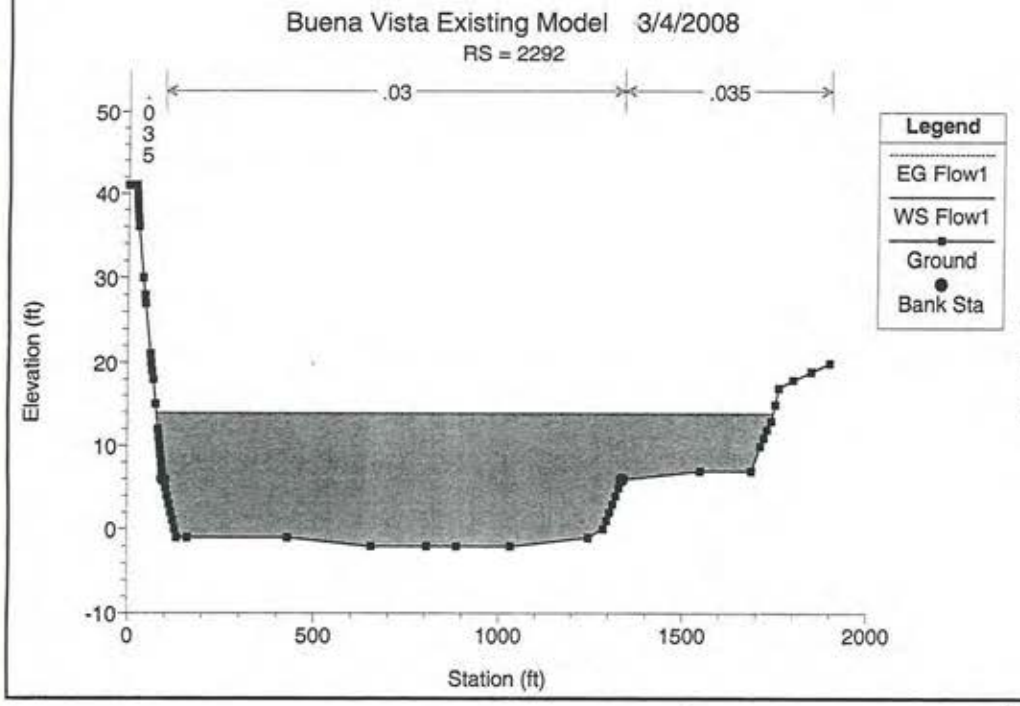

Buena Vista Existing Model 3/4/2008
RS = 3420
.035
.03
.035
Legend
EG Flow1
WS Flow1
Ground
Bank Sta
Elevation (ft)
Station (ft)

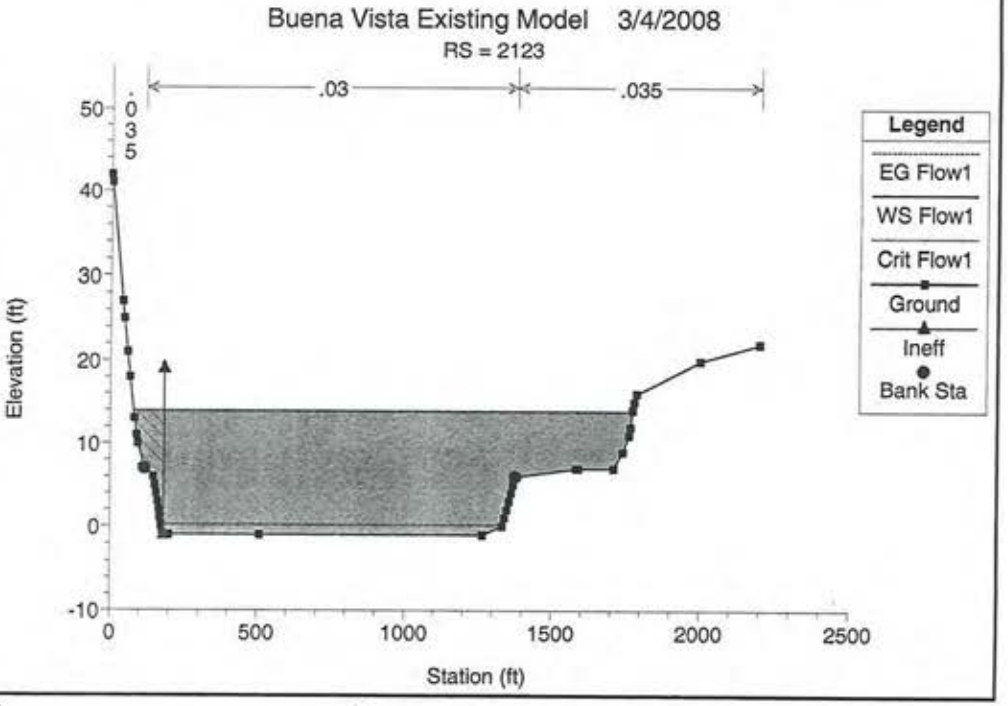

Buena Vista Existing Model 3/4/2008
RS = 3149
.035
.03
.035
Legend
EG Flow1
WS Flow1
Ground
Bank Sta
Elevation (ft)
Station (ft)


Buena Vista Existing Model 3/4/2008
RS = 2862
.035
.03
.035
Legend
EG Flow1
WS Flow1
Ground
Bank Sta
Elevation (ft)
Station (ft)

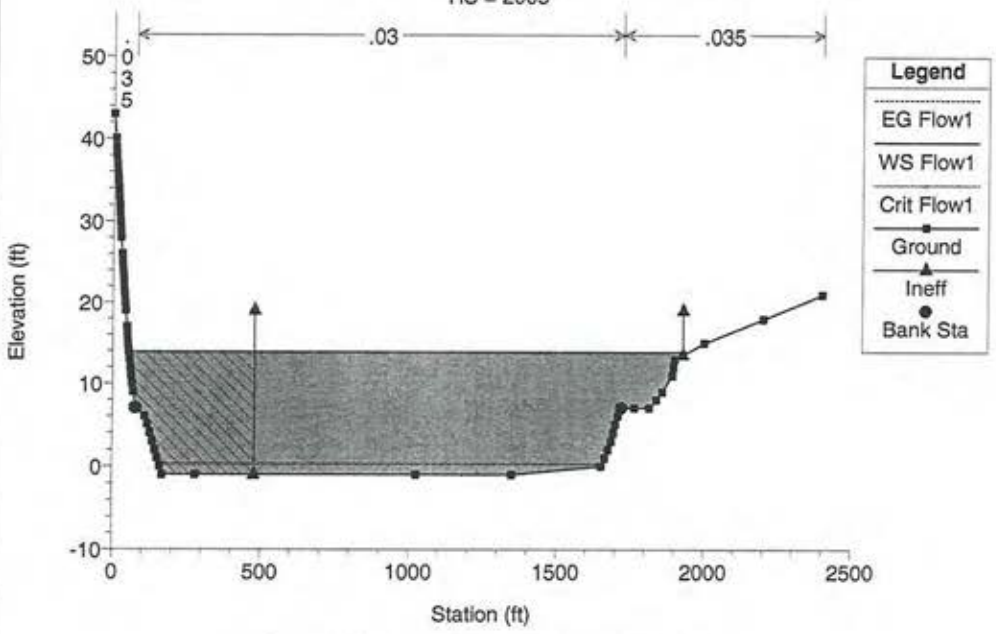

Buena Vista Existing Model 3/4/2008
RS = 2630
.035
.03
.035
Legend
EG Flow1
WS Flow1
Ground
Bank Sta
Elevation (ft)
Station (ft)
50
40
30
20
10
0
-10
0
500
1000
1500
2000


Buena Vista Existing Model 3/4/2008
RS = 2447
.035
.03
.035
Legend
EG Flow1
WS Flow1
Ground
Bank Sta
Elevation (ft)
Station (ft)
50
40
30
20
10
0
-10
0
500
1000
1500
2000

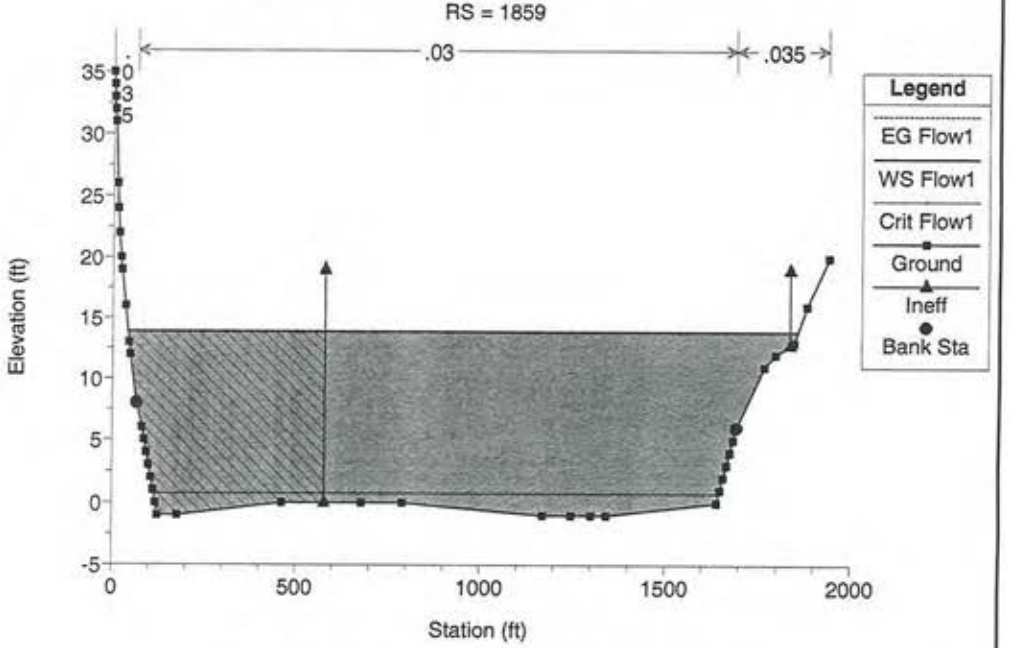

Buena Vista Existing Model 3/4/2008
RS = 2292
.035
.03
.035
Legend
EG Flow1
WS Flow1
Ground
Bank Sta
Elevation (ft)
Station (ft)
50
40
30
20
10
0
-10
0
500
1000
1500
2000


Buena Vista Existing Model 3/4/2008
RS = 2123
.035
.03
.035
Legend
EG Flow1
WS Flow1
Crit Flow1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
50
40
30
20
10
0
-10
0
500
1000
1500
2000
2500

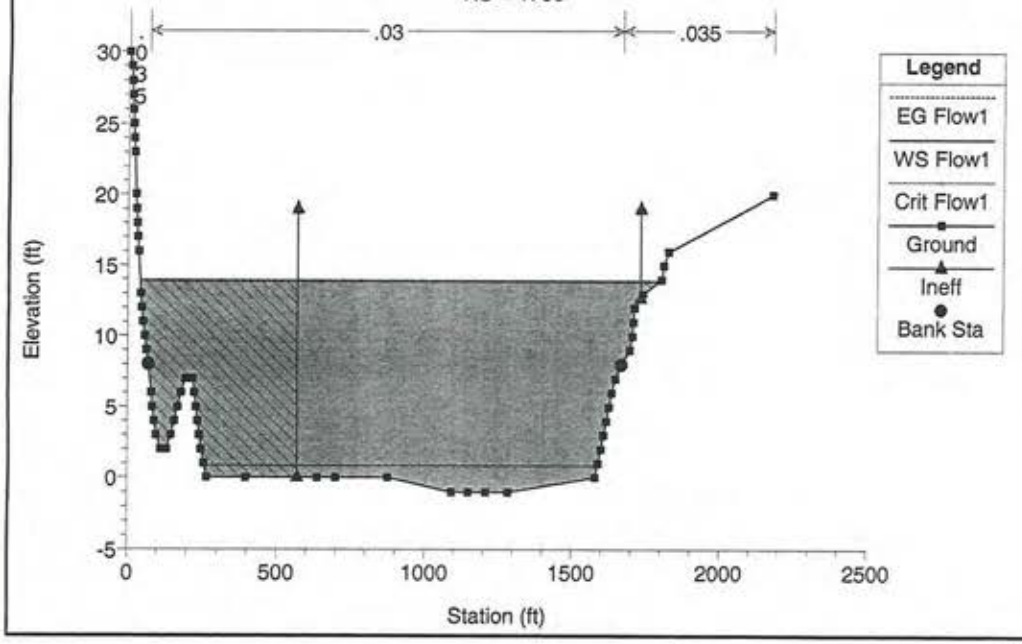
Buena Vista Existing Model 3/4/2008
RS = 2005



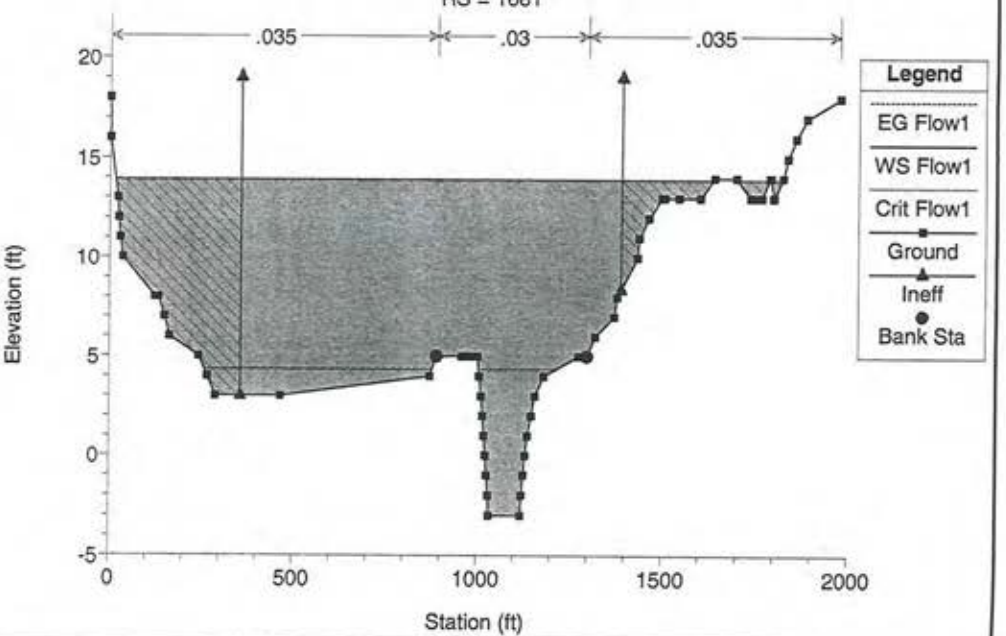
Buena Vista Existing Model 3/4/2008
RS = 1859

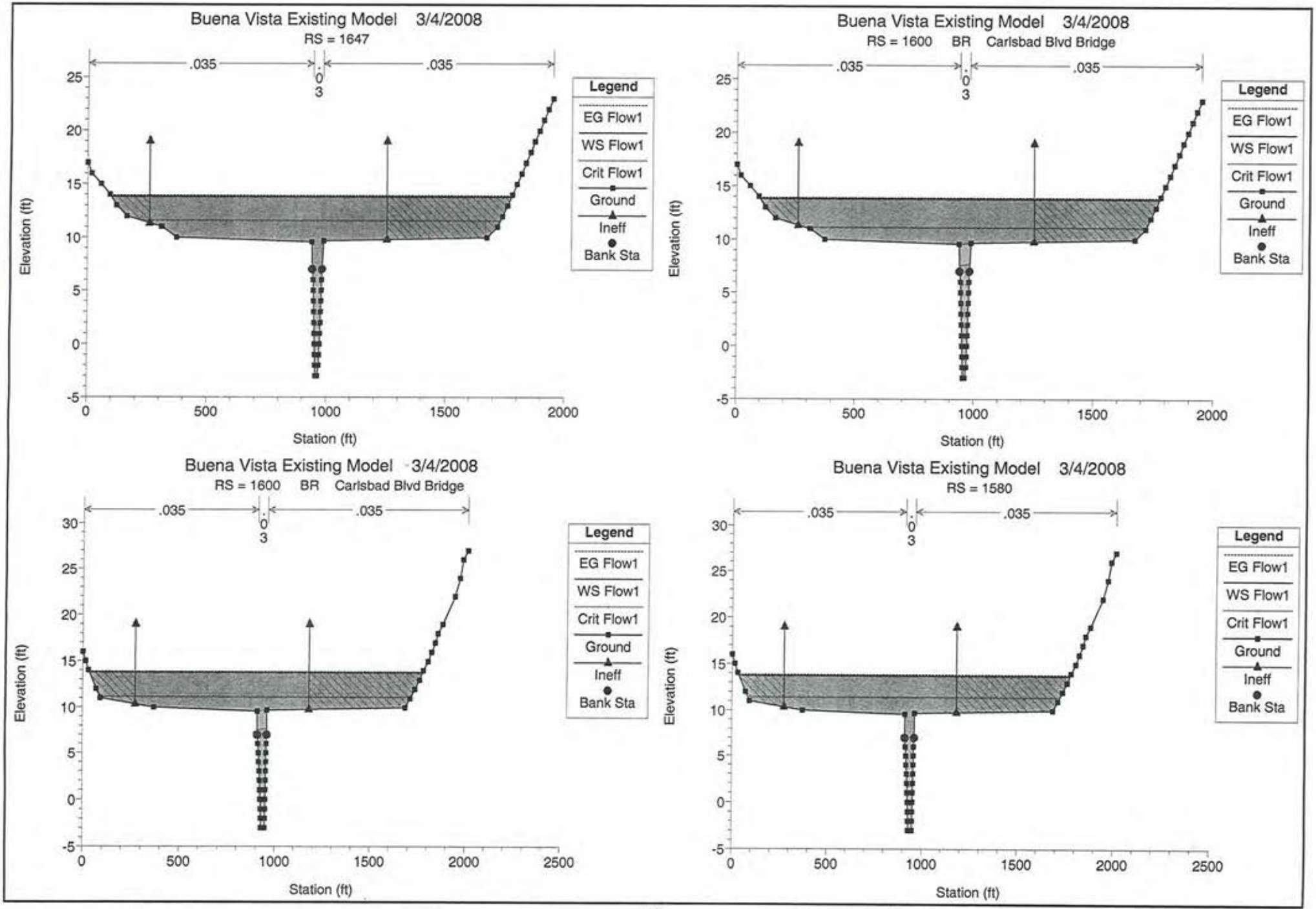


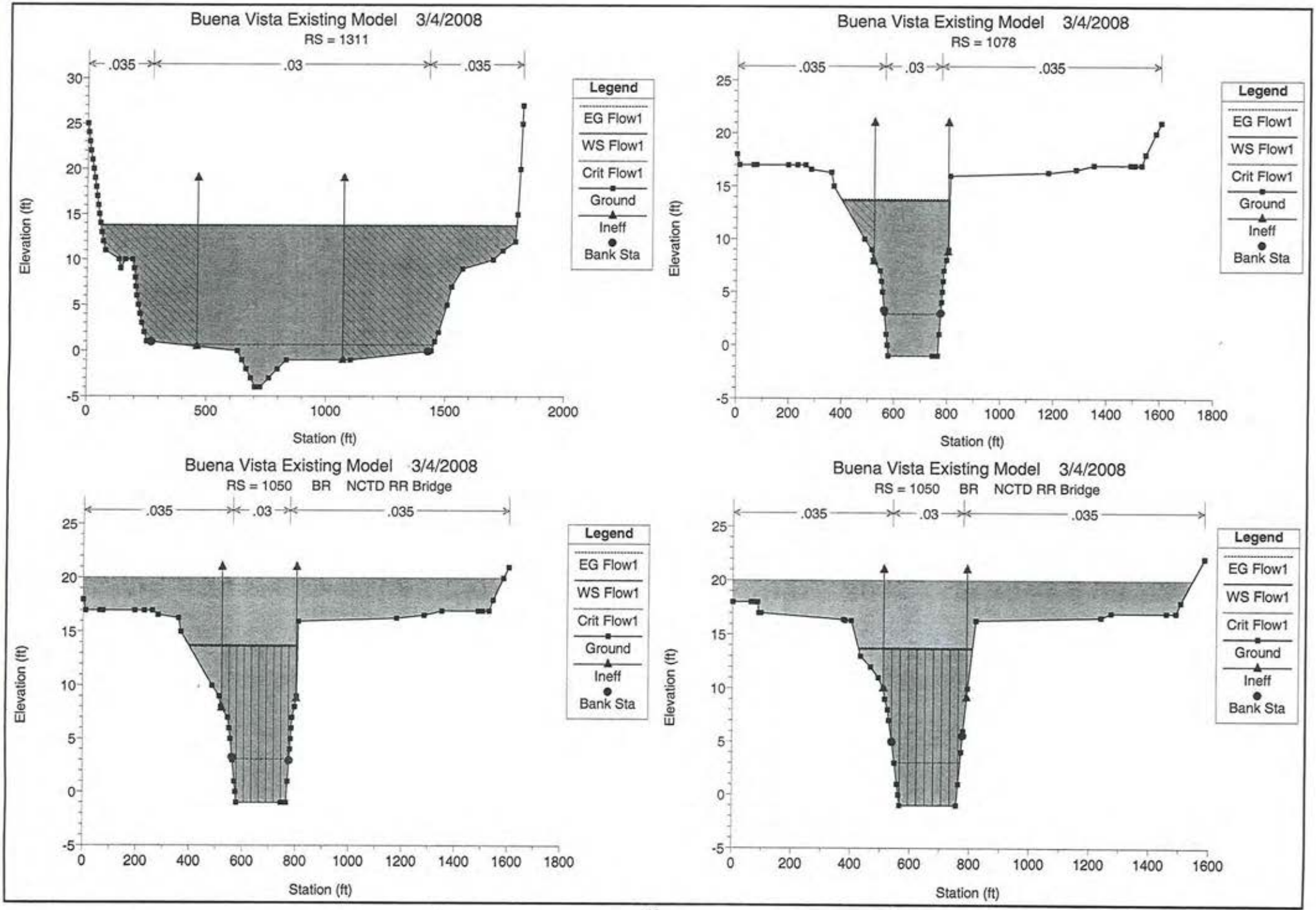
Buena Vista Existing Model 3/4/2008
RS = 1780

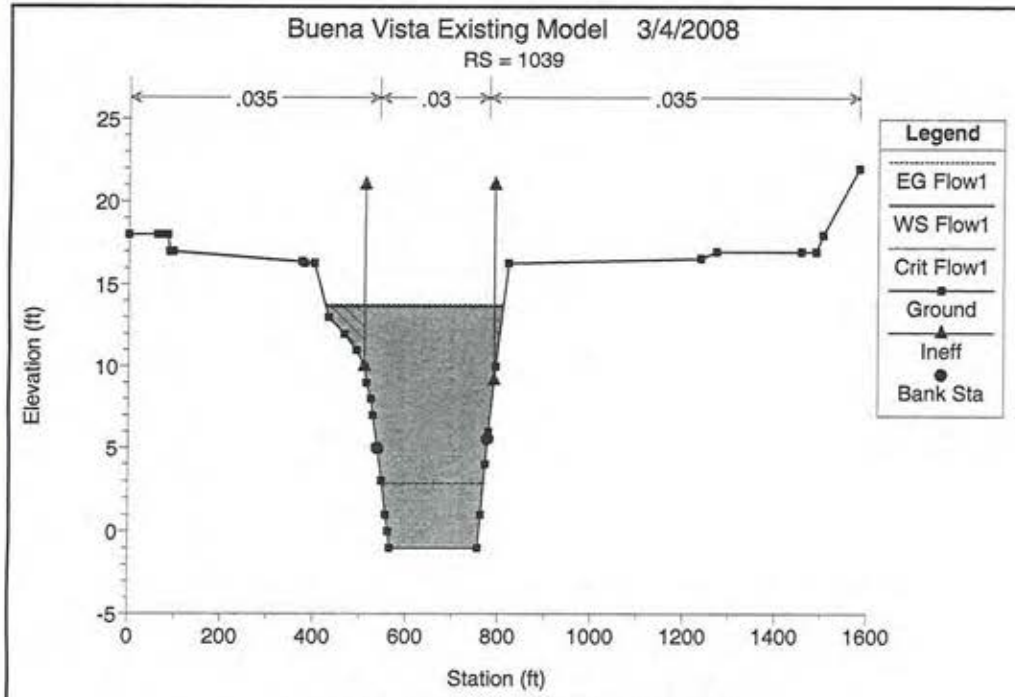


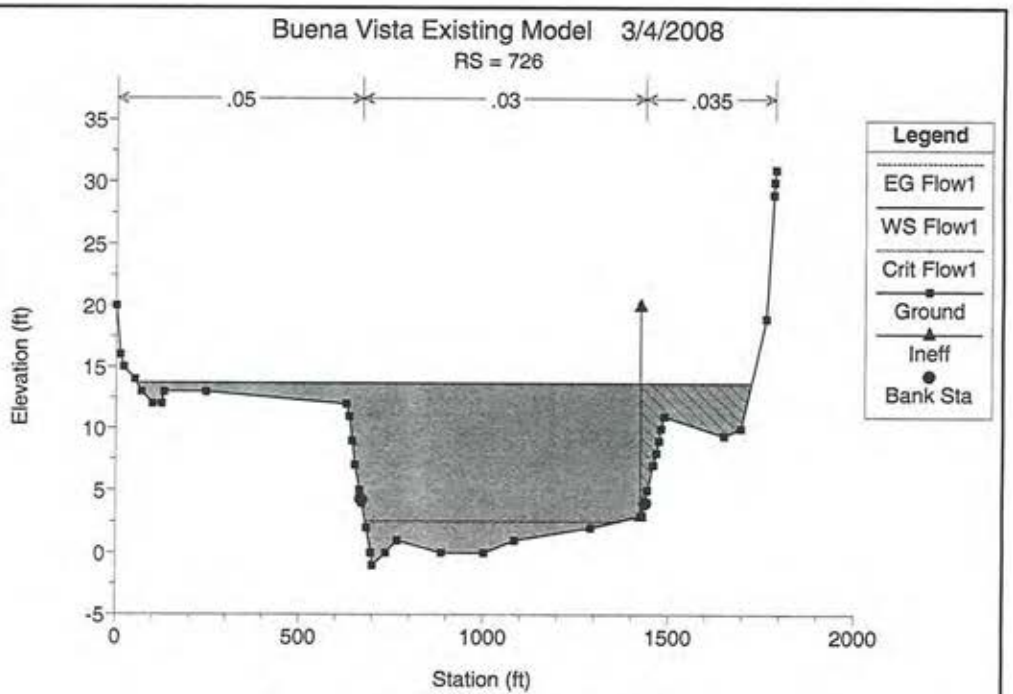
Buena Vista Existing Model 3/4/2008
RS = 1681

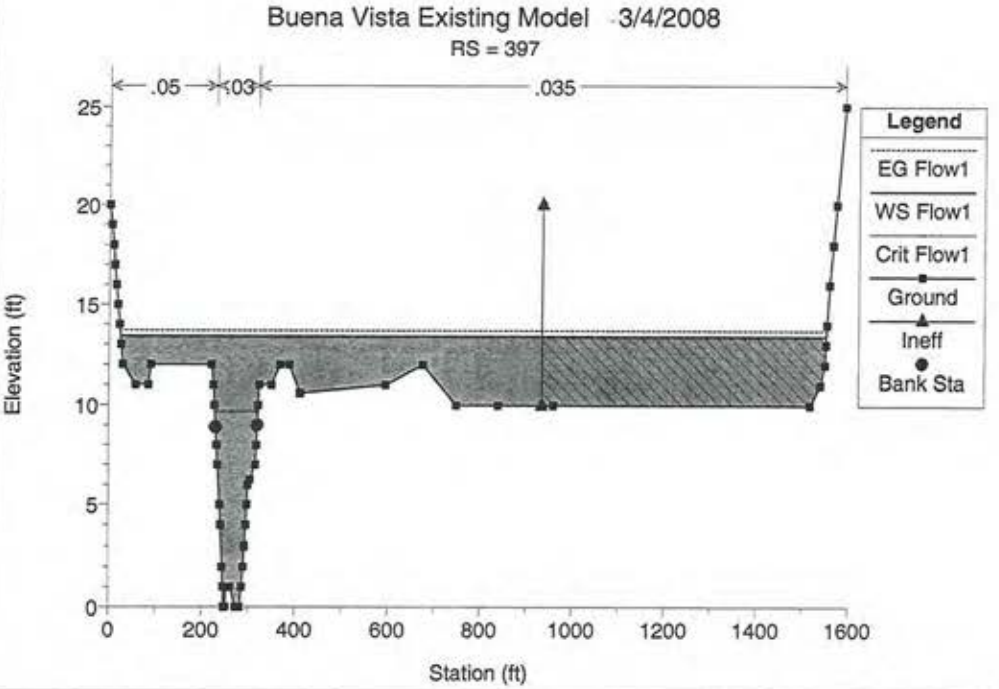


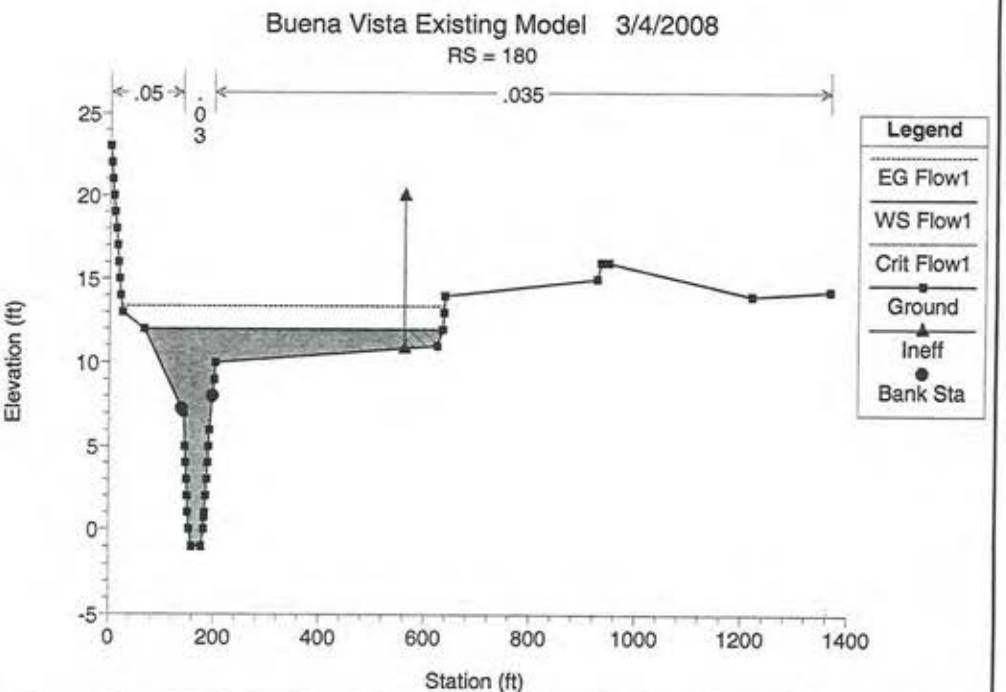

Buena Vista Existing Model 3/4/2008
RS = 1647
.035
.035
.03
Elevation (ft)
Station (ft)
Legend
EG Flow1
WS Flow1
Crit Flow1
Ground
Ineff
Bank Sta
Buena Vista Existing Model 3/4/2008
RS = 1600 BR Carlsbad Blvd Bridge
.035
.035
.03
Elevation (ft)
Station (ft)
Legend
EG Flow1
WS Flow1
Crit Flow1
Ground
Ineff
Bank Sta
Buena Vista Existing Model 3/4/2008
RS = 1600 BR Carlsbad Blvd Bridge
.035
.035
.03
Elevation (ft)
Station (ft)
Legend
EG Flow1
WS Flow1
Crit Flow1
Ground
Ineff
Bank Sta
Buena Vista Existing Model 3/4/2008
RS = 1580
.035
.035
.03
Elevation (ft)
Station (ft)
Legend
EG Flow1
WS Flow1
Crit Flow1
Ground
Ineff
Bank Sta

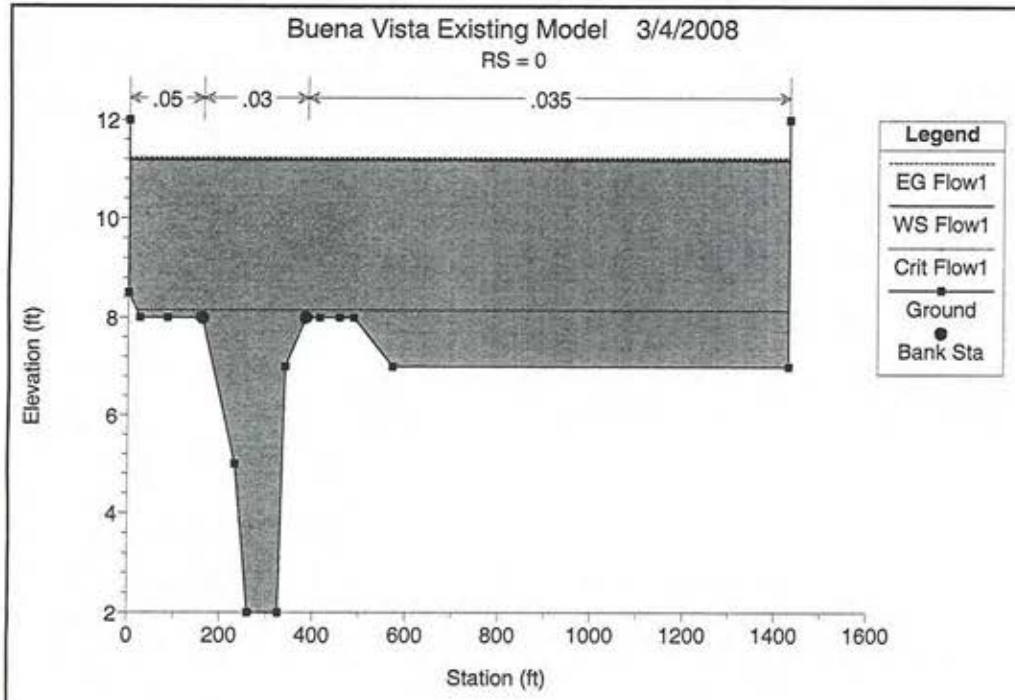

Buena Vista Existing Model 3/4/2008
RS = 1311
.035
.03
.035
Elevation (ft)
Station (ft)
Legend
EG Flow1
WS Flow1
Crit Flow1
Ground
Ineff
Bank Sta
Buena Vista Existing Model 3/4/2008
RS = 1078
.035
.03
.035
Elevation (ft)
Station (ft)
Legend
EG Flow1
WS Flow1
Crit Flow1
Ground
Ineff
Bank Sta
Buena Vista Existing Model 3/4/2008
RS = 1050 BR NCTD RR Bridge
.035
.03
.035
Elevation (ft)
Station (ft)
Legend
EG Flow1
WS Flow1
Crit Flow1
Ground
Ineff
Bank Sta
Buena Vista Existing Model 3/4/2008
RS = 1050 BR NCTD RR Bridge
.035
.03
.035
Elevation (ft)
Station (ft)
Legend
EG Flow1
WS Flow1
Crit Flow1
Ground
Ineff
Bank Sta


Buena Vista Existing Model 3/4/2008
RS = 1039
.035
.03
.035
Legend
EG Flow1
WS Flow1
Crit Flow1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


Buena Vista Existing Model 3/4/2008
RS = 726
.05
.03
.035
Legend
EG Flow1
WS Flow1
Crit Flow1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


Buena Vista Existing Model 3/4/2008
RS = 397
.05
.03
.035
Legend
EG Flow1
WS Flow1
Crit Flow1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


Buena Vista Existing Model 3/4/2008
RS = 180
.05
.035
Legend
EG Flow1
WS Flow1
Crit Flow1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


Buena Vista Existing Model 3/4/2008
RS = 0
.05
.03
.035
12
10
8
6
4
2
0
200
400
600
800
1000
1200
1400
1600
Elevation (ft)
Station (ft)
Legend
EG Flow1
WS Flow1
Crit Flow1
Ground
Bank Sta

Summary

The State Route 78 (SR 78)/Woodland Parkway interchange project, located within the City of San Marcos, is planned to improve traffic along SR 78 and on adjacent local roads. The project will accomplish the following: (1) reconfigure the on-ramps and off-ramps at SR 78, (2) realign Barham Drive, (3) enhance ramp intersections at Rancheros Drive and Barham Drive, and (4) expand the existing SR 78 bridge over Woodland Parkway.

The Area of Effect (AE) is a 33.83-acre area defined as the extent of the project footprint, all permanent and temporary impacts included. The 44-acre Biological Study Area (BSA) was created by buffering the limits of the project footprint by 20 feet. No buffer was added to the eastbound Barham Drive on-ramp since only the existing asphalt road surface will be reconfigured and no grading will be required. The BSA also includes the entire area of the eastbound Barham Drive on-ramp and all parcels proposed for City or Department ROW take outside of the actual project alignment. The majority of the BSA is developed and landscaped. Portions of the AE totaling 23.83 acres are within the current Department ROW. A total of 10 acres within the AE are within the current City ROW. There are two patches of Diegan coastal sage scrub within the BSA and one small patch of southern willow scrub. The remainder of the vegetation onsite is primarily nonnative grassland and nonnative woodland.

Two distinct patches of Diegan coastal sage scrub exist within the BSA. One patch (the more western-located patch) of coastal sage scrub is located between SR 78 and the eastbound off-ramp and totals 0.21 acre. This patch occurs within the current Department ROW. The other (more eastern-located patch) is southwest of the Barham Drive and Woodland Parkway intersection and totals 0.73 acre. This patch occurs within the current City ROW. All of the smaller patch within the Department ROW will be permanently impacted by the project design. Portions of the larger patch of coastal sage scrub within the City ROW will be permanently impacted (0.47 acre) by the project design. Permanent impacts to coastal sage scrub within the Department ROW will not require compensatory mitigation because the patch size is of low quality with very sparse cover and is located adjacent to the traveled way. No special status species are supported by this patch of habitat onsite. Permanent impacts to Diegan coastal sage scrub within the City ROW will require compensatory mitigation at a 1:1 to 2:1 ratio (pending finalization of the City of San Marcos Draft

BV_Exist.rep

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
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PROJECT DATA
Project Title: BuenaVista_Existing
Project File : BV_Exist.prj
Run Date and Time: 3/4/2008 11:02:42 AM

Project in English units

Project Description:
Existing Buena Vista

PLAN DATA

Plan Title: Buena Vista Existing Model
Plan File : p:\1683_TO64_I5_Floodplain\420_Env_ Stud\Buena Vista\HEC-RAS\Final\Existing\BV_Exist.p02

Geometry Title: Buena Vista Existing Geometry
Geometry File : p:\1683_TO64_I5_Floodplain\420_Env_ Stud\Buena Vista\HEC-RAS\Final\Existing\BV_Exist.g02

Flow Title : 100-yr Storm
Flow File : p:\1683_TO64_I5_Floodplain\420_Env_ Stud\Buena Vista\HEC-RAS\Final\Existing\BV_Exist.f02

Plan Summary Information:

Number of:	Cross Sections	= 51	Multiple Openings	=	0
	Culverts	= 0	Inline Structures	=	0
	Bridges	= 3	Lateral Structures	=	0

Computational Information

Water surface calculation tolerance	= 0.01
Critical depth calculation tolerance	= 0.01
Maximum number of iterations	= 40
Maximum difference tolerance	= 0.3
Flow tolerance factor	= 0.001

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

FLOW DATA

Flow Title: 100-yr Storm
Flow File : p:\1683_TO64_I5_Floodplain\420_Env_ Stud\Buena Vista\HEC-RAS\Final\Existing\BV_Exist.f02

Flow Data (cfs)

River	Reach	RS	Flow1
Existing	Buena Vista	7947	8500

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
Existing	Buena Vista	Flow1	Known WS = 17.188	Known WS = 11.19

GEOMETRY DATA

Geometry Title: Buena Vista Existing Geometry
Geometry File : p:\1683_TO64_I5_Floodplain\420_Env_ Stud\Buena Vista\HEC-RAS\Final\Existing\BV_Exist.g02

CROSS SECTION

RIVER: Existing
REACH: Buena Vista RS: 7947

INPUT
Description:
Station Elevation Data num= 78

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	20	1	9	24.85	10	70.08	12	85.21	13
109.78	15	137.27	16	142.57	16	194.05	16	201.77	16
236.6	13	289.94	13	342.74	14	371.41	15	396.96	15
424.56	10	429.64	9	446.16	8	467.51	6	471.45	5
474.99	4	478.64	3	490.23	3	496.2	4	517.04	4
528.44	3	536.76	2	542.78	1	549.18	0	685.34	0
735.27	1	743.19	2	751.09	3	759.04	4	766.94	5
775.85	6	788.31	9	791.01	10	840.27	11	863.41	13
876.15	19	878.4	20	880.3	21	882.36	22	884.9	23
887.94	24	914.96	24	933.26	23	934.96	22	937.8	20
939.53	19	942.51	17	945.84	15	947.44	14	949.45	13
953.37	12	958.47	11	1048.43	11	1075.9	12	1106.08	25
1108.17	26	1110.24	27	1112.51	28	1114.86	29	1117.3	30
1119.75	31	1123.15	32	1144.45	33	1167.72	34	1173.22	32
1175.25	31	1177.69	30	1179.7	29	1182.05	28	1184.41	27
1186.58	26	1188.85	25	1191.03	24				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	424.56	.03	791.01	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
424.56	791.01	122.19	82.58 146.76	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	396	25	F
801	1191.03	25	F

CROSS SECTION OUTPUT Profile #Flow1

E.G. Elev (ft)	15.79	Element	Left OB	Channel Right OB
Vel Head (ft)	0.05	Wt. n-Val.	0.035	0.030 0.035
W.S. Elev (ft)	15.75	Reach Len. (ft)	122.19	82.58 146.76
Crit W.S. (ft)	4.12	Flow Area (sq ft)	90.33	4881.93 56.40
E.G. Slope (ft/ft)	0.000038	Area (sq ft)	918.89	4881.93 954.54
Q Total (cfs)	8500.00	Flow (cfs)	50.73	8402.18 47.09
Top Width (ft)	934.46	Top Width (ft)	349.78	366.45 218.23
Vel Total (ft/s)	1.69	Avg. Vel. (ft/s)	0.56	1.72 0.83
Max Chl Dpth (ft)	15.75	Hydr. Depth (ft)	3.16	13.32 5.65
Conv. Total (cfs)	1370178.0	Conv. (cfs)	8178.0	1354410.0 7590.6
Length Wtd. (ft)	83.08	Wetted Per. (ft)	29.01	368.27 9.99
Min Ch El (ft)	0.00	Shear (lb/sq ft)	0.01	0.03 0.01
Alpha	1.03	Stream Power (lb/ft s)	0.00	0.05 0.01
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	172.42	2652.21 263.22
C & E Loss (ft)	0.01	Cum SA (acres)	35.01	187.70 56.59

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

CROSS SECTION

RIVER: Existing
REACH: Buena Vista RS: 7865

INPUT

Description:

Station Elevation Data num= 74

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	20	1	16	35.81	14	46.01	13	53.71	12
124.82	9	124.83	9	184.89	11	194	12	204.74	13
237.9	15	247.96	15	312.38	15	312.56	15	321.65	14
321.7	14	341.11	13	444.91	13	448.22	13	451.72	12
454.71	11	483.82	6	491.79	5	500.37	4	509.65	3
520.5	2	533.23	1	545.83	0	606.96	-1	623.2	-2
768.99	-2	811.33	-1	850.09	0	857.6	1	864.8	2
872.13	3	879.44	4	886.76	5	895.22	6	904.44	7
909.18	8	920.18	9	997.08	10	1029.74	11	1032.09	12
1034.05	13	1036.66	14	1039.07	15	1043.98	17	1092.2	20
1094.45	20	1099.32	17	1103.13	15	1105.38	14	1107.81	13
1110.41	12	1113.83	11	1117.92	10	1237.92	10	1259.92	11
1263.05	12	1282.77	21	1289.96	24	1303.32	25	1312.76	26
1320.73	27	1324.28	27	1327.58	24	1328.5	23	1329.34	22
1330.2	21	1331.81	21	1334.82	22	1349.75	23		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	448.22	.03	920.18	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
448.22	920.18	190.68	168.96 242.49	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	351	25	F
920	1349.75	25	F

CROSS SECTION OUTPUT Profile #Flow1

E.G. Elev (ft)	15.78	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.02	Wt. n-Val.	0.035	0.030
W.S. Elev (ft)	15.76	Reach Len. (ft)	190.68	168.96
242.49				
Crit W.S. (ft)	1.50	Flow Area (sq ft)	268.48	7047.06
E.G. Slope (ft/ft)	0.000016	Area (sq ft)	1335.80	7048.28
1568.86				
Q Total (cfs)	8500.00	Flow (cfs)	89.35	8410.65
Top Width (ft)	1205.40	Top Width (ft)	443.07	471.96
290.37				
Vel Total (ft/s)	1.16	Avg. Vel. (ft/s)	0.33	1.19
Max Chl Dpth (ft)	17.76	Hydr. Depth (ft)	2.76	14.94
Conv. Total (cfs)	2134419.0	Conv. (cfs)	22435.5	2111984.0
Length Wtd. (ft)	171.47	Wetted Per. (ft)	97.22	473.47
Min Ch El (ft)	-2.00	Shear (lb/sq ft)	0.00	0.01
Alpha	1.04	Stream Power (lb/ft s)	0.00	0.02
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	169.26	2640.90
258.97				
C & E Loss (ft)	0.00	Cum SA (acres)	33.90	186.90
55.73				

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

CROSS SECTION

RIVER: Existing
REACH: Buena Vista RS: 7697

INPUT
Description:
Station Elevation Data num= 71

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	31	73.54	28	102.74	27	110.82	25	115.42	24
131.39	22	142.88	21	158.21	20	167.96	19	199.21	17
241.66	14	371.39	12	377.89	11	385.11	10	401.52	9
401.53	9	412.53	8	421.48	7	425.58	6	427.73	5
431.14	4	436.52	3	441.28	2	450.97	1	585.92	0
608.49	-1	624.64	-2	656.92	-3	694.94	-4	786.86	-4
802.47	-3	818.29	-2	838.79	-1	913.4	0	972.84	1
980.3	2	987.86	3	995.34	4	1003.02	5	1011.85	6
1020.92	7	1020.93	7	1029.02	8	1029.03	8	1063.43	9
1245.49	10	1248.39	11	1251.19	12	1254.1	13	1257.11	14
1261.92	15	1262.31	15	1281.39	15	1312.53	15	1314.18	14
1316.36	13	1317.81	12	1319.41	11	1414.42	11	1416.7	12
1419.02	13	1421.29	14	1423.55	15	1425.81	16	1430.3	18
1432.52	19	1437.22	21	1451.94	22	1472.75	23	1492.61	24
1522.09	25								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	412.53	.03	1029.02	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
412.53	1029.02	163.29	213.8 270.78	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
1261.92	1522.09	25	F

CROSS SECTION OUTPUT Profile #Flow1

E.G. Elev (ft)	15.78	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.01	Wt. n-Val.	0.035	0.030
0.035				
W.S. Elev (ft)	15.77	Reach Len. (ft)	163.29	213.80
270.78				
Crit W.S. (ft)	0.56	Flow Area (sq ft)	630.05	9978.12
1441.14				
E.G. Slope (ft/ft)	0.000006	Area (sq ft)	630.05	9978.12
1977.77				
Q Total (cfs)	8500.00	Flow (cfs)	144.64	7844.20
511.15				

Top Width (ft)	1208.66	Top Width (ft)	195.90	616.49 396.27
Vel Total (ft/s)	0.71	Avg. Vel. (ft/s)	0.23	0.79 0.35
Max Chl Dpth (ft)	19.77	Hydr. Depth (ft)	3.22	16.19 6.19
Conv. Total (cfs)	3421457.0	Conv. (cfs)	58221.8	3157484.0 205752.0
Length Wtd. (ft)	217.01	Wetted Per. (ft)	196.20	617.90 233.69
Min Ch El (ft)	-4.00	Shear (lb/sq ft)	0.00	0.01 0.00
Alpha	1.16	Stream Power (lb/ft s)	0.00	0.00 0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	164.95	2607.88 249.10
C & E Loss (ft)	0.00	Cum SA (acres)	32.50	184.79 53.82

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

CROSS SECTION

RIVER: Existing
REACH: Buena Vista RS: 7483

INPUT
Description:
Station Elevation Data num= 94

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	31	11.01	29	24.34	28	47.61	28	102.53	26
114.05	25	122.6	24	149.71	22	158.17	21	168.85	20
201.29	18	245.95	17	253.18	16	276.44	12	285.32	11
285.48	11	339.45	11	344.87	10	350.17	9	356.06	8
360.16	7	370.04	6	380.46	5	390.25	4	400.43	3
410.77	2	420.85	1	526.93	1	532.5	2	549.13	5
577.25	9	601.05	11	608.94	12	661.19	12	697.74	11
700	10	705.76	8	709.94	7	718.14	6	733.93	3
738.53	2	743.05	1	850.42	1	856.27	2	862.45	3
868.44	4	874.44	5	893	7	901.62	8	911.68	9
919.67	10	929.94	11	935.02	11	952.01	10	958.8	10
963.8	11	968.34	11	971.1	10	973.83	9	977.08	8
987.1	6	991.18	5	998.76	3	1002.61	2	1006.7	1
1097.16	1	1103.4	2	1109.65	3	1115.84	4	1122.05	5
1128.06	6	1141.66	7	1155.31	8	1201.62	9	1364.24	10
1367.19	11	1370.1	12	1373.95	13	1419.5	13	1430.4	12
1437.6	12	1441.19	13	1446.51	13	1499.74	13	1511.46	15
1515.59	16	1518.63	17	1521.58	18	1524.64	19	1530.5	21
1536.4	23	1538.73	24	1556.49	25	1579.33	26		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	356.06	.03	1155.31	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
356.06	1155.31	123.8	201.79 281.54	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
1373.95	1579.33	25	F

CROSS SECTION OUTPUT Profile #Flow1

E.G. Elev (ft)	15.78	Element	Left OB	Channel Right OB
Vel Head (ft)	0.01	Wt. n-Val.	0.035	0.030 0.035
W.S. Elev (ft)	15.76	Reach Len. (ft)	123.80	201.79 281.54
Crit W.S. (ft)	3.73	Flow Area (sq ft)	441.54	8692.55 1395.75
E.G. Slope (ft/ft)	0.000013	Area (sq ft)	441.54	8692.55 1779.88
Q Total (cfs)	8500.00	Flow (cfs)	179.29	7586.70 734.01
Top Width (ft)	1260.07	Top Width (ft)	101.51	799.25 359.31
Vel Total (ft/s)	0.81	Avg. Vel. (ft/s)	0.41	0.87 0.53
Max Chl Dpth (ft)	14.76	Hydr. Depth (ft)	4.35	10.88 6.38
Conv. Total (cfs)	2358011.0	Conv. (cfs)	49738.2	2104650.0 203622.9
Length Wtd. (ft)	206.19	Wetted Per. (ft)	102.16	804.28 219.11
Min Ch El (ft)	1.00	Shear (lb/sq ft)	0.00	0.01 0.01
Alpha	1.09	Stream Power (lb/ft s)	0.00	0.01 0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	162.94	2562.06 237.42
C & E Loss (ft)	0.00	Cum SA (acres)	31.94	181.32 51.47

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

CROSS SECTION

RIVER: Existing
REACH: Buena Vista RS: 7282

INPUT
Description:
Station Elevation Data num= 94

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	36	4.46	35	8.45	34	25.32	30	48.76	25
54.88	24	63.89	23	73.3	22	84.56	21	122.67	19
135.08	18	149.83	17	165.1	16	170.18	16	171.73	16
186.99	15	233.71	13	293.94	11	303.64	10	314.11	9
323.05	8	331.28	7	339.83	6	348.98	5	357.49	4
365.52	3	373.53	2	381.53	1	516.9	1	516.91	1
522.81	2	528.1	3	532.9	4	538.08	5	543.09	6

556.1	8	570.17	9	587.74	10	606.4	11	637.92	11
647.97	10	670.38	9	721.05	8	749.68	7	750.93	7
762.06	7	767.82	6	773.02	5	778.4	4	783.88	3
789.03	2	794.08	1	914.89	3	919.19	4	923.52	5
927.84	6	941.84	9	946.4	10	966.34	11	971.68	12
984.9	12	992.77	11	1016.02	9	1021.85	9	1027.53	10
1036.81	10	1040.12	9	1044.64	8	1054.28	6	1074.73	2
1219.56	1	1226.47	2	1233.75	3	1240.76	4	1248.59	5
1258	6	1274.35	7	1302.79	9	1479.31	12	1516.3	13
1524.97	13	1526.04	12	1541.35	12	1544.1	13	1553.26	14
1568.3	14	1587.51	15	1592.36	16	1600.21	18	1603.24	19
1606.38	20	1620.28	24	1636.72	25	1668.02	26		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	323.05	.03	1274.35	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
323.05	1274.35	127.78	146.46 178.49	.1	.3

CROSS SECTION OUTPUT Profile #Flow1

E.G. Elev (ft)	15.77	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.01	Wt. n-Val.	0.035	0.030
0.035				
W.S. Elev (ft)	15.76	Reach Len. (ft)	127.78	146.46
178.49				
Crit W.S. (ft)		Flow Area (sq ft)	495.22	10322.26
1437.90				
E.G. Slope (ft/ft)	0.000010	Area (sq ft)	495.22	10322.26
1437.90				
Q Total (cfs)	8500.00	Flow (cfs)	147.39	7829.23
523.38				
Top Width (ft)	1415.89	Top Width (ft)	147.72	951.30
316.87				
Vel Total (ft/s)	0.69	Avg. Vel. (ft/s)	0.30	0.76
0.36				
Max Chl Dpth (ft)	14.76	Hydr. Depth (ft)	3.35	10.85
4.54				
Conv. Total (cfs)	2712653.0	Conv. (cfs)	47038.4	2498586.0
167029.0				
Length Wtd. (ft)	147.95	Wetted Per. (ft)	147.98	955.45
317.71				
Min Ch El (ft)	1.00	Shear (lb/sq ft)	0.00	0.01
0.00				
Alpha	1.12	Stream Power (lb/ft s)	0.00	0.01
0.00				
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	161.61	2518.02
227.02				
C & E Loss (ft)	0.00	Cum SA (acres)	31.59	177.26
49.29				

CROSS SECTION

RIVER: Existing
REACH: Buena Vista RS: 7136

INPUT

Description:

Station Elevation Data num= 101

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	53	8.69	50	11.23	49	13.78	48	16.25	47
18.76	46	34.37	39	38.62	37	44.36	34	46.26	33
51.45	30	52.96	29	63.66	22.89	67.14	21	70.65	19
75.52	18	88.55	16	141.92	13	178.3	11	202.25	11
248.38	12	249.95	12	253.21	11	257.69	10	262.6	9
267.41	8	273.83	7	282.02	6	292.34	5	302.74	4
313.17	3	323.53	2	334.11	1	345.4	0	503.08	0
508.5	1	513.79	2	519.36	3	523.86	4	529.28	5
534.27	6	618.07	11	650.59	11	658.62	10	723.7	9
759.88	9	766.36	9	768.77	8	770.68	7	784.54	5
791.45	4	798.32	3	805.24	2	812.09	1	925.34	2
937.26	4	942.82	5	948.43	6	953.38	7	959.29	8
965.05	9	988.97	9	1031.46	8	1128.92	8	1131.95	9
1135.49	10	1141.82	10	1150.3	9	1178.45	7	1189.41	6
1197.76	5	1213.88	3	1222.14	2	1230.38	1	1329.56	1
1339.26	2	1348.66	3	1358.1	4	1367.42	5	1376.73	6
1398.91	7	1403.48	8	1553.52	10	1557.09	10	1561.2	11
1565.46	12	1589.51	13	1610.93	13	1613.81	12	1628.46	12
1630.99	13	1633.53	14	1636.01	15	1643.92	15	1658.74	18
1660.73	19	1663.24	20	1667.3	21	1672.02	22	1672.86	22
1730.6	24								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	273.83	.03	1398.91	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
273.83	1398.91	112.3	173.35 239.96	.1	.3

CROSS SECTION OUTPUT Profile #Flow1

E.G. Elev (ft)	15.77	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.01	Wt. n-Val.	0.035	0.030
0.035				
W.S. Elev (ft)	15.76	Reach Len. (ft)	112.30	173.35
239.96				
Crit W.S. (ft)		Flow Area (sq ft)	677.98	12252.84
1340.10				
E.G. Slope (ft/ft)	0.000007	Area (sq ft)	677.98	12252.84
1340.10				
Q Total (cfs)	8500.00	Flow (cfs)	182.81	7857.00
460.20				
Top Width (ft)	1554.97	Top Width (ft)	181.10	1125.08
248.79				
Vel Total (ft/s)	0.60	Avg. Vel. (ft/s)	0.27	0.64
0.34				
Max Chl Dpth (ft)	15.76	Hydr. Depth (ft)	3.74	10.89
5.39				
Conv. Total (cfs)	3218757.0	Conv. (cfs)	69224.2	2975267.0
174265.5				
Length Wtd. (ft)	174.69	Wetted Per. (ft)	181.78	1128.79
249.99				
Min Ch El (ft)	0.00	Shear (lb/sq ft)	0.00	0.00
0.00				
Alpha	1.09	Stream Power (lb/ft s)	0.00	0.00
0.00				
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	159.89	2480.07
221.33				

C & E Loss (ft)	0.00	Cum SA (acres)	31.11	173.77
48.13				

CROSS SECTION

RIVER: Existing
REACH: Buena Vista RS: 6964

INPUT
Description:
Station Elevation Data num= 105

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	64	7.29	62	10.9	61	14.22	60	17.4	59
33.45	55	44.21	51	46.39	50	48.48	49	50.46	48
52.7	47	54.78	46	57.05	45	58.98	44	61.82	42
63.55	41	64.88	40	67.93	38	69.65	37	71.5	36
72.82	35	74.13	34	75.41	33	76.95	32	77.56	31
81.62	29	82.96	28	84.51	27	86.54	26	88.01	25
89.5	24	90.63	22.89	91.64	22.02	92.64	21	94.04	20
98.77	17	100.6	16	102.6	15	116.56	11	121.82	10
127.25	9	146.05	9	149.26	10	152.51	11	157.87	12
159.85	12	201.74	8	234.12	6	245.81	5	255.79	4
265.41	3	274.51	2	283.81	1	522.49	3	529.43	4
553.96	8	563.5	10	630.61	10	723.44	9	768.95	9
782.4	8	784.73	7	798.81	5	813.28	3	820.52	2
827.71	1	971.85	1	988.45	3	996.36	4	1004.59	5
1022.51	7	1053.9	9	1068.48	10	1076.82	10	1161.11	11
1187.16	12	1201.46	11	1216.91	10	1259.47	8	1283.17	8
1309.41	6	1323.76	4	1331.23	3	1347.98	1	1458.9	1
1467.91	2	1476.25	3	1484.32	4	1491.83	5	1499.43	6
1506.92	7	1513.91	8	1519.41	9	1574.98	10	1613.81	11
1620.57	12	1626.81	13	1682.87	15	1687.18	16	1691.43	17
1700.03	19	1700.18	19	1704.22	19	1757.08	21	1800	22

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	201.74	.03	1513.91	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
201.74	1513.91	110.48	160.7 214.42	.1	.3

CROSS SECTION OUTPUT Profile #Flow1

E.G. Elev (ft)	15.77	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.01	Wt. n-Val.	0.035	0.030
0.035				
W.S. Elev (ft)	15.76	Reach Len. (ft)	110.48	160.70
214.42				
Crit W.S. (ft)		Flow Area (sq ft)	537.03	13706.93
741.82				
E.G. Slope (ft/ft)	0.000006	Area (sq ft)	537.03	13706.93
741.82				
Q Total (cfs)	8500.00	Flow (cfs)	172.74	8118.64
208.62				
Top Width (ft)	1585.09	Top Width (ft)	100.67	1312.17
172.25				
Vel Total (ft/s)	0.57	Avg. Vel. (ft/s)	0.32	0.59
0.28				

Max Chl Dpth (ft)	14.76	Hydr. Depth (ft)	5.33	10.45
4.31				
Conv. Total (cfs)	3391426.0	Conv. (cfs)	68920.4	3239267.0
83239.2				
Length Wtd. (ft)	160.76	Wetted Per. (ft)	102.18	1315.20
172.64				
Min Ch El (ft)	1.00	Shear (lb/sq ft)	0.00	0.00
0.00				
Alpha	1.05	Stream Power (lb/ft s)	0.00	0.00
0.00				
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	158.33	2428.41
215.59				
C & E Loss (ft)	0.00	Cum SA (acres)	30.74	168.92
46.97				

CROSS SECTION

RIVER: Existing
REACH: Buena Vista RS: 6803

INPUT
Description:
Station Elevation Data num= 93

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	56	18.77	54	26.56	53	32.31	52	42.21	51
55.28	46	58.92	44	60.78	43	64.03	41	65.62	40
84.03	29	98.3	24	101.55	23	113.57	20	116.46	19
119.25	18	124.37	16	126.76	15	129.29	14	148.23	13
185.2	10	189.57	9	193	8	196.85	7	199.68	6
201.67	5	204.25	4	206.78	3	210.04	2	214.32	1
221.56	1	224.64	2	229.91	3	234.48	3	248.67	2
301.15	1	585.55	1	598.02	3	604.35	4	610.38	5
616.22	6	639.19	8	644.43	9	794.58	9	843.8	6
848.47	5	853.11	4	857.74	3	866.95	1	1017.48	1
1029.82	2	1043.52	3	1075.11	2	1084.21	1	1107.85	0
1148.34	0	1152.52	1	1156.86	2	1169.6	5	1175.43	6
1182.32	7	1187.54	8	1194.31	9	1203.07	9	1206.56	9
1268.38	10	1355.37	10	1403.54	6	1410.18	5	1416.88	4
1430.53	2	1437.53	1	1513.97	1	1521.86	2	1530.3	3
1540.5	4	1552.11	5	1564.65	6	1611.92	7	1616.39	8
1619.37	9	1622.26	10	1628.44	12	1632.49	13	1640.12	14
1642.12	14	1649.22	14	1746.8	16	1750.86	16	1799.06	18
1800	19	1850	21	1879.8	23				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	196.85	.03	1611.92	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
196.85	1611.92	83.5	154.99 229.89	.1	.3

CROSS SECTION OUTPUT Profile #Flow1

E.G. Elev (ft)	15.77	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.00	Wt. n-Val.	0.035	0.030
0.035				
W.S. Elev (ft)	15.76	Reach Len. (ft)	83.50	154.99
229.89				

Crit W.S. (ft)		Flow Area (sq ft)	288.54	16513.59
228.63				
E.G. Slope (ft/ft)	0.000004	Area (sq ft)	288.54	16513.59
228.63				
Q Total (cfs)	8500.00	Flow (cfs)	61.44	8409.39
29.17				
Top Width (ft)	1610.37	Top Width (ft)	71.92	1415.07
123.38				
Vel Total (ft/s)	0.50	Avg. Vel. (ft/s)	0.21	0.51
0.13				
Max Chl Dpth (ft)	15.76	Hydr. Depth (ft)	4.01	11.67
1.85				
Conv. Total (cfs)	4244623.0	Conv. (cfs)	30682.5	4199373.0
14567.5				
Length Wtd. (ft)	157.61	Wetted Per. (ft)	72.79	1419.51
124.34				
Min Ch El (ft)	0.00	Shear (lb/sq ft)	0.00	0.00
0.00				
Alpha	1.03	Stream Power (lb/ft s)	0.00	0.00
0.00				
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	157.28	2372.67
213.20				
C & E Loss (ft)	0.00	Cum SA (acres)	30.52	163.89
46.24				

CROSS SECTION

RIVER: Existing
REACH: Buena Vista RS: 6648

INPUT
Description:
Station Elevation Data num= 112

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	53	16.37	52	57.95	49	59.44	48	60.83	47
64	45	68.03	42	69.62	41	71.23	40	72.8	39
74.33	38	77.54	36	81.39	34	83.4	33	85.56	32
87.62	31	94.98	28	97.63	27	100.47	26	104	25
106.89	24	112	22	116.87	20	119.15	19	140.28	13
163.31	12	166.4	11	168.54	10	170.99	9	173.33	8
177.46	6	178.51	5	180.15	4	181.39	3	183.16	2
184.44	1	186.7	1	187.83	2	189	3	191.3	5
192.4	6	193.54	7	239.7	7	259.79	5	283.86	3
296.8	2	309.41	1	686.78	2	694.52	3	709.57	5
716.8	6	723.93	7	731.51	8	831.05	9	839.12	8
842.33	7	847.1	6	852.02	5	857	4	861.98	3
866.91	2	871.94	1	940.37	1	947.53	2	954.77	3
976.03	6	983.31	7	1069.09	8	1116.16	8	1166.01	7
1176.94	6	1183.6	5	1190.24	4	1197	3	1204.13	2
1211.22	1	1219.11	0	1248.14	0	1255.88	1	1263.88	2
1278.7	4	1311.16	7	1321.02	8	1365.22	7	1370.79	6
1375.29	5	1379.88	4	1388.79	2	1419.26	0	1431.45	1
1434.96	2	1438.47	3	1442	4	1445.55	5	1449.07	6
1466.99	7	1476.34	8	1477.28	8	1486.62	7	1578.85	7
1596.06	7	1685.45	8	1697.3	9	1702.18	10	1707.21	11
1712.31	12	1718.86	13	1805.65	15	1850	18	1900	20
1920	21	1984.09	22						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val

0 .035 173.33 .03 1466.99 .035

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
173.33 1466.99 107.95 137.87 165.59 .1 .3

CROSS SECTION OUTPUT Profile #Flow1

E.G. Elev (ft)	15.77	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.00	Wt. n-Val.	0.035	0.030	0.035
W.S. Elev (ft)	15.76	Reach Len. (ft)	107.95	137.87	165.59
Crit W.S. (ft)		Flow Area (sq ft)	145.39	15079.18	2203.16
E.G. Slope (ft/ft)	0.000004	Area (sq ft)	145.39	15079.18	2203.16
Q Total (cfs)	8500.00	Flow (cfs)	28.03	7820.29	651.68
Top Width (ft)	1686.39	Top Width (ft)	42.78	1293.66	349.95
Vel Total (ft/s)	0.49	Avg. Vel. (ft/s)	0.19	0.52	0.30
Max Chl Dpth (ft)	15.76	Hydr. Depth (ft)	3.40	11.66	6.30
Conv. Total (cfs)	4155038.0	Conv. (cfs)	13700.5	3822778.0	318559.3
Length Wtd. (ft)	139.90	Wetted Per. (ft)	43.97	1302.23	350.53
Min Ch El (ft)	0.00	Shear (lb/sq ft)	0.00	0.00	0.00
Alpha	1.07	Stream Power (lb/ft s)	0.00	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	156.86	2316.46	206.79
C & E Loss (ft)	0.00	Cum SA (acres)	30.41	159.07	44.99

CROSS SECTION

RIVER: Existing
REACH: Buena Vista RS: 6511

INPUT
Description:
Station Elevation Data num= 97

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	67	1.23	66	2.63	65	4.2	64	6.82	62
8.76	60	13.68	56	17.12	55	19.43	54	22.18	53
24.74	52	33.97	50	104.91	48	106.27	47	107.74	46
109.15	45	110.6	44	112.17	43	113.8	42	115.29	41
117.11	40	120.42	38	122.04	37	123.56	36	125.35	35
127.02	34	128.72	33	130.37	32	132.1	31	133.69	30
137.29	28	138.87	27	140.43	26	141.76	25	143.4	24
144.78	23	146.27	22	147.81	21	149.16	20	151.21	19
154.55	17	176.74	14	179.06	14	205.74	12	209.9	11
214.12	10	218.76	9	223.6	8	240.35	6	255.27	5
274.65	4	312.36	3	336.45	2	352.96	1	784.9	1
806.02	2	829.54	2	844.58	1	984.57	4	994.56	5

1254.11	7	1287.04	8	1313.19	9	1319.66	9	1360.13	7
1374.41	6	1385.67	4	1390.29	3	1394.88	2	1399.39	1
1417.81	1	1422.36	2	1426.85	3	1431.08	4	1435.48	5
1439.77	6	1459.82	7	1473.87	8	1485.87	8	1578.45	7
1586.85	8	1590.35	8	1599.73	7	1713.3	9	1717.84	10
1722.38	11	1726.98	12	1770.01	13	1773.32	13	1782.5	13
1800	15	1850	17	1900	19	1920	20	1940	21
1960	22	2043.39	25						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	223.6	.03	1459.82	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
223.6	1459.82	94.88	130.28	181.08	.1	.3

CROSS SECTION OUTPUT Profile #Flow1

E.G. Elev (ft)	15.77	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.00	Wt. n-Val.	0.035	0.030
0.035				
W.S. Elev (ft)	15.76	Reach Len. (ft)	94.88	130.28
181.08				
Crit W.S. (ft)		Flow Area (sq ft)	193.47	15238.10
2315.03				
E.G. Slope (ft/ft)	0.000004	Area (sq ft)	193.47	15238.10
2315.03				
Q Total (cfs)	8500.00	Flow (cfs)	34.57	7805.99
659.44				
Top Width (ft)	1655.38	Top Width (ft)	59.90	1236.22
359.26				
Vel Total (ft/s)	0.48	Avg. Vel. (ft/s)	0.18	0.51
0.28				
Max Chl Dpth (ft)	14.76	Hydr. Depth (ft)	3.23	12.33
6.44				
Conv. Total (cfs)	4381730.0	Conv. (cfs)	17821.0	4023968.0
339940.9				
Length Wtd. (ft)	134.13	Wetted Per. (ft)	60.54	1237.82
359.90				
Min Ch El (ft)	1.00	Shear (lb/sq ft)	0.00	0.00
0.00				
Alpha	1.08	Stream Power (lb/ft s)	0.00	0.00
0.00				
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	156.44	2268.48
198.20				
C & E Loss (ft)	0.00	Cum SA (acres)	30.29	155.07
43.64				

CROSS SECTION

RIVER: Existing
REACH: Buena Vista RS: 6381

INPUT
Description:
Station Elevation Data num= 83

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	73	1.46	72	3.07	71	7.32	70	12.72	69

14.33	68	16.11	67	17.72	66	18.6	65	22.84	63
23.57	60	24.49	56	104.32	48	106.62	48	118.37	48
148.79	45	150.26	44	151.6	43	153.1	42	154.45	41
156.16	40	157.68	39	158.98	38	160.69	37	163.24	36
165.98	35	168.63	34	171.33	33	174.2	32	179.64	30
184.62	28	187.13	27	188.94	26	190.54	25	192.47	24
194.22	23	196.35	22	197.53	21	199.34	20	201.71	19
203.49	18	205.31	17	223.04	16	239.9	17	256.35	17
266.53	14	269.63	13	297.41	9	308.56	8	336.44	6
345.25	5	353.92	4	362.36	3	370.71	2	379.1	1
707.57	0	942.82	0	964.1	1	993.07	2	1115.21	4
1255.72	5	1285.14	6	1407.43	6	1410.23	5	1416.01	3
1418.92	2	1421.95	1	1449.99	1	1455.71	2	1465.56	3
1475.86	4	1495.93	5	1522.98	6	1755.67	7	1766.2	8
1799.15	13	1833.43	14	1850	15	1900	17	1950	19
2000	20	2100	22	2150	23				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	308.56	.03	1522.98	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
308.56	1522.98	73.31	102.19 143.99	.1	.3

CROSS SECTION OUTPUT Profile #Flow1

E.G. Elev (ft)	15.77	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.00	Wt. n-Val.	0.035	0.030
0.035				
W.S. Elev (ft)	15.76	Reach Len. (ft)	73.31	102.19
143.99				
Crit W.S. (ft)		Flow Area (sq ft)	225.59	16298.13
2521.66				
E.G. Slope (ft/ft)	0.000003	Area (sq ft)	225.59	16298.13
2521.66				
Q Total (cfs)	8500.00	Flow (cfs)	45.36	7769.05
685.60				
Top Width (ft)	1608.53	Top Width (ft)	48.01	1214.42
346.10				
Vel Total (ft/s)	0.45	Avg. Vel. (ft/s)	0.20	0.48
0.27				
Max Chl Dpth (ft)	15.76	Hydr. Depth (ft)	4.70	13.42
7.29				
Conv. Total (cfs)	4983668.0	Conv. (cfs)	26594.3	4555099.0
401974.6				
Length Wtd. (ft)	104.74	Wetted Per. (ft)	48.76	1215.93
346.59				
Min Ch El (ft)	0.00	Shear (lb/sq ft)	0.00	0.00
0.00				
Alpha	1.07	Stream Power (lb/ft s)	0.00	0.00
0.00				
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	155.99	2221.33
188.15				
C & E Loss (ft)	0.00	Cum SA (acres)	30.17	151.40
42.18				

CROSS SECTION

RIVER: Existing
REACH: Buena Vista RS: 6279

INPUT
Description:
Station Elevation Data num= 83

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	70	1.51	70	2.71	69	5.54	67	6.96	66
8.37	65	9.82	64	11.19	63	12.66	62	14.03	61
15.45	60	16.87	59	104.74	52	127.06	48	132.31	47
140.02	46	147.78	45	163.76	44	166.6	43	168.86	42
171.08	41	173.28	40	175.53	39	177.69	38	192.25	31
194.15	30	209.38	22	210.35	21	211.5	20	213.78	19
214.78	18	216.48	17	284.23	18	286.31	17	290.66	15
298.03	12	300.44	11	303.14	10	306.75	9	310.43	8
314.28	7	353.21	8	359.01	8	367.63	7	374.28	6
381.59	5	387.97	4	394.98	3	401.61	2	408.63	1
682.14	0	942.57	0	1568.85	1	1576.97	2	1585.86	3
1608.97	6	1703.29	6	1706.56	5	1709.56	4	1712.82	3
1715.83	2	1718.87	1	1750	1	1752.67	2	1755.34	3
1757.86	4	1760.58	5	1763.36	6	1770.98	7	1782.41	8
1788.98	9	1792.86	10	1796.22	11	1799.55	12	1802.95	13
1806.54	14	1833.62	15	1900	16	1950	18	2000	20
2100	22	2150	23	2200	24				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	367.63	.03	1608.97	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
367.63	1608.97	73.95	110.72 186.66	.1	.3

CROSS SECTION OUTPUT Profile #Flow1

E.G. Elev (ft)	15.77	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.00	Wt. n-Val.	0.035	0.030
0.035				
W.S. Elev (ft)	15.76	Reach Len. (ft)	73.95	110.72
186.66				
Crit W.S. (ft)		Flow Area (sq ft)	560.91	18815.66
2076.37				
E.G. Slope (ft/ft)	0.000002	Area (sq ft)	560.91	18815.66
2076.37				
Q Total (cfs)	8500.00	Flow (cfs)	120.74	7912.10
467.17				
Top Width (ft)	1595.29	Top Width (ft)	78.63	1241.34
275.32				
Vel Total (ft/s)	0.40	Avg. Vel. (ft/s)	0.22	0.42
0.22				
Max Chl Dpth (ft)	15.76	Hydr. Depth (ft)	7.13	15.16
7.54				
Conv. Total (cfs)	6129588.0	Conv. (cfs)	87066.5	5705633.0
336888.0				
Length Wtd. (ft)	112.64	Wetted Per. (ft)	80.23	1242.09
277.92				
Min Ch El (ft)	0.00	Shear (lb/sq ft)	0.00	0.00
0.00				
Alpha	1.07	Stream Power (lb/ft s)	0.00	0.00
0.00				
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	155.33	2180.14
180.55				

C & E Loss (ft)	0.00	Cum SA (acres)	30.06	148.52	41.15

CROSS SECTION

RIVER: Existing
REACH: Buena Vista RS: 6168

INPUT
Description:
Station Elevation Data num= 102

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	72	3.25	71	4.98	70	6.87	69	7.89	68
10.48	67	18.34	66	35.06	64	45.27	62	51.03	61
55.84	60	63.32	59	68.36	58	73.33	57	77.52	56
82.83	55	87.52	54	92	53	97.64	52	103.18	51
108.92	50	113.78	49	118.05	48	122.27	47	126.59	46
131.8	45	138.11	44	144.84	43	153.6	42	160.01	42
175.78	42	177.07	41	178.54	40	180.07	39	181.69	38
183.1	37	184.39	36	185.65	35	186.91	34	188.03	33
189.17	32	190.65	31	192.09	30	193.35	29	194.46	28
195.74	27	197.04	26	198.49	25	199.86	24	201.34	23
202.99	22	204.5	21	206.07	20	207.46	19	209.19	18
222.07	18	232.28	19	244.38	20	250.11	20	255.04	19
262.61	18	264.41	17	266.28	16	268.03	15	269.65	14
271.36	13	273.09	12	275.09	11	277.17	10	279.14	9
281.31	8	289.14	7	328.11	6	339.3	5	350.54	4
361.77	3	373.02	2	384.27	1	395.49	0	505.81	0
673.83	0	881.91	0	1734.59	1	1739.7	2	1744.75	3
1749.94	4	1755.43	5	1761.03	6	1767.44	7	1772.02	8
1781.75	10	1791.65	11	1800.76	12	1804.24	13	1807.75	14
1811.31	15	1815.33	16	1822.23	17	1856.88	18	1890.53	19
1950	20	2000	22						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	281.31	.03	1772.02	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
281.31	1772.02	125.29	108.76 112.06	.1	.3

CROSS SECTION OUTPUT Profile #Flow1

E.G. Elev (ft)	15.77	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.00	Wt. n-Val.	0.035	0.030
0.035				
W.S. Elev (ft)	15.76	Reach Len. (ft)	125.29	108.76
112.06				
Crit W.S. (ft)		Flow Area (sq ft)	59.65	22388.38
181.73				
E.G. Slope (ft/ft)	0.000002	Area (sq ft)	59.65	22388.38
181.73				
Q Total (cfs)	8500.00	Flow (cfs)	7.47	8467.30
25.24				
Top Width (ft)	1547.69	Top Width (ft)	14.62	1490.71
42.36				
Vel Total (ft/s)	0.38	Avg. Vel. (ft/s)	0.13	0.38
0.14				

Max Chl Dpth (ft)	15.76	Hydr. Depth (ft)	4.08	15.02
4.29				
Conv. Total (cfs)	6773245.0	Conv. (cfs)	5949.5	6747184.0
20111.6				
Length Wtd. (ft)	108.84	Wetted Per. (ft)	16.56	1491.71
43.18				
Min Ch El (ft)	0.00	Shear (lb/sq ft)	0.00	0.00
0.00				
Alpha	1.01	Stream Power (lb/ft s)	0.00	0.00
0.00				
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	154.80	2127.77
175.71				
C & E Loss (ft)	0.00	Cum SA (acres)	29.98	145.05
40.47				

CROSS SECTION

RIVER: Existing
REACH: Buena Vista RS: 6060

INPUT
Description:
Station Elevation Data num= 92

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	59	3.75	58	6.27	57	8.37	56	10.7	55
13.01	54	15.34	53	17.66	52	20	51	22.32	50
24.31	49	26.39	48	28.4	47	29.86	46	31.79	45
34.4	44	35.98	43	38.32	42	40.82	41	45.31	40
49.87	39	55.04	38	60.86	37	67.21	36	79.98	35
97.82	34	99.1	33	100.32	32	101.61	31	103.21	30
104.32	29	105.89	28	107.23	27	108.62	26	109.99	25
111.17	24	112.51	23	114.02	22	115.41	21	116.79	20
118.16	19	138.13	19	154.05	20	158.38	20	161.58	19
163.66	18	165.38	17	166.71	16	168.3	15	169.97	14
171.55	13	173.06	12	174.51	11	175.96	10	177.41	9
180.45	8	186.93	7	195.19	6	212.02	6	228.06	6
243.75	5	259.13	4	275.65	3	291.97	2	308.42	1
419.46	0	530.74	0	589.41	0	789.88	0	1648.98	1
1654.78	2	1660.63	3	1666.46	4	1672.36	5	1678.2	6
1682.15	7	1684.6	8	1687.04	9	1689.49	10	1691.96	11
1697.43	12	1718.28	13	1723.41	14	1726.88	15	1729.91	16
1732.76	17	1735.64	18	1738.61	19	1741.94	20	1762.6	21
1793.18	22	1821.76	23						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	212.02	.03	1684.6	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
212.02	1684.6	119.41	121.47 123.15	.1	.3

CROSS SECTION OUTPUT Profile #Flow1

E.G. Elev (ft)	15.77	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.00	Wt. n-Val.	0.035	0.030
0.035				
W.S. Elev (ft)	15.76	Reach Len. (ft)	119.41	121.47
123.15				

Crit W.S. (ft)		Flow Area (sq ft)	350.43	22206.17
154.31				
E.G. Slope (ft/ft)	0.000002	Area (sq ft)	350.43	22206.17
154.31				
Q Total (cfs)	8500.00	Flow (cfs)	70.91	8410.60
18.49				
Top Width (ft)	1562.11	Top Width (ft)	44.93	1472.58
44.59				
Vel Total (ft/s)	0.37	Avg. Vel. (ft/s)	0.20	0.38
0.12				
Max Chl Dpth (ft)	15.76	Hydr. Depth (ft)	7.80	15.08
3.46				
Conv. Total (cfs)	6782003.0	Conv. (cfs)	56577.7	6710671.0
14753.6				
Length Wtd. (ft)	121.47	Wetted Per. (ft)	47.25	1473.49
45.66				
Min Ch El (ft)	0.00	Shear (lb/sq ft)	0.00	0.00
0.00				
Alpha	1.02	Stream Power (lb/ft s)	0.00	0.00
0.00				
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	154.21	2072.10
175.28				
C & E Loss (ft)	0.00	Cum SA (acres)	29.90	141.35
40.36				

CROSS SECTION

RIVER: Existing
REACH: Buena Vista RS: 5939

INPUT
Description:
Station Elevation Data num= 98

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	71	1.13	70	2.19	69	3.38	68	4.44	67
5.63	66	6.59	65	7.74	64	8.86	63	10.2	62
10.98	61	11.98	60	13.06	59	14.07	58	15.23	57
16.8	56	17.52	55	18.98	54	20.16	53	21.24	52
22.1	51	22.91	50	24.28	49	25.54	48	26.69	47
27.96	46	29	45	29.99	44	31.33	43	32.81	42
34.2	41	35.54	40	37.07	39	38.48	38	41.29	37
44.79	36	48.95	35	53.11	34	57.37	33	64.07	32
80.71	31	87.33	30	90.15	30	100.6	30	102.38	29
104.09	28	105.44	27	107.03	26	108.49	25	109.91	24
111.55	23	113.35	22	115.1	21	121.04	20	137.46	20
157.88	20	159.68	19	161.53	18	163.35	17	165.25	16
167.09	15	169.15	14	171.16	13	173.21	12	175.06	11
177.21	10	179.31	9	182.03	8	189.04	7	200.83	6
216.92	5	232.4	4	247.15	3	262.86	2	279.03	1
369.72	0	777.31	0	1629.2	1	1635.12	2	1640.86	3
1646.54	4	1652.31	5	1658.08	6	1662.94	7	1666.13	8
1670.42	9	1675.75	10	1683.67	11	1717.61	12	1720.44	13
1722.84	14	1725.55	15	1728.17	16	1730.8	17	1746.56	23
1749.15	24	1767.31	25	1785.33	26				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	189.04	.03	1662.94	.035

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

189.04 1662.94 104.06 122.18 155.9 .1 .3

CROSS SECTION OUTPUT Profile #Flow1

E.G. Elev (ft)	15.77	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.00	Wt. n-Val.	0.035	0.030
0.035				
W.S. Elev (ft)	15.76	Reach Len. (ft)	104.06	122.18
155.90				
Crit W.S. (ft)		Flow Area (sq ft)	124.41	22279.62
296.13				
E.G. Slope (ft/ft)	0.000002	Area (sq ft)	124.41	22279.62
296.13				
Q Total (cfs)	8500.00	Flow (cfs)	19.16	8437.93
42.90				
Top Width (ft)	1561.86	Top Width (ft)	23.35	1473.90
64.61				
Vel Total (ft/s)	0.37	Avg. Vel. (ft/s)	0.15	0.38
0.14				
Max Chl Dpth (ft)	15.76	Hydr. Depth (ft)	5.33	15.12
4.58				
Conv. Total (cfs)	6793792.0	Conv. (cfs)	15317.0	6744184.0
34290.6				
Length Wtd. (ft)	122.26	Wetted Per. (ft)	25.19	1474.64
65.74				
Min Ch El (ft)	0.00	Shear (lb/sq ft)	0.00	0.00
0.00				
Alpha	1.02	Stream Power (lb/ft s)	0.00	0.00
0.00				
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	153.56	2010.07
174.64				
C & E Loss (ft)	0.00	Cum SA (acres)	29.80	137.24
40.20				

CROSS SECTION

RIVER: Existing
REACH: Buena Vista RS: 5816

INPUT
Description:
Station Elevation Data num= 87

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	59	1.42	58	2.84	57	4.45	56	8.21	54
10.14	53	13.78	51	15.65	50	17.54	49	19.49	48
21.29	47	23.15	46	24.89	45	26.78	44	28.59	43
30.47	42	32.17	41	33.83	40	35.5	39	37.15	38
38.78	37	40.47	36	42.13	35	43.82	34	48.26	32
53.97	30	56.9	29	75.05	27	79.32	27	81.24	26
83.07	25	85.4	24	87.42	23	94.22	21	99.99	21
123.04	22	128.27	22	130.91	21	132.66	20	133.97	19
135.55	18	137.05	17	138.48	16	139.92	15	141.4	14
142.86	13	144.35	12	146.3	11	150.64	10	155.42	9
159.69	8	167.13	7	181.78	6	197.13	5	212.14	4
226.99	3	241.98	2	257.03	1	272.15	0	757.13	0
1271.78	0	1359.26	0	1602.54	1	1608.92	2	1615.22	3
1621.56	4	1627.91	5	1634.05	6	1639.1	7	1642.38	8
1645.29	9	1648.24	10	1651.42	11	1662.67	12	1694.01	14

1698.43	16	1700.59	17	1702.58	18	1704.54	19	1706.51	20
1710.75	22	1712.76	23	1715.26	24	1719.91	26	1722.47	27
1742.8	29	1761.67	30						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	167.13	.03	1645.29	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
167.13	1645.29	123.85	146.63 192.73	.1	.3

CROSS SECTION OUTPUT Profile #Flow1

E.G. Elev (ft)	15.77	Element	Left OB	Channel Right OB
Vel Head (ft)	0.00	Wt. n-Val.	0.035	0.030 0.035
W.S. Elev (ft)	15.76	Reach Len. (ft)	123.85	146.63 192.73
Crit W.S. (ft)		Flow Area (sq ft)	164.03	22619.75 173.20
E.G. Slope (ft/ft)	0.000002	Area (sq ft)	164.03	22619.75 173.20
Q Total (cfs)	8500.00	Flow (cfs)	26.41	8453.87 19.73
Top Width (ft)	1559.09	Top Width (ft)	28.31	1478.16 52.62
Vel Total (ft/s)	0.37	Avg. Vel. (ft/s)	0.16	0.37 0.11
Max Chl Dpth (ft)	15.76	Hydr. Depth (ft)	5.79	15.30 3.29
Conv. Total (cfs)	6940092.0	Conv. (cfs)	21562.0	6902423.0 16106.6
Length Wtd. (ft)	146.64	Wetted Per. (ft)	30.11	1479.20 53.42
Min Ch El (ft)	0.00	Shear (lb/sq ft)	0.00	0.00 0.00
Alpha	1.01	Stream Power (lb/ft s)	0.00	0.00 0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	153.21	1947.11 173.80
C & E Loss (ft)	0.00	Cum SA (acres)	29.74	133.10 39.99

CROSS SECTION

RIVER: Existing
REACH: Buena Vista RS: 5670

INPUT
Description:
Station Elevation Data num= 74

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	57	5.9	54	7.75	53	9.37	52	12.66	50
14.22	49	15.88	48	17.57	47	19.19	46	20.77	45
22.04	44	23.57	43	25.41	42	26.94	41	28.51	40
29.9	39	31.38	38	32.87	37	34.36	36	35.83	35
37.26	34	38.72	33	40.22	32	41.68	31	74.6	23
95.22	23	96.77	22	98.33	21	99.73	20	101.22	19

102.63	18	104.02	17	105.43	16	106.81	15	108.19	14
110.57	13	114.13	12	125.54	9	140.4	7	151.1	6
164.54	5	177.96	4	191.03	3	203.75	2	216.52	1
230.14	0	749.92	0	1257.4	0	1526.06	0	1539.38	1
1544.43	2	1549.19	3	1554.18	4	1559.2	5	1564.22	6
1571.24	8	1574.16	9	1577.14	10	1580.13	11	1583.27	12
1627.86	16	1632.24	18	1634.65	19	1637	20	1639.3	21
1641.45	22	1643.56	23	1645.61	24	1647.6	25	1649.77	26
1651.75	27	1653.36	28	1655.53	29	1672.8	30		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	140.4	.03	1574.16	.035

Bank Sta: Left	Right	Lengths: Left Channel		Right	Coeff Contr.	Expan.
140.4	1574.16	166.55	147.89	121.91	.1	.3

CROSS SECTION OUTPUT Profile #Flow1

E.G. Elev (ft)	15.76	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.00	Wt. n-Val.	0.035	0.030
0.035				
W.S. Elev (ft)	15.76	Reach Len. (ft)	166.55	147.89
121.91				
Crit W.S. (ft)		Flow Area (sq ft)	194.54	22124.70
126.69				
E.G. Slope (ft/ft)	0.000002	Area (sq ft)	194.54	22124.70
126.69				
Q Total (cfs)	8500.00	Flow (cfs)	31.64	8456.18
12.18				
Top Width (ft)	1519.46	Top Width (ft)	34.64	1433.76
51.05				
Vel Total (ft/s)	0.38	Avg. Vel. (ft/s)	0.16	0.38
0.10				
Max Chl Dpth (ft)	15.76	Hydr. Depth (ft)	5.62	15.43
2.48				
Conv. Total (cfs)	6823538.0	Conv. (cfs)	25398.9	6788363.0
9776.0				
Length Wtd. (ft)	147.87	Wetted Per. (ft)	36.08	1435.02
51.70				
Min Ch El (ft)	0.00	Shear (lb/sq ft)	0.00	0.00
0.00				
Alpha	1.01	Stream Power (lb/ft s)	0.00	0.00
0.00				
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	152.70	1871.80
173.14				
C & E Loss (ft)	0.00	Cum SA (acres)	29.65	128.20
39.76				

CROSS SECTION

RIVER: Existing
REACH: Buena Vista RS: 5522

INPUT
Description:
Station Elevation Data num= 84

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev

0	52	2.06	51	4.24	50	8.84	48	15.07	46
31.04	45	32.6	44	34.02	43	35.49	42	37.05	41
38.53	40	40.12	39	41.61	38	43.19	37	44.51	36
46.01	35	47.34	34	48.72	33	50.13	32	51.53	31
52.89	30	54.15	29	55.49	28	56.78	27	58.25	26
59.56	25	63.18	25	63.27	25	69.69	25	95.27	25
99.95	24	101.62	23	104.9	21	106.62	20	108.21	19
110.4	18	112.49	17	114.54	16	120.13	14	123.27	13
126.17	12	129.23	11	133.45	10	159.06	6	172.86	5
187.08	4	201.07	3	214.8	2	228.28	1	405	0
605.99	0	630.69	0	823.93	0	841.93	0	916.71	0
1300.11	0	1498.28	0	1504.07	1	1509.53	2	1514.71	3
1519.74	4	1524.78	5	1529.7	6	1534.09	7	1537.93	8
1541.55	9	1552.49	12	1597.94	13	1600.46	14	1603.02	15
1608.12	17	1610.68	18	1615.69	20	1617.86	21	1624.87	24
1627.2	25	1629.62	26	1631.35	27	1634.38	29	1645.22	29
1646.02	29	1654.16	30	1662.6	31	1680.39	33		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	133.45	.03	1537.93	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
133.45	1537.93	180.15	154.33 129.47	.1	.3

CROSS SECTION OUTPUT Profile #Flow1

E.G. Elev (ft)	15.76	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.00	Wt. n-Val.	0.035	0.030
0.035				
W.S. Elev (ft)	15.76	Reach Len. (ft)	180.15	154.33
129.47				
Crit W.S. (ft)		Flow Area (sq ft)	56.15	21452.38
241.80				
E.G. Slope (ft/ft)	0.000002	Area (sq ft)	56.15	21452.38
241.80				
Q Total (cfs)	8500.00	Flow (cfs)	6.32	8462.75
30.93				
Top Width (ft)	1489.76	Top Width (ft)	18.25	1404.48
67.03				
Vel Total (ft/s)	0.39	Avg. Vel. (ft/s)	0.11	0.39
0.13				
Max Chl Dpth (ft)	15.76	Hydr. Depth (ft)	3.08	15.27
3.61				
Conv. Total (cfs)	6565909.0	Conv. (cfs)	4883.9	6537135.0
23890.2				
Length Wtd. (ft)	154.34	Wetted Per. (ft)	19.15	1405.78
68.11				
Min Ch El (ft)	0.00	Shear (lb/sq ft)	0.00	0.00
0.00				
Alpha	1.01	Stream Power (lb/ft s)	0.00	0.00
0.00				
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	152.22	1797.82
172.62				
C & E Loss (ft)	0.00	Cum SA (acres)	29.55	123.39
39.60				

CROSS SECTION

RIVER: Existing
REACH: Buena Vista RS: 5368

INPUT
Description:
Station Elevation Data num= 60

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	35	2.86	34	8.8	32	14.53	30	17.51	29
21.06	28	58.34	25	59.93	24	61.76	23	65.12	21
66.78	20	68.5	19	70.05	18	71.68	17	75.24	15
79.18	13	81.31	12	84.89	11	90.14	10	100.91	8
117.13	7	142.44	6	163.33	5	182.97	4	202.21	3
220.17	2	238.39	1	296.05	0	673.71	0	723.96	0
731.97	0	1023.83	0	1394.77	0	1433.47	0	1438.85	1
1443.11	2	1447.07	3	1451.3	4	1455.56	5	1459.83	6
1463.66	7	1475.99	11	1478.68	12	1481.2	13	1522.52	13
1526.01	13	1528.54	14	1535.09	16	1538.35	17	1541.39	18
1544.43	19	1550.51	21	1553.82	22	1557.03	23	1560.12	24
1566.47	26	1578.48	28	1578.86	28	1591.42	29	1602.77	30

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	117.13	.03	1463.66	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
117.13	1463.66	173.65	124.23	77.16	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
1478.87	1602.77	25	F

CROSS SECTION OUTPUT Profile #Flow1

E.G. Elev (ft)	15.76	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.00	Wt. n-Val.	0.035	0.030
0.035				
W.S. Elev (ft)	15.76	Reach Len. (ft)	173.65	124.23
77.16				
Crit W.S. (ft)	1.18	Flow Area (sq ft)	264.12	20586.15
95.54				
E.G. Slope (ft/ft)	0.000002	Area (sq ft)	264.12	20586.15
237.62				
Q Total (cfs)	8500.00	Flow (cfs)	49.31	8432.79
17.91				
Top Width (ft)	1460.43	Top Width (ft)	43.25	1346.53
70.65				
Vel Total (ft/s)	0.41	Avg. Vel. (ft/s)	0.19	0.41
0.19				
Max Chl Dpth (ft)	15.76	Hydr. Depth (ft)	6.11	15.29
6.28				
Conv. Total (cfs)	6327931.0	Conv. (cfs)	36706.3	6277894.0
13330.7				
Length Wtd. (ft)	124.37	Wetted Per. (ft)	44.59	1347.50
16.04				
Min Ch El (ft)	0.00	Shear (lb/sq ft)	0.00	0.00
0.00				
Alpha	1.01	Stream Power (lb/ft s)	0.00	0.00
0.00				
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	151.56	1723.35
171.91				
C & E Loss (ft)	0.00	Cum SA (acres)	29.42	118.51

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

CROSS SECTION

RIVER: Existing
REACH: Buena Vista RS: 5244

INPUT
Description:
Station Elevation Data num= 57

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	31	22.62	30	80.03	30	85.41	30	92.72	28
105.67	27	112.9	26	114.34	25	115.92	24	117.66	23
119.83	22	121.99	21	124.14	20	129.26	18	131.76	17
134.8	16	137.09	15	140.23	14	143.03	13	147.11	12
153.74	10	157.53	9	161.08	8	173.1	6	186.34	5
199.47	4	212.57	3	225.7	2	238.97	1	252.09	0
624.8	0	667.68	0	716.1	0	743.51	0	1350.21	1
1357.19	2	1364.26	3	1371.34	4	1378.54	5	1385.67	6
1390.95	7	1394.45	8	1402.68	10	1406.49	11	1410.12	12
1424.94	13	1446.2	15	1450.81	16	1457.6	18	1460.9	19
1464.45	20	1467.74	21	1476.84	24	1479.41	25	1482.48	26
1499.63	27	1510.67	28						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	161.08	.03	1394.45	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
161.08	1394.45	225.58	155.95	82.33	.1 .3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
1324.3	1510.67	25	F

CROSS SECTION OUTPUT Profile #Flow1

E.G. Elev (ft)	15.76	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.00	Wt. n-Val.	0.035	0.030
W.S. Elev (ft)	15.76	Reach Len. (ft)	225.58	155.95
82.33				
Crit W.S. (ft)	1.50	Flow Area (sq ft)	105.32	17733.69
E.G. Slope (ft/ft)	0.000002	Area (sq ft)	105.32	18628.82
178.23				
Q Total (cfs)	8500.00	Flow (cfs)	17.45	8482.55
Top Width (ft)	1314.36	Top Width (ft)	25.73	1233.37
55.26				
Vel Total (ft/s)	0.48	Avg. Vel. (ft/s)	0.17	0.48
Max Chl Dpth (ft)	15.76	Hydr. Depth (ft)	4.09	15.25
Conv. Total (cfs)	5410353.0	Conv. (cfs)	11105.8	5399247.0

Length Wtd. (ft)	156.26	Wetted Per. (ft)	26.90	1163.61
Min Ch El (ft)	0.00	Shear (lb/sq ft)	0.00	0.00
Alpha	1.01	Stream Power (lb/ft s)	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	150.83	1667.43
171.54				
C & E Loss (ft)	0.00	Cum SA (acres)	29.29	114.83
39.28				

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

CROSS SECTION

RIVER: Existing
REACH: Buena Vista RS: 5089

INPUT
Description:
Station Elevation Data num= 52

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	35	2.85	33	4.29	32	5.47	31	11.28	27
12.87	26	15.8	24	18.65	22	20.33	21	21.74	20
31.69	16	34.86	15	41.7	13	46.04	12	61.26	10
85.12	10	86.81	10	97.91	8	110.3	7	129.88	6
153.6	5	174.63	4	195.49	3	224.66	2	265.98	1
303.41	0	395.4	0	594.72	0	617.26	0	684.61	0
883.4	0	1183.3	1	1190.21	2	1197.67	3	1205.31	4
1214.08	5	1223.28	6	1229.42	7	1235.22	10	1238.77	12
1259.34	13	1263.31	14	1267.3	15	1271.13	16	1278.92	18
1282.63	19	1286.23	20	1289.53	21	1293	22	1296.57	23
1300.12	24	1318.42	25						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	86.81	.03	1235.22	.035

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
86.81 1235.22 206.08 115.01 98.82 .1 .3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	33.4	25	F
1037.36	1318.42	25	F

CROSS SECTION OUTPUT Profile #Flow1

E.G. Elev (ft)	15.76	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.01	Wt. n-Val.	0.035	0.030
W.S. Elev (ft)	15.76	Reach Len. (ft)	206.08	115.01
98.82				
Crit W.S. (ft)	1.64	Flow Area (sq ft)	246.46	14167.27
E.G. Slope (ft/ft)	0.000004	Area (sq ft)	246.60	16939.66

98.99				
Q Total (cfs)	8500.00	Flow (cfs)	57.20	8442.80
Top Width (ft)	1237.75	Top Width (ft)	54.35	1148.41
34.98				
Vel Total (ft/s)	0.59	Avg. Vel. (ft/s)	0.23	0.60
Max Chl Dpth (ft)	15.76	Hydr. Depth (ft)	4.61	14.90
Conv. Total (cfs)	4277515.0	Conv. (cfs)	28785.8	4248729.0
Length Wtd. (ft)	120.25	Wetted Per. (ft)	54.01	950.91
Min Ch El (ft)	0.00	Shear (lb/sq ft)	0.00	0.00
Alpha	1.02	Stream Power (lb/ft s)	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	149.91	1603.76
171.28				
C & E Loss (ft)	0.00	Cum SA (acres)	29.08	110.57
39.20				

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

CROSS SECTION

RIVER: Existing
REACH: Buena Vista RS: 4974

INPUT
Description:
Station Elevation Data num= 54

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	46	2.96	44	4.49	43	6.23	42	9.55	40
10.97	39	12.63	38	13.86	37	15.26	36	16.65	35
19.21	33	20.46	32	21.77	31	57.2	12	66.51	11
75.43	10	79.89	9	82.89	8	87.12	8	94.5	9
110.77	9	136.67	7	325.3	6	338.69	5	350.01	4
361.12	3	371.63	2	378.93	1	711.59	0	826.43	0
914.24	1	929	2	944.9	3	965.94	3	999.7	3
1012.72	4	1023.76	5	1043.19	6	1093.18	7	1098.27	8
1104.58	9	1110.98	10	1136.19	12	1148.78	13	1154.58	14
1160.07	15	1165.76	16	1178.08	18	1182.19	19	1185.22	20
1188.34	21	1193.09	22	1213.73	23	1227.37	24		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	325.3	.03	1093.18	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
325.3	1093.18	84.98	67.04	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	173.48	25	F

812.4 1227.37 25 F

CROSS SECTION OUTPUT Profile #Flow1

E.G. Elev (ft)	15.76	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.02	Wt. n-Val.	0.035	0.030
W.S. Elev (ft)	15.75	Reach Len. (ft)	84.98	67.04
322.00				
Crit W.S. (ft)	2.66	Flow Area (sq ft)	1418.53	7302.81
E.G. Slope (ft/ft)	0.000012	Area (sq ft)	2289.67	10926.71
309.63				
Q Total (cfs)	8500.00	Flow (cfs)	920.97	7579.03
Top Width (ft)	1114.10	Top Width (ft)	275.09	767.88
71.13				
Vel Total (ft/s)	0.97	Avg. Vel. (ft/s)	0.65	1.04
Max Chl Dpth (ft)	15.75	Hydr. Depth (ft)	9.34	14.99
Conv. Total (cfs)	2465696.0	Conv. (cfs)	267157.4	2198539.0
Length Wtd. (ft)	68.01	Wetted Per. (ft)	151.82	487.34
Min Ch El (ft)	0.00	Shear (lb/sq ft)	0.01	0.01
Alpha	1.06	Stream Power (lb/ft s)	0.00	0.01
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	143.91	1566.98
170.81				
C & E Loss (ft)	0.05	Cum SA (acres)	28.30	108.04
39.08				

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for
additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid,
water surface was used.

CROSS SECTION

RIVER: Existing
REACH: Buena Vista RS: 4887

INPUT
Description:
Station Elevation Data num= 52

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	48	4.17	47	17.72	40	21	38	24.67	36
29.04	33	35.24	29	36.78	28	38.34	27	41.45	25
46.47	22	56.4	20	60.87	19	65.64	18	87.38	15
155.23	13	210.41	10	244.53	9	313.57	8	344.07	7

373.81	6	375.75	5	378.32	4	380.65	3	382.83	2
384.98	1	429.69	1	432.86	2	435.04	3	439.44	4
443.27	5	447.01	6	462.8	7	521.05	7	545.4	7
552.14	8	573.17	8	592.21	8	731.99	7	749.79	7
800.22	9	832.06	10	906.5	11	969.57	12	977.13	13
999.3	14	1009.27	15	1017.54	16	1038.28	19	1073.01	20
1092.97	21	1111.42	22						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	313.57	.03	552.14	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
313.57	552.14	20	20	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	334.47	25	F
465.7	1111.42	25	F

CROSS SECTION OUTPUT Profile #Flow1

E.G. Elev (ft)	15.71	Element	Left OB	Channel Right OB
Vel Head (ft)	0.53	Wt. n-Val.		0.030
W.S. Elev (ft)	15.18	Reach Len. (ft)	20.00	20.00 20.00
Crit W.S. (ft)	9.13	Flow Area (sq ft)		1460.17
E.G. Slope (ft/ft)	0.000567	Area (sq ft)	938.65	2321.30 2695.49
Q Total (cfs)	8500.00	Flow (cfs)		8500.00
Top Width (ft)	924.71	Top Width (ft)	227.51	238.57 458.63
Vel Total (ft/s)	5.82	Avg. Vel. (ft/s)		5.82
Max Chl Dpth (ft)	14.18	Hydr. Depth (ft)		11.13
Conv. Total (cfs)	357070.2	Conv. (cfs)		357070.2
Length Wtd. (ft)	20.00	Wetted Per. (ft)		133.10
Min Ch El (ft)	1.00	Shear (lb/sq ft)		0.39
Alpha	1.00	Stream Power (lb/ft s)		2.26
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	140.77	1556.78 159.71
C & E Loss (ft)	0.08	Cum SA (acres)	27.81	107.27 37.12

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

CROSS SECTION

RIVER: Existing

REACH: Buena Vista RS: 4867

INPUT
Description:
Station Elevation Data num= 52

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	48	4.17	47	17.72	40	21	38	24.67	36
29.04	33	35.24	29	36.78	28	38.34	27	41.45	25
46.47	22	56.4	20	60.87	19	65.64	18	87.38	15
155.23	13	210.41	10	244.53	9	313.57	8	344.07	7
373.81	6	375.75	5	378.32	4	380.65	3	382.83	2
384.98	1	429.69	1	432.86	2	435.04	3	439.44	4
443.27	5	447.01	6	462.8	7	521.05	7	545.4	7
552.14	8	573.17	8	592.21	8	731.99	7	749.79	7
800.22	9	832.06	10	906.5	11	969.57	12	977.13	13
999.3	14	1009.27	15	1017.54	16	1038.28	19	1073.01	20
1092.97	21	1111.42	22						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	313.57	.03	552.14	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
313.57	552.14	274	274	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	348.83	25	F
451.33	1111.42	25	F

CROSS SECTION OUTPUT Profile #Flow1

E.G. Elev (ft)	15.61	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.80	Wt. n-Val.		0.030
W.S. Elev (ft)	14.81	Reach Len. (ft)	38.00	38.00
38.00				
Crit W.S. (ft)	9.24	Flow Area (sq ft)		1184.18
E.G. Slope (ft/ft)	0.000823	Area (sq ft)	855.51	2233.11
2526.55				
Q Total (cfs)	8500.00	Flow (cfs)		8500.00
Top Width (ft)	913.65	Top Width (ft)	219.82	238.57
455.26				
Vel Total (ft/s)	7.18	Avg. Vel. (ft/s)		7.18
Max Chl Dpth (ft)	13.81	Hydr. Depth (ft)		11.55
Conv. Total (cfs)	296207.6	Conv. (cfs)		296207.6
Length Wtd. (ft)	38.00	Wetted Per. (ft)		104.34
Min Ch El (ft)	1.00	Shear (lb/sq ft)		0.58
Alpha	1.00	Stream Power (lb/ft s)		4.19
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)	140.35	1555.74
158.51				
C & E Loss (ft)	0.04	Cum SA (acres)	27.71	107.16
36.91				

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

BRIDGE

RIVER: Existing
REACH: Buena Vista RS: 4700

INPUT
Description: I-5 Existing Bridge
Distance from Upstream XS = 38
Deck/Roadway Width = 184
Weir Coefficient = 2.5
Upstream Deck/Roadway Coordinates
num= 12

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
0	34	0	114	29.8	0	185.9	28.6	0
250	27	0	280	27.3		348.832	28.26	0
348.832	28.26	23	451.332	25.16	19.9	451.332	25.16	0
575	20	0	730	19.1	0	1111.42	21	0

Upstream Bridge Cross Section Data
Station Elevation Data num= 52

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	48	4.17	47	17.72	40	21	38	24.67	36
29.04	33	35.24	29	36.78	28	38.34	27	41.45	25
46.47	22	56.4	20	60.87	19	65.64	18	87.38	15
155.23	13	210.41	10	244.53	9	313.57	8	344.07	7
373.81	6	375.75	5	378.32	4	380.65	3	382.83	2
384.98	1	429.69	1	432.86	2	435.04	3	439.44	4
443.27	5	447.01	6	462.8	7	521.05	7	545.4	7
552.14	8	573.17	8	592.21	8	731.99	7	749.79	7
800.22	9	832.06	10	906.5	11	969.57	12	977.13	13
999.3	14	1009.27	15	1017.54	16	1038.28	19	1073.01	20
1092.97	21	1111.42	22						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	313.57	.03	552.14	.035

Bank Sta: Left Right Coeff Contr. Expan.
313.57 552.14 .3 .5
Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	348.83	25	F
451.33	1111.42	25	F

Downstream Deck/Roadway Coordinates
num= 12

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
0	34	0	95	29.8	0	166.9	28.6	0
231	27	0	264.7	27.3	0	299.943	28.26	0
299.943	28.26	23	402.443	25.16	19.9	402.443	25.16	0
560	20	0	715	19.1	0	995.41	21	0

Downstream Bridge Cross Section Data
Station Elevation Data num= 74

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	47	36.55	46	60.64	46	71.69	46	79.07	45
84.89	44	86.72	43	88.18	42	89.81	41	90.95	40
93.01	39	94.15	38	95.4	37	96.78	36	98.12	35
99.86	34	101.3	33	102.79	32	104.27	31	105.7	30
107.27	29	108.68	28	110.33	27	111.63	26	115.71	24
119.42	23	143.69	20	163.4	19	173.87	18	184.43	17
200.85	15	224.06	14	254.21	13	276.87	12	303.27	11
312.07	10	317.55	9	321.35	8	324.37	7	326.49	6
327.8	5	329.07	4	330.3	3	331.49	2	332.71	1
333.88	0	368.56	0	370.58	1	372.2	2	374.15	3
376.89	4	378.81	5	381.6	6	385.11	7	451.18	8
476.04	7	684.01	7	713.77	8	755.35	10	770.77	11
803.5	12	816.67	13	830.66	14	846.74	15	859.1	16
892.75	17	910.8	18	931.46	19	938.21	20	949.38	21
951.57	21	955.85	21	976.63	22	995.41	23		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	321.35	.03	385.11	.035

Bank Sta: Left	Right	Coeff Contr.	Expan.
321.35	385.11	.3	.4

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
402.44	995.41	19	F

Upstream Embankment side slope = .67 horiz. to 1.0 vertical
Downstream Embankment side slope = .67 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow = .95
Elevation at which weir flow begins = 23
Energy head used in spillway design =
Spillway height used in design =
Weir crest shape = Broad Crested

Number of Piers = 2

Pier Data
Pier Station Upstream= 380.08 Downstream= 331.19
Upstream num= 2

Width	Elev	Width	Elev
2.5	0	2.5	26

Downstream num= 2

Width	Elev	Width	Elev
2.5	0	2.5	26

Pier Data
Pier Station Upstream= 420.08 Downstream= 371.19
Upstream num= 2

Width	Elev	Width	Elev
2.5	0	2.5	26

Downstream num= 2

Width	Elev	Width	Elev
2.5	0	2.5	26

Number of Bridge Coefficient Sets = 1

Low Flow Methods and Data
Energy
Momentum Cd = 1.2
Selected Low Flow Methods = Highest Energy Answer

High Flow Method
Energy Only

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

BRIDGE OUTPUT Profile #Flow1

E.G. US. (ft)	15.61	Element	Inside BR US
Inside BR DS			
W.S. US. (ft)	14.81	E.G. Elev (ft)	15.53
14.81			
Q Total (cfs)	8500.00	W.S. Elev (ft)	14.60
13.07			
Q Bridge (cfs)	8500.00	Crit W.S. (ft)	9.50
10.77			
Q Weir (cfs)		Max Chl Dpth (ft)	13.60
13.07			
Weir Sta Lft (ft)		Vel Total (ft/s)	7.72
10.34			
Weir Sta Rgt (ft)		Flow Area (sq ft)	1100.46
822.15			
Weir Submerg		Froude # Chl	0.41
0.58			
Weir Max Depth (ft)		Specif Force (cu ft)	8530.25
7043.70			
Min El Weir Flow (ft)	25.01	Hydr Depth (ft)	11.29
8.43			
Min El Prs (ft)	23.00	W.P. Total (ft)	149.06
145.60			
Delta EG (ft)	0.99	Conv. Total (cfs)	206658.3
128554.6			
Delta WS (ft)	1.86	Top Width (ft)	97.50
97.50			
BR Open Area (sq ft)	1639.56	Frctn Loss (ft)	0.47
0.15			
BR Open Vel (ft/s)	10.34	C & E Loss (ft)	0.25
0.04			
Coef of Q		Shear Total (lb/sq ft)	0.78
1.54			
Br Sel Method	Energy only	Power Total (lb/ft s)	6.02
15.93			

Warning: For the final momentum answer at the bridge, the upstream energy was computed lower than
the downstream energy. This is not physically possible, the momentum answer has been
disregarded.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for
additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4. This may indicate the need for additional cross sections.

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

CROSS SECTION

RIVER: Existing
REACH: Buena Vista RS: 4607

INPUT
Description:
Station Elevation Data num= 74

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	47	36.55	46	60.64	46	71.69	46	79.07	45
84.89	44	86.72	43	88.18	42	89.81	41	90.95	40
93.01	39	94.15	38	95.4	37	96.78	36	98.12	35
99.86	34	101.3	33	102.79	32	104.27	31	105.7	30
107.27	29	108.68	28	110.33	27	111.63	26	115.71	24
119.42	23	143.69	20	163.4	19	173.87	18	184.43	17
200.85	15	224.06	14	254.21	13	276.87	12	303.27	11
312.07	10	317.55	9	321.35	8	324.37	7	326.49	6
327.8	5	329.07	4	330.3	3	331.49	2	332.71	1
333.88	0	368.56	0	370.58	1	372.2	2	374.15	3
376.89	4	378.81	5	381.6	6	385.11	7	451.18	8
476.04	7	684.01	7	713.77	8	755.35	10	770.77	11
803.5	12	816.67	13	830.66	14	846.74	15	859.1	16
892.75	17	910.8	18	931.46	19	938.21	20	949.38	21
951.57	21	955.85	21	976.63	22	995.41	23		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	321.35	.03	385.11	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
321.35	385.11	45.88	77.71 297.82	.3	.4

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
402.44	995.41	19	F

CROSS SECTION OUTPUT Profile #Flow1

E.G. Elev (ft)	14.62	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.66	Wt. n-Val.	0.035	0.030	0.035
W.S. Elev (ft)	12.95	Reach Len. (ft)	45.88	77.71	297.82
Crit W.S. (ft)	10.29	Flow Area (sq ft)	106.18	702.23	100.92
E.G. Slope (ft/ft)	0.002103	Area (sq ft)	106.18	702.23	2152.53
Q Total (cfs)	8500.00	Flow (cfs)	282.61	7581.44	635.94
Top Width (ft)	560.83	Top Width (ft)	66.11	63.76	

430.96					
Vel Total (ft/s)	9.35	Avg. Vel. (ft/s)	2.66	10.80	6.30
Max Chl Dpth (ft)	12.95	Hydr. Depth (ft)	1.61	11.01	5.82
Conv. Total (cfs)	185343.3	Conv. (cfs)	6162.4	165314.1	13866.8
Length Wtd. (ft)	85.22	Wetted Per. (ft)	66.42	67.77	17.33
Min Ch El (ft)	0.00	Shear (lb/sq ft)	0.21	1.36	0.76
Alpha	1.23	Stream Power (lb/ft s)	0.56	14.69	4.82
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	139.74	1549.77	155.84
C & E Loss (ft)	0.64	Cum SA (acres)	27.51	106.61	36.41

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

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

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

CROSS SECTION

RIVER: Existing
REACH: Buena Vista RS: 4529

INPUT
Description:
Station Elevation Data num= 60

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	52	16.48	47	18.95	46	20.87	45	22.66	44
24.27	43	27.68	41	29.46	40	33.06	38	34.39	37
49.62	26	61.41	21	79.08	20	109.93	17	118.96	15
123.11	14	162.13	6.909	167.13	6	233.83	6	258.41	6
261.92	5	265.32	4	268.64	3	271.95	2	275.7	1
277.9	0	283.84	-1	286.32	-2	288.79	-3	291.28	-4
293.74	-5	296.36	-6	298.69	-7	301.72	-7	304.49	-6
307.02	-5	309.92	-4	319.36	-3	351.15	-2	370.79	-1
494.48	0	526.2	1	533.71	1	573.82	0	688.95	0
733.11	1	752.92	2	772.46	3	797.6	4	817.48	5
832.96	6	871.84	7	880.53	9	892.06	12	913.95	14
932.09	18	986.81	26	1055.32	31	1068.35	32	1069.07	32

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	162.13	.03	871.84	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
162.13	871.84	53.77	128.94	133.05	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
461.18	1069.07	19	F

CROSS SECTION OUTPUT Profile #Flow1

E.G. Elev (ft)	13.97	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.07	Wt. n-Val.	0.035	0.030
W.S. Elev (ft)	13.89	Reach Len. (ft)	53.77	128.94
133.05				
Crit W.S. (ft)	2.28	Flow Area (sq ft)	134.19	3841.13
E.G. Slope (ft/ft)	0.000066	Area (sq ft)	134.19	8891.37
109.93				
Q Total (cfs)	8500.00	Flow (cfs)	105.03	8394.98
Top Width (ft)	789.07	Top Width (ft)	38.43	709.71
40.93				
Vel Total (ft/s)	2.14	Avg. Vel. (ft/s)	0.78	2.19
Max Chl Dpth (ft)	20.89	Hydr. Depth (ft)	3.49	12.84
Conv. Total (cfs)	1049763.0	Conv. (cfs)	12970.8	1036793.0
Length Wtd. (ft)	128.18	Wetted Per. (ft)	39.06	301.94
Min Ch El (ft)	-7.00	Shear (lb/sq ft)	0.01	0.05
Alpha	1.03	Stream Power (lb/ft s)	0.01	0.11
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	139.61	1541.21
148.11				
C & E Loss (ft)	0.01	Cum SA (acres)	27.46	105.92
34.79				

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

CROSS SECTION

RIVER: Existing
REACH: Buena Vista RS: 4400

INPUT
Description:
Station Elevation Data num= 92

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	56	3.18	55	7.06	54	9.99	53	12.59	52
16.08	50	17.75	49	19.51	48	21.18	47	22.85	46
24.55	45	26.19	44	27.93	43	34.68	39	38.04	37
39.58	36	40.93	35	42.45	34	44.02	33	46.14	32
47.5	31	49.5	30	51.68	29	53.42	28	55.27	27
57.18	26	61.1	24	64.14	23	66.98	22	97.47	21
104.45	20	111.25	19	117.42	18	123.89	17	130.33	16
136.06	15	140.9	14	146.01	13	150.92	12	155.73	11

161.17	10	167.03	9	173.12	8	179.22	7	234.1	6		
241.12	5	248.55	4	256.63	3	268.05	2	281.25	1		
292.54	0	351.29	-1	872.32	-1	878.14	0	884.03	1		
890.08	2	896.08	3	901.9	4	907.55	5	913.31	6		
928.46	7	972.95	10	985.8	11	1007.34	12	1025.48	13		
1029.35	14	1033.06	15	1036.68	16	1039.97	17	1043.52	18		
1046.08	19	1048.49	20	1053.17	22	1055.55	23	1057.96	24		
1060.33	25	1062.76	26	1065.17	27	1067.66	28	1070.25	29		
1072.89	30	1075.5	31	1078.13	32	1080.77	33	1083.37	34		
1086.88	35	1088.96	35	1092.23	35	1117.79	36	1121.21	37		
1133.48	37	1148.23	36								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	179.22	.03	928.46	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
179.22	928.46	52.77	112.04	284.31	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
637.51	1148.23	19	F

CROSS SECTION OUTPUT Profile #Flow1

E.G. Elev (ft)	13.95	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.03	Wt. n-Val.	0.035	0.030
284.31				
W.S. Elev (ft)	13.92	Reach Len. (ft)	52.77	112.04
Crit W.S. (ft)	1.75	Flow Area (sq ft)	137.42	6183.53
364.51				
E.G. Slope (ft/ft)	0.000024	Area (sq ft)	137.42	10268.04
Q Total (cfs)	8500.00	Flow (cfs)	66.19	8433.81
100.58				
Top Width (ft)	887.72	Top Width (ft)	37.91	749.24
Vel Total (ft/s)	1.34	Avg. Vel. (ft/s)	0.48	1.36
Max Chl Dpth (ft)	14.92	Hydr. Depth (ft)	3.63	13.49
Conv. Total (cfs)	1748584.0	Conv. (cfs)	13616.4	1734968.0
Length Wtd. (ft)	111.76	Wetted Per. (ft)	38.54	458.63
Min Ch El (ft)	-1.00	Shear (lb/sq ft)	0.01	0.02
Alpha	1.02	Stream Power (lb/ft s)	0.00	0.03
147.38				
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	139.44	1512.86
34.58				
C & E Loss (ft)	0.01	Cum SA (acres)	27.41	103.76

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth

with the lowest, valid,
water surface was used.

CROSS SECTION

RIVER: Existing
REACH: Buena Vista RS: 4288

INPUT
Description:
Station Elevation Data num= 90

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	62	3.36	61	9.64	60	13.76	59	14.8	58
16.45	57	17.68	56	18.99	55	20.24	54	21.41	53
22.88	52	24.45	51	25.86	50	27.33	49	30.26	47
31.74	46	33.13	45	34.5	44	35.66	43	36.91	42
37.93	41	39.07	40	40.29	39	41.31	38	42.56	37
43.81	36	44.92	35	45.99	34	47.14	33	48.23	32
51.92	30	53.33	29	55.08	28	57.04	27	59.22	26
60.9	25	62.87	24	76.51	24	86.31	24	89.09	23
91.43	22	93.06	21	94.77	20	96.42	19	98.27	18
100.23	17	102.22	16	104.2	15	105.62	14	107.87	13
110.06	12	117.21	11	124.44	10	128.56	9	141.03	7
172.6	6	187.66	5	202.95	4	215.79	3	226.81	2
237.1	1	246.32	0	306.98	-1	451.84	-2	627.18	-2
1085.25	-1	1091.53	0	1097.81	1	1104.04	2	1110.19	3
1116.41	4	1122.63	5	1128.9	6	1224.64	8	1228.78	8
1318.63	8	1330.39	9	1340.57	10	1388.5	17	1392.44	18
1401.42	20	1404.45	21	1408.04	22	1411.48	23	1414.11	24
1416.43	25	1418.76	26	1421	27	1423.43	28	1425.44	29

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	128.56	.03	1128.9	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
128.56	1128.9	106.91	179.01 314.77	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
896.61	1425.44	19	F

CROSS SECTION OUTPUT Profile #Flow1

E.G. Elev (ft)	13.94	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.01	Wt. n-Val.	0.035	0.030
W.S. Elev (ft)	13.93	Reach Len. (ft)	106.91	179.01
314.77				
Crit W.S. (ft)	0.12	Flow Area (sq ft)	64.57	11209.02
E.G. Slope (ft/ft)	0.000007	Area (sq ft)	64.57	14563.73
1383.07				
Q Total (cfs)	8500.00	Flow (cfs)	13.78	8486.22
Top Width (ft)	1261.72	Top Width (ft)	22.79	1000.34
238.59				
Vel Total (ft/s)	0.75	Avg. Vel. (ft/s)	0.21	0.76
Max Chl Dpth (ft)	15.93	Hydr. Depth (ft)	2.83	14.59

Conv. Total (cfs)	3319703.0	Conv. (cfs)	5383.7	3314319.0
Length Wtd. (ft)	179.02	Wetted Per. (ft)	23.46	768.49
Min Ch El (ft)	-2.00	Shear (lb/sq ft)	0.00	0.01
Alpha	1.01	Stream Power (lb/ft s)	0.00	0.00
Frctn Loss (ft) 141.68	0.00	Cum Volume (acre-ft)	139.32	1480.92
C & E Loss (ft) 33.47	0.00	Cum SA (acres)	27.38	101.51

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

CROSS SECTION

RIVER: Existing
REACH: Buena Vista RS: 4110

INPUT
Description:
Station Elevation Data num= 103

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	63	1.39	62	2.89	61	4.38	60	5.87	59
7.45	58	8.87	57	10.64	56	10.89	55	11.71	54
12.28	53	13.08	52	14.14	51	15.72	50	16.67	49
17.58	48	18.38	47	19.76	46	20.87	45	22.26	44
23.43	43	24.76	42	26.04	41	27.55	40	28.24	39
28.87	38	30	37	31.19	36	35.7	34	37.62	33
40.12	32	42.22	31	47.05	30	63.05	29	66.31	28
69.3	27	72.05	26	73.55	25	75.07	24	76.62	23
78.09	22	79.57	21	81.12	20	82.73	19	84.27	18
85.81	17	135.42	6	140.77	5	146.97	4	153.25	3
159.14	2	165.42	1	171.28	0	193.81	-1	543.19	-2
707.02	-2	1210.16	-1	1216.99	0	1223.68	1	1230.5	2
1237.73	3	1244.99	4	1252.39	5	1259.55	6	1267.63	7
1275.57	8	1289.18	11	1292.83	12	1296.85	13	1299.8	14
1303.27	15	1309.48	17	1312.44	18	1315.45	19	1318.43	20
1323.76	22	1326.07	23	1328.38	24	1330.65	25	1332.93	26
1335.33	27	1338.06	28	1341.2	29	1344.46	30	1347.51	31
1353.43	33	1356.4	34	1359.37	35	1362.37	36	1365.35	37
1368.57	38	1371.98	39	1375.32	40	1378.65	41	1382.2	42
1385.24	43	1388.37	44	1391.5	45	1395.43	46	1399.96	47
1404.73	48	1409.31	49	1413.69	50				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	135.42	.03	1267.63	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
135.42	1267.63	169.99	238.13 299.47	.1	.3

CROSS SECTION OUTPUT Profile #Flow1

E.G. Elev (ft)	13.94	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.00	Wt. n-Val.	0.035	0.030
0.035				
W.S. Elev (ft)	13.93	Reach Len. (ft)	169.99	238.13
299.47				
Crit W.S. (ft)		Flow Area (sq ft)	141.97	17109.32
127.39				
E.G. Slope (ft/ft)	0.000003	Area (sq ft)	141.97	17109.32
127.39				
Q Total (cfs)	8500.00	Flow (cfs)	24.28	8453.89
21.83				
Top Width (ft)	1199.97	Top Width (ft)	35.78	1132.21
31.98				
Vel Total (ft/s)	0.49	Avg. Vel. (ft/s)	0.17	0.49
0.17				
Max Chl Dpth (ft)	15.93	Hydr. Depth (ft)	3.97	15.11
3.98				
Conv. Total (cfs)	5204712.0	Conv. (cfs)	14865.0	5176479.0
13368.4				
Length Wtd. (ft)	239.23	Wetted Per. (ft)	36.65	1133.29
32.78				
Min Ch El (ft)	-2.00	Shear (lb/sq ft)	0.00	0.00
0.00				
Alpha	1.02	Stream Power (lb/ft s)	0.00	0.00
0.00				
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	139.07	1415.84
136.22				
C & E Loss (ft)	0.00	Cum SA (acres)	27.30	97.13
32.49				

CROSS SECTION

RIVER: Existing
REACH: Buena Vista RS: 3872

INPUT
Description:
Station Elevation Data num= 37

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	25	8.12	20	9.83	19	13.06	17	14.62	16
21.93	13	36.3	8	51.77	6	55.66	5	59.99	4
63.64	3	67.34	2	71.36	1	75.32	0	236.49	-1
488.94	-2	511.87	-2	1112.67	-1	1120.44	0	1128.04	1
1135.77	2	1143.55	3	1151.17	4	1158.99	5	1166.34	6
1347.81	8	1405.89	19	1412.5	22	1423.99	27	1425.68	28
1428.3	29	1430.39	30	1432.4	31	1434.36	32	1435.71	33
1436.77	34	1454.67	42						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	36.3	.03	1166.34	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
36.3	1166.34	248.77	253.91 259.39	.1	.3

CROSS SECTION OUTPUT Profile #Flow1

E.G. Elev (ft)	13.94	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.00	Wt. n-Val.	0.035	0.030	0.035
W.S. Elev (ft)	13.93	Reach Len. (ft)	248.77	253.91	259.39
Crit W.S. (ft)		Flow Area (sq ft)	50.41	16839.93	1351.29
E.G. Slope (ft/ft)	0.000003	Area (sq ft)	50.41	16839.93	1351.29
Q Total (cfs)	8500.00	Flow (cfs)	6.97	8174.95	318.08
Top Width (ft)	1359.49	Top Width (ft)	16.65	1130.04	212.80
Vel Total (ft/s)	0.47	Avg. Vel. (ft/s)	0.14	0.49	0.24
Max Chl Dpth (ft)	15.93	Hydr. Depth (ft)	3.03	14.90	6.35
Conv. Total (cfs)	5247691.0	Conv. (cfs)	4304.1	5047012.0	196374.8
Length Wtd. (ft)	254.02	Wetted Per. (ft)	17.68	1131.38	213.37
Min Ch El (ft)	-2.00	Shear (lb/sq ft)	0.00	0.00	0.00
Alpha	1.05	Stream Power (lb/ft s)	0.00	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	138.69	1323.05	131.14
C & E Loss (ft)	0.00	Cum SA (acres)	27.20	90.94	31.65

CROSS SECTION

RIVER: Existing
REACH: Buena Vista RS: 3623

INPUT
Description:
Station Elevation Data num= 50

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	47	12.97	45	23.17	43	27.9	42	30.82	41
34.56	40	37.27	39	39.87	38	45.13	37	46.18	37
60.5	37	64.78	36	69.65	34	71.97	33	90.43	22
91.84	21	93.18	20	106.76	13	109.42	12	130.18	7
138.29	6	142.86	5	147.39	4	151.93	3	156.22	2
160.52	1	164.63	0	362.78	-1	735.4	-2	751.14	-2
1416.37	-1	1425.48	0	1434.69	1	1444.12	2	1453.57	3
1463.07	4	1472.8	5	1482.56	6	1524.96	10	1530.59	11
1542.74	13	1547.56	14	1552.67	15	1567.33	20	1574.97	23
1584.85	27	1586.58	28	1612.59	42	1616.05	44	1617.93	45

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	130.18	.03	1482.56	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
130.18	1482.56	510.81	201.77 183.85	.1	.3

CROSS SECTION OUTPUT Profile #Flow1

E.G. Elev (ft)	13.94	Element	Left OB	Channel Right OB
Vel Head (ft)	0.00	Wt. n-Val.	0.035	0.030 0.035
W.S. Elev (ft)	13.93	Reach Len. (ft)	510.81	201.77 183.85
Crit W.S. (ft)		Flow Area (sq ft)	96.71	20229.66 296.54
E.G. Slope (ft/ft)	0.000002	Area (sq ft)	96.71	20229.66 296.54
Q Total (cfs)	8500.00	Flow (cfs)	13.60	8438.44 47.96
Top Width (ft)	1442.30	Top Width (ft)	25.23	1352.38 64.68
Vel Total (ft/s)	0.41	Avg. Vel. (ft/s)	0.14	0.42 0.16
Max Chl Dpth (ft)	15.93	Hydr. Depth (ft)	3.83	14.96 4.58
Conv. Total (cfs)	6124086.0	Conv. (cfs)	9798.5	6079734.0 34553.5
Length Wtd. (ft)	202.26	Wetted Per. (ft)	26.23	1353.49 65.22
Min Ch El (ft)	-2.00	Shear (lb/sq ft)	0.00	0.00 0.00
Alpha	1.02	Stream Power (lb/ft s)	0.00	0.00 0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	138.27	1215.01 126.23
C & E Loss (ft)	0.00	Cum SA (acres)	27.08	83.71 30.82

CROSS SECTION

RIVER: Existing
REACH: Buena Vista RS: 3420

INPUT
Description:
Station Elevation Data num= 37

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	26	6.98	24	23.26	20	41.66	16	99.25	7
118.2	6	126.49	5	135.05	4	143.13	3	150.42	2
157.9	1	165.21	0	332.74	-1	1016.96	-2	1040.64	-2
1623.54	-1	1630.88	0	1638.14	1	1645.45	2	1652.71	3
1660.21	4	1667.49	5	1674.6	6	1761.13	17	1765.19	18
1785.12	24	1787.74	25	1818.9	39	1828.34	43	1830.71	44
1835.63	46	1838.13	47	1840.92	48	1843.45	49	1854.48	50
1874.11	51	1886.25	51						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	99.25	.03	1674.6	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
99.25	1674.6	426.25	271.34	272.17	.1 .3

CROSS SECTION OUTPUT Profile #Flow1

E.G. Elev (ft)	13.94	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.00	Wt. n-Val.	0.035	0.030	0.035
W.S. Elev (ft)	13.93	Reach Len. (ft)	426.25	271.34	272.17
Crit W.S. (ft)		Flow Area (sq ft)	153.84	23587.30	247.60
E.G. Slope (ft/ft)	0.000001	Area (sq ft)	153.84	23587.30	247.60
Q Total (cfs)	8500.00	Flow (cfs)	17.68	8451.11	31.21
Top Width (ft)	1682.14	Top Width (ft)	44.37	1575.35	62.41
Vel Total (ft/s)	0.35	Avg. Vel. (ft/s)	0.11	0.36	0.13
Max Chl Dpth (ft)	15.93	Hydr. Depth (ft)	3.47	14.97	3.97
Conv. Total (cfs)	7135556.0	Conv. (cfs)	14841.9	7094511.0	26202.9
Length Wtd. (ft)	271.64	Wetted Per. (ft)	44.91	1576.24	62.92
Min Ch El (ft)	-2.00	Shear (lb/sq ft)	0.00	0.00	0.00
Alpha	1.02	Stream Power (lb/ft s)	0.00	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	136.80	1113.53	125.09
C & E Loss (ft)	0.00	Cum SA (acres)	26.67	76.93	30.56

CROSS SECTION

RIVER: Existing
REACH: Buena Vista RS: 3149

INPUT
Description:
Station Elevation Data num= 36

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	42	3.05	41	24.66	31	26.63	30	39.22	24
41.18	23	64.35	14	75.33	11	79.58	10	85.77	9
92.16	8	97.97	7	104.09	6	111.01	5	117.96	4
124.93	3	131.86	2	138.71	1	145.1	0	168.74	-1
455.59	-1	532.82	-1	1768.54	-1	1786.33	0	1793.43	1
1800.48	2	1807.49	3	1814.62	4	1821.63	5	1828.77	6
1869.54	19	1882.37	24	1885.13	25	1887.32	26	1917.11	38
1922.53	40								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	97.97	.03	1828.77	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
97.97	1828.77	289.73	287.19	287.23	.1 .3

CROSS SECTION OUTPUT Profile #Flow1

E.G. Elev (ft)	13.94	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.00	Wt. n-Val.	0.035	0.030
0.035				
W.S. Elev (ft)	13.93	Reach Len. (ft)	289.73	287.19
287.23				
Crit W.S. (ft)		Flow Area (sq ft)	129.90	25445.92
98.71				
E.G. Slope (ft/ft)	0.000001	Area (sq ft)	129.90	25445.92
98.71				
Q Total (cfs)	8500.00	Flow (cfs)	15.07	8473.54
11.40				
Top Width (ft)	1789.06	Top Width (ft)	33.38	1730.80
24.88				
Vel Total (ft/s)	0.33	Avg. Vel. (ft/s)	0.12	0.33
0.12				
Max Chl Dpth (ft)	14.93	Hydr. Depth (ft)	3.89	14.70
3.97				
Conv. Total (cfs)	7584522.0	Conv. (cfs)	13443.6	7560910.0
10168.3				
Length Wtd. (ft)	287.19	Wetted Per. (ft)	34.13	1731.79
26.12				
Min Ch El (ft)	-1.00	Shear (lb/sq ft)	0.00	0.00
0.00				
Alpha	1.01	Stream Power (lb/ft s)	0.00	0.00
0.00				
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	135.42	960.81
124.00				
C & E Loss (ft)	0.00	Cum SA (acres)	26.29	66.63
30.28				

CROSS SECTION

RIVER: Existing
REACH: Buena Vista RS: 2862

INPUT
Description:
Station Elevation Data num= 64

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	43	2.84	42	7.27	41	30.84	30	33.08	29
37.94	27	40.12	26	42.81	25	45.24	24	47.59	23
50.4	22	53.2	21	55.89	20	60.09	19	64.52	18
80.69	16	94.27	14	100.19	13	111.08	11	120.13	9
133.52	6	138.66	5	143.59	4	148.56	3	153.46	2
158.4	1	163.31	0	168.33	-1	1062.68	-2	1168.22	-2
1377.98	-2	1403.63	-2	1772.38	-1	1781.84	0	1791.24	1
1800.66	2	1810.02	3	1819.37	4	1828.74	5	1837.97	6
1860.1	8	1871.65	9	1881.55	10	1891.57	11	1918.93	15
1924.26	16	1931.53	17	1939.65	18	1946.43	19	1956.57	20
1959.15	21	1964.32	23	1973.64	24	1978.7	25	1983.68	26
1985.71	27	1988.64	28	1992.61	30	1995.85	31	1998.74	32
2010.78	35	2016.57	36	2018.8	37	2023.27	38		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	120.13	.03	1837.97	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
120.13	1837.97	261.34	232.13 220.05	.1	.3

CROSS SECTION OUTPUT Profile #Flow1

E.G. Elev (ft)	13.94	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.00	Wt. n-Val.	0.035	0.030
0.035				
W.S. Elev (ft)	13.93	Reach Len. (ft)	261.34	232.13
220.05				
Crit W.S. (ft)		Flow Area (sq ft)	59.24	26161.59
323.95				
E.G. Slope (ft/ft)	0.000001	Area (sq ft)	59.24	26161.59
323.95				
Q Total (cfs)	8500.00	Flow (cfs)	4.63	8456.29
39.07				
Top Width (ft)	1816.98	Top Width (ft)	25.47	1717.84
73.67				
Vel Total (ft/s)	0.32	Avg. Vel. (ft/s)	0.08	0.32
0.12				
Max Chl Dpth (ft)	15.93	Hydr. Depth (ft)	2.33	15.23
4.40				
Conv. Total (cfs)	7998248.0	Conv. (cfs)	4360.9	7957121.0
36765.9				
Length Wtd. (ft)	232.14	Wetted Per. (ft)	25.95	1719.24
74.11				
Min Ch El (ft)	-2.00	Shear (lb/sq ft)	0.00	0.00
0.00				
Alpha	1.01	Stream Power (lb/ft s)	0.00	0.00
0.00				
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	134.79	790.69
122.61				
C & E Loss (ft)	0.00	Cum SA (acres)	26.10	55.26
29.96				

CROSS SECTION

RIVER: Existing
REACH: Buena Vista RS: 2630

INPUT
Description:
Station Elevation Data num= 38

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	42	2.34	41	4.7	40	11.88	37	13.88	36
15.58	35	19.02	33	34.23	24	42.47	19	110.82	6
115.24	5	119.67	4	124.04	3	128.45	2	132.78	1
137.37	0	141.92	-1	614.97	-2	644.91	-3	695.81	-3
767.82	-2	1774.11	-1	1786.57	0	1793.58	1	1800.39	2
1807.13	3	1813.91	4	1820.92	5	1828	6	1834.05	7
1839.46	8	1845.05	9	1856.27	18	1863.16	22	1864.82	23
1890	36	1893.38	37	1900.5	39				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	110.82	.03	1834.05	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
110.82	1834.05	178.38	183.19	295.58	.1	.3

CROSS SECTION OUTPUT Profile #Flow1

E.G. Elev (ft)	13.94	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.00	Wt. n-Val.	0.035	0.030
0.035				
W.S. Elev (ft)	13.93	Reach Len. (ft)	178.38	183.19
295.58				
Crit W.S. (ft)		Flow Area (sq ft)	165.46	26402.39
80.35				
E.G. Slope (ft/ft)	0.000001	Area (sq ft)	165.46	26402.39
80.35				
Q Total (cfs)	8500.00	Flow (cfs)	18.28	8472.37
9.35				
Top Width (ft)	1782.09	Top Width (ft)	41.71	1723.23
17.15				
Vel Total (ft/s)	0.32	Avg. Vel. (ft/s)	0.11	0.32
0.12				
Max Chl Dpth (ft)	16.93	Hydr. Depth (ft)	3.97	15.32
4.69				
Conv. Total (cfs)	8089155.0	Conv. (cfs)	17395.9	8062858.0
8900.7				
Length Wtd. (ft)	186.47	Wetted Per. (ft)	42.46	1724.59
19.07				
Min Ch El (ft)	-3.00	Shear (lb/sq ft)	0.00	0.00
0.00				
Alpha	1.01	Stream Power (lb/ft s)	0.00	0.00
0.00				
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	134.11	650.63
121.59				
C & E Loss (ft)	0.00	Cum SA (acres)	25.90	46.09
29.73				

CROSS SECTION

RIVER: Existing
REACH: Buena Vista RS: 2447

INPUT
Description:
Station Elevation Data num= 51

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	41	1.95	40	5.69	38	9.51	36	13.28	34
15.31	33	16.97	32	18.86	31	20.76	30	22.62	29
32.97	24	37.2	22	46.34	18	65.9	12	80.98	9
88.49	8	99.59	7	111.63	6	115.7	5	119.75	4
123.84	3	127.96	2	132.02	1	136.13	0	140.3	-1
158.02	-1	185.87	-1	205.4	-1	365.55	-1	635.69	-2
811.75	-2	1335.91	-1	1372.75	0	1379.3	1	1385.99	2
1392.45	3	1399.53	4	1409.72	5	1433.39	6	1650.65	7
1728.21	7	1735.41	8	1745.98	9	1793.03	11	1799.55	12
1802.62	13	1805.69	14	1808.69	15	1811.28	16	1813.31	17
1823.69	18								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	99.59	.03	1433.39	.035

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

99.59 1433.39 194.36 154.79 143.63 .1 .3

CROSS SECTION OUTPUT Profile #Flow1

E.G. Elev (ft)	13.93	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.00	Wt. n-Val.	0.035	0.030
0.035				
W.S. Elev (ft)	13.93	Reach Len. (ft)	194.36	154.79
143.63				
Crit W.S. (ft)		Flow Area (sq ft)	170.05	19990.55
2462.81				
E.G. Slope (ft/ft)	0.000002	Area (sq ft)	170.05	19990.55
2462.81				
Q Total (cfs)	8500.00	Flow (cfs)	24.87	7986.23
488.90				
Top Width (ft)	1745.88	Top Width (ft)	39.99	1333.80
372.09				
Vel Total (ft/s)	0.38	Avg. Vel. (ft/s)	0.15	0.40
0.20				
Max Chl Dpth (ft)	15.93	Hydr. Depth (ft)	4.25	14.99
6.62				
Conv. Total (cfs)	6402114.0	Conv. (cfs)	18731.7	6015150.0
368232.6				
Length Wtd. (ft)	154.17	Wetted Per. (ft)	40.69	1335.07
372.64				
Min Ch El (ft)	-2.00	Shear (lb/sq ft)	0.00	0.00
0.00				
Alpha	1.08	Stream Power (lb/ft s)	0.00	0.00
0.00				
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	133.43	553.08
112.96				
C & E Loss (ft)	0.00	Cum SA (acres)	25.73	39.66
28.41				

CROSS SECTION

RIVER: Existing
REACH: Buena Vista RS: 2292

INPUT
Description:
Station Elevation Data num= 55

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	41	18.77	41	20.52	41	22.06	40	23.5	39
24.61	38	26.25	37	28.01	36	40.42	30	45.41	28
47.85	27	61.13	21	63.44	20	65.79	19	69.02	18
75.56	15	82.37	12	84.66	11	86.95	10	89.25	9
91.51	8	93.7	7	97.09	6	102.46	5	107.56	4
112.64	3	117.79	2	123.04	1	128.16	0	133.34	-1
162.76	-1	430.88	-1	654.96	-2	804.49	-2	885.55	-2
1032.74	-2	1245.64	-1	1286.22	0	1294.47	1	1302.73	2
1311	3	1319.26	4	1327.54	5	1335.91	6	1548.8	7
1687.76	7	1711.99	10	1721.53	11	1730.17	12	1741.53	13
1752.07	15	1761.24	17	1800	18	1850	19	1900	20

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	97.09	.03	1335.91	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
97.09	1335.91	166.63	169.15 169.41	.1	.3

CROSS SECTION OUTPUT Profile #Flow1

E.G. Elev (ft)	13.93	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.00	Wt. n-Val.	0.035	0.030	0.035
W.S. Elev (ft)	13.93	Reach Len. (ft)	166.63	169.15	169.41
Crit W.S. (ft)		Flow Area (sq ft)	79.41	18747.61	2749.36
E.G. Slope (ft/ft)	0.000002	Area (sq ft)	79.41	18747.61	2749.36
Q Total (cfs)	8500.00	Flow (cfs)	11.51	7911.09	577.41
Top Width (ft)	1668.46	Top Width (ft)	19.11	1238.82	410.53
Vel Total (ft/s)	0.39	Avg. Vel. (ft/s)	0.14	0.42	0.21
Max Chl Dpth (ft)	15.93	Hydr. Depth (ft)	4.16	15.13	6.70
Conv. Total (cfs)	6100747.0	Conv. (cfs)	8259.5	5678062.0	414425.5
Length Wtd. (ft)	169.17	Wetted Per. (ft)	20.71	1239.87	410.96
Min Ch El (ft)	-2.00	Shear (lb/sq ft)	0.00	0.00	0.00
Alpha	1.09	Stream Power (lb/ft s)	0.00	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	132.87	484.25	104.37
C & E Loss (ft)	0.00	Cum SA (acres)	25.60	35.09	27.12

CROSS SECTION

RIVER: Existing
REACH: Buena Vista RS: 2123

INPUT
Description:
Station Elevation Data num= 39

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	42	2.51	41	40.68	27	46.2	25	57.81	21
66.98	18	81.93	13	89.97	11	93.67	10	117.19	7
146.88	6	151.97	5	157.09	4	161.55	3	165.88	2
170.14	1	174.39	0	178.53	-1	201.04	-1	509.03	-1
1265.85	-1	1333.51	0	1340.98	1	1348.3	2	1355.55	3
1362.9	4	1370.08	5	1377.45	6	1583.33	7	1591.23	7
1709.91	7	1741.7	9	1762.57	11	1766.68	12	1774.52	14
1778.53	15	1786.65	16	2000	20	2200	22		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	117.19	.03	1377.45	.035

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
117.19 1377.45 290.39 118.42 124.94 .1 .3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
0	184.2	19	F

CROSS SECTION OUTPUT Profile #Flow1

E.G. Elev (ft)	13.93	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.00	Wt. n-Val.		0.030	0.035
W.S. Elev (ft)	13.93	Reach Len. (ft)	290.39	118.42	124.94
Crit W.S. (ft)	0.22	Flow Area (sq ft)		17607.47	2695.19
E.G. Slope (ft/ft)	0.000002	Area (sq ft)	157.26	18269.77	2695.19
Q Total (cfs)	8500.00	Flow (cfs)		7883.74	616.26
Top Width (ft)	1695.11	Top Width (ft)	38.04	1260.26	396.80
Vel Total (ft/s)	0.42	Avg. Vel. (ft/s)		0.45	0.23
Max Chl Dpth (ft)	14.93	Hydr. Depth (ft)		14.76	6.79
Conv. Total (cfs)	5655450.0	Conv. (cfs)		5245424.0	410026.3
Length Wtd. (ft)	118.74	Wetted Per. (ft)		1193.67	397.32
Min Ch El (ft)	-1.00	Shear (lb/sq ft)		0.00	0.00
Alpha	1.08	Stream Power (lb/ft s)		0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	132.42	412.38	93.78
C & E Loss (ft)	0.00	Cum SA (acres)	25.49	30.24	25.55

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

CROSS SECTION

RIVER: Existing
REACH: Buena Vista RS: 2005

INPUT
Description:
Station Elevation Data num= 61

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	43	6	40.04	7.34	39	9.17	38	10.69	37
12.37	36	13.98	35	15.76	34	17.54	33	19.12	32
20.99	31	22.48	30	24.41	29	26.43	28	30.11	26
31.33	25	33.3	24	35.14	23	37.26	22	39.27	21
40.97	20	42.83	19	47.12	17	49.07	16	51.04	15
53.45	14	56.06	13	59.07	12	61.81	11	65.36	10
68.85	9	76.81	7	108.29	6	117.32	5	126.36	4

134.64	3	143.28	2	151.75	1	160.27	0	168.99	-1		
279.6	-1	1024.15	-1	1348.64	-1	1652.16	0	1663.27	1		
1674.06	2	1684.92	3	1692.44	4	1699.77	5	1707.55	6		
1720.26	7	1762.86	7	1814.12	7	1837.69	8	1858.19	9		
1891.96	11	1896.38	12	1899.42	13	2000	15	2200	18		
2400	21										

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	76.81	.03	1720.26	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
76.81	1720.26	243.07	145.64 107.05	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	478.05	19	F
1927.6	2400	19	F

CROSS SECTION OUTPUT Profile #Flow1

E.G. Elev (ft)	13.93	Element	Left OB	Channel Right OB
Vel Head (ft)	0.00	Wt. n-Val.		0.030 0.035
W.S. Elev (ft)	13.93	Reach Len. (ft)	243.07	145.64 107.05
Crit W.S. (ft)	0.31	Flow Area (sq ft)		18093.54 1079.57
E.G. Slope (ft/ft)	0.000002	Area (sq ft)	86.95	23633.99 1083.02
Q Total (cfs)	8500.00	Flow (cfs)		8286.76 213.25
Top Width (ft)	1892.59	Top Width (ft)	23.18	1643.45 225.96
Vel Total (ft/s)	0.44	Avg. Vel. (ft/s)		0.46 0.20
Max Chl Dpth (ft)	14.93	Hydr. Depth (ft)		14.57 5.21
Conv. Total (cfs)	5481467.0	Conv. (cfs)		5343950.0 137517.2
Length Wtd. (ft)	144.93	Wetted Per. (ft)		1242.59 207.72
Min Ch El (ft)	-1.00	Shear (lb/sq ft)		0.00 0.00
Alpha	1.05	Stream Power (lb/ft s)		0.00 0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	131.60	355.42 88.36
C & E Loss (ft)	0.00	Cum SA (acres)	25.28	26.29 24.65

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

CROSS SECTION

RIVER: Existing
REACH: Buena Vista RS: 1859

INPUT
Description:
Station Elevation Data num= 42

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	35	1.86	34	3.02	33	4.7	32	5.98	31
11.31	26	13.28	24	16.02	22	21.5	20	24.47	19
34.48	16	43.91	13	47.81	12	65.46	8	80.71	6
86.8	5	92.9	4	98.95	3	105.06	2	111.15	1
117.21	0	123.33	-1	177.82	-1	462.47	0	679.56	0
790.11	0	1170.12	-1	1247.26	-1	1301.17	-1	1342.62	-1
1640.36	0	1649.14	1	1658.13	2	1667.14	3	1676	4
1684.89	5	1693.54	6	1766.59	11	1796.6	12	1846.35	13
1880.38	16	1939.78	20						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	65.46	.03	1693.54	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
65.46	1693.54	137.81	78.69	68.05	.1 .3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	577.25	19	F
1835.88	1939.78	19	F

CROSS SECTION OUTPUT Profile #Flow1

E.G. Elev (ft)	13.93	Element	Left OB	Channel Right OB
Vel Head (ft)	0.00	Wt. n-Val.		0.030 0.035
W.S. Elev (ft)	13.93	Reach Len. (ft)	137.81	78.69 68.05
Crit W.S. (ft)	0.77	Flow Area (sq ft)		15901.23 529.75
E.G. Slope (ft/ft)	0.000003	Area (sq ft)	76.28	23013.54 545.48
Q Total (cfs)	8500.00	Flow (cfs)		8402.01 97.99
Top Width (ft)	1815.90	Top Width (ft)	24.47	1628.08 163.35
Vel Total (ft/s)	0.52	Avg. Vel. (ft/s)		0.53 0.18
Max Chl Dpth (ft)	14.93	Hydr. Depth (ft)		14.24 3.72
Conv. Total (cfs)	4681169.0	Conv. (cfs)		4627205.0 53963.4
Length Wtd. (ft)	78.60	Wetted Per. (ft)		1116.63 142.54
Min Ch El (ft)	-1.00	Shear (lb/sq ft)		0.00 0.00
Alpha	1.03	Stream Power (lb/ft s)		0.00 0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	131.15	277.44 86.36
C & E Loss (ft)	0.00	Cum SA (acres)	25.15	20.82 24.18

Note: Multiple critical depths were found at this location. The critical depth

with the lowest, valid,
water surface was used.

CROSS SECTION

RIVER: Existing
REACH: Buena Vista RS: 1780

INPUT
Description:
Station Elevation Data num= 65

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	30	7.21	29	9.26	28	11.49	27	13.75	26
15.87	25	18.01	24	20	23	25.92	20	28	19
30.72	18	32.8	17	35.5	16	43.47	13	46.29	12
50.53	11	56.83	10	63.17	9	69.14	8	79.57	6
83.55	5	89.73	4	96.27	3	111.54	2	131.97	2
146.14	3	157.58	4	168.15	5	180.47	6	194.12	7
219.22	7	224.41	6	229.77	5	235.16	4	241.04	3
247.1	2	256.81	1	266.37	0	397.24	0	637.01	0
698.47	0	873.85	0	1090.72	-1	1148.33	-1	1207.35	-1
1283.19	-1	1578.86	0	1588.02	1	1597.36	2	1606.65	3
1615.79	4	1624.47	5	1633.75	6	1645.86	7	1665.72	8
1694.5	9	1702.49	10	1705.97	11	1709.43	12	1710.01	12
1737.91	13	1801.15	14	1808.12	15	1825.27	16	2178.2	20

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	69.14	.03	1665.72	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
69.14	1665.72	684.62	99.7	145.5	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	570.9	19	F
1729.3	2178.2	19	F

CROSS SECTION OUTPUT Profile #Flow1

E.G. Elev (ft)	13.93	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.00	Wt. n-Val.		0.030
0.035				
W.S. Elev (ft)	13.93	Reach Len. (ft)	684.62	99.70
145.50				
Crit W.S. (ft)	0.85	Flow Area (sq ft)		15306.15
243.59				
E.G. Slope (ft/ft)	0.000004	Area (sq ft)	97.55	21472.42
280.16				
Q Total (cfs)	8500.00	Flow (cfs)		8451.54
48.46				
Top Width (ft)	1755.61	Top Width (ft)	28.14	1596.58
130.90				
Vel Total (ft/s)	0.55	Avg. Vel. (ft/s)		0.55
0.20				
Max Chl Dpth (ft)	14.93	Hydr. Depth (ft)		13.98
3.83				
Conv. Total (cfs)	4423847.0	Conv. (cfs)		4398625.0
25221.6				
Length Wtd. (ft)	237.97	Wetted Per. (ft)		1095.22
63.95				

Min Ch El (ft)	-1.00	Shear (lb/sq ft)		0.00
0.00				
Alpha	1.02	Stream Power (lb/ft s)		0.00
0.00				
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	130.87	237.26
85.72				
C & E Loss (ft)	0.00	Cum SA (acres)	25.07	17.91
23.95				

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

CROSS SECTION

RIVER: Existing
REACH: Buena Vista RS: 1681

INPUT
Description:
Station Elevation Data num= 63

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	18	1	16	21.62	13	23.97	12	28.15	11
35.22	10	123.88	8	133.07	8	149.24	7	163.71	6
242.94	5	267.06	4	288.61	3	466.03	3	871.71	4
890.48	5	958.87	5	979.22	5	1002.07	5	1006.18	4
1010.82	3	1015.39	2	1018.95	1	1022.97	0	1026.59	-1
1030.75	-2	1034.01	-3	1118.85	-3	1122.46	-2	1126.71	-1
1131.63	0	1137.74	1	1147.89	2	1157.04	3	1181.69	4
1275.69	5	1288.17	5	1298.4	5	1320.35	6	1371.85	7
1379.53	8	1433.96	10	1438.56	11	1464.38	12	1499.06	13
1505.42	13	1544.46	13	1602.58	13	1639.89	14	1698.4	14
1737.07	13	1749.9	13	1763.55	13	1767.52	13	1787.99	14
1791.03	14	1798.45	13	1800.57	13	1824.11	14	1836.49	15
1858.74	16	1888	17	1977.77	18				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	890.48	.03	1298.4	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
890.48	1298.4	151.62	32.33	32.8	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	356.9	19	F
1389.7	1977.77	19	F

CROSS SECTION OUTPUT Profile #Flow1

E.G. Elev (ft)	13.93	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.01	Wt. n-Val.	0.035	0.030
0.035				
W.S. Elev (ft)	13.92	Reach Len. (ft)	151.62	32.33
32.80				

Crit W.S. (ft)	4.36	Flow Area (sq ft)	5596.37	4691.90
674.68				
E.G. Slope (ft/ft)	0.000012	Area (sq ft)	8203.74	4691.90
1191.21				
Q Total (cfs)	8500.00	Flow (cfs)	3985.12	4134.76
380.12				
Top Width (ft)	1737.24	Top Width (ft)	875.19	407.92
454.13				
Vel Total (ft/s)	0.78	Avg. Vel. (ft/s)	0.71	0.88
0.56				
Max Chl Dpth (ft)	16.92	Hydr. Depth (ft)	10.49	11.50
7.39				
Conv. Total (cfs)	2428106.0	Conv. (cfs)	1138387.0	1181133.0
108586.2				
Length Wtd. (ft)	91.32	Wetted Per. (ft)	533.61	409.48
91.40				
Min Ch El (ft)	-3.00	Shear (lb/sq ft)	0.01	0.01
0.01				
Alpha	1.05	Stream Power (lb/ft s)	0.01	0.01
0.00				
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	65.64	207.32
83.26				
C & E Loss (ft)	0.01	Cum SA (acres)	17.97	15.62
22.97				

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

CROSS SECTION

RIVER: Existing
REACH: Buena Vista RS: 1647

INPUT
Description:
Station Elevation Data num= 47

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	17	16.79	16	55.91	15	93.15	14	120.43	13
163.58	12	307.64	11	310.29	11	371.51	10	936	9.6
939.05	7	942.89	6	944.25	5	945.4	4	946.66	3
947.76	2	948.95	1	950.1	0	951.27	-1	952.41	-2
954.13	-3	961.66	-3	967.8	-2	969.86	-1	971.52	0
972.63	1	973.74	2	974.87	3	976.27	4	977.42	5
978.61	6	979.96	7	986	9.7	1672.72	10	1716.12	11
1737.14	12	1758.47	13	1778.71	14	1797.83	15	1817.28	16
1836.14	17	1855.32	18	1872.96	19	1892.67	20	1910.71	21
1929.96	22	1949.51	23						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	939.05	.03	979.96	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
939.05	979.96	77.77	66.72	65.11	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	258.3	19	F
1250.4	1949.51	19	F

CROSS SECTION OUTPUT Profile #Flow1

E.G. Elev (ft)	13.92	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.10	Wt. n-Val.	0.035	0.030
0.035				
W.S. Elev (ft)	13.82	Reach Len. (ft)	9.60	9.60
9.60				
Crit W.S. (ft)	11.60	Flow Area (sq ft)	2629.11	536.35
1107.74				
E.G. Slope (ft/ft)	0.000258	Area (sq ft)	2899.15	536.35
2989.02				
Q Total (cfs)	8500.00	Flow (cfs)	4413.09	2154.08
1932.84				
Top Width (ft)	1677.12	Top Width (ft)	841.05	40.91
795.15				
Vel Total (ft/s)	1.99	Avg. Vel. (ft/s)	1.68	4.02
1.74				
Max Chl Dpth (ft)	16.82	Hydr. Depth (ft)	3.86	13.11
4.10				
Conv. Total (cfs)	528707.6	Conv. (cfs)	274497.9	133985.5
120224.2				
Length Wtd. (ft)	9.60	Wetted Per. (ft)	681.72	47.35
271.02				
Min Ch El (ft)	-3.00	Shear (lb/sq ft)	0.06	0.18
0.07				
Alpha	1.58	Stream Power (lb/ft s)	0.10	0.73
0.12				
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	46.31	205.38
81.69				
C & E Loss (ft)	0.02	Cum SA (acres)	14.98	15.45
22.50				

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

BRIDGE

RIVER: Existing
REACH: Buena Vista RS: 1600

INPUT
Description: Carlsbad Blvd Bridge
Distance from Upstream XS = 9.595
Deck/Roadway Width = 47.26
Weir Coefficient = 2.6
Upstream Deck/Roadway Coordinates
num= 10

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
0	11	0	371.5	10	0	936	9.6	0
936	9.6	7.6	986	9.7	7.7	986	9.7	0
1693	10	0	1810	15	0	1901	20	0
2011	23	0						

Upstream Bridge Cross Section Data
Station Elevation Data num= 47

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	17	16.79	16	55.91	15	93.15	14	120.43	13
163.58	12	307.64	11	310.29	11	371.51	10	936	9.6
939.05	7	942.89	6	944.25	5	945.4	4	946.66	3
947.76	2	948.95	1	950.1	0	951.27	-1	952.41	-2
954.13	-3	961.66	-3	967.8	-2	969.86	-1	971.52	0
972.63	1	973.74	2	974.87	3	976.27	4	977.42	5
978.61	6	979.96	7	986	9.7	1672.72	10	1716.12	11
1737.14	12	1758.47	13	1778.71	14	1797.83	15	1817.28	16
1836.14	17	1855.32	18	1872.96	19	1892.67	20	1910.71	21
1929.96	22	1949.51	23						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	939.05	.03	979.96	.035

Bank Sta: Left Right Coeff Contr. Expan.
939.05 979.96 .3 .5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	258.3	19	F
1250.4	1949.51	19	F

Downstream Deck/Roadway Coordinates
num= 10

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
0	11	0	371.5	10	0	911	9.6	0
911	9.6	7.6	961	9.7	7.7	961	9.7	0
1693	10	0	1810	15	0	1901	20	0
2011	23	0						

Downstream Bridge Cross Section Data
Station Elevation Data num= 44

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	16	13.62	15	29.09	14	70.33	12	91.67	11
371.5	10	911	9.6	911.28	7	914.33	6	916.79	5
918.78	4	921.11	3	922.48	2	923.91	1	925.38	0
926.66	-1	927.94	-2	929.25	-3	948.55	-3	949.75	-2
950.88	-1	952.07	0	953.28	1	954.31	2	955.43	3
956.54	4	957.66	5	958.63	6	960.78	7	961	9.7
1685.55	10	1711.15	11	1736.27	12	1759.98	13	1779.49	14
1804.1	15	1822.22	16	1840.63	17	1855.23	18	1880.29	19
1943.35	22	1969.18	24	1985.31	26	2010.85	27		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	911.28	.03	960.78	.035

Bank Sta: Left Right Coeff Contr. Expan.
911.28 960.78 .3 .5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	273.56	19	F
1181.3	2010.85	19	F

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

Spillway height used in design =
Weir crest shape = Broad Crested

Number of Bridge Coefficient Sets = 1

Low Flow Methods and Data
Energy
Selected Low Flow Methods = Highest Energy Answer

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

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

BRIDGE OUTPUT Profile #Flow1

E.G. US. (ft)	13.92	Element	Inside BR US
Inside BR DS			
W.S. US. (ft)	13.82	E.G. Elev (ft)	13.90
13.88			
Q Total (cfs)	8500.00	W.S. Elev (ft)	13.84
13.81			
Q Bridge (cfs)	581.02	Crit W.S. (ft)	11.16
11.14			
Q Weir (cfs)		Max Chl Dpth (ft)	16.84
16.81			
Weir Sta Lft (ft)		Vel Total (ft/s)	2.03
2.14			
Weir Sta Rgt (ft)		Flow Area (sq ft)	4193.34
3979.57			
Weir Submerg		Froude # Chl	0.10
0.10			
Weir Max Depth (ft)		Specif Force (cu ft)	11297.82
11617.59			
Min El Weir Flow (ft)	9.61	Hydr Depth (ft)	4.23
4.38			
Min El Prs (ft)	7.69	W.P. Total (ft)	1085.25
1014.60			
Delta EG (ft)	0.06	Conv. Total (cfs)	446936.1
430238.6			
Delta WS (ft)	0.08	Top Width (ft)	1677.76
1742.73			
BR Open Area (sq ft)	284.47	Frctn Loss (ft)	0.02
0.00			
BR Open Vel (ft/s)	2.04	C & E Loss (ft)	0.00
0.01			
Coef of Q		Shear Total (lb/sq ft)	0.09
0.10			
Br Sel Method	Energy only	Power Total (lb/ft s)	0.18
0.20			

Note: The weir over a bridge is submerged, the energy answer was used.

Note: The downstream water surface is above the minimum elevation required for orifice flow. The orifice flow equation was used for pressure flow.

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

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

CROSS SECTION

RIVER: Existing
REACH: Buena Vista RS: 1580

INPUT
Description:

Station Elevation Data num= 44

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	16	13.62	15	29.09	14	70.33	12	91.67	11
371.5	10	911	9.6	911.28	7	914.33	6	916.79	5
918.78	4	921.11	3	922.48	2	923.91	1	925.38	0
926.66	-1	927.94	-2	929.25	-3	948.55	-3	949.75	-2
950.88	-1	952.07	0	953.28	1	954.31	2	955.43	3
956.54	4	957.66	5	958.63	6	960.78	7	961	9.7
1685.55	10	1711.15	11	1736.27	12	1759.98	13	1779.49	14
1804.1	15	1822.22	16	1840.63	17	1855.23	18	1880.29	19
1943.35	22	1969.18	24	1985.31	26	2010.85	27		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	911.28	.03	960.78	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
911.28	960.78	476.8	269.74	307.75	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	273.56	19	F
1181.3	2010.85	19	F

CROSS SECTION OUTPUT Profile #Flow1

E.G. Elev (ft)	13.86	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.12	Wt. n-Val.	0.035	0.030	0.035
W.S. Elev (ft)	13.74	Reach Len. (ft)	476.80	269.74	307.75
Crit W.S. (ft)	11.45	Flow Area (sq ft)	2479.09	659.42	882.11
E.G. Slope (ft/ft)	0.000265	Area (sq ft)	3116.64	659.42	2997.19
Q Total (cfs)	8500.00	Flow (cfs)	4223.42	2752.60	1523.98
Top Width (ft)	1740.14	Top Width (ft)	876.92	49.50	813.72
Vel Total (ft/s)	2.11	Avg. Vel. (ft/s)	1.70	4.17	1.73
Max Chl Dpth (ft)	16.74	Hydr. Depth (ft)	3.89	13.32	4.00
Conv. Total (cfs)	522424.3	Conv. (cfs)	259578.3	169179.4	

93666.6				
Length Wtd. (ft)	324.59	Wetted Per. (ft)	640.06	55.94
223.01				
Min Ch El (ft)	-3.00	Shear (lb/sq ft)	0.06	0.19
0.07				
Alpha	1.70	Stream Power (lb/ft s)	0.11	0.81
0.11				
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	41.66	204.57
77.06				
C & E Loss (ft)	0.05	Cum SA (acres)	13.66	15.38
21.27				

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

CROSS SECTION

RIVER: Existing
REACH: Buena Vista RS: 1311

INPUT
Description:
Station Elevation Data num= 53

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	25	4.38	24	8.79	23	13.39	22	18.93	21
25.36	20	31.34	19	36.02	18	40.77	17	45.46	16
50.44	15	54.92	14	60.49	13	66.22	12	76.34	11
132.61	10	139.7	9	159.95	10	189.1	10	197.42	9
201	8	204.32	7	207.68	6	214.48	5	221.58	4
228.98	3	239.16	2	249.71	1	268.39	.951	629.58	0
648.5	-1	666.69	-2	685.47	-3	702.67	-4	725.44	-4
761.5	-3	796.67	-2	835	-1	1103.2	-1	1428.13	-.04
1441.7	0	1456.72	1	1471.79	2	1506.76	5	1525.92	7
1571.43	9	1700.16	10	1739.64	11	1792.75	12	1801.83	15
1812.44	20	1820.03	25	1823.03	27				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	268.39	.03	1428.13	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
268.39	1428.13	313.44	233.54	417.3	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	459.5	19	F
1070.36	1823.03	19	F

CROSS SECTION OUTPUT Profile #Flow1

E.G. Elev (ft)	13.80	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.01	Wt. n-Val.		0.030
W.S. Elev (ft)	13.79	Reach Len. (ft)	313.44	233.54

417.30				
Crit W.S. (ft)	0.67	Flow Area (sq ft)		9126.33
E.G. Slope (ft/ft)	0.000010	Area (sq ft)	1227.20	16762.35
2152.65				
Q Total (cfs)	8500.00	Flow (cfs)		8500.00
Top Width (ft)	1742.06	Top Width (ft)	212.29	1159.74
370.03				
Vel Total (ft/s)	0.93	Avg. Vel. (ft/s)		0.93
Max Chl Dpth (ft)	17.79	Hydr. Depth (ft)		14.94
Conv. Total (cfs)	2741584.0	Conv. (cfs)		2741584.0
Length Wtd. (ft)	238.04	Wetted Per. (ft)		611.01
Min Ch El (ft)	-4.00	Shear (lb/sq ft)		0.01
Alpha	1.00	Stream Power (lb/ft s)		0.01
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	17.89	150.63
58.87				
C & E Loss (ft)	0.01	Cum SA (acres)	7.70	11.64
17.08				

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

CROSS SECTION

RIVER: Existing
REACH: Buena Vista RS: 1078

INPUT
Description:
Station Elevation Data num= 42

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	18	9.32	17	62.8	17	73.84	17	193.54	17
229.48	17	259.86	17	281.13	16.6	357.62	16.3	367.34	15
484.33	10	511.88	9	517.89	8	544.49	7	549.82	6
553.49	5	560.53	3.249	561.53	3	569.71	1	573.42	0
577.2	-1	744.79	-1	763.53	-1	769.27	1	774.79	2.971
774.87	3	777.69	4	780.52	5	783.35	6	785.51	7
795.9	8	802.78	9	808.08	16	1178.8	16.3	1282.45	16.6
1349.55	17	1487.3	17	1503.69	17	1528.51	17	1542.96	18
1582.01	20	1602.3	21						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	560.53	.03	774.79	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
560.53	774.79	40.6	38.95	38.81	.1 .3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	521.32	21	F
801.32	1602.3	21	F

CROSS SECTION OUTPUT Profile #Flow1

			Left OB	Channel	Right OB
E.G. Elev (ft)	13.79	Element			
Vel Head (ft)	0.10	Wt. n-Val.	0.035	0.030	0.035
W.S. Elev (ft)	13.69	Reach Len. (ft)	10.16	10.16	10.16
Crit W.S. (ft)	2.92	Flow Area (sq ft)	280.75	3089.75	187.40
E.G. Slope (ft/ft)	0.000076	Area (sq ft)	606.76	3089.75	202.75
Q Total (cfs)	8500.00	Flow (cfs)	382.69	7867.46	249.84
Top Width (ft)	408.41	Top Width (ft)	162.61	214.26	31.54
Vel Total (ft/s)	2.39	Avg. Vel. (ft/s)	1.36	2.55	1.33
Max Chl Dpth (ft)	14.69	Hydr. Depth (ft)	7.16	14.42	7.06
Conv. Total (cfs)	975892.0	Conv. (cfs)	43937.5	903269.9	28684.6
Length Wtd. (ft)	10.16	Wetted Per. (ft)	39.67	215.47	27.38
Min Ch El (ft)	-1.00	Shear (lb/sq ft)	0.03	0.07	0.03
Alpha	1.08	Stream Power (lb/ft s)	0.05	0.17	0.04
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	11.29	97.42	47.59
C & E Loss (ft)	0.00	Cum SA (acres)	6.35	7.95	15.16

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

BRIDGE

RIVER: Existing
REACH: Buena Vista RS: 1050

INPUT
Description: NCTD RR Bridge
Distance from Upstream XS = 10.16
Deck/Roadway Width = 20
Weir Coefficient = 2.6
Upstream Deck/Roadway Coordinates
num= 6

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
0	20	0	521.32	20	0	521.32	20	13.75

801.32	20	13.75	801.32	20	0	1700	20	0	

Upstream Bridge Cross Section Data
Station Elevation Data num= 42

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	18	9.32	17	62.8	17	73.84	17	193.54	17
229.48	17	259.86	17	281.13	16.6	357.62	16.3	367.34	15
484.33	10	511.88	9	517.89	8	544.49	7	549.82	6
553.49	5	560.53	3.249	561.53	3	569.71	1	573.42	0
577.2	-1	744.79	-1	763.53	-1	769.27	1	774.79	2.971
774.87	3	777.69	4	780.52	5	783.35	6	785.51	7
795.9	8	802.78	9	808.08	16	1178.8	16.3	1282.45	16.6
1349.55	17	1487.3	17	1503.69	17	1528.51	17	1542.96	18
1582.01	20	1602.3	21						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	560.53	.03	774.79	.035

Bank Sta: Left Right Coeff Contr. Expan.
560.53 774.79 .1 .3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	521.32	21	F
801.32	1602.3	21	F

Downstream Deck/Roadway Coordinates
num= 6

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
0	20	0	509.27	20	0	509.27	20	13.75
789.27	20	13.75	789.27	20	0	1700	20	0

Downstream Bridge Cross Section Data
Station Elevation Data num= 36

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	18	61.73	18	78.86	18	83.75	18	87.72	17
91.27	17	95.28	17	373.08	16.4	379.01	16.3	399.68	16.3
431.69	13	465.19	12	491.76	11	508.89	10	513.73	9
523.38	8	527.6	7	538.22	5	547.06	3	556.03	1
560.45	0	560.53	-.017	565.16	-1	754.78	-1	761.05	1
770.76	4	775.56	5.576	776.85	6	792.61	10	819.55	16.3
1237.07	16.6	1270.6	17	1455.79	17	1487.36	17	1502.57	18
1580.95	22								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	538.22	.03	775.56	.035

Bank Sta: Left Right Coeff Contr. Expan.
538.22 775.56 .1 .3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	508.89	21	F
789.27	1580.95	21	F

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

Number of Piers = 9

Pier Data
Pier Station Upstream= 549.32 Downstream= 537.23
Upstream num= 2
Width Elev Width Elev
2 -5 2 20
Downstream num= 2
Width Elev Width Elev
2 -5 2 20

Pier Data
Pier Station Upstream= 577.32 Downstream= 565.27
Upstream num= 2
Width Elev Width Elev
2 -5 2 20
Downstream num= 2
Width Elev Width Elev
2 -5 2 20

Pier Data
Pier Station Upstream= 605.32 Downstream= 593.27
Upstream num= 2
Width Elev Width Elev
2 -5 2 20
Downstream num= 2
Width Elev Width Elev
2 -5 2 20

Pier Data
Pier Station Upstream= 633.32 Downstream= 621.27
Upstream num= 2
Width Elev Width Elev
2 -5 2 20
Downstream num= 2
Width Elev Width Elev
2 -5 2 20

Pier Data
Pier Station Upstream= 661.32 Downstream= 649.29
Upstream num= 2
Width Elev Width Elev
2 -5 2 20
Downstream num= 2
Width Elev Width Elev
2 -5 2 20

Pier Data
Pier Station Upstream= 689.32 Downstream= 677.27
Upstream num= 2
Width Elev Width Elev
2 -5 2 20
Downstream num= 2
Width Elev Width Elev
2 -5 2 20

Pier Data
Pier Station Upstream= 717.32 Downstream= 705.27
Upstream num= 2
Width Elev Width Elev
2 -5 2 20
Downstream num= 2
Width Elev Width Elev

```
      2       -5       2       20

Pier Data
Pier Station     Upstream=  745.32    Downstream=  733.27
Upstream     num=        2
    Width   Elev    Width   Elev
      2       -5       2       20
Downstream     num=        2
    Width   Elev    Width   Elev
      2       -5       2       20

Pier Data
Pier Station     Upstream=  773.32    Downstream=  761.27
Upstream     num=        2
    Width   Elev    Width   Elev
      2       -5       2       20
Downstream     num=        2
    Width   Elev    Width   Elev
      2       -5       2       20

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
      Energy
Selected Low Flow Methods = Highest Energy Answer

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

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

BRIDGE OUTPUT  Profile #Flow1


  E.G. US. (ft)              13.79    Element                Inside BR US
Inside BR DS
  W.S. US. (ft)              13.69    E.G. Elev (ft)              13.79
13.78
  Q Total (cfs)            8500.00    W.S. Elev (ft)              13.68
13.68
  Q Bridge (cfs)           8500.00    Crit W.S. (ft)               3.11
 3.05
  Q Weir (cfs)                        Max Chl Dpth (ft)           14.68
14.68
  Weir Sta Lft (ft)                   Vel Total (ft/s)             2.57
 2.54
  Weir Sta Rgt (ft)                   Flow Area (sq ft)         3311.67
3350.57
  Weir Submerg                        Froude # Chl                 0.13
 0.13
  Weir Max Depth (ft)                 Specif Force (cu ft)     23039.15
23481.67
  Min El Weir Flow (ft)        20.01  Hydr Depth (ft)             12.64
12.79
  Min El Prs (ft)              13.75  W.P. Total (ft)             507.32
```

511.97			
Delta EG (ft)	0.01	Conv. Total (cfs)	564699.7
578154.8			
Delta WS (ft)	0.01	Top Width (ft)	262.00
262.00			
BR Open Area (sq ft)	3329.58	Frctn Loss (ft)	0.00
0.00			
BR Open Vel (ft/s)	2.57	C & E Loss (ft)	0.00
0.00			
Coef of Q		Shear Total (lb/sq ft)	0.09
0.09			
Br Sel Method	Energy only	Power Total (lb/ft s)	0.24
0.22			

Warning: The sluice gate calculations did not converge during the pressure flow only calculation.
Note: The downstream water surface is below the minimum elevation for pressure flow. The sluice gate equations were used for pressure flow.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Existing
REACH: Buena Vista RS: 1039

INPUT
Description:
Station Elevation Data num= 36

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	18	61.73	18	78.86	18	83.75	18	87.72	17
91.27	17	95.28	17	373.08	16.4	379.01	16.3	399.68	16.3
431.69	13	465.19	12	491.76	11	508.89	10	513.73	9
523.38	8	527.6	7	538.22	5	547.06	3	556.03	1
560.45	0	560.53	-.017	565.16	-1	754.78	-1	761.05	1
770.76	4	775.56	5.576	776.85	6	792.61	10	819.55	16.3
1237.07	16.6	1270.6	17	1455.79	17	1487.36	17	1502.57	18
1580.95	22								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	538.22	.03	775.56	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
538.22	775.56	295.4	313.15	432.17	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	508.89	21	F
789.27	1580.95	21	F

CROSS SECTION OUTPUT Profile #Flow1

E.G. Elev (ft)	13.78	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.09	Wt. n-Val.	0.035	0.030
0.035				
W.S. Elev (ft)	13.69	Reach Len. (ft)	295.40	313.15
432.17				
Crit W.S. (ft)	2.86	Flow Area (sq ft)	178.03	3337.38
86.07				
E.G. Slope (ft/ft)	0.000073	Area (sq ft)	332.68	3337.38
128.84				
Q Total (cfs)	8500.00	Flow (cfs)	212.52	8183.63
103.85				
Top Width (ft)	383.33	Top Width (ft)	113.18	237.34
32.81				
Vel Total (ft/s)	2.36	Avg. Vel. (ft/s)	1.19	2.45
1.21				
Max Chl Dpth (ft)	14.69	Hydr. Depth (ft)	6.07	14.06
6.28				
Conv. Total (cfs)	995568.7	Conv. (cfs)	24891.5	958513.7
12163.5				
Length Wtd. (ft)	313.54	Wetted Per. (ft)	29.79	239.02
14.17				
Min Ch El (ft)	-1.00	Shear (lb/sq ft)	0.03	0.06
0.03				
Alpha	1.05	Stream Power (lb/ft s)	0.03	0.16
0.03				
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	11.04	94.70
47.46				
C & E Loss (ft)	0.02	Cum SA (acres)	6.30	7.76
15.14				

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

CROSS SECTION

RIVER: Existing
REACH: Buena Vista RS: 726

INPUT
Description:
Station Elevation Data num= 40

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	20	11.05	16	20.66	15	50.72	14	69.38	13
99.7	12	124.49	12	131.47	13	244.17	13	626.29	12
635.38	11	642.96	9	651.23	7	663.53	5	668.24	4.262
669.91	4	682.38	2	694.5	0	700.36	-1	735.67	0
766.58	1	887.67	0	1002.73	0	1085.26	1	1290.27	2
1424.43	2.961	1429.9	3	1437.7	4	1443.16	5	1459.02	7
1467.64	8	1474.65	9	1479.91	10	1489.54	11	1649.19	9.4
1695.16	10	1762.1	19	1781.98	29	1784.02	30	1787.56	31

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.05	668.24	.03	1437.7	.035

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
668.24 1437.7 266.28 329.03 441.88 .1 .3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
1424.4	1787.56	20	F

CROSS SECTION OUTPUT Profile #Flow1

E.G. Elev (ft)	13.75	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.01	Wt. n-Val.	0.050	0.030
W.S. Elev (ft)	13.73	Reach Len. (ft)	266.28	329.03
441.88				
Crit W.S. (ft)	2.55	Flow Area (sq ft)	882.39	9591.85
E.G. Slope (ft/ft)	0.000011	Area (sq ft)	882.39	9730.82
1118.44				
Q Total (cfs)	8500.00	Flow (cfs)	108.56	8391.44
Top Width (ft)	1667.25	Top Width (ft)	612.56	769.46
285.23				
Vel Total (ft/s)	0.81	Avg. Vel. (ft/s)	0.12	0.87
Max Chl Dpth (ft)	14.73	Hydr. Depth (ft)	1.44	12.68
Conv. Total (cfs)	2616390.0	Conv. (cfs)	33415.1	2582975.0
Length Wtd. (ft)	348.44	Wetted Per. (ft)	613.44	756.63
Min Ch El (ft)	-1.00	Shear (lb/sq ft)	0.00	0.01
Alpha	1.15	Stream Power (lb/ft s)	0.00	0.01
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	6.92	47.73
41.27				
C & E Loss (ft)	0.03	Cum SA (acres)	3.84	4.15
13.56				

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

CROSS SECTION

RIVER: Existing
REACH: Buena Vista RS: 397

INPUT
Description:
Station Elevation Data num= 59

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev

0	20	4.4	19	8.24	18	11.88	17	15.38	16
18.77	15	22.03	14	25.47	13	29.78	12	57.39	11
84.94	11	90.26	12	220.61	12	225.23	11	227.61	10
230.11	9	230.29	8.912	232.15	8	234.37	7	239.45	5
241.53	4	244.16	2	246.03	1	247.87	0	251.09	0
253.24	1	261.04	1	273.43	0	281.5	0	286.21	1
289.48	2	292.66	3	295.62	4	297.69	5	300.18	6
304.19	6.254	315.97	7	318	8	319.81	9	321.85	10
323.71	11	350.13	11	368.58	12	387.57	12	411.33	10.6
595.78	11	676.15	12	748.85	10	839.75	10	960.01	10
1517.99	10	1539.58	11	1549.71	12	1551.6	13	1553.53	14
1558.33	16	1566.09	18	1574.05	20	1591.53	25		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.05	230.29	.03	319.81	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
230.29	319.81	212.89	204.4	198.16	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
934.4	1591.53	20	F

CROSS SECTION OUTPUT Profile #Flow1

E.G. Elev (ft)	13.71	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.29	Wt. n-Val.	0.050	0.030
0.035				
W.S. Elev (ft)	13.42	Reach Len. (ft)	212.89	204.40
198.16				
Crit W.S. (ft)	9.69	Flow Area (sq ft)	345.19	920.41
1636.73				
E.G. Slope (ft/ft)	0.000566	Area (sq ft)	345.19	920.41
3715.52				
Q Total (cfs)	8500.00	Flow (cfs)	343.19	4982.13
3174.68				
Top Width (ft)	1528.37	Top Width (ft)	206.26	89.52
1232.60				
Vel Total (ft/s)	2.93	Avg. Vel. (ft/s)	0.99	5.41
1.94				
Max Chl Dpth (ft)	13.42	Hydr. Depth (ft)	1.67	10.28
2.66				
Conv. Total (cfs)	357224.1	Conv. (cfs)	14422.8	209381.0
133420.3				
Length Wtd. (ft)	203.03	Wetted Per. (ft)	207.06	93.51
615.18				
Min Ch El (ft)	0.00	Shear (lb/sq ft)	0.06	0.35
0.09				
Alpha	2.17	Stream Power (lb/ft s)	0.06	1.88
0.18				
Frctn Loss (ft)	0.21	Cum Volume (acre-ft)	3.17	7.50
16.76				
C & E Loss (ft)	0.11	Cum SA (acres)	1.34	0.90
5.86				

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

is less than
0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid,
water surface was used.

CROSS SECTION

RIVER: Existing
REACH: Buena Vista RS: 180

INPUT
Description:
Station Elevation Data num= 42

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	23	2.51	22	4.52	21	6.63	20	9.15	19
12.27	18	14.44	17	16.5	16	18.57	15	20.61	14
24.71	13	66.04	12	138.59	7.257	142.52	7	145.07	5
146.5	4	148.12	3	149.47	2	150.69	1	152.99	0
158.34	-1	176.91	-1	181.36	0	182.58	.678	183.16	1
184.98	2	186.89	3	188.61	4	190.17	5	191.86	6
197.18	8	200.15	9	202.87	10	623.92	11	634.19	12
636.4	13	637.83	14	926.87	15	934.43	16	948.91	16
1219.16	14	1366.21	14.3						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.05	138.59	.03	197.18	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
138.59	197.18	246.68	171.04	121.32	.1 .3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
561.3	1366.21	20	F

CROSS SECTION OUTPUT Profile #Flow1

E.G. Elev (ft)	13.39	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.39	Wt. n-Val.	0.050	0.030	0.035
W.S. Elev (ft)	12.00	Reach Len. (ft)	246.68	171.04	121.32
Crit W.S. (ft)	12.00	Flow Area (sq ft)	172.16	596.88	582.01
E.G. Slope (ft/ft)	0.002352	Area (sq ft)	172.16	596.88	654.53
Q Total (cfs)	8500.00	Flow (cfs)	440.51	6422.47	1637.02
Top Width (ft)	568.21	Top Width (ft)	72.61	58.59	437.01
Vel Total (ft/s)	6.29	Avg. Vel. (ft/s)	2.56	10.76	2.81
Max Chl Dpth (ft)	13.00	Hydr. Depth (ft)	2.37	10.19	1.60
Conv. Total (cfs)	175284.6	Conv. (cfs)	9084.1	132442.3	33758.2
Length Wtd. (ft)	154.25	Wetted Per. (ft)	72.76	62.95	364.46
Min Ch El (ft)	-1.00	Shear (lb/sq ft)	0.35	1.39	

0.23					
Alpha		2.26	Stream Power (lb/ft s)	0.89	14.98
0.66					
Frctn Loss (ft)		0.05	Cum Volume (acre-ft)	1.91	3.94
6.82					
C & E Loss (ft)		0.41	Cum SA (acres)	0.66	0.55
2.07					

Warning: The energy equation could not be balanced within the specified number of iterations. The
program used critical depth for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for
additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical
depth, the calculated water surface came back below critical depth. This indicates that there
is not a valid subcritical answer. The program defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid,
water surface was used.

CROSS SECTION

RIVER: Existing
REACH: Buena Vista RS: 0

INPUT
Description:
Station Elevation Data num= 16

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	12	1	8.5	25.64	8	84.76	8	159.87	8
230.86	5	260.16	2	325.27	2	339.05	7	383.22	8
413.01	8	455.84	8	485.76	8	570.32	7	1429.27	7
1430	12								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.05	159.87	.03	383.22	.035

Bank Sta: Left	Right	Coeff Contr.	Expan.
159.87	383.22	.1	.3

CROSS SECTION OUTPUT Profile #Flow1

E.G. Elev (ft)		11.23	Element	Left OB	Channel
Right OB					
Vel Head (ft)		0.04	Wt. n-Val.	0.050	0.030
0.035					

W.S. Elev (ft)	11.19	Reach Len. (ft)		
Crit W.S. (ft)	8.16	Flow Area (sq ft)	501.67	1411.80 4239.41
E.G. Slope (ft/ft)	0.000137	Area (sq ft)	501.67	1411.80 4239.41
Q Total (cfs)	8500.00	Flow (cfs)	371.21	2788.65 5340.14
Top Width (ft)	1429.65	Top Width (ft)	159.64	223.35 1046.66
Vel Total (ft/s)	1.38	Avg. Vel. (ft/s)	0.74	1.98 1.26
Max Chl Dpth (ft)	9.19	Hydr. Depth (ft)	3.14	6.32 4.05
Conv. Total (cfs)	726267.3	Conv. (cfs)	31717.3	238271.4 456278.5
Length Wtd. (ft)		Wetted Per. (ft)	161.67	224.46 1050.29
Min Ch El (ft)	2.00	Shear (lb/sq ft)	0.03	0.05 0.03
Alpha	1.21	Stream Power (lb/ft s)	0.02	0.11 0.04
Frctn Loss (ft)		Cum Volume (acre-ft)		
C & E Loss (ft)		Cum SA (acres)		

SUMMARY OF MANNING'S N VALUES

River:Existing

Reach	River Sta.	n1	n2	n3
Buena Vista	7947	.035	.03	.035
Buena Vista	7865	.035	.03	.035
Buena Vista	7697	.035	.03	.035
Buena Vista	7483	.035	.03	.035
Buena Vista	7282	.035	.03	.035
Buena Vista	7136	.035	.03	.035
Buena Vista	6964	.035	.03	.035
Buena Vista	6803	.035	.03	.035
Buena Vista	6648	.035	.03	.035
Buena Vista	6511	.035	.03	.035
Buena Vista	6381	.035	.03	.035
Buena Vista	6279	.035	.03	.035
Buena Vista	6168	.035	.03	.035
Buena Vista	6060	.035	.03	.035
Buena Vista	5939	.035	.03	.035
Buena Vista	5816	.035	.03	.035
Buena Vista	5670	.035	.03	.035
Buena Vista	5522	.035	.03	.035
Buena Vista	5368	.035	.03	.035
Buena Vista	5244	.035	.03	.035
Buena Vista	5089	.035	.03	.035
Buena Vista	4974	.035	.03	.035
Buena Vista	4887	.035	.03	.035
Buena Vista	4867	.035	.03	.035
Buena Vista	4700	Bridge		
Buena Vista	4607	.035	.03	.035

Buena Vista	4529	.035	.03	.035
Buena Vista	4400	.035	.03	.035
Buena Vista	4288	.035	.03	.035
Buena Vista	4110	.035	.03	.035
Buena Vista	3872	.035	.03	.035
Buena Vista	3623	.035	.03	.035
Buena Vista	3420	.035	.03	.035
Buena Vista	3149	.035	.03	.035
Buena Vista	2862	.035	.03	.035
Buena Vista	2630	.035	.03	.035
Buena Vista	2447	.035	.03	.035
Buena Vista	2292	.035	.03	.035
Buena Vista	2123	.035	.03	.035
Buena Vista	2005	.035	.03	.035
Buena Vista	1859	.035	.03	.035
Buena Vista	1780	.035	.03	.035
Buena Vista	1681	.035	.03	.035
Buena Vista	1647	.035	.03	.035
Buena Vista	1600	Bridge		
Buena Vista	1580	.035	.03	.035
Buena Vista	1311	.035	.03	.035
Buena Vista	1078	.035	.03	.035
Buena Vista	1050	Bridge		
Buena Vista	1039	.035	.03	.035
Buena Vista	726	.05	.03	.035
Buena Vista	397	.05	.03	.035
Buena Vista	180	.05	.03	.035
Buena Vista	0	.05	.03	.035

SUMMARY OF REACH LENGTHS

River: Existing

Reach	River Sta.	Left	Channel	Right
Buena Vista	7947	122.19	82.58	146.76
Buena Vista	7865	190.68	168.96	242.49
Buena Vista	7697	163.29	213.8	270.78
Buena Vista	7483	123.8	201.79	281.54
Buena Vista	7282	127.78	146.46	178.49
Buena Vista	7136	112.3	173.35	239.96
Buena Vista	6964	110.48	160.7	214.42
Buena Vista	6803	83.5	154.99	229.89
Buena Vista	6648	107.95	137.87	165.59
Buena Vista	6511	94.88	130.28	181.08
Buena Vista	6381	73.31	102.19	143.99
Buena Vista	6279	73.95	110.72	186.66
Buena Vista	6168	125.29	108.76	112.06
Buena Vista	6060	119.41	121.47	123.15
Buena Vista	5939	104.06	122.18	155.9
Buena Vista	5816	123.85	146.63	192.73
Buena Vista	5670	166.55	147.89	121.91
Buena Vista	5522	180.15	154.33	129.47
Buena Vista	5368	173.65	124.23	77.16
Buena Vista	5244	225.58	155.95	82.33
Buena Vista	5089	206.08	115.01	98.82
Buena Vista	4974	84.98	67.04	322
Buena Vista	4887	20	20	20
Buena Vista	4867	274	274	274
Buena Vista	4700	Bridge		

Buena Vista	4607	45.88	77.71	297.82
Buena Vista	4529	53.77	128.94	133.05
Buena Vista	4400	52.77	112.04	284.31
Buena Vista	4288	106.91	179.01	314.77
Buena Vista	4110	169.99	238.13	299.47
Buena Vista	3872	248.77	253.91	259.39
Buena Vista	3623	510.81	201.77	183.85
Buena Vista	3420	426.25	271.34	272.17
Buena Vista	3149	289.73	287.19	287.23
Buena Vista	2862	261.34	232.13	220.05
Buena Vista	2630	178.38	183.19	295.58
Buena Vista	2447	194.36	154.79	143.63
Buena Vista	2292	166.63	169.15	169.41
Buena Vista	2123	290.39	118.42	124.94
Buena Vista	2005	243.07	145.64	107.05
Buena Vista	1859	137.81	78.69	68.05
Buena Vista	1780	684.62	99.7	145.5
Buena Vista	1681	151.62	32.33	32.8
Buena Vista	1647	77.77	66.72	65.11
Buena Vista	1600	Bridge		
Buena Vista	1580	476.8	269.74	307.75
Buena Vista	1311	313.44	233.54	417.3
Buena Vista	1078	40.6	38.95	38.81
Buena Vista	1050	Bridge		
Buena Vista	1039	295.4	313.15	432.17
Buena Vista	726	266.28	329.03	441.88
Buena Vista	397	212.89	204.4	198.16
Buena Vista	180	246.68	171.04	121.32
Buena Vista	0			

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: Existing

Reach	River Sta.	Contr.	Expan.
Buena Vista	7947	.1	.3
Buena Vista	7865	.1	.3
Buena Vista	7697	.1	.3
Buena Vista	7483	.1	.3
Buena Vista	7282	.1	.3
Buena Vista	7136	.1	.3
Buena Vista	6964	.1	.3
Buena Vista	6803	.1	.3
Buena Vista	6648	.1	.3
Buena Vista	6511	.1	.3
Buena Vista	6381	.1	.3
Buena Vista	6279	.1	.3
Buena Vista	6168	.1	.3
Buena Vista	6060	.1	.3
Buena Vista	5939	.1	.3
Buena Vista	5816	.1	.3
Buena Vista	5670	.1	.3
Buena Vista	5522	.1	.3
Buena Vista	5368	.1	.3
Buena Vista	5244	.1	.3
Buena Vista	5089	.1	.3
Buena Vista	4974	.1	.3
Buena Vista	4887	.3	.5
Buena Vista	4867	.3	.5

Buena Vista	4700	Bridge		
Buena Vista	4607		.3	.4
Buena Vista	4529		.1	.3
Buena Vista	4400		.1	.3
Buena Vista	4288		.1	.3
Buena Vista	4110		.1	.3
Buena Vista	3872		.1	.3
Buena Vista	3623		.1	.3
Buena Vista	3420		.1	.3
Buena Vista	3149		.1	.3
Buena Vista	2862		.1	.3
Buena Vista	2630		.1	.3
Buena Vista	2447		.1	.3
Buena Vista	2292		.1	.3
Buena Vista	2123		.1	.3
Buena Vista	2005		.1	.3
Buena Vista	1859		.1	.3
Buena Vista	1780		.1	.3
Buena Vista	1681		.1	.3
Buena Vista	1647		.3	.5
Buena Vista	1600	Bridge		
Buena Vista	1580		.3	.5
Buena Vista	1311		.1	.3
Buena Vista	1078		.1	.3
Buena Vista	1050	Bridge		
Buena Vista	1039		.1	.3
Buena Vista	726		.1	.3
Buena Vista	397		.1	.3
Buena Vista	180		.1	.3
Buena Vista	0		.1	.3

Profile Output Table - Standard Table 1

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.
E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl	
			(cfs)	(ft)	(ft)	(ft)
(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)		
Buena Vista	7947	Flow1	8500.00	0.00	15.75	4.12
15.79	0.000038	1.72	5028.66	934.46	0.08	
Buena Vista	7865	Flow1	8500.00	-2.00	15.76	1.50
15.78	0.000016	1.19	7315.54	1205.40	0.05	
Buena Vista	7697	Flow1	8500.00	-4.00	15.77	0.56
15.78	0.000006	0.79	12049.31	1208.66	0.03	
Buena Vista	7483	Flow1	8500.00	1.00	15.76	3.73
15.78	0.000013	0.87	10529.84	1260.07	0.05	
Buena Vista	7282	Flow1	8500.00	1.00	15.76	
15.77	0.000010	0.76	12255.38	1415.89	0.04	
Buena Vista	7136	Flow1	8500.00	0.00	15.76	
15.77	0.000007	0.64	14270.92	1554.97	0.03	
Buena Vista	6964	Flow1	8500.00	1.00	15.76	
15.77	0.000006	0.59	14985.79	1585.09	0.03	
Buena Vista	6803	Flow1	8500.00	0.00	15.76	
15.77	0.000004	0.51	17030.76	1610.37	0.03	
Buena Vista	6648	Flow1	8500.00	0.00	15.76	
15.77	0.000004	0.52	17427.74	1686.39	0.03	
Buena Vista	6511	Flow1	8500.00	1.00	15.76	
15.77	0.000004	0.51	17746.60	1655.38	0.03	
Buena Vista	6381	Flow1	8500.00	0.00	15.76	
15.77	0.000003	0.48	19045.38	1608.53	0.02	

Buena Vista	6279	Flow1	8500.00	0.00	15.76	
15.77	0.000002	0.42	21452.93	1595.29	0.02	
Buena Vista	6168	Flow1	8500.00	0.00	15.76	
15.77	0.000002	0.38	22629.76	1547.69	0.02	
Buena Vista	6060	Flow1	8500.00	0.00	15.76	
15.77	0.000002	0.38	22710.90	1562.11	0.02	
Buena Vista	5939	Flow1	8500.00	0.00	15.76	
15.77	0.000002	0.38	22700.15	1561.86	0.02	
Buena Vista	5816	Flow1	8500.00	0.00	15.76	
15.77	0.000002	0.37	22956.98	1559.09	0.02	
Buena Vista	5670	Flow1	8500.00	0.00	15.76	
15.76	0.000002	0.38	22445.93	1519.46	0.02	
Buena Vista	5522	Flow1	8500.00	0.00	15.76	
15.76	0.000002	0.39	21750.33	1489.76	0.02	
Buena Vista	5368	Flow1	8500.00	0.00	15.76	1.18
15.76	0.000002	0.41	20945.81	1460.43	0.02	
Buena Vista	5244	Flow1	8500.00	0.00	15.76	1.50
15.76	0.000002	0.48	17839.00	1314.36	0.02	
Buena Vista	5089	Flow1	8500.00	0.00	15.76	1.64
15.76	0.000004	0.60	14413.73	1237.75	0.03	
Buena Vista	4974	Flow1	8500.00	0.00	15.75	2.66
15.76	0.000012	1.04	8721.34	1114.10	0.05	
Buena Vista	4887	Flow1	8500.00	1.00	15.18	9.13
15.71	0.000567	5.82	1460.17	924.71	0.31	
Buena Vista	4867	Flow1	8500.00	1.00	14.81	9.24
15.61	0.000823	7.18	1184.18	913.65	0.37	
Buena Vista	4700		Bridge			
Buena Vista	4607	Flow1	8500.00	0.00	12.95	10.29
14.62	0.002103	10.80	909.32	560.83	0.57	
Buena Vista	4529	Flow1	8500.00	-7.00	13.89	2.28
13.97	0.000066	2.19	3975.31	789.07	0.11	
Buena Vista	4400	Flow1	8500.00	-1.00	13.92	1.75
13.95	0.000024	1.36	6320.95	887.72	0.07	
Buena Vista	4288	Flow1	8500.00	-2.00	13.93	0.12
13.94	0.000007	0.76	11273.59	1261.72	0.03	
Buena Vista	4110	Flow1	8500.00	-2.00	13.93	
13.94	0.000003	0.49	17378.68	1199.97	0.02	
Buena Vista	3872	Flow1	8500.00	-2.00	13.93	
13.94	0.000003	0.49	18241.63	1359.49	0.02	
Buena Vista	3623	Flow1	8500.00	-2.00	13.93	
13.94	0.000002	0.42	20622.91	1442.30	0.02	
Buena Vista	3420	Flow1	8500.00	-2.00	13.93	
13.94	0.000001	0.36	23988.75	1682.14	0.02	
Buena Vista	3149	Flow1	8500.00	-1.00	13.93	
13.94	0.000001	0.33	25674.53	1789.06	0.02	
Buena Vista	2862	Flow1	8500.00	-2.00	13.93	
13.94	0.000001	0.32	26544.78	1816.98	0.01	
Buena Vista	2630	Flow1	8500.00	-3.00	13.93	
13.94	0.000001	0.32	26648.20	1782.09	0.01	
Buena Vista	2447	Flow1	8500.00	-2.00	13.93	
13.93	0.000002	0.40	22623.41	1745.88	0.02	
Buena Vista	2292	Flow1	8500.00	-2.00	13.93	
13.93	0.000002	0.42	21576.38	1668.46	0.02	
Buena Vista	2123	Flow1	8500.00	-1.00	13.93	0.22
13.93	0.000002	0.45	20302.66	1695.11	0.02	
Buena Vista	2005	Flow1	8500.00	-1.00	13.93	0.31
13.93	0.000002	0.46	19173.12	1892.59	0.02	
Buena Vista	1859	Flow1	8500.00	-1.00	13.93	0.77
13.93	0.000003	0.53	16430.98	1815.90	0.02	
Buena Vista	1780	Flow1	8500.00	-1.00	13.93	0.85
13.93	0.000004	0.55	15549.74	1755.61	0.03	
Buena Vista	1681	Flow1	8500.00	-3.00	13.92	4.36

13.93	0.000012	0.88	10962.95	1737.24	0.05	
Buena Vista	1647	Flow1	8500.00	-3.00	13.82	11.60
13.92	0.000258	4.02	4273.20	1677.12	0.20	
Buena Vista	1600		Bridge			
Buena Vista	1580	Flow1	8500.00	-3.00	13.74	11.45
13.86	0.000265	4.17	4020.62	1740.14	0.20	
Buena Vista	1311	Flow1	8500.00	-4.00	13.79	0.67
13.80	0.000010	0.93	9126.33	1742.06	0.04	
Buena Vista	1078	Flow1	8500.00	-1.00	13.69	2.92
13.79	0.000076	2.55	3557.91	408.41	0.12	
Buena Vista	1050		Bridge			
Buena Vista	1039	Flow1	8500.00	-1.00	13.69	2.86
13.78	0.000073	2.45	3601.48	383.33	0.12	
Buena Vista	726	Flow1	8500.00	-1.00	13.73	2.55
13.75	0.000011	0.87	10474.23	1667.25	0.04	
Buena Vista	397	Flow1	8500.00	0.00	13.42	9.69
13.71	0.000566	5.41	2902.33	1528.37	0.30	
Buena Vista	180	Flow1	8500.00	-1.00	12.00	12.00
13.39	0.002352	10.76	1351.05	568.21	0.59	
Buena Vista	0	Flow1	8500.00	2.00	11.19	8.16
11.23	0.000137	1.98	6152.88	1429.65	0.14	

ERRORS WARNINGS AND NOTES
Errors Warnings and Notes for Plan : ExistingBV

River: Existing Reach: Buena Vista RS: 7947 Profile: Flow1
Warning:Divided flow computed for this cross-section.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was
used.
River: Existing Reach: Buena Vista RS: 7865 Profile: Flow1
Warning:Divided flow computed for this cross-section.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was
used.
River: Existing Reach: Buena Vista RS: 7697 Profile: Flow1
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was
used.
River: Existing Reach: Buena Vista RS: 7483 Profile: Flow1
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was
used.
River: Existing Reach: Buena Vista RS: 5368 Profile: Flow1
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was
used.
River: Existing Reach: Buena Vista RS: 5244 Profile: Flow1

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
River: Existing Reach: Buena Vista RS: 5089 Profile: Flow1
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
River: Existing Reach: Buena Vista RS: 4974 Profile: Flow1
Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
River: Existing Reach: Buena Vista RS: 4887 Profile: Flow1
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
River: Existing Reach: Buena Vista RS: 4867 Profile: Flow1
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
River: Existing Reach: Buena Vista RS: 4700 Profile: Flow1
Warning:For the final momentum answer at the bridge, the upstream energy was computed lower than the downstream energy. This is not physically possible, the momentum answer has been disregarded.
River: Existing Reach: Buena Vista RS: 4700 Profile: Flow1 Upstream
Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
River: Existing Reach: Buena Vista RS: 4700 Profile: Flow1 Downstream
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
River: Existing Reach: Buena Vista RS: 4607 Profile: Flow1
Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
River: Existing Reach: Buena Vista RS: 4529 Profile: Flow1
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
River: Existing Reach: Buena Vista RS: 4400 Profile: Flow1

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

River: Existing Reach: Buena Vista RS: 4288 Profile: Flow1
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

River: Existing Reach: Buena Vista RS: 2123 Profile: Flow1
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

River: Existing Reach: Buena Vista RS: 2005 Profile: Flow1
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

River: Existing Reach: Buena Vista RS: 1859 Profile: Flow1
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

River: Existing Reach: Buena Vista RS: 1780 Profile: Flow1
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

River: Existing Reach: Buena Vista RS: 1681 Profile: Flow1
Warning:Divided flow computed for this cross-section.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

River: Existing Reach: Buena Vista RS: 1647 Profile: Flow1
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

River: Existing Reach: Buena Vista RS: 1600 Profile: Flow1
Note: The weir over a bridge is submerged, the energy answer was used.
Note: The downstream water surface is above the minimum elevation required for orifice flow. The orifice flow equation was used for pressure flow.

River: Existing Reach: Buena Vista RS: 1600 Profile: Flow1 Upstream
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

River: Existing Reach: Buena Vista RS: 1600 Profile: Flow1 Downstream
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

River: Existing Reach: Buena Vista RS: 1580 Profile: Flow1
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

River: Existing Reach: Buena Vista RS: 1311 Profile: Flow1
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.

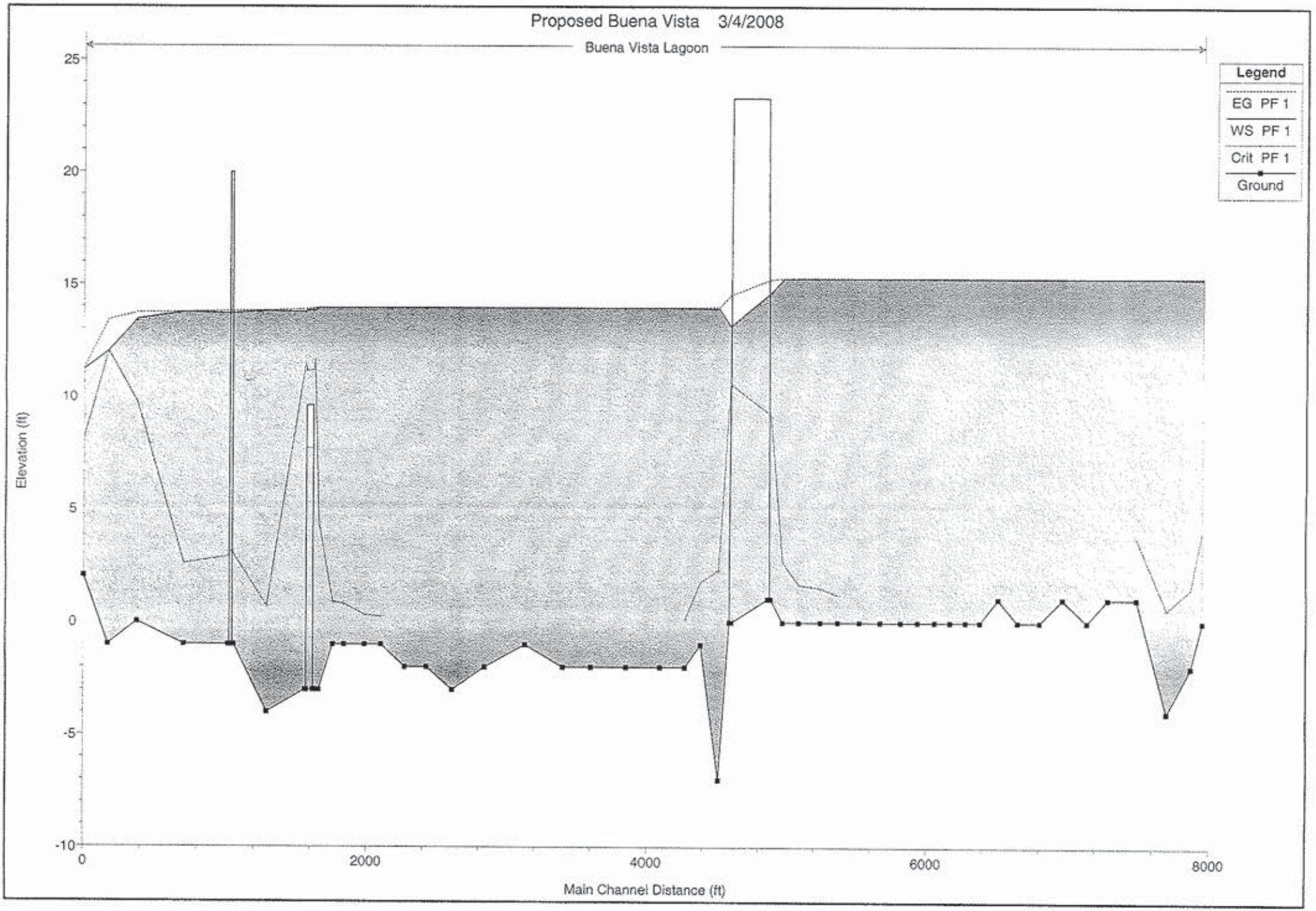
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
River: Existing Reach: Buena Vista RS: 1078 Profile: Flow1
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
River: Existing Reach: Buena Vista RS: 1050 Profile: Flow1
Warning:The sluice gate calculations did not converge during the pressure flow only calculation.
Note: The downstream water surface is below the minimum elevation for pressure flow. The sluice gate equations were used for pressure flow.
River: Existing Reach: Buena Vista RS: 1050 Profile: Flow1 Upstream
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
River: Existing Reach: Buena Vista RS: 1050 Profile: Flow1 Downstream
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
River: Existing Reach: Buena Vista RS: 1039 Profile: Flow1
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
River: Existing Reach: Buena Vista RS: 726 Profile: Flow1
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
River: Existing Reach: Buena Vista RS: 397 Profile: Flow1
Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
River: Existing Reach: Buena Vista RS: 180 Profile: Flow1
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The

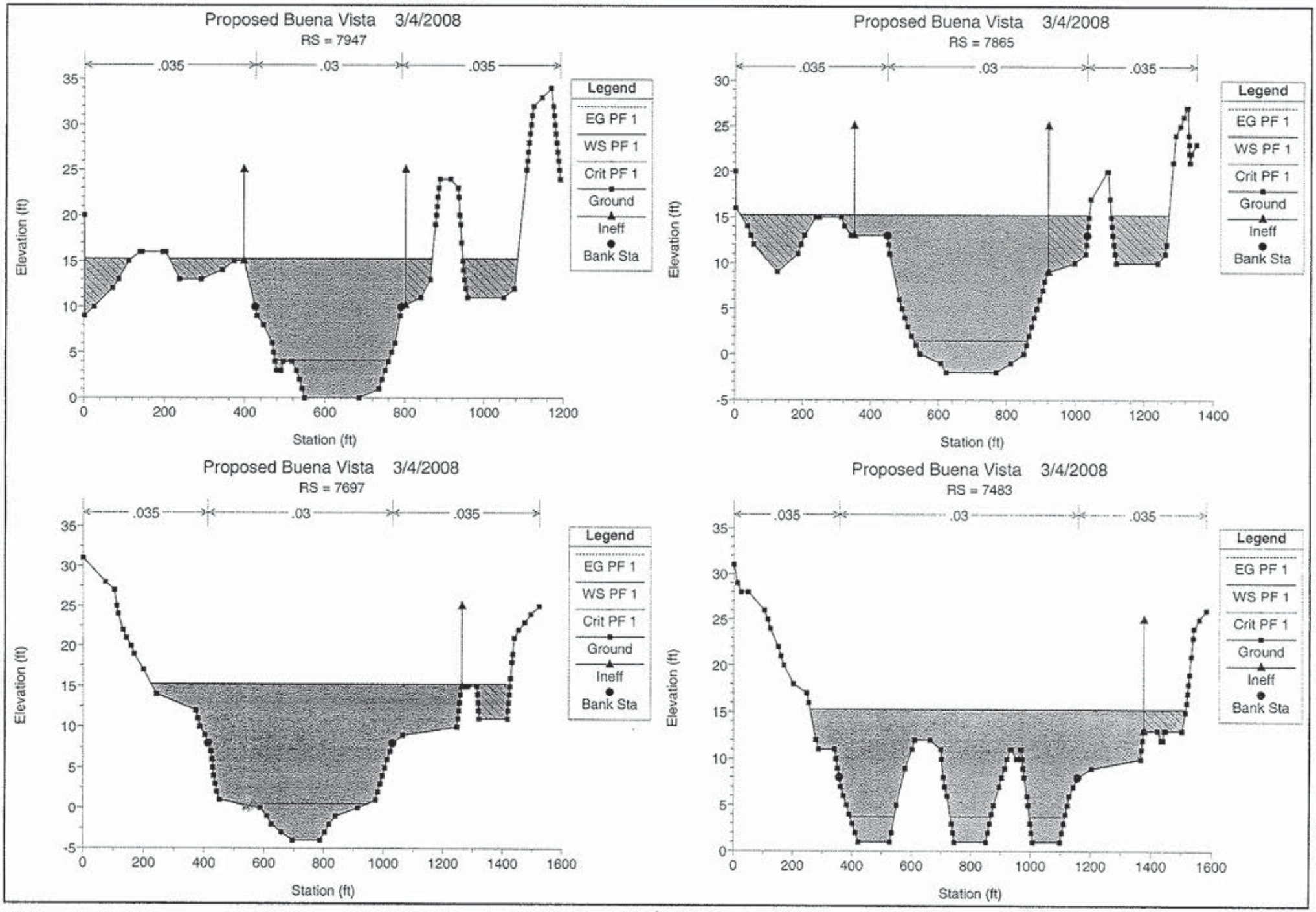
program defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

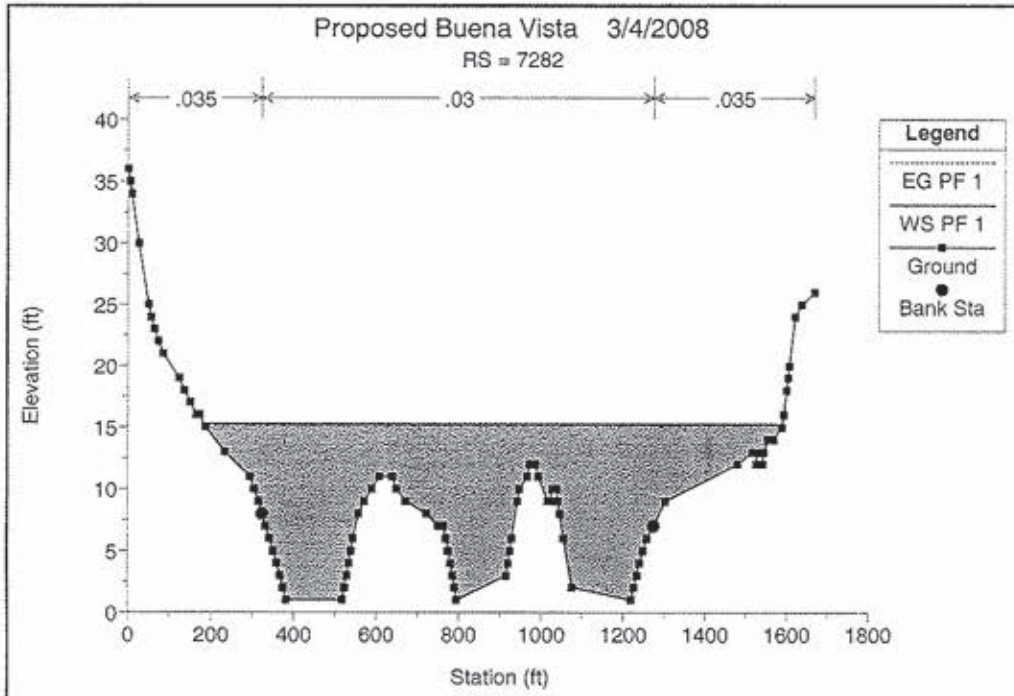
PROSPOSED

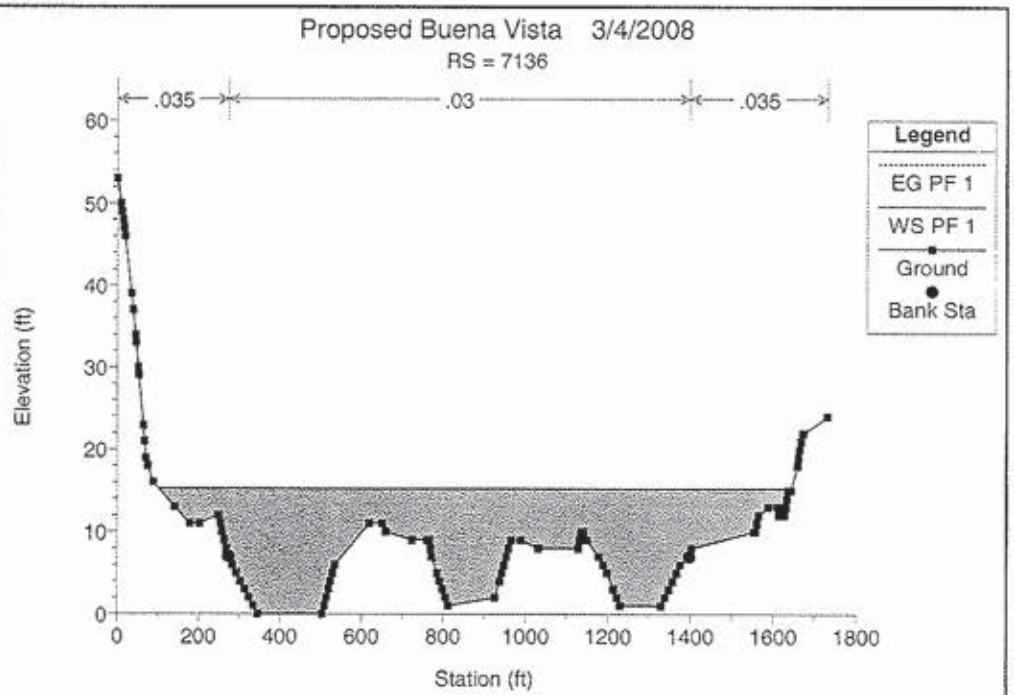
HEC-RAS Plan: Proposed BV River: Buena Vista Reach: Lagoon Profile: PF 1

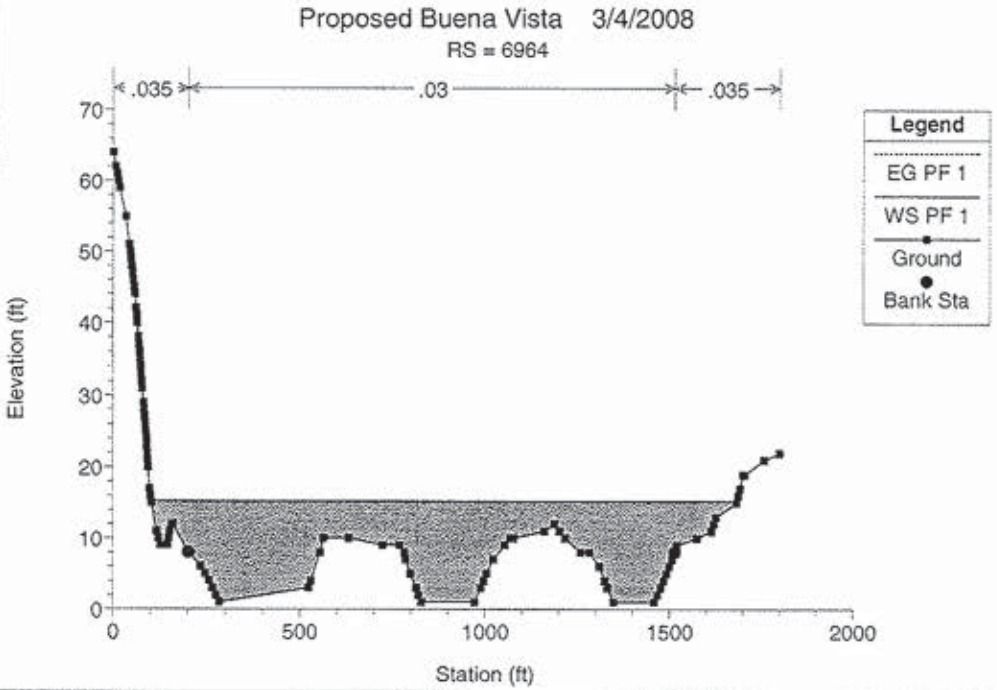
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Lagoon	7947	PF 1	8500.00	0.00	15.26	4.12	15.31	0.000044	1.79	4833.16	912.60	0.09
Lagoon	7865	PF 1	8500.00	-2.00	15.28	1.50	15.30	0.000018	1.24	7041.56	1193.87	0.06
Lagoon	7697	PF 1	8500.00	-4.00	15.29	0.56	15.30	0.000007	0.82	11548.06	1200.76	0.04
Lagoon	7483	PF 1	8500.00	1.00	15.28	3.73	15.30	0.000015	0.92	9991.09	1255.28	0.05
Lagoon	7282	PF 1	8500.00	1.00	15.28		15.29	0.000012	0.80	11575.06	1406.20	0.04
Lagoon	7136	PF 1	8500.00	0.00	15.28		15.29	0.000008	0.68	13523.87	1544.01	0.04
Lagoon	6964	PF 1	8500.00	1.00	15.28		15.29	0.000007	0.62	14222.08	1582.05	0.03
Lagoon	6803	PF 1	8500.00	0.00	15.28		15.29	0.000005	0.53	16260.11	1585.69	0.03
Lagoon	6648	PF 1	8500.00	0.00	15.28		15.29	0.000005	0.54	16616.40	1677.56	0.03
Lagoon	6511	PF 1	8500.00	1.00	15.28		15.28	0.000004	0.53	16951.76	1639.75	0.03
Lagoon	6381	PF 1	8500.00	0.00	15.28		15.28	0.000003	0.50	18272.67	1594.83	0.02
Lagoon	6279	PF 1	8500.00	0.00	15.28		15.28	0.000002	0.43	20691.35	1562.22	0.02
Lagoon	6168	PF 1	8500.00	0.00	15.28		15.28	0.000002	0.39	21883.83	1544.90	0.02
Lagoon	6060	PF 1	8500.00	0.00	15.28		15.28	0.000002	0.39	21957.85	1559.88	0.02
Lagoon	5939	PF 1	8500.00	0.00	15.28		15.28	0.000002	0.39	21947.16	1559.71	0.02
Lagoon	5816	PF 1	8500.00	0.00	15.28		15.28	0.000002	0.39	22205.21	1557.32	0.02
Lagoon	5670	PF 1	8500.00	0.00	15.28		15.28	0.000002	0.39	21714.27	1513.41	0.02
Lagoon	5522	PF 1	8500.00	0.00	15.28		15.28	0.000002	0.41	21032.09	1487.18	0.02
Lagoon	5368	PF 1	8500.00	0.00	15.28	1.18	15.28	0.000002	0.42	20268.01	1457.99	0.02
Lagoon	5244	PF 1	8500.00	0.00	15.28	1.50	15.28	0.000003	0.49	17265.39	1311.03	0.02
Lagoon	5089	PF 1	8500.00	0.00	15.27	1.64	15.28	0.000004	0.62	13928.98	1234.37	0.03
Lagoon	4974	PF 1	8500.00	0.00	15.26	2.66	15.28	0.000013	1.08	8412.18	1110.44	0.05
Lagoon	4887	PF 1	8500.00	1.00	14.64	9.13	15.22	0.000670	6.12	1388.67	905.96	0.33
Lagoon	4700		Bridge									
Lagoon	4607	PF 1	8500.00	0.00	13.13	10.30	14.50	0.001757	9.98	1019.14	568.41	0.53
Lagoon	4529	PF 1	8500.00	-7.00	13.89	2.28	13.97	0.000066	2.19	3975.31	789.07	0.11
Lagoon	4400	PF 1	8500.00	-1.00	13.92	1.75	13.95	0.000024	1.36	6320.95	887.72	0.07
Lagoon	4288	PF 1	8500.00	-2.00	13.93	0.12	13.94	0.000007	0.76	11273.59	1261.72	0.03
Lagoon	4110	PF 1	8500.00	-2.00	13.93		13.94	0.000003	0.49	17378.68	1199.97	0.02
Lagoon	3872	PF 1	8500.00	-2.00	13.93		13.94	0.000003	0.49	18241.63	1359.49	0.02
Lagoon	3623	PF 1	8500.00	-2.00	13.93		13.94	0.000002	0.42	20622.91	1442.30	0.02
Lagoon	3420	PF 1	8500.00	-2.00	13.93		13.94	0.000001	0.36	23988.75	1682.14	0.02
Lagoon	3149	PF 1	8500.00	-1.00	13.93		13.94	0.000001	0.33	25674.53	1789.06	0.02
Lagoon	2862	PF 1	8500.00	-2.00	13.93		13.94	0.000001	0.32	26544.78	1816.98	0.01
Lagoon	2630	PF 1	8500.00	-3.00	13.93		13.94	0.000001	0.32	26648.20	1782.09	0.01
Lagoon	2447	PF 1	8500.00	-2.00	13.93		13.93	0.000002	0.40	22623.41	1745.88	0.02
Lagoon	2292	PF 1	8500.00	-2.00	13.93		13.93	0.000002	0.42	21576.38	1668.46	0.02
Lagoon	2123	PF 1	8500.00	-1.00	13.93	0.22	13.93	0.000002	0.45	20302.66	1695.11	0.02
Lagoon	2005	PF 1	8500.00	-1.00	13.93	0.31	13.93	0.000002	0.46	19173.12	1892.59	0.02
Lagoon	1859	PF 1	8500.00	-1.00	13.93	0.77	13.93	0.000003	0.53	16430.98	1815.90	0.02
Lagoon	1780	PF 1	8500.00	-1.00	13.93	0.85	13.93	0.000004	0.55	15549.74	1755.61	0.03
Lagoon	1681	PF 1	8500.00	-3.00	13.92	4.36	13.93	0.000012	0.88	10962.95	1737.24	0.05
Lagoon	1647	PF 1	8500.00	-3.00	13.82	11.60	13.92	0.000258	4.02	4273.20	1677.12	0.20
Lagoon	1600		Bridge									
Lagoon	1580	PF 1	8500.00	-3.00	13.74	11.45	13.86	0.000265	4.17	4020.62	1740.14	0.20
Lagoon	1311	PF 1	8500.00	-4.00	13.79	0.67	13.80	0.000010	0.93	9126.33	1742.06	0.04
Lagoon	1078	PF 1	8500.00	-1.00	13.69	2.92	13.79	0.000076	2.55	3557.91	408.41	0.12
Lagoon	1050		Bridge									
Lagoon	1039	PF 1	8500.00	-1.00	13.69	2.86	13.78	0.000073	2.45	3601.48	383.33	0.12
Lagoon	726	PF 1	8500.00	-1.00	13.73	2.55	13.75	0.000011	0.87	10474.23	1667.25	0.04
Lagoon	397	PF 1	8500.00	0.00	13.42	9.69	13.71	0.000566	5.41	2902.33	1528.37	0.30
Lagoon	180	PF 1	8500.00	-1.00	12.00	12.00	13.39	0.002352	10.76	1351.05	568.21	0.59
Lagoon	0	PF 1	8500.00	2.00	11.19	8.16	11.23	0.000137	1.98	6152.88	1429.65	0.14

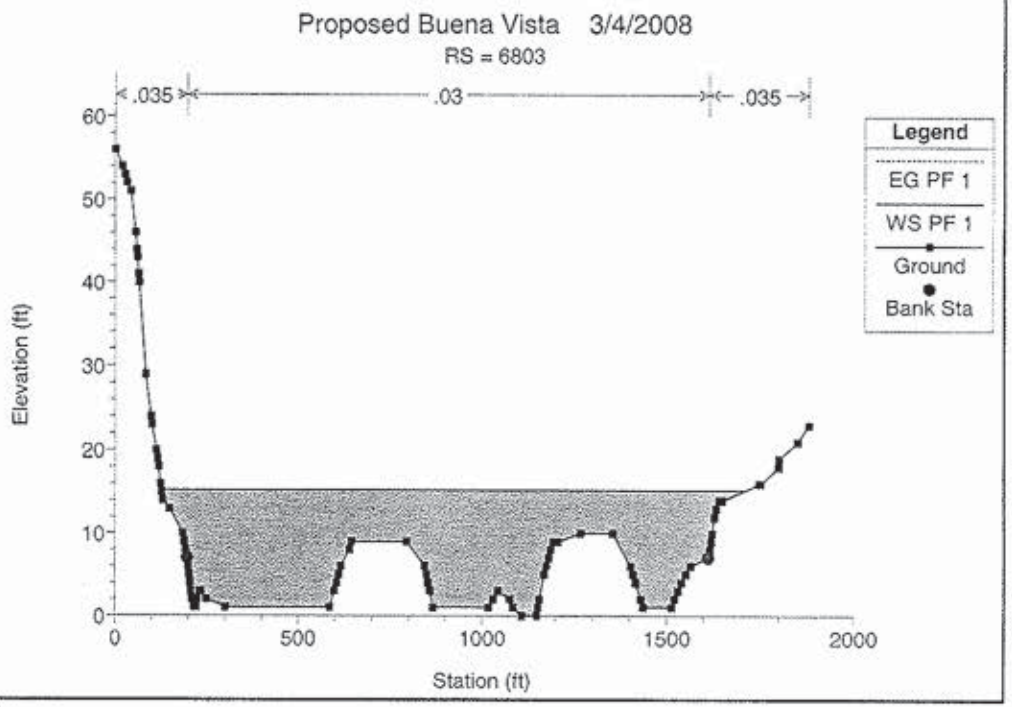

Proposed Buena Vista 3/4/2008
Buena Vista Lagoon
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Elevation (ft)
25
20
15
10
5
0
-5
-10
0
2000
4000
6000
8000
Main Channel Distance (ft)

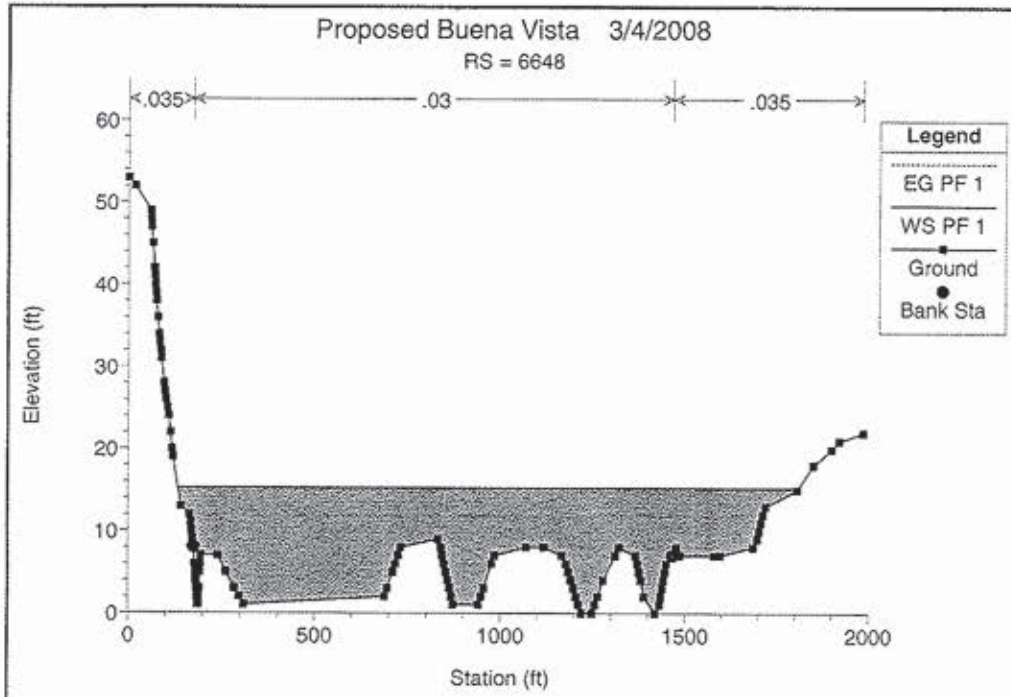

Proposed Buena Vista 3/4/2008
RS = 7947
.035
.03
.035
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Proposed Buena Vista 3/4/2008
RS = 7865
.035
.03
.035
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Proposed Buena Vista 3/4/2008
RS = 7697
.035
.03
.035
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Proposed Buena Vista 3/4/2008
RS = 7483
.035
.03
.035
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta

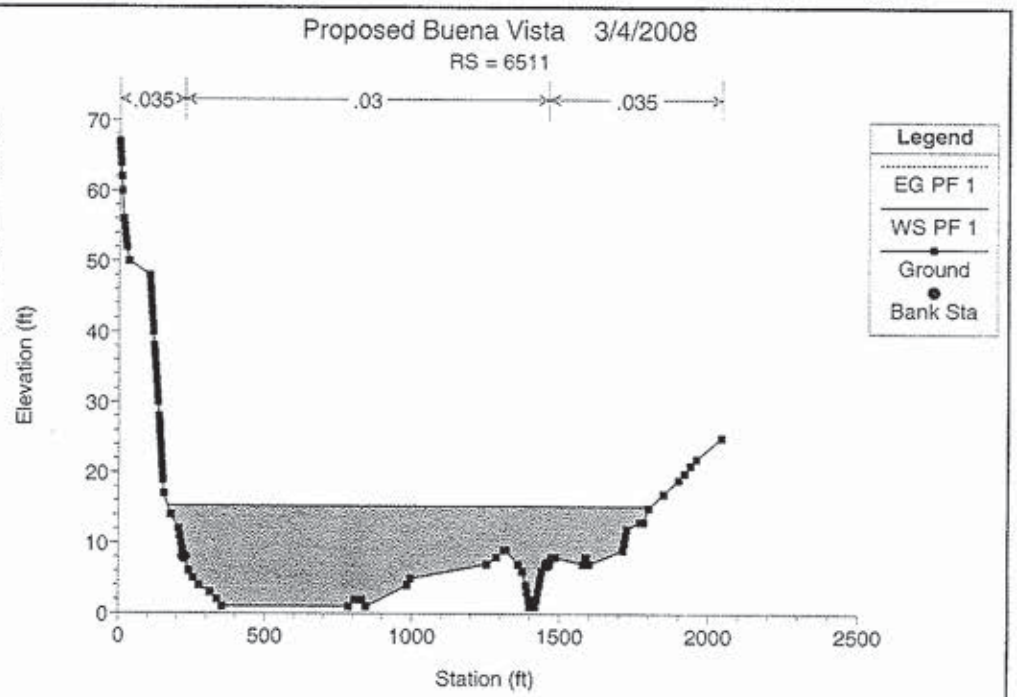

Proposed Buena Vista 3/4/2008
RS = 7282
.035
.03
.035
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

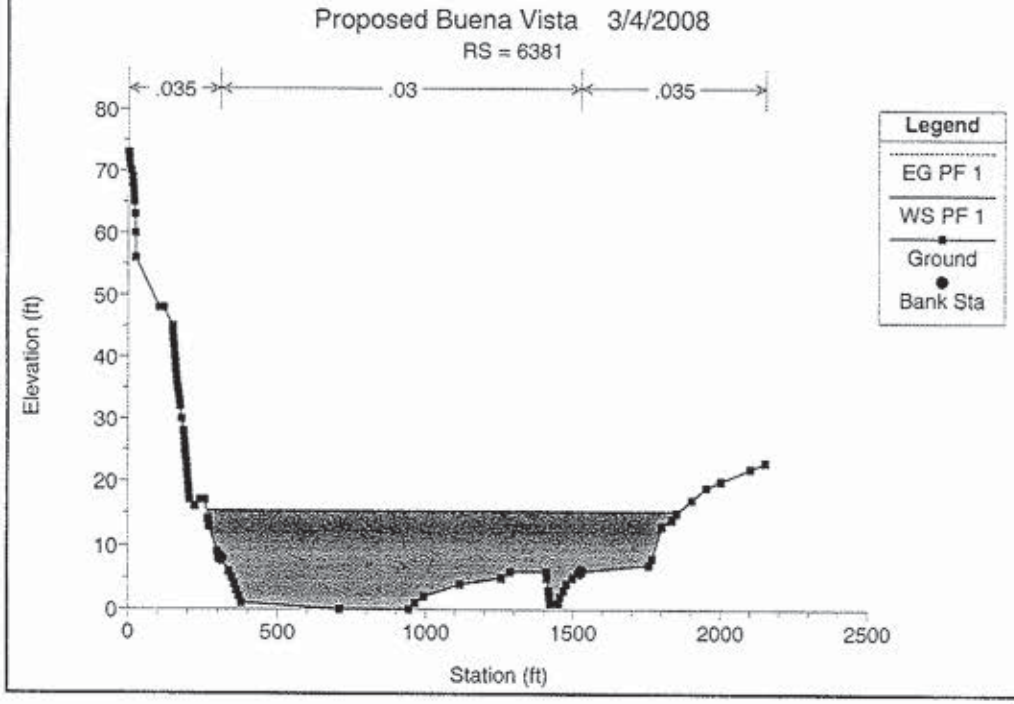

Proposed Buena Vista 3/4/2008
RS = 7136
.035
.03
.035
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

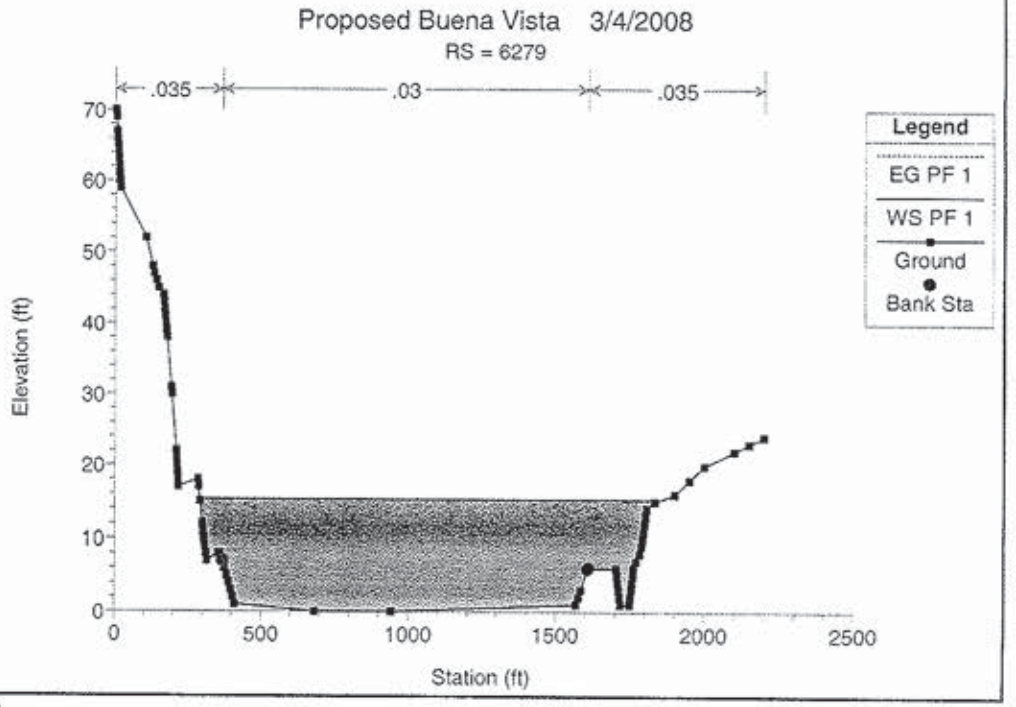

Proposed Buena Vista 3/4/2008
RS = 6964
.035
.03
.035
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

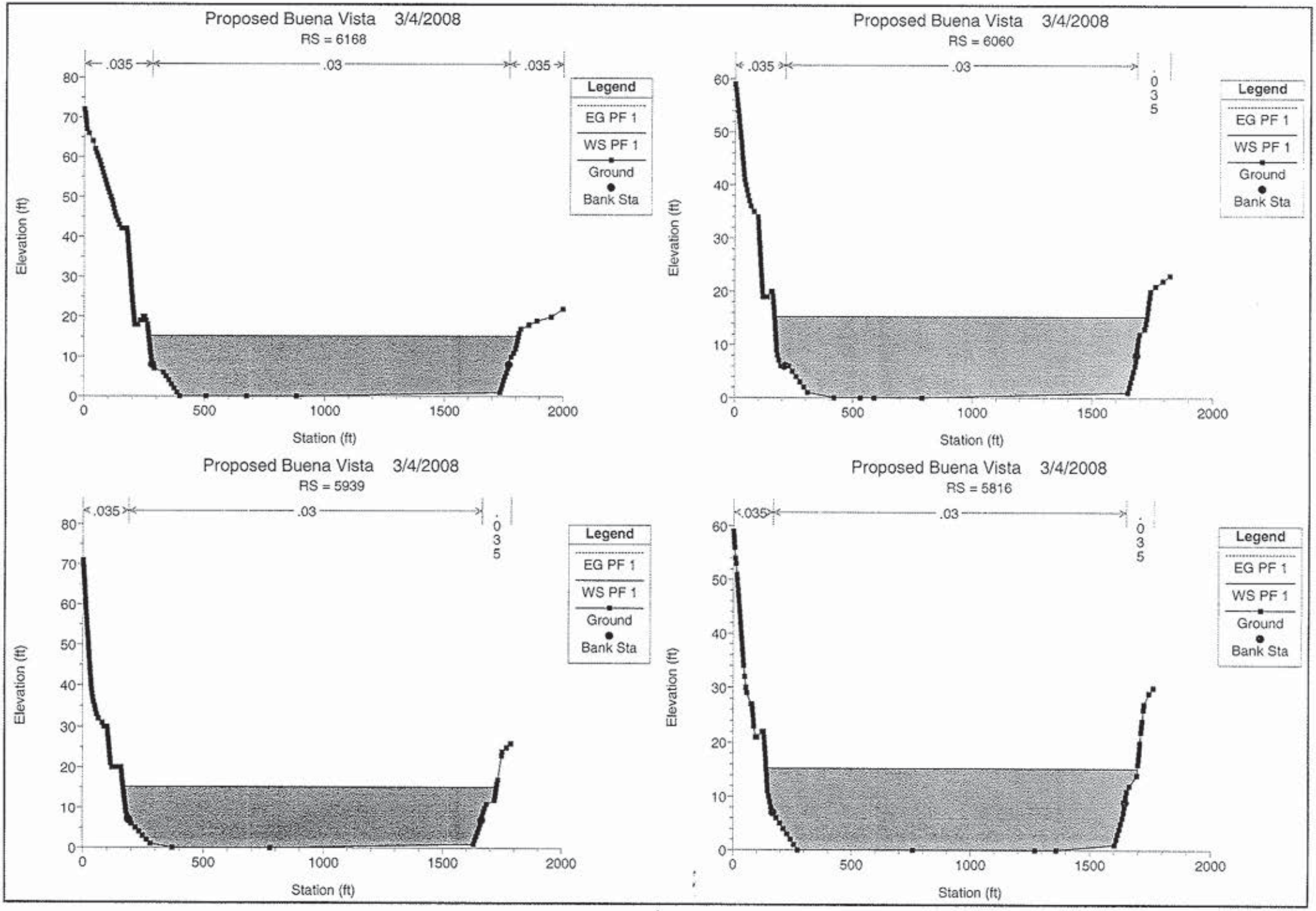

Proposed Buena Vista 3/4/2008
RS = 6803
.035
.03
.035
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

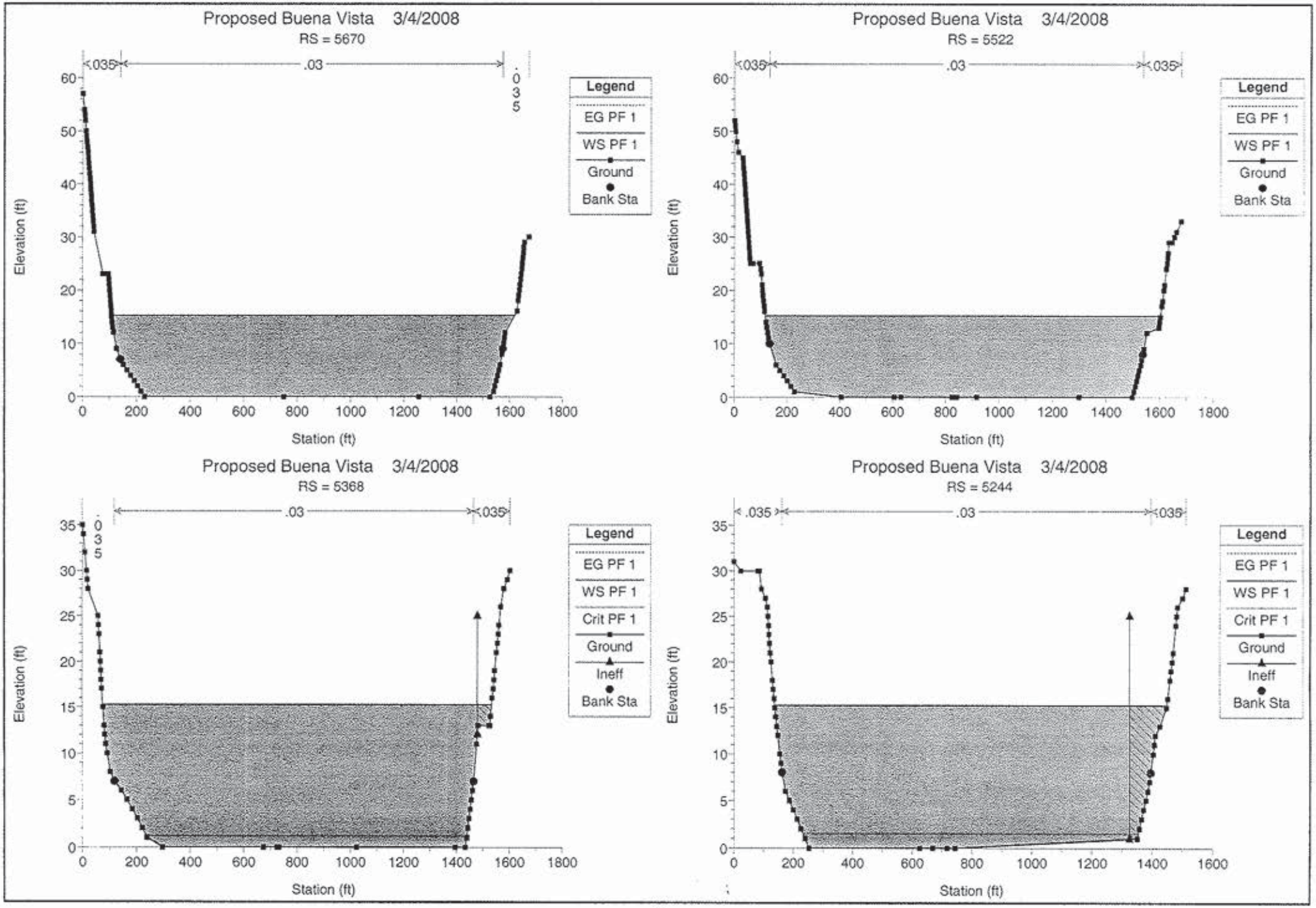

Proposed Buena Vista 3/4/2008
RS = 6648
.035
.03
.035
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
0
10
20
30
40
50
60
0
500
1000
1500
2000

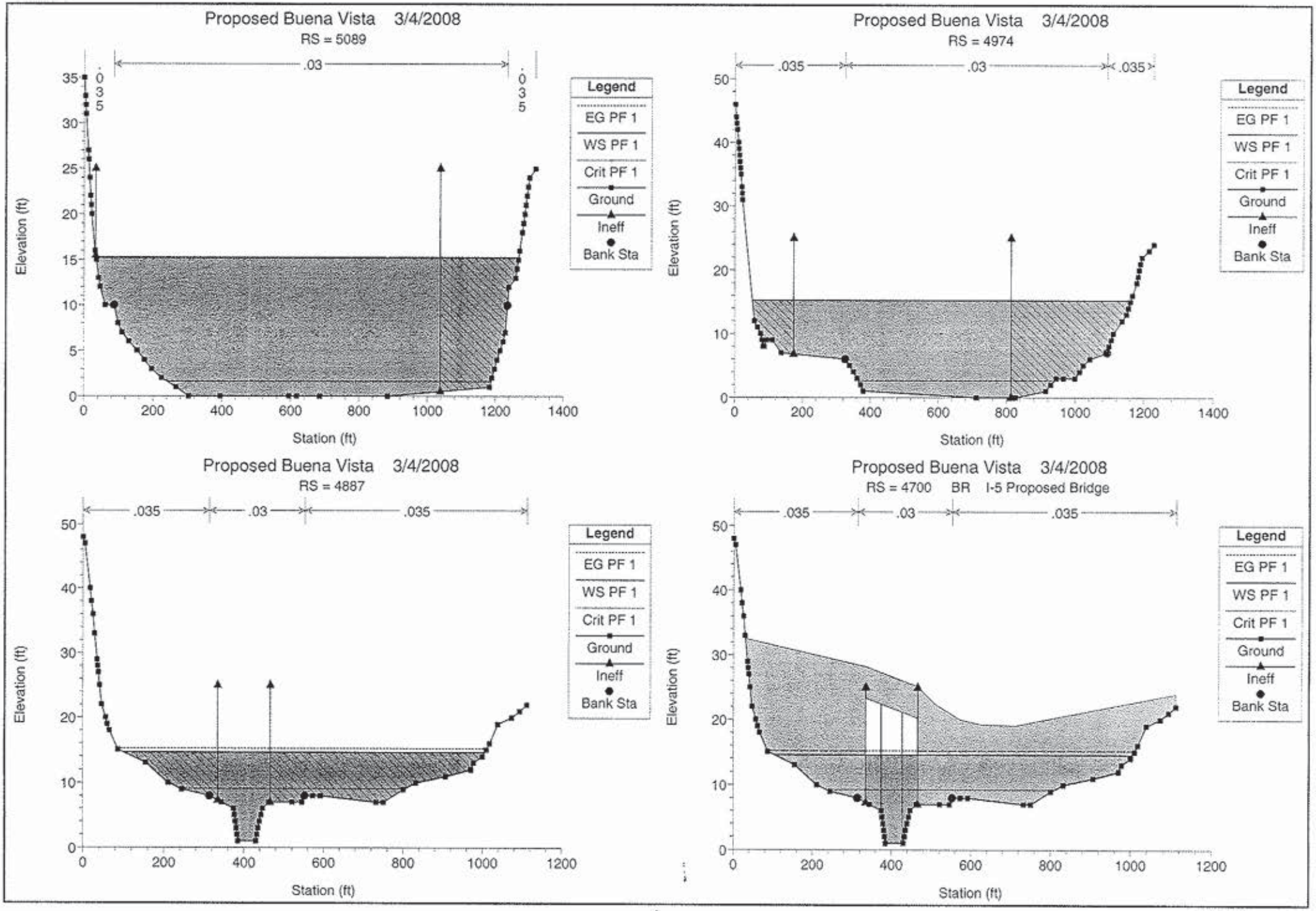

Proposed Buena Vista 3/4/2008
RS = 6511
.035
.03
.035
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
0
10
20
30
40
50
60
70
0
500
1000
1500
2000
2500

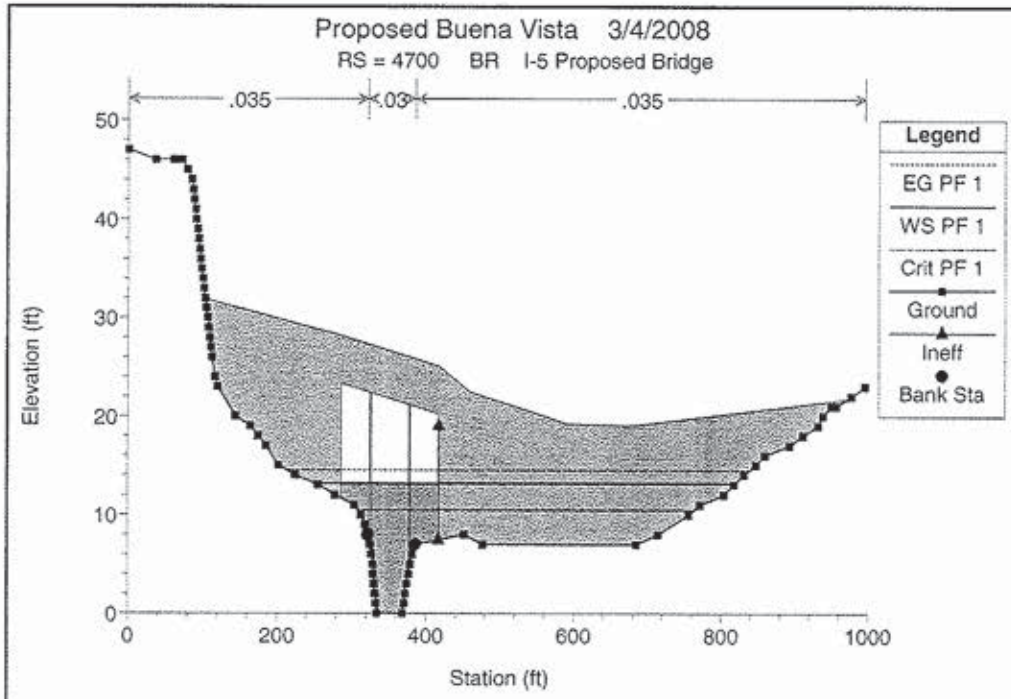

Proposed Buena Vista 3/4/2008
RS = 6381
.035
.03
.035
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
0
10
20
30
40
50
60
70
80
0
500
1000
1500
2000
2500

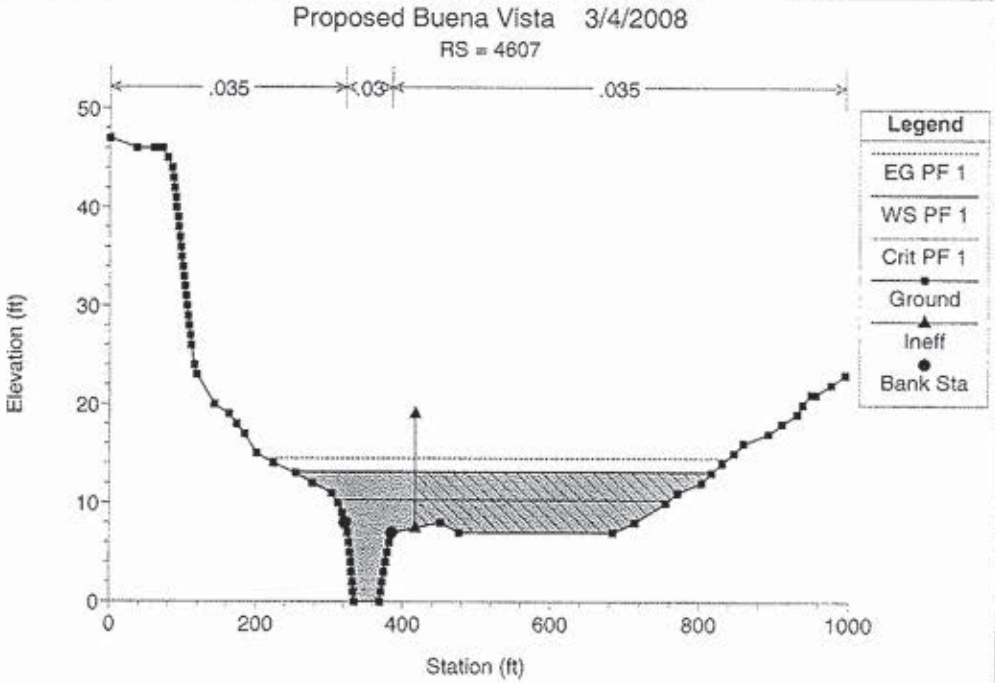

Proposed Buena Vista 3/4/2008
RS = 6279
.035
.03
.035
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
0
10
20
30
40
50
60
70
0
500
1000
1500
2000
2500

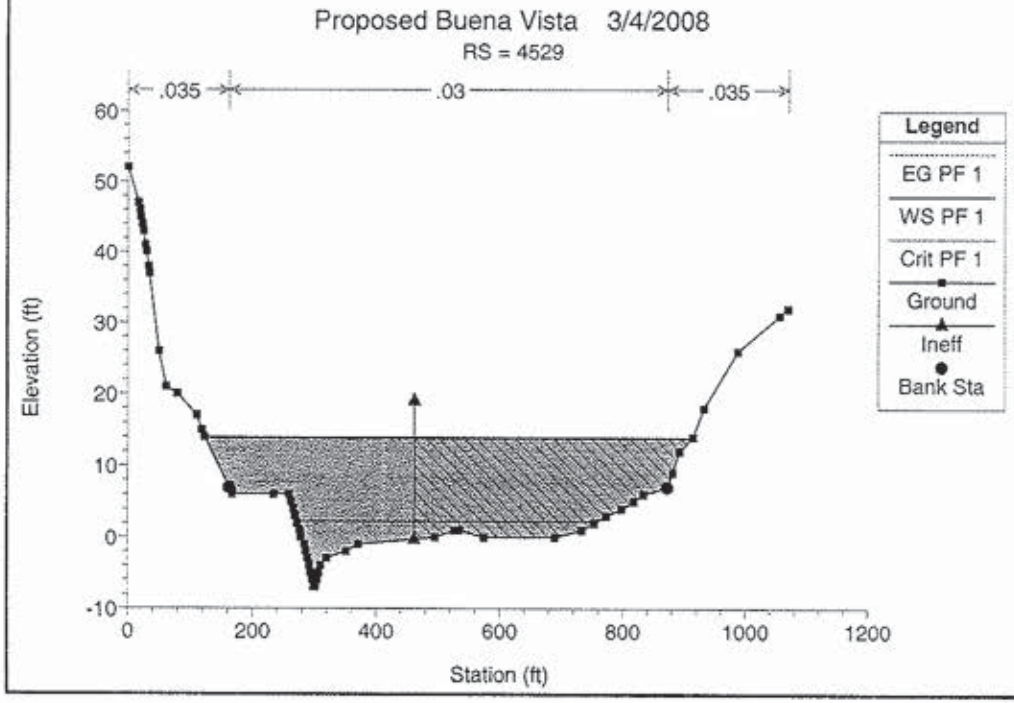

Proposed Buena Vista 3/4/2008
RS = 6168
.035
.03
.035
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
0
10
20
30
40
50
60
70
80
500
1000
1500
2000
Proposed Buena Vista 3/4/2008
RS = 6060
.035
.03
.035
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
Proposed Buena Vista 3/4/2008
RS = 5939
.035
.03
.035
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
Proposed Buena Vista 3/4/2008
RS = 5816
.035
.03
.035
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

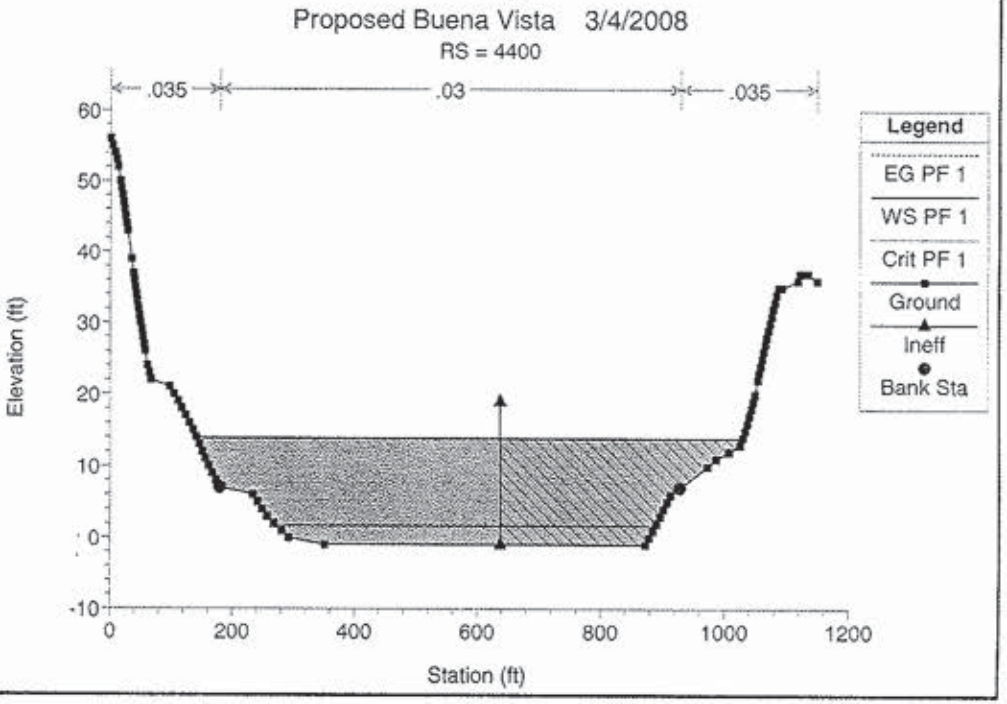

Proposed Buena Vista 3/4/2008
RS = 5670
.035
.03
.035
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
Proposed Buena Vista 3/4/2008
RS = 5522
.035
.03
.035
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
Proposed Buena Vista 3/4/2008
RS = 5368
.035
.03
.035
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Proposed Buena Vista 3/4/2008
RS = 5244
.035
.03
.035
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

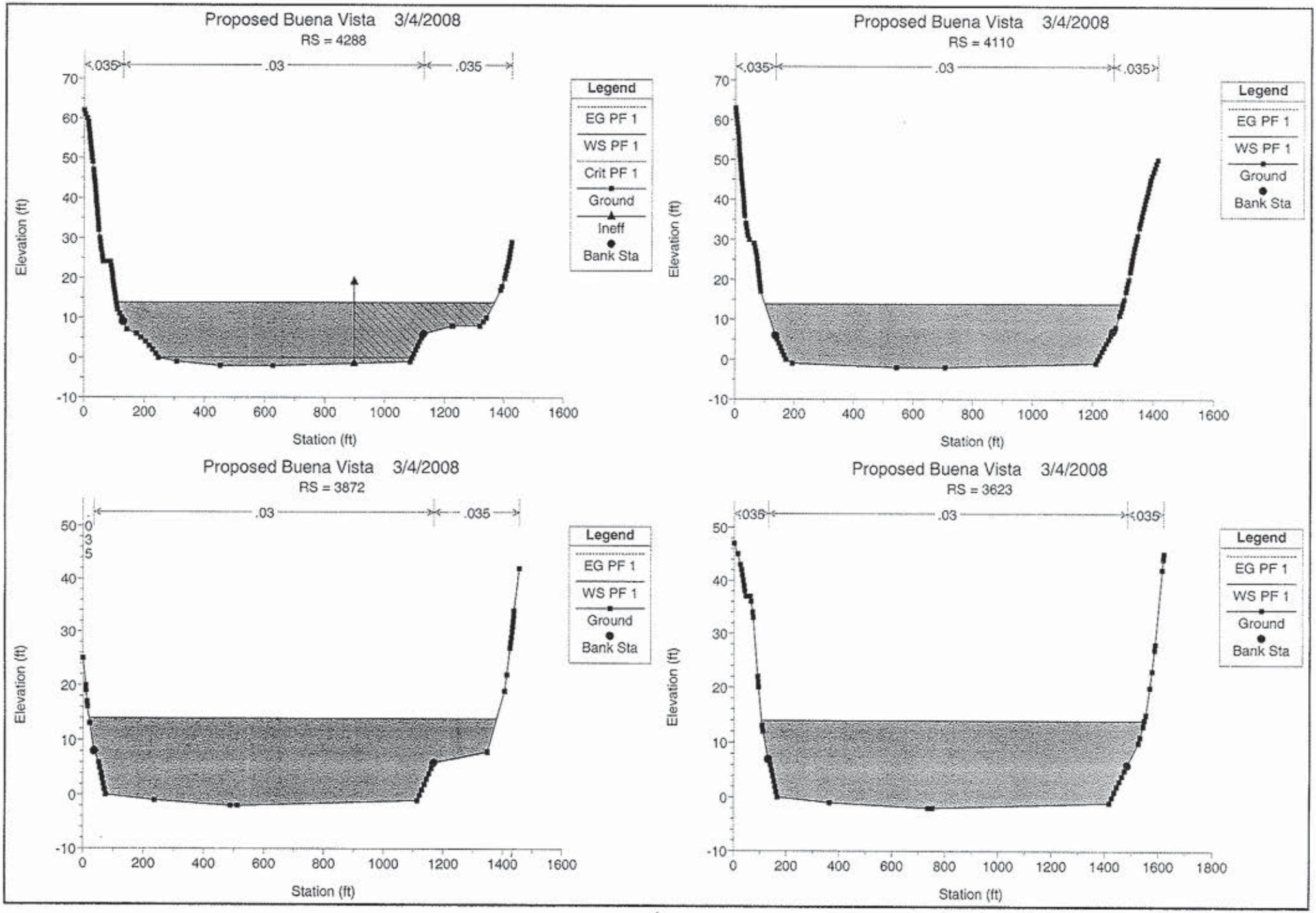

Proposed Buena Vista 3/4/2008
RS = 5089
.035
.03
.035
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Proposed Buena Vista 3/4/2008
RS = 4974
.035
.03
.035
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Proposed Buena Vista 3/4/2008
RS = 4887
.035
.03
.035
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Proposed Buena Vista 3/4/2008
RS = 4700 BR I-5 Proposed Bridge
.035
.03
.035
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

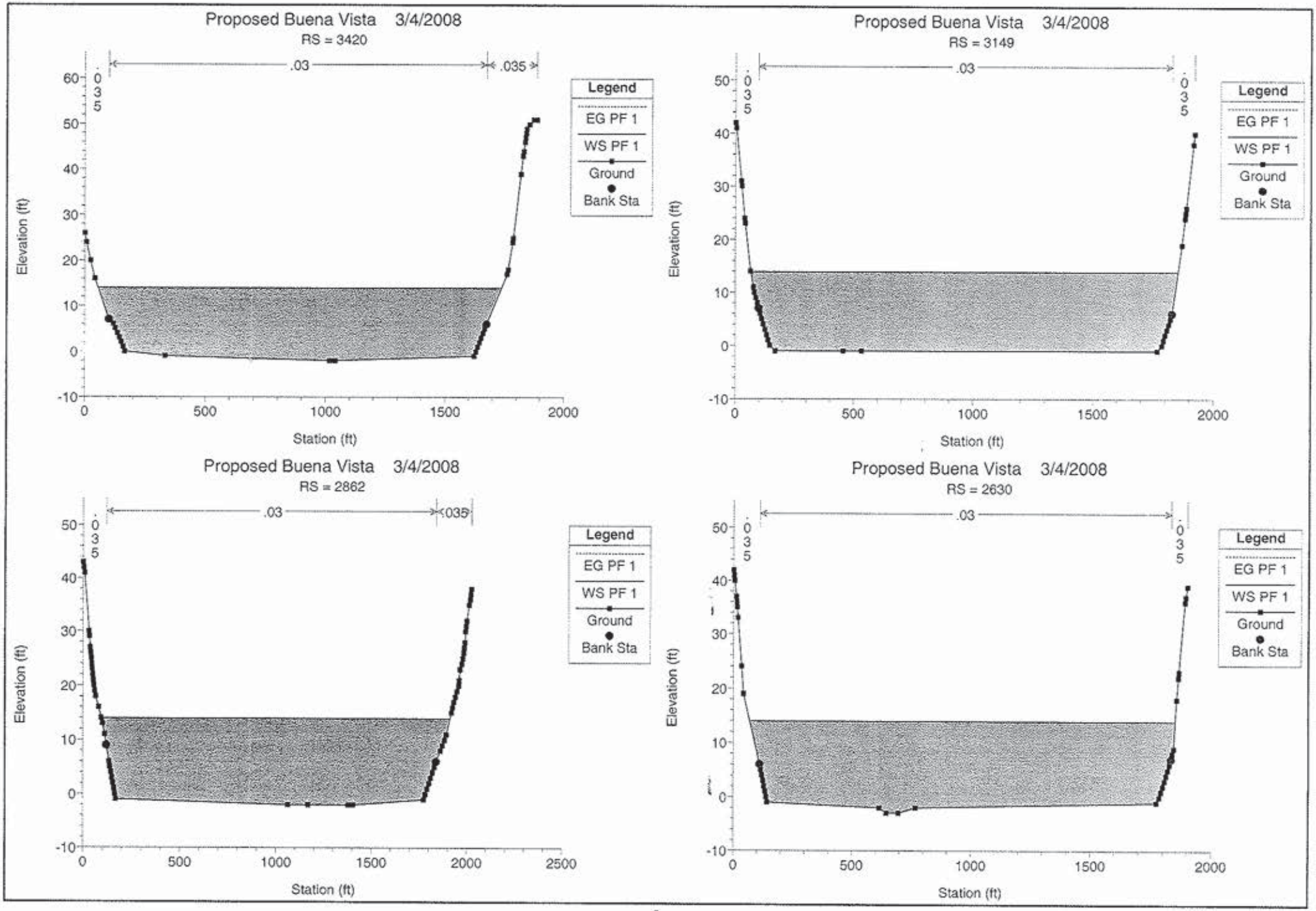

Proposed Buena Vista 3/4/2008
RS = 4700 BR I-5 Proposed Bridge
.035
.03
.035
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

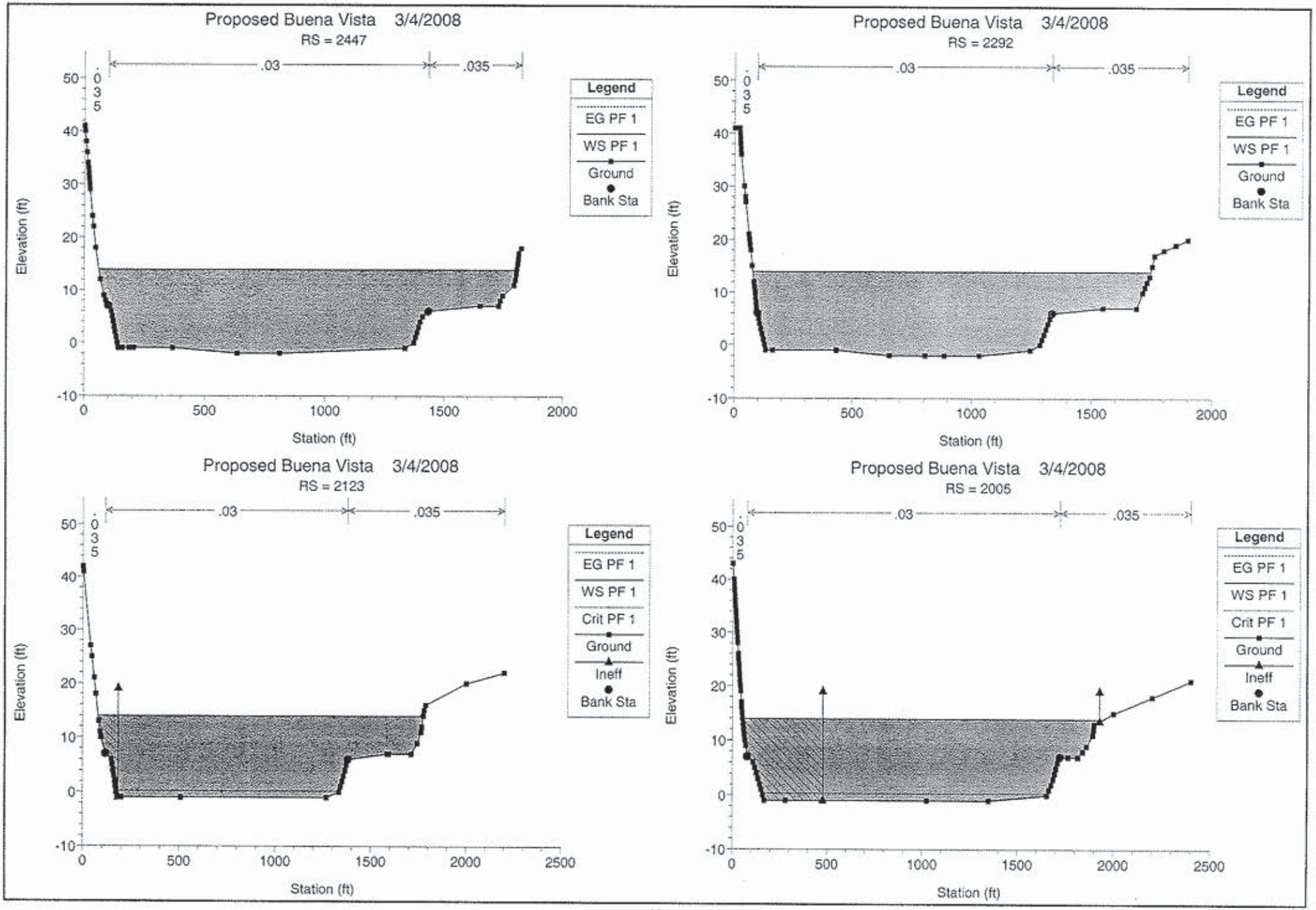

Proposed Buena Vista 3/4/2008
RS = 4607
.035
.03
.035
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

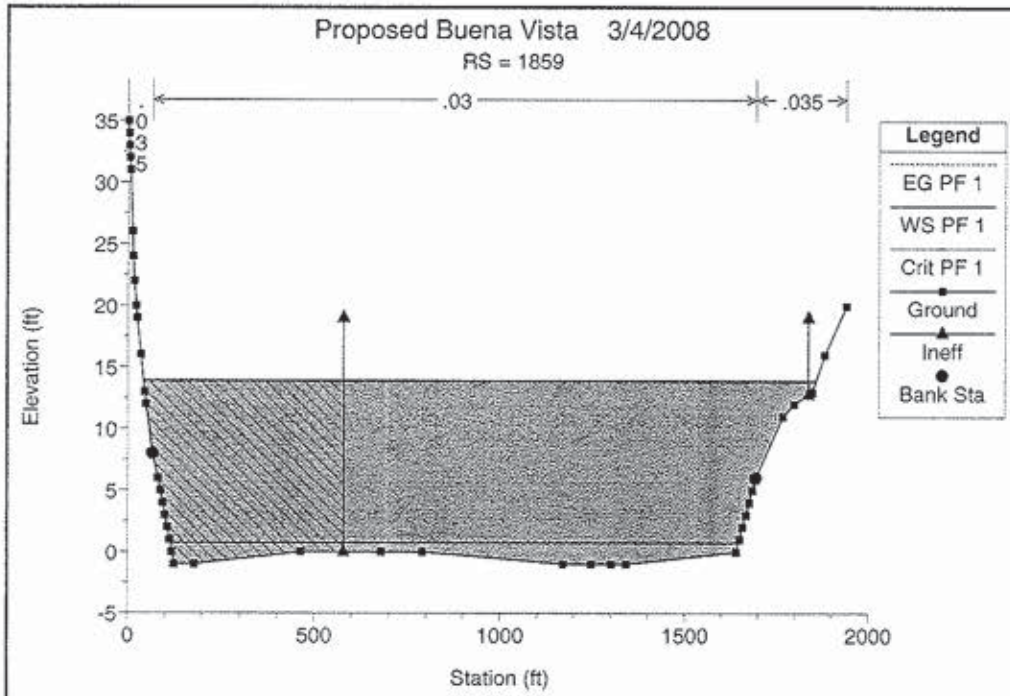

Proposed Buena Vista 3/4/2008
RS = 4529
.035
.03
.035
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

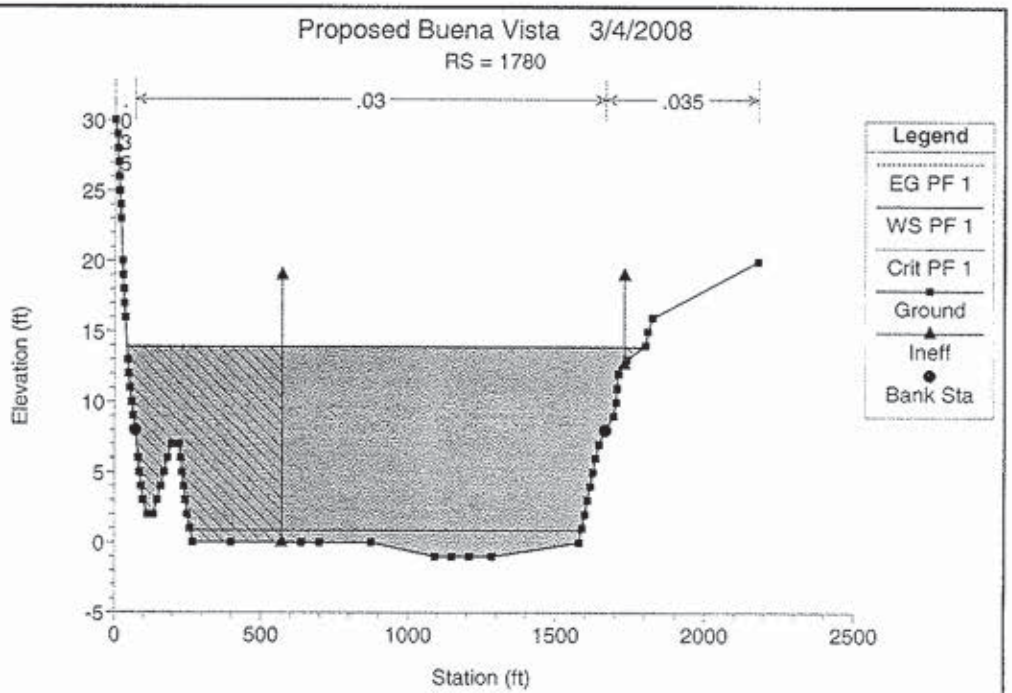

Proposed Buena Vista 3/4/2008
RS = 4400
.035
.03
.035
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

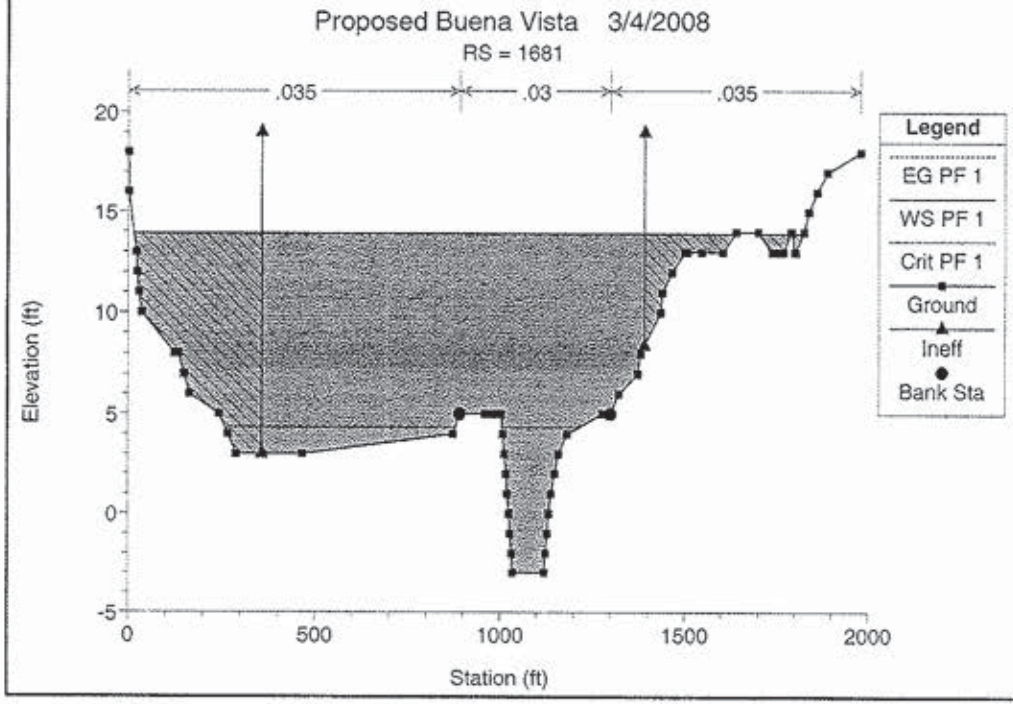

Proposed Buena Vista 3/4/2008
RS = 4288
.035
.03
.035
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Proposed Buena Vista 3/4/2008
RS = 4110
.035
.03
.035
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
Proposed Buena Vista 3/4/2008
RS = 3872
.03
.035
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
Proposed Buena Vista 3/4/2008
RS = 3623
.035
.03
.035
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

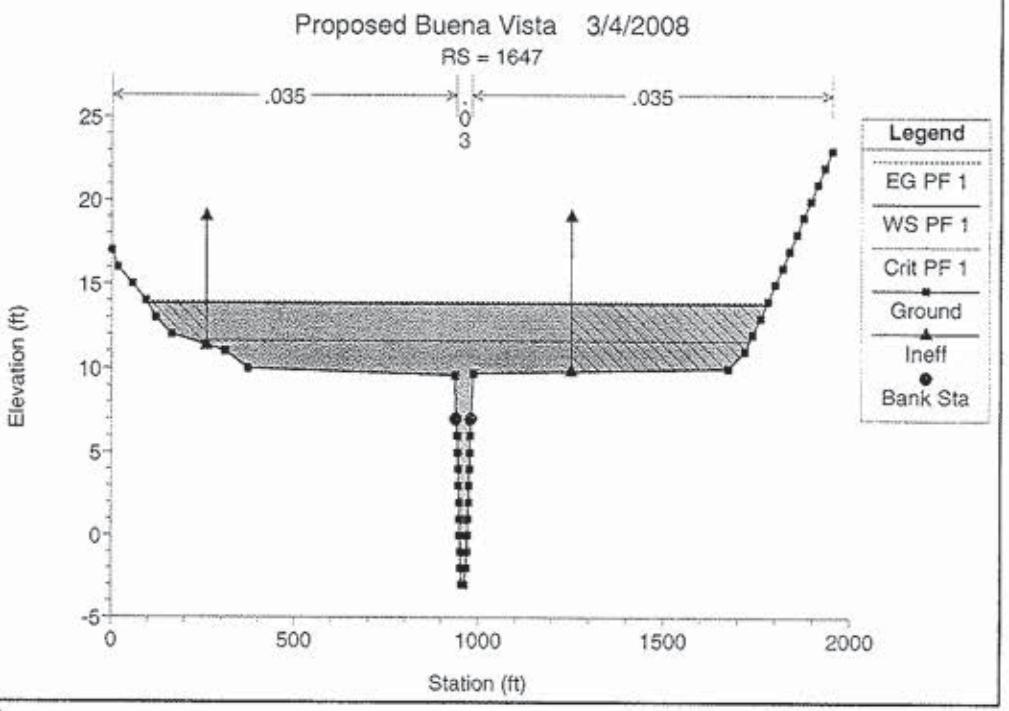

Proposed Buena Vista 3/4/2008
RS = 3420
.03
.035
.035
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
Proposed Buena Vista 3/4/2008
RS = 3149
.03
.035
.035
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
Proposed Buena Vista 3/4/2008
RS = 2862
.03
.035
.035
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
Proposed Buena Vista 3/4/2008
RS = 2630
.03
.035
.035
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

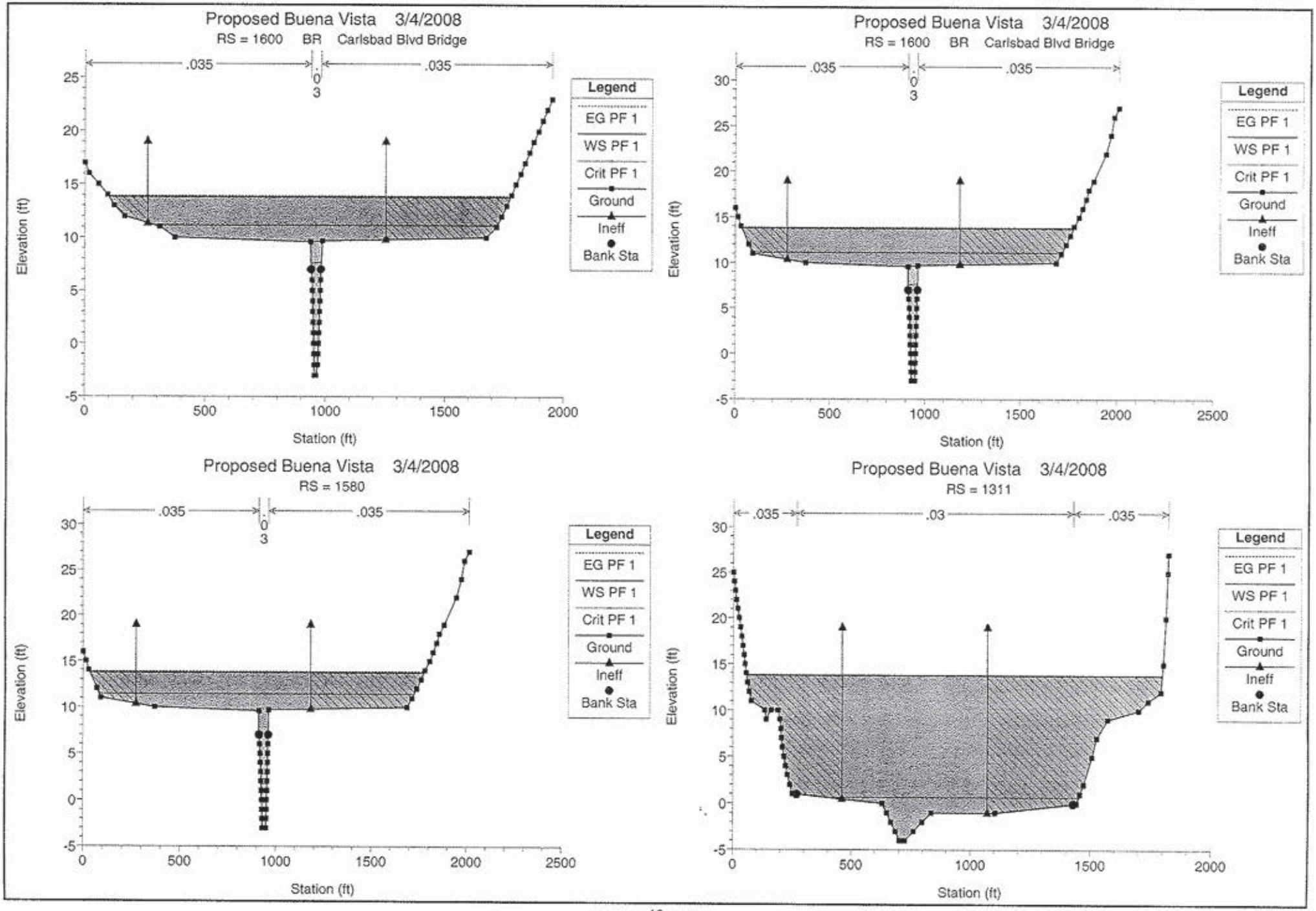

Proposed Buena Vista 3/4/2008
RS = 2447
.03
.035
.035
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
Proposed Buena Vista 3/4/2008
RS = 2292
.03
.035
.035
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
Proposed Buena Vista 3/4/2008
RS = 2123
.03
.035
.035
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Proposed Buena Vista 3/4/2008
RS = 2005
.03
.035
.035
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

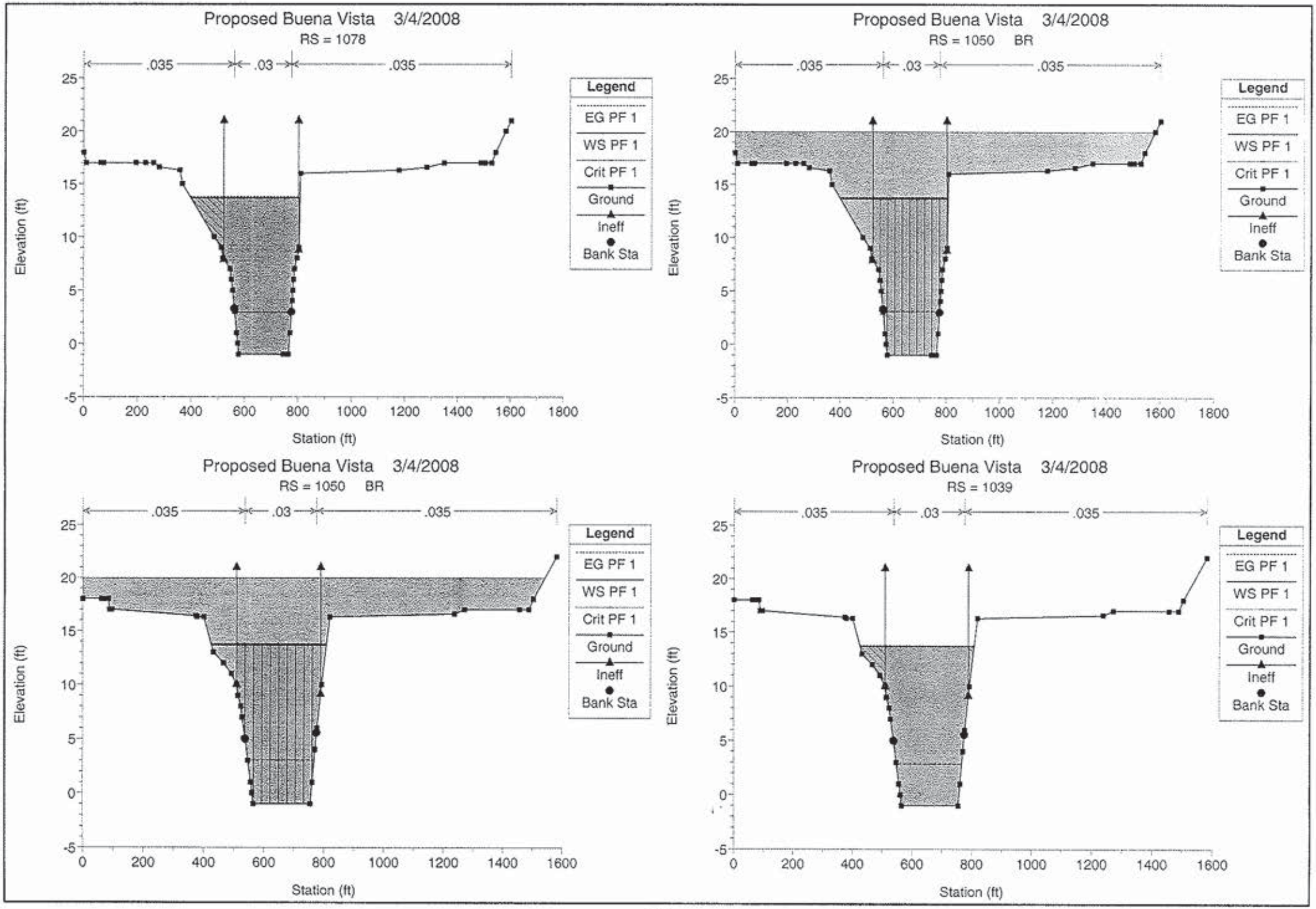

Proposed Buena Vista 3/4/2008
RS = 1859
.03
.035
.035
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

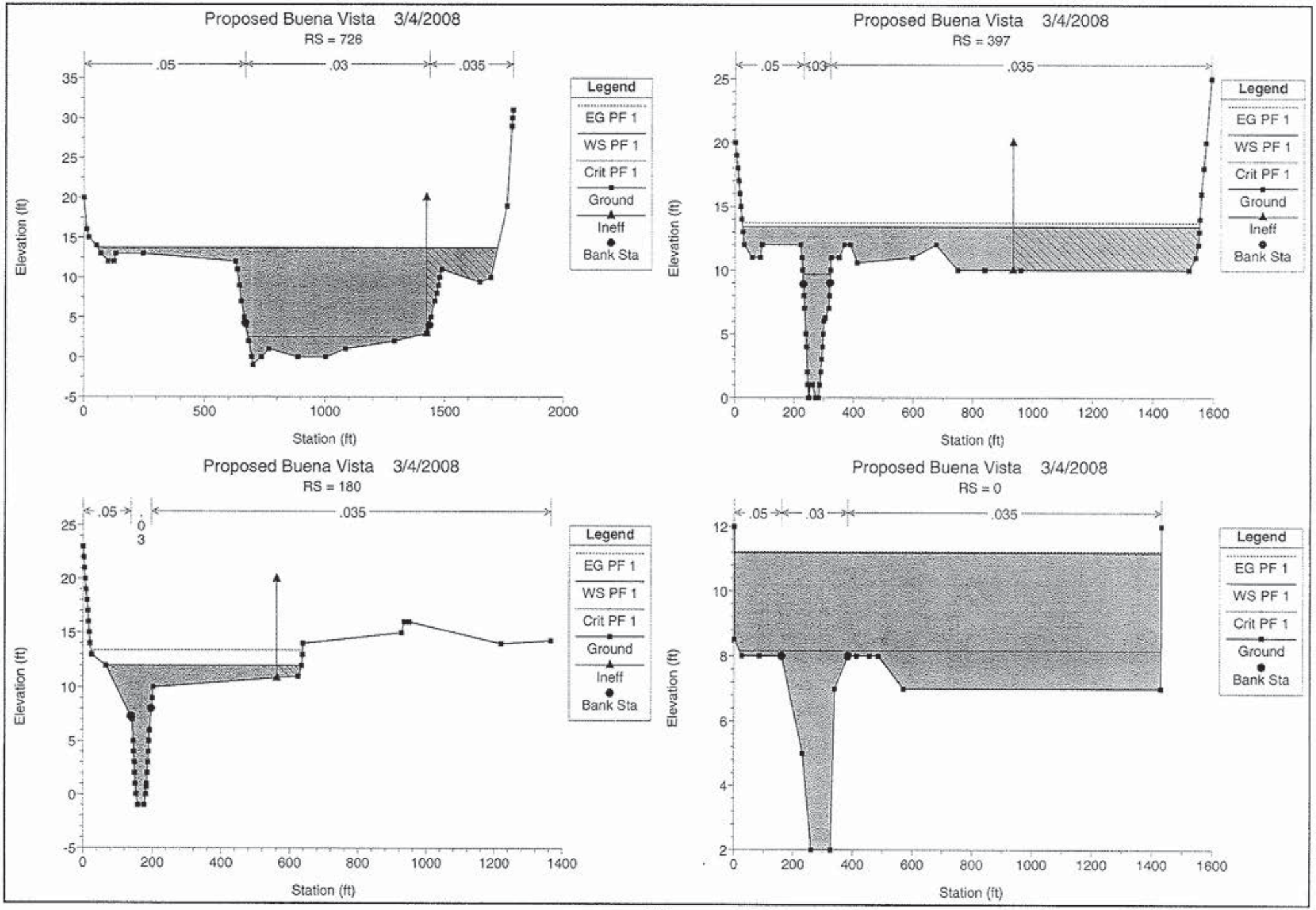

Proposed Buena Vista 3/4/2008
RS = 1780
.03
.035
.035
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


Proposed Buena Vista 3/4/2008
RS = 1681
.035
.03
.035
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


Proposed Buena Vista 3/4/2008
RS = 1647
.035
.035
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


Proposed Buena Vista 3/4/2008
RS = 1600 BR Carlsbad Blvd Bridge
.035
.035
.03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Proposed Buena Vista 3/4/2008
RS = 1600 BR Carlsbad Blvd Bridge
Proposed Buena Vista 3/4/2008
RS = 1580
Proposed Buena Vista 3/4/2008
RS = 1311


Proposed Buena Vista 3/4/2008
RS = 1078
.035
.03
.035
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Proposed Buena Vista 3/4/2008
RS = 1050 BR
.035
.03
.035
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Proposed Buena Vista 3/4/2008
RS = 1050 BR
.035
.03
.035
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Proposed Buena Vista 3/4/2008
RS = 1039
.035
.03
.035
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


Proposed Buena Vista 3/4/2008
RS = 726
.05
.03
.035
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Proposed Buena Vista 3/4/2008
RS = 397
.05
.03
.035
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Proposed Buena Vista 3/4/2008
RS = 180
.05
.03
.035
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Proposed Buena Vista 3/4/2008
RS = 0
.05
.03
.035
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta

BV_Prop.rep

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
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PROJECT DATA
Project Title: BuenaVista_Proposed
Project File : BV_Prop.prj
Run Date and Time: 3/4/2008 10:59:45 AM

Project in English units

Project Description:
Proposed Buena Vista

PLAN DATA

Plan Title: Proposed Buena Vista
Plan File : p:\1683_T064_I5_Floodplain\420_Env_ Stud\Buena Vista\HEC-RAS\Final\Proposed\BV_Prop.p03

Geometry Title: Base Conditions Geometry
Geometry File : p:\1683_T064_I5_Floodplain\420_Env_ Stud\Buena Vista\HEC-RAS\Final\Proposed\BV_Prop.G01

Flow Title : 100-year
Flow File : p:\1683_T064_I5_Floodplain\420_Env_ Stud\Buena Vista\HEC-RAS\Final\Proposed\BV_Prop.f03

Plan Summary Information:

Number of:	Cross Sections	= 50	Multiple Openings	=	0
	Culverts	= 0	Inline Structures	=	0
	Bridges	= 3	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: Subcritical Flow

FLOW DATA

Flow Title: 100-year
Flow File : p:\1683_TO64_I5_Floodplain\420_Env_ Stud\Buena Vista\HEC-RAS\Final\Proposed\BV_Prop.f03

Flow Data (cfs)

River	Reach	RS	PF 1
Buena Vista	Lagoon	7947	8500

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
Buena Vista	Lagoon	PF 1	Known WS = 17.188	Known WS = 11.19

GEOMETRY DATA

Geometry Title: Base Conditions Geometry
Geometry File : p:\1683_TO64_I5_Floodplain\420_Env_ Stud\Buena Vista\HEC-RAS\Final\Proposed\BV_Prop.G01

CROSS SECTION

RIVER: Buena Vista
REACH: Lagoon RS: 7947

INPUT
Description:
Station Elevation Data num= 78

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	20	1	9	24.85	10	70.08	12	85.21	13
109.78	15	137.27	16	142.57	16	194.05	16	201.77	16
236.6	13	289.94	13	342.74	14	371.41	15	396.96	15
424.56	10	429.64	9	446.16	8	467.51	6	471.45	5
474.99	4	478.64	3	490.23	3	496.2	4	517.04	4
528.44	3	536.76	2	542.78	1	549.18	0	685.34	0
735.27	1	743.19	2	751.09	3	759.04	4	766.94	5
775.85	6	788.31	9	791.01	10	840.27	11	863.41	13
876.15	19	878.4	20	880.3	21	882.36	22	884.9	23
887.94	24	914.96	24	933.26	23	934.96	22	937.8	20
939.53	19	942.51	17	945.84	15	947.44	14	949.45	13
953.37	12	958.47	11	1048.43	11	1075.9	12	1106.08	25
1108.17	26	1110.24	27	1112.51	28	1114.86	29	1117.3	30
1119.75	31	1123.15	32	1144.45	33	1167.72	34	1173.22	32
1175.25	31	1177.69	30	1179.7	29	1182.05	28	1184.41	27
1186.58	26	1188.85	25	1191.03	24				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	424.56	.03	791.01	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
424.56	791.01	122.04	82.58	146.76	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	396	25	F
801	1191.03	25	F

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	15.31	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.05	Wt. n-Val.	0.035	0.030
0.035				
W.S. Elev (ft)	15.26	Reach Len. (ft)	122.04	82.58
146.76				
Crit W.S. (ft)	4.12	Flow Area (sq ft)	76.55	4705.04
51.58				
E.G. Slope (ft/ft)	0.000044	Area (sq ft)	754.62	4705.04
849.90				
Q Total (cfs)	8500.00	Flow (cfs)	41.00	8415.78
43.22				
Top Width (ft)	912.60	Top Width (ft)	330.86	366.45
215.29				
Vel Total (ft/s)	1.76	Avg. Vel. (ft/s)	0.54	1.79
0.84				
Max Chl Dpth (ft)	15.26	Hydr. Depth (ft)	2.68	12.84
5.16				
Conv. Total (cfs)	1286354.0	Conv. (cfs)	6205.5	1273609.0
6540.0				
Length Wtd. (ft)	83.00	Wetted Per. (ft)	29.01	368.27
9.99				
Min Ch El (ft)	0.00	Shear (lb/sq ft)	0.01	0.03
0.01				
Alpha	1.03	Stream Power (lb/ft s)	0.00	0.06
0.01				
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	169.15	2618.09
249.66				
C & E Loss (ft)	0.01	Cum SA (acres)	34.79	188.25
55.24				

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

CROSS SECTION

RIVER: Buena Vista
REACH: Lagoon RS: 7865

INPUT

Description:

Station Elevation Data num= 74

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	20	1	16	35.81	14	46.01	13	53.71	12
124.82	9	124.83	9	184.89	11	194	12	204.74	13
237.9	15	247.96	15	312.38	15	312.56	15	321.65	14
321.7	14	341.11	13	444.91	13	448.22	13	451.72	12
454.71	11	483.82	6	491.79	5	500.37	4	509.65	3
520.5	2	533.23	1	545.83	0	606.96	-1	623.2	-2
768.99	-2	811.33	-1	850.09	0	857.6	1	864.8	2
872.13	3	879.44	4	886.76	5	895.22	6	904.44	7
909.18	8	920.18	9	997.08	10	1029.74	11	1032.09	12
1034.05	13	1036.66	14	1039.07	15	1043.98	17	1092.2	20
1094.45	20	1099.32	17	1103.13	15	1105.38	14	1107.81	13
1110.41	12	1113.83	11	1117.92	10	1237.92	10	1259.92	11
1263.05	12	1282.77	21	1289.96	24	1303.32	25	1312.76	26
1320.73	27	1324.28	27	1327.58	24	1328.5	23	1329.34	22
1330.2	21	1331.81	21	1334.82	22	1349.75	23		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	448.22	.03	1034.05	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
448.22	1034.05	190.68	168.96 242.49	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	351	25	F
920	1349.75	25	F

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	15.30	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.02	Wt. n-Val.	0.035	0.030
W.S. Elev (ft)	15.28	Reach Len. (ft)	190.68	168.96
242.49				
Crit W.S. (ft)	1.50	Flow Area (sq ft)	221.66	6819.89
E.G. Slope (ft/ft)	0.000018	Area (sq ft)	1124.47	7435.95
814.86				
Q Total (cfs)	8500.00	Flow (cfs)	68.73	8431.27
Top Width (ft)	1193.87	Top Width (ft)	434.69	585.83
173.35				
Vel Total (ft/s)	1.21	Avg. Vel. (ft/s)	0.31	1.24
Max Chl Dpth (ft)	17.28	Hydr. Depth (ft)	2.28	14.46
Conv. Total (cfs)	2016039.0	Conv. (cfs)	16302.2	1999736.0
Length Wtd. (ft)	171.25	Wetted Per. (ft)	97.22	473.47
Min Ch El (ft)	-2.00	Shear (lb/sq ft)	0.00	0.02
Alpha	1.04	Stream Power (lb/ft s)	0.00	0.02
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	166.51	2606.59
246.86				
C & E Loss (ft)	0.00	Cum SA (acres)	33.72	187.35
54.59				

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

CROSS SECTION

RIVER: Buena Vista
REACH: Lagoon RS: 7697

INPUT
Description:
Station Elevation Data num= 71

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	31	73.54	28	102.74	27	110.82	25	115.42	24
131.39	22	142.88	21	158.21	20	167.96	19	199.21	17
241.66	14	371.39	12	377.89	11	385.11	10	401.52	9
401.53	9	412.53	8	421.48	7	425.58	6	427.73	5
431.14	4	436.52	3	441.28	2	450.97	1	585.92	0
608.49	-1	624.64	-2	656.92	-3	694.94	-4	786.86	-4
802.47	-3	818.29	-2	838.79	-1	913.4	0	972.84	1
980.3	2	987.86	3	995.34	4	1003.02	5	1011.85	6
1020.92	7	1020.93	7	1029.02	8	1029.03	8	1063.43	9
1245.49	10	1248.39	11	1251.19	12	1254.1	13	1257.11	14
1261.92	15	1262.31	15	1281.39	15	1312.53	15	1314.18	14
1316.36	13	1317.81	12	1319.41	11	1414.42	11	1416.7	12
1419.02	13	1421.29	14	1423.55	15	1425.81	16	1430.3	18
1432.52	19	1437.22	21	1451.94	22	1472.75	23	1492.61	24
1522.09	25								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	412.53	.03	1029.02	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
412.53	1029.02	163.29	213.8 270.78	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
1261.92	1522.09	25	F

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	15.30	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.01	Wt. n-Val.	0.035	0.030	0.035
W.S. Elev (ft)	15.29	Reach Len. (ft)	163.29	213.80	270.78
Crit W.S. (ft)	0.56	Flow Area (sq ft)	537.44	9681.53	1329.09
E.G. Slope (ft/ft)	0.000007	Area (sq ft)	537.44	9681.53	1787.39
Q Total (cfs)	8500.00	Flow (cfs)	120.43	7906.17	473.40

Top Width (ft)	1200.76	Top Width (ft)	189.09	616.49
395.18				
Vel Total (ft/s)	0.74	Avg. Vel. (ft/s)	0.22	0.82
0.36				
Max Chl Dpth (ft)	19.29	Hydr. Depth (ft)	2.84	15.70
5.71				
Conv. Total (cfs)	3228139.0	Conv. (cfs)	45736.3	3002616.0
179787.5				
Length Wtd. (ft)	216.89	Wetted Per. (ft)	189.38	617.90
233.69				
Min Ch El (ft)	-4.00	Shear (lb/sq ft)	0.00	0.01
0.00				
Alpha	1.16	Stream Power (lb/ft s)	0.00	0.01
0.00				
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	162.88	2573.39
239.61				
C & E Loss (ft)	0.00	Cum SA (acres)	32.36	185.02
53.01				

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

CROSS SECTION

RIVER: Buena Vista
REACH: Lagoon RS: 7483

INPUT
Description:
Station Elevation Data num= 94

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	31	11.01	29	24.34	28	47.61	28	102.53	26
114.05	25	122.6	24	149.71	22	158.17	21	168.85	20
201.29	18	245.95	17	253.18	16	276.44	12	285.32	11
285.48	11	339.45	11	344.87	10	350.17	9	356.06	8
360.16	7	370.04	6	380.46	5	390.25	4	400.43	3
410.77	2	420.85	1	526.93	1	532.5	2	549.13	5
577.25	9	601.05	11	608.94	12	661.19	12	697.74	11
700	10	705.76	8	709.94	7	718.14	6	733.93	3
738.53	2	743.05	1	850.42	1	856.27	2	862.45	3
868.44	4	874.44	5	893	7	901.62	8	911.68	9
919.67	10	929.94	11	935.02	11	952.01	10	958.8	10
963.8	11	968.34	11	971.1	10	973.83	9	977.08	8
987.1	6	991.18	5	998.76	3	1002.61	2	1006.7	1
1097.16	1	1103.4	2	1109.65	3	1115.84	4	1122.05	5
1128.06	6	1141.66	7	1155.31	8	1201.62	9	1364.24	10
1367.19	11	1370.1	12	1373.95	13	1419.5	13	1430.4	12
1437.6	12	1441.19	13	1446.51	13	1499.74	13	1511.46	15
1515.59	16	1518.63	17	1521.58	18	1524.64	19	1530.5	21
1536.4	23	1538.73	24	1556.49	25	1579.33	26		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	356.06	.03	1155.31	.035

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
356.06 1155.31 123.8 201.79 281.54 .1 .3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
1373.95	1579.33	25	F

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	15.30	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.01	Wt. n-Val.	0.035	0.030	0.035
W.S. Elev (ft)	15.28	Reach Len. (ft)	123.80	201.79	281.54
Crit W.S. (ft)	3.73	Flow Area (sq ft)	393.30	8307.41	1290.39
E.G. Slope (ft/ft)	0.000015	Area (sq ft)	393.30	8307.41	1607.22
Q Total (cfs)	8500.00	Flow (cfs)	163.56	7637.28	699.16
Top Width (ft)	1255.28	Top Width (ft)	98.71	799.25	357.32
Vel Total (ft/s)	0.85	Avg. Vel. (ft/s)	0.42	0.92	0.54
Max Chl Dpth (ft)	14.28	Hydr. Depth (ft)	3.98	10.39	5.90
Conv. Total (cfs)	2171986.0	Conv. (cfs)	41794.0	1951537.0	178655.2
Length Wtd. (ft)	205.96	Wetted Per. (ft)	99.32	804.28	219.11
Min Ch El (ft)	1.00	Shear (lb/sq ft)	0.00	0.01	0.01
Alpha	1.09	Stream Power (lb/ft s)	0.00	0.01	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	161.13	2529.24	229.06
C & E Loss (ft)	0.00	Cum SA (acres)	31.82	181.54	50.67

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

CROSS SECTION

RIVER: Buena Vista
REACH: Lagoon RS: 7282

INPUT
Description:
Station Elevation Data num= 94

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	36	4.46	35	8.45	34	25.32	30	48.76	25
54.88	24	63.89	23	73.3	22	84.56	21	122.67	19
135.08	18	149.83	17	165.1	16	170.18	16	171.73	16
186.99	15	233.71	13	293.94	11	303.64	10	314.11	9
323.05	8	331.28	7	339.83	6	348.98	5	357.49	4
365.52	3	373.53	2	381.53	1	516.9	1	516.91	1
522.81	2	528.1	3	532.9	4	538.08	5	543.09	6

556.1	8	570.17	9	587.74	10	606.4	11	637.92	11
647.97	10	670.38	9	721.05	8	749.68	7	750.93	7
762.06	7	767.82	6	773.02	5	778.4	4	783.88	3
789.03	2	794.08	1	914.89	3	919.19	4	923.52	5
927.84	6	941.84	9	946.4	10	966.34	11	971.68	12
984.9	12	992.77	11	1016.02	9	1021.85	9	1027.53	10
1036.81	10	1040.12	9	1044.64	8	1054.28	6	1074.73	2
1219.56	1	1226.47	2	1233.75	3	1240.76	4	1248.59	5
1258	6	1274.35	7	1302.79	9	1479.31	12	1516.3	13
1524.97	13	1526.04	12	1541.35	12	1544.1	13	1553.26	14
1568.3	14	1587.51	15	1592.36	16	1600.21	18	1603.24	19
1606.38	20	1620.28	24	1636.72	25	1668.02	26		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	323.05	.03	1274.35	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
323.05	1274.35	127.78	146.46 178.49	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	15.29	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.01	Wt. n-Val.	0.035	0.030
0.035				
W.S. Elev (ft)	15.28	Reach Len. (ft)	127.78	146.46
178.49				
Crit W.S. (ft)		Flow Area (sq ft)	425.77	9863.60
1285.69				
E.G. Slope (ft/ft)	0.000012	Area (sq ft)	425.77	9863.60
1285.69				
Q Total (cfs)	8500.00	Flow (cfs)	128.97	7896.12
474.90				
Top Width (ft)	1406.20	Top Width (ft)	140.37	951.30
314.53				
Vel Total (ft/s)	0.73	Avg. Vel. (ft/s)	0.30	0.80
0.37				
Max Chl Dpth (ft)	14.28	Hydr. Depth (ft)	3.03	10.37
4.09				
Conv. Total (cfs)	2493448.0	Conv. (cfs)	37833.6	2316303.0
139311.7				
Length Wtd. (ft)	147.84	Wetted Per. (ft)	140.61	955.45
315.32				
Min Ch El (ft)	1.00	Shear (lb/sq ft)	0.00	0.01
0.00				
Alpha	1.12	Stream Power (lb/ft s)	0.00	0.01
0.00				
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	159.97	2487.15
219.72				
C & E Loss (ft)	0.00	Cum SA (acres)	31.48	177.49
48.50				

CROSS SECTION

RIVER: Buena Vista
REACH: Lagoon RS: 7136

INPUT

Description:

Station Elevation Data num= 101

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	53	8.69	50	11.23	49	13.78	48	16.25	47
18.76	46	34.37	39	38.62	37	44.36	34	46.26	33
51.45	30	52.96	29	63.66	22.89	67.14	21	70.65	19
75.52	18	88.55	16	141.92	13	178.3	11	202.25	11
248.38	12	249.95	12	253.21	11	257.69	10	262.6	9
267.41	8	273.83	7	282.02	6	292.34	5	302.74	4
313.17	3	323.53	2	334.11	1	345.4	0	503.08	0
508.5	1	513.79	2	519.36	3	523.86	4	529.28	5
534.27	6	618.07	11	650.59	11	658.62	10	723.7	9
759.88	9	766.36	9	768.77	8	770.68	7	784.54	5
791.45	4	798.32	3	805.24	2	812.09	1	925.34	2
937.26	4	942.82	5	948.43	6	953.38	7	959.29	8
965.05	9	988.97	9	1031.46	8	1128.92	8	1131.95	9
1135.49	10	1141.82	10	1150.3	9	1178.45	7	1189.41	6
1197.76	5	1213.88	3	1222.14	2	1230.38	1	1329.56	1
1339.26	2	1348.66	3	1358.1	4	1367.42	5	1376.73	6
1398.91	7	1403.48	8	1553.52	10	1557.09	10	1561.2	11
1565.46	12	1589.51	13	1610.93	13	1613.81	12	1628.46	12
1630.99	13	1633.53	14	1636.01	15	1643.92	15	1658.74	18
1660.73	19	1663.24	20	1667.3	21	1672.02	22	1672.86	22
1730.6	24								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	273.83	.03	1398.91	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
273.83	1398.91	112.3	173.35	239.96	.1 .3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	15.29	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.01	Wt. n-Val.	0.035	0.030	0.035
W.S. Elev (ft)	15.28	Reach Len. (ft)	112.30	173.35	239.96
Crit W.S. (ft)		Flow Area (sq ft)	592.74	11710.40	1220.73
E.G. Slope (ft/ft)	0.000008	Area (sq ft)	592.74	11710.40	1220.73
Q Total (cfs)	8500.00	Flow (cfs)	163.76	7905.99	430.24
Top Width (ft)	1544.01	Top Width (ft)	172.52	1125.08	246.41
Vel Total (ft/s)	0.63	Avg. Vel. (ft/s)	0.28	0.68	0.35
Max Chl Dpth (ft)	15.28	Hydr. Depth (ft)	3.44	10.41	4.95
Conv. Total (cfs)	2966291.0	Conv. (cfs)	57149.8	2758997.0	150144.0
Length Wtd. (ft)	174.60	Wetted Per. (ft)	173.19	1128.79	247.56
Min Ch El (ft)	0.00	Shear (lb/sq ft)	0.00	0.01	0.00
Alpha	1.09	Stream Power (lb/ft s)	0.00	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	158.47	2450.89	214.58

C & E Loss (ft)	0.00	Cum SA (acres)	31.02	174.00
47.35				

CROSS SECTION

RIVER: Buena Vista
REACH: Lagoon RS: 6964

INPUT
Description:
Station Elevation Data num= 105

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	64	7.29	62	10.9	61	14.22	60	17.4	59
33.45	55	44.21	51	46.39	50	48.48	49	50.46	48
52.7	47	54.78	46	57.05	45	58.98	44	61.82	42
63.55	41	64.88	40	67.93	38	69.65	37	71.5	36
72.82	35	74.13	34	75.41	33	76.95	32	77.56	31
81.62	29	82.96	28	84.51	27	86.54	26	88.01	25
89.5	24	90.63	22.89	91.64	22.02	92.64	21	94.04	20
98.77	17	100.6	16	102.6	15	116.56	11	121.82	10
127.25	9	146.05	9	149.26	10	152.51	11	157.87	12
159.85	12	201.74	8	234.12	6	245.81	5	255.79	4
265.41	3	274.51	2	283.81	1	522.49	3	529.43	4
553.96	8	563.5	10	630.61	10	723.44	9	768.95	9
782.4	8	784.73	7	798.81	5	813.28	3	820.52	2
827.71	1	971.85	1	988.45	3	996.36	4	1004.59	5
1022.51	7	1053.9	9	1068.48	10	1076.82	10	1161.11	11
1187.16	12	1201.46	11	1216.91	10	1259.47	8	1283.17	8
1309.41	6	1323.76	4	1331.23	3	1347.98	1	1458.9	1
1467.91	2	1476.25	3	1484.32	4	1491.83	5	1499.43	6
1506.92	7	1513.91	8	1519.41	9	1574.98	10	1613.81	11
1620.57	12	1626.81	13	1682.87	15	1687.18	16	1691.43	17
1700.03	19	1700.18	19	1704.22	19	1757.08	21	1800	22

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	201.74	.03	1513.91	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
201.74	1513.91	110.48	160.7 214.42	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	15.29	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.01	Wt. n-Val.	0.035	0.030
0.035				
W.S. Elev (ft)	15.28	Reach Len. (ft)	110.48	160.70
214.42				
Crit W.S. (ft)		Flow Area (sq ft)	488.72	13074.12
659.25				
E.G. Slope (ft/ft)	0.000007	Area (sq ft)	488.72	13074.12
659.25				
Q Total (cfs)	8500.00	Flow (cfs)	161.49	8150.80
187.71				
Top Width (ft)	1582.05	Top Width (ft)	99.70	1312.17
170.18				
Vel Total (ft/s)	0.60	Avg. Vel. (ft/s)	0.33	0.62
0.28				

Max Chl Dpth (ft)	14.28	Hydr. Depth (ft)	4.90	9.96	3.87
Conv. Total (cfs)	3122138.0	Conv. (cfs)	59317.0	2993874.0	68946.6
Length Wtd. (ft)	160.73	Wetted Per. (ft)	101.10	1315.20	170.51
Min Ch El (ft)	1.00	Shear (lb/sq ft)	0.00	0.00	0.00
Alpha	1.05	Stream Power (lb/ft s)	0.00	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	157.08	2401.57	209.40
C & E Loss (ft)	0.00	Cum SA (acres)	30.67	169.15	46.20

CROSS SECTION

RIVER: Buena Vista
REACH: Lagoon RS: 6803

INPUT
Description:
Station Elevation Data num= 93

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	56	18.77	54	26.56	53	32.31	52	42.21	51
55.28	46	58.92	44	60.78	43	64.03	41	65.62	40
84.03	29	98.3	24	101.55	23	113.57	20	116.46	19
119.25	18	124.37	16	126.76	15	129.29	14	148.23	13
185.2	10	189.57	9	193	8	196.85	7	199.68	6
201.67	5	204.25	4	206.78	3	210.04	2	214.32	1
221.56	1	224.64	2	229.91	3	234.48	3	248.67	2
301.15	1	585.55	1	598.02	3	604.35	4	610.38	5
616.22	6	639.19	8	644.43	9	794.58	9	843.8	6
848.47	5	853.11	4	857.74	3	866.95	1	1017.48	1
1029.82	2	1043.52	3	1075.11	2	1084.21	1	1107.85	0
1148.34	0	1152.52	1	1156.86	2	1169.6	5	1175.43	6
1182.32	7	1187.54	8	1194.31	9	1203.07	9	1206.56	9
1268.38	10	1355.37	10	1403.54	6	1410.18	5	1416.88	4
1430.53	2	1437.53	1	1513.97	1	1521.86	2	1530.3	3
1540.5	4	1552.11	5	1564.65	6	1611.92	7	1616.39	8
1619.37	9	1622.26	10	1628.44	12	1632.49	13	1640.12	14
1642.12	14	1649.22	14	1746.8	16	1750.86	16	1799.06	18
1800	19	1850	21	1879.8	23				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	196.85	.03	1611.92	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
196.85	1611.92	83.5	154.99 229.89	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	15.29	Element	Left OB	Channel
Vel Head (ft)	0.00	Wt. n-Val.	0.035	0.030
W.S. Elev (ft)	15.28	Reach Len. (ft)	83.50	154.99

Right OB
0.035
229.89

Crit W.S. (ft)		Flow Area (sq ft)	254.14	15831.17
174.80				
E.G. Slope (ft/ft)	0.000005	Area (sq ft)	254.14	15831.17
174.80				
Q Total (cfs)	8500.00	Flow (cfs)	54.05	8422.90
23.05				
Top Width (ft)	1585.69	Top Width (ft)	70.76	1415.07
99.85				
Vel Total (ft/s)	0.52	Avg. Vel. (ft/s)	0.21	0.53
0.13				
Max Chl Dpth (ft)	15.28	Hydr. Depth (ft)	3.59	11.19
1.75				
Conv. Total (cfs)	3949974.0	Conv. (cfs)	25119.2	3914144.0
10710.8				
Length Wtd. (ft)	157.51	Wetted Per. (ft)	71.54	1419.51
100.81				
Min Ch El (ft)	0.00	Shear (lb/sq ft)	0.00	0.00
0.00				
Alpha	1.03	Stream Power (lb/ft s)	0.00	0.00
0.00				
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	156.14	2348.25
207.35				
C & E Loss (ft)	0.00	Cum SA (acres)	30.45	164.12
45.54				

CROSS SECTION

RIVER: Buena Vista
REACH: Lagoon RS: 6648

INPUT
Description:
Station Elevation Data num= 112

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	53	16.37	52	57.95	49	59.44	48	60.83	47
64	45	68.03	42	69.62	41	71.23	40	72.8	39
74.33	38	77.54	36	81.39	34	83.4	33	85.56	32
87.62	31	94.98	28	97.63	27	100.47	26	104	25
106.89	24	112	22	116.87	20	119.15	19	140.28	13
163.31	12	166.4	11	168.54	10	170.99	9	173.33	8
177.46	6	178.51	5	180.15	4	181.39	3	183.16	2
184.44	1	186.7	1	187.83	2	189	3	191.3	5
192.4	6	193.54	7	239.7	7	259.79	5	283.86	3
296.8	2	309.41	1	686.78	2	694.52	3	709.57	5
716.8	6	723.93	7	731.51	8	831.05	9	839.12	8
842.33	7	847.1	6	852.02	5	857	4	861.98	3
866.91	2	871.94	1	940.37	1	947.53	2	954.77	3
976.03	6	983.31	7	1069.09	8	1116.16	8	1166.01	7
1176.94	6	1183.6	5	1190.24	4	1197	3	1204.13	2
1211.22	1	1219.11	0	1248.14	0	1255.88	1	1263.88	2
1278.7	4	1311.16	7	1321.02	8	1365.22	7	1370.79	6
1375.29	5	1379.88	4	1388.79	2	1419.26	0	1431.45	1
1434.96	2	1438.47	3	1442	4	1445.55	5	1449.07	6
1466.99	7	1476.34	8	1477.28	8	1486.62	7	1578.85	7
1596.06	7	1685.45	8	1697.3	9	1702.18	10	1707.21	11
1712.31	12	1718.86	13	1805.65	15	1850	18	1900	20
1920	21	1984.09	22						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val

0 .035 173.33 .03 1466.99 .035

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
173.33 1466.99 107.95 137.87 165.59 .1 .3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	15.29	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.00	Wt. n-Val.	0.035	0.030
0.035				
W.S. Elev (ft)	15.28	Reach Len. (ft)	107.95	137.87
165.59				
Crit W.S. (ft)		Flow Area (sq ft)	125.17	14455.16
2036.08				
E.G. Slope (ft/ft)	0.000005	Area (sq ft)	125.17	14455.16
2036.08				
Q Total (cfs)	8500.00	Flow (cfs)	24.17	7851.74
624.09				
Top Width (ft)	1677.56	Top Width (ft)	41.08	1293.66
342.82				
Vel Total (ft/s)	0.51	Avg. Vel. (ft/s)	0.19	0.54
0.31				
Max Chl Dpth (ft)	15.28	Hydr. Depth (ft)	3.05	11.17
5.94				
Conv. Total (cfs)	3856923.0	Conv. (cfs)	10969.2	3562770.0
283183.5				
Length Wtd. (ft)	139.83	Wetted Per. (ft)	42.20	1302.23
343.38				
Min Ch El (ft)	0.00	Shear (lb/sq ft)	0.00	0.00
0.00				
Alpha	1.07	Stream Power (lb/ft s)	0.00	0.00
0.00				
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	155.77	2294.37
201.52				
C & E Loss (ft)	0.00	Cum SA (acres)	30.34	159.30
44.37				

CROSS SECTION

RIVER: Buena Vista
REACH: Lagoon RS: 6511

INPUT
Description:
Station Elevation Data num= 97

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	67	1.23	66	2.63	65	4.2	64	6.82	62
8.76	60	13.68	56	17.12	55	19.43	54	22.18	53
24.74	52	33.97	50	104.91	48	106.27	47	107.74	46
109.15	45	110.6	44	112.17	43	113.8	42	115.29	41
117.11	40	120.42	38	122.04	37	123.56	36	125.35	35
127.02	34	128.72	33	130.37	32	132.1	31	133.69	30
137.29	28	138.87	27	140.43	26	141.76	25	143.4	24
144.78	23	146.27	22	147.81	21	149.16	20	151.21	19
154.55	17	176.74	14	179.06	14	205.74	12	209.9	11
214.12	10	218.76	9	223.6	8	240.35	6	255.27	5
274.65	4	312.36	3	336.45	2	352.96	1	784.9	1
806.02	2	829.54	2	844.58	1	984.57	4	994.56	5

1254.11	7	1287.04	8	1313.19	9	1319.66	9	1360.13	7		
1374.41	6	1385.67	4	1390.29	3	1394.88	2	1399.39	1		
1417.81	1	1422.36	2	1426.85	3	1431.08	4	1435.48	5		
1439.77	6	1459.82	7	1473.87	8	1485.87	8	1578.45	7		
1586.85	8	1590.35	8	1599.73	7	1713.3	9	1717.84	10		
1722.38	11	1726.98	12	1770.01	13	1773.32	13	1782.5	13		
1800	15	1850	17	1900	19	1920	20	1940	21		
1960	22	2043.39	25								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	223.6	.03	1459.82	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
223.6	1459.82	94.88	130.28 181.08	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	15.28	Element	Left OB	Channel Right OB
Vel Head (ft)	0.00	Wt. n-Val.	0.035	0.030 0.035
W.S. Elev (ft)	15.28	Reach Len. (ft)	94.88	130.28 181.08
Crit W.S. (ft)		Flow Area (sq ft)	165.43	14641.70 2144.62
E.G. Slope (ft/ft)	0.000004	Area (sq ft)	165.43	14641.70 2144.62
Q Total (cfs)	8500.00	Flow (cfs)	29.75	7833.27 636.98
Top Width (ft)	1639.75	Top Width (ft)	56.33	1236.22 347.20
Vel Total (ft/s)	0.50	Avg. Vel. (ft/s)	0.18	0.53 0.30
Max Chl Dpth (ft)	14.28	Hydr. Depth (ft)	2.94	11.84 6.18
Conv. Total (cfs)	4085375.0	Conv. (cfs)	14301.0	3764922.0 306151.9
Length Wtd. (ft)	134.03	Wetted Per. (ft)	56.94	1237.82 347.83
Min Ch El (ft)	1.00	Shear (lb/sq ft)	0.00	0.00 0.00
Alpha	1.08	Stream Power (lb/ft s)	0.00	0.00 0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	155.41	2248.32 193.57
C & E Loss (ft)	0.00	Cum SA (acres)	30.22	155.30 43.06

CROSS SECTION

RIVER: Buena Vista
REACH: Lagoon RS: 6381

INPUT
Description:
Station Elevation Data num= 83

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	73	1.46	72	3.07	71	7.32	70	12.72	69

14.33	68	16.11	67	17.72	66	18.6	65	22.84	63
23.57	60	24.49	56	104.32	48	106.62	48	118.37	48
148.79	45	150.26	44	151.6	43	153.1	42	154.45	41
156.16	40	157.68	39	158.98	38	160.69	37	163.24	36
165.98	35	168.63	34	171.33	33	174.2	32	179.64	30
184.62	28	187.13	27	188.94	26	190.54	25	192.47	24
194.22	23	196.35	22	197.53	21	199.34	20	201.71	19
203.49	18	205.31	17	223.04	16	239.9	17	256.35	17
266.53	14	269.63	13	297.41	9	308.56	8	336.44	6
345.25	5	353.92	4	362.36	3	370.71	2	379.1	1
707.57	0	942.82	0	964.1	1	993.07	2	1115.21	4
1255.72	5	1285.14	6	1407.43	6	1410.23	5	1416.01	3
1418.92	2	1421.95	1	1449.99	1	1455.71	2	1465.56	3
1475.86	4	1495.93	5	1522.98	6	1755.67	7	1766.2	8
1799.15	13	1833.43	14	1850	15	1900	17	1950	19
2000	20	2100	22	2150	23				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	308.56	.03	1522.98	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
308.56	1522.98	73.31	102.19 143.99	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	15.28	Element	Left OB	Channel Right OB
Vel Head (ft)	0.00	Wt. n-Val.	0.035	0.030 0.035
W.S. Elev (ft)	15.28	Reach Len. (ft)	73.31	102.19 143.99
Crit W.S. (ft)		Flow Area (sq ft)	202.83	15712.24 2357.60
E.G. Slope (ft/ft)	0.000003	Area (sq ft)	202.83	15712.24 2357.60
Q Total (cfs)	8500.00	Flow (cfs)	41.46	7789.75 668.79
Top Width (ft)	1594.83	Top Width (ft)	46.38	1214.42 334.04
Vel Total (ft/s)	0.47	Avg. Vel. (ft/s)	0.20	0.50 0.28
Max Chl Dpth (ft)	15.28	Hydr. Depth (ft)	4.37	12.94 7.06
Conv. Total (cfs)	4676213.0	Conv. (cfs)	22808.6	4285472.0 367931.8
Length Wtd. (ft)	104.75	Wetted Per. (ft)	47.05	1215.93 334.51
Min Ch El (ft)	0.00	Shear (lb/sq ft)	0.00	0.00 0.00
Alpha	1.07	Stream Power (lb/ft s)	0.00	0.00 0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	155.01	2202.93 184.21
C & E Loss (ft)	0.00	Cum SA (acres)	30.11	151.63 41.64

CROSS SECTION

RIVER: Buena Vista
REACH: Lagoon RS: 6279

INPUT
Description:
Station Elevation Data num= 83

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	70	1.51	70	2.71	69	5.54	67	6.96	66
8.37	65	9.82	64	11.19	63	12.66	62	14.03	61
15.45	60	16.87	59	104.74	52	127.06	48	132.31	47
140.02	46	147.78	45	163.76	44	166.6	43	168.86	42
171.08	41	173.28	40	175.53	39	177.69	38	192.25	31
194.15	30	209.38	22	210.35	21	211.5	20	213.78	19
214.78	18	216.48	17	284.23	18	286.31	17	290.66	15
298.03	12	300.44	11	303.14	10	306.75	9	310.43	8
314.28	7	353.21	8	359.01	8	367.63	7	374.28	6
381.59	5	387.97	4	394.98	3	401.61	2	408.63	1
682.14	0	942.57	0	1568.85	1	1576.97	2	1585.86	3
1608.97	6	1703.29	6	1706.56	5	1709.56	4	1712.82	3
1715.83	2	1718.87	1	1750	1	1752.67	2	1755.34	3
1757.86	4	1760.58	5	1763.36	6	1770.98	7	1782.41	8
1788.98	9	1792.86	10	1796.22	11	1799.55	12	1802.95	13
1806.54	14	1833.62	15	1900	16	1950	18	2000	20
2100	22	2150	23	2200	24				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	367.63	.03	1608.97	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
367.63	1608.97	73.95	110.72	186.66	.1 .3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	15.28	Element	Left OB	Channel Right OB
Vel Head (ft)	0.00	Wt. n-Val.	0.035	0.030 0.035
W.S. Elev (ft)	15.28	Reach Len. (ft)	73.95	110.72 186.66
Crit W.S. (ft)		Flow Area (sq ft)	523.23	18216.84 1951.28
E.G. Slope (ft/ft)	0.000002	Area (sq ft)	523.23	18216.84 1951.28
Q Total (cfs)	8500.00	Flow (cfs)	114.46	7903.71 481.83
Top Width (ft)	1562.22	Top Width (ft)	77.58	1241.34 243.30
Vel Total (ft/s)	0.41	Avg. Vel. (ft/s)	0.22	0.43 0.25
Max Chl Dpth (ft)	15.28	Hydr. Depth (ft)	6.74	14.68 8.02
Conv. Total (cfs)	5814084.0	Conv. (cfs)	78292.0	5406216.0 329576.3
Length Wtd. (ft)	112.71	Wetted Per. (ft)	79.08	1242.09 245.90
Min Ch El (ft)	0.00	Shear (lb/sq ft)	0.00	0.00 0.00
Alpha	1.06	Stream Power (lb/ft s)	0.00	0.00 0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	154.40	2163.13 177.09

C & E Loss (ft)	0.00	Cum SA (acres)	30.01	148.75
40.69				

CROSS SECTION

RIVER: Buena Vista
REACH: Lagoon RS: 6168

INPUT
Description:
Station Elevation Data num= 102

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	72	3.25	71	4.98	70	6.87	69	7.89	68
10.48	67	18.34	66	35.06	64	45.27	62	51.03	61
55.84	60	63.32	59	68.36	58	73.33	57	77.52	56
82.83	55	87.52	54	92	53	97.64	52	103.18	51
108.92	50	113.78	49	118.05	48	122.27	47	126.59	46
131.8	45	138.11	44	144.84	43	153.6	42	160.01	42
175.78	42	177.07	41	178.54	40	180.07	39	181.69	38
183.1	37	184.39	36	185.65	35	186.91	34	188.03	33
189.17	32	190.65	31	192.09	30	193.35	29	194.46	28
195.74	27	197.04	26	198.49	25	199.86	24	201.34	23
202.99	22	204.5	21	206.07	20	207.46	19	209.19	18
222.07	18	232.28	19	244.38	20	250.11	20	255.04	19
262.61	18	264.41	17	266.28	16	268.03	15	269.65	14
271.36	13	273.09	12	275.09	11	277.17	10	279.14	9
281.31	8	289.14	7	328.11	6	339.3	5	350.54	4
361.77	3	373.02	2	384.27	1	395.49	0	505.81	0
673.83	0	881.91	0	1734.59	1	1739.7	2	1744.75	3
1749.94	4	1755.43	5	1761.03	6	1767.44	7	1772.02	8
1781.75	10	1791.65	11	1800.76	12	1804.24	13	1807.75	14
1811.31	15	1815.33	16	1822.23	17	1856.88	18	1890.53	19
1950	20	2000	22						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	281.31	.03	1772.02	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
281.31	1772.02	125.29	108.76 112.06	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	15.28	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.00	Wt. n-Val.	0.035	0.030
0.035				
W.S. Elev (ft)	15.28	Reach Len. (ft)	125.29	108.76
112.06				
Crit W.S. (ft)		Flow Area (sq ft)	52.80	21669.26
161.76				
E.G. Slope (ft/ft)	0.000002	Area (sq ft)	52.80	21669.26
161.76				
Q Total (cfs)	8500.00	Flow (cfs)	6.70	8470.63
22.66				
Top Width (ft)	1544.90	Top Width (ft)	13.77	1490.71
40.42				
Vel Total (ft/s)	0.39	Avg. Vel. (ft/s)	0.13	0.39
0.14				

Max Chl Dpth (ft)	15.28	Hydr. Depth (ft)	3.83	14.54
4.00				
Conv. Total (cfs)	6412016.0	Conv. (cfs)	5055.2	6389863.0
17097.1				
Length Wtd. (ft)	108.84	Wetted Per. (ft)	15.59	1491.71
41.18				
Min Ch El (ft)	0.00	Shear (lb/sq ft)	0.00	0.00
0.00				
Alpha	1.01	Stream Power (lb/ft s)	0.00	0.00
0.00				
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	153.91	2112.44
172.56				
C & E Loss (ft)	0.00	Cum SA (acres)	29.93	145.28
40.08				

CROSS SECTION

RIVER: Buena Vista
REACH: Lagoon RS: 6060

INPUT
Description:
Station Elevation Data num= 92

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	59	3.75	58	6.27	57	8.37	56	10.7	55
13.01	54	15.34	53	17.66	52	20	51	22.32	50
24.31	49	26.39	48	28.4	47	29.86	46	31.79	45
34.4	44	35.98	43	38.32	42	40.82	41	45.31	40
49.87	39	55.04	38	60.86	37	67.21	36	79.98	35
97.82	34	99.1	33	100.32	32	101.61	31	103.21	30
104.32	29	105.89	28	107.23	27	108.62	26	109.99	25
111.17	24	112.51	23	114.02	22	115.41	21	116.79	20
118.16	19	138.13	19	154.05	20	158.38	20	161.58	19
163.66	18	165.38	17	166.71	16	168.3	15	169.97	14
171.55	13	173.06	12	174.51	11	175.96	10	177.41	9
180.45	8	186.93	7	195.19	6	212.02	6	228.06	6
243.75	5	259.13	4	275.65	3	291.97	2	308.42	1
419.46	0	530.74	0	589.41	0	789.88	0	1648.98	1
1654.78	2	1660.63	3	1666.46	4	1672.36	5	1678.2	6
1682.15	7	1684.6	8	1687.04	9	1689.49	10	1691.96	11
1697.43	12	1718.28	13	1723.41	14	1726.88	15	1729.91	16
1732.76	17	1735.64	18	1738.61	19	1741.94	20	1762.6	21
1793.18	22	1821.76	23						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	212.02	.03	1684.6	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
212.02	1684.6	119.41	121.47 123.15	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	15.28	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.00	Wt. n-Val.	0.035	0.030
0.035				
W.S. Elev (ft)	15.28	Reach Len. (ft)	119.41	121.47
123.15				

Crit W.S. (ft)		Flow Area (sq ft)	328.94	21495.76
133.15				
E.G. Slope (ft/ft)	0.000002	Area (sq ft)	328.94	21495.76
133.15				
Q Total (cfs)	8500.00	Flow (cfs)	68.28	8416.09
15.63				
Top Width (ft)	1559.88	Top Width (ft)	44.17	1472.58
43.13				
Vel Total (ft/s)	0.39	Avg. Vel. (ft/s)	0.21	0.39
0.12				
Max Chl Dpth (ft)	15.28	Hydr. Depth (ft)	7.45	14.60
3.09				
Conv. Total (cfs)	6420075.0	Conv. (cfs)	51575.0	6356695.0
11805.1				
Length Wtd. (ft)	121.46	Wetted Per. (ft)	46.35	1473.49
44.12				
Min Ch El (ft)	0.00	Shear (lb/sq ft)	0.00	0.00
0.00				
Alpha	1.02	Stream Power (lb/ft s)	0.00	0.00
0.00				
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	153.36	2058.56
172.18				
C & E Loss (ft)	0.00	Cum SA (acres)	29.84	141.58
39.97				

CROSS SECTION

RIVER: Buena Vista
REACH: Lagoon RS: 5939

INPUT
Description:
Station Elevation Data num= 98

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	71	1.13	70	2.19	69	3.38	68	4.44	67
5.63	66	6.59	65	7.74	64	8.86	63	10.2	62
10.98	61	11.98	60	13.06	59	14.07	58	15.23	57
16.8	56	17.52	55	18.98	54	20.16	53	21.24	52
22.1	51	22.91	50	24.28	49	25.54	48	26.69	47
27.96	46	29	45	29.99	44	31.33	43	32.81	42
34.2	41	35.54	40	37.07	39	38.48	38	41.29	37
44.79	36	48.95	35	53.11	34	57.37	33	64.07	32
80.71	31	87.33	30	90.15	30	100.6	30	102.38	29
104.09	28	105.44	27	107.03	26	108.49	25	109.91	24
111.55	23	113.35	22	115.1	21	121.04	20	137.46	20
157.88	20	159.68	19	161.53	18	163.35	17	165.25	16
167.09	15	169.15	14	171.16	13	173.21	12	175.06	11
177.21	10	179.31	9	182.03	8	189.04	7	200.83	6
216.92	5	232.4	4	247.15	3	262.86	2	279.03	1
369.72	0	777.31	0	1629.2	1	1635.12	2	1640.86	3
1646.54	4	1652.31	5	1658.08	6	1662.94	7	1666.13	8
1670.42	9	1675.75	10	1683.67	11	1717.61	12	1720.44	13
1722.84	14	1725.55	15	1728.17	16	1730.8	17	1746.56	23
1749.15	24	1767.31	25	1785.33	26				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	189.04	.03	1662.94	.035

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

189.04 1662.94 104.06 122.18 155.9 .1 .3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	15.28	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.00	Wt. n-Val.	0.035	0.030	0.035
W.S. Elev (ft)	15.28	Reach Len. (ft)	104.06	122.18	155.90
Crit W.S. (ft)		Flow Area (sq ft)	113.36	21568.54	265.26
E.G. Slope (ft/ft)	0.000002	Area (sq ft)	113.36	21568.54	265.26
Q Total (cfs)	8500.00	Flow (cfs)	17.81	8443.94	38.25
Top Width (ft)	1559.71	Top Width (ft)	22.47	1473.90	63.35
Vel Total (ft/s)	0.39	Avg. Vel. (ft/s)	0.16	0.39	0.14
Max Chl Dpth (ft)	15.28	Hydr. Depth (ft)	5.05	14.63	4.19
Conv. Total (cfs)	6431691.0	Conv. (cfs)	13479.7	6389270.0	28941.6
Length Wtd. (ft)	122.24	Wetted Per. (ft)	24.18	1474.64	64.39
Min Ch El (ft)	0.00	Shear (lb/sq ft)	0.00	0.00	0.00
Alpha	1.02	Stream Power (lb/ft s)	0.00	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	152.76	1998.51	171.62
C & E Loss (ft)	0.00	Cum SA (acres)	29.75	137.47	39.82

CROSS SECTION

RIVER: Buena Vista
REACH: Lagoon RS: 5816

INPUT
Description:
Station Elevation Data num= 87

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	59	1.42	58	2.84	57	4.45	56	8.21	54
10.14	53	13.78	51	15.65	50	17.54	49	19.49	48
21.29	47	23.15	46	24.89	45	26.78	44	28.59	43
30.47	42	32.17	41	33.83	40	35.5	39	37.15	38
38.78	37	40.47	36	42.13	35	43.82	34	48.26	32
53.97	30	56.9	29	75.05	27	79.32	27	81.24	26
83.07	25	85.4	24	87.42	23	94.22	21	99.99	21
123.04	22	128.27	22	130.91	21	132.66	20	133.97	19
135.55	18	137.05	17	138.48	16	139.92	15	141.4	14
142.86	13	144.35	12	146.3	11	150.64	10	155.42	9
159.69	8	167.13	7	181.78	6	197.13	5	212.14	4
226.99	3	241.98	2	257.03	1	272.15	0	757.13	0
1271.78	0	1359.26	0	1602.54	1	1608.92	2	1615.22	3
1621.56	4	1627.91	5	1634.05	6	1639.1	7	1642.38	8
1645.29	9	1648.24	10	1651.42	11	1662.67	12	1694.01	14

1698.43	16	1700.59	17	1702.58	18	1704.54	19	1706.51	20
1710.75	22	1712.76	23	1715.26	24	1719.91	26	1722.47	27
1742.8	29	1761.67	30						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	167.13	.03	1645.29	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
167.13	1645.29	123.85	146.63	192.73	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	15.28	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.00	Wt. n-Val.	0.035	0.030
0.035				
W.S. Elev (ft)	15.28	Reach Len. (ft)	123.85	146.63
192.73				
Crit W.S. (ft)		Flow Area (sq ft)	150.54	21906.59
148.07				
E.G. Slope (ft/ft)	0.000002	Area (sq ft)	150.54	21906.59
148.07				
Q Total (cfs)	8500.00	Flow (cfs)	24.62	8459.10
16.27				
Top Width (ft)	1557.32	Top Width (ft)	27.61	1478.16
51.55				
Vel Total (ft/s)	0.38	Avg. Vel. (ft/s)	0.16	0.39
0.11				
Max Chl Dpth (ft)	15.28	Hydr. Depth (ft)	5.45	14.82
2.87				
Conv. Total (cfs)	6575184.0	Conv. (cfs)	19046.7	6543550.0
12588.0				
Length Wtd. (ft)	146.63	Wetted Per. (ft)	29.26	1479.20
52.25				
Min Ch El (ft)	0.00	Shear (lb/sq ft)	0.00	0.00
0.00				
Alpha	1.01	Stream Power (lb/ft s)	0.00	0.00
0.00				
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	152.44	1937.54
170.88				
C & E Loss (ft)	0.00	Cum SA (acres)	29.69	133.33
39.62				

CROSS SECTION

RIVER: Buena Vista
REACH: Lagoon RS: 5670

INPUT
Description:
Station Elevation Data num= 74

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	57	5.9	54	7.75	53	9.37	52	12.66	50
14.22	49	15.88	48	17.57	47	19.19	46	20.77	45
22.04	44	23.57	43	25.41	42	26.94	41	28.51	40
29.9	39	31.38	38	32.87	37	34.36	36	35.83	35
37.26	34	38.72	33	40.22	32	41.68	31	74.6	23
95.22	23	96.77	22	98.33	21	99.73	20	101.22	19

102.63	18	104.02	17	105.43	16	106.81	15	108.19	14
110.57	13	114.13	12	125.54	9	140.4	7	151.1	6
164.54	5	177.96	4	191.03	3	203.75	2	216.52	1
230.14	0	749.92	0	1257.4	0	1526.06	0	1539.38	1
1544.43	2	1549.19	3	1554.18	4	1559.2	5	1564.22	6
1571.24	8	1574.16	9	1577.14	10	1580.13	11	1583.27	12
1627.86	16	1632.24	18	1634.65	19	1637	20	1639.3	21
1641.45	22	1643.56	23	1645.61	24	1647.6	25	1649.77	26
1651.75	27	1653.36	28	1655.53	29	1672.8	30		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	140.4	.03	1574.16	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
140.4	1574.16	166.55	147.89	121.91	.1 .3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	15.28	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.00	Wt. n-Val.	0.035	0.030
0.035				
W.S. Elev (ft)	15.28	Reach Len. (ft)	166.55	147.89
121.91				
Crit W.S. (ft)		Flow Area (sq ft)	177.99	21432.92
103.36				
E.G. Slope (ft/ft)	0.000002	Area (sq ft)	177.99	21432.92
103.36				
Q Total (cfs)	8500.00	Flow (cfs)	29.23	8460.93
9.85				
Top Width (ft)	1513.41	Top Width (ft)	33.98	1433.76
45.68				
Vel Total (ft/s)	0.39	Avg. Vel. (ft/s)	0.16	0.39
0.10				
Max Chl Dpth (ft)	15.28	Hydr. Depth (ft)	5.24	14.95
2.26				
Conv. Total (cfs)	6468042.0	Conv. (cfs)	22239.2	6438308.0
7494.6				
Length Wtd. (ft)	147.87	Wetted Per. (ft)	35.25	1435.02
46.30				
Min Ch El (ft)	0.00	Shear (lb/sq ft)	0.00	0.00
0.00				
Alpha	1.01	Stream Power (lb/ft s)	0.00	0.00
0.00				
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	151.98	1864.60
170.32				
C & E Loss (ft)	0.00	Cum SA (acres)	29.61	128.43
39.40				

CROSS SECTION

RIVER: Buena Vista
REACH: Lagoon RS: 5522

INPUT
Description:
Station Elevation Data num= 84

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev

0	52	2.06	51	4.24	50	8.84	48	15.07	46
31.04	45	32.6	44	34.02	43	35.49	42	37.05	41
38.53	40	40.12	39	41.61	38	43.19	37	44.51	36
46.01	35	47.34	34	48.72	33	50.13	32	51.53	31
52.89	30	54.15	29	55.49	28	56.78	27	58.25	26
59.56	25	63.18	25	63.27	25	69.69	25	95.27	25
99.95	24	101.62	23	104.9	21	106.62	20	108.21	19
110.4	18	112.49	17	114.54	16	120.13	14	123.27	13
126.17	12	129.23	11	133.45	10	159.06	6	172.86	5
187.08	4	201.07	3	214.8	2	228.28	1	405	0
605.99	0	630.69	0	823.93	0	841.93	0	916.71	0
1300.11	0	1498.28	0	1504.07	1	1509.53	2	1514.71	3
1519.74	4	1524.78	5	1529.7	6	1534.09	7	1537.93	8
1541.55	9	1552.49	12	1597.94	13	1600.46	14	1603.02	15
1608.12	17	1610.68	18	1615.69	20	1617.86	21	1624.87	24
1627.2	25	1629.62	26	1631.35	27	1634.38	29	1645.22	29
1646.02	29	1654.16	30	1662.6	31	1680.39	33		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	133.45	.03	1537.93	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
133.45	1537.93	180.15	154.33 129.47	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	15.28	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.00	Wt. n-Val.	0.035	0.030
0.035				
W.S. Elev (ft)	15.28	Reach Len. (ft)	180.15	154.33
129.47				
Crit W.S. (ft)		Flow Area (sq ft)	47.67	20774.67
209.75				
E.G. Slope (ft/ft)	0.000002	Area (sq ft)	47.67	20774.67
209.75				
Q Total (cfs)	8500.00	Flow (cfs)	5.35	8468.55
26.10				
Top Width (ft)	1487.18	Top Width (ft)	16.90	1404.48
65.80				
Vel Total (ft/s)	0.40	Avg. Vel. (ft/s)	0.11	0.41
0.12				
Max Chl Dpth (ft)	15.28	Hydr. Depth (ft)	2.82	14.79
3.19				
Conv. Total (cfs)	6219589.0	Conv. (cfs)	3915.5	6196576.0
19097.3				
Length Wtd. (ft)	154.35	Wetted Per. (ft)	17.72	1405.78
66.79				
Min Ch El (ft)	0.00	Shear (lb/sq ft)	0.00	0.00
0.00				
Alpha	1.01	Stream Power (lb/ft s)	0.00	0.00
0.00				
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	151.54	1792.95
169.89				
C & E Loss (ft)	0.00	Cum SA (acres)	29.51	123.61
39.24				

CROSS SECTION

RIVER: Buena Vista
REACH: Lagoon RS: 5368

INPUT
Description:
Station Elevation Data num= 60

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	35	2.86	34	8.8	32	14.53	30	17.51	29
21.06	28	58.34	25	59.93	24	61.76	23	65.12	21
66.78	20	68.5	19	70.05	18	71.68	17	75.24	15
79.18	13	81.31	12	84.89	11	90.14	10	100.91	8
117.13	7	142.44	6	163.33	5	182.97	4	202.21	3
220.17	2	238.39	1	296.05	0	673.71	0	723.96	0
731.97	0	1023.83	0	1394.77	0	1433.47	0	1438.85	1
1443.11	2	1447.07	3	1451.3	4	1455.56	5	1459.83	6
1463.66	7	1475.99	11	1478.68	12	1481.2	13	1522.52	13
1526.01	13	1528.54	14	1535.09	16	1538.35	17	1541.39	18
1544.43	19	1550.51	21	1553.82	22	1557.03	23	1560.12	24
1566.47	26	1578.48	28	1578.86	28	1591.42	29	1602.77	30

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	117.13	.03	1463.66	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
117.13	1463.66	173.65	124.23	77.16	.1 .3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
1478.87	1602.77	25	F

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	15.28	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.00	Wt. n-Val.	0.035	0.030
0.035				
W.S. Elev (ft)	15.28	Reach Len. (ft)	173.65	124.23
77.16				
Crit W.S. (ft)	1.18	Flow Area (sq ft)	243.45	19936.36
88.20				
E.G. Slope (ft/ft)	0.000002	Area (sq ft)	243.45	19936.36
203.90				
Q Total (cfs)	8500.00	Flow (cfs)	46.12	8437.34
16.54				
Top Width (ft)	1457.99	Top Width (ft)	42.39	1346.53
69.07				
Vel Total (ft/s)	0.42	Avg. Vel. (ft/s)	0.19	0.42
0.19				
Max Chl Dpth (ft)	15.28	Hydr. Depth (ft)	5.74	14.81
5.80				
Conv. Total (cfs)	5995308.0	Conv. (cfs)	32527.1	5951113.0
11668.0				
Length Wtd. (ft)	124.36	Wetted Per. (ft)	43.61	1347.50
16.04				
Min Ch El (ft)	0.00	Shear (lb/sq ft)	0.00	0.00
0.00				
Alpha	1.01	Stream Power (lb/ft s)	0.00	0.00
0.00				
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	150.94	1720.83
169.27				
C & E Loss (ft)	0.00	Cum SA (acres)	29.39	118.74

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

CROSS SECTION

RIVER: Buena Vista
REACH: Lagoon RS: 5244

INPUT
Description:
Station Elevation Data num= 57

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	31	22.62	30	80.03	30	85.41	30	92.72	28
105.67	27	112.9	26	114.34	25	115.92	24	117.66	23
119.83	22	121.99	21	124.14	20	129.26	18	131.76	17
134.8	16	137.09	15	140.23	14	143.03	13	147.11	12
153.74	10	157.53	9	161.08	8	173.1	6	186.34	5
199.47	4	212.57	3	225.7	2	238.97	1	252.09	0
624.8	0	667.68	0	716.1	0	743.51	0	1350.21	1
1357.19	2	1364.26	3	1371.34	4	1378.54	5	1385.67	6
1390.95	7	1394.45	8	1402.68	10	1406.49	11	1410.12	12
1424.94	13	1446.2	15	1450.81	16	1457.6	18	1460.9	19
1464.45	20	1467.74	21	1476.84	24	1479.41	25	1482.48	26
1499.63	27	1510.67	28						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	161.08	.03	1394.45	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
161.08	1394.45	225.58	155.95	82.33	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
1324.3	1510.67	25	F

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	15.28	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.00	Wt. n-Val.	0.035	0.030
W.S. Elev (ft)	15.28	Reach Len. (ft)	225.58	155.95
82.33				
Crit W.S. (ft)	1.50	Flow Area (sq ft)	93.16	17172.23
E.G. Slope (ft/ft)	0.000003	Area (sq ft)	93.16	18033.50
152.09				
Q Total (cfs)	8500.00	Flow (cfs)	15.48	8484.52
Top Width (ft)	1311.03	Top Width (ft)	24.63	1233.37
53.03				
Vel Total (ft/s)	0.49	Avg. Vel. (ft/s)	0.17	0.49
Max Chl Dpth (ft)	15.28	Hydr. Depth (ft)	3.78	14.76
Conv. Total (cfs)	5126694.0	Conv. (cfs)	9334.2	5117360.0

Length Wtd. (ft)	156.22	Wetted Per. (ft)	25.70	1163.61
Min Ch El (ft)	0.00	Shear (lb/sq ft)	0.00	0.00
Alpha	1.01	Stream Power (lb/ft s)	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	150.27	1666.69
168.96				
C & E Loss (ft)	0.00	Cum SA (acres)	29.25	115.06
38.94				

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

CROSS SECTION

RIVER: Buena Vista
REACH: Lagoon RS: 5089

INPUT
Description:
Station Elevation Data num= 52

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	35	2.85	33	4.29	32	5.47	31	11.28	27
12.87	26	15.8	24	18.65	22	20.33	21	21.74	20
31.69	16	34.86	15	41.7	13	46.04	12	61.26	10
85.12	10	86.81	10	97.91	8	110.3	7	129.88	6
153.6	5	174.63	4	195.49	3	224.66	2	265.98	1
303.41	0	395.4	0	594.72	0	617.26	0	684.61	0
883.4	0	1183.3	1	1190.21	2	1197.67	3	1205.31	4
1214.08	5	1223.28	6	1229.42	7	1235.22	10	1238.77	12
1259.34	13	1263.31	14	1267.3	15	1271.13	16	1278.92	18
1282.63	19	1286.23	20	1289.53	21	1293	22	1296.57	23
1300.12	24	1318.42	25						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	86.81	.03	1235.22	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
86.81	1235.22	206.08	115.01 98.82	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	33.4	25	F
1037.36	1318.42	25	F

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	15.28	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.01	Wt. n-Val.	0.035	0.030
W.S. Elev (ft)	15.27	Reach Len. (ft)	206.08	115.01
98.82				
Crit W.S. (ft)	1.64	Flow Area (sq ft)	220.72	13708.26
E.G. Slope (ft/ft)	0.000004	Area (sq ft)	220.72	16385.10

82.54				
Q Total (cfs)	8500.00	Flow (cfs)	50.71	8449.29
Top Width (ft)	1234.37	Top Width (ft)	52.82	1148.41
33.13				
Vel Total (ft/s)	0.61	Avg. Vel. (ft/s)	0.23	0.62
Max Chl Dpth (ft)	15.27	Hydr. Depth (ft)	4.18	14.42
Conv. Total (cfs)	4045923.0	Conv. (cfs)	24136.5	4021787.0
Length Wtd. (ft)	120.07	Wetted Per. (ft)	53.39	950.91
Min Ch El (ft)	0.00	Shear (lb/sq ft)	0.00	0.00
Alpha	1.01	Stream Power (lb/ft s)	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	149.46	1605.08
168.73				
C & E Loss (ft)	0.00	Cum SA (acres)	29.05	110.80
38.85				

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

CROSS SECTION

RIVER: Buena Vista
REACH: Lagoon RS: 4974

INPUT
Description:
Station Elevation Data num= 54

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	46	2.96	44	4.49	43	6.23	42	9.55	40
10.97	39	12.63	38	13.86	37	15.26	36	16.65	35
19.21	33	20.46	32	21.77	31	57.2	12	66.51	11
75.43	10	79.89	9	82.89	8	87.12	8	94.5	9
110.77	9	136.67	7	325.3	6	338.69	5	350.01	4
361.12	3	371.63	2	378.93	1	711.59	0	826.43	0
914.24	1	929	2	944.9	3	965.94	3	999.7	3
1012.72	4	1023.76	5	1043.19	6	1093.18	7	1098.27	8
1104.58	9	1110.98	10	1136.19	12	1148.78	13	1154.58	14
1160.07	15	1165.76	16	1178.08	18	1182.19	19	1185.22	20
1188.34	21	1193.09	22	1213.73	23	1227.37	24		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	325.3	.03	1093.18	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
325.3	1093.18	104.98	87.04	342	.1 .3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	173.48	25	F

812.4 1227.37 25 F

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	15.28	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.02	Wt. n-Val.	0.035	0.030
W.S. Elev (ft)	15.26	Reach Len. (ft)	104.98	87.04
342.00				
Crit W.S. (ft)	2.66	Flow Area (sq ft)	1345.07	7067.12
E.G. Slope (ft/ft)	0.000013	Area (sq ft)	2156.79	10555.15
275.87				
Q Total (cfs)	8500.00	Flow (cfs)	893.46	7606.54
Top Width (ft)	1110.44	Top Width (ft)	274.18	767.88
68.38				
Vel Total (ft/s)	1.01	Avg. Vel. (ft/s)	0.66	1.08
Max Chl Dpth (ft)	15.26	Hydr. Depth (ft)	8.86	14.51
Conv. Total (cfs)	2326052.0	Conv. (cfs)	244498.8	2081554.0
Length Wtd. (ft)	87.98	Wetted Per. (ft)	151.82	487.34
Min Ch El (ft)	0.00	Shear (lb/sq ft)	0.01	0.01
Alpha	1.06	Stream Power (lb/ft s)	0.00	0.01
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	143.83	1569.51
168.33				
C & E Loss (ft)	0.06	Cum SA (acres)	28.28	108.27
38.74				

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for
additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid,
water surface was used.

CROSS SECTION

RIVER: Buena Vista
REACH: Lagoon RS: 4887

INPUT
Description:
Station Elevation Data num= 52

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	48	4.17	47	17.72	40	21	38	24.67	36
29.04	33	35.24	29	36.78	28	38.34	27	41.45	25
46.47	22	56.4	20	60.87	19	65.64	18	87.38	15
155.23	13	210.41	10	244.53	9	313.57	8	344.07	7

373.81	6	375.75	5	378.32	4	380.65	3	382.83	2
384.98	1	429.69	1	432.86	2	435.04	3	439.44	4
443.27	5	447.01	6	462.8	7	521.05	7	545.4	7
552.14	8	573.17	8	592.21	8	731.99	7	749.79	7
800.22	9	832.06	10	906.5	11	969.57	12	977.13	13
999.3	14	1009.27	15	1017.54	16	1038.28	19	1073.01	20
1092.97	21	1111.42	22						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	313.57	.03	552.14	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
313.57	552.14	294	294	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	334.47	25	F
465.7	1111.42	25	F

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	15.22	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.58	Wt. n-Val.		0.030
W.S. Elev (ft)	14.64	Reach Len. (ft)	20.17	20.17
20.17				
Crit W.S. (ft)	9.13	Flow Area (sq ft)		1388.67
E.G. Slope (ft/ft)	0.000670	Area (sq ft)	817.53	2191.32
2446.95				
Q Total (cfs)	8500.00	Flow (cfs)		8500.00
Top Width (ft)	905.96	Top Width (ft)	213.87	238.57
453.51				
Vel Total (ft/s)	6.12	Avg. Vel. (ft/s)		6.12
Max Chl Dpth (ft)	13.64	Hydr. Depth (ft)		10.58
Conv. Total (cfs)	328407.7	Conv. (cfs)		328407.7
Length Wtd. (ft)	20.17	Wetted Per. (ft)		133.10
Min Ch El (ft)	1.00	Shear (lb/sq ft)		0.44
Alpha	1.00	Stream Power (lb/ft s)		2.67
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	140.25	1556.78
157.64				
C & E Loss (ft)	0.02	Cum SA (acres)	27.69	107.26
36.69				

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

BRIDGE

RIVER: Buena Vista

REACH: Lagoon RS: 4700

INPUT
Description: I-5 Proposed Bridge
Distance from Upstream XS = 20.17
Deck/Roadway Width = 259.37
Weir Coefficient = 2.5
Upstream Deck/Roadway Coordinates
num= 10

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
0	33	0	334.467	28.26	0	334.467	28.26	23.3
465.697	25.16	20.2	465.697	25.16	0	508.3	22.5	0
573.26	20	0	623.7	19.3		711.4	19.1	0
1111.4	24	0						

Upstream Bridge Cross Section Data
Station Elevation Data num= 52

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	48	4.17	47	17.72	40	21	38	24.67	36
29.04	33	35.24	29	36.78	28	38.34	27	41.45	25
46.47	22	56.4	20	60.87	19	65.64	18	87.38	15
155.23	13	210.41	10	244.53	9	313.57	8	344.07	7
373.81	6	375.75	5	378.32	4	380.65	3	382.83	2
384.98	1	429.69	1	432.86	2	435.04	3	439.44	4
443.27	5	447.01	6	462.8	7	521.05	7	545.4	7
552.14	8	573.17	8	592.21	8	731.99	7	749.79	7
800.22	9	832.06	10	906.5	11	969.57	12	977.13	13
999.3	14	1009.27	15	1017.54	16	1038.28	19	1073.01	20
1092.97	21	1111.42	22						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	313.57	.03	552.14	.035

Bank Sta: Left Right Coeff Contr. Expan.
313.57 552.14 .3 .5
Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	334.47	25	F
465.7	1111.42	25	F

Downstream Deck/Roadway Coordinates
num= 10

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
0	34	0	285.578	28.26	0	285.578	28.26	23.3
416.808	25.16	20.2	416.808	25.16	0	459.4	22.5	0
562.2	20	0	589.45	19.3	0	677.15	19.1	0
996.16	22	0						

Downstream Bridge Cross Section Data
Station Elevation Data num= 74

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	47	36.55	46	60.64	46	71.69	46	79.07	45
84.89	44	86.72	43	88.18	42	89.81	41	90.95	40
93.01	39	94.15	38	95.4	37	96.78	36	98.12	35
99.86	34	101.3	33	102.79	32	104.27	31	105.7	30
107.27	29	108.68	28	110.33	27	111.63	26	115.71	24
119.42	23	143.69	20	163.4	19	173.87	18	184.43	17
200.85	15	224.06	14	254.21	13	276.87	12	303.27	11
312.07	10	317.55	9	321.35	8	324.37	7	326.49	6
327.8	5	329.07	4	330.3	3	331.49	2	332.71	1
333.88	0	368.56	0	370.58	1	372.2	2	374.15	3
376.89	4	378.81	5	381.6	6	385.11	7	451.18	8

476.04	7	684.01	7	713.77	8	755.35	10	770.77	11
803.5	12	816.67	13	830.66	14	846.74	15	859.1	16
892.75	17	910.8	18	931.46	19	938.21	20	949.38	21
951.57	21	955.85	21	976.63	22	995.41	23		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	321.35	.03	385.11	.035

Bank Sta: Left Right Coeff Contr. Expan.

321.35	385.11	.3	.4

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
416.81	995.41	19	F

Upstream Embankment side slope = .67 horiz. to 1.0 vertical
Downstream Embankment side slope = .67 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow = .95
Elevation at which weir flow begins = 23
Energy head used in spillway design =
Spillway height used in design =
Weir crest shape = Broad Crested

Number of Piers = 2

Pier Data
Pier Station Upstream= 373.84 Downstream= 324.95
Upstream num= 2

Width	Elev	Width	Elev
2.5	0	2.5	26

Downstream num= 2

Width	Elev	Width	Elev
2.5	0	2.5	26

Pier Data
Pier Station Upstream= 426.33 Downstream= 377.44
Upstream num= 2

Width	Elev	Width	Elev
2.5	0	2.5	26

Downstream num= 2

Width	Elev	Width	Elev
2.5	0	2.5	26

Number of Bridge Coefficient Sets = 1

Low Flow Methods and Data
Energy
Momentum Cd = 1.2
Selected Low Flow Methods = Highest Energy Answer

High Flow Method
Energy Only

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

BRIDGE OUTPUT Profile #PF 1

E.G. US. (ft)	15.22	Element	Inside BR US
Inside BR DS			
W.S. US. (ft)	14.64	E.G. Elev (ft)	15.18
14.53			
Q Total (cfs)	8500.00	W.S. Elev (ft)	14.54
13.19			
Q Bridge (cfs)	8500.00	Crit W.S. (ft)	9.28
10.51			
Q Weir (cfs)		Max Chl Dpth (ft)	13.54
13.19			
Weir Sta Lft (ft)		Vel Total (ft/s)	6.44
8.84			
Weir Sta Rgt (ft)		Flow Area (sq ft)	1320.24
961.71			
Weir Submerg		Froude # Chl	0.35
0.56			
Weir Max Depth (ft)		Specif Force (cu ft)	9025.00
7230.96			
Min El Weir Flow (ft)	25.01	Hydr Depth (ft)	10.46
7.62			
Min El Prs (ft)	23.30	W.P. Total (ft)	172.72
160.74			
Delta EG (ft)	0.72	Conv. Total (cfs)	253751.1
160398.0			
Delta WS (ft)	1.50	Top Width (ft)	126.23
126.23			
BR Open Area (sq ft)	2042.50	Frctn Loss (ft)	0.44
0.03			
BR Open Vel (ft/s)	8.84	C & E Loss (ft)	0.21
0.01			
Coef of Q		Shear Total (lb/sq ft)	0.54
1.05			
Br Sel Method	Energy only	Power Total (lb/ft s)	3.45
9.27			

Warning: For the final momentum answer at the bridge, the upstream energy was computed lower than
the downstream energy. This is not physically possible, the momentum answer has been
disregarded.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for
additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid,
energy was used.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid,
energy was used.

CROSS SECTION

RIVER: Buena Vista
REACH: Lagoon RS: 4607

INPUT

Description:

Station Elevation Data num= 74

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	47	36.55	46	60.64	46	71.69	46	79.07	45
84.89	44	86.72	43	88.18	42	89.81	41	90.95	40
93.01	39	94.15	38	95.4	37	96.78	36	98.12	35
99.86	34	101.3	33	102.79	32	104.27	31	105.7	30
107.27	29	108.68	28	110.33	27	111.63	26	115.71	24
119.42	23	143.69	20	163.4	19	173.87	18	184.43	17
200.85	15	224.06	14	254.21	13	276.87	12	303.27	11
312.07	10	317.55	9	321.35	8	324.37	7	326.49	6
327.8	5	329.07	4	330.3	3	331.49	2	332.71	1
333.88	0	368.56	0	370.58	1	372.2	2	374.15	3
376.89	4	378.81	5	381.6	6	385.11	7	451.18	8
476.04	7	684.01	7	713.77	8	755.35	10	770.77	11
803.5	12	816.67	13	830.66	14	846.74	15	859.1	16
892.75	17	910.8	18	931.46	19	938.21	20	949.38	21
951.57	21	955.85	21	976.63	22	995.41	23		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	321.35	.03	385.11	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
321.35	385.11	45.88	77.71 297.82	.3	.4

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
416.81	995.41	19	F

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	14.50	Element	Left OB	Channel
Right OB				
Vel Head (ft)	1.36	Wt. n-Val.	0.035	0.030
0.035				
W.S. Elev (ft)	13.13	Reach Len. (ft)	45.88	77.71
297.82				
Crit W.S. (ft)	10.30	Flow Area (sq ft)	118.54	713.73
186.87				
E.G. Slope (ft/ft)	0.001757	Area (sq ft)	118.54	713.73
2230.49				
Q Total (cfs)	8500.00	Flow (cfs)	295.41	7119.49
1085.09				
Top Width (ft)	568.41	Top Width (ft)	71.21	63.76
433.45				
Vel Total (ft/s)	8.34	Avg. Vel. (ft/s)	2.49	9.98
5.81				
Max Chl Dpth (ft)	13.13	Hydr. Depth (ft)	1.66	11.19
5.89				
Conv. Total (cfs)	202786.6	Conv. (cfs)	7047.7	169851.5
25887.4				
Length Wtd. (ft)	91.01	Wetted Per. (ft)	71.53	67.77
31.70				
Min Ch El (ft)	0.00	Shear (lb/sq ft)	0.18	1.16
0.65				
Alpha	1.26	Stream Power (lb/ft s)	0.45	11.52
3.75				
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	139.74	1549.78
156.11				
C & E Loss (ft)	0.52	Cum SA (acres)	27.52	106.61
36.41				

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

CROSS SECTION

RIVER: Buena Vista
REACH: Lagoon RS: 4529

INPUT
Description:
Station Elevation Data num= 60

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	52	16.48	47	18.95	46	20.87	45	22.66	44
24.27	43	27.68	41	29.46	40	33.06	38	34.39	37
49.62	26	61.41	21	79.08	20	109.93	17	118.96	15
123.11	14	162.13	6.909	167.13	6	233.83	6	258.41	6
261.92	5	265.32	4	268.64	3	271.95	2	275.7	1
277.9	0	283.84	-1	286.32	-2	288.79	-3	291.28	-4
293.74	-5	296.36	-6	298.69	-7	301.72	-7	304.49	-6
307.02	-5	309.92	-4	319.36	-3	351.15	-2	370.79	-1
494.48	0	526.2	1	533.71	1	573.82	0	688.95	0
733.11	1	752.92	2	772.46	3	797.6	4	817.48	5
832.96	6	871.84	7	880.53	9	892.06	12	913.95	14
932.09	18	986.81	26	1055.32	31	1068.35	32	1069.07	32

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	162.13	.03	871.84	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
162.13	871.84	53.77	128.94	133.05	.1 .3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
461.18	1069.07	19	F

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	13.97	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.07	Wt. n-Val.	0.035	0.030
W.S. Elev (ft)	13.89	Reach Len. (ft)	53.77	128.94
133.05				
Crit W.S. (ft)	2.28	Flow Area (sq ft)	134.19	3841.13
E.G. Slope (ft/ft)	0.000066	Area (sq ft)	134.19	8891.37
109.93				
Q Total (cfs)	8500.00	Flow (cfs)	105.03	8394.98
Top Width (ft)	789.07	Top Width (ft)	38.43	709.71
40.93				

Vel Total (ft/s)	2.14	Avg. Vel. (ft/s)	0.78	2.19
Max Chl Dpth (ft)	20.89	Hydr. Depth (ft)	3.49	12.84
Conv. Total (cfs)	1049764.0	Conv. (cfs)	12970.8	1036793.0
Length Wtd. (ft)	128.18	Wetted Per. (ft)	39.06	301.94
Min Ch El (ft)	-7.00	Shear (lb/sq ft)	0.01	0.05
Alpha	1.03	Stream Power (lb/ft s)	0.01	0.11
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	139.61	1541.21
148.11				
C & E Loss (ft)	0.01	Cum SA (acres)	27.46	105.92
34.79				

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

CROSS SECTION

RIVER: Buena Vista
REACH: Lagoon RS: 4400

INPUT
Description:
Station Elevation Data num= 92

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	56	3.18	55	7.06	54	9.99	53	12.59	52
16.08	50	17.75	49	19.51	48	21.18	47	22.85	46
24.55	45	26.19	44	27.93	43	34.68	39	38.04	37
39.58	36	40.93	35	42.45	34	44.02	33	46.14	32
47.5	31	49.5	30	51.68	29	53.42	28	55.27	27
57.18	26	61.1	24	64.14	23	66.98	22	97.47	21
104.45	20	111.25	19	117.42	18	123.89	17	130.33	16
136.06	15	140.9	14	146.01	13	150.92	12	155.73	11
161.17	10	167.03	9	173.12	8	179.22	7	234.1	6
241.12	5	248.55	4	256.63	3	268.05	2	281.25	1
292.54	0	351.29	-1	872.32	-1	878.14	0	884.03	1
890.08	2	896.08	3	901.9	4	907.55	5	913.31	6
928.46	7	972.95	10	985.8	11	1007.34	12	1025.48	13
1029.35	14	1033.06	15	1036.68	16	1039.97	17	1043.52	18
1046.08	19	1048.49	20	1053.17	22	1055.55	23	1057.96	24
1060.33	25	1062.76	26	1065.17	27	1067.66	28	1070.25	29
1072.89	30	1075.5	31	1078.13	32	1080.77	33	1083.37	34
1086.88	35	1088.96	35	1092.23	35	1117.79	36	1121.21	37
1133.48	37	1148.23	36						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	179.22	.03	928.46	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
179.22	928.46	52.77	112.04 284.31	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
637.51	1148.23	19	F

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	13.95	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.03	Wt. n-Val.	0.035	0.030	
W.S. Elev (ft)	13.92	Reach Len. (ft)	52.77	112.04	284.31
Crit W.S. (ft)	1.75	Flow Area (sq ft)	137.42	6183.53	
E.G. Slope (ft/ft)	0.000024	Area (sq ft)	137.42	10268.04	364.51
Q Total (cfs)	8500.00	Flow (cfs)	66.19	8433.81	
Top Width (ft)	887.72	Top Width (ft)	37.91	749.24	100.58
Vel Total (ft/s)	1.34	Avg. Vel. (ft/s)	0.48	1.36	
Max Chl Dpth (ft)	14.92	Hydr. Depth (ft)	3.63	13.49	
Conv. Total (cfs)	1748584.0	Conv. (cfs)	13616.4	1734968.0	
Length Wtd. (ft)	111.76	Wetted Per. (ft)	38.54	458.63	
Min Ch El (ft)	-1.00	Shear (lb/sq ft)	0.01	0.02	
Alpha	1.02	Stream Power (lb/ft s)	0.00	0.03	
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	139.44	1512.86	147.38
C & E Loss (ft)	0.01	Cum SA (acres)	27.41	103.76	34.58

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

CROSS SECTION

RIVER: Buena Vista
REACH: Lagoon RS: 4288

INPUT
Description:
Station Elevation Data num= 90

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	62	3.36	61	9.64	60	13.76	59	14.8	58
16.45	57	17.68	56	18.99	55	20.24	54	21.41	53
22.88	52	24.45	51	25.86	50	27.33	49	30.26	47
31.74	46	33.13	45	34.5	44	35.66	43	36.91	42
37.93	41	39.07	40	40.29	39	41.31	38	42.56	37

43.81	36	44.92	35	45.99	34	47.14	33	48.23	32
51.92	30	53.33	29	55.08	28	57.04	27	59.22	26
60.9	25	62.87	24	76.51	24	86.31	24	89.09	23
91.43	22	93.06	21	94.77	20	96.42	19	98.27	18
100.23	17	102.22	16	104.2	15	105.62	14	107.87	13
110.06	12	117.21	11	124.44	10	128.56	9	141.03	7
172.6	6	187.66	5	202.95	4	215.79	3	226.81	2
237.1	1	246.32	0	306.98	-1	451.84	-2	627.18	-2
1085.25	-1	1091.53	0	1097.81	1	1104.04	2	1110.19	3
1116.41	4	1122.63	5	1128.9	6	1224.64	8	1228.78	8
1318.63	8	1330.39	9	1340.57	10	1388.5	17	1392.44	18
1401.42	20	1404.45	21	1408.04	22	1411.48	23	1414.11	24
1416.43	25	1418.76	26	1421	27	1423.43	28	1425.44	29

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	128.56	.03	1128.9	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
128.56	1128.9	106.91	179.01	314.77	.1 .3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
896.61	1425.44	19	F

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	13.94	Element	Left OB	Channel Right OB
Vel Head (ft)	0.01	Wt. n-Val.	0.035	0.030
W.S. Elev (ft)	13.93	Reach Len. (ft)	106.91	179.01 314.77
Crit W.S. (ft)	0.12	Flow Area (sq ft)	64.57	11209.02
E.G. Slope (ft/ft)	0.000007	Area (sq ft)	64.57	14563.73 1383.07
Q Total (cfs)	8500.00	Flow (cfs)	13.78	8486.22
Top Width (ft)	1261.72	Top Width (ft)	22.79	1000.34 238.59
Vel Total (ft/s)	0.75	Avg. Vel. (ft/s)	0.21	0.76
Max Chl Dpth (ft)	15.93	Hydr. Depth (ft)	2.83	14.59
Conv. Total (cfs)	3319703.0	Conv. (cfs)	5383.7	3314320.0
Length Wtd. (ft)	179.02	Wetted Per. (ft)	23.46	768.49
Min Ch El (ft)	-2.00	Shear (lb/sq ft)	0.00	0.01
Alpha	1.01	Stream Power (lb/ft s)	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	139.32	1480.92 141.68
C & E Loss (ft)	0.00	Cum SA (acres)	27.38	101.51 33.47

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

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

CROSS SECTION

RIVER: Buena Vista
REACH: Lagoon RS: 4110

INPUT
Description:
Station Elevation Data num= 103

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	63	1.39	62	2.89	61	4.38	60	5.87	59
7.45	58	8.87	57	10.64	56	10.89	55	11.71	54
12.28	53	13.08	52	14.14	51	15.72	50	16.67	49
17.58	48	18.38	47	19.76	46	20.87	45	22.26	44
23.43	43	24.76	42	26.04	41	27.55	40	28.24	39
28.87	38	30	37	31.19	36	35.7	34	37.62	33
40.12	32	42.22	31	47.05	30	63.05	29	66.31	28
69.3	27	72.05	26	73.55	25	75.07	24	76.62	23
78.09	22	79.57	21	81.12	20	82.73	19	84.27	18
85.81	17	135.42	6	140.77	5	146.97	4	153.25	3
159.14	2	165.42	1	171.28	0	193.81	-1	543.19	-2
707.02	-2	1210.16	-1	1216.99	0	1223.68	1	1230.5	2
1237.73	3	1244.99	4	1252.39	5	1259.55	6	1267.63	7
1275.57	8	1289.18	11	1292.83	12	1296.85	13	1299.8	14
1303.27	15	1309.48	17	1312.44	18	1315.45	19	1318.43	20
1323.76	22	1326.07	23	1328.38	24	1330.65	25	1332.93	26
1335.33	27	1338.06	28	1341.2	29	1344.46	30	1347.51	31
1353.43	33	1356.4	34	1359.37	35	1362.37	36	1365.35	37
1368.57	38	1371.98	39	1375.32	40	1378.65	41	1382.2	42
1385.24	43	1388.37	44	1391.5	45	1395.43	46	1399.96	47
1404.73	48	1409.31	49	1413.69	50				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	135.42	.03	1267.63	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
135.42	1267.63	169.99	238.13 299.47	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	13.94	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.00	Wt. n-Val.	0.035	0.030
0.035				
W.S. Elev (ft)	13.93	Reach Len. (ft)	169.99	238.13
299.47				
Crit W.S. (ft)		Flow Area (sq ft)	141.97	17109.32
127.39				
E.G. Slope (ft/ft)	0.000003	Area (sq ft)	141.97	17109.32
127.39				
Q Total (cfs)	8500.00	Flow (cfs)	24.28	8453.89
21.83				
Top Width (ft)	1199.97	Top Width (ft)	35.78	1132.21
31.98				
Vel Total (ft/s)	0.49	Avg. Vel. (ft/s)	0.17	0.49
0.17				

Max Chl Dpth (ft)	15.93	Hydr. Depth (ft)	3.97	15.11
3.98				
Conv. Total (cfs)	5204712.0	Conv. (cfs)	14865.0	5176479.0
13368.4				
Length Wtd. (ft)	239.23	Wetted Per. (ft)	36.65	1133.29
32.78				
Min Ch El (ft)	-2.00	Shear (lb/sq ft)	0.00	0.00
0.00				
Alpha	1.02	Stream Power (lb/ft s)	0.00	0.00
0.00				
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	139.07	1415.84
136.22				
C & E Loss (ft)	0.00	Cum SA (acres)	27.30	97.13
32.49				

CROSS SECTION

RIVER: Buena Vista
REACH: Lagoon RS: 3872

INPUT
Description:
Station Elevation Data num= 37

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	25	8.12	20	9.83	19	13.06	17	14.62	16
21.93	13	36.3	8	51.77	6	55.66	5	59.99	4
63.64	3	67.34	2	71.36	1	75.32	0	236.49	-1
488.94	-2	511.87	-2	1112.67	-1	1120.44	0	1128.04	1
1135.77	2	1143.55	3	1151.17	4	1158.99	5	1166.34	6
1347.81	8	1405.89	19	1412.5	22	1423.99	27	1425.68	28
1428.3	29	1430.39	30	1432.4	31	1434.36	32	1435.71	33
1436.77	34	1454.67	42						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	36.3	.03	1166.34	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
36.3	1166.34	248.77	253.91 259.39	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	13.94	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.00	Wt. n-Val.	0.035	0.030
0.035				
W.S. Elev (ft)	13.93	Reach Len. (ft)	248.77	253.91
259.39				
Crit W.S. (ft)		Flow Area (sq ft)	50.41	16839.93
1351.29				
E.G. Slope (ft/ft)	0.000003	Area (sq ft)	50.41	16839.93
1351.29				
Q Total (cfs)	8500.00	Flow (cfs)	6.97	8174.95
318.08				
Top Width (ft)	1359.49	Top Width (ft)	16.65	1130.04
212.80				
Vel Total (ft/s)	0.47	Avg. Vel. (ft/s)	0.14	0.49
0.24				
Max Chl Dpth (ft)	15.93	Hydr. Depth (ft)	3.03	14.90

6.35					
Conv. Total (cfs)	5247692.0	Conv. (cfs)	4304.1	5047013.0	196374.8
Length Wtd. (ft)	254.02	Wetted Per. (ft)	17.68	1131.38	213.37
Min Ch El (ft)	-2.00	Shear (lb/sq ft)	0.00	0.00	0.00
Alpha	1.05	Stream Power (lb/ft s)	0.00	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	138.69	1323.05	131.14
C & E Loss (ft)	0.00	Cum SA (acres)	27.20	90.94	31.65

CROSS SECTION

RIVER: Buena Vista
REACH: Lagoon RS: 3623

INPUT
Description:
Station Elevation Data num= 50

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	47	12.97	45	23.17	43	27.9	42	30.82	41
34.56	40	37.27	39	39.87	38	45.13	37	46.18	37
60.5	37	64.78	36	69.65	34	71.97	33	90.43	22
91.84	21	93.18	20	106.76	13	109.42	12	130.18	7
138.29	6	142.86	5	147.39	4	151.93	3	156.22	2
160.52	1	164.63	0	362.78	-1	735.4	-2	751.14	-2
1416.37	-1	1425.48	0	1434.69	1	1444.12	2	1453.57	3
1463.07	4	1472.8	5	1482.56	6	1524.96	10	1530.59	11
1542.74	13	1547.56	14	1552.67	15	1567.33	20	1574.97	23
1584.85	27	1586.58	28	1612.59	42	1616.05	44	1617.93	45

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	130.18	.03	1482.56	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
130.18	1482.56	510.81	201.77 183.85	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	13.94	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.00	Wt. n-Val.	0.035	0.030	0.035
W.S. Elev (ft)	13.93	Reach Len. (ft)	510.81	201.77	183.85
Crit W.S. (ft)		Flow Area (sq ft)	96.71	20229.66	296.54
E.G. Slope (ft/ft)	0.000002	Area (sq ft)	96.71	20229.66	296.54
Q Total (cfs)	8500.00	Flow (cfs)	13.60	8438.44	47.96
Top Width (ft)	1442.30	Top Width (ft)	25.23	1352.38	64.68
Vel Total (ft/s)	0.41	Avg. Vel. (ft/s)	0.14	0.42	0.16

Max Chl Dpth (ft)	15.93	Hydr. Depth (ft)	3.83	14.96	4.58
Conv. Total (cfs)	6124086.0	Conv. (cfs)	9798.5	6079734.0	34553.6
Length Wtd. (ft)	202.26	Wetted Per. (ft)	26.23	1353.49	65.22
Min Ch El (ft)	-2.00	Shear (lb/sq ft)	0.00	0.00	0.00
Alpha	1.02	Stream Power (lb/ft s)	0.00	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	138.27	1215.01	126.23
C & E Loss (ft)	0.00	Cum SA (acres)	27.08	83.71	30.82

CROSS SECTION

RIVER: Buena Vista
REACH: Lagoon RS: 3420

INPUT
Description:
Station Elevation Data num= 37

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	26	6.98	24	23.26	20	41.66	16	99.25	7
118.2	6	126.49	5	135.05	4	143.13	3	150.42	2
157.9	1	165.21	0	332.74	-1	1016.96	-2	1040.64	-2
1623.54	-1	1630.88	0	1638.14	1	1645.45	2	1652.71	3
1660.21	4	1667.49	5	1674.6	6	1761.13	17	1765.19	18
1785.12	24	1787.74	25	1818.9	39	1828.34	43	1830.71	44
1835.63	46	1838.13	47	1840.92	48	1843.45	49	1854.48	50
1874.11	51	1886.25	51						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	99.25	.03	1674.6	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
99.25	1674.6	426.25	271.34 272.17	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	13.94	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.00	Wt. n-Val.	0.035	0.030	0.035
W.S. Elev (ft)	13.93	Reach Len. (ft)	426.25	271.34	272.17
Crit W.S. (ft)		Flow Area (sq ft)	153.84	23587.30	247.60
E.G. Slope (ft/ft)	0.000001	Area (sq ft)	153.84	23587.30	247.60
Q Total (cfs)	8500.00	Flow (cfs)	17.68	8451.11	31.21
Top Width (ft)	1682.14	Top Width (ft)	44.37	1575.35	62.41
Vel Total (ft/s)	0.35	Avg. Vel. (ft/s)	0.11	0.36	0.13
Max Chl Dpth (ft)	15.93	Hydr. Depth (ft)	3.47	14.97	

3.97					
Conv. Total (cfs)	7135556.0	Conv. (cfs)	14842.0	7094511.0	26202.9
Length Wtd. (ft)	271.64	Wetted Per. (ft)	44.91	1576.24	62.92
Min Ch El (ft)	-2.00	Shear (lb/sq ft)	0.00	0.00	0.00
Alpha	1.02	Stream Power (lb/ft s)	0.00	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	136.80	1113.53	125.09
C & E Loss (ft)	0.00	Cum SA (acres)	26.67	76.93	30.56

CROSS SECTION

RIVER: Buena Vista
REACH: Lagoon RS: 3149

INPUT
Description:
Station Elevation Data num= 36

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	42	3.05	41	24.66	31	26.63	30	39.22	24
41.18	23	64.35	14	75.33	11	79.58	10	85.77	9
92.16	8	97.97	7	104.09	6	111.01	5	117.96	4
124.93	3	131.86	2	138.71	1	145.1	0	168.74	-1
455.59	-1	532.82	-1	1768.54	-1	1786.33	0	1793.43	1
1800.48	2	1807.49	3	1814.62	4	1821.63	5	1828.77	6
1869.54	19	1882.37	24	1885.13	25	1887.32	26	1917.11	38
1922.53	40								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	97.97	.03	1828.77	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
97.97	1828.77	289.73	287.19 287.23	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	13.94	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.00	Wt. n-Val.	0.035	0.030	0.035
W.S. Elev (ft)	13.93	Reach Len. (ft)	289.73	287.19	287.23
Crit W.S. (ft)		Flow Area (sq ft)	129.90	25445.92	98.71
E.G. Slope (ft/ft)	0.000001	Area (sq ft)	129.90	25445.92	98.71
Q Total (cfs)	8500.00	Flow (cfs)	15.07	8473.54	11.40
Top Width (ft)	1789.06	Top Width (ft)	33.38	1730.80	24.88
Vel Total (ft/s)	0.33	Avg. Vel. (ft/s)	0.12	0.33	0.12
Max Chl Dpth (ft)	14.93	Hydr. Depth (ft)	3.89	14.70	3.97

Conv. Total (cfs)	7584523.0	Conv. (cfs)	13443.6	7560911.0
10168.3				
Length Wtd. (ft)	287.19	Wetted Per. (ft)	34.13	1731.79
26.12				
Min Ch El (ft)	-1.00	Shear (lb/sq ft)	0.00	0.00
0.00				
Alpha	1.01	Stream Power (lb/ft s)	0.00	0.00
0.00				
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	135.42	960.81
124.00				
C & E Loss (ft)	0.00	Cum SA (acres)	26.29	66.63
30.28				

CROSS SECTION

RIVER: Buena Vista
REACH: Lagoon RS: 2862

INPUT
Description:
Station Elevation Data num= 64

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	43	2.84	42	7.27	41	30.84	30	33.08	29
37.94	27	40.12	26	42.81	25	45.24	24	47.59	23
50.4	22	53.2	21	55.89	20	60.09	19	64.52	18
80.69	16	94.27	14	100.19	13	111.08	11	120.13	9
133.52	6	138.66	5	143.59	4	148.56	3	153.46	2
158.4	1	163.31	0	168.33	-1	1062.68	-2	1168.22	-2
1377.98	-2	1403.63	-2	1772.38	-1	1781.84	0	1791.24	1
1800.66	2	1810.02	3	1819.37	4	1828.74	5	1837.97	6
1860.1	8	1871.65	9	1881.55	10	1891.57	11	1918.93	15
1924.26	16	1931.53	17	1939.65	18	1946.43	19	1956.57	20
1959.15	21	1964.32	23	1973.64	24	1978.7	25	1983.68	26
1985.71	27	1988.64	28	1992.61	30	1995.85	31	1998.74	32
2010.78	35	2016.57	36	2018.8	37	2023.27	38		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	120.13	.03	1837.97	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
120.13	1837.97	261.34	232.13 220.05	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	13.94	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.00	Wt. n-Val.	0.035	0.030
0.035				
W.S. Elev (ft)	13.93	Reach Len. (ft)	261.34	232.13
220.05				
Crit W.S. (ft)		Flow Area (sq ft)	59.24	26161.59
323.95				
E.G. Slope (ft/ft)	0.000001	Area (sq ft)	59.24	26161.59
323.95				
Q Total (cfs)	8500.00	Flow (cfs)	4.63	8456.29
39.07				
Top Width (ft)	1816.98	Top Width (ft)	25.47	1717.84
73.67				

Vel Total (ft/s)	0.32	Avg. Vel. (ft/s)	0.08	0.32 0.12
Max Chl Dpth (ft)	15.93	Hydr. Depth (ft)	2.33	15.23 4.40
Conv. Total (cfs)	7998249.0	Conv. (cfs)	4360.9	7957122.0 36765.9
Length Wtd. (ft)	232.14	Wetted Per. (ft)	25.95	1719.24 74.11
Min Ch El (ft)	-2.00	Shear (lb/sq ft)	0.00	0.00 0.00
Alpha	1.01	Stream Power (lb/ft s)	0.00	0.00 0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	134.79	790.69 122.61
C & E Loss (ft)	0.00	Cum SA (acres)	26.10	55.26 29.96

CROSS SECTION

RIVER: Buena Vista
REACH: Lagoon RS: 2630

INPUT
Description:
Station Elevation Data num= 38

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	42	2.34	41	4.7	40	11.88	37	13.88	36
15.58	35	19.02	33	34.23	24	42.47	19	110.82	6
115.24	5	119.67	4	124.04	3	128.45	2	132.78	1
137.37	0	141.92	-1	614.97	-2	644.91	-3	695.81	-3
767.82	-2	1774.11	-1	1786.57	0	1793.58	1	1800.39	2
1807.13	3	1813.91	4	1820.92	5	1828	6	1834.05	7
1839.46	8	1845.05	9	1856.27	18	1863.16	22	1864.82	23
1890	36	1893.38	37	1900.5	39				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	110.82	.03	1834.05	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
110.82	1834.05	178.38	183.19 295.58	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	13.94	Element	Left OB	Channel Right OB
Vel Head (ft)	0.00	Wt. n-Val.	0.035	0.030 0.035
W.S. Elev (ft)	13.93	Reach Len. (ft)	178.38	183.19 295.58
Crit W.S. (ft)		Flow Area (sq ft)	165.46	26402.39 80.35
E.G. Slope (ft/ft)	0.000001	Area (sq ft)	165.46	26402.39 80.35
Q Total (cfs)	8500.00	Flow (cfs)	18.28	8472.37 9.35
Top Width (ft)	1782.09	Top Width (ft)	41.71	1723.23 17.15
Vel Total (ft/s)	0.32	Avg. Vel. (ft/s)	0.11	0.32

0.12					
Max Chl Dpth (ft)	16.93	Hydr. Depth (ft)	3.97	15.32	4.69
Conv. Total (cfs)	8089156.0	Conv. (cfs)	17395.9	8062859.0	8900.7
Length Wtd. (ft)	186.47	Wetted Per. (ft)	42.46	1724.59	19.07
Min Ch El (ft)	-3.00	Shear (lb/sq ft)	0.00	0.00	0.00
Alpha	1.01	Stream Power (lb/ft s)	0.00	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	134.11	650.63	121.59
C & E Loss (ft)	0.00	Cum SA (acres)	25.90	46.09	29.73

CROSS SECTION

RIVER: Buena Vista
REACH: Lagoon RS: 2447

INPUT
Description:
Station Elevation Data num= 51

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	41	1.95	40	5.69	38	9.51	36	13.28	34
15.31	33	16.97	32	18.86	31	20.76	30	22.62	29
32.97	24	37.2	22	46.34	18	65.9	12	80.98	9
88.49	8	99.59	7	111.63	6	115.7	5	119.75	4
123.84	3	127.96	2	132.02	1	136.13	0	140.3	-1
158.02	-1	185.87	-1	205.4	-1	365.55	-1	635.69	-2
811.75	-2	1335.91	-1	1372.75	0	1379.3	1	1385.99	2
1392.45	3	1399.53	4	1409.72	5	1433.39	6	1650.65	7
1728.21	7	1735.41	8	1745.98	9	1793.03	11	1799.55	12
1802.62	13	1805.69	14	1808.69	15	1811.28	16	1813.31	17
1823.69	18								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	99.59	.03	1433.39	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
99.59	1433.39	194.36	154.79	143.63	.1 .3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	13.93	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.00	Wt. n-Val.	0.035	0.030	0.035
W.S. Elev (ft)	13.93	Reach Len. (ft)	194.36	154.79	143.63
Crit W.S. (ft)		Flow Area (sq ft)	170.05	19990.55	2462.81
E.G. Slope (ft/ft)	0.000002	Area (sq ft)	170.05	19990.55	2462.81
Q Total (cfs)	8500.00	Flow (cfs)	24.87	7986.23	488.90
Top Width (ft)	1745.88	Top Width (ft)	39.99	1333.80	

372.09					
Vel Total (ft/s)	0.38	Avg. Vel. (ft/s)	0.15	0.40	
0.20					
Max Chl Dpth (ft)	15.93	Hydr. Depth (ft)	4.25	14.99	
6.62					
Conv. Total (cfs)	6402114.0	Conv. (cfs)	18731.7	6015150.0	
368232.7					
Length Wtd. (ft)	154.17	Wetted Per. (ft)	40.69	1335.07	
372.64					
Min Ch El (ft)	-2.00	Shear (lb/sq ft)	0.00	0.00	
0.00					
Alpha	1.08	Stream Power (lb/ft s)	0.00	0.00	
0.00					
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	133.43	553.08	
112.96					
C & E Loss (ft)	0.00	Cum SA (acres)	25.73	39.66	
28.41					

CROSS SECTION

RIVER: Buena Vista
REACH: Lagoon RS: 2292

INPUT
Description:
Station Elevation Data num= 55

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	41	18.77	41	20.52	41	22.06	40	23.5	39
24.61	38	26.25	37	28.01	36	40.42	30	45.41	28
47.85	27	61.13	21	63.44	20	65.79	19	69.02	18
75.56	15	82.37	12	84.66	11	86.95	10	89.25	9
91.51	8	93.7	7	97.09	6	102.46	5	107.56	4
112.64	3	117.79	2	123.04	1	128.16	0	133.34	-1
162.76	-1	430.88	-1	654.96	-2	804.49	-2	885.55	-2
1032.74	-2	1245.64	-1	1286.22	0	1294.47	1	1302.73	2
1311	3	1319.26	4	1327.54	5	1335.91	6	1548.8	7
1687.76	7	1711.99	10	1721.53	11	1730.17	12	1741.53	13
1752.07	15	1761.24	17	1800	18	1850	19	1900	20

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	97.09	.03	1335.91	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
97.09	1335.91	166.63	169.15 169.41	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	13.93	Element	Left OB	Channel	
Right OB					
Vel Head (ft)	0.00	Wt. n-Val.	0.035	0.030	
0.035					
W.S. Elev (ft)	13.93	Reach Len. (ft)	166.63	169.15	
169.41					
Crit W.S. (ft)		Flow Area (sq ft)	79.41	18747.61	
2749.36					
E.G. Slope (ft/ft)	0.000002	Area (sq ft)	79.41	18747.61	
2749.36					
Q Total (cfs)	8500.00	Flow (cfs)	11.51	7911.09	

577.41				
Top Width (ft)	1668.46	Top Width (ft)	19.11	1238.82
410.53				
Vel Total (ft/s)	0.39	Avg. Vel. (ft/s)	0.14	0.42
0.21				
Max Chl Dpth (ft)	15.93	Hydr. Depth (ft)	4.16	15.13
6.70				
Conv. Total (cfs)	6100747.0	Conv. (cfs)	8259.5	5678062.0
414425.7				
Length Wtd. (ft)	169.17	Wetted Per. (ft)	20.71	1239.87
410.96				
Min Ch El (ft)	-2.00	Shear (lb/sq ft)	0.00	0.00
0.00				
Alpha	1.09	Stream Power (lb/ft s)	0.00	0.00
0.00				
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	132.87	484.25
104.37				
C & E Loss (ft)	0.00	Cum SA (acres)	25.60	35.09
27.12				

CROSS SECTION

RIVER: Buena Vista
REACH: Lagoon RS: 2123

INPUT
Description:
Station Elevation Data num= 39

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	42	2.51	41	40.68	27	46.2	25	57.81	21
66.98	18	81.93	13	89.97	11	93.67	10	117.19	7
146.88	6	151.97	5	157.09	4	161.55	3	165.88	2
170.14	1	174.39	0	178.53	-1	201.04	-1	509.03	-1
1265.85	-1	1333.51	0	1340.98	1	1348.3	2	1355.55	3
1362.9	4	1370.08	5	1377.45	6	1583.33	7	1591.23	7
1709.91	7	1741.7	9	1762.57	11	1766.68	12	1774.52	14
1778.53	15	1786.65	16	2000	20	2200	22		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	117.19	.03	1377.45	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
117.19	1377.45	290.39	118.42	124.94	.1 .3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
0	184.2	19	F

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	13.93	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.00	Wt. n-Val.		0.030
0.035				
W.S. Elev (ft)	13.93	Reach Len. (ft)	290.39	118.42
124.94				
Crit W.S. (ft)	0.22	Flow Area (sq ft)		17607.47
2695.19				
E.G. Slope (ft/ft)	0.000002	Area (sq ft)	157.26	18269.77

2695.19					
Q Total (cfs)	8500.00	Flow (cfs)			7883.74
616.26					
Top Width (ft)	1695.11	Top Width (ft)		38.04	1260.26
396.80					
Vel Total (ft/s)	0.42	Avg. Vel. (ft/s)			0.45
0.23					
Max Chl Dpth (ft)	14.93	Hydr. Depth (ft)			14.76
6.79					
Conv. Total (cfs)	5655451.0	Conv. (cfs)			5245425.0
410026.5					
Length Wtd. (ft)	118.74	Wetted Per. (ft)			1193.67
397.32					
Min Ch El (ft)	-1.00	Shear (lb/sq ft)			0.00
0.00					
Alpha	1.08	Stream Power (lb/ft s)			0.00
0.00					
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)		132.42	412.38
93.78					
C & E Loss (ft)	0.00	Cum SA (acres)		25.49	30.24
25.55					

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

CROSS SECTION

RIVER: Buena Vista
REACH: Lagoon RS: 2005

INPUT
Description:
Station Elevation Data num= 61

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	43	6	40.04	7.34	39	9.17	38	10.69	37
12.37	36	13.98	35	15.76	34	17.54	33	19.12	32
20.99	31	22.48	30	24.41	29	26.43	28	30.11	26
31.33	25	33.3	24	35.14	23	37.26	22	39.27	21
40.97	20	42.83	19	47.12	17	49.07	16	51.04	15
53.45	14	56.06	13	59.07	12	61.81	11	65.36	10
68.85	9	76.81	7	108.29	6	117.32	5	126.36	4
134.64	3	143.28	2	151.75	1	160.27	0	168.99	-1
279.6	-1	1024.15	-1	1348.64	-1	1652.16	0	1663.27	1
1674.06	2	1684.92	3	1692.44	4	1699.77	5	1707.55	6
1720.26	7	1762.86	7	1814.12	7	1837.69	8	1858.19	9
1891.96	11	1896.38	12	1899.42	13	2000	15	2200	18
2400	21								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	76.81	.03	1720.26	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
76.81	1720.26	243.07	145.64 107.05	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	478.05	19	F
1927.6	2400	19	F

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	13.93	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.00	Wt. n-Val.		0.030
0.035				
W.S. Elev (ft)	13.93	Reach Len. (ft)	243.07	145.64
107.05				
Crit W.S. (ft)	0.31	Flow Area (sq ft)		18093.54
1079.57				
E.G. Slope (ft/ft)	0.000002	Area (sq ft)	86.95	23633.99
1083.02				
Q Total (cfs)	8500.00	Flow (cfs)		8286.76
213.25				
Top Width (ft)	1892.59	Top Width (ft)	23.18	1643.45
225.96				
Vel Total (ft/s)	0.44	Avg. Vel. (ft/s)		0.46
0.20				
Max Chl Dpth (ft)	14.93	Hydr. Depth (ft)		14.57
5.21				
Conv. Total (cfs)	5481467.0	Conv. (cfs)		5343950.0
137517.2				
Length Wtd. (ft)	144.93	Wetted Per. (ft)		1242.59
207.72				
Min Ch El (ft)	-1.00	Shear (lb/sq ft)		0.00
0.00				
Alpha	1.05	Stream Power (lb/ft s)		0.00
0.00				
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	131.60	355.42
88.36				
C & E Loss (ft)	0.00	Cum SA (acres)	25.28	26.29
24.65				

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

CROSS SECTION

RIVER: Buena Vista
REACH: Lagoon RS: 1859

INPUT
Description:
Station Elevation Data num= 42

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	35	1.86	34	3.02	33	4.7	32	5.98	31
11.31	26	13.28	24	16.02	22	21.5	20	24.47	19
34.48	16	43.91	13	47.81	12	65.46	8	80.71	6
86.8	5	92.9	4	98.95	3	105.06	2	111.15	1
117.21	0	123.33	-1	177.82	-1	462.47	0	679.56	0
790.11	0	1170.12	-1	1247.26	-1	1301.17	-1	1342.62	-1
1640.36	0	1649.14	1	1658.13	2	1667.14	3	1676	4
1684.89	5	1693.54	6	1766.59	11	1796.6	12	1846.35	13
1880.38	16	1939.78	20						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	65.46	.03	1693.54	.035

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
65.46 1693.54 137.81 78.69 68.05 .1 .3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	577.25	19	F
1835.88	1939.78	19	F

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	13.93	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.00	Wt. n-Val.		0.030	0.035
W.S. Elev (ft)	13.93	Reach Len. (ft)	137.81	78.69	68.05
Crit W.S. (ft)	0.77	Flow Area (sq ft)		15901.23	529.75
E.G. Slope (ft/ft)	0.000003	Area (sq ft)	76.28	23013.54	545.48
Q Total (cfs)	8500.00	Flow (cfs)		8402.01	97.99
Top Width (ft)	1815.90	Top Width (ft)	24.47	1628.08	163.35
Vel Total (ft/s)	0.52	Avg. Vel. (ft/s)		0.53	0.18
Max Chl Dpth (ft)	14.93	Hydr. Depth (ft)		14.24	3.72
Conv. Total (cfs)	4681169.0	Conv. (cfs)		4627206.0	53963.4
Length Wtd. (ft)	78.60	Wetted Per. (ft)		1116.63	142.54
Min Ch El (ft)	-1.00	Shear (lb/sq ft)		0.00	0.00
Alpha	1.03	Stream Power (lb/ft s)		0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	131.15	277.44	86.36
C & E Loss (ft)	0.00	Cum SA (acres)	25.15	20.82	24.18

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

CROSS SECTION

RIVER: Buena Vista
REACH: Lagoon RS: 1780

INPUT
Description:
Station Elevation Data num= 65

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	30	7.21	29	9.26	28	11.49	27	13.75	26
15.87	25	18.01	24	20	23	25.92	20	28	19
30.72	18	32.8	17	35.5	16	43.47	13	46.29	12
50.53	11	56.83	10	63.17	9	69.14	8	79.57	6
83.55	5	89.73	4	96.27	3	111.54	2	131.97	2

146.14	3	157.58	4	168.15	5	180.47	6	194.12	7
219.22	7	224.41	6	229.77	5	235.16	4	241.04	3
247.1	2	256.81	1	266.37	0	397.24	0	637.01	0
698.47	0	873.85	0	1090.72	-1	1148.33	-1	1207.35	-1
1283.19	-1	1578.86	0	1588.02	1	1597.36	2	1606.65	3
1615.79	4	1624.47	5	1633.75	6	1645.86	7	1665.72	8
1694.5	9	1702.49	10	1705.97	11	1709.43	12	1710.01	12
1737.91	13	1801.15	14	1808.12	15	1825.27	16	2178.2	20

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	69.14	.03	1665.72	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
69.14	1665.72	684.62	99.7	145.5	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	570.9	19	F
1729.3	2178.2	19	F

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	13.93	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.00	Wt. n-Val.		0.030
0.035				
W.S. Elev (ft)	13.93	Reach Len. (ft)	684.62	99.70
145.50				
Crit W.S. (ft)	0.85	Flow Area (sq ft)		15306.15
243.59				
E.G. Slope (ft/ft)	0.000004	Area (sq ft)	97.55	21472.42
280.16				
Q Total (cfs)	8500.00	Flow (cfs)		8451.54
48.46				
Top Width (ft)	1755.61	Top Width (ft)	28.14	1596.58
130.90				
Vel Total (ft/s)	0.55	Avg. Vel. (ft/s)		0.55
0.20				
Max Chl Dpth (ft)	14.93	Hydr. Depth (ft)		13.98
3.83				
Conv. Total (cfs)	4423848.0	Conv. (cfs)		4398626.0
25221.6				
Length Wtd. (ft)	237.97	Wetted Per. (ft)		1095.22
63.95				
Min Ch El (ft)	-1.00	Shear (lb/sq ft)		0.00
0.00				
Alpha	1.02	Stream Power (lb/ft s)		0.00
0.00				
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	130.87	237.26
85.72				
C & E Loss (ft)	0.00	Cum SA (acres)	25.07	17.91
23.95				

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

CROSS SECTION

RIVER: Buena Vista
REACH: Lagoon RS: 1681

INPUT
Description:
Station Elevation Data num= 63

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	18	1	16	21.62	13	23.97	12	28.15	11
35.22	10	123.88	8	133.07	8	149.24	7	163.71	6
242.94	5	267.06	4	288.61	3	466.03	3	871.71	4
890.48	5	958.87	5	979.22	5	1002.07	5	1006.18	4
1010.82	3	1015.39	2	1018.95	1	1022.97	0	1026.59	-1
1030.75	-2	1034.01	-3	1118.85	-3	1122.46	-2	1126.71	-1
1131.63	0	1137.74	1	1147.89	2	1157.04	3	1181.69	4
1275.69	5	1288.17	5	1298.4	5	1320.35	6	1371.85	7
1379.53	8	1433.96	10	1438.56	11	1464.38	12	1499.06	13
1505.42	13	1544.46	13	1602.58	13	1639.89	14	1698.4	14
1737.07	13	1749.9	13	1763.55	13	1767.52	13	1787.99	14
1791.03	14	1798.45	13	1800.57	13	1824.11	14	1836.49	15
1858.74	16	1888	17	1977.77	18				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	890.48	.03	1298.4	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
890.48	1298.4	151.62	32.33	32.8	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	356.9	19	F
1389.7	1977.77	19	T

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	13.93	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.01	Wt. n-Val.	0.035	0.030
0.035				
W.S. Elev (ft)	13.92	Reach Len. (ft)	151.62	32.33
32.80				
Crit W.S. (ft)	4.36	Flow Area (sq ft)	5596.37	4691.90
674.68				
E.G. Slope (ft/ft)	0.000012	Area (sq ft)	8203.74	4691.90
1191.21				
Q Total (cfs)	8500.00	Flow (cfs)	3985.12	4134.76
380.12				
Top Width (ft)	1737.24	Top Width (ft)	875.19	407.92
454.13				
Vel Total (ft/s)	0.78	Avg. Vel. (ft/s)	0.71	0.88
0.56				
Max Chl Dpth (ft)	16.92	Hydr. Depth (ft)	10.49	11.50
7.39				
Conv. Total (cfs)	2428106.0	Conv. (cfs)	1138387.0	1181133.0
108586.3				
Length Wtd. (ft)	91.32	Wetted Per. (ft)	533.61	409.48
91.40				
Min Ch El (ft)	-3.00	Shear (lb/sq ft)	0.01	0.01
0.01				

Alpha	1.05	Stream Power (lb/ft s)	0.01	0.01
0.00				
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	65.64	207.32
83.26				
C & E Loss (ft)	0.01	Cum SA (acres)	17.97	15.62
22.97				

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

CROSS SECTION

RIVER: Buena Vista
REACH: Lagoon RS: 1647

INPUT
Description:
Station Elevation Data num= 47

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	17	16.79	16	55.91	15	93.15	14	120.43	13
163.58	12	307.64	11	310.29	11	371.51	10	936	9.6
939.05	7	942.89	6	944.25	5	945.4	4	946.66	3
947.76	2	948.95	1	950.1	0	951.27	-1	952.41	-2
954.13	-3	961.66	-3	967.8	-2	969.86	-1	971.52	0
972.63	1	973.74	2	974.87	3	976.27	4	977.42	5
978.61	6	979.96	7	986	9.7	1672.72	10	1716.12	11
1737.14	12	1758.47	13	1778.71	14	1797.83	15	1817.28	16
1836.14	17	1855.32	18	1872.96	19	1892.67	20	1910.71	21
1929.96	22	1949.51	23						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	939.05	.03	979.96	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
939.05	979.96	77.77	66.72	65.11	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	258.3	19	F
1250.4	1949.51	19	F

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	13.92	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.10	Wt. n-Val.	0.035	0.030
0.035				
W.S. Elev (ft)	13.82	Reach Len. (ft)	9.60	9.60
9.60				
Crit W.S. (ft)	11.60	Flow Area (sq ft)	2629.11	536.35
1107.74				
E.G. Slope (ft/ft)	0.000258	Area (sq ft)	2899.15	536.35
2989.02				

Q Total (cfs)	8500.00	Flow (cfs)	4413.09	2154.08 1932.84
Top Width (ft)	1677.12	Top Width (ft)	841.05	40.91 795.15
Vel Total (ft/s)	1.99	Avg. Vel. (ft/s)	1.68	4.02 1.74
Max Chl Dpth (ft)	16.82	Hydr. Depth (ft)	3.86	13.11 4.10
Conv. Total (cfs)	528707.9	Conv. (cfs)	274498.0	133985.5 120224.3
Length Wtd. (ft)	9.60	Wetted Per. (ft)	681.72	47.35 271.02
Min Ch El (ft)	-3.00	Shear (lb/sq ft)	0.06	0.18 0.07
Alpha	1.58	Stream Power (lb/ft s)	0.10	0.73 0.12
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	46.31	205.37 81.69
C & E Loss (ft)	0.02	Cum SA (acres)	14.98	15.45 22.50

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

BRIDGE

RIVER: Buena Vista
REACH: Lagoon RS: 1600

INPUT
Description: Carlsbad Blvd Bridge
Distance from Upstream XS = 9.595
Deck/Roadway Width = 47.26
Weir Coefficient = 2.6
Upstream Deck/Roadway Coordinates
num= 10

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
0	11	0	371.5	10	0	936	9.6	0
936	9.6	7.6	986	9.7	7.7	986	9.7	0
1693	10	0	1810	15	0	1901	20	0
2011	23	0						

Upstream Bridge Cross Section Data
Station Elevation Data num= 47

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	17	16.79	16	55.91	15	93.15	14	120.43	13
163.58	12	307.64	11	310.29	11	371.51	10	936	9.6
939.05	7	942.89	6	944.25	5	945.4	4	946.66	3
947.76	2	948.95	1	950.1	0	951.27	-1	952.41	-2
954.13	-3	961.66	-3	967.8	-2	969.86	-1	971.52	0
972.63	1	973.74	2	974.87	3	976.27	4	977.42	5
978.61	6	979.96	7	986	9.7	1672.72	10	1716.12	11
1737.14	12	1758.47	13	1778.71	14	1797.83	15	1817.28	16
1836.14	17	1855.32	18	1872.96	19	1892.67	20	1910.71	21
1929.96	22	1949.51	23						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	939.05	.03	979.96	.035

Bank Sta: Left Right Coeff Contr. Expan.
939.05 979.96 .3 .5
Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	258.3	19	F
1250.4	1949.51	19	F

Downstream Deck/Roadway Coordinates
num= 10

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
0	11	0	371.5	10	0	911	9.6	0
911	9.6	7.6	961	9.7	7.7	961	9.7	0
1693	10	0	1810	15	0	1901	20	0
2011	23	0						

Downstream Bridge Cross Section Data
Station Elevation Data num= 44

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	16	13.62	15	29.09	14	70.33	12	91.67	11
371.5	10	911	9.6	911.28	7	914.33	6	916.79	5
918.78	4	921.11	3	922.48	2	923.91	1	925.38	0
926.66	-1	927.94	-2	929.25	-3	948.55	-3	949.75	-2
950.88	-1	952.07	0	953.28	1	954.31	2	955.43	3
956.54	4	957.66	5	958.63	6	960.78	7	961	9.7
1685.55	10	1711.15	11	1736.27	12	1759.98	13	1779.49	14
1804.1	15	1822.22	16	1840.63	17	1855.23	18	1880.29	19
1943.35	22	1969.18	24	1985.31	26	2010.85	27		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	911.28	.03	960.78	.035

Bank Sta: Left Right Coeff Contr. Expan.
911.28 960.78 .3 .5
Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	273.56	19	F
1181.3	2010.85	19	F

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

Number of Bridge Coefficient Sets = 1

Low Flow Methods and Data
Energy
Selected Low Flow Methods = Highest Energy Answer

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

Additional Bridge Parameters
Add Friction component to Momentum
Do not add Weight component to Momentum

Class B flow critical depth computations use critical depth
inside the bridge at the upstream end
Criteria to check for pressure flow = Upstream energy grade line

BRIDGE OUTPUT Profile #PF 1

E.G. US. (ft)	13.92	Element	Inside BR US
Inside BR DS			
W.S. US. (ft)	13.82	E.G. Elev (ft)	13.90
13.88			
Q Total (cfs)	8500.00	W.S. Elev (ft)	13.84
13.81			
Q Bridge (cfs)	581.02	Crit W.S. (ft)	11.16
11.14			
Q Weir (cfs)		Max Chl Dpth (ft)	16.84
16.81			
Weir Sta Lft (ft)		Vel Total (ft/s)	2.03
2.14			
Weir Sta Rgt (ft)		Flow Area (sq ft)	4193.34
3979.57			
Weir Submerg		Froude # Chl	0.10
0.10			
Weir Max Depth (ft)		Specif Force (cu ft)	11297.83
11617.59			
Min El Weir Flow (ft)	9.61	Hydr Depth (ft)	4.23
4.38			
Min El Prs (ft)	7.69	W.P. Total (ft)	1085.25
1014.60			
Delta EG (ft)	0.06	Conv. Total (cfs)	446936.3
430238.8			
Delta WS (ft)	0.08	Top Width (ft)	1677.76
1742.73			
BR Open Area (sq ft)	284.47	Frctn Loss (ft)	0.02
0.00			
BR Open Vel (ft/s)	2.04	C & E Loss (ft)	0.00
0.01			
Coef of Q		Shear Total (lb/sq ft)	0.09
0.10			
Br Sel Method	Energy only	Power Total (lb/ft s)	0.18
0.20			

Note: The weir over a bridge is submerged, the energy answer was used.
Note: The downstream water surface is above the minimum elevation required for orifice flow. The
orifice flow equation was used for pressure flow.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid,
energy was used.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid,
energy was used.

CROSS SECTION

RIVER: Buena Vista
REACH: Lagoon RS: 1580

INPUT
Description:

Station Elevation Data num= 44

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	16	13.62	15	29.09	14	70.33	12	91.67	11
371.5	10	911	9.6	911.28	7	914.33	6	916.79	5
918.78	4	921.11	3	922.48	2	923.91	1	925.38	0
926.66	-1	927.94	-2	929.25	-3	948.55	-3	949.75	-2
950.88	-1	952.07	0	953.28	1	954.31	2	955.43	3
956.54	4	957.66	5	958.63	6	960.78	7	961	9.7
1685.55	10	1711.15	11	1736.27	12	1759.98	13	1779.49	14
1804.1	15	1822.22	16	1840.63	17	1855.23	18	1880.29	19
1943.35	22	1969.18	24	1985.31	26	2010.85	27		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	911.28	.03	960.78	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
911.28	960.78	476.8	269.74	307.75	.3 .5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	273.56	19	F
1181.3	2010.85	19	F

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	13.86	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.12	Wt. n-Val.	0.035	0.030
0.035				
W.S. Elev (ft)	13.74	Reach Len. (ft)	476.80	269.74
307.75				
Crit W.S. (ft)	11.45	Flow Area (sq ft)	2479.09	659.42
882.11				
E.G. Slope (ft/ft)	0.000265	Area (sq ft)	3116.64	659.42
2997.19				
Q Total (cfs)	8500.00	Flow (cfs)	4223.42	2752.60
1523.98				
Top Width (ft)	1740.14	Top Width (ft)	876.92	49.50
813.72				
Vel Total (ft/s)	2.11	Avg. Vel. (ft/s)	1.70	4.17
1.73				
Max Chl Dpth (ft)	16.74	Hydr. Depth (ft)	3.89	13.32
4.00				
Conv. Total (cfs)	522424.4	Conv. (cfs)	259578.4	169179.4
93666.6				
Length Wtd. (ft)	324.59	Wetted Per. (ft)	640.06	55.94
223.01				
Min Ch El (ft)	-3.00	Shear (lb/sq ft)	0.06	0.19
0.07				
Alpha	1.70	Stream Power (lb/ft s)	0.11	0.81
0.11				
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	41.66	204.57
77.06				
C & E Loss (ft)	0.05	Cum SA (acres)	13.66	15.38
21.27				

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

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

CROSS SECTION

RIVER: Buena Vista
REACH: Lagoon RS: 1311

INPUT
Description:
Station Elevation Data num= 53

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	25	4.38	24	8.79	23	13.39	22	18.93	21
25.36	20	31.34	19	36.02	18	40.77	17	45.46	16
50.44	15	54.92	14	60.49	13	66.22	12	76.34	11
132.61	10	139.7	9	159.95	10	189.1	10	197.42	9
201	8	204.32	7	207.68	6	214.48	5	221.58	4
228.98	3	239.16	2	249.71	1	268.39	.951	629.58	0
648.5	-1	666.69	-2	685.47	-3	702.67	-4	725.44	-4
761.5	-3	796.67	-2	835	-1	1103.2	-1	1428.13	-.04
1441.7	0	1456.72	1	1471.79	2	1506.76	5	1525.92	7
1571.43	9	1700.16	10	1739.64	11	1792.75	12	1801.83	15
1812.44	20	1820.03	25	1823.03	27				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	268.39	.03	1428.13	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
268.39	1428.13	313.44	233.54	417.3	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	459.5	19	F
1070.36	1823.03	19	F

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	13.80	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.01	Wt. n-Val.		0.030
W.S. Elev (ft)	13.79	Reach Len. (ft)	313.44	233.54
417.30				
Crit W.S. (ft)	0.67	Flow Area (sq ft)		9126.33
E.G. Slope (ft/ft)	0.000010	Area (sq ft)	1227.20	16762.35
2152.65				
Q Total (cfs)	8500.00	Flow (cfs)		8500.00
Top Width (ft)	1742.06	Top Width (ft)	212.29	1159.74
370.03				
Vel Total (ft/s)	0.93	Avg. Vel. (ft/s)		0.93
Max Chl Dpth (ft)	17.79	Hydr. Depth (ft)		14.94
Conv. Total (cfs)	2741584.0	Conv. (cfs)		2741584.0
Length Wtd. (ft)	238.04	Wetted Per. (ft)		611.01
Min Ch El (ft)	-4.00	Shear (lb/sq ft)		0.01

Alpha	1.00	Stream Power (lb/ft s)		0.01
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	17.89	150.63
58.87				
C & E Loss (ft)	0.01	Cum SA (acres)	7.70	11.64
17.08				

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

CROSS SECTION

RIVER: Buena Vista
REACH: Lagoon RS: 1078

INPUT
Description:
Station Elevation Data num= 42

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	18	9.32	17	62.8	17	73.84	17	193.54	17
229.48	17	259.86	17	281.13	16.6	357.62	16.3	367.34	15
484.33	10	511.88	9	517.89	8	544.49	7	549.82	6
553.49	5	560.53	3.249	561.53	3	569.71	1	573.42	0
577.2	-1	744.79	-1	763.53	-1	769.27	1	774.79	2.971
774.87	3	777.69	4	780.52	5	783.35	6	785.51	7
795.9	8	802.78	9	808.08	16	1178.8	16.3	1282.45	16.6
1349.55	17	1487.3	17	1503.69	17	1528.51	17	1542.96	18
1582.01	20	1602.3	21						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	560.53	.03	774.79	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
560.53	774.79	40.6	38.95	38.81	.1 .3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	521.32	21	F
801.32	1602.3	21	F

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	13.79	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.10	Wt. n-Val.	0.035	0.030
0.035				
W.S. Elev (ft)	13.69	Reach Len. (ft)	10.16	10.16
10.16				
Crit W.S. (ft)	2.92	Flow Area (sq ft)	280.75	3089.75
187.40				
E.G. Slope (ft/ft)	0.000076	Area (sq ft)	606.76	3089.75
202.75				
Q Total (cfs)	8500.00	Flow (cfs)	382.69	7867.46

249.84					
Top Width (ft)	408.41	Top Width (ft)	162.61	214.26	
31.54					
Vel Total (ft/s)	2.39	Avg. Vel. (ft/s)	1.36	2.55	
1.33					
Max Chl Dpth (ft)	14.69	Hydr. Depth (ft)	7.16	14.42	
7.06					
Conv. Total (cfs)	975892.3	Conv. (cfs)	43937.5	903270.1	
28684.6					
Length Wtd. (ft)	10.16	Wetted Per. (ft)	39.67	215.47	
27.38					
Min Ch El (ft)	-1.00	Shear (lb/sq ft)	0.03	0.07	
0.03					
Alpha	1.08	Stream Power (lb/ft s)	0.05	0.17	
0.04					
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	11.29	97.42	
47.59					
C & E Loss (ft)	0.00	Cum SA (acres)	6.35	7.95	
15.16					

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

BRIDGE

RIVER: Buena Vista
REACH: Lagoon RS: 1050

INPUT
Description:
Distance from Upstream XS = 10.16
Deck/Roadway Width = 20
Weir Coefficient = 2.6
Upstream Deck/Roadway Coordinates
num= 6

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
0	20	0	521.32	20	0
521.32	20	13.75	801.32	20	0
801.32	20	13.75	801.32	20	0
1700	20	0			

Upstream Bridge Cross Section Data
Station Elevation Data num= 42

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	18	9.32	17	62.8	17	73.84	17	193.54	17
229.48	17	259.86	17	281.13	16.6	357.62	16.3	367.34	15
484.33	10	511.88	9	517.89	8	544.49	7	549.82	6
553.49	5	560.53	3.249	561.53	3	569.71	1	573.42	0
577.2	-1	744.79	-1	763.53	-1	769.27	1	774.79	2.971
774.87	3	777.69	4	780.52	5	783.35	6	785.51	7
795.9	8	802.78	9	808.08	16	1178.8	16.3	1282.45	16.6
1349.55	17	1487.3	17	1503.69	17	1528.51	17	1542.96	18
1582.01	20	1602.3	21						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	560.53	.03	774.79	.035

```
Bank Sta: Left   Right    Coeff Contr.   Expan.
        560.53  774.79            .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0  521.32      21       F
  801.32  1602.3      21       F

Downstream  Deck/Roadway Coordinates
    num=       6
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
       0       20       0  509.27       20       0  509.27       20   13.75
  789.27       20   13.75  789.27       20       0    1700       20       0

Downstream Bridge Cross Section Data
Station Elevation Data    num=      36
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0      18   61.73      18   78.86      18   83.75      18   87.72      17
   91.27      17   95.28      17  373.08    16.4  379.01    16.3  399.68    16.3
  431.69      13  465.19      12  491.76      11  508.89      10  513.73       9
  523.38       8   527.6       7  538.22       5  547.06       3  556.03       1
  560.45       0  560.53    -.017  565.16      -1  754.78      -1  761.05       1
  770.76       4  775.56    5.576  776.85       6  792.61      10  819.55    16.3
 1237.07    16.6  1270.6      17 1455.79      17 1487.36      17 1502.57      18
 1580.95      22

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
       0    .035  538.22     .03  775.56    .035

Bank Sta: Left   Right    Coeff Contr.   Expan.
        538.22  775.56            .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0  508.89      21       F
  789.27 1580.95      21       F

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

Number of Piers =  9

Pier Data
Pier Station     Upstream=  549.32    Downstream=  537.27
Upstream     num=       2
    Width   Elev    Width   Elev
        2     -5        2     20
Downstream     num=       2
    Width   Elev    Width   Elev
        2     -5        2     20

Pier Data
Pier Station     Upstream=  577.32    Downstream=  565.27
Upstream     num=       2
    Width   Elev    Width   Elev
        2     -5        2     20
Downstream     num=       2
    Width   Elev    Width   Elev
```

```
       2       -5        2       20

Pier Data
Pier Station     Upstream=  605.32    Downstream=  593.27
Upstream     num=        2
    Width   Elev    Width   Elev
       2       -5        2       20
Downstream     num=        2
    Width   Elev    Width   Elev
       2       -5        2       20

Pier Data
Pier Station     Upstream=  633.32    Downstream=  621.27
Upstream     num=        2
    Width   Elev    Width   Elev
       2       -5        2       20
Downstream     num=        2
    Width   Elev    Width   Elev
       2       -5        2       20

Pier Data
Pier Station     Upstream=  661.32    Downstream=  649.29
Upstream     num=        2
    Width   Elev    Width   Elev
       2       -5        2       20
Downstream     num=        2
    Width   Elev    Width   Elev
       2       -5        2       20

Pier Data
Pier Station     Upstream=  689.32    Downstream=  677.27
Upstream     num=        2
    Width   Elev    Width   Elev
       2       -5        2       20
Downstream     num=        2
    Width   Elev    Width   Elev
       2       -5        2       20

Pier Data
Pier Station     Upstream=  717.32    Downstream=  705.27
Upstream     num=        2
    Width   Elev    Width   Elev
       2       -5        2       20
Downstream     num=        2
    Width   Elev    Width   Elev
       2       -5        2       20

Pier Data
Pier Station     Upstream=  745.32    Downstream=  733.27
Upstream     num=        2
    Width   Elev    Width   Elev
       2       -5        2       20
Downstream     num=        2
    Width   Elev    Width   Elev
       2       -5        2       20

Pier Data
Pier Station     Upstream=  773.32    Downstream=  761.27
Upstream     num=        2
    Width   Elev    Width   Elev
       2       -5        2       20
Downstream     num=        2
    Width   Elev    Width   Elev
```

2 -5 2 20

Number of Bridge Coefficient Sets = 1

Low Flow Methods and Data
Energy
Selected Low Flow Methods = Highest Energy Answer

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

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

BRIDGE OUTPUT Profile #PF 1

E.G. US. (ft)	13.79	Element	Inside BR US
Inside BR DS			
W.S. US. (ft)	13.69	E.G. Elev (ft)	13.79
13.78			
Q Total (cfs)	8500.00	W.S. Elev (ft)	13.68
13.68			
Q Bridge (cfs)	8500.00	Crit W.S. (ft)	3.11
3.05			
Q Weir (cfs)		Max Chl Dpth (ft)	14.68
14.68			
Weir Sta Lft (ft)		Vel Total (ft/s)	2.57
2.54			
Weir Sta Rgt (ft)		Flow Area (sq ft)	3311.67
3350.55			
Weir Submerg		Froude # Chl	0.13
0.13			
Weir Max Depth (ft)		Specif Force (cu ft)	23039.15
23481.54			
Min El Weir Flow (ft)	20.01	Hydr Depth (ft)	12.64
12.79			
Min El Prs (ft)	13.75	W.P. Total (ft)	507.32
511.99			
Delta EG (ft)	0.01	Conv. Total (cfs)	564699.8
578125.3			
Delta WS (ft)	0.01	Top Width (ft)	262.00
262.00			
BR Open Area (sq ft)	3329.58	Frctn Loss (ft)	0.00
0.00			
BR Open Vel (ft/s)	2.57	C & E Loss (ft)	0.00
0.00			
Coef of Q		Shear Total (lb/sq ft)	0.09
0.09			
Br Sel Method	Energy only	Power Total (lb/ft s)	0.24
0.22			

Warning: The sluice gate calculations did not converge during the pressure flow only calculation.

Note: The downstream water surface is below the minimum elevation for pressure flow. The sluice
gate equations were used for pressure flow.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid,
energy was used.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid,
energy was used.

CROSS SECTION

RIVER: Buena Vista
REACH: Lagoon RS: 1039

INPUT
Description:
Station Elevation Data num= 36

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	18	61.73	18	78.86	18	83.75	18	87.72	17
91.27	17	95.28	17	373.08	16.4	379.01	16.3	399.68	16.3
431.69	13	465.19	12	491.76	11	508.89	10	513.73	9
523.38	8	527.6	7	538.22	5	547.06	3	556.03	1
560.45	0	560.53	-.017	565.16	-1	754.78	-1	761.05	1
770.76	4	775.56	5.576	776.85	6	792.61	10	819.55	16.3
1237.07	16.6	1270.6	17	1455.79	17	1487.36	17	1502.57	18
1580.95	22								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	538.22	.03	775.56	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
538.22	775.56	295.4	313.15	432.17	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	508.89	21	F
789.27	1580.95	21	F

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	13.78	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.09	Wt. n-Val.	0.035	0.030
0.035				
W.S. Elev (ft)	13.69	Reach Len. (ft)	295.40	313.15
432.17				
Crit W.S. (ft)	2.86	Flow Area (sq ft)	178.03	3337.38
86.07				
E.G. Slope (ft/ft)	0.000073	Area (sq ft)	332.68	3337.38
128.84				
Q Total (cfs)	8500.00	Flow (cfs)	212.52	8183.63
103.85				
Top Width (ft)	383.33	Top Width (ft)	113.18	237.34
32.81				
Vel Total (ft/s)	2.36	Avg. Vel. (ft/s)	1.19	2.45
1.21				

Max Chl Dpth (ft)	14.69	Hydr. Depth (ft)	6.07	14.06
6.28				
Conv. Total (cfs)	995568.7	Conv. (cfs)	24891.5	958513.7
12163.5				
Length Wtd. (ft)	313.54	Wetted Per. (ft)	29.79	239.02
14.17				
Min Ch El (ft)	-1.00	Shear (lb/sq ft)	0.03	0.06
0.03				
Alpha	1.05	Stream Power (lb/ft s)	0.03	0.16
0.03				
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	11.04	94.70
47.46				
C & E Loss (ft)	0.02	Cum SA (acres)	6.30	7.76
15.14				

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

CROSS SECTION

RIVER: Buena Vista
REACH: Lagoon RS: 726

INPUT
Description:
Station Elevation Data num= 40

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	20	11.05	16	20.66	15	50.72	14	69.38	13
99.7	12	124.49	12	131.47	13	244.17	13	626.29	12
635.38	11	642.96	9	651.23	7	663.53	5	668.24	4.262
669.91	4	682.38	2	694.5	0	700.36	-1	735.67	0
766.58	1	887.67	0	1002.73	0	1085.26	1	1290.27	2
1424.43	2.961	1429.9	3	1437.7	4	1443.16	5	1459.02	7
1467.64	8	1474.65	9	1479.91	10	1489.54	11	1649.19	9.4
1695.16	10	1762.1	19	1781.98	29	1784.02	30	1787.56	31

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.05	668.24	.03	1437.7	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
668.24	1437.7	266.28	329.03 441.88	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
1424.4	1787.56	20	F

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	13.75	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.01	Wt. n-Val.	0.050	0.030
W.S. Elev (ft)	13.73	Reach Len. (ft)	266.28	329.03
441.88				

Crit W.S. (ft)	2.55	Flow Area (sq ft)	882.39	9591.85
E.G. Slope (ft/ft)	0.000011	Area (sq ft)	882.39	9730.82
1118.44				
Q Total (cfs)	8500.00	Flow (cfs)	108.56	8391.44
Top Width (ft)	1667.25	Top Width (ft)	612.56	769.46
285.23				
Vel Total (ft/s)	0.81	Avg. Vel. (ft/s)	0.12	0.87
Max Chl Dpth (ft)	14.73	Hydr. Depth (ft)	1.44	12.68
Conv. Total (cfs)	2616390.0	Conv. (cfs)	33415.1	2582975.0
Length Wtd. (ft)	348.44	Wetted Per. (ft)	613.44	756.63
Min Ch El (ft)	-1.00	Shear (lb/sq ft)	0.00	0.01
Alpha	1.15	Stream Power (lb/ft s)	0.00	0.01
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	6.92	47.73
41.27				
C & E Loss (ft)	0.03	Cum SA (acres)	3.84	4.15
13.56				

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

CROSS SECTION

RIVER: Buena Vista
REACH: Lagoon RS: 397

INPUT
Description:
Station Elevation Data num= 59

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	20	4.4	19	8.24	18	11.88	17	15.38	16
18.77	15	22.03	14	25.47	13	29.78	12	57.39	11
84.94	11	90.26	12	220.61	12	225.23	11	227.61	10
230.11	9	230.29	8.912	232.15	8	234.37	7	239.45	5
241.53	4	244.16	2	246.03	1	247.87	0	251.09	0
253.24	1	261.04	1	273.43	0	281.5	0	286.21	1
289.48	2	292.66	3	295.62	4	297.69	5	300.18	6
304.19	6.254	315.97	7	318	8	319.81	9	321.85	10
323.71	11	350.13	11	368.58	12	387.57	12	411.33	10.6
595.78	11	676.15	12	748.85	10	839.75	10	960.01	10
1517.99	10	1539.58	11	1549.71	12	1551.6	13	1553.53	14
1558.33	16	1566.09	18	1574.05	20	1591.53	25		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.05	230.29	.03	319.81	.035

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

230.29 319.81 212.89 204.4 198.16 .1 .3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
934.4	1591.53	20	F

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	13.71	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.29	Wt. n-Val.	0.050	0.030	0.035
W.S. Elev (ft)	13.42	Reach Len. (ft)	212.89	204.40	198.16
Crit W.S. (ft)	9.69	Flow Area (sq ft)	345.19	920.41	1636.73
E.G. Slope (ft/ft)	0.000566	Area (sq ft)	345.19	920.41	3715.52
Q Total (cfs)	8500.00	Flow (cfs)	343.19	4982.13	3174.68
Top Width (ft)	1528.37	Top Width (ft)	206.26	89.52	1232.60
Vel Total (ft/s)	2.93	Avg. Vel. (ft/s)	0.99	5.41	1.94
Max Chl Dpth (ft)	13.42	Hydr. Depth (ft)	1.67	10.28	2.66
Conv. Total (cfs)	357224.1	Conv. (cfs)	14422.8	209381.0	133420.3
Length Wtd. (ft)	203.03	Wetted Per. (ft)	207.06	93.51	615.18
Min Ch El (ft)	0.00	Shear (lb/sq ft)	0.06	0.35	0.09
Alpha	2.17	Stream Power (lb/ft s)	0.06	1.88	0.18
Frctn Loss (ft)	0.21	Cum Volume (acre-ft)	3.17	7.50	16.76
C & E Loss (ft)	0.11	Cum SA (acres)	1.34	0.90	5.86

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for
additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid,
water surface was used.

CROSS SECTION

RIVER: Buena Vista
REACH: Lagoon RS: 180

INPUT
Description:
Station Elevation Data num= 42

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	23	2.51	22	4.52	21	6.63	20	9.15	19

12.27	18	14.44	17	16.5	16	18.57	15	20.61	14
24.71	13	66.04	12	138.59	7.257	142.52	7	145.07	5
146.5	4	148.12	3	149.47	2	150.69	1	152.99	0
158.34	-1	176.91	-1	181.36	0	182.58	.678	183.16	1
184.98	2	186.89	3	188.61	4	190.17	5	191.86	6
197.18	8	200.15	9	202.87	10	623.92	11	634.19	12
636.4	13	637.83	14	926.87	15	934.43	16	948.91	16
1219.16	14	1366.21	14.3						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.05	138.59	.03	197.18	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
138.59	197.18	246.68	171.04	121.32	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
561.3	1366.21	20	F

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	13.39	Element	Left OB	Channel
Right OB				
Vel Head (ft)	1.39	Wt. n-Val.	0.050	0.030
0.035				
W.S. Elev (ft)	12.00	Reach Len. (ft)	246.68	171.04
121.32				
Crit W.S. (ft)	12.00	Flow Area (sq ft)	172.16	596.88
582.01				
E.G. Slope (ft/ft)	0.002352	Area (sq ft)	172.16	596.88
654.53				
Q Total (cfs)	8500.00	Flow (cfs)	440.51	6422.47
1637.02				
Top Width (ft)	568.21	Top Width (ft)	72.61	58.59
437.01				
Vel Total (ft/s)	6.29	Avg. Vel. (ft/s)	2.56	10.76
2.81				
Max Chl Dpth (ft)	13.00	Hydr. Depth (ft)	2.37	10.19
1.60				
Conv. Total (cfs)	175284.6	Conv. (cfs)	9084.1	132442.3
33758.2				
Length Wtd. (ft)	154.25	Wetted Per. (ft)	72.76	62.95
364.46				
Min Ch El (ft)	-1.00	Shear (lb/sq ft)	0.35	1.39
0.23				
Alpha	2.26	Stream Power (lb/ft s)	0.89	14.98
0.66				
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)	1.91	3.94
6.82				
C & E Loss (ft)	0.41	Cum SA (acres)	0.66	0.55
2.07				

Warning: The energy equation could not be balanced within the specified number of iterations. The
program used critical depth for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for
additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance)

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

CROSS SECTION

RIVER: Buena Vista
REACH: Lagoon RS: 0

INPUT
Description:
Station Elevation Data num= 16

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	12	1	8.5	25.64	8	84.76	8	159.87	8
230.86	5	260.16	2	325.27	2	339.05	7	383.22	8
413.01	8	455.84	8	485.76	8	570.32	7	1429.27	7
1430	12								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.05	159.87	.03	383.22	.035

Bank Sta: Left	Right	Coeff Contr.	Expan.
159.87	383.22	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	11.23	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.04	Wt. n-Val.	0.050	0.030	0.035
W.S. Elev (ft)	11.19	Reach Len. (ft)			
Crit W.S. (ft)	8.16	Flow Area (sq ft)	501.67	1411.80	4239.41
E.G. Slope (ft/ft)	0.000137	Area (sq ft)	501.67	1411.80	4239.41
Q Total (cfs)	8500.00	Flow (cfs)	371.21	2788.65	5340.14
Top Width (ft)	1429.65	Top Width (ft)	159.64	223.35	1046.66
Vel Total (ft/s)	1.38	Avg. Vel. (ft/s)	0.74	1.98	1.26
Max Chl Dpth (ft)	9.19	Hydr. Depth (ft)	3.14	6.32	4.05
Conv. Total (cfs)	726267.3	Conv. (cfs)	31717.3	238271.4	456278.5
Length Wtd. (ft)		Wetted Per. (ft)	161.67	224.46	1050.29

Min Ch El (ft)	2.00	Shear (lb/sq ft)	0.03	0.05
0.03				
Alpha	1.21	Stream Power (lb/ft s)	0.02	0.11
0.04				
Frctn Loss (ft)		Cum Volume (acre-ft)		
C & E Loss (ft)		Cum SA (acres)		

SUMMARY OF MANNING'S N VALUES

River:Buena Vista

Reach	River Sta.	n1	n2	n3
Lagoon	7947	.035	.03	.035
Lagoon	7865	.035	.03	.035
Lagoon	7697	.035	.03	.035
Lagoon	7483	.035	.03	.035
Lagoon	7282	.035	.03	.035
Lagoon	7136	.035	.03	.035
Lagoon	6964	.035	.03	.035
Lagoon	6803	.035	.03	.035
Lagoon	6648	.035	.03	.035
Lagoon	6511	.035	.03	.035
Lagoon	6381	.035	.03	.035
Lagoon	6279	.035	.03	.035
Lagoon	6168	.035	.03	.035
Lagoon	6060	.035	.03	.035
Lagoon	5939	.035	.03	.035
Lagoon	5816	.035	.03	.035
Lagoon	5670	.035	.03	.035
Lagoon	5522	.035	.03	.035
Lagoon	5368	.035	.03	.035
Lagoon	5244	.035	.03	.035
Lagoon	5089	.035	.03	.035
Lagoon	4974	.035	.03	.035
Lagoon	4887	.035	.03	.035
Lagoon	4700	Bridge		
Lagoon	4607	.035	.03	.035
Lagoon	4529	.035	.03	.035
Lagoon	4400	.035	.03	.035
Lagoon	4288	.035	.03	.035
Lagoon	4110	.035	.03	.035
Lagoon	3872	.035	.03	.035
Lagoon	3623	.035	.03	.035
Lagoon	3420	.035	.03	.035
Lagoon	3149	.035	.03	.035
Lagoon	2862	.035	.03	.035
Lagoon	2630	.035	.03	.035
Lagoon	2447	.035	.03	.035
Lagoon	2292	.035	.03	.035
Lagoon	2123	.035	.03	.035
Lagoon	2005	.035	.03	.035
Lagoon	1859	.035	.03	.035
Lagoon	1780	.035	.03	.035
Lagoon	1681	.035	.03	.035
Lagoon	1647	.035	.03	.035
Lagoon	1600	Bridge		

Lagoon	1580	.035	.03	.035
Lagoon	1311	.035	.03	.035
Lagoon	1078	.035	.03	.035
Lagoon	1050	Bridge		
Lagoon	1039	.035	.03	.035
Lagoon	726	.05	.03	.035
Lagoon	397	.05	.03	.035
Lagoon	180	.05	.03	.035
Lagoon	0	.05	.03	.035

SUMMARY OF REACH LENGTHS

River: Buena Vista

Reach	River Sta.	Left	Channel	Right
Lagoon	7947	122.04	82.58	146.76
Lagoon	7865	190.68	168.96	242.49
Lagoon	7697	163.29	213.8	270.78
Lagoon	7483	123.8	201.79	281.54
Lagoon	7282	127.78	146.46	178.49
Lagoon	7136	112.3	173.35	239.96
Lagoon	6964	110.48	160.7	214.42
Lagoon	6803	83.5	154.99	229.89
Lagoon	6648	107.95	137.87	165.59
Lagoon	6511	94.88	130.28	181.08
Lagoon	6381	73.31	102.19	143.99
Lagoon	6279	73.95	110.72	186.66
Lagoon	6168	125.29	108.76	112.06
Lagoon	6060	119.41	121.47	123.15
Lagoon	5939	104.06	122.18	155.9
Lagoon	5816	123.85	146.63	192.73
Lagoon	5670	166.55	147.89	121.91
Lagoon	5522	180.15	154.33	129.47
Lagoon	5368	173.65	124.23	77.16
Lagoon	5244	225.58	155.95	82.33
Lagoon	5089	206.08	115.01	98.82
Lagoon	4974	104.98	87.04	342
Lagoon	4887	294	294	294
Lagoon	4700	Bridge		
Lagoon	4607	45.88	77.71	297.82
Lagoon	4529	53.77	128.94	133.05
Lagoon	4400	52.77	112.04	284.31
Lagoon	4288	106.91	179.01	314.77
Lagoon	4110	169.99	238.13	299.47
Lagoon	3872	248.77	253.91	259.39
Lagoon	3623	510.81	201.77	183.85
Lagoon	3420	426.25	271.34	272.17
Lagoon	3149	289.73	287.19	287.23
Lagoon	2862	261.34	232.13	220.05
Lagoon	2630	178.38	183.19	295.58
Lagoon	2447	194.36	154.79	143.63
Lagoon	2292	166.63	169.15	169.41
Lagoon	2123	290.39	118.42	124.94
Lagoon	2005	243.07	145.64	107.05
Lagoon	1859	137.81	78.69	68.05
Lagoon	1780	684.62	99.7	145.5
Lagoon	1681	151.62	32.33	32.8
Lagoon	1647	77.77	66.72	65.11
Lagoon	1600	Bridge		

Lagoon	1580	476.8	269.74	307.75
Lagoon	1311	313.44	233.54	417.3
Lagoon	1078	40.6	38.95	38.81
Lagoon	1050	Bridge		
Lagoon	1039	295.4	313.15	432.17
Lagoon	726	266.28	329.03	441.88
Lagoon	397	212.89	204.4	198.16
Lagoon	180	246.68	171.04	121.32
Lagoon	0			

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: Buena Vista

Reach	River Sta.	Contr.	Expan.
Lagoon	7947	.1	.3
Lagoon	7865	.1	.3
Lagoon	7697	.1	.3
Lagoon	7483	.1	.3
Lagoon	7282	.1	.3
Lagoon	7136	.1	.3
Lagoon	6964	.1	.3
Lagoon	6803	.1	.3
Lagoon	6648	.1	.3
Lagoon	6511	.1	.3
Lagoon	6381	.1	.3
Lagoon	6279	.1	.3
Lagoon	6168	.1	.3
Lagoon	6060	.1	.3
Lagoon	5939	.1	.3
Lagoon	5816	.1	.3
Lagoon	5670	.1	.3
Lagoon	5522	.1	.3
Lagoon	5368	.1	.3
Lagoon	5244	.1	.3
Lagoon	5089	.1	.3
Lagoon	4974	.1	.3
Lagoon	4887	.3	.5
Lagoon	4700	Bridge	
Lagoon	4607	.3	.4
Lagoon	4529	.1	.3
Lagoon	4400	.1	.3
Lagoon	4288	.1	.3
Lagoon	4110	.1	.3
Lagoon	3872	.1	.3
Lagoon	3623	.1	.3
Lagoon	3420	.1	.3
Lagoon	3149	.1	.3
Lagoon	2862	.1	.3
Lagoon	2630	.1	.3
Lagoon	2447	.1	.3
Lagoon	2292	.1	.3
Lagoon	2123	.1	.3
Lagoon	2005	.1	.3
Lagoon	1859	.1	.3
Lagoon	1780	.1	.3
Lagoon	1681	.1	.3
Lagoon	1647	.3	.5
Lagoon	1600	Bridge	

BV_Prop.rep

Lagoon	1580		.3	.5
Lagoon	1311		.1	.3
Lagoon	1078		.1	.3
Lagoon	1050	Bridge		
Lagoon	1039		.1	.3
Lagoon	726		.1	.3
Lagoon	397		.1	.3
Lagoon	180		.1	.3
Lagoon	0		.1	.3

Profile Output Table - Standard Table 1

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.
E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl	
			(cfs)	(ft)	(ft)	(ft)
(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)		
Lagoon	7947	PF 1	8500.00	0.00	15.26	4.12
15.31	0.000044	1.79	4833.16	912.60	0.09	
Lagoon	7865	PF 1	8500.00	-2.00	15.28	1.50
15.30	0.000018	1.24	7041.56	1193.87	0.06	
Lagoon	7697	PF 1	8500.00	-4.00	15.29	0.56
15.30	0.000007	0.82	11548.06	1200.76	0.04	
Lagoon	7483	PF 1	8500.00	1.00	15.28	3.73
15.30	0.000015	0.92	9991.09	1255.28	0.05	
Lagoon	7282	PF 1	8500.00	1.00	15.28	
15.29	0.000012	0.80	11575.06	1406.20	0.04	
Lagoon	7136	PF 1	8500.00	0.00	15.28	
15.29	0.000008	0.68	13523.87	1544.01	0.04	
Lagoon	6964	PF 1	8500.00	1.00	15.28	
15.29	0.000007	0.62	14222.08	1582.05	0.03	
Lagoon	6803	PF 1	8500.00	0.00	15.28	
15.29	0.000005	0.53	16260.11	1585.69	0.03	
Lagoon	6648	PF 1	8500.00	0.00	15.28	
15.29	0.000005	0.54	16616.40	1677.56	0.03	
Lagoon	6511	PF 1	8500.00	1.00	15.28	
15.28	0.000004	0.53	16951.76	1639.75	0.03	
Lagoon	6381	PF 1	8500.00	0.00	15.28	
15.28	0.000003	0.50	18272.67	1594.83	0.02	
Lagoon	6279	PF 1	8500.00	0.00	15.28	
15.28	0.000002	0.43	20691.35	1562.22	0.02	
Lagoon	6168	PF 1	8500.00	0.00	15.28	
15.28	0.000002	0.39	21883.83	1544.90	0.02	
Lagoon	6060	PF 1	8500.00	0.00	15.28	
15.28	0.000002	0.39	21957.85	1559.88	0.02	
Lagoon	5939	PF 1	8500.00	0.00	15.28	
15.28	0.000002	0.39	21947.16	1559.71	0.02	
Lagoon	5816	PF 1	8500.00	0.00	15.28	
15.28	0.000002	0.39	22205.21	1557.32	0.02	
Lagoon	5670	PF 1	8500.00	0.00	15.28	
15.28	0.000002	0.39	21714.27	1513.41	0.02	
Lagoon	5522	PF 1	8500.00	0.00	15.28	
15.28	0.000002	0.41	21032.09	1487.18	0.02	
Lagoon	5368	PF 1	8500.00	0.00	15.28	1.18
15.28	0.000002	0.42	20268.01	1457.99	0.02	
Lagoon	5244	PF 1	8500.00	0.00	15.28	1.50
15.28	0.000003	0.49	17265.39	1311.03	0.02	
Lagoon	5089	PF 1	8500.00	0.00	15.27	1.64
15.28	0.000004	0.62	13928.98	1234.37	0.03	
Lagoon	4974	PF 1	8500.00	0.00	15.26	2.66

15.28	0.000013	1.08	8412.18	1110.44	0.05	
Lagoon	4887	PF 1	8500.00	1.00	14.64	9.13
15.22	0.000670	6.12	1388.67	905.96	0.33	
Lagoon	4700		Bridge			
Lagoon	4607	PF 1	8500.00	0.00	13.13	10.30
14.50	0.001757	9.98	1019.14	568.41	0.53	
Lagoon	4529	PF 1	8500.00	-7.00	13.89	2.28
13.97	0.000066	2.19	3975.31	789.07	0.11	
Lagoon	4400	PF 1	8500.00	-1.00	13.92	1.75
13.95	0.000024	1.36	6320.95	887.72	0.07	
Lagoon	4288	PF 1	8500.00	-2.00	13.93	0.12
13.94	0.000007	0.76	11273.59	1261.72	0.03	
Lagoon	4110	PF 1	8500.00	-2.00	13.93	
13.94	0.000003	0.49	17378.68	1199.97	0.02	
Lagoon	3872	PF 1	8500.00	-2.00	13.93	
13.94	0.000003	0.49	18241.63	1359.49	0.02	
Lagoon	3623	PF 1	8500.00	-2.00	13.93	
13.94	0.000002	0.42	20622.91	1442.30	0.02	
Lagoon	3420	PF 1	8500.00	-2.00	13.93	
13.94	0.000001	0.36	23988.75	1682.14	0.02	
Lagoon	3149	PF 1	8500.00	-1.00	13.93	
13.94	0.000001	0.33	25674.53	1789.06	0.02	
Lagoon	2862	PF 1	8500.00	-2.00	13.93	
13.94	0.000001	0.32	26544.78	1816.98	0.01	
Lagoon	2630	PF 1	8500.00	-3.00	13.93	
13.94	0.000001	0.32	26648.20	1782.09	0.01	
Lagoon	2447	PF 1	8500.00	-2.00	13.93	
13.93	0.000002	0.40	22623.41	1745.88	0.02	
Lagoon	2292	PF 1	8500.00	-2.00	13.93	
13.93	0.000002	0.42	21576.38	1668.46	0.02	
Lagoon	2123	PF 1	8500.00	-1.00	13.93	0.22
13.93	0.000002	0.45	20302.66	1695.11	0.02	
Lagoon	2005	PF 1	8500.00	-1.00	13.93	0.31
13.93	0.000002	0.46	19173.12	1892.59	0.02	
Lagoon	1859	PF 1	8500.00	-1.00	13.93	0.77
13.93	0.000003	0.53	16430.98	1815.90	0.02	
Lagoon	1780	PF 1	8500.00	-1.00	13.93	0.85
13.93	0.000004	0.55	15549.74	1755.61	0.03	
Lagoon	1681	PF 1	8500.00	-3.00	13.92	4.36
13.93	0.000012	0.88	10962.95	1737.24	0.05	
Lagoon	1647	PF 1	8500.00	-3.00	13.82	11.60
13.92	0.000258	4.02	4273.20	1677.12	0.20	
Lagoon	1600		Bridge			
Lagoon	1580	PF 1	8500.00	-3.00	13.74	11.45
13.86	0.000265	4.17	4020.62	1740.14	0.20	
Lagoon	1311	PF 1	8500.00	-4.00	13.79	0.67
13.80	0.000010	0.93	9126.33	1742.06	0.04	
Lagoon	1078	PF 1	8500.00	-1.00	13.69	2.92
13.79	0.000076	2.55	3557.91	408.41	0.12	
Lagoon	1050		Bridge			
Lagoon	1039	PF 1	8500.00	-1.00	13.69	2.86
13.78	0.000073	2.45	3601.48	383.33	0.12	
Lagoon	726	PF 1	8500.00	-1.00	13.73	2.55
13.75	0.000011	0.87	10474.23	1667.25	0.04	
Lagoon	397	PF 1	8500.00	0.00	13.42	9.69
13.71	0.000566	5.41	2902.33	1528.37	0.30	
Lagoon	180	PF 1	8500.00	-1.00	12.00	12.00
13.39	0.002352	10.76	1351.05	568.21	0.59	
Lagoon	0	PF 1	8500.00	2.00	11.19	8.16
11.23	0.000137	1.98	6152.88	1429.65	0.14	

ERRORS WARNINGS AND NOTES
Errors Warnings and Notes for Plan : Proposed BV

River: Buena Vista Reach: Lagoon RS: 7947 Profile: PF 1
  Warning:Divided flow computed for this cross-section.
  Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
  This may indicate the need for additional cross sections.
  Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was
  used.
River: Buena Vista Reach: Lagoon RS: 7865 Profile: PF 1
  Warning:Divided flow computed for this cross-section.
  Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
  This may indicate the need for additional cross sections.
  Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was
  used.
River: Buena Vista Reach: Lagoon RS: 7697 Profile: PF 1
  Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
  This may indicate the need for additional cross sections.
  Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was
  used.
River: Buena Vista Reach: Lagoon RS: 7483 Profile: PF 1
  Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was
  used.
River: Buena Vista Reach: Lagoon RS: 5368 Profile: PF 1
  Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was
  used.
River: Buena Vista Reach: Lagoon RS: 5244 Profile: PF 1
  Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was
  used.
River: Buena Vista Reach: Lagoon RS: 5089 Profile: PF 1
  Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
  This may indicate the need for additional cross sections.
  Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was
  used.
River: Buena Vista Reach: Lagoon RS: 4974 Profile: PF 1
  Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
  Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
  This may indicate the need for additional cross sections.
  Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was
  used.
River: Buena Vista Reach: Lagoon RS: 4887 Profile: PF 1
  Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
River: Buena Vista Reach: Lagoon RS: 4700 Profile: PF 1

Warning:For the final momentum answer at the bridge, the upstream energy was computed lower than the downstream energy. This
is not physically possible, the momentum answer has been disregarded.
River: Buena Vista Reach: Lagoon RS: 4700 Profile: PF 1 Upstream
Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
River: Buena Vista Reach: Lagoon RS: 4700 Profile: PF 1 Downstream
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
River: Buena Vista Reach: Lagoon RS: 4607 Profile: PF 1
Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
River: Buena Vista Reach: Lagoon RS: 4529 Profile: PF 1
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was
used.
River: Buena Vista Reach: Lagoon RS: 4400 Profile: PF 1
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was
used.
River: Buena Vista Reach: Lagoon RS: 4288 Profile: PF 1
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was
used.
River: Buena Vista Reach: Lagoon RS: 2123 Profile: PF 1
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was
used.
River: Buena Vista Reach: Lagoon RS: 2005 Profile: PF 1
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was
used.
River: Buena Vista Reach: Lagoon RS: 1859 Profile: PF 1
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was
used.
River: Buena Vista Reach: Lagoon RS: 1780 Profile: PF 1
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was
used.
River: Buena Vista Reach: Lagoon RS: 1681 Profile: PF 1

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

River: Buena Vista Reach: Lagoon RS: 1647 Profile: PF 1
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

River: Buena Vista Reach: Lagoon RS: 1600 Profile: PF 1
Note: The weir over a bridge is submerged, the energy answer was used.
Note: The downstream water surface is above the minimum elevation required for orifice flow. The orifice flow equation was used for pressure flow.

River: Buena Vista Reach: Lagoon RS: 1600 Profile: PF 1 Upstream
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

River: Buena Vista Reach: Lagoon RS: 1600 Profile: PF 1 Downstream
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

River: Buena Vista Reach: Lagoon RS: 1580 Profile: PF 1
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

River: Buena Vista Reach: Lagoon RS: 1311 Profile: PF 1
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

River: Buena Vista Reach: Lagoon RS: 1078 Profile: PF 1
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

River: Buena Vista Reach: Lagoon RS: 1050 Profile: PF 1
Warning:The sluice gate calculations did not converge during the pressure flow only calculation.
Note: The downstream water surface is below the minimum elevation for pressure flow. The sluice gate equations were used for pressure flow.

River: Buena Vista Reach: Lagoon RS: 1050 Profile: PF 1 Upstream
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

River: Buena Vista Reach: Lagoon RS: 1050 Profile: PF 1 Downstream
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

River: Buena Vista Reach: Lagoon RS: 1039 Profile: PF 1
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

River: Buena Vista Reach: Lagoon RS: 726 Profile: PF 1
Warning:The conveyance ratio (upstream conveyance divided by downstream

conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was
used.
River: Buena Vista Reach: Lagoon RS: 397 Profile: PF 1
Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was
used.
River: Buena Vista Reach: Lagoon RS: 180 Profile: PF 1
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate
the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The
program defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was
used.

APPENDIX 'C'

Location Hydraulic Study Form

Floodplain Encroachment Form

Planning Study

As-builts

Backup Data

LOCATION HYDRAULIC STUDY FORM

Dist. *11* Co. *SD* Rte. *005* K.P.
EA Bridge No. *57-0277*
Floodplain Description:
A freshwater lagoon with a fringing freshwater marsh and several bridge crossings. Location of interest: I-5 / Buena Vista Lagoon Intersection

1. Description of Proposal (include any physical barriers i.e. concrete barriers, soundwalls, etc. and design elements to minimize floodplain impacts)

This project includes an improvement to the I-5 / Bridge over Buena Vista Lagoon with 10+4+buffer alternative. The alternative requires the existing I-5 bridge to be replaced and would not have a significant impact to the existing floodplain.

2. ADT: Current **275,650 (year 2015)** Projected **326,800 (year 2030)**
(ADT values taken from Wilson & Company's Traffic Demand Forecasting Report for the I-5 North Coast Corridor Project)

3. Hydraulic Data: Base Flood Q_{100}= ***8,500*** ft^3 / s

WSE_{100}= **16.64 feet (Upstream face of I-5 Bridge)**
The flood of record, if greater than Q_{100}:
Q= ***N/A*** ft^3 / s WSE= ***N/A***
Overtopping flood Q=***(no increase from existing condition)*** ft^3 / s
WSE= ***(no increase from existing condition)***

Are NFIP maps and studies available? YES **X** NO_____

4. Is the highway location alternative within a regulatory floodway ?
YES ***X*** NO_____

5. Attach map with flood limits outlined showing all buildings or other improvements within the base floodplain. ***(See Appendix 'A')***

Potential Q_{100} backwater damages:

A. Residences? NO___YES ***(no increase from existing condition)***
B. Other Bldgs? NO___YES ***(no increase from existing condition)***
C. Crops? NO***X***YES _____
D. Natural and beneficial

FLOODPLAIN VALUES? NO **X** YES_____

6. Type of Traffic:

A. Emergency supply or evacuation route?	NO_____	YES__X__
B. Emergency vehicle access?	NO_____	YES__X__
C. Practicable detour available?	NO_____	YES__X__
D. School bus or mail route?	NO_____	YES__X__

7. Estimated duration of traffic interruption for 100-year event hours: ***I-5 crossing is above the floodplain, therefore, no traffic interruptions are anticipated.***

8. Estimated value of Q_{100} flood damages (if any) – moderate risk level.

A.	Roadway	$ ***(no increase from existing condition)***
B	Property	$ ***(no increase from existing condition)***
	Total	$ ***(no increase from existing condition)***

9. Assessment of Level of Risk Low__X__
Moderate____
High_____

For High Risk projects, during design phase, additional Design Study Risk Analysis May be necessary to determine design alternative.

Is there any longitudinal encroachment, significant encroachment, or any support of incompatible
Floodplain development? NO__X__YES _____

If yes, provide evaluation and discussion of practicability of alternatives in accordance with 23 CFR 650.113

Information developed to comply with the Federal requirement for the Location Hydraulic Study shall be retained in the project files.

Signature – Hydraulic/Project Engineer_____Date_____

FLOODPLAIN ENCROACHMENT REPORT SUMMARY

Dist. *11* Co. ***SD*** Rte. ***005*** K.P.
Bridge No. ***57-0277***
Limits: ***I-5 / Buena Vista Lagoon Intersection***

Floodplain Description: **A freshwater lagoon with a fringing freshwater marsh and several bridge crossings.**

		No	Yes
1.	Is the proposed action a longitudinal encroachment of the base floodplain?	*X*	___
2.	Are the risks associated with the implementation of the proposed action significant?	*X*	___
3.	Will the proposed action support probable incompatible floodplain development?	*X*	___
4.	Are there any significant impacts on natural and beneficial floodplain values?	*X*	___
5.	Routine construction procedures are required to minimize impacts on the floodplain. Are there any special mitigation measures necessary to minimize impacts or restore and preserve natural and beneficial floodplain values? If yes, explain.	*X*	___
6.	Does the proposed action constitute a significant floodplain encroachment as defined in 23 CFR, Section 650.105(q).	*X*	___
7.	Are Location Hydraulic Studies that document the above answers on file? If not explain.	___	*X*

PREPARED BY:

_____ _____
Signature - Dist. Hydraulic Engineer Date

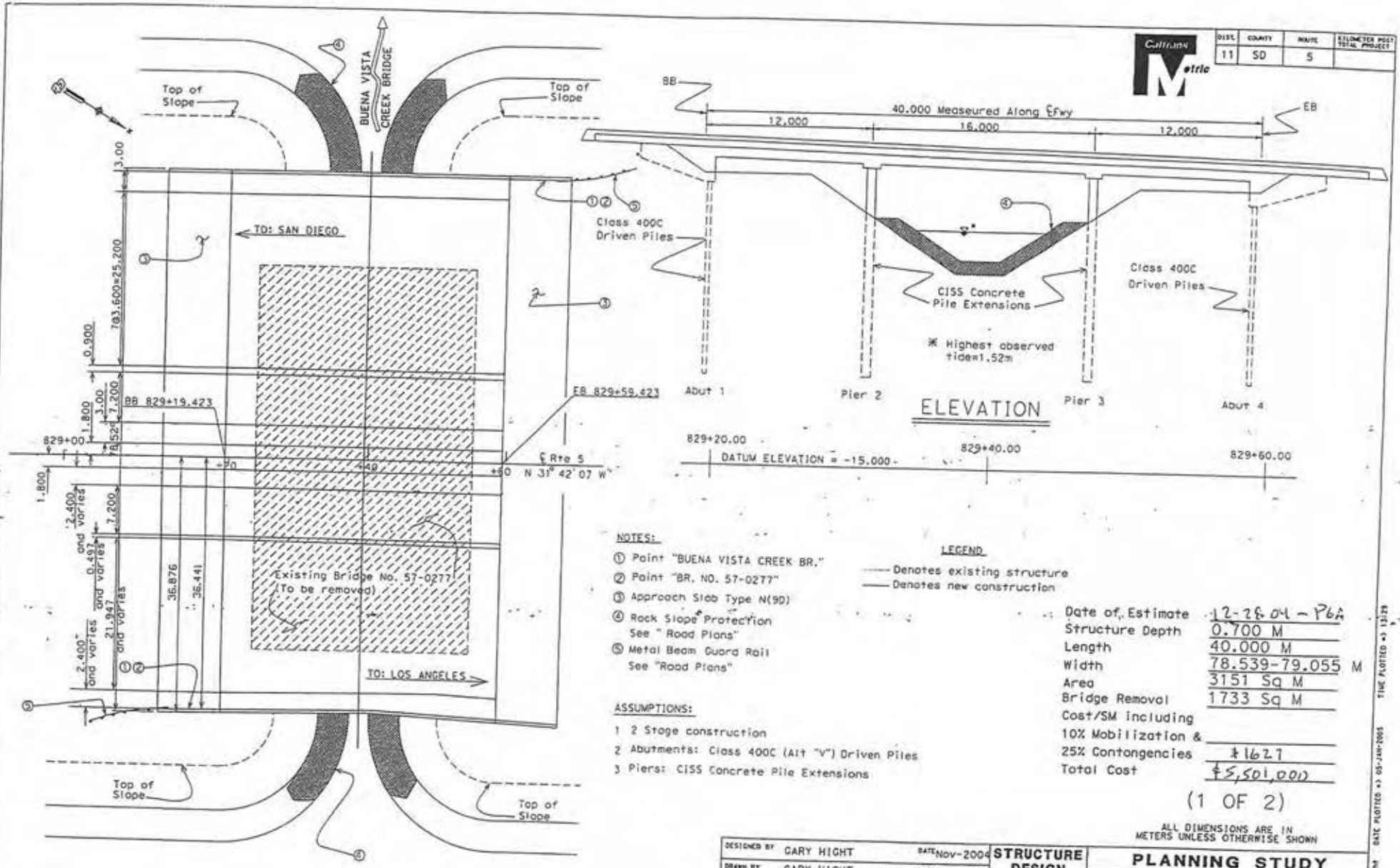
_____ _____
Signature - Dist. Environmental Branch Chief Date

_____ _____
Signature - Dist. Project Engineer Date

.0087
1.0087

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION - DIVISION OF STRUCTURES

DIST.	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT
11	SD	5	



NOTES:

① Paint "BUENA VISTA CREEK BR."
② Paint "BR. NO. 57-0277"
③ Approach Slab Type N(9D)
④ Rock Slope Protection See "Road Plans"
⑤ Metal Beam Guard Rail See "Road Plans"

LEGEND

—— Denotes existing structure
—— Denotes new construction

ASSUMPTIONS:

1 2 Stage construction
2 Abutments: Class 400C (Alt "V") Driven Piles
3 Piers: CISS Concrete Pile Extensions

Date of Estimate	12-28-04 - P6A
Structure Depth	0.700 M
Length	40.000 M
Width	78.539-79.055 M
Area	3151 Sq M
Bridge Removal	1733 Sq M
Cost/SM including 10% Mobilization & 25% Contongencies	$1627
Total Cost	$5,501,001

(1 OF 2)

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

DESIGNED BY	GARY HIGHT	DATE	Nov-2004
DRAWN BY	GARY HIGHT	DATE	Nov-2004
CHECKED BY		DATE	
APPROVED		DATE	

STRUCTURE DESIGN SECTION 18

PLANNING STUDY

BUENA VISTA CREEK BRIDGE (REPLACE)

BRIDGE NO. 57-0277	CU 11
SCALE: No Scale	EA 235600

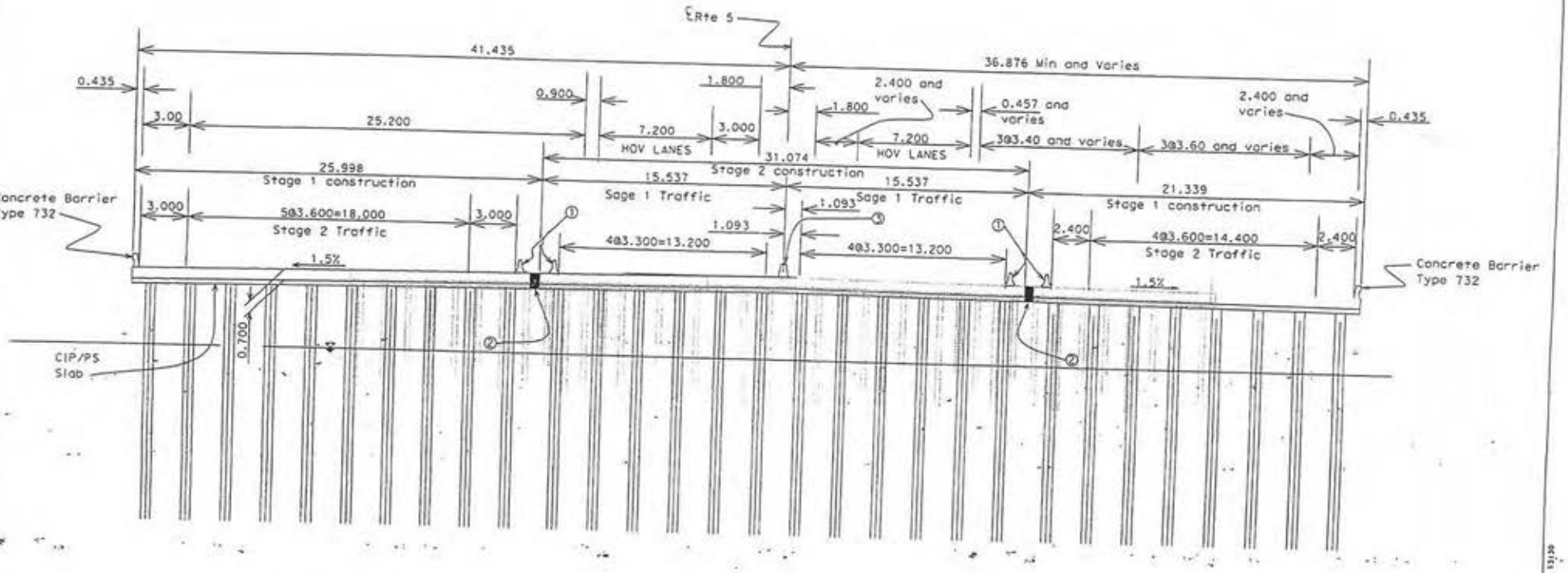
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FILE => Buena Vista.dgn

USERNAME => gkight DATE PLOTTED => 05-JAN-2005 TIME PLOTTED => 13:29

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION - DIVISION OF STRUCTURES

DIST.	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT
11	SD	5	



① Temp Barrier (Type K)
See "Road Plans"
② 610 mm Closure Pour
③ Concrete Barrier Type 60

LEGEND

Denotes existing structure
Denotes new construction

(2 OF 2)

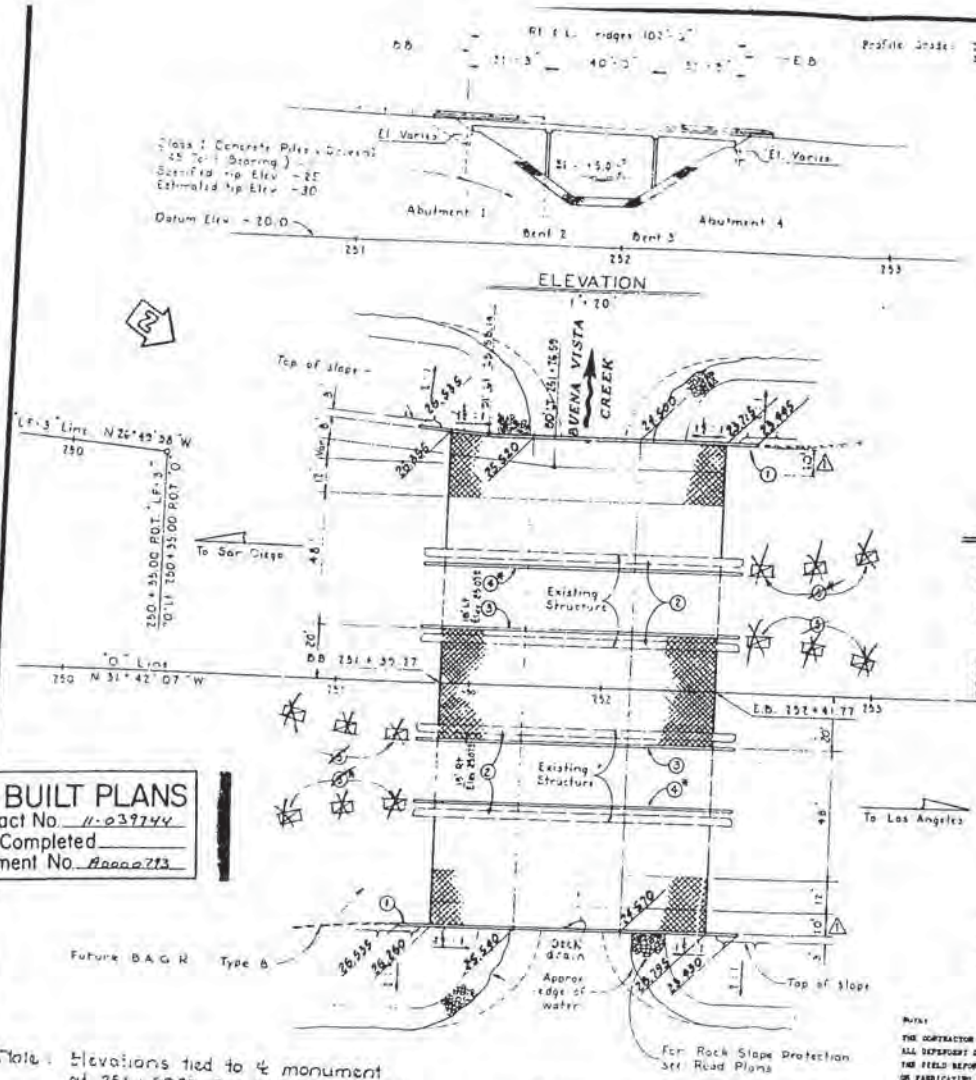
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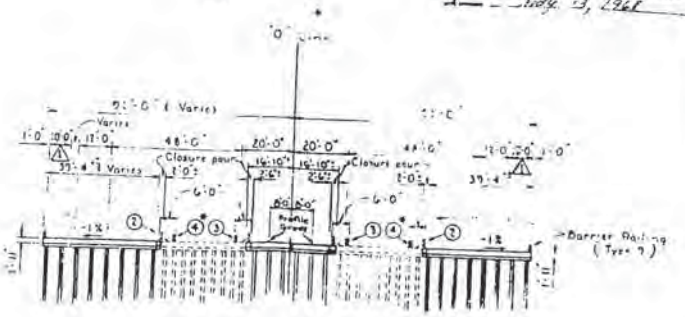
DESIGNED BY GARY HIGHT	DATE Nov-2004	STRUCTURE DESIGN SECTION 18	PLANNING STUDY
DRAWN BY GARY HIGHT	DATE Nov-2004		BUENA VISTA CREEK BR (REPLACE)
CHECKED BY	DATE		BRIDGE NO. 57-0277 CU 11
APPROVED	DATE		SCALE: No Scale EA 235800

STRUCTURES DESIGN ADVANCE PLANNING STUDY SHEET SMETRIC1 (REV. 9/3/04)

FILE =? Buena Vista.dgn

USERNAME =? gdigon DATE PLOTTED =? 05-JAN-2005 TIME PLOTTED =? 13:39





I-005-1(124)47

Nov. 13, 1968

Index to Plans

SHT NO	TITLE
1	General Plan
2	Foundation Plan
3	Abutment Details
4	Typical Section
5	Deck Details
6	Concrete Pile Details
7	Barrier Railing (Type 7)
8	Log of Test Borings

Standard Plans dated February, 1968

AG2-02 Excavation & Backfill (Bridges & Walls)
B11-50 Temporary Railings
B11-45 Barrier Railing Details for Types 9, 10, 11 & 12

1. Paint "Buena Vista Creek Bridge" Br. No. to rear
2. Remove existing curb & rail (inside curb & rail Stage 1; Outside curb & rail Stage 2)
3. Temporary Railing (Metal Beam) Stage 1
4. Temporary Railing (Metal Beam) Stage 2
5. ~~Temporary Timber Railing (Portable)~~ Eliminated Refer to C.C.O. # 95
* Move railing used in Stage 1
Indicates Contrast Treatment

Note: Elevations tied to ℄ monument at 254 + 39.27 POT "O" Line 51 18.16

AS BUILT PLANS
Contract No. 11-039744
Date Completed
Document No. A0000713

DESIGN SECTION 8

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

BUENA VISTA CREEK BRIDGE (WIDEN)

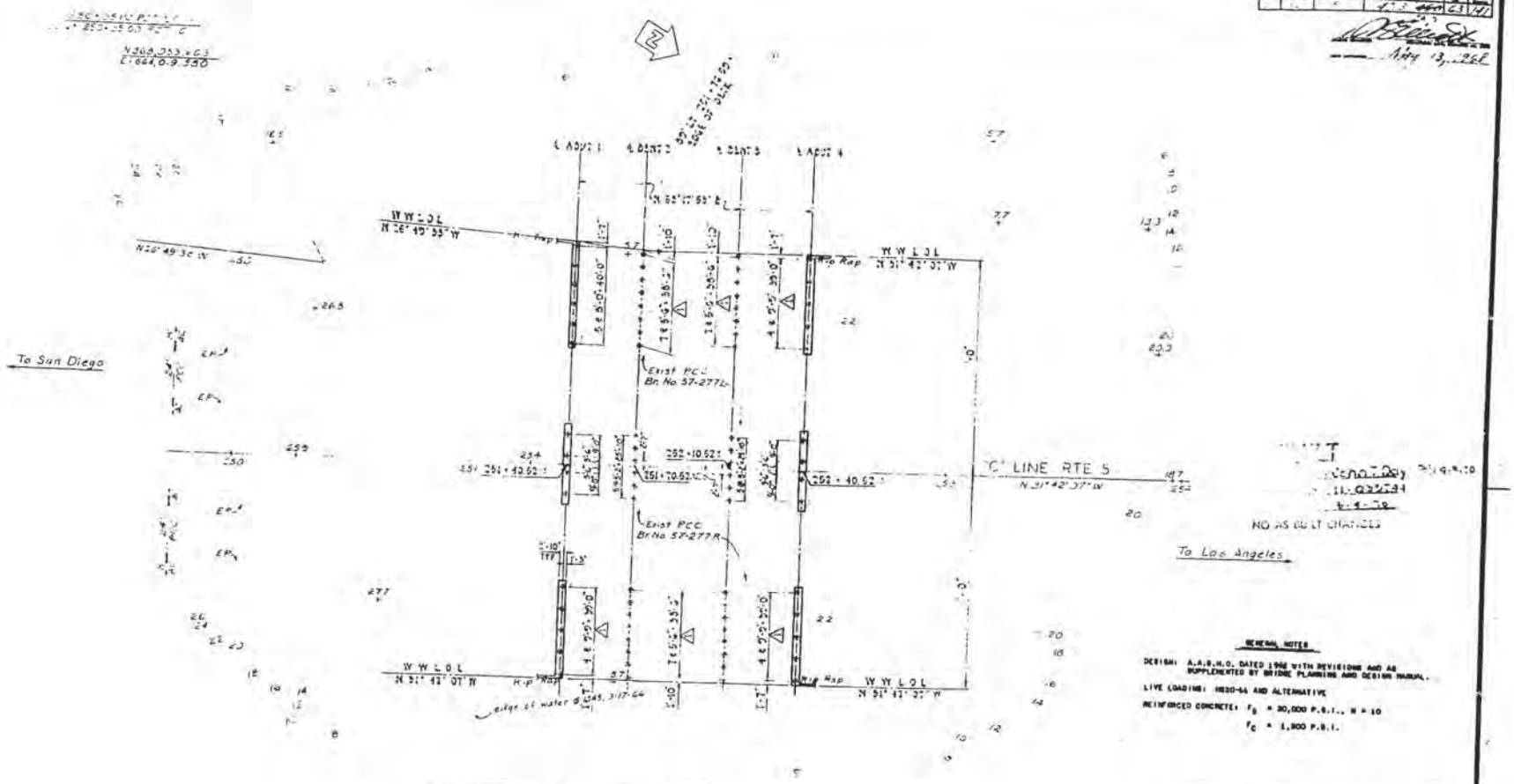
LOCATED APPROX. 1.0 MI. S. OF THE CITY LIMITS OF OCEANSIDE IN SAN DIEGO COUNTY

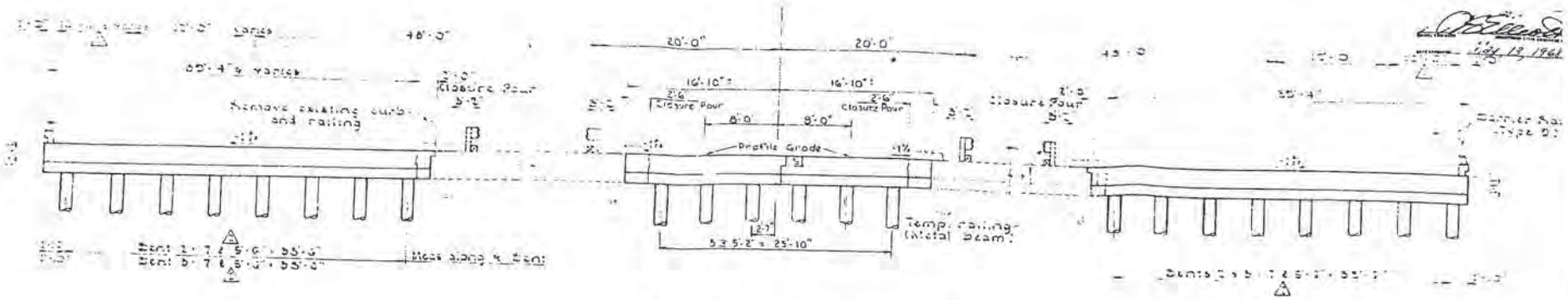
GENERAL PLAN

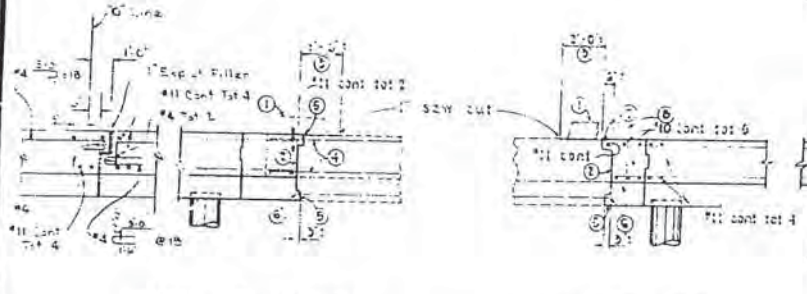
BRIDGE NO. 57-277 | ROUTE 5 | POST MILE 50.2 | EA 57277-1 | SHEET 1 | OF 8

WO 039741
CU 11208

I HEREBY CERTIFY THAT THIS IS A TRUE AND ACCURATE COPY OF THE ABOVE DOCUMENT DRAWN UNDER MY DIRECTION AND CONTROL ON THIS DATE IN SACRAMENTO, CALIFORNIA PURSUANT TO

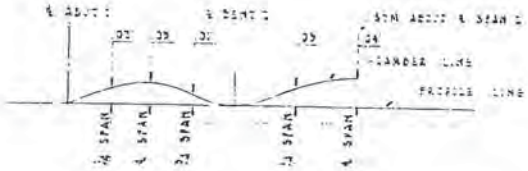

To San Diego
To Los Angeles
℄ LINE RTE 5
N 31° 42' 37" W
Exist PCC Br No 57-277L
Exist PCC Br No 57-277R
℄ Abut 1
℄ Abut 2
℄ Abut 3
℄ Abut 4
W W L O L
N 31° 42' 37" W
N 58° 49' 30" W
N 65° 17' 55" E
Edge of water @ 345, 317.66
252 + 10.62
251 + 70.62
251 + 43.62
252 + 40.62
GENERAL NOTES
DESIGN: A.A.S.H.O. DATED 1956 WITH REVISIONS AND AS SUPPLEMENTED BY BRIDGE PLANNING AND DESIGN MANUAL.
LIVE LOADING: H20-44 AND ALTERNATIVE
REINFORCED CONCRETE: f_s = 20,000 P.S.I., n = 10
f_c = 1,000 P.S.I.
NO AS BUILT CHANGES
AS BUILT PLANS
Contract No. 11-039744
Date Completed
Document No. R0000773
DESIGN SECTION
REVISIONS
BUENA VISTA CREEK BRIDGE (WIDEN)
FOUNDATION PLAN
May 13, 1968
WO
CU







Note: Closure pour not to be made until 60 days after falsework has been struck.



TOTAL SLAB DEFLECTION DUE TO DEAD LOADS

1. Remove existing curb & rail.
2. Existing concrete surface to be cleaned by abrasive means.
3. Existing deck surface to be refinished. Remove ½" existing surface and replace with epoxy grout, as directed by the Engineer.
4. Existing transverse reinforcing to remain and spliced to new.
5. Remove 8'-6" section at ends of caps (expose existing cap reinf.)
6. Butt weld new cap reinforcing to existing prior to placing deck slab in Stage 1.
7. Remove 8'-6" section of existing slab. Existing longitudinal bar ... may be removed. Transverse reinforcing to remain.
8. Remove portion of existing sidewalk at bents so that 5, 6, & 7 can be done in Stage 1. If rail post is removed for 6, provide temporary support from adjacent post.

①②③④⑥⑦ Typical, entire length of bridge

AS BUILT PLANS
Contract No 11-039744
Date Completed
Document No Reona793

DESIGN SECTION 8

STATE OF CALIFORNIA
TRANSPORTATION AGENCY
DEPARTMENT OF PUBLIC WORKS
DIVISION OF HIGHWAYS

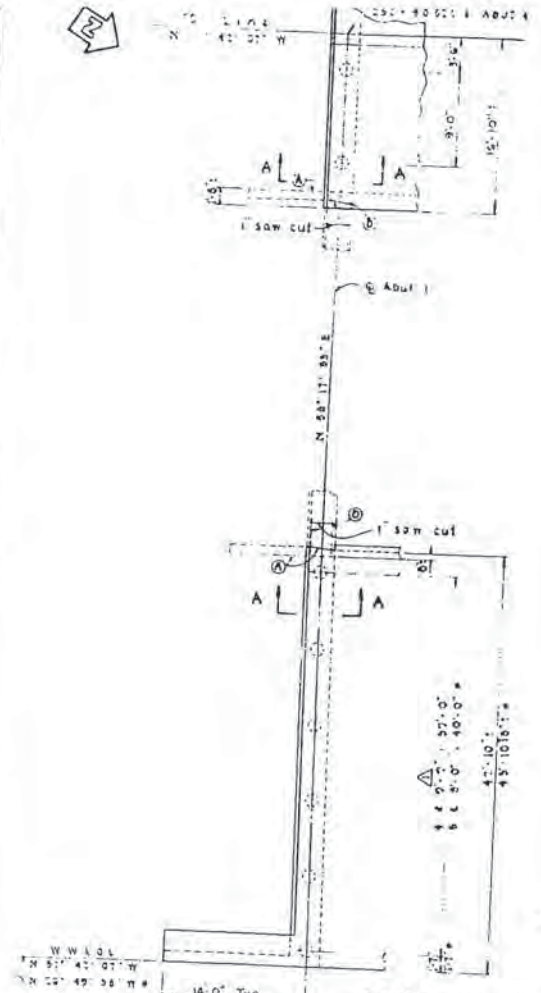
BUENA VISTA CREEK BRIDGE WIDEN

TYPICAL SECTION

DRAWING NO. 57277-A

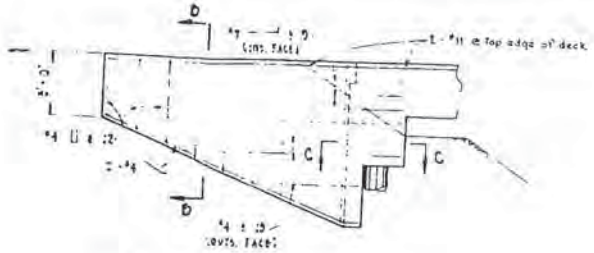
REVISIONS

WO
CU

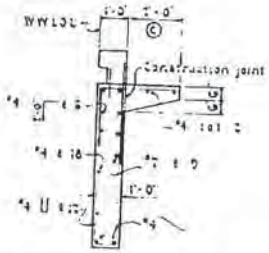


PLAN

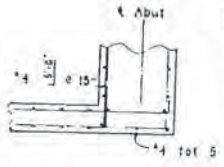
P FILE 4 ABUT LAYOUT FOR ABUT 1 LT. BRIDGE.
(A) REMOVE EXIST. WINGWALL, ABUT CAP & CURTAIN WALL TO EDGE OF SLAB.
(B) EXIST ABUT CAP & CURTAIN WALL BEING TO REMAIN
(C) TO BE PLACED AFTER BACKFILL IS COMPLETED
ABUT 1 AT BRIDGE WIDEN SHOWN
2 AREAS SIMILAR EXCEPT AS SHOWN



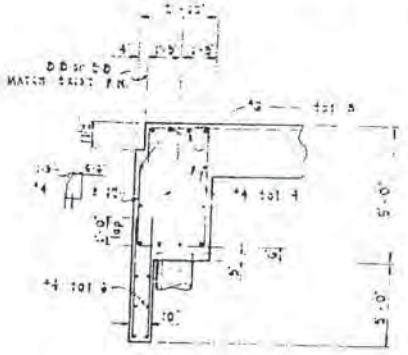
TYP. WINGWALL ELEVATION



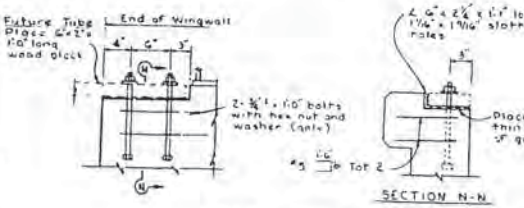
SECTION B-B



SECTION C-C



SECTION A-A



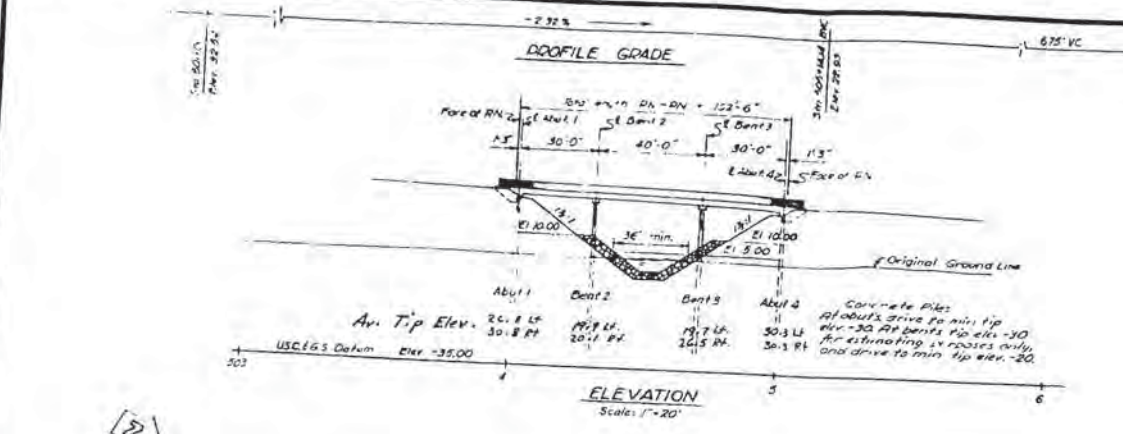
DETAIL "B"
No Scale

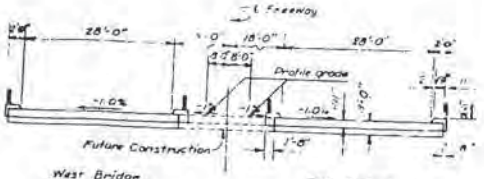
SECTION N-N

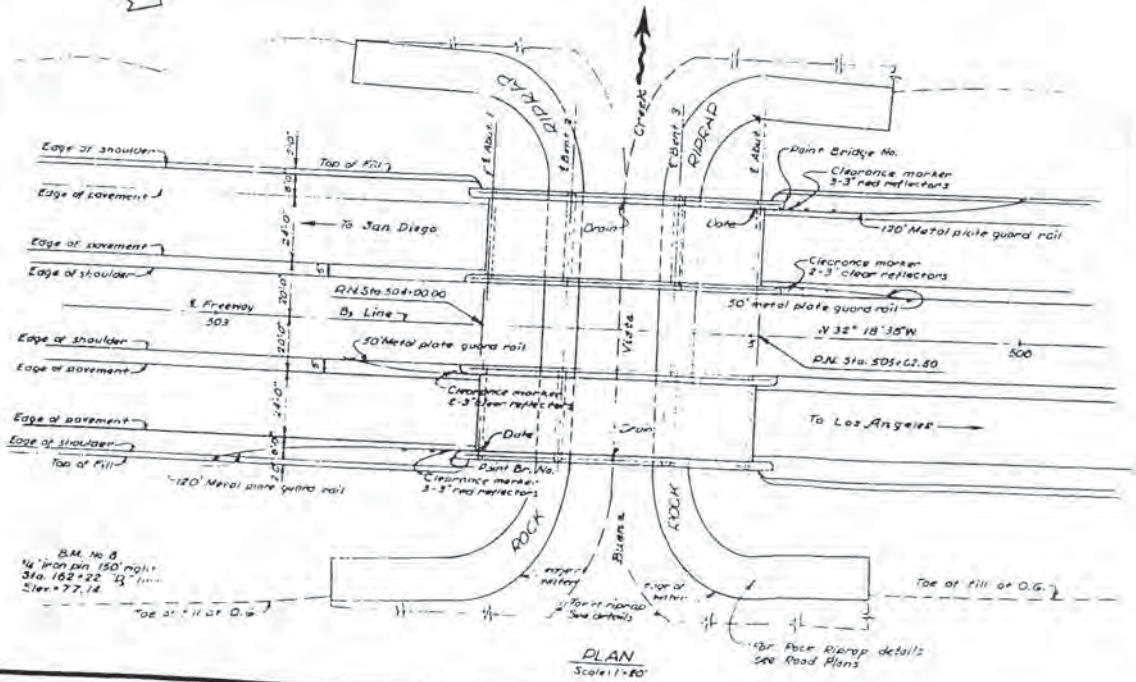
AS BUILT PLANS
Contract No. 11-039744
Date Completed
Document No. A0004713

11-SD-136(17)

BRIDGE DEPARTMENT







AS BUILT PLANS
Contract No 53-11VG1F
Date Completed
Document No A00201140

INDEX TO PLANS

Sheet	Title
1	General Plan
2	Foundation Plan
3	Deck Details
4	Spalling Details
5	Pile Details
6	Log of Test Borings

Live Loads: H20-S16-44

11VG1-F

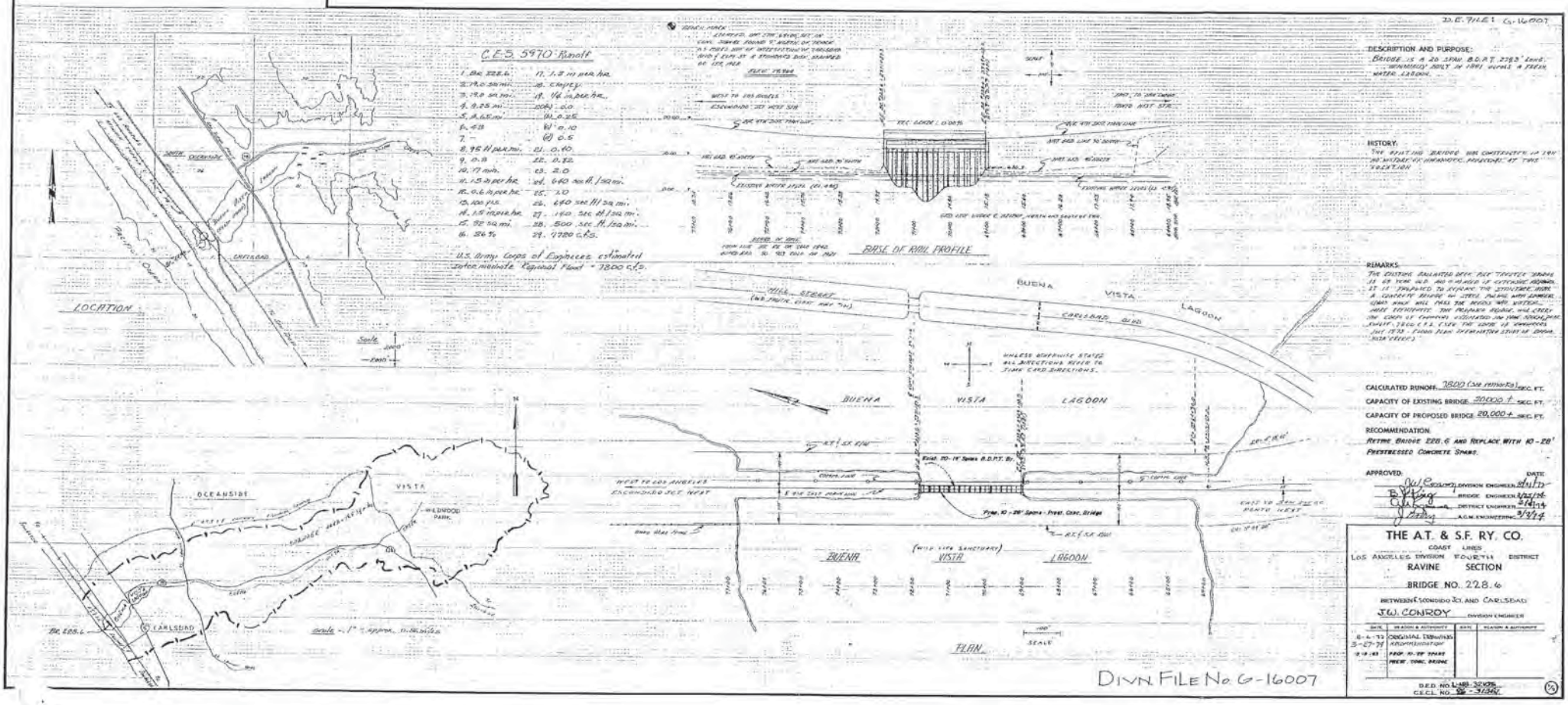
BUENA VISTA CREEK BRIDGE

Located about 000 feet south of the city limits of Oceanside in San Diego County

GENERAL PLAN

Scale As Noted | Bridge 53-277 4V/L | P.M. | Date

D.E. FILE: G-16007



DIVN. FILE No. G-16007

DESCRIPTION AND PURPOSE:
BRIDGE IS A 20 SPAN R.D.P.T. 2783' LONG. ORIGINALLY BUILT IN 1891 ACROSS A FRESH WATER LAGOON.

HISTORY:
THE EXISTING BRIDGE WAS CONSTRUCTED IN 1891 AS PART OF DYNAMITE PROJECT AT THIS LOCATION

REMARKS:
THE EXISTING GALVANIZED DECK PLATE GIRDER SPANS IS 69 YEARS OLD AND IS NEARLY IS CORRODED BEYOND. IT IS PROPOSED TO REPLACE THE STRUCTURE WITH A CONCRETE BRIDGE OF STEEL PILING WITH CONCRETE WINGS WHICH WILL TIE THE ABUTS INTO BOTTOM. MOST ECONOMICAL. THE PROPOSED BRIDGE WILL CONSIST OF CONCRETE ENCASED ON STEEL GIRDERS ON CONCRETE PILES. THE LOCAL DRAINAGE STUDY OF 1973 - FLOOD PEAK INFORMATION STUDY OF ENCINITAS CREEK.

CALCULATED RUNOFF 7800 (See remarks) SEC. FT.
CAPACITY OF EXISTING BRIDGE 20000 ± SEC. FT.
CAPACITY OF PROPOSED BRIDGE 20,000 ± SEC. FT.

RECOMMENDATION:
RETIRE BRIDGE 228.6 AND REPLACE WITH 10 - 28' PRESTRESSED CONCRETE SPANS.

APPROVED: DATE:
DIVISION ENGINEER 3/1/74
BRIDGE ENGINEER 3/12/74
DISTRICT ENGINEER 3/14/74
A.G.M. ENGINEERING 3/19/74

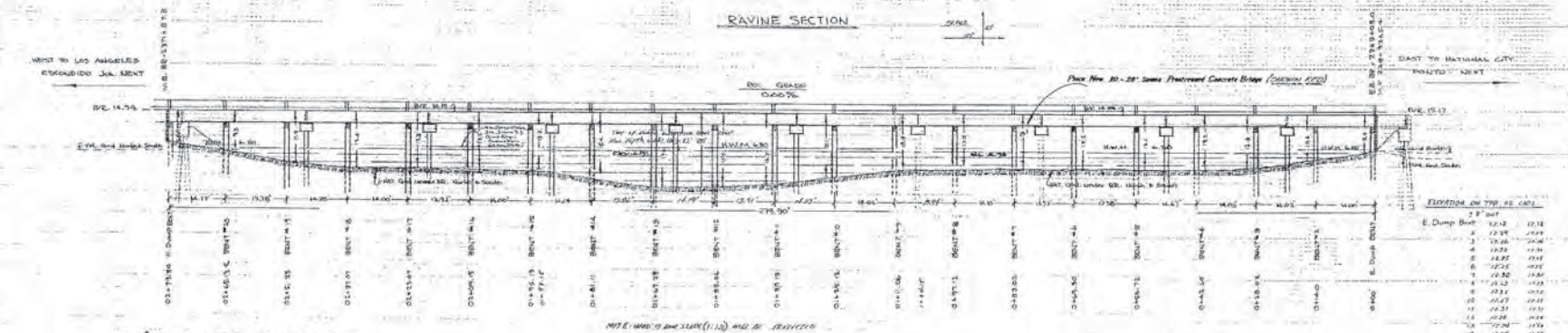
THE A.T. & S.F. RY. CO.
COAST LINES
LOS ANGELES DIVISION FOURTH DISTRICT
RAVINE SECTION
BRIDGE NO. 228.6
BETWEEN ESCONDIDO JCT. AND CARLSBAD
J.W. CONROY DIVISION ENGINEER

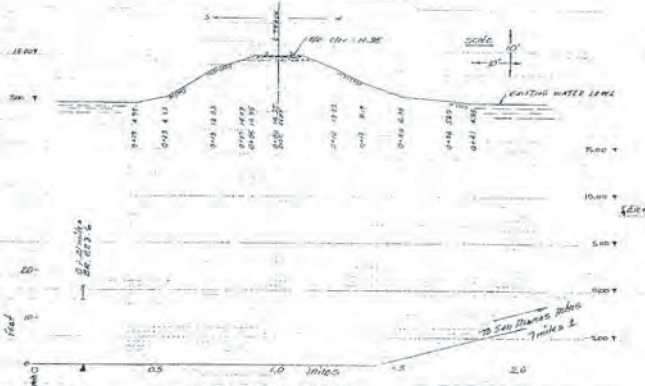
DATE	REASON & AUTHORITY	DATE	REASON & AUTHORITY
8-6-73	ORIGINAL DRAWING		
3-27-74	RECOMMENDATION		
9-19-83	PROP. 10-28' SPANS PRECT. CONC. BRIDGE		

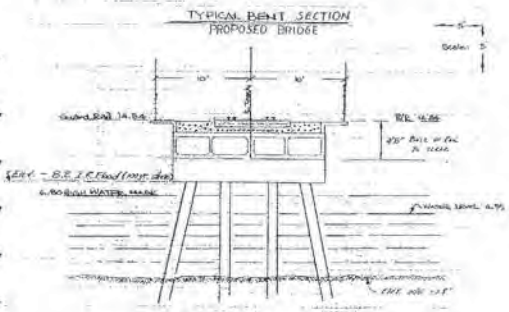
B.E.D. NO. LAND-32108
C.E.C.L. NO. 5970.

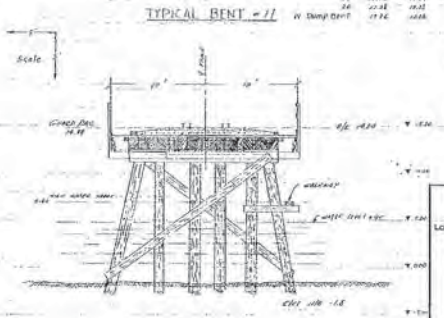
1/1

D. E. FILE # G-16007









DESCRIPTION AND PURPOSE:
See Page One

HISTORY:
See Page One

REMARKS:
See Page One

CALCULATED RUNOFF: _____ SEC. FT.
CAPACITY OF EXISTING BRIDGE _____ SEC. FT.
CAPACITY OF PROPOSED BRIDGE _____ SEC. FT.
RECOMMENDATION:
See Page One

APPROVED: DATE
DIVISION ENGINEER
BRIDGE ENGINEER
DISTRICT ENGINEER
A & M. ENGINEERING

THE A.T. & S.F. RY. CO.
COAST LINES
LOS ANGELES DIVISION VALLEY DISTRICT
RAVINE SECTION
BRIDGE NO. 228.6
BETWEEN ESCONDIDO & LAND CARLSBAD
S.W. CONROY DIVISION ENGINEER

DATE	REASON & AUTHORITY	DATE	REASON & AUTHORITY
12-A-72	ORIGINAL DRAWING		
12-9-72	RECOMMENDATION		
5-8-73	PROP. 30-20' SPANS PRESTR. CONC. BRIDGE		

D.E.D. NO. 1-48-32105
C.E.C.I. NO. 96-31/81

DIVN. FILE No. G-16007

I-5 North Coast Widening Floodplain Studies
Caltrans
DE Project 1683

RECORD OF CONVERSATION

DATE: 09/21/07 **TIME:** 8:30 AM **DE FILE No.** 1683-300

RECORDED BY: Glen Parker

SPOKE WITH: Ray Martinez

TELEPHONE No. 703-317-6251

NATURE OF CALL: ☐ Incoming ☒ Outgoing ☐ Meeting

DISTRIBUTION: Ray Martinez (Michael Baker), Glen Parker (Dokken Engineering), Tim Brownson (Caltrans), Wen Cheng (Michael Baker), Mike Skowronek (Michael Baker)

SUBJECT OF CONVERSATION: Acceptable FEMA floodplain modeling procedures

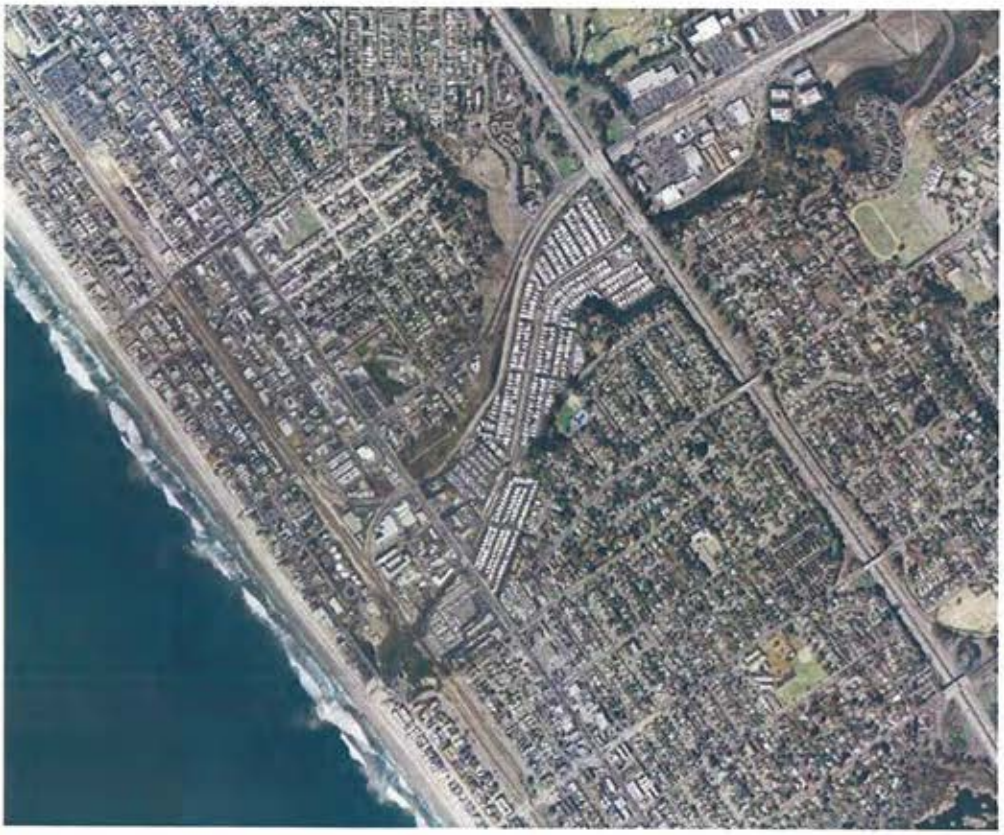
ITEMS DISCUSSED:

Available Backup Data to generate previously approved floodplain models: Glen explained that a formal request has been submitted for backup floodplain information for lagoons and creeks along I-5 with Zone AE floodplains between San Diego and Oceanside. In some cases the HEC-2 data provided by Michael Baker Corporation was limited and did not have enough information to recreate previously generated floodplain models with reasonable accuracy. Glen said in these cases, Dokken Engineering would prefer to create HEC-RAS models which tie in with FEMA cross sections to use as a basis for existing conditions. Ray said Dokken Engineering must use their expertise to decide whether the existing FEMA data can be reused and to document efforts in a Technical Studies Data Notebook (TSDN). There have been past situations which required an existing model to be recreated and it is acceptable to FEMA as long as the appropriate documentation supports the procedure. Glen agreed to document the scenarios where existing models could not be used with accuracy.

Coordination with FEMA and Caltrans: Glen said that Caltrans is in the planning phase for the I-5 North Coast Widening, which will widen I-5 from San Diego to Oceanside. At this point in time, a preferred alternative has not been identified and therefore no coordination has occurred between Caltrans and FEMA to begin processing LOMRs. Glen said the final design of this project would likely occur in different phases several years in the future. It would be beneficial to coordinate with FEMA when needed during the process. Glen asked who the appropriate FEMA contacts may be to continue coordination when needed throughout the process. Ray said to coordinate with Wen Chen and Michael Skowronek, who work at the RMC for FEMA Region IX and can act as Outreach Coordinators on behalf of FEMA, when appropriate depending on the development of the project.

SECTION 10

Loma Alta Creek
Location Hydraulic Study



SECTION 10: LOMA ALTA CREEK LOCATION HYDRAULIC STUDY

10.0 PROJECT PURPOSE AND VICINITY MAP



Figure 1: Project Vicinity Map

The I-5 Bridge is located in the City of Oceanside in the northwestern region of San Diego County.

This study was prepared for Caltrans for the purpose of determining impacts to the Loma Alta Creek 100-year floodplain from the proposed widening to the Interstate-5.

This study specifically addresses the following:

1.) The Loma Alta Creek 100-year floodplain as it presently exists,

2.) The Loma Alta Creek 100-year floodplain after the I-5 Bridge has been widened.

The existing I-5 Bridge (consists of two bridges, one over Loma Alta Creek and the other spanning Oceanside Blvd. The Loma Alta Creek Bridge is 139 ft long and the Oceanside Blvd Bridge is 193 ft long. Both bridges have a width of 169 ft. The proposed improvements to both I-5 Bridges require that the bridge be widened 30 feet on each side to a total width of 229 ft. The widening of both bridges proposes to add seventeen additional piers, split between five rows of piers, to the floodplain. Results are provided in this study, which demonstrate that no substantial rise to the water surface elevation (WSE) of the existing Loma Alta Creek floodplain should occur due to the proposed improvements.

10.1 DESCRIPTION OF WATERSHED

The existing watershed of Loma Alta Creek is located within the Carlsbad Watershed and includes 6,277 acres in area. Loma Alta Creek forms the western portion of the northern border of the Carlsbad Hydrologic Unit. The watershed extends inland approximately 7.3 miles and is almost completely contained within the City of Oceanside. Three tributaries drain into Loma Alta Creek with Garrison Creek being the largest of the three.

Land uses within the watershed are dominated by residential and urban development. Much of the length of Loma Alta Creek has been channelized in the past to prevent private property flood damage. Flood prevention is a top priority of the City of Oceanside within the lower sections of the watershed. Interstate 5 spans the entire width of the watershed near the coast and Oceanside Boulevard, which parallels the drainage of Loma Alta Creek.



Figure 2: Carlsbad Watershed

10.2 FLOODPLAIN MODELING METHODOLOGY

The area of analysis ranges from approximately 2,400 ft upstream to 3,500 ft downstream of the I-5 crossing. The upstream portion of the study reach was initiated where the floodplain widens. In this part of the floodplain, the main creek flows through a concrete channel while the overflow would travel through a commercial district. As the floodplain approaches I-5, the floodwaters will split between Oceanside Boulevard and Loma Alta Creek. Downstream of I-5, the floodplain lies between two concrete channels which flow through the Cavalier Mobile Estates. Downstream of the I-5 and within the Cavalier Mobile Estates, there are two crossings over the main channel of Loma Alta Creek. Both of these smaller bridges are included in the model. The study concludes where the concrete channels converge to one channel to show combined back water effects near I-5. FEMA water elevations were known and used as the boundary conditions of this model.

10.3 HEC-RAS INPUT

The HEC-RAS River Analysis System v3.1.3 is a graphically based computer program which has been developed by the U.S. Army Corps of Engineers Hydrologic Engineering Center. Input required by the software included channel cross sectional geometry, channel roughness coefficients, starting water surface elevations, and a 100-year storm event discharge. For this study, HEC-RAS was analyzed using the Standard Step Method under subcritical flow conditions.

10.3.1 Cross Sectional Geometry

The majority of the cross sections correspond to Loma Alta Creek FEMA cross sections. Several additional cross sections were interpolated where the cross sections were spaced far apart or underwent rapid changes. All results for this study are provided in North American Vertical Datum of 1988 (NAVD 88).

10.3.1.1 Bridges

Four bridges exist within the floodplain of the I-5 corridor study area. They include two small bridges crossing over the channelized portion of Loma Alta Creek that flows through the Cavalier Mobile Estates at Hillside Lane and Parkwood Lane, and the I-5 Bridges crossing Oceanside Boulevard and Loma Alta Creek. The bridges were modeled using the Energy (Standard Step) method.

The bridges were modeled at the following Cross sections:

- Cross section #1800 – Hillside Lane Bridge
- Cross section #3250 – Parkwood Lane Bridge
- Cross section #3500 - I-5 Bridge crossing Oceanside Boulevard and Loma Alta Creek

Expansion/ contraction coefficients (0.1 and 0.3) are utilized throughout the modeled reach to represent energy losses due to gradual transitions in the geometry of the concrete channelized creek.

The as-builts for Parkwood Lane and Hillside Lane Bridges were not available and they were modeled based on information gathered in the field. The Advanced Planning Study Oceanside Boulevard OH (Widen), dated 11-08-2004, and the Advanced Planning Study Loma Alta Creek Bridge (Widen), dated 11-21-2004, were used to model the existing conditions and the proposed widening of the I-5 Bridges. In addition, the bridge piers were modeled as twice their diameters. This approach was used to account for debris which could catch on the bridge piers and provide additional blockage to the flow.

The two bridges with in the mobile estate are identical crossings over the concrete trapezoidal channel of Loma Alta Creek. The small bridges are sized for one way traffic across the channel, at 20 feet wide and approximately 36 feet long. The bridge decks are 2 feet thick and span the channel with no piers. Although these bridges are within the 100-year flood level, they are not a major obstruction to the main flow of the creek.



Figure 3: Parkwood Lane Bridge

The existing I-5 Loma Alta Creek Bridge would be widened to approximately 229 feet. For the existing condition, two rows of 3 foot square concrete piers continue through the entire width of the bridge. The existing rows consist of nine piers in each row. The proposed widening would add four piers to each row. The existing and proposed bridge piers were modeled as 6 foot square piers to account for debris.

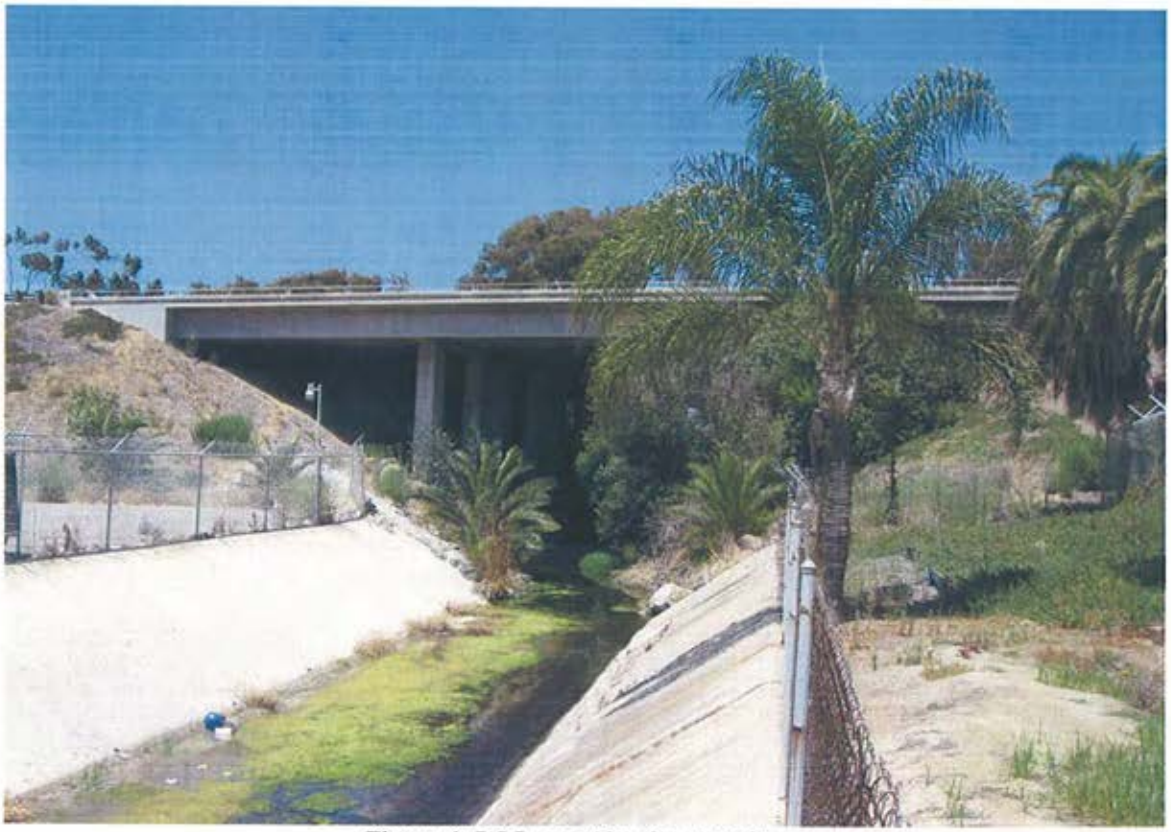


Figure 4: I-5 Loma Alta Creek Bridge

The existing bridge over Oceanside Boulevard has three rows of piers across the width of the bridge deck. The proposed widening would increase the bridge width to approximately 229 feet. The proposed widening would add three piers to each existing row of piers. The existing and proposed bridge piers were modeled as 4 foot diameter piers to account for debris.



Figure 5: I-5 Oceanside Boulevard Bridge

The existing and proposed I-5 Bridge decks would be completely above the 100-year floodplain and the deck depths were not a concern in the model. In the bridge analysis portion of HEC-RAS, the energy equation (Standard Step Method) was used. This method provided the highest energy loss through the bridge.

10.3.1.2 Ineffective Flow Areas

As mentioned above, residential and urban development has encroached on the Loma Alta Creek floodplain. To account for this in the modeling, ineffective flow areas were placed throughout the cross sections. Theses areas model the shopping centers upstream of I-5 and the mobile homes downstream of I-5.

10.3.1.3 Flood Insurance Study (FIS) Cross Sections

Detailed hydraulic analyses have been performed in this area, and base floodplain elevations have been determined as shown in the Flood Insurance Rate Map (FIRM) in Appendix A. Downstream the model ties into Loma Alta Creek FEMA cross section F. Upstream, the model ends at Loma Alta Creek FEMA cross section U.

10.3.1.4 Existing Floodplain Conditions

Several trial hydraulic models were developed to determine the most accurate methods in which to depict the floodplain of the Soledad Canyon. HEC-2 model output (Appendix C) was received, dated July 1982, from FEMA per a backup data request that was submitted on 7/10/07. In addition to the HEC-2 model output, topography, and a plan view of the cut cross sections along the Carmel Valley Creek were requested. Upon further coordination with FEMA, it was concluded that all of the available data for the established federal floodway had been received and back-up topography or working maps were not available. Only the HEC-2 output was received. Attempts were made to salvage the HEC-2 data and match it up to FIRM cross sections and recent topography. Based on cross sections within the FIRM, recent topography and the HEC-2 stations, elevations and reach lengths, it was determined that the model could not be regenerated with reasonable certainty. Therefore, a new existing conditions model was created using more recent information. Communication with FEMA and approval to recreate the existing model from current up to date information was approved, and the record of conversation was recorded (see Appendix C).

10.3.2 Manning's Roughness Coefficient

Since this floodplain included two main channels, each RS is divided into five segments. These segments represent the different regions of the waterway in terms of roughness coefficients. The main channel is the large concrete channel and the left and right overbanks represent the paved areas containing mobile homes and buildings. Within the right overbank, a secondary channel has been constructed to collect flow and reduce flooding. Manning's Roughness Coefficients were obtained from *Haestad Methods, Floodplain Modeling Using HEC-RAS, first edition,* and through field verification. Upstream of the I-5 bridges, the left overbank consists of scattered brush and heavy weeds, a roughness value of 0.05. For the rest of the left and right overbanks, a roughness value of 0.035 was used to simulate flow through housing and landscaping. The two main concrete channels contain no vegetation or debris, for this segment a roughness coefficient of 0.016 was used. Behind the urban area upstream of the I-5 Bridge and downstream after the two main channels join; the main channel remains a natural channel which corresponds with a value of 0.3 for the roughness coefficient.



Figure 3: Concrete channel

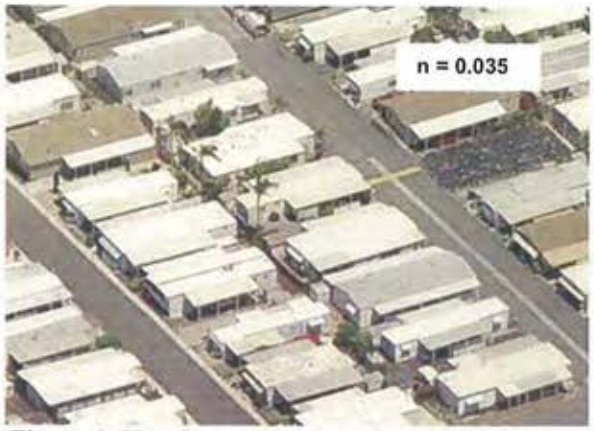


Figure 4: Housing and landscaping



Figure 5: Scattered brush, heavy weeds

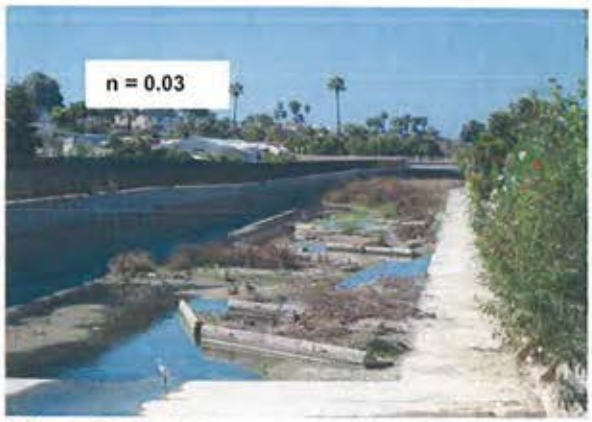


Figure 6: Earth bottom and rubble sides

10.3.3 Starting Water Surface Elevation

The model was run in a mixed flow regime condition. Since this is a FEMA Zone AE, the base flood elevations have been determined. At the first cross section, water surface elevation of 12.8 feet (NGVD 29) was used as the boundary condition. Upstream, a depth of 31.2 feet (NGVD 29) was input as the boundary condition, which has been converted to the NAVD 88 vertical datum. The upstream data was from a FEMA Letter of Map Revision (LOMR), which has been included in Appendix C.

10.3.4 Discharge

Upstream of the I-5 widening project, several detention basins have been proposed to reduce the high flow. Currently, the Garrison Creek detention basin has been constructed while two other basins are still in the planning phase. 3,389 cfs was identified as the peak 100-year storm discharge for this study. This models Loma Alta Creek storm conditions using information from the Rick Engineering hydraulic study with only the Garrison Creek detention basin in place.

10.4 HEC-RAS OUTPUT

The water surface elevations which are displayed in the appendices and output of this study are based on flooding that would occur during a 100-year storm. Appendix B contains water surface elevations, channel velocity, top width, flow regime, and bottom elevations for each cross section. It was determined that the resulting water surface elevation at the upstream side of the existing I-5 Bridge was 25.49 ft (NAVD 88). This provided a freeboard of roughly 17.11 ft from the water surface elevation to the bottom soffit of the Loma Alta Creek Bridge. In the proposed model, the water surface elevation at the upstream side of the existing I-5 Bridge was 26.37 ft (NAVD 88) which was approximately 16.3 ft from the bottom of the bridge.

TABLE A: EXISTING AND PROPOSED FLOODPLAIN COMPARISION

FEMA LABEL	River Station	Existing W.S. Elev. (ft)	Proposed W.S. Elev. (ft)	Change in Elevation (ft)	Existing Top Width (ft)	Proposed Top Width (ft)	Change in Top Width (ft)
U		33.40	33.40	**0.00**	228.26	228.26	**0.00**
T	5292	29.20	29.20	**0.00**	381.95	381.95	**0.00**
S	4864	28.03	27.77	**-0.26**	756.30	741.22	**-15.08**
R	4819	27.87	27.62	**-0.25**	754.82	744.99	**-9.83**
Q	4163	26.75	26.77	**0.02**	832.12	832.81	**0.69**
P	4056	26.50	26.53	**0.03**	815.02	817.23	**2.21**
O	3840	26.33	26.37	**0.04**	733.75	734.75	**1.00**
	3792	25.49	N/A	**N/A**	92.01	N/A	**N/A**
	3500	**I-5 Bridge**					
N	3486	22.71	22.76	**0.05**	232.85	248.45	**15.60**
	3383*	22.46	22.49	**0.03**	262.00	276.66	**14.66**
M	3279	21.94	21.95	**0.01**	157.42	158.04	**0.62**
	3250	**Parkwood Lane Bridge**					
L	3231	21.07	21.08	**0.01**	332.99	335.67	**2.68**
K	2792	20.11	20.11	**0.00**	304.43	304.43	**0.00**
J	2500	19.58	19.58	**0.00**	264.98	264.98	**0.00**
I	1851	19.30	19.30	**0.00**	460.17	460.17	**0.00**
	1800	**Hillside Lane Bridge**					
H	1787	18.94	18.94	**0.00**	428.78	428.78	**0.00**
	1582*	18.39	18.39	**0.00**	470.12	470.12	**0.00**
	1378*	18.02	18.02	**0.00**	516.25	516.25	**0.00**
	1173	17.05	17.05	**0.00**	492.77	492.77	**0.00**
	1096*	16.48	16.48	**0.00**	349.51	349.51	**0.00**
	1020*	16.07	16.07	**0.00**	93.76	93.76	**0.00**
G	943	15.19	15.19	**0.00**	106.18	106.18	**0.00**
F	571	15.00	15.00	**0.00**	442.84	442.84	**0.00**

* Interpolated cross sections

The largest increase (0.05 ft) to the water surface elevation of the Loma Alta Creek will occur just downstream of the Interstate 5 bridges. Only a few cross sections both upstream and downstream of I-5 have changed water surface elevations, but these minor changes taper back down to the existing conditions within a few hundred feet of this location.

10.4.1 Warning Messages

Warning messages encountered during the proposed model include the following:

The velocity head has changed by more than 0.5 feet (0.15 m). This may indicate the need for additional cross sections, displayed at cross sections #943, #1378, #3250, #3486, #3500,

#3840, #4864, and #5292. This message is common at obstructions and bridges and additional cross sections are not normally added.

The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections, displayed at cross sections #1800, #2792, #3500, #3840 and #5292. Portions of Loma Alta Creek were relatively uniform and allowed for cross sections to be placed several hundred feet apart. These changes are appropriate based on the spacing of the sections.

The energy loss was greater than 1.0 feet (0.3 m) between the current and previous section. This may indicate the need for additional cross sections, displayed at cross sections #4864 and #5292. These portions of the Loma Alta Creek were relatively uniform and allowed for cross sections to be placed several hundred feet apart. These changes are appropriate based on the spacing of the sections.

Divided flow computed for this cross section, displayed at cross section #943, #1020, #2500, #2792, #3231, #3279, #3383, #3486, #5292, and #6165. This was expected throughout the model due to the two main channels downstream of I-5 and because of the various buildings with in the floodplain modeled as ineffective flow areas.

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, displayed at cross sections #1173, and #3500. To address this warning message, the model was run in a mixed flow regime instead of subcritical flow. This warning occurs in transitional flow between subcritical and supercritical flow. Since the model was run in a mixed flow regime, these cross sections are considered valid.

For the final momentum answer at the bridge, the upstream energy was computed lower than the downstream energy. This is not physically possible; the momentum answer has been disregarded, displayed at cross section #3500. The Energy (standard step) method was used for this cross section.

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. This warning displayed at cross section #1173. A critical depth at this point in the concrete lined channel is reasonable. Since the model was run in a mixed flow regime, this cross section is considered valid.

10.5 RISK ASSESSMENT

Within the Loma Alta Creek floodplain, the widening to the I-5 Bridge would cause a negligible increase to flood water elevations upstream. The impacts to the floodplain would not be considered a significant or longitudinal encroachment. Since the 100-year flood would still be contained within the existing floodplain boundaries, there would be no increased risk to life or property associated with the proposed improvements. No additional roadways would flood upstream from the proposed I-5 Bridge widening. Therefore, no transportation routes will be interrupted or terminated beyond existing conditions.

Additionally, no floodplain values will be adversely impacted without mitigation. Natural and beneficial floodplain values, as defined in Chapter 17 "Definitions" in the Caltrans Standard Environmental Reference (SER), include fish, wildlife, plants, outdoor recreation, aquaculture, forestry, etc., that are found within a designated floodplain. Listed below are the beneficial uses of the Soledad Canyon obtained from the Water Quality Control Plan for the San Diego Basin along with a short description and determination of impacts.

- Municipal and domestic supply. Includes uses of water for community, military, or individual water supply systems including, but not limited to drinking water. These water uses do not occur around the project site and therefore will remain unaffected.

- Non-contact water recreation. This includes the uses of water for recreational activities involving proximity to water, but not normally involving body contact with water, where ingestion of water is reasonably possible. These uses include, but are not limited to, picnicking, sunbathing, hiking, beachcombing, camping, boating, tidepool and marine life study, hunting, sightseeing, or aesthetic enjoyment in conjunction with the above activities. It is unlikely that non-contact water recreation in Loma Alta Creek takes place in the immediate vicinity of the I-5 Bridge; however, the proposed conditions would not alter the amount of non-contact water recreation that may occur within the Loma Alta Creek.

- Warm freshwater habitat. This includes uses of water that support warm water ecosystems including, but not limited to, preservation or enhancement of aquatic habitats, vegetation, fish or wildlife, including invertebrates. The I-5 Bridge is located within an urbanized area and therefore the widening will not affect any warm freshwater habitats.

- Wildlife habitat. This includes uses of water that supports terrestrial ecosystems including, but not limited to, preservation and enhancement of terrestrial habitats, vegetation, wildlife, or wildlife water and food sources. The I-5 Bridge is located within a developed area and therefore will not encroach on a wildlife habitat.

The proposed bridge has been designed to minimize disturbance to the floodplain. The bridge design has been through several iterations to select an alternative which is compatible with floodplain development and least harmful to the environment, while maintaining feasibility for improving I-5. Efforts should be made to limit the footprint of the construction site and reduce construction time in order to minimize impacts to natural and beneficial floodplain values, hazards to human life, and property loss. Since the effects of the proposed changes are localized around the freeway through an urbanized area, the beneficial uses of Loma Alta Creek would not be affected by the I-5 widening.

10.6 SUMMARY AND CONCLUSION

Loma Alta Creek is a FEMA studied floodway where base flood elevations have been determined using a HEC-2 model. Attempts were made to match the existing model by matching the HEC-2 model up to FIRM cross sections and recent topography. Based on cross sections within the FIRM, recent topography and the HEC-2 stations, elevations and reach lengths, it was determined that the model could not be regenerated with any certainty. Therefore, a new model was created using more recent information.

There were only minor differences in water surface elevation (0.05 feet) between existing and proposed conditions, locally around the I-5 freeway. This would indicate that the proposed floodplain will tie back into existing conditions shortly upstream and downstream. Since the change is slight and the proposed floodplain remains inside the FEMA floodplain, impacts to the existing floodplain are not considered significant or an incompatible floodplain development.

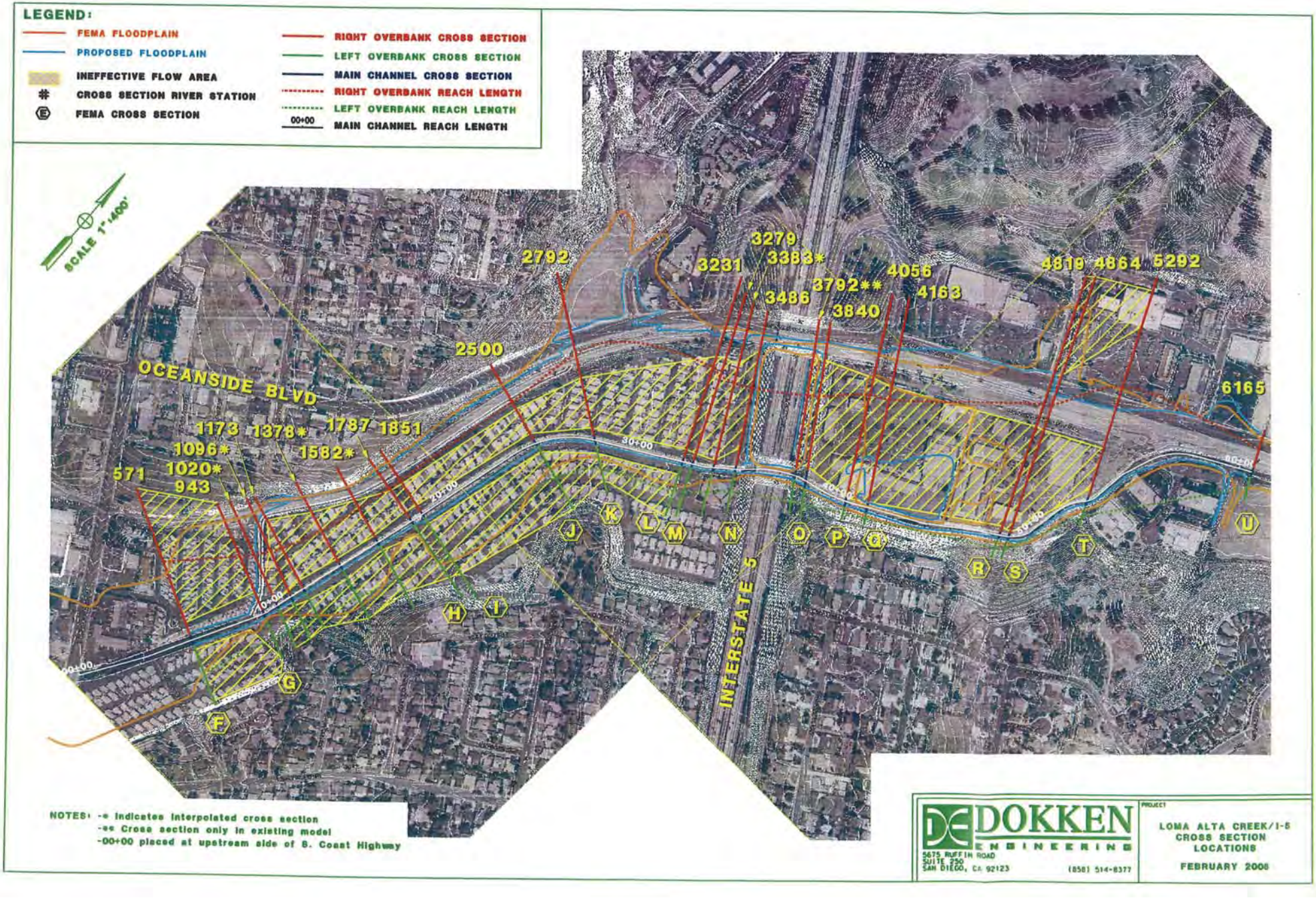
Appendix A

Cross Section Location Exhibit

Flood Insurance Rate Map (FIRM)

Floodway Data Sheet

City of Oceanside Topo Maps



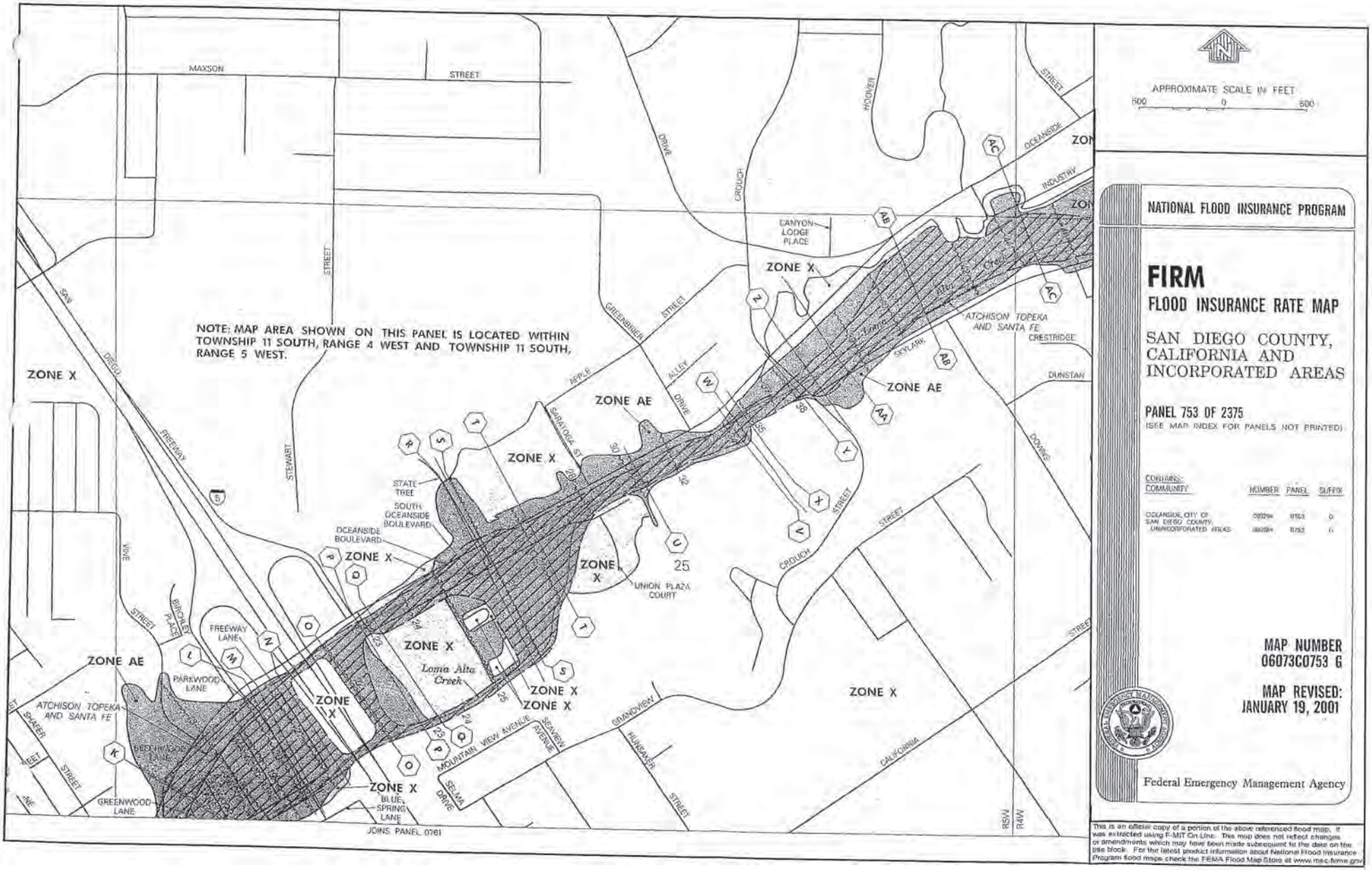
NOTES: -* Indicates interpolated cross section
-** Cross section only in existing model
-00+00 placed at upstream side of S. Coast Highway

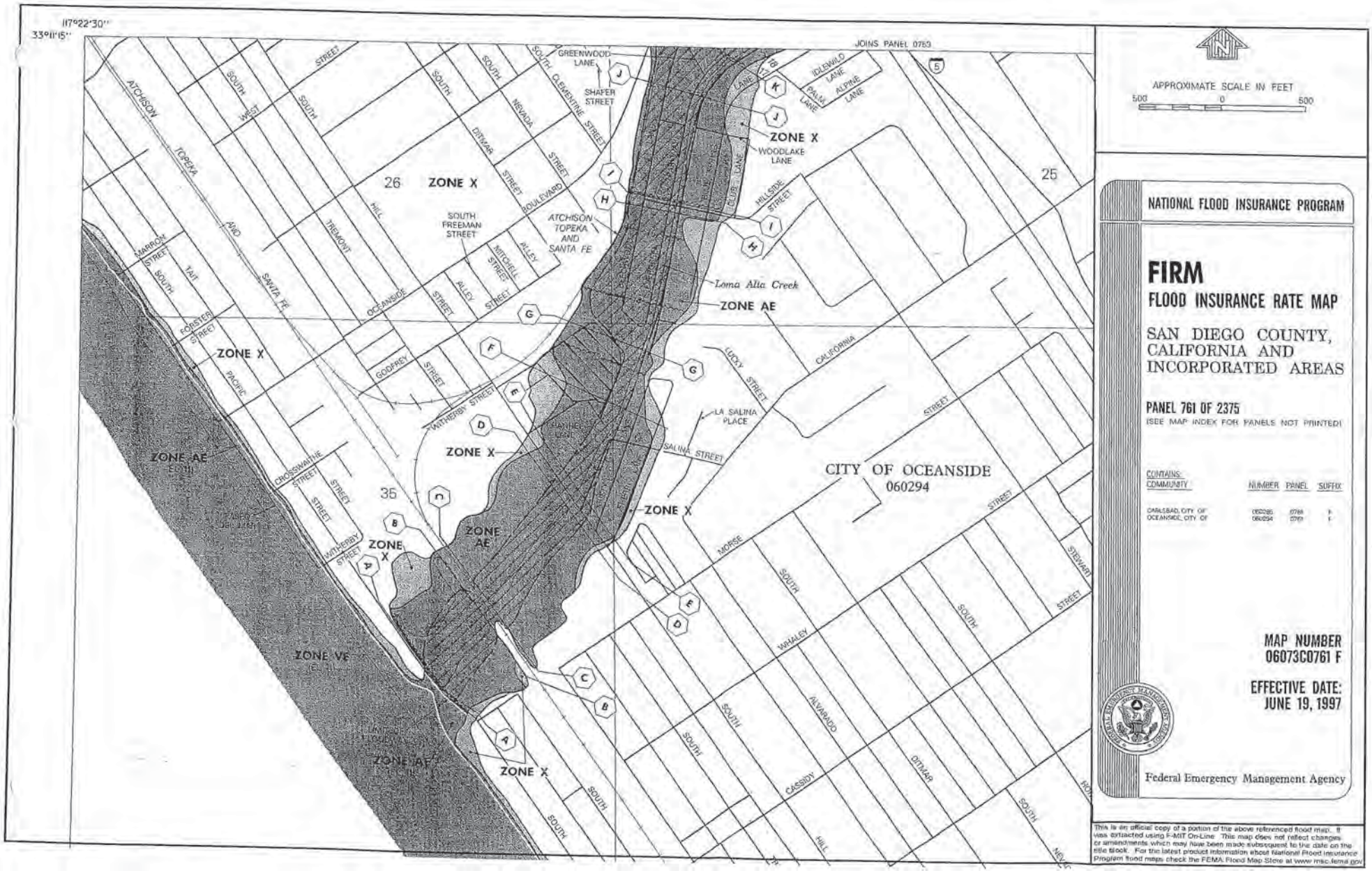
DOKKEN ENGINEERING
5675 RUFFIN ROAD
SUITE 250
SAN DIEGO, CA 92123
(858) 514-8377

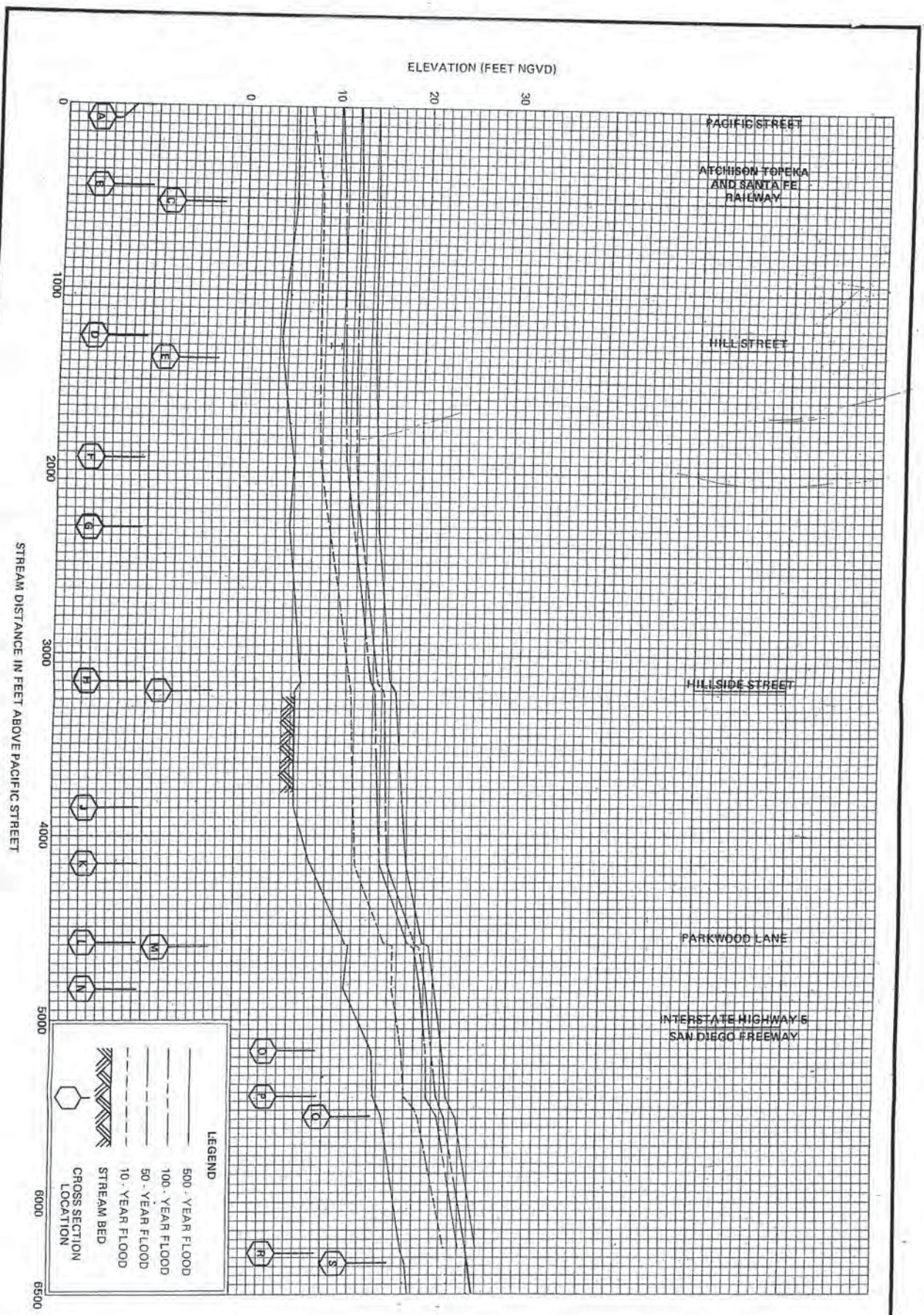
PROJECT

LOMA ALTA CREEK/I-5 CROSS SECTION LOCATIONS

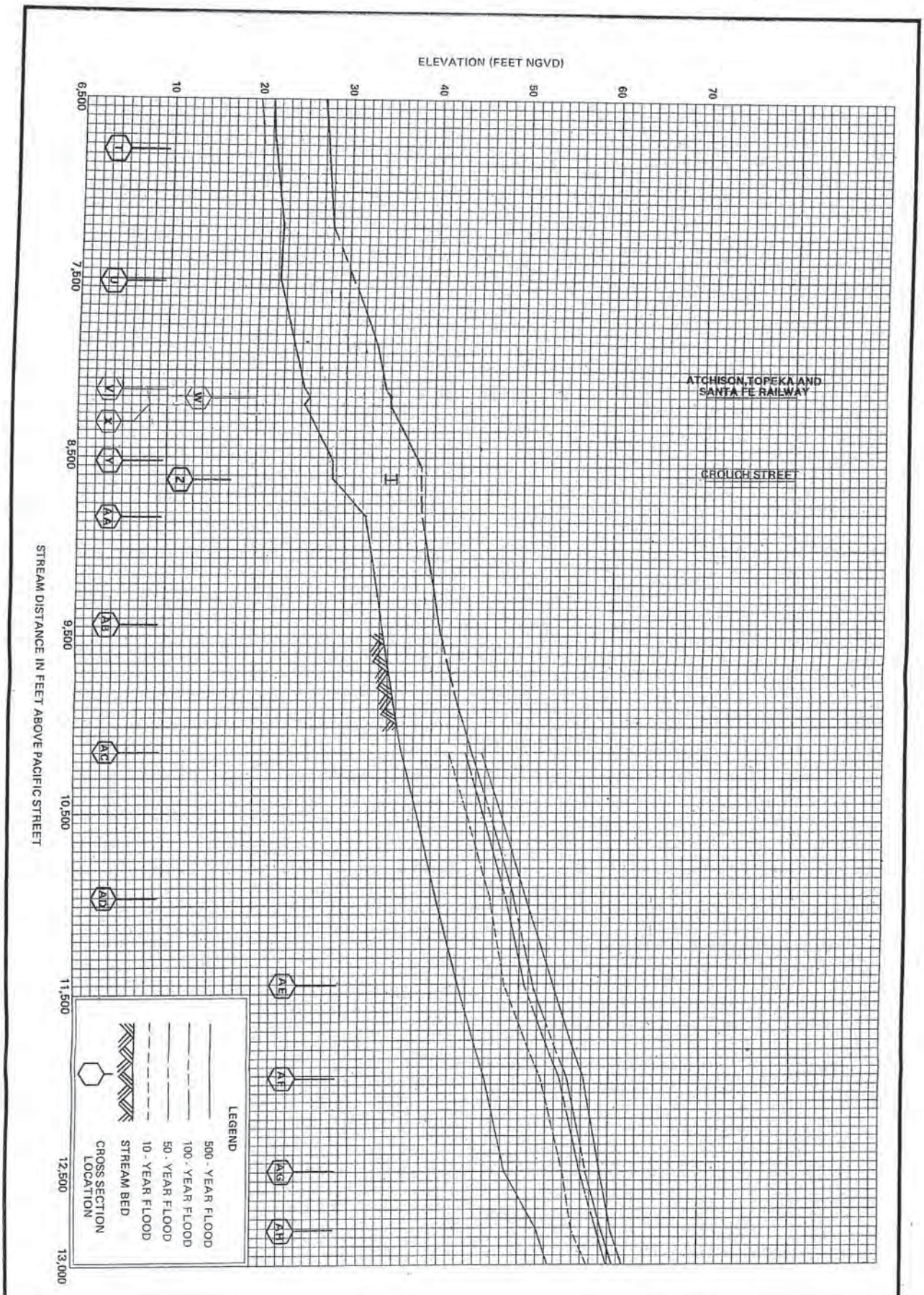
FEBRUARY 2006


MAXSON STREET
NOTE: MAP AREA SHOWN ON THIS PANEL IS LOCATED WITHIN TOWNSHIP 11 SOUTH, RANGE 4 WEST AND TOWNSHIP 11 SOUTH, RANGE 5 WEST.
ZONE X
ZONE AE
SAN DIEGO FREEWAY
STEWART STREET
VINE STREET
BIRCH CITY PLACE
FREEWAY LANE
PARKWOOD LANE
BEECHWOOD LANE
GREENWOOD LANE
SHARER STREET
ATCHISON TOPEKA AND SANTA FE
STATE TREE
SOUTH OCEANSIDE BOULEVARD
OCEANSIDE BOULEVARD
SARATOGA ST.
GREENBRIER STREET
ALLEY
APPLE
DRIVE
CANYON LODGE PLACE
CROUCH STREET
HOOVER STREET
OCEANSIDE
INDUSTRY
SKYLARK
CRESTRIDGE
DUNSTAN
DOWNS STREET
UNION PLAZA COURT
Loma Alta Creek
MOUNTAIN VIEW AVENUE
SEAVIEW AVENUE
GRANDVIEW
HUNSAKER STREET
SELMA DRIVE
BLUE SPRING LANE
CALIFORNIA
RSW
R4W
JOINS PANEL 0761
APPROXIMATE SCALE IN FEET
500 0 500
NATIONAL FLOOD INSURANCE PROGRAM
FIRM
FLOOD INSURANCE RATE MAP
SAN DIEGO COUNTY, CALIFORNIA AND INCORPORATED AREAS
PANEL 753 OF 2375
(SEE MAP INDEX FOR PANELS NOT PRINTED)
CONTAINS:
COMMUNITY NUMBER PANEL SUFFIX
OCEANSIDE, CITY OF 060294 0753 G
SAN DIEGO COUNTY, UNINCORPORATED AREAS 060284 0753 G
MAP NUMBER
06073C0753 G
MAP REVISED:
JANUARY 19, 2001
Federal Emergency Management Agency
This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov


117°22'30"
33°11'15"
JOINS PANEL 0759
APPROXIMATE SCALE IN FEET
500 0 500
NATIONAL FLOOD INSURANCE PROGRAM
FIRM
FLOOD INSURANCE RATE MAP
SAN DIEGO COUNTY, CALIFORNIA AND INCORPORATED AREAS
PANEL 761 OF 2375
(SEE MAP INDEX FOR PANELS NOT PRINTED)
CONTAINS:
COMMUNITY NUMBER PANEL SUFFIX
CARLSBAD, CITY OF 060285 0761 F
OCEANSIDE, CITY OF 060294 0761 F
MAP NUMBER
06073C0761 F
EFFECTIVE DATE:
JUNE 19, 1997
Federal Emergency Management Agency
CITY OF OCEANSIDE
060294
ZONE X
ZONE AE
ZONE VE
ZONE AF
Loma Alla Creek
ATCHISON TOPEKA AND SANTA FE
SOUTH FREEMAN STREET
WOODLAKE LANE
GREENWOOD LANE
SHAPER STREET
SOUTH CLEMENTINE STREET
IDLEWILD LANE
PALM LANE
ALPINE LANE
HILLSIDE STREET
CLUB LANE
LUCKY STREET
LA SALINA PLACE
SALINA STREET
CALIFORNIA STREET
MORSE STREET
STEWART STREET
WHALEY STREET
ALVARADO STREET
CASSIDY STREET
OTMAR STREET
HILL STREET
NEVADA STREET
DITMAR STREET
TREMONT STREET
BOULEVARD
MITCHELL STREET
ALLEY
OCEANSIDE BLVD
GODFREY STREET
WITHERBY STREET
CROSSMAINE STREET
FORSTER STREET
HARRON STREET
TAIT
PACIFIC
SOUTH WEST
ATCHISON TOPEKA AND SANTA FE
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J
K
This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov



164P	FEDERAL EMERGENCY MANAGEMENT AGENCY **SAN DIEGO COUNTY, CA AND INCORPORATED AREAS**	**FLOOD PROFILES** LOMA ALTA CREEK



165P	FEDERAL EMERGENCY MANAGEMENT AGENCY **SAN DIEGO COUNTY, CA AND INCORPORATED AREAS**	**FLOOD PROFILES** LOMA ALTA CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY (FEET NGVD)	INCREASE
Loma Alta Creek								
A	0	300	1,297	2.9	12.0	12.0	13.0	1.0
B	440	400	2,605	1.5	12.5	12.5	13.4	0.9
C	520	350	2,174	1.7	12.5	12.5	13.4	0.9
D	1,260	300	1,794	2.1	12.6	12.6	13.6	1.0
E	1,370	300	1,917	2.0	12.8	12.8	13.7	0.9
F	1,930	130	634	6.0	12.8	12.8	13.7	0.9
G	2,300	222	639	5.9	13.3	13.3	13.9	0.6
H	3,155	334	922	4.1	15.7	15.7	16.1	0.4
I	3,200	341	1,073	3.5	16.0	16.0	16.3	0.3
J	3,865	337	946	4.0	16.6	16.6	16.8	0.2
K	4,150	565	1,380	2.8	17.0	17.0	17.2	0.2
L	4,595	696	1,009	3.8	19.9	19.9	19.9	0.0
M	4,610	696	1,353	2.8	20.5	20.5	20.5	0.0
N	4,845	675	908	4.2	21.1	21.1	21.1	0.0
O	5,160	708	3,109	1.2	22.0	22.0	22.0	0.0
P	5,420	755[2]	648	5.9	22.7	22.7	22.7	0.0
Q	5,537	770[2]	566	6.7	23.3	23.3	23.3	0.0
R	6,275	800	1,562	2.4	25.8	25.8	26.2	0.4
S	6,325	800	1,702	2.2	25.9	25.9	26.3	0.4
T	6,775	543[2]	976	3.9	26.2	26.2	26.8	0.6
U	7,520	125	441	8.6	29.2	29.2	30.2	1.0
V	8,090	463	1,599	2.4	31.8	31.8	32.6	0.8
W	8,140	495	1,177	3.2	31.9	31.9	32.6	0.7
X	8,180	537[2]	511	7.4	33.5	33.5	33.5	0.0
Y	8,520	306[2]	798	4.8	36.6	36.6	37.1	0.5
Z	8,620	240	918	4.1	38.0	38.0	38.0	0.0

[1]Feet Above Pacific Street

[2]Width Includes Islands

TABLE 8

FEDERAL EMERGENCY MANAGEMENT AGENCY

SAN DIEGO COUNTY, CA
AND INCORPORATED AREAS

FLOODWAY DATA

LOMA ALTA CREEK

- SOURCE: MERRICK 2001 ORTHOPHOTO AND CONTOURS
- THIS MAP PREPARED SOLELY FOR ILLUSTRATION PURPOSE AND IS NOT TO BE RELIED UPON FOR ENGINEERING DRAWINGS.
- SOME INFORMATION MAY NOT BE ACCURATE.

Map No. 195



Contour (10')
Contour (2')
Tile

182	183	184
194	195	196
206	207	208

N

Scale 1"=200'

Map No. 195

Map No. 196

- SOURCE: MERRICK 2001 ORTHOPHOTO AND CONTOURS
- THIS MAP PREPARED SOLELY FOR ILLUSTRATION PURPOSE AND IS NOT TO BE RELIED UPON FOR ENGINEERING DRAWINGS.
- SOME INFORMATION MAY NOT BE ACCURATE.



Contour (10')
Contour (2')
Tile

183	184	185
195	196	197
207	208	209

N

Scale 1"=200'

Map No. 196

- SOURCE: MERRICK 2001 ORTHOPHOTO AND CONTOURS.
- THIS MAP PREPARED SOLELY FOR ILLUSTRATION PURPOSE AND IS NOT TO BE RELIED UPON FOR ENGINEERING DRAWINGS.
- SOME INFORMATION MAY NOT BE ACCURATE.

Map No. 207



Contour (10')
Contour (2')
Tile

194	195	196
206	207	208
217	218	219

N

Scale 1"=200'

Map No. 207

Map No. 208

- SOURCE: MERRICK 2001 ORTHOPHOTO AND CONTOURS
- THIS MAP PREPARED SOLELY FOR ILLUSTRATION PURPOSE AND IS NOT TO BE RELIED UPON FOR ENGINEERING DRAWINGS.
- SOME INFORMATION MAY NOT BE ACCURATE.



Scale 1"=200'

Map No. 208

Map No. 218

- SOURCE: MERRICK 2001 ORTHOPHOTO AND CONTOURS
- THIS MAP PREPARED SOLELY FOR ILLUSTRATION PURPOSE AND IS NOT TO BE RELIED UPON FOR ENGINEERING DRAWINGS.
- SOME INFORMATION MAY NOT BE ACCURATE.



Contour (10')
Contour (2')
Tile

206	207	208
217	218	219
229	230	231

N

Scale 1"=200'

Map No. 218

Appendix B

Results Summary

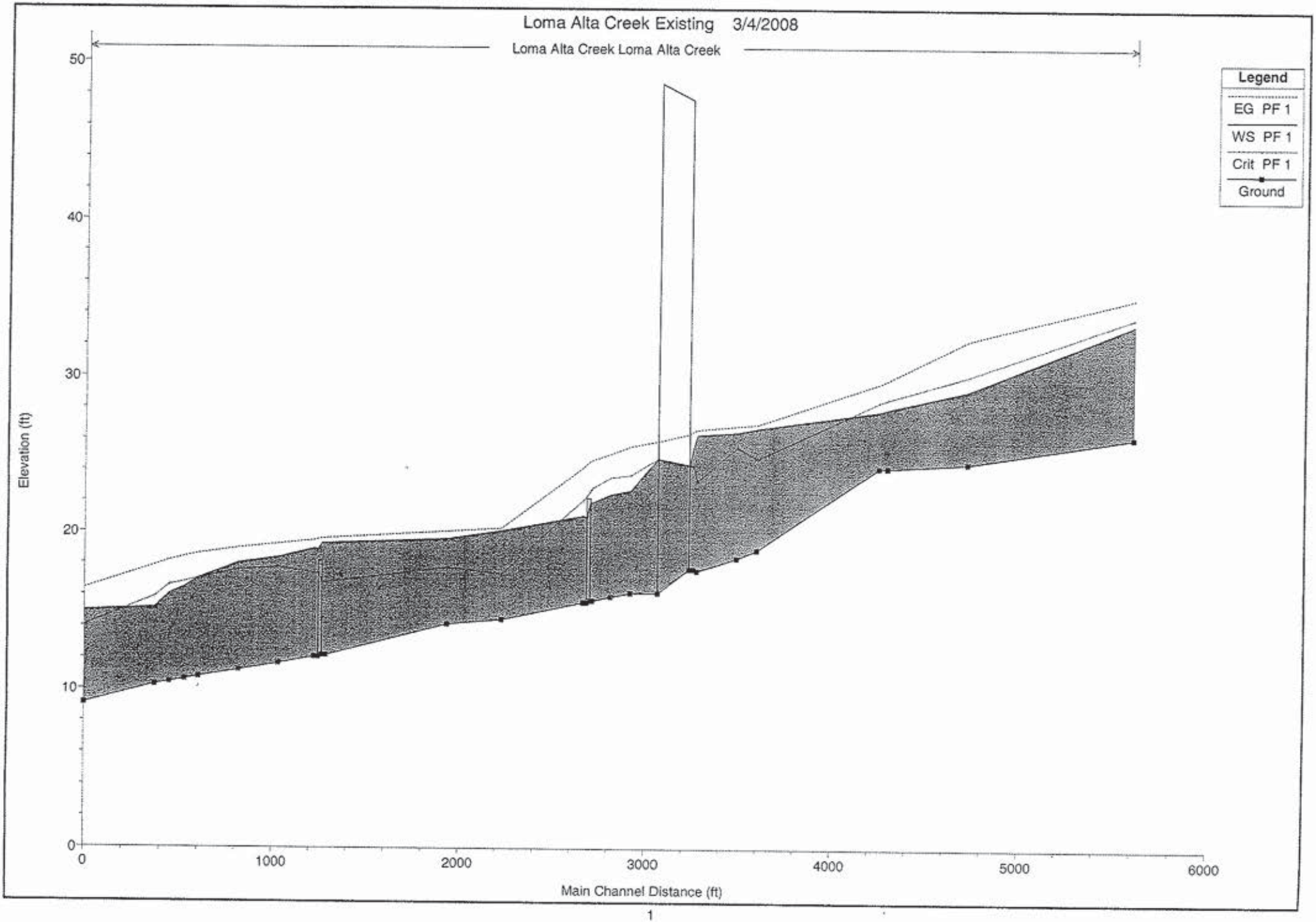
HEC-RAS Cross Section Input/Output

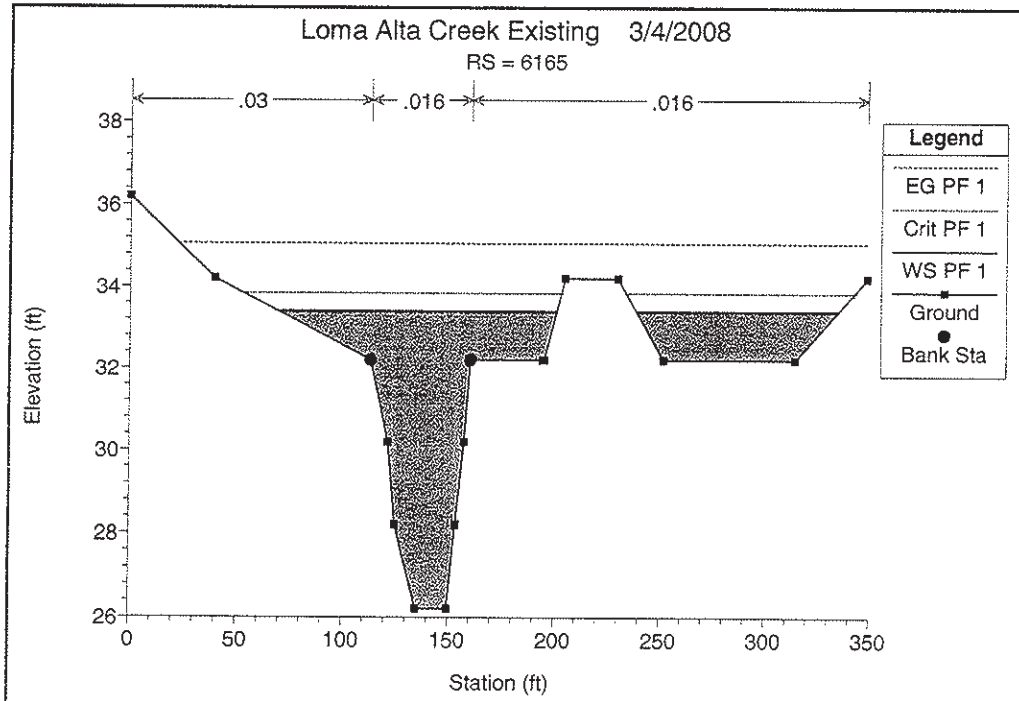
Existing
Proposed

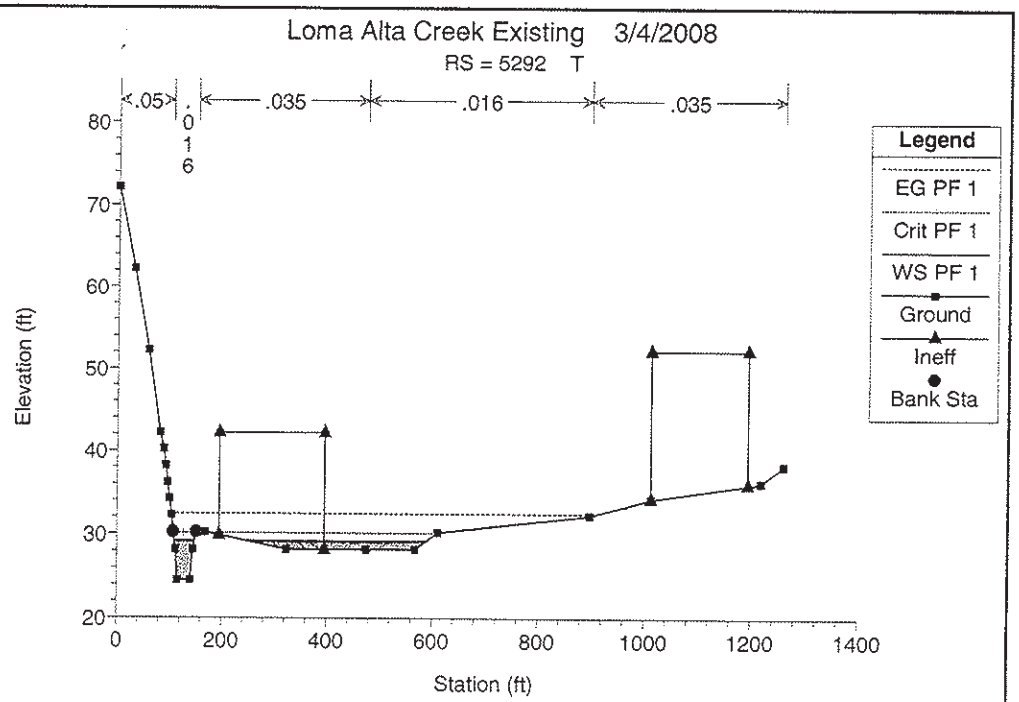
EXISTING

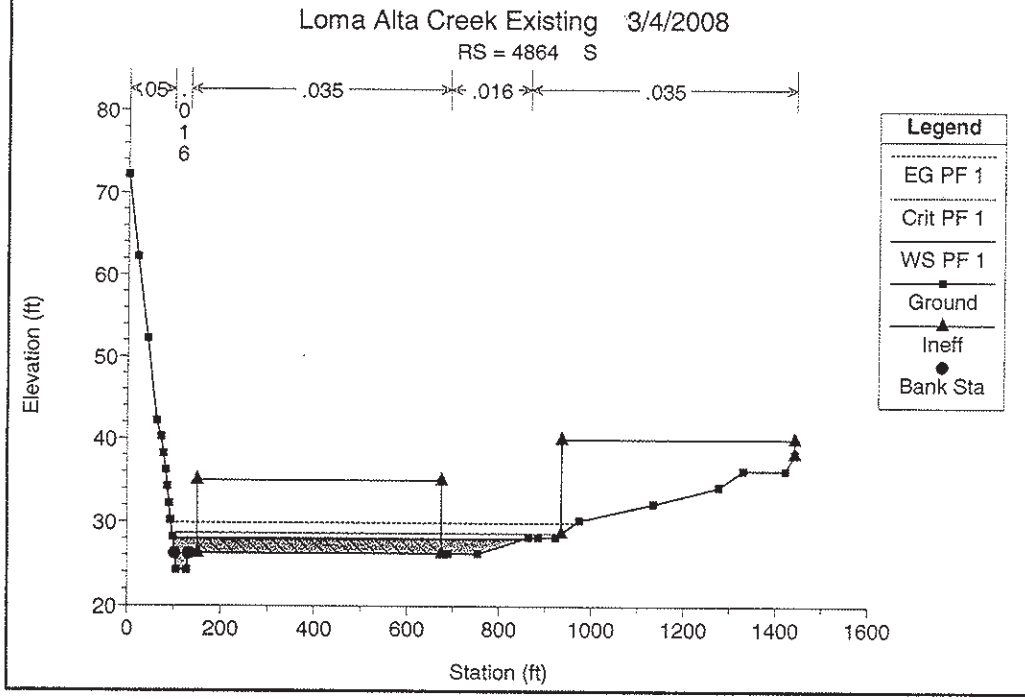
HEC-RAS Plan: LA_Exist River: Loma Alta Creek Reach: Loma Alta Creek Profile: PF 1

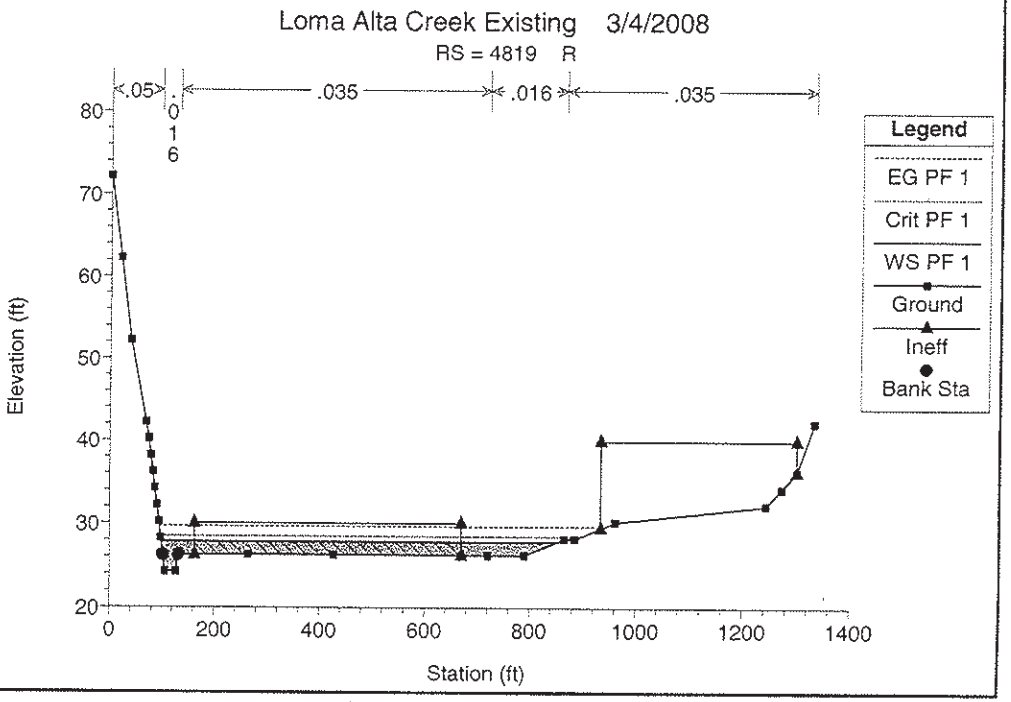
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Loma Alta Creek	6165	PF 1	3389.00	26.20	33.40	33.84	35.06	0.001724	11.26	415.64	228.26	0.86
Loma Alta Creek	5292	PF 1	3389.00	24.50	29.20	30.14	32.42	0.006215	16.71	327.37	381.95	1.52
Loma Alta Creek	4864	PF 1	3389.00	24.20	28.03	28.65	29.89	0.004604	14.38	381.27	756.30	1.35
Loma Alta Creek	4819	PF 1	3389.00	24.20	27.87	28.46	29.66	0.005108	14.60	407.35	754.82	1.41
Loma Alta Creek	4163	PF 1	3389.00	18.90	26.75	24.80	27.01	0.000658	4.30	828.72	832.12	0.29
Loma Alta Creek	4056	PF 1	3389.00	18.40	26.50	25.55	26.91	0.001177	5.79	687.42	815.02	0.39
Loma Alta Creek	3840	PF 1	3389.00	17.60	26.33	23.36	26.67	0.000816	5.02	770.09	733.75	0.34
Loma Alta Creek	3792	PF 1	3389.00	17.70	25.49	24.29	26.57	0.002679	7.98	417.39	92.01	0.58
Loma Alta Creek	3500		Bridge									
Loma Alta Creek	3486	PF 1	3389.00	16.20	22.71	23.72	25.58	0.004269	15.67	294.53	232.85	1.29
Loma Alta Creek	3383*	PF 1	3389.00	15.95	22.46	23.55	25.08	0.004098	14.96	300.27	262.00	1.26
Loma Alta Creek	3279	PF 1	3389.00	15.70	21.94	22.87	24.67	0.004630	15.31	300.03	157.42	1.33
Loma Alta Creek	3250		Bridge									
Loma Alta Creek	3231	PF 1	3389.00	15.60	21.07	22.09	24.20	0.006318	16.72	276.52	332.99	1.52
Loma Alta Creek	2792	PF 1	3389.00	14.50	20.11	17.40	20.28	0.000346	4.58	1104.03	304.43	0.38
Loma Alta Creek	2500	PF 1	3389.00	14.20	19.58	17.80	20.06	0.000891	7.05	658.16	264.98	0.60
Loma Alta Creek	1851	PF 1	3389.00	12.20	19.30	16.83	19.61	0.000446	5.58	816.34	460.17	0.42
Loma Alta Creek	1800		Bridge									
Loma Alta Creek	1787	PF 1	3389.00	12.10	18.94	17.40	19.48	0.001056	6.43	593.46	428.78	0.56
Loma Alta Creek	1582*	PF 1	3389.00	11.67	18.39	17.78	19.25	0.001202	8.29	476.34	470.12	0.72
Loma Alta Creek	1378*	PF 1	3389.00	11.24	18.02	17.62	18.98	0.001255	9.16	484.37	516.25	0.73
Loma Alta Creek	1173	PF 1	3389.00	10.81	17.05	17.05	18.60	0.001948	10.95	362.19	492.77	0.89
Loma Alta Creek	1096*	PF 1	3389.00	10.64	16.48	16.83	18.42	0.002505	11.63	306.43	349.51	0.99
Loma Alta Creek	1020*	PF 1	3389.00	10.47	16.07	16.63	18.18	0.002786	11.83	290.48	93.76	1.03
Loma Alta Creek	943	PF 1	3389.00	10.30	15.19	15.89	17.87	0.004181	13.76	259.11	106.18	1.24
Loma Alta Creek	571	PF 1	3389.00	9.10	15.00	14.08	16.39	0.001252	9.56	402.04	442.84	0.73

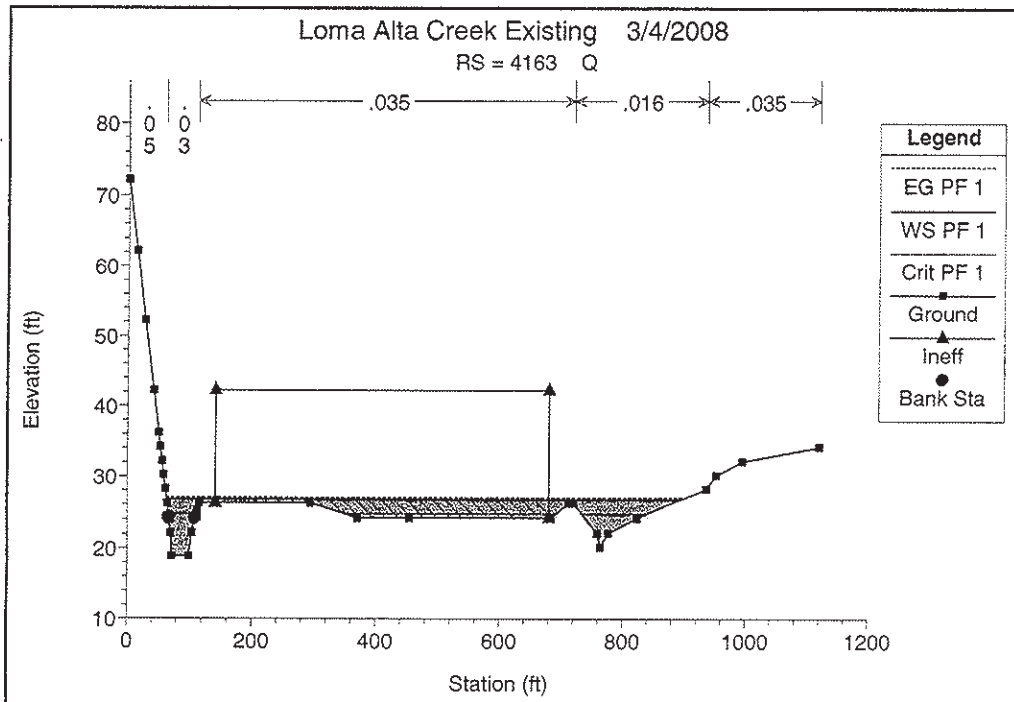

Loma Alta Creek Existing 3/4/2008
Loma Alta Creek Loma Alta Creek
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Elevation (ft)
50
40
30
20
10
0
0
1000
2000
3000
4000
5000
6000
Main Channel Distance (ft)

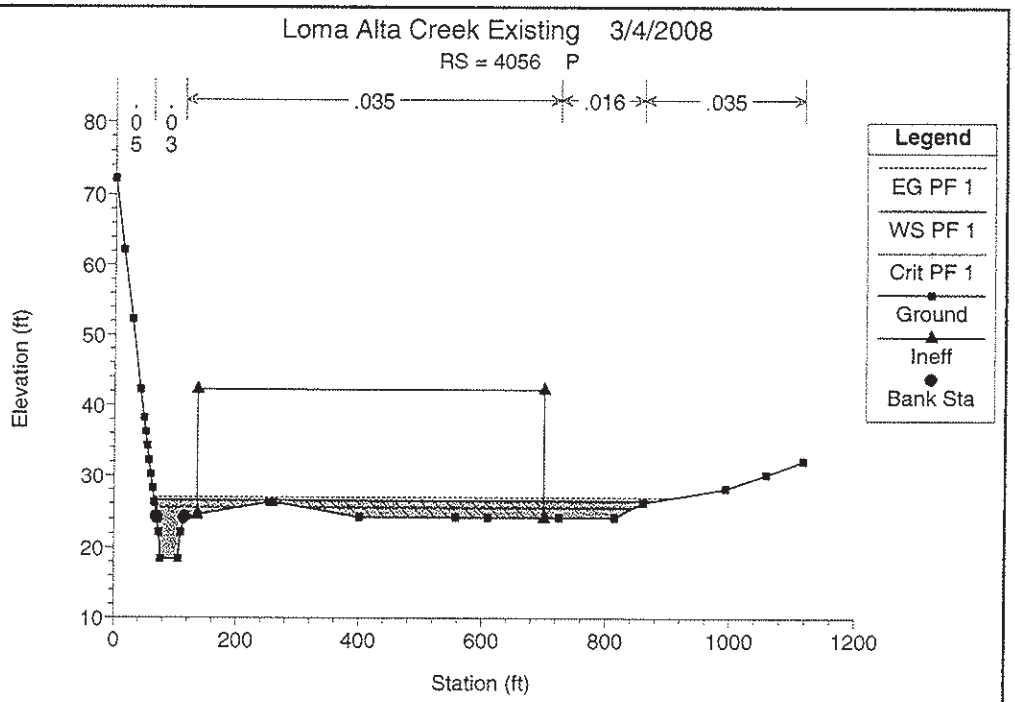

Loma Alta Creek Existing 3/4/2008
RS = 6165
.03
.016
.016
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

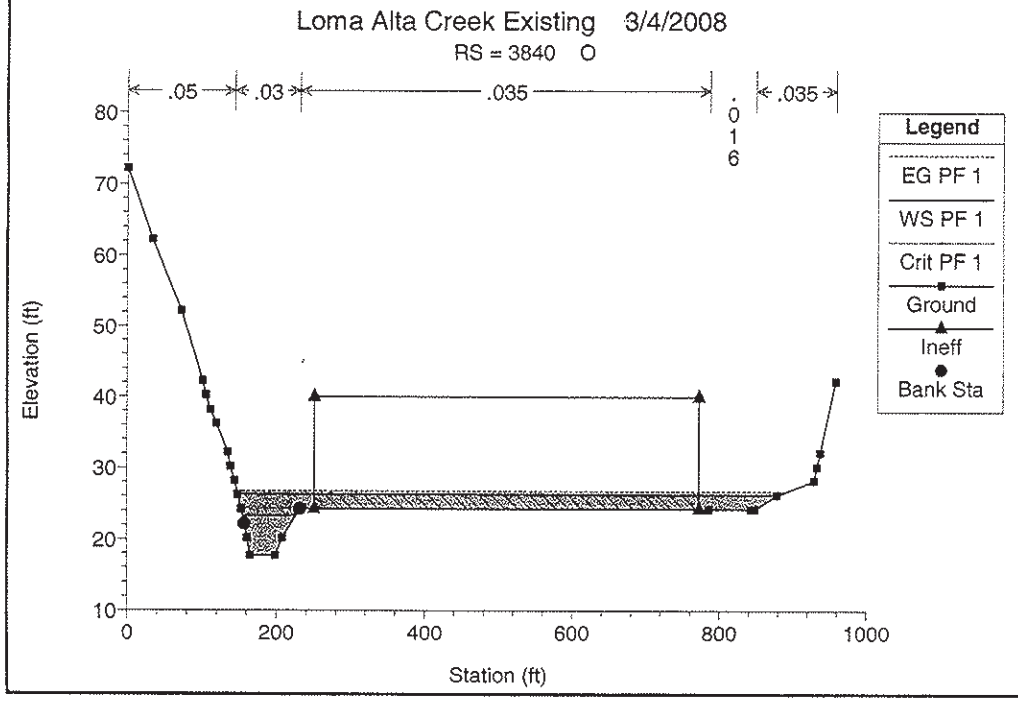

Loma Alta Creek Existing 3/4/2008
RS = 5292 T
.05
.035
.016
.035
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

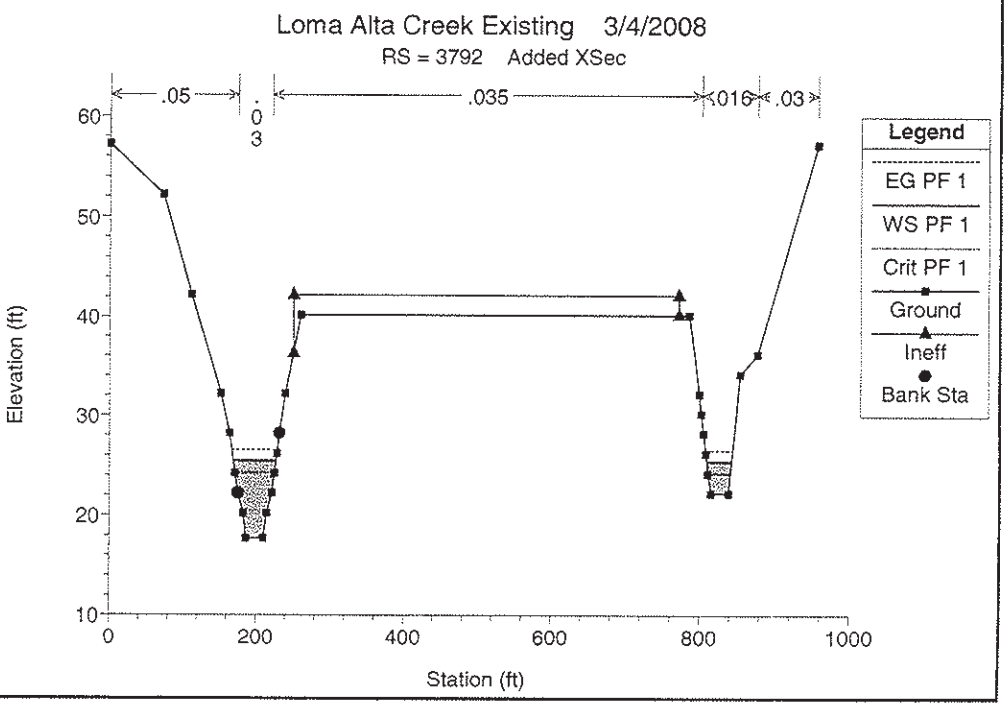

Loma Alta Creek Existing 3/4/2008
RS = 4864 S
.05
.035
.016
.035
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

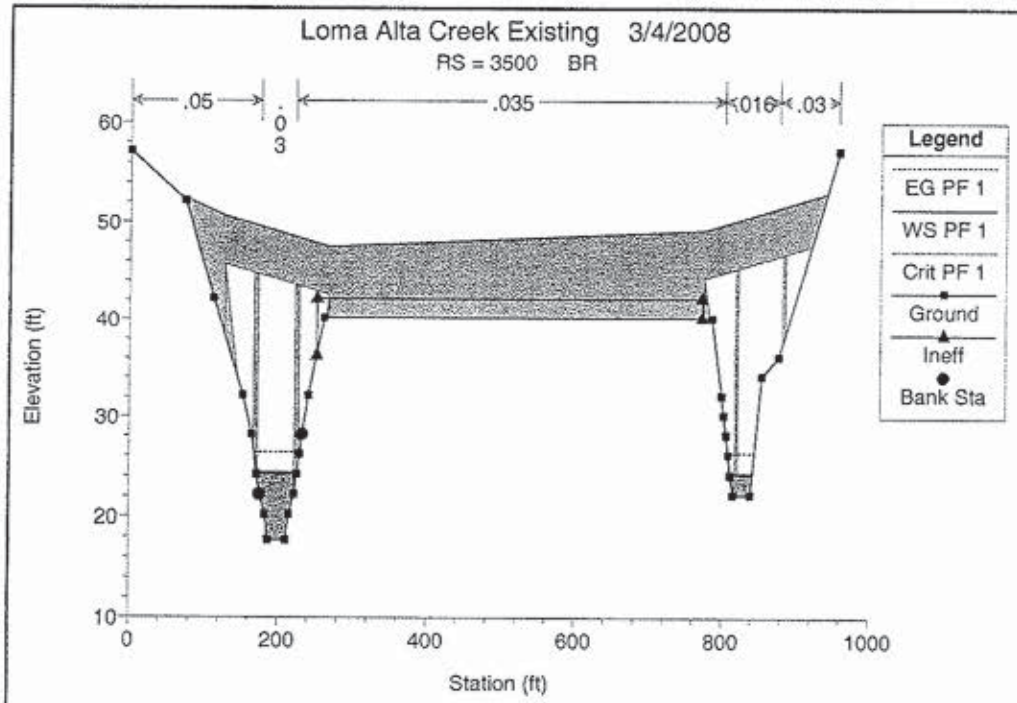

Loma Alta Creek Existing 3/4/2008
RS = 4819 R
.05
.035
.016
.035
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

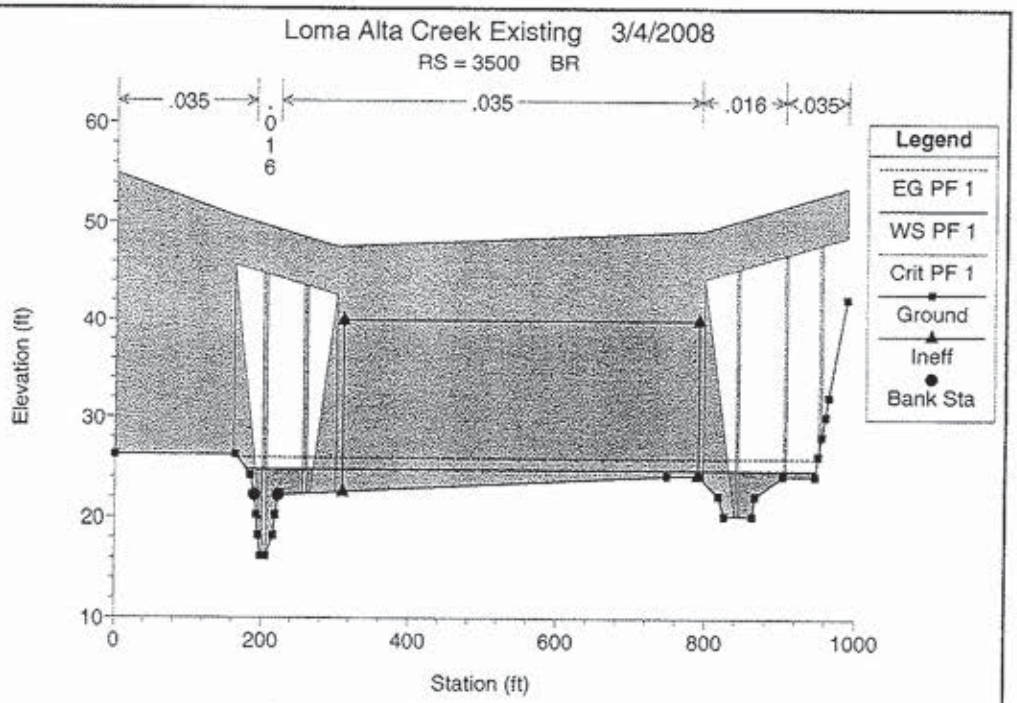

Loma Alta Creek Existing 3/4/2008
RS = 4163 Q
.05
.03
.035
.016
.035
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

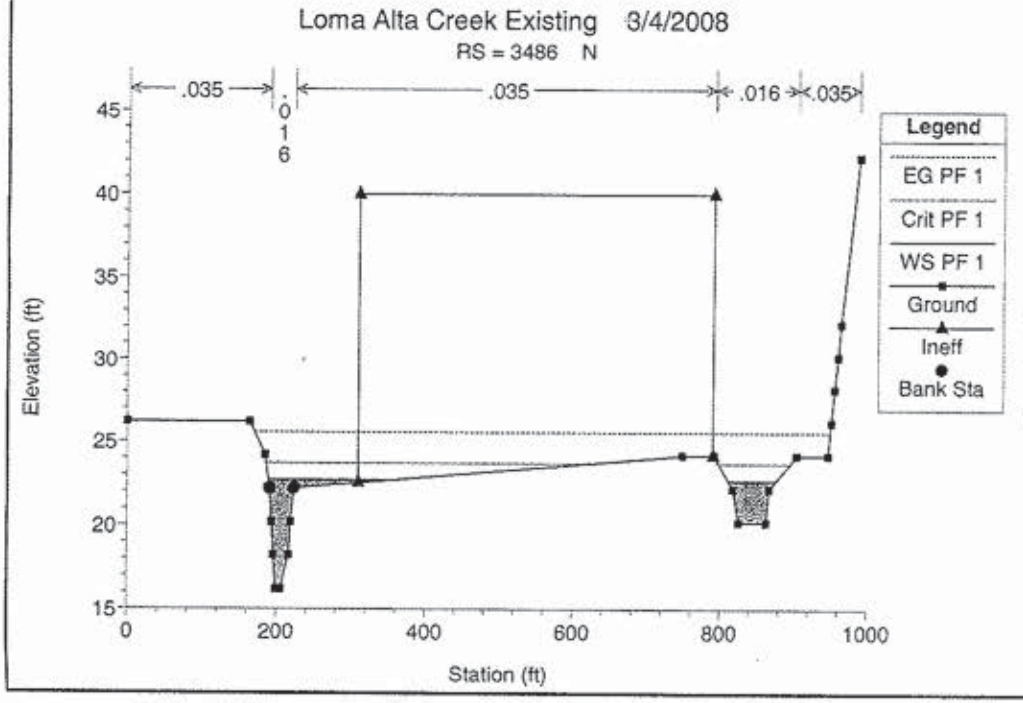

Loma Alta Creek Existing 3/4/2008
RS = 4056 P
.05
.03
.035
.016
.035
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

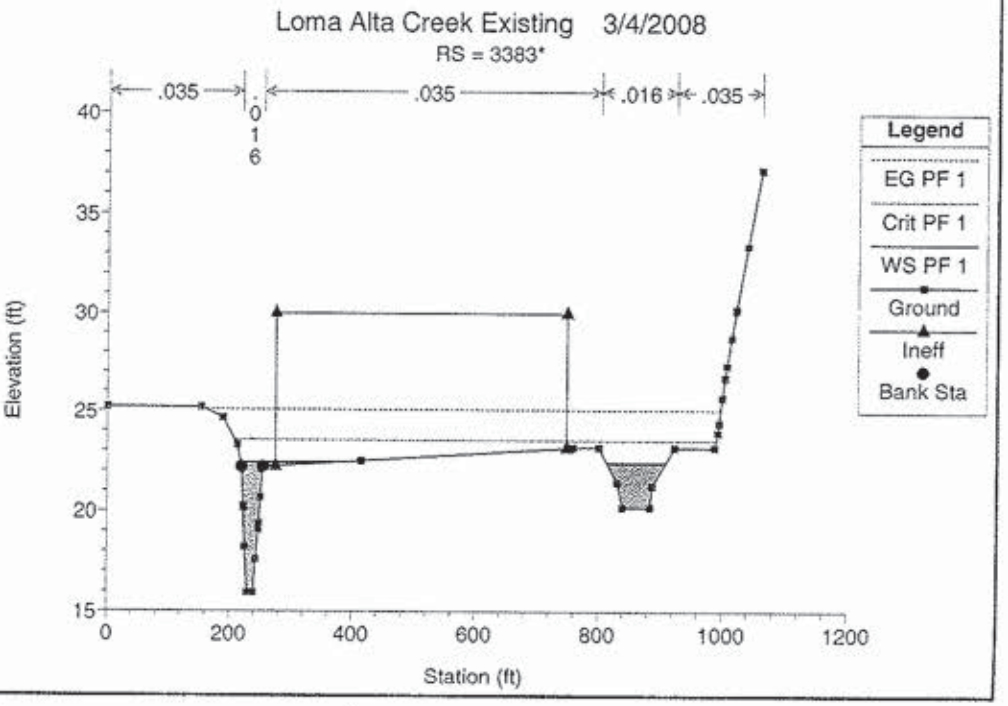

Loma Alta Creek Existing 3/4/2008
RS = 3840 O
.05
.03
.035
.016
.035
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

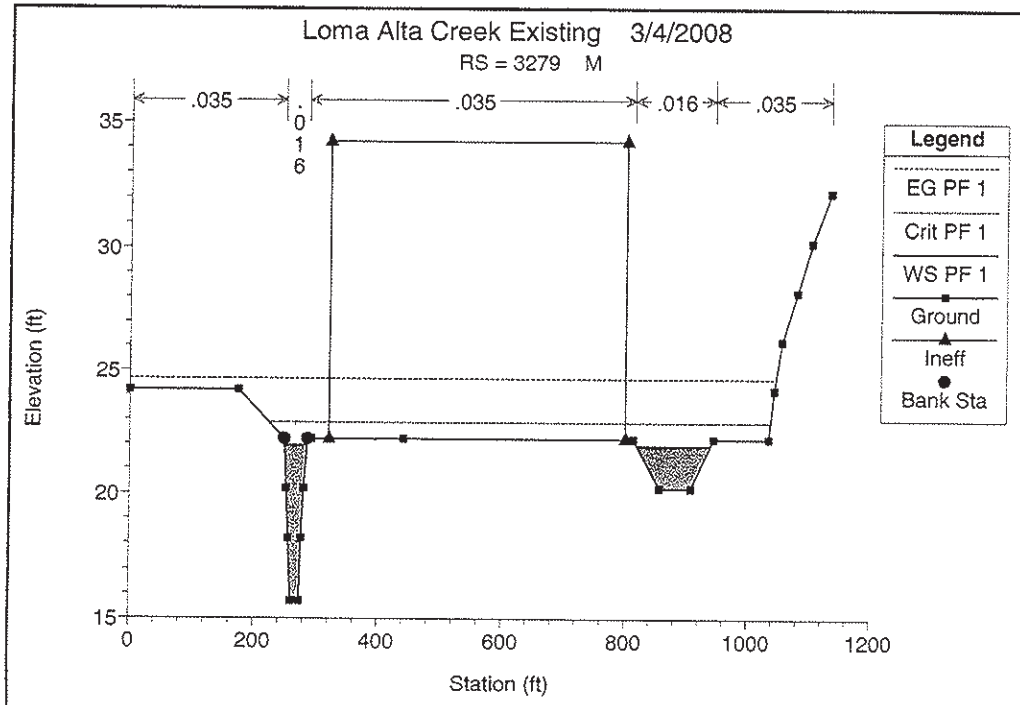

Loma Alta Creek Existing 3/4/2008
RS = 3792 Added XSec
.05
.03
.035
.016
.03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

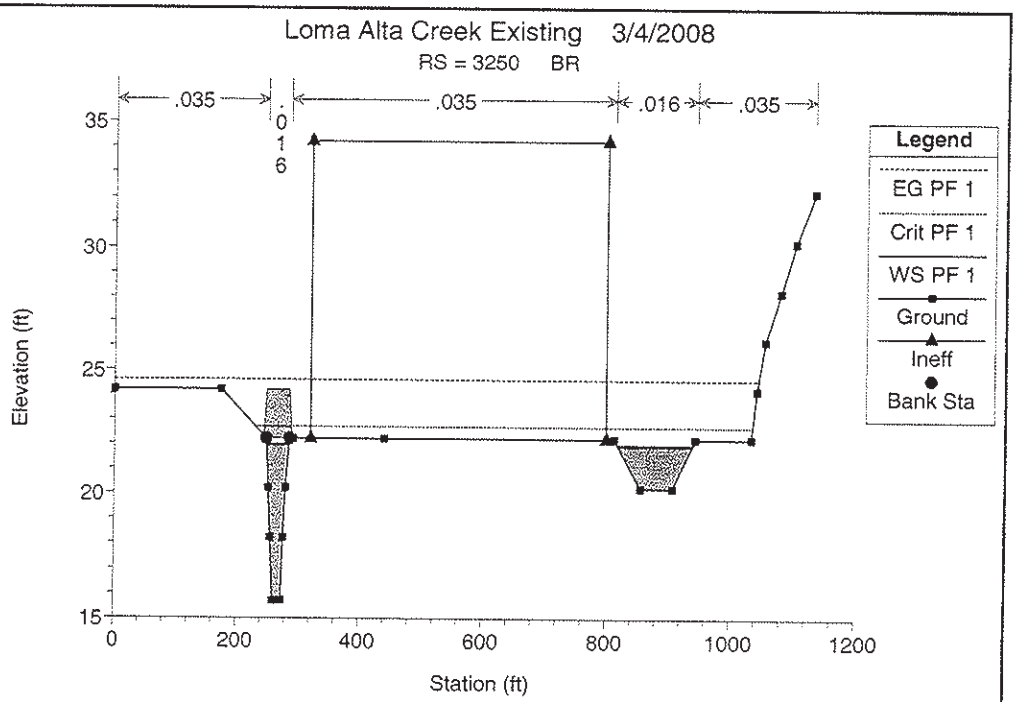

Loma Alta Creek Existing 3/4/2008
RS = 3500 BR
.05
.03
.035
.016
.03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

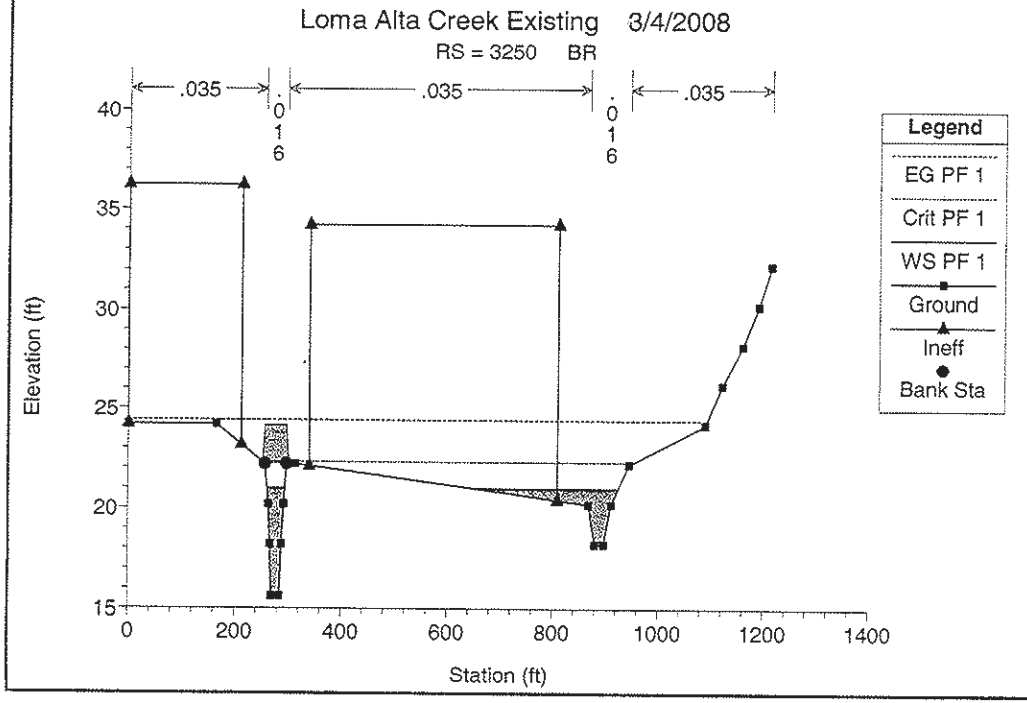

Loma Alta Creek Existing 3/4/2008
RS = 3500 BR
.035
.016
.035
.035
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

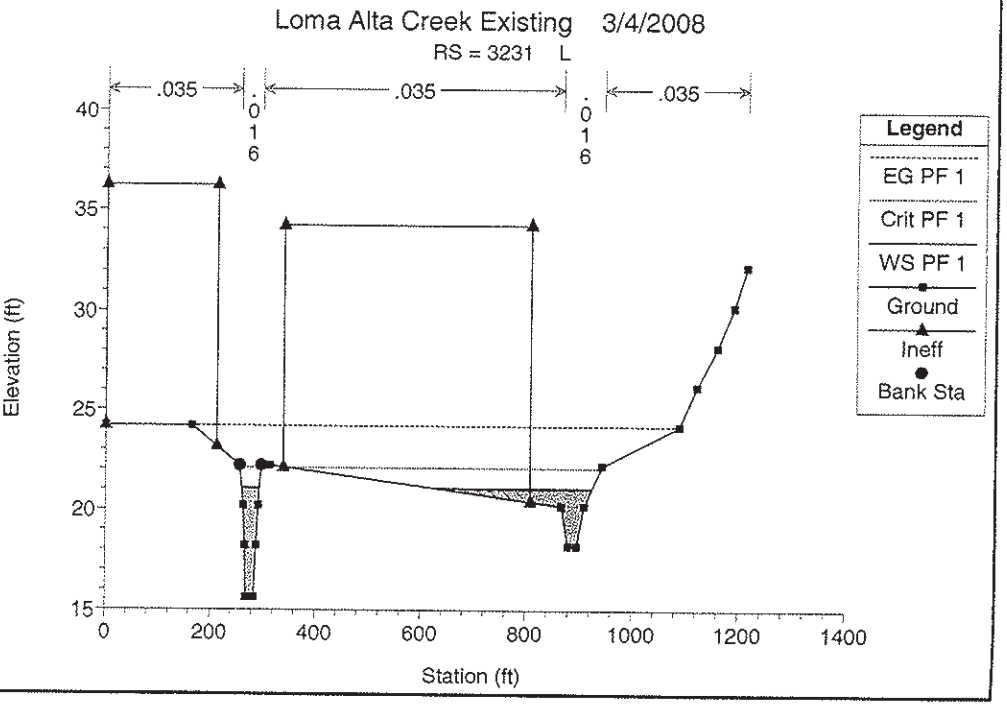

Loma Alta Creek Existing 3/4/2008
RS = 3486 N
.035
.016
.035
.035
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

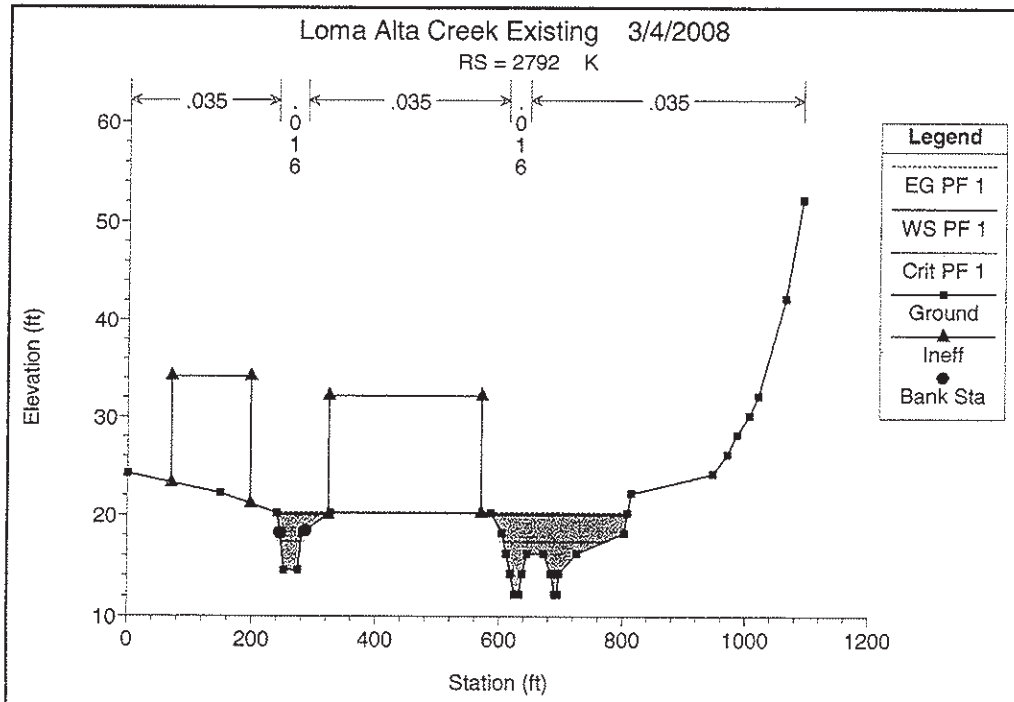

Loma Alta Creek Existing 3/4/2008
RS = 3383*
.035
.016
.035
.035
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

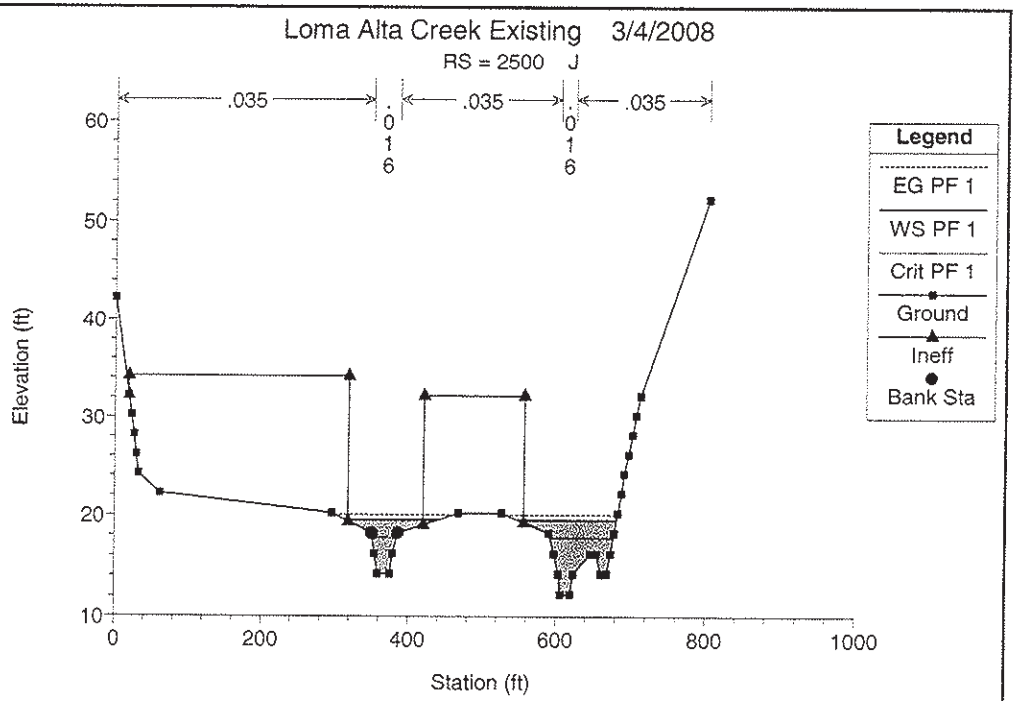

Loma Alta Creek Existing 3/4/2008
RS = 3279 M
.035
.016
.035
.016
.035
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

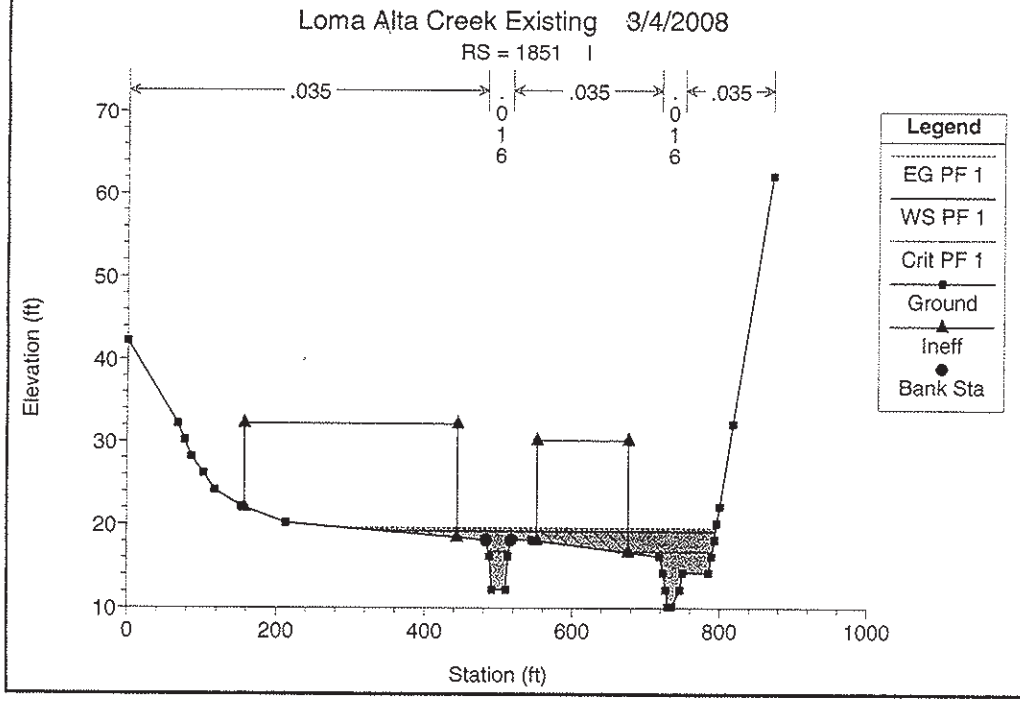

Loma Alta Creek Existing 3/4/2008
RS = 3250 BR
.035
.016
.035
.016
.035
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

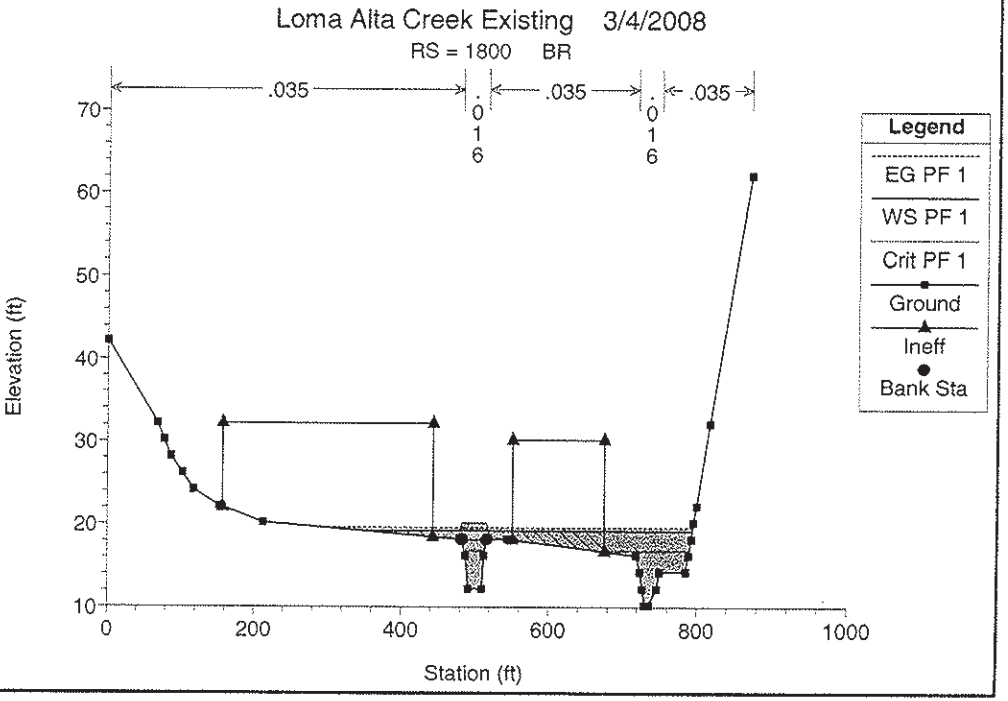

Loma Alta Creek Existing 3/4/2008
RS = 3250 BR
.035
.016
.035
.016
.035
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

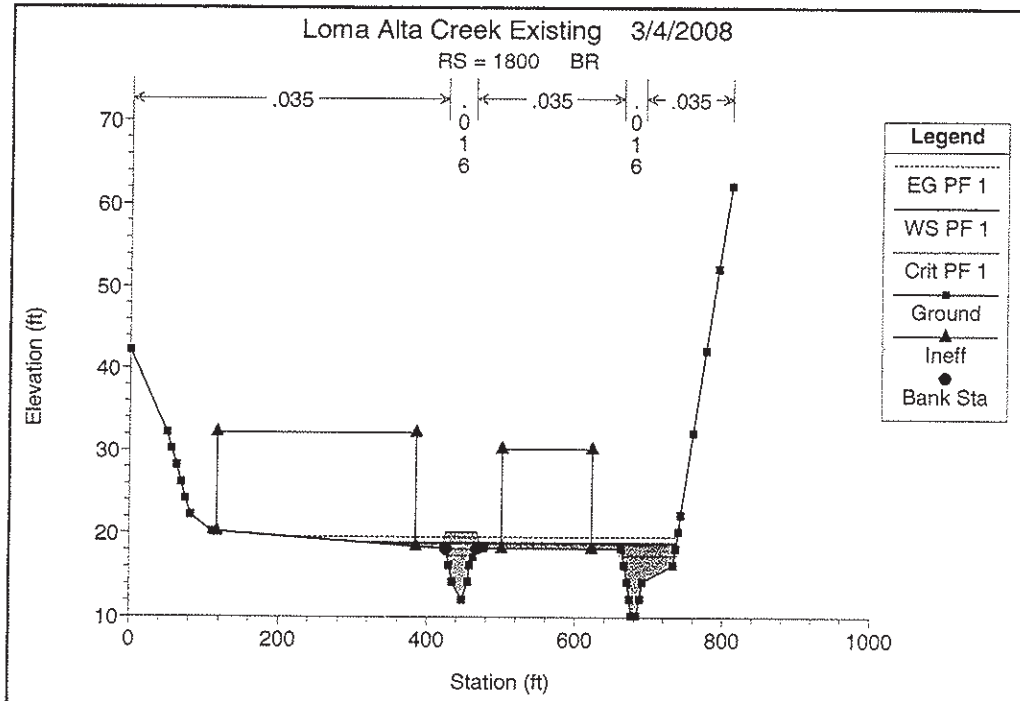

Loma Alta Creek Existing 3/4/2008
RS = 3231 L
.035
.016
.035
.016
.035
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

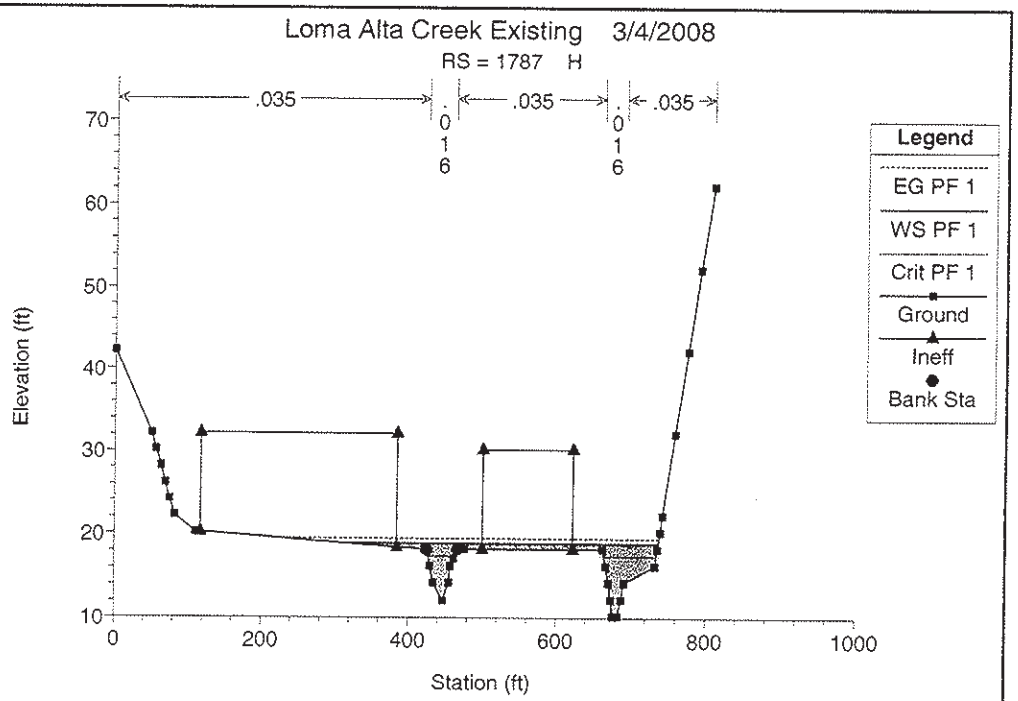

Loma Alta Creek Existing 3/4/2008
RS = 2792 K
.035
.035
.035
.016
.016
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
10
20
30
40
50
60
0
200
400
600
800
1000
1200

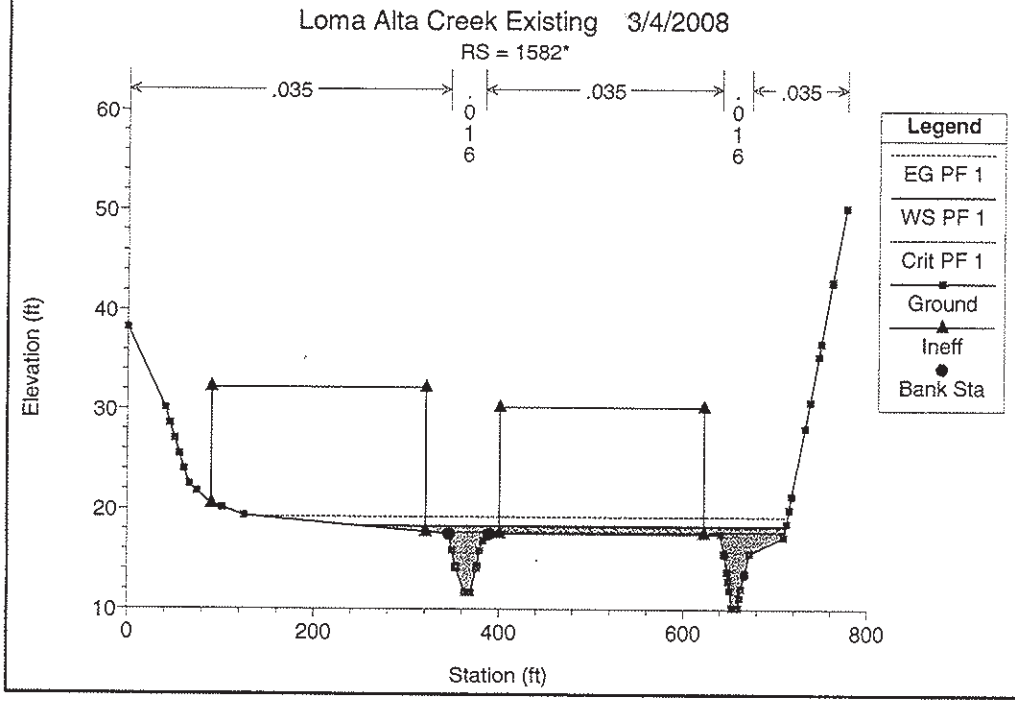

Loma Alta Creek Existing 3/4/2008
RS = 2500 J
.035
.035
.035
.016
.016
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
10
20
30
40
50
60
0
200
400
600
800
1000

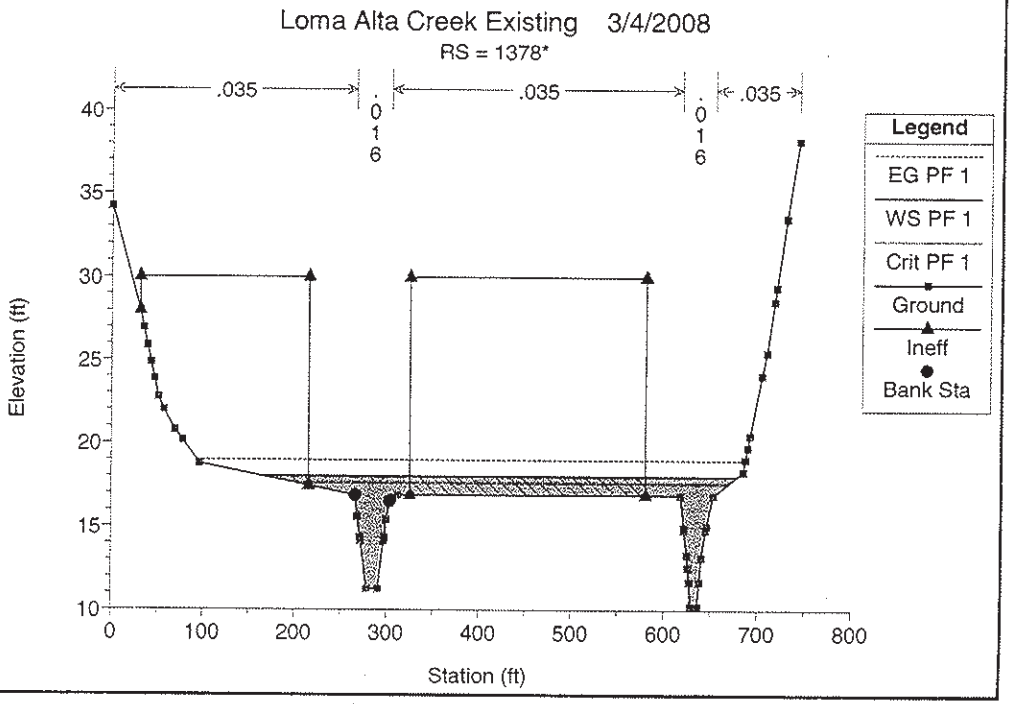

Loma Alta Creek Existing 3/4/2008
RS = 1851 I
.035
.035
.035
.016
.016
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
10
20
30
40
50
60
70
0
200
400
600
800
1000

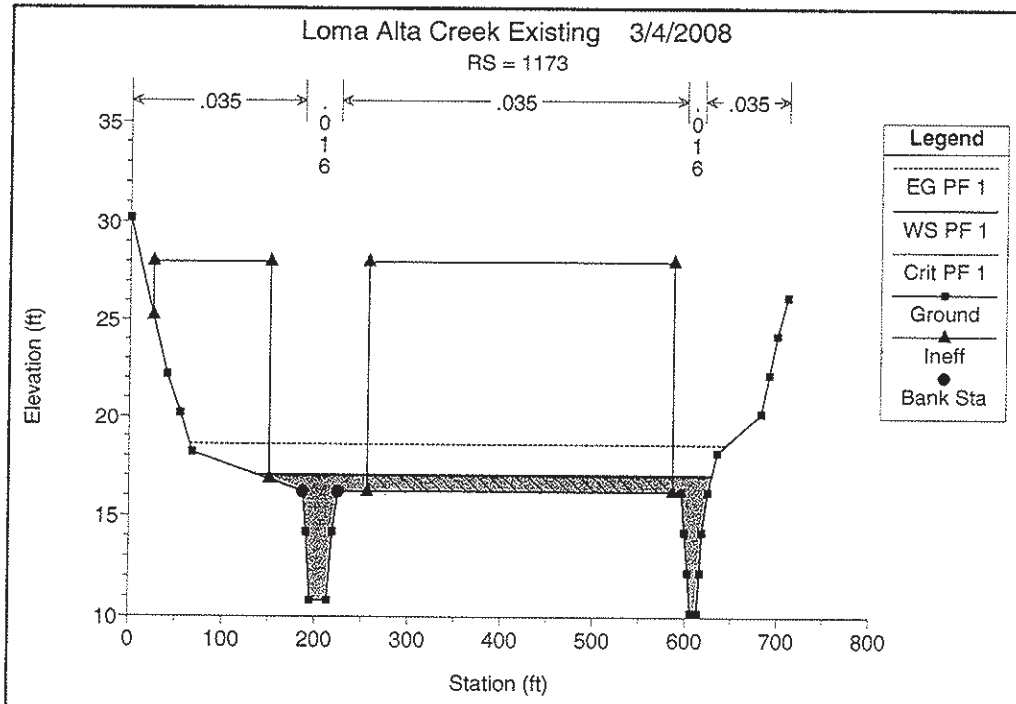

Loma Alta Creek Existing 3/4/2008
RS = 1800 BR
.035
.035
.035
.016
.016
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
10
20
30
40
50
60
70
0
200
400
600
800
1000

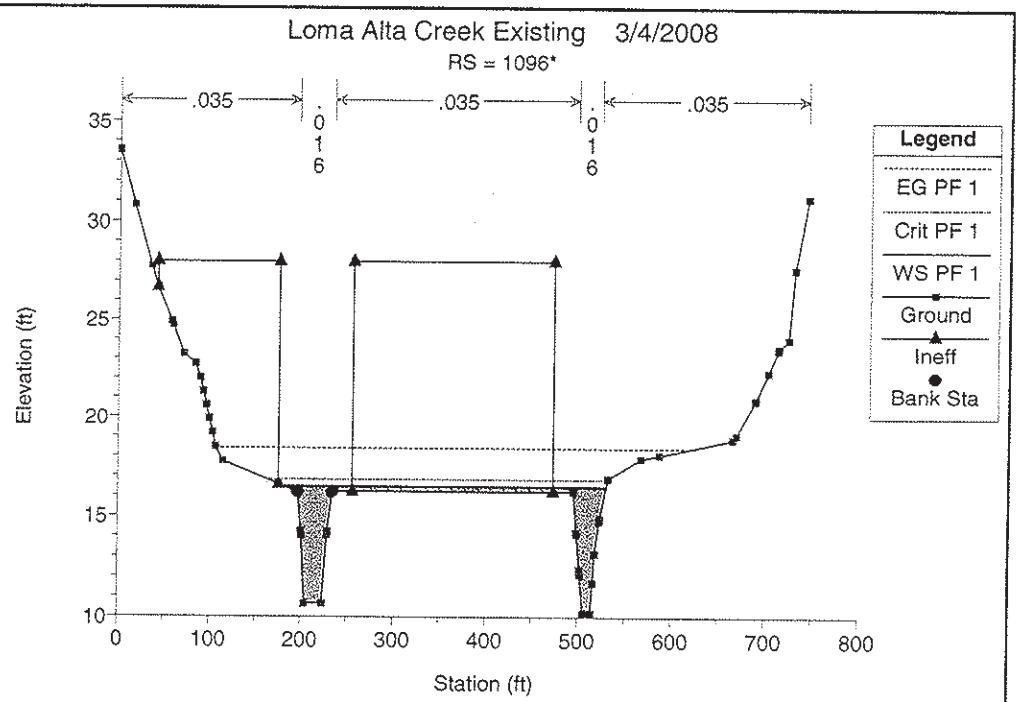

Loma Alta Creek Existing 3/4/2008
RS = 1800 BR
.035
.016
.035
.016
.035
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta

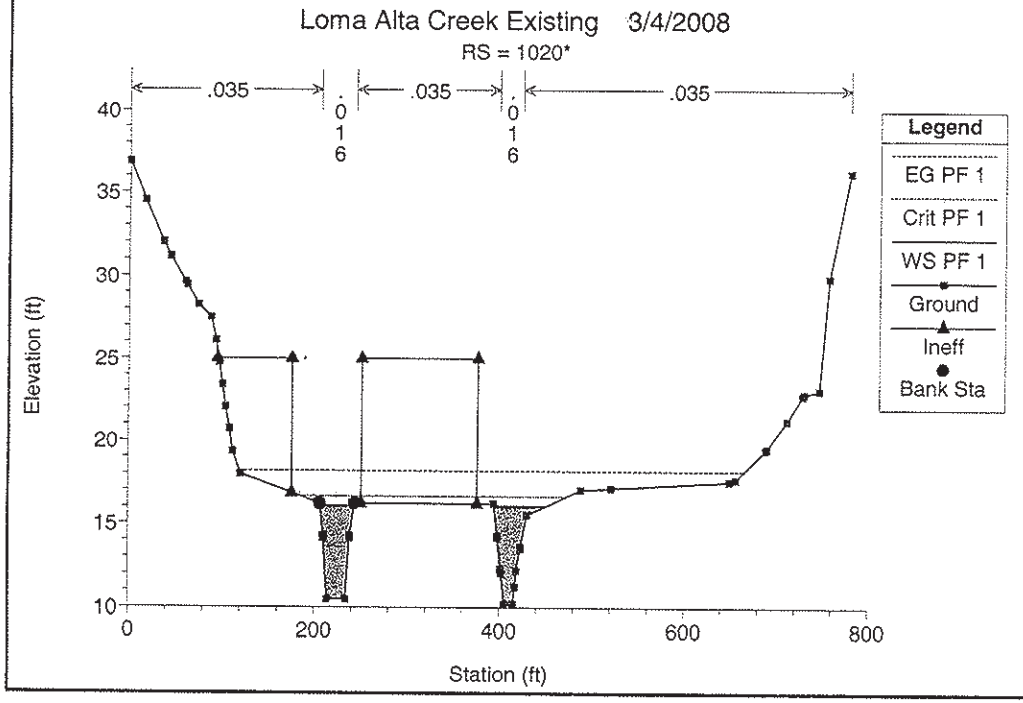

Loma Alta Creek Existing 3/4/2008
RS = 1787 H
.035
.016
.035
.016
.035
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta

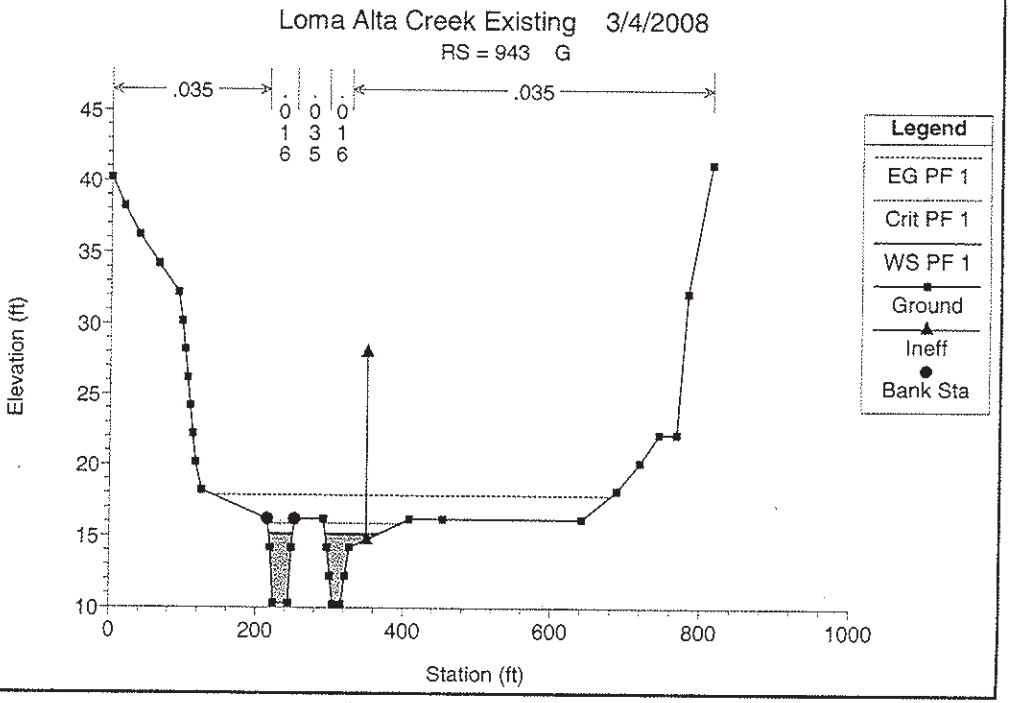

Loma Alta Creek Existing 3/4/2008
RS = 1582*
.035
.016
.035
.016
.035
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta

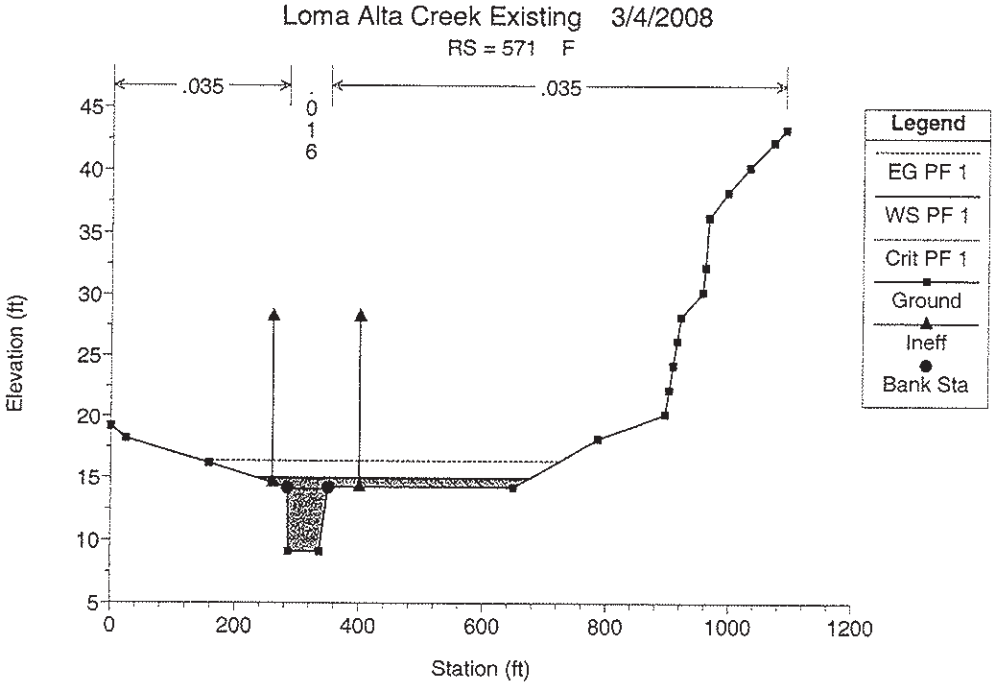

Loma Alta Creek Existing 3/4/2008
RS = 1378*
.035
.016
.035
.016
.035
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta


Loma Alta Creek Existing 3/4/2008
RS = 1173
.035
.035
.035
.016
.016
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


Loma Alta Creek Existing 3/4/2008
RS = 1096*
.035
.035
.035
.016
.016
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


Loma Alta Creek Existing 3/4/2008
RS = 1020*
.035
.035
.035
.016
.016
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


Loma Alta Creek Existing 3/4/2008
RS = 943 G
.035
.035
.016
.035
.016
.016
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


Loma Alta Creek Existing 3/4/2008
RS = 571 F
.035
.016
.035
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta

LA_Exist.rep

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
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X     X  XXXXXX    XXXX        X    X    X    X   XXXXX
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PROJECT DATA
Project Title: Loma Alta Existing
Project File : LA_Exist.prj
Run Date and Time: 3/4/2008 11:26:50 AM

Project in English units

Project Description:
Loma Alta Creek Existing 100-yr Model

PLAN DATA

Plan Title: Loma Alta Creek Existing
Plan File : p:\1683_T064_I5_Floodplain\420_Env_ Stud\Loma Alta\HEC-RAS\Final\Existing\LA_Exist.p01

Geometry Title: Loma Alta Existing
Geometry File : p:\1683_T064_I5_Floodplain\420_Env_ Stud\Loma Alta\HEC-RAS\Final\Existing\LA_Exist.g01

Flow Title : 100-year
Flow File : p:\1683_T064_I5_Floodplain\420_Env_ Stud\Loma Alta\HEC-RAS\Final\Existing\LA_Exist.f01

Plan Summary Information:

Number of:	Cross Sections	= 23	Multiple Openings	=	0
	Culverts	= 0	Inline Structures	=	0
	Bridges	= 3	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: 100-year
Flow File : p:\1683_TO64_I5_Floodplain\420_Env_ Stud\Loma Alta\HEC-RAS\Final\Existing\LA_Exist.f01

Flow Data (cfs)

River	Reach	RS	PF 1
Loma Alta Creek	Loma Alta Creek	6165	3389
Loma Alta Creek	Loma Alta Creek	5292	3389

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
Loma Alta Creek	Loma Alta Creek	PF 1	Known WS = 33.4	Known WS = 15

GEOMETRY DATA

Geometry Title: Loma Alta Existing
Geometry File : p:\1683_TO64_I5_Floodplain\420_Env_ Stud\Loma Alta\HEC-RAS\Final\Existing\LA_Exist.g01

CROSS SECTION

RIVER: Loma Alta Creek
REACH: Loma Alta Creek RS: 6165

INPUT
Description:
Station Elevation Data num= 17

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	36.2	39.5	34.2	113	32.2	121.1	30.2	124.6	28.2
134.9	26.2	149.7	26.2	153.3	28.2	157.3	30.2	160.2	32.2
194.2	32.2	195	32.2	204.6	34.2	229.6	34.2	251.4	32.2
314.2	32.2	348.4	34.2						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.03	113	.016	160.2	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
113	160.2	806	880.3	719.9	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	35.06	Element	Left OB	Channel

Right OB					
Vel Head (ft)	1.66	Wt. n-Val.	0.030	0.016	0.016
W.S. Elev (ft)	33.40	Reach Len. (ft)	806.00	880.30	719.90
Crit W.S. (ft)	33.84	Flow Area (sq ft)	26.46	248.44	140.74
E.G. Slope (ft/ft)	0.001724	Area (sq ft)	26.46	248.44	140.74
Q Total (cfs)	3389.00	Flow (cfs)	38.70	2797.43	552.87
Top Width (ft)	228.26	Top Width (ft)	44.10	47.20	136.96
Vel Total (ft/s)	8.15	Avg. Vel. (ft/s)	1.46	11.26	3.93
Max Chl Dpth (ft)	7.20	Hydr. Depth (ft)	0.60	5.26	1.03
Conv. Total (cfs)	81630.7	Conv. (cfs)	932.1	67381.7	13317.0
Length Wtd. (ft)	843.85	Wetted Per. (ft)	44.12	49.78	137.17
Min Ch El (ft)	26.20	Shear (lb/sq ft)	0.06	0.54	0.11
Alpha	1.61	Stream Power (lb/ft s)	0.09	6.05	0.43
Frctn Loss (ft)		Cum Volume (acre-ft)	2.13	24.17	82.17
C & E Loss (ft)		Cum SA (acres)	3.91	5.02	47.03

Warning: Divided flow computed for this cross-section.

CROSS SECTION

RIVER: Loma Alta Creek
REACH: Loma Alta Creek RS: 5292

INPUT
Description: T
Station Elevation Data num= 24

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	72.21	30.6	62.21	58.9	52.21	80.8	42.21	88.3	40.21
92.7	38.21	96.3	36.21	99.6	34.21	103.9	32.21	107.2	30.2
111.4	28.2	114.8	24.5	140	24.5	145	28.2	151.2	30.2
168	30.2	323	28.2	475	28.2	567.7	28.2	610.5	30.2
897.3	32.21	1012	34.21	1218.6	36.21	1261	38.21		

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.05	103.9	.016	151.2	.035	475	.016	897.3	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
107.2	151.2	409.2	427.2	354.9	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
195	395	42.21	F
1012	1194	52.21	F

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	32.42	Element	Left OB	Channel
Right OB				
Vel Head (ft)	3.22	Wt. n-Val.		0.016
0.021				
W.S. Elev (ft)	29.20	Reach Len. (ft)	409.20	427.20
354.90				
Crit W.S. (ft)	30.14	Flow Area (sq ft)		144.81
182.56				
E.G. Slope (ft/ft)	0.006215	Area (sq ft)		144.81
292.67				
Q Total (cfs)	3389.00	Flow (cfs)		2419.58
969.42				
Top Width (ft)	381.95	Top Width (ft)		38.78
343.17				
Vel Total (ft/s)	10.35	Avg. Vel. (ft/s)		16.71
5.31				
Max Chl Dpth (ft)	4.70	Hydr. Depth (ft)		3.73
0.94				
Conv. Total (cfs)	42988.7	Conv. (cfs)		30691.9
12296.9				
Length Wtd. (ft)	397.61	Wetted Per. (ft)		42.00
194.03				
Min Ch El (ft)	24.50	Shear (lb/sq ft)		1.34
0.37				
Alpha	1.94	Stream Power (lb/ft s)		22.35
1.94				
Frctn Loss (ft)	2.50	Cum Volume (acre-ft)	1.89	20.20
78.58				
C & E Loss (ft)	0.16	Cum SA (acres)	3.50	4.16
43.06				

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

CROSS SECTION

RIVER: Loma Alta Creek
REACH: Loma Alta Creek RS: 4864

INPUT
Description: S
Station Elevation Data num= 26

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	72.21	20.5	62.21	42	52.21	62.6	42.21	72.7	40.21
77.7	38.21	82.7	36.21	85.8	34.21	90.1	32.21	92.9	30.2
97.4	28.2	101.1	26.2	104.7	24.2	126.8	24.2	131.9	26.2
690	26.2	753.5	26.2	863.3	28.2	884.8	28.2	922.4	28.2

973.8	30.2	1134	32.21	1276.2	34.21	1329.2	36.21	1420.7	36.21
1440.9	38.21								

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.05	97.4	.016	131.9	.035	690	.016	863.3	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
101.1	131.9	46.2	45.6	40	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
150	675	35	F
935	1440.9	40	F

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	29.89	Element	Left OB	Channel
Right OB				
Vel Head (ft)	1.86	Wt. n-Val.	0.016	0.016
0.019				
W.S. Elev (ft)	28.03	Reach Len. (ft)	46.20	45.60
40.00				
Crit W.S. (ft)	28.65	Flow Area (sq ft)	3.10	109.29
268.88				
E.G. Slope (ft/ft)	0.004604	Area (sq ft)	3.10	109.29
1230.10				
Q Total (cfs)	3389.00	Flow (cfs)	16.91	1571.85
1800.24				
Top Width (ft)	756.30	Top Width (ft)	3.39	30.80
722.12				
Vel Total (ft/s)	8.89	Avg. Vel. (ft/s)	5.45	14.38
6.70				
Max Chl Dpth (ft)	3.83	Hydr. Depth (ft)	0.92	3.55
1.36				
Conv. Total (cfs)	49946.8	Conv. (cfs)	249.3	23165.8
26531.8				
Length Wtd. (ft)	42.56	Wetted Per. (ft)	3.85	31.70
197.13				
Min Ch El (ft)	24.20	Shear (lb/sq ft)	0.23	0.99
0.39				
Alpha	1.52	Stream Power (lb/ft s)	1.26	14.25
2.62				
Frctn Loss (ft)	2.11	Cum Volume (acre-ft)	1.87	18.95
72.38				
C & E Loss (ft)	0.41	Cum SA (acres)	3.48	3.81
38.72				

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

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

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

CROSS SECTION

RIVER: Loma Alta Creek
REACH: Loma Alta Creek RS: 4819

INPUT
Description: R
Station Elevation Data num= 26

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	72.21	20	62.21	39.6	52.21	69.2	42.21	74.4	40.21
78.1	38.21	82.1	36.21	86	34.21	90	32.21	94.2	30.2
97.6	28.2	101.2	26.2	105.3	24.2	126.2	24.2	131.8	26.2
264.6	26.22	427.33	26.22	720.5	26.2	789.9	26.2	865.7	28.2
886	28.2	962.1	30.2	1244.3	32.21	1273.3	34.21	1301.8	36.21
1333.9	42.21								

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.05	97.6	.016	131.8	.035	720.5	.016	865.7	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
101.2	131.8	645.9	655.9	749.4	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
162	670	30	F
935	1301.8	40	F

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	29.66	Element	Left OB	Channel
Right OB				
Vel Head (ft)	1.80	Wt. n-Val.	0.016	0.016
0.022				
W.S. Elev (ft)	27.87	Reach Len. (ft)	645.90	655.90
749.40				
Crit W.S. (ft)	28.46	Flow Area (sq ft)	2.50	102.46
302.39				
E.G. Slope (ft/ft)	0.005108	Area (sq ft)	2.50	102.46
1141.08				
Q Total (cfs)	3389.00	Flow (cfs)	13.41	1495.89
1879.70				
Top Width (ft)	754.82	Top Width (ft)	3.00	30.60
721.22				
Vel Total (ft/s)	8.32	Avg. Vel. (ft/s)	5.37	14.60
6.22				
Max Chl Dpth (ft)	3.67	Hydr. Depth (ft)	0.83	3.35
1.42				
Conv. Total (cfs)	47419.9	Conv. (cfs)	187.6	20931.0
26301.3				
Length Wtd. (ft)	715.06	Wetted Per. (ft)	3.43	31.41
213.24				
Min Ch El (ft)	24.20	Shear (lb/sq ft)	0.23	1.04
0.45				
Alpha	1.67	Stream Power (lb/ft s)	1.25	15.19
2.81				
Frctn Loss (ft)	0.21	Cum Volume (acre-ft)	1.87	18.84
71.29				
C & E Loss (ft)	0.02	Cum SA (acres)	3.48	3.78
38.06				

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

water surface was used.

CROSS SECTION

RIVER: Loma Alta Creek
REACH: Loma Alta Creek RS: 4163

INPUT
Description: Q
Station Elevation Data num= 32

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	72.21	14.2	62.21	27.7	52.21	41.7	42.21	49.9	36.21
52.4	34.21	55.4	32.21	57.9	30.2	61.1	28.2	63.8	26.2
66.1	24.2	69.1	22.2	71.6	18.9	98.7	18.9	103.4	22.2
108.2	24.2	112	25.22	115.7	26.2	293.5	26.2	370	24.2
453.8	24.2	683.7	24.2	711.8	26.2	719.7	26.2	758.4	22.2
763.3	20.2	776.8	22.2	823.5	24.2	936.1	28.2	952	30.2
994.9	32.21	1120	34.21						

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.05	61.1	.03	112	.035	719.7	.016	936.1	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
66.1	108.2	108.2	107	94.6	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
141	680	42.21	F

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	27.01	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.26	Wt. n-Val.	0.030	0.030
0.017				
W.S. Elev (ft)	26.75	Reach Len. (ft)	108.20	107.00
94.60				
Crit W.S. (ft)	24.80	Flow Area (sq ft)	3.76	284.91
540.06				
E.G. Slope (ft/ft)	0.000658	Area (sq ft)	3.76	284.91
1531.03				
Q Total (cfs)	3389.00	Flow (cfs)	4.61	1224.76
2159.63				
Top Width (ft)	832.12	Top Width (ft)	3.04	42.10
786.98				
Vel Total (ft/s)	4.09	Avg. Vel. (ft/s)	1.23	4.30
4.00				
Max Chl Dpth (ft)	7.85	Hydr. Depth (ft)	1.24	6.77
2.18				
Conv. Total (cfs)	132100.9	Conv. (cfs)	179.6	47740.4
84181.0				
Length Wtd. (ft)	100.17	Wetted Per. (ft)	3.97	45.79
249.15				
Min Ch El (ft)	18.90	Shear (lb/sq ft)	0.04	0.26
0.09				
Alpha	1.01	Stream Power (lb/ft s)	0.05	1.10
0.36				
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)	1.82	15.92
48.31				
C & E Loss (ft)	0.01	Cum SA (acres)	3.44	3.24
25.09				

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

CROSS SECTION

RIVER: Loma Alta Creek
REACH: Loma Alta Creek RS: 4056

INPUT
Description: P
Station Elevation Data num= 28

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	72.21	13.9	62.21	28.9	52.21	42.1	42.21	48.1	38.21
50.9	36.21	54	34.21	56.6	32.21	59.6	30.2	62.7	28.2
65.6	26.2	69	24.2	72.4	22.2	75.7	18.4	104.7	18.4
109.1	22.2	114.6	24.2	253.6	26.2	260.8	26.2	400.2	24.2
556.9	24.2	609.3	24.2	725	24.2	813.6	24.2	860.4	26.2
992.5	28.2	1058.2	30.2	1117.8	32.21				

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.05	62.7	.03	114.6	.035	725	.016	860.4	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
69	114.6	201.2	215.5	243.2	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
136	700	42.21	F

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	26.91	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.41	Wt. n-Val.	0.030	0.030
0.019				
W.S. Elev (ft)	26.50	Reach Len. (ft)	201.20	215.50
243.20				
Crit W.S. (ft)	25.55	Flow Area (sq ft)	4.48	311.99
370.94				
E.G. Slope (ft/ft)	0.001177	Area (sq ft)	4.48	311.99
1378.42				
Q Total (cfs)	3389.00	Flow (cfs)	7.63	1805.74
1575.62				
Top Width (ft)	815.02	Top Width (ft)	3.83	45.60
765.59				
Vel Total (ft/s)	4.93	Avg. Vel. (ft/s)	1.70	5.79
4.25				
Max Chl Dpth (ft)	8.10	Hydr. Depth (ft)	1.17	6.84
1.84				
Conv. Total (cfs)	98769.2	Conv. (cfs)	222.5	52626.6
45920.1				
Length Wtd. (ft)	224.97	Wetted Per. (ft)	4.47	49.64
201.64				
Min Ch El (ft)	18.40	Shear (lb/sq ft)	0.07	0.46
0.14				

Alpha	1.08	Stream Power (lb/ft s)	0.13	2.67
0.57				
Frctn Loss (ft)	0.22	Cum Volume (acre-ft)	1.81	15.19
45.15				
C & E Loss (ft)	0.02	Cum SA (acres)	3.43	3.13
23.40				

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

CROSS SECTION

RIVER: Loma Alta Creek
REACH: Loma Alta Creek RS: 3840

INPUT
Description: O
Station Elevation Data num= 26

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	72.21	33.8	62.21	72.7	52.21	101.1	42.21	105.6	40.21
111.5	38.21	119.2	36.21	134.4	32.21	138	30.2	143.5	28.2
147.3	26.2	152	24.2	156.4	22.2	160.3	20.2	164.2	17.6
198.2	17.6	207.7	20.2	231.3	24.2	785	24.2	841.7	24.2
847.5	24.2	877.5	26.2	927.9	28.2	931.9	30.2	936.2	32.21
957	42.21								

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.05	143.5	.03	231.3	.035	785	.016	847.5	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
156.4	231.3	19.6	21.1	19.7	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
250	771	40	F

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	26.67	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.34	Wt. n-Val.	0.030	0.030
0.021				
W.S. Elev (ft)	26.33	Reach Len. (ft)	19.60	21.10
19.70				
Crit W.S. (ft)	23.36	Flow Area (sq ft)	19.11	513.94
237.04				
E.G. Slope (ft/ft)	0.000816	Area (sq ft)	19.11	513.94
1347.37				
Q Total (cfs)	3389.00	Flow (cfs)	41.03	2580.83
767.14				
Top Width (ft)	733.75	Top Width (ft)	9.35	74.90
649.51				
Vel Total (ft/s)	4.40	Avg. Vel. (ft/s)	2.15	5.02
3.24				
Max Chl Dpth (ft)	8.73	Hydr. Depth (ft)	2.04	6.86
1.84				
Conv. Total (cfs)	118647.7	Conv. (cfs)	1436.3	90354.0
26857.5				

Length Wtd. (ft)	20.75	Wetted Per. (ft)	10.22	76.86
128.57				
Min Ch El (ft)	17.60	Shear (lb/sq ft)	0.10	0.34
0.09				
Alpha	1.12	Stream Power (lb/ft s)	0.20	1.71
0.30				
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	1.76	13.15
37.54				
C & E Loss (ft)	0.07	Cum SA (acres)	3.40	2.83
19.45				

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for
additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid,
water surface was used.

CROSS SECTION

RIVER: Loma Alta Creek
REACH: Loma Alta Creek RS: 3792

INPUT
Description: Added XSec
Station Elevation Data num= 28

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	57.2	73	52.2	111.6	42.2	151.9	32.2	163.7	28.2
170.6	24.2	174.6	22.2	182	20.2	185.9	17.7	209.8	17.7
214.2	20.2	221.2	22.2	224.6	24.2	228	26.2	231.3	28.2
239.5	32.2	260	40.2	785	40.2	798.5	32.2	801.4	30.2
804.8	28.2	807.7	26.2	810.5	24.2	814.5	22.2	838.2	22.2
853	34.2	875.8	36.2	957	57.2				

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.05	174.6	.03	221.2	.035	801.4	.016	875.8	.03

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
174.6	231.3	334.8	333.3	309.6	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
250	771	42.2	F

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	26.57	Element	Left OB	Channel
Right OB				
Vel Head (ft)	1.07	Wt. n-Val.	0.050	0.031
0.016				
W.S. Elev (ft)	25.49	Reach Len. (ft)	20.25	20.25
20.25				
Crit W.S. (ft)	24.29	Flow Area (sq ft)	10.62	311.65
95.11				
E.G. Slope (ft/ft)	0.002679	Area (sq ft)	10.62	311.65

95.11				
Q Total (cfs)	3389.00	Flow (cfs)	21.47	2487.73
879.80				
Top Width (ft)	92.01	Top Width (ft)	6.23	52.20
33.57				
Vel Total (ft/s)	8.12	Avg. Vel. (ft/s)	2.02	7.98
9.25				
Max Chl Dpth (ft)	7.79	Hydr. Depth (ft)	1.70	5.97
2.83				
Conv. Total (cfs)	65475.2	Conv. (cfs)	414.7	48062.8
16997.7				
Length Wtd. (ft)	20.25	Wetted Per. (ft)	7.05	55.04
35.63				
Min Ch El (ft)	17.70	Shear (lb/sq ft)	0.25	0.95
0.45				
Alpha	1.05	Stream Power (lb/ft s)	0.51	7.56
4.13				
Frctn Loss (ft)		Cum Volume (acre-ft)	1.75	12.95
37.21				
C & E Loss (ft)		Cum SA (acres)	3.39	2.80
19.30				

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

BRIDGE

RIVER: Loma Alta Creek
REACH: Loma Alta Creek RS: 3500

INPUT
Description:
Distance from Upstream XS = 20.25
Deck/Roadway Width = 169.3
Weir Coefficient = 2.6
Upstream Deck/Roadway Coordinates
num= 10

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
0	55	0	126.8	50.7	0	126.8	50.7	45.7
265.9	47.6	42.6	265.9	47.6	0	773.9	49.3	0
773.9	49.3	44.3	966.7	53.7	48.7	966.7	53.7	0
1000	57.2	0						

Upstream Bridge Cross Section Data
Station Elevation Data num= 28

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	57.2	73	52.2	111.6	42.2	151.9	32.2	163.7	28.2
170.6	24.2	174.6	22.2	182	20.2	185.9	17.7	209.8	17.7
214.2	20.2	221.2	22.2	224.6	24.2	228	26.2	231.3	28.2
239.5	32.2	260	40.2	785	40.2	798.5	32.2	801.4	30.2

804.8	28.2	807.7	26.2	810.5	24.2	814.5	22.2	838.2	22.2
853	34.2	875.8	36.2	957	57.2				

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.05	174.6	.03	221.2	.035	801.4	.016	875.8	.03

Bank Sta: Left	Right	Coeff Contr.	Expan.
174.6	231.3	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
250	771	42.2	F

Downstream Deck/Roadway Coordinates num= 10

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
0	55	0	161.8	50.7	0	161.8	50.7	45.7
300.8	47.6	42.6	300.8	47.6	0	797.5	49.3	0
797.5	49.3	44.3	990.3	53.7	48.7	990.3	53.7	0
1000	57.2	0						

Downstream Bridge Cross Section Data

Station Elevation Data num= 24

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	26.2	164	26.2	184.7	24.2	190.3	22.2	193.1	20.2
195.5	18.2	199	16.2	205.9	16.2	216.1	18.2	218.7	20.2
222.8	22.2	748.6	24.2	791.6	24.2	817.1	22.2	825	20.2
862.6	20.2	866.4	22.2	904.2	24.2	946.68	24.2	950.6	26.2
955.1	28.2	959.7	30.2	963.9	32.21	988.1	42.21		

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.035	190.3	.016	222.8	.035	791.6	.016	904.2	.035

Bank Sta: Left	Right	Coeff Contr.	Expan.
190.3	222.8	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
310	790	40	F

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

Number of Abutments = 3

Abutment Data

Upstream num= 2

Sta	Elev	Sta	Elev
126.8	45.7	168.8	18.2

Downstream num= 2

Sta	Elev	Sta	Elev
161.8	45.7	203.8	16.2

Abutment Data

Upstream num= 2

Sta	Elev	Sta	Elev
223.8	18.2	265.9	42.6

Downstream num= 2

Sta	Elev	Sta	Elev
258.8	18.2	300.8	42.6

Abutment Data
Upstream num= 2

Sta	Elev	Sta	Elev
773.9	44.3	815.8	22.2

Downstream num= 2

Sta	Elev	Sta	Elev
797.5	44.31	839.4	20.2

Number of Piers = 5

Pier Data
Pier Station Upstream= 168.8 Downstream= 203.8
Upstream num= 2

Width	Elev	Width	Elev
6	0	6	60

Downstream num= 2

Width	Elev	Width	Elev
6	0	6	60

Pier Data
Pier Station Upstream= 223.8 Downstream= 258.8
Upstream num= 2

Width	Elev	Width	Elev
6	0	6	60

Downstream num= 2

Width	Elev	Width	Elev
6	0	6	60

Pier Data
Pier Station Upstream= 818.8 Downstream= 842.4
Upstream num= 2

Width	Elev	Width	Elev
4	0	4	60

Downstream num= 2

Width	Elev	Width	Elev
4	0	4	60

Pier Data
Pier Station Upstream= 882.9 Downstream= 906.5
Upstream num= 2

Width	Elev	Width	Elev
4	0	4	60

Downstream num= 2

Width	Elev	Width	Elev
4	0	4	60

Pier Data
Pier Station Upstream= 929.7 Downstream= 953.3
Upstream num= 2

Width	Elev	Width	Elev
4	0	4	60

Downstream num= 2

Width	Elev	Width	Elev
4	0	4	60

Number of Bridge Coefficient Sets = 1

Low Flow Methods and Data
Energy
Selected Low Flow Methods = Highest Energy Answer

High Flow Method
Energy Only

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

BRIDGE OUTPUT Profile #PF 1

E.G. US. (ft)	26.57	Element	Inside BR US
Inside BR DS			
W.S. US. (ft)	25.49	E.G. Elev (ft)	26.39
25.90			
Q Total (cfs)	3389.00	W.S. Elev (ft)	24.37
24.78			
Q Bridge (cfs)	3389.00	Crit W.S. (ft)	24.37
24.78			
Q Weir (cfs)		Max Chl Dpth (ft)	6.67
8.40			
Weir Sta Lft (ft)		Vel Total (ft/s)	11.26
7.91			
Weir Sta Rgt (ft)		Flow Area (sq ft)	300.85
428.20			
Weir Submerg		Froude # Chl	0.88
0.48			
Weir Max Depth (ft)		Specif Force (cu ft)	1980.02
1701.96			
Min El Weir Flow (ft)	47.61	Hydr Depth (ft)	4.05
2.45			
Min El Prs (ft)	47.63	W.P. Total (ft)	85.17
210.85			
Delta EG (ft)	0.98	Conv. Total (cfs)	42066.5
61157.7			
Delta WS (ft)	2.79	Top Width (ft)	74.20
174.89			
BR Open Area (sq ft)	3553.80	Frctn Loss (ft)	
BR Open Vel (ft/s)	11.26	C & E Loss (ft)	
Coef of Q		Shear Total (lb/sq ft)	1.43
0.39			
Br Sel Method	Momentum	Power Total (lb/ft s)	16.12
3.08			

Warning: Pier drag coefficient of 2.0 assumed for Class B flow.
Note: The momentum method has computed a class B profile.
Warning: The composite Mannings n value for the channel was larger than the largest entered n value or
smaller than the smallest entered n value.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid,
energy was used.
Warning: The energy equation could not be balanced within the specified number of iterations. The
program used critical depth for the water surface and continued on with the calculations.

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

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

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

CROSS SECTION

RIVER: Loma Alta Creek
REACH: Loma Alta Creek RS: 3486

INPUT
Description: N
Station Elevation Data num= 24

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	26.2	164	26.2	184.7	24.2	190.3	22.2	193.1	20.2
195.5	18.2	199	16.2	205.9	16.2	216.1	18.2	218.7	20.2
222.8	22.2	748.6	24.2	791.6	24.2	817.1	22.2	825	20.2
862.6	20.2	866.4	22.2	904.2	24.2	946.68	24.2	950.6	26.2
955.1	28.2	959.7	30.2	963.9	32.21	988.1	42.21		

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.035	190.3	.016	222.8	.035	791.6	.016	904.2	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
190.3	222.8	112.32	106.6	90.9	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
310	790	40	F

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	25.58	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.88	Wt. n-Val.	0.035	0.016	0.017
W.S. Elev (ft)	22.71	Reach Len. (ft)	112.32	106.60	90.90
Crit W.S. (ft)	23.72	Flow Area (sq ft)	0.36	148.31	145.86
E.G. Slope (ft/ft)	0.004269	Area (sq ft)	0.36	148.31	149.95
Q Total (cfs)	3389.00	Flow (cfs)	0.39	2324.22	1064.40
Top Width (ft)	232.85	Top Width (ft)	1.42	32.50	198.92
Vel Total (ft/s)	11.51	Avg. Vel. (ft/s)	1.07	15.67	7.30
Max Chl Dpth (ft)	6.51	Hydr. Depth (ft)	0.25	4.56	0.96
Conv. Total (cfs)	51869.0	Conv. (cfs)	5.9	35572.4	16290.7
Length Wtd. (ft)	101.56	Wetted Per. (ft)	1.51	35.73	153.35
Min Ch El (ft)	16.20	Shear (lb/sq ft)	0.06	1.11	

0.25				
Alpha	1.40	Stream Power (lb/ft s)	0.07	17.34
1.85				
Frctn Loss (ft)		Cum Volume (acre-ft)	1.74	11.63
35.76				
C & E Loss (ft)		Cum SA (acres)	3.38	2.54
18.37				

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Note: The energy method has computed a class B profile.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Loma Alta Creek
REACH: Loma Alta Creek RS: 3383*

INPUT
Description:
Station Elevation Data num= 35

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	25.2	153.29	25.2	188.91	24.66	212.75	23.3	219.2	22.2
222.34	20.24	222.48	20.15	225.3	18.2	229.4	15.95	239.8	15.95
243.07	17.58	247.42	19.08	248.49	19.36	250.71	20.68	254.2	22.2
260.13	22.21	414.74	22.52	760.63	23.2	802.05	23.2	831.21	21.44
840.25	20.2	884.8	20.2	888.39	21.29	924.1	23.2	988.65	23.2
993.34	23.96	994.86	24.44	999.73	25.73	1004.02	26.78	1007.06	27.37
1014.56	28.79	1021.41	30.19	1021.76	30.25	1038.85	33.42	1060.85	37.21

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.035	219.2	.016	254.2	.035	802.05	.016	924.1	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
219.2	254.2	113.25	100.4	73.1	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
275	750	30	F

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	25.08	Element	Left OB	Channel
Right OB				
Vel Head (ft)	2.62	Wt. n-Val.	0.035	0.016
0.016				
W.S. Elev (ft)	22.46	Reach Len. (ft)	113.25	100.40
73.10				
Crit W.S. (ft)	23.55	Flow Area (sq ft)	0.20	152.22
147.85				
E.G. Slope (ft/ft)	0.004098	Area (sq ft)	0.20	152.22
159.72				
Q Total (cfs)	3389.00	Flow (cfs)	0.13	2277.69
1111.17				
Top Width (ft)	262.00	Top Width (ft)	1.51	35.00

225.49					
Vel Total (ft/s)	11.29	Avg. Vel. (ft/s)	0.69		14.96
7.52					
Max Chl Dpth (ft)	6.51	Hydr. Depth (ft)	0.13		4.35
1.27					
Conv. Total (cfs)	52937.3	Conv. (cfs)	2.1		35578.3
17356.9					
Length Wtd. (ft)	91.51	Wetted Per. (ft)	1.53		38.12
116.99					
Min Ch El (ft)	15.95	Shear (lb/sq ft)	0.03		1.02
0.32					
Alpha	1.33	Stream Power (lb/ft s)	0.02		15.29
2.43					
Frctn Loss (ft)	0.42	Cum Volume (acre-ft)	1.74		11.26
35.44					
C & E Loss (ft)	0.08	Cum SA (acres)	3.38		2.46
17.93					

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid,
water surface was used.

CROSS SECTION

RIVER: Loma Alta Creek
REACH: Loma Alta Creek RS: 3279

INPUT
Description: M
Station Elevation Data num= 22

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	24.2	173.5	24.2	248.1	22.2	251.7	20.2	255.1	18.2
259.8	15.7	273.7	15.7	276.4	18.2	280	20.2	285.6	22.2
291.3	22.2	440	22.2	812.5	22.2	855.5	20.2	907	20.2
944	22.2	1033.5	22.2	1042.1	24.2	1054.8	26.2	1079.4	28.2
1103.1	30.2	1133.6	32.21						

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.035	248.1	.016	285.6	.035	812.5	.016	944	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
248.1	285.6	49.8	48.2	58.2	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
320	800	34.21	F

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	24.67	Element	Left OB	Channel
Right OB				
Vel Head (ft)	2.73	Wt. n-Val.		0.016
0.016				
W.S. Elev (ft)	21.94	Reach Len. (ft)	9.00	9.00
9.00				
Crit W.S. (ft)	22.87	Flow Area (sq ft)		149.82
150.21				
E.G. Slope (ft/ft)	0.004630	Area (sq ft)		149.82

150.21					
Q Total (cfs)	3389.00	Flow (cfs)			2293.86
1095.14					
Top Width (ft)	157.42	Top Width (ft)			36.31
121.12					
Vel Total (ft/s)	11.30	Avg. Vel. (ft/s)			15.31
7.29					
Max Chl Dpth (ft)	6.24	Hydr. Depth (ft)			4.13
1.24					
Conv. Total (cfs)	49806.8	Conv. (cfs)			33711.9
16094.8					
Length Wtd. (ft)	9.00	Wetted Per. (ft)			39.72
121.20					
Min Ch El (ft)	15.70	Shear (lb/sq ft)			1.09
0.36					
Alpha	1.38	Stream Power (lb/ft s)			16.69
2.61					
Frctn Loss (ft)	0.40	Cum Volume (acre-ft)		1.74	10.91
35.18					
C & E Loss (ft)	0.01	Cum SA (acres)		3.38	2.38
17.64					

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid,
energy was used.

BRIDGE

RIVER: Loma Alta Creek
REACH: Loma Alta Creek RS: 3250

INPUT
Description:
Distance from Upstream XS = 9
Deck/Roadway Width = 20
Weir Coefficient = 2.6
Upstream Deck/Roadway Coordinates
num= 4

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
243.1	22.205	0	248.1	24.205	22.205	285.6	24.205	22.205
290.6	22.205	0						

Upstream Bridge Cross Section Data
Station Elevation Data num= 22

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	24.2	173.5	24.2	248.1	22.2	251.7	20.2	255.1	18.2
259.8	15.7	273.7	15.7	276.4	18.2	280	20.2	285.6	22.2
291.3	22.2	440	22.2	812.5	22.2	855.5	20.2	907	20.2
944	22.2	1033.5	22.2	1042.1	24.2	1054.8	26.2	1079.4	28.2
1103.1	30.2	1133.6	32.21						

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.035	248.1	.016	285.6	.035	812.5	.016	944	.035

Bank Sta: Left	Right	Coeff Contr.	Expan.
248.1	285.6	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent

```
     320      800   34.21        F

Downstream  Deck/Roadway Coordinates
    num=        4
      Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
   250.9  22.205       0   255.9  24.205  22.205   296.4  24.205  22.205
   301.4  22.205       0

Downstream Bridge Cross Section Data
Station Elevation Data    num=      21
     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev
       0     24.2   164.8     24.2   255.9     22.2   262.8     20.2   265.9     18.2
   268.3     15.6   283.7     15.6   287.9     18.2   291.4     20.2   296.4     22.2
   313.5     22.2   866.8     20.2   879.5     18.2   896.7     18.2   910.4     20.2
   943.6     22.2  1088.6     24.2  1120.2     26.2  1158.7     28.2  1189.2     30.2
  1213.6    32.21

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
       0    .035   255.9    .016   296.4    .035   866.8    .016   943.6    .035

Bank Sta: Left   Right    Coeff Contr.    Expan.
         255.9   296.4             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
       0     212   36.21        F
     339     808   34.21        F

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

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
       Energy
Selected Low Flow Methods = Highest Energy Answer

High Flow Method
       Energy Only

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

BRIDGE OUTPUT  Profile #PF 1


  E.G. US. (ft)                24.67    Element                  Inside BR US
Inside BR DS
  W.S. US. (ft)                21.94    E.G. Elev (ft)                24.61
24.42
  Q Total (cfs)              3389.00    W.S. Elev (ft)                21.97
20.99
  Q Bridge (cfs)             2277.55    Crit W.S. (ft)                22.69
22.32
```

Q Weir (cfs)		Max Chl Dpth (ft)	6.27
5.39			
Weir Sta Lft (ft)		Vel Total (ft/s)	11.13
12.85			
Weir Sta Rgt (ft)		Flow Area (sq ft)	304.37
263.69			
Weir Submerg		Froude # Chl	1.31
1.59			
Weir Max Depth (ft)		Specif Force (cu ft)	1835.63
1923.62			
Min El Weir Flow (ft)	20.21	Hydr Depth (ft)	1.92
1.77			
Min El Prs (ft)	22.21	W.P. Total (ft)	162.17
152.31			
Delta EG (ft)	0.47	Conv. Total (cfs)	50605.6
40713.2			
Delta WS (ft)	0.87	Top Width (ft)	158.65
307.35			
BR Open Area (sq ft)	159.59	Frctn Loss (ft)	0.04
0.11			
BR Open Vel (ft/s)	18.44	C & E Loss (ft)	0.03
0.08			
Coef of Q		Shear Total (lb/sq ft)	0.53
0.75			
Br Sel Method	Energy only	Power Total (lb/ft s)	5.85
9.63			

Note: Momentum answer is not valid if the water surface is above the low chord or if there is weir flow. The momentum answer has been disregarded.

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

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

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

CROSS SECTION

RIVER: Loma Alta Creek
REACH: Loma Alta Creek RS: 3231

INPUT
Description: L
Station Elevation Data num= 21

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	24.2	164.8	24.2	255.9	22.2	262.8	20.2	265.9	18.2
268.3	15.6	283.7	15.6	287.9	18.2	291.4	20.2	296.4	22.2
313.5	22.2	866.8	20.2	879.5	18.2	896.7	18.2	910.4	20.2
943.6	22.2	1088.6	24.2	1120.2	26.2	1158.7	28.2	1189.2	30.2
1213.6	32.21								

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.035	255.9	.016	296.4	.035	866.8	.016	943.6	.035

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

255.9 296.4 365.5 439.2 669.5 .1 .3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	212	36.21	F
339	808	34.21	F

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	24.20	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.13	Wt. n-Val.		0.016	0.018
W.S. Elev (ft)	21.07	Reach Len. (ft)	365.50	439.20	669.50
Crit W.S. (ft)	22.09	Flow Area (sq ft)		126.41	150.11
E.G. Slope (ft/ft)	0.006318	Area (sq ft)		126.41	210.20
Q Total (cfs)	3389.00	Flow (cfs)		2113.84	1275.16
Top Width (ft)	332.99	Top Width (ft)		33.79	299.20
Vel Total (ft/s)	12.26	Avg. Vel. (ft/s)		16.72	8.49
Max Chl Dpth (ft)	5.47	Hydr. Depth (ft)		3.74	1.28
Conv. Total (cfs)	42635.8	Conv. (cfs)		26593.4	16042.3
Length Wtd. (ft)	580.52	Wetted Per. (ft)		37.08	117.20
Min Ch El (ft)	15.60	Shear (lb/sq ft)		1.34	0.51
Alpha	1.34	Stream Power (lb/ft s)		22.49	4.29
Frctn Loss (ft)	0.13	Cum Volume (acre-ft)	1.74	10.88	35.15
C & E Loss (ft)	0.09	Cum SA (acres)	3.38	2.37	17.61

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid,
energy was used.

CROSS SECTION

RIVER: Loma Alta Creek
REACH: Loma Alta Creek RS: 2792

INPUT
Description: K
Station Elevation Data num= 33

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	24.2	148.8	22.2	239.7	20.2	245	18.2	251.3	14.5
274.5	14.5	280.7	18.2	286.3	18.45	326.1	20.2	586.1	20.2
603.7	18.2	610.7	16.2	617.6	14.2	624.2	12.2	632.2	12.2
637.5	14.2	645.1	16.2	671.6	16.2	683.9	14.2	689.7	12.2
694.5	12.2	697	14.2	725.3	16.2	802.5	18.2	807.4	20.2
813.5	22.2	946	24.2	969.2	26.2	984.7	28.2	1004.9	30.2

1019.4	32.21	1063.3	42.21	1090.4	52.21

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.035	239.7	.016	286.3	.035	610.7	.016	645.1	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
245	286.3	228.9	292	385.4	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
70	197	34.21	F
323	570	32.21	F

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	20.28	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.17	Wt. n-Val.	0.016	0.016
0.026				
W.S. Elev (ft)	20.11	Reach Len. (ft)	228.90	292.00
385.40				
Crit W.S. (ft)	17.40	Flow Area (sq ft)	4.84	187.18
912.02				
E.G. Slope (ft/ft)	0.000346	Area (sq ft)	4.84	187.18
912.04				
Q Total (cfs)	3389.00	Flow (cfs)	7.76	858.09
2523.15				
Top Width (ft)	304.43	Top Width (ft)	5.06	41.30
258.06				
Vel Total (ft/s)	3.07	Avg. Vel. (ft/s)	1.60	4.58
2.77				
Max Chl Dpth (ft)	7.91	Hydr. Depth (ft)	0.96	4.53
3.55				
Conv. Total (cfs)	182092.6	Conv. (cfs)	416.8	46105.8
135570.0				
Length Wtd. (ft)	358.00	Wetted Per. (ft)	5.41	43.33
260.29				
Min Ch El (ft)	14.50	Shear (lb/sq ft)	0.02	0.09
0.08				
Alpha	1.17	Stream Power (lb/ft s)	0.03	0.43
0.21				
Frctn Loss (ft)	0.19	Cum Volume (acre-ft)	1.72	9.30
26.52				
C & E Loss (ft)	0.03	Cum SA (acres)	3.36	1.99
13.33				

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

CROSS SECTION

RIVER: Loma Alta Creek
REACH: Loma Alta Creek RS: 2500

INPUT
Description: J
Station Elevation Data num= 36

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	42.21	18.5	32.21	22.4	30.2	25.8	28.2	28.8	26.2
31.8	24.2	61.3	22.2	296	20.2	349.9	18.2	354	16.2
358.4	14.2	374.6	14.2	379.2	16.2	385.8	18.2	467.5	20.2
526.1	20.2	590.1	18.2	596.7	16.2	602.9	14.2	606	12.2
619.2	12.2	623	14.2	646.5	16.2	653.9	16.2	659.8	14.2
668.3	14.2	673.2	16.2	678	18.2	682.9	20.2	687.7	22.2
690.8	24.2	696.8	26.2	702.1	28.2	706.4	30.2	712.1	32.21
802.4	52.21								

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.035	349.9	.016	385.8	.035	602.9	.016	623	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
349.9	385.8	637.9	648.9	662	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
18.5	318	34.21	F
420	556	32.21	F

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	20.06	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.48	Wt. n-Val.	0.035	0.016
0.023				
W.S. Elev (ft)	19.58	Reach Len. (ft)	637.90	648.90
662.00				
Crit W.S. (ft)	17.80	Flow Area (sq ft)	25.17	152.07
480.93				
E.G. Slope (ft/ft)	0.000891	Area (sq ft)	25.69	152.07
488.55				
Q Total (cfs)	3389.00	Flow (cfs)	27.21	1071.57
2290.22				
Top Width (ft)	264.98	Top Width (ft)	37.21	35.90
191.87				
Vel Total (ft/s)	5.15	Avg. Vel. (ft/s)	1.08	7.05
4.76				
Max Chl Dpth (ft)	7.38	Hydr. Depth (ft)	0.79	4.24
3.01				
Conv. Total (cfs)	113566.8	Conv. (cfs)	911.8	35908.8
76746.2				
Length Wtd. (ft)	657.71	Wetted Per. (ft)	31.92	37.51
162.78				
Min Ch El (ft)	14.20	Shear (lb/sq ft)	0.04	0.23
0.16				
Alpha	1.17	Stream Power (lb/ft s)	0.05	1.59
0.78				
Frctn Loss (ft)	0.40	Cum Volume (acre-ft)	1.64	8.16
20.33				
C & E Loss (ft)	0.05	Cum SA (acres)	3.25	1.73
11.34				

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid,
water surface was used.

CROSS SECTION

RIVER: Loma Alta Creek
REACH: Loma Alta Creek RS: 1851

INPUT
Description: I
Station Elevation Data num= 29

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	42.21	67.7	32.21	76.8	30.2	86.2	28.2	102.2	26.2
117.2	24.2	152.1	22.2	212.4	20.2	481.7	18.2	486.6	16.2
490.8	12.2	509.5	12.2	512.3	16.2	515.9	18.2	543.3	18.2
717.7	16.2	723.2	14.2	726.4	12.2	729.4	10.2	735	10.2
745.9	12.2	749.6	14.2	785	14.2	788.7	16.2	792.4	18.2
795.3	20.2	799.3	22.2	816.7	32.21	870	62.21		

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.035	481.7	.016	515.9	.035	717.7	.016	749.6	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
481.7	515.9	66.3	63.3	65.4	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
157	443	32.21	F
551	675	30.2	F

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	19.61	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.31	Wt. n-Val.	0.035	0.016	0.022
W.S. Elev (ft)	19.30	Reach Len. (ft)	21.55	21.55	21.55
Crit W.S. (ft)	16.83	Flow Area (sq ft)	36.94	186.26	593.14
E.G. Slope (ft/ft)	0.000446	Area (sq ft)	81.20	186.26	828.43
Q Total (cfs)	3389.00	Flow (cfs)	32.10	1039.31	2317.60
Top Width (ft)	460.17	Top Width (ft)	147.87	34.20	278.09
Vel Total (ft/s)	4.15	Avg. Vel. (ft/s)	0.87	5.58	3.91
Max Chl Dpth (ft)	9.10	Hydr. Depth (ft)	0.95	5.45	3.85
Conv. Total (cfs)	160531.1	Conv. (cfs)	1520.3	49230.3	109780.5
Length Wtd. (ft)	21.55	Wetted Per. (ft)	38.70	38.79	157.67
Min Ch El (ft)	12.20	Shear (lb/sq ft)	0.03	0.13	0.10
Alpha	1.16	Stream Power (lb/ft s)	0.02	0.75	0.41
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.86	5.64	

10.32
C & E Loss (ft) 0.00 Cum SA (acres) 1.89 1.21
7.77

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

BRIDGE

RIVER: Loma Alta Creek
REACH: Loma Alta Creek RS: 1800

INPUT
Description:
Distance from Upstream XS = 21.55
Deck/Roadway Width = 20
Weir Coefficient = 2.6
Upstream Deck/Roadway Coordinates
num= 4

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
476.7	18.205	0	481.7	20.205	18.205	515.9	20.205	18.205
520.9	18.205	0						

Upstream Bridge Cross Section Data
Station Elevation Data num= 29

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	42.21	67.7	32.21	76.8	30.2	86.2	28.2	102.2	26.2
117.2	24.2	152.1	22.2	212.4	20.2	481.7	18.2	486.6	16.2
490.8	12.2	509.5	12.2	512.3	16.2	515.9	18.2	543.3	18.2
717.7	16.2	723.2	14.2	726.4	12.2	729.4	10.2	735	10.2
745.9	12.2	749.6	14.2	785	14.2	788.7	16.2	792.4	18.2
795.3	20.2	799.3	22.2	816.7	32.21	870	62.21		

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.035	481.7	.016	515.9	.035	717.7	.016	749.6	.035

Bank Sta: Left Right Coeff Contr. Expan.
481.7 515.9 .1 .3
Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
157	443	32.21	F
551	675	30.2	F

Downstream Deck/Roadway Coordinates
num= 4

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
419.4	18.205	0	424.4	20.205	18.205	466.7	20.205	18.205
471.7	18.205	0						

Downstream Bridge Cross Section Data
Station Elevation Data num= 34

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	42.21	49.6	32.21	55.9	30.2	62.7	28.2	68.5	26.2
74.4	24.2	81.8	22.2	110.3	20.2	424.4	18.2	428.8	16.2
433.3	14.2	446.5	12.1	446.8	12.1	454.9	14.2	457.2	16.2
461.6	17.13	466.7	18.2	476.2	18.2	661.8	18.2	666.1	16.2
670	14.2	673.2	12.2	675.7	10.2	682.7	10.2	687.5	12.2
690.8	14.2	732.7	16.2	736.1	18.2	739.2	20.2	742.2	22.2

758.4	32.21	775.3	42.21	791.8	52.21	809	62.21

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.035	424.4	.016	461.6	.035	661.8	.016	690.8	.035

Bank Sta: Left Right Coeff Contr. Expan.
424.4 466.7 .1 .3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
117	384	32.21	F
500	622	30.2	F

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

Number of Bridge Coefficient Sets = 1

Low Flow Methods and Data
Energy
Selected Low Flow Methods = Highest Energy Answer

High Flow Method
Energy Only

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

BRIDGE OUTPUT Profile #PF 1

E.G. US. (ft)	19.61	Element	Inside BR US
Inside BR DS			
W.S. US. (ft)	19.30	E.G. Elev (ft)	19.60
19.54			
Q Total (cfs)	3389.00	W.S. Elev (ft)	19.27
18.89			
Q Bridge (cfs)	570.96	Crit W.S. (ft)	16.83
17.39			
Q Weir (cfs)		Max Chl Dpth (ft)	7.07
6.79			
Weir Sta Lft (ft)		Vel Total (ft/s)	4.43
6.19			
Weir Sta Rgt (ft)		Flow Area (sq ft)	765.41
547.09			
Weir Submerg		Froude # Chl	0.34
0.54			
Weir Max Depth (ft)		Specif Force (cu ft)	2600.77
2039.94			
Min El Weir Flow (ft)	10.21	Hydr Depth (ft)	4.07
3.00			
Min El Prs (ft)	18.21	W.P. Total (ft)	265.04
273.34			
Delta EG (ft)	0.13	Conv. Total (cfs)	131978.2

86766.4			
Delta WS (ft)	0.36	Top Width (ft)	417.20
371.72			
BR Open Area (sq ft)	143.89	Frctn Loss (ft)	0.02
0.03			
BR Open Vel (ft/s)	3.97	C & E Loss (ft)	0.03
0.03			
Coef of Q		Shear Total (lb/sq ft)	0.12
0.19			
Br Sel Method	Energy only	Power Total (lb/ft s)	0.53
1.18			

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.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid,
energy was used.
Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid,
energy was used.

CROSS SECTION

RIVER: Loma Alta Creek
REACH: Loma Alta Creek RS: 1787

INPUT
Description: H
Station Elevation Data num= 34

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	42.21	49.6	32.21	55.9	30.2	62.7	28.2	68.5	26.2
74.4	24.2	81.8	22.2	110.3	20.2	424.4	18.2	428.8	16.2
433.3	14.2	446.5	12.1	446.8	12.1	454.9	14.2	457.2	16.2
461.6	17.13	466.7	18.2	476.2	18.2	661.8	18.2	666.1	16.2
670	14.2	673.2	12.2	675.7	10.2	682.7	10.2	687.5	12.2
690.8	14.2	732.7	16.2	736.1	18.2	739.2	20.2	742.2	22.2
758.4	32.21	775.3	42.21	791.8	52.21	809	62.21		

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.035	424.4	.016	461.6	.035	661.8	.016	690.8	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
424.4	466.7	212.1	190.1	172.6	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
117	384	32.21	F
500	622	30.2	F

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	19.48	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.55	Wt. n-Val.	0.035	0.019
0.021				
W.S. Elev (ft)	18.94	Reach Len. (ft)	212.10	190.10

172.60				
Crit W.S. (ft)	17.40	Flow Area (sq ft)	24.63	174.90
393.93				
E.G. Slope (ft/ft)	0.001056	Area (sq ft)	42.79	174.90
483.99				
Q Total (cfs)	3389.00	Flow (cfs)	24.43	1125.23
2239.34				
Top Width (ft)	428.78	Top Width (ft)	115.94	42.30
270.54				
Vel Total (ft/s)	5.71	Avg. Vel. (ft/s)	0.99	6.43
5.68				
Max Chl Dpth (ft)	8.74	Hydr. Depth (ft)	0.61	4.13
2.65				
Conv. Total (cfs)	104287.4	Conv. (cfs)	751.7	34626.0
68909.7				
Length Wtd. (ft)	179.65	Wetted Per. (ft)	40.40	44.55
152.51				
Min Ch El (ft)	12.10	Shear (lb/sq ft)	0.04	0.26
0.17				
Alpha	1.08	Stream Power (lb/ft s)	0.04	1.67
0.97				
Frctn Loss (ft)	0.20	Cum Volume (acre-ft)	0.77	5.41
9.38				
C & E Loss (ft)	0.03	Cum SA (acres)	1.71	1.19
7.37				

Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid,
energy was used.

CROSS SECTION

RIVER: Loma Alta Creek
REACH: Loma Alta Creek RS: 1582*

INPUT
Description:
Station Elevation Data num= 47

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	38.21	40.31	30.09	45.43	28.57	50.96	27.03	55.67	25.53
60.47	24.03	66.48	22.48	74.18	21.76	89.65	20.49	101.25	20.14
124.81	19.35	344.93	17.53	348.41	15.91	351.97	14.27	352.81	14.09
362.4	11.67	368.8	11.67	375.59	14.07	376.3	14.27	378.43	15.81
382.5	16.82	389.05	17.53	401.26	17.53	639.7	17.53	643.62	15.58
643.92	15.42	647.17	13.74	648.64	12.86	650.09	11.94	652.37	10.2
659.53	10.2	661.19	11.17	662.5	12.07	666.12	13.4	666.84	13.62
671.87	15.53	708.76	17.24	711.75	18.61	714.48	19.97	717.12	21.33
731.38	28.15	737.08	30.76	746.26	35.4	748.75	36.68	760.69	42.83
760.79	42.88	775.93	50.21						

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.035	344.93	.016	382.5	.035	639.7	.016	671.87	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
344.93	389.05	212.2	212.3	212	.1 .3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
90	320	32.21	F

400 622 30.2 F

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	19.25	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.86	Wt. n-Val.	0.035	0.016	0.018
W.S. Elev (ft)	18.39	Reach Len. (ft)	212.20	212.30	212.00
Crit W.S. (ft)	17.78	Flow Area (sq ft)	18.82	180.88	276.64
E.G. Slope (ft/ft)	0.001202	Area (sq ft)	44.53	180.88	467.14
Q Total (cfs)	3389.00	Flow (cfs)	22.98	1499.29	1866.74
Top Width (ft)	470.12	Top Width (ft)	103.79	44.12	322.22
Vel Total (ft/s)	7.11	Avg. Vel. (ft/s)	1.22	8.29	6.75
Max Chl Dpth (ft)	8.19	Hydr. Depth (ft)	0.76	4.10	2.76
Conv. Total (cfs)	97741.9	Conv. (cfs)	662.7	43240.8	53838.4
Length Wtd. (ft)	212.14	Wetted Per. (ft)	24.93	46.26	103.67
Min Ch El (ft)	11.67	Shear (lb/sq ft)	0.06	0.29	0.20
Alpha	1.10	Stream Power (lb/ft s)	0.07	2.43	1.35
Frctn Loss (ft)	0.26	Cum Volume (acre-ft)	0.56	4.64	7.50
C & E Loss (ft)	0.01	Cum SA (acres)	1.17	1.00	6.20

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

CROSS SECTION

RIVER: Loma Alta Creek
REACH: Loma Alta Creek RS: 1378*

INPUT
Description:
Station Elevation Data num= 47

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	34.2	31.03	27.97	34.97	26.93	39.22	25.87	42.85	24.86
46.54	23.85	51.17	22.75	57.09	21.98	68.99	20.77	77.93	20.17
96.05	18.77	265.47	16.87	268.02	15.61	270.63	14.34	271.26	14.14
278.3	11.24	290.8	11.24	297.05	14.13	297.7	14.34	299.65	15.41
303.4	16.51	311.4	16.87	326.31	16.87	617.6	16.87	621.14	14.96
621.41	14.81	624.34	13.28	625.67	12.53	626.98	11.68	629.03	10.2
636.37	10.2	638.6	11.68	640.35	13.14	645.21	14.8	646.18	15.04
652.93	16.87	684.81	18.29	687.4	19.02	689.76	19.74	692.04	20.46
704.37	24.09	709.29	25.48	717.23	28.59	719.37	29.44	729.7	33.51
729.78	33.55	742.87	38.2						

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.035	265.47	.016	303.4	.035	617.6	.016	652.93	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
265.47	303.4	212.2	212.4	212.5	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
31.03	215	30	F
325	580	30	F

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	18.98	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.96	Wt. n-Val.	0.035	0.016
0.018				
W.S. Elev (ft)	18.02	Reach Len. (ft)	212.20	212.40
212.50				
Crit W.S. (ft)	17.62	Flow Area (sq ft)	43.95	186.95
253.47				
E.G. Slope (ft/ft)	0.001255	Area (sq ft)	59.36	186.95
547.70				
Q Total (cfs)	3389.00	Flow (cfs)	60.28	1713.15
1615.57				
Top Width (ft)	516.25	Top Width (ft)	102.89	37.93
375.43				
Vel Total (ft/s)	7.00	Avg. Vel. (ft/s)	1.37	9.16
6.37				
Max Chl Dpth (ft)	7.82	Hydr. Depth (ft)	0.87	4.93
2.10				
Conv. Total (cfs)	95654.4	Conv. (cfs)	1701.5	48353.6
45599.3				
Length Wtd. (ft)	212.44	Wetted Per. (ft)	50.47	40.22
123.82				
Min Ch El (ft)	11.24	Shear (lb/sq ft)	0.07	0.36
0.16				
Alpha	1.26	Stream Power (lb/ft s)	0.09	3.34
1.02				
Frctn Loss (ft)	0.33	Cum Volume (acre-ft)	0.31	3.74
5.03				
C & E Loss (ft)	0.06	Cum SA (acres)	0.67	0.80
4.50				

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for
additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid,
water surface was used.

CROSS SECTION

RIVER: Loma Alta Creek
REACH: Loma Alta Creek RS: 1173

INPUT
Description:
Station Elevation Data num= 23

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	30.2	40	22.2	54.6	20.2	67.3	18.2	186	16.2
189.7	14.2	194.2	10.81	212.8	10.81	218.5	14.2	224.3	16.2
595.5	16.2	598.9	14.2	602.7	12.2	605.7	10.2	613.2	10.2
616	12.2	618.2	14.2	624.3	16.2	634	18.2	681.5	20.2
690	22.2	698.7	24.2	709.8	26.2				

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.035	186	.016	224.3	.035	598.9	.016	618.2	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
186	224.3	81.3	72.1	57.5	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
25	150	28	F
256	586	28	F

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	18.60	Element	Left OB	Channel
Right OB				
Vel Head (ft)	1.55	Wt. n-Val.	0.035	0.016
0.017				
W.S. Elev (ft)	17.05	Reach Len. (ft)	81.30	72.10
57.50				
Crit W.S. (ft)	17.05	Flow Area (sq ft)	19.62	179.94
162.63				
E.G. Slope (ft/ft)	0.001948	Area (sq ft)	21.36	179.94
442.60				
Q Total (cfs)	3389.00	Flow (cfs)	24.53	1970.40
1394.07				
Top Width (ft)	492.77	Top Width (ft)	50.35	38.30
404.11				
Vel Total (ft/s)	9.36	Avg. Vel. (ft/s)	1.25	10.95
8.57				
Max Chl Dpth (ft)	6.85	Hydr. Depth (ft)	0.55	4.70
2.19				
Conv. Total (cfs)	76784.6	Conv. (cfs)	555.9	44643.4
31585.3				
Length Wtd. (ft)	65.91	Wetted Per. (ft)	36.01	41.21
77.58				
Min Ch El (ft)	10.81	Shear (lb/sq ft)	0.07	0.53
0.25				
Alpha	1.14	Stream Power (lb/ft s)	0.08	5.82
2.19				
Frctn Loss (ft)	0.13	Cum Volume (acre-ft)	0.11	2.84
2.61				
C & E Loss (ft)	0.01	Cum SA (acres)	0.30	0.62
2.60				

Warning: The energy equation could not be balanced within the specified number of iterations. The
program selected the water surface that had the least amount of error between computed and
assumed values.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical
depth, the calculated water surface came back below critical depth. This indicates that there

is not a valid subcritical answer. The program defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid,
water surface was used.

CROSS SECTION

RIVER: Loma Alta Creek
REACH: Loma Alta Creek RS: 1096*

INPUT
Description:
Station Elevation Data num= 47

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	33.54	16.28	30.81	35.02	27.77	42.09	26.68	57.46	24.92
59.25	24.69	70.82	23.22	83.59	22.73	88.77	22.01	92.32	21.3
95.77	20.6	98.87	19.9	102.69	19.19	106.14	18.49	114.15	17.74
195.73	16.2	199.46	14.25	199.77	14.05	204	10.64	223.23	10.64
228.14	14.08	228.4	14.23	233.67	16.2	494.3	16.2	498	14.23
498.17	14.14	501.61	12.37	502.14	12.11	505.4	10.2	514.1	10.2
516.48	11.71	518.35	13.18	523.09	14.75	523.53	14.9	531.77	16.87
567.09	17.89	586.81	18.08	665.03	18.87	669.1	19.09	688.88	20.84
689.65	20.91	702.98	22.3	713.29	23.47	714.31	23.58	724.36	24.01
730.4	27.6	744.43	31.2						

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.035	195.73	.016	233.67	.035	498	.016	523.09	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
195.73	233.67	80.4	81.1	82.2	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
42.09	175	28	F
255	472.6	28	F

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	18.42	Element	Left OB	Channel
Right OB				
Vel Head (ft)	1.94	Wt. n-Val.	0.035	0.016
0.016				
W.S. Elev (ft)	16.48	Reach Len. (ft)	80.40	81.10
82.20				
Crit W.S. (ft)	16.83	Flow Area (sq ft)	2.15	162.88
141.40				
E.G. Slope (ft/ft)	0.002505	Area (sq ft)	2.15	162.88
203.37				
Q Total (cfs)	3389.00	Flow (cfs)	1.24	1894.14
1493.62				
Top Width (ft)	349.51	Top Width (ft)	15.09	37.94
296.49				
Vel Total (ft/s)	11.06	Avg. Vel. (ft/s)	0.58	11.63
10.56				
Max Chl Dpth (ft)	6.28	Hydr. Depth (ft)	0.14	4.29
1.79				
Conv. Total (cfs)	67708.3	Conv. (cfs)	24.9	37842.7
29840.7				
Length Wtd. (ft)	81.60	Wetted Per. (ft)	15.09	41.16
81.82				

Min Ch El (ft)	10.64	Shear (lb/sq ft)	0.02	0.62
0.27				
Alpha	1.02	Stream Power (lb/ft s)	0.01	7.20
2.86				
Frctn Loss (ft)	0.15	Cum Volume (acre-ft)	0.09	2.56
2.19				
C & E Loss (ft)	0.04	Cum SA (acres)	0.24	0.55
2.13				

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

CROSS SECTION

RIVER: Loma Alta Creek
REACH: Loma Alta Creek RS: 1020*

INPUT
Description:
Station Elevation Data num= 47

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	36.87	17.09	34.51	36.76	31.99	44.19	31.15	60.31	29.64
62.19	29.45	74.34	28.24	87.74	27.47	93.19	26.1	96.91	24.75
100.54	23.4	103.78	22.05	107.79	20.7	111.42	19.34	119.82	17.97
205.47	16.2	209.23	14.3	209.53	14.12	213.8	10.47	233.67	10.47
238.07	14.14	238.31	14.26	243.03	16.2	393.1	16.2	397.1	14.26
397.29	14.17	401.01	12.28	401.57	12.02	405.1	10.2	415	10.2
416.96	11.22	418.49	12.16	422.39	13.48	422.76	13.6	429.53	15.53
487.6	17.04	520.01	17.14	648.57	17.53	655.25	17.65	687.76	19.48
689.02	19.55	710.94	21.25	727.88	22.75	729.55	22.89	746.08	23.1
756	29.91	779.07	36.21						

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.035	205.47	.016	243.03	.035	397.1	.016	422.39	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
205.47	243.03	80 76.86	71.1	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
94.95	175	25	F
250	375	25	F

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	18.18	Element	Left OB	Channel
Right OB				
Vel Head (ft)	2.12	Wt. n-Val.		0.016
0.016				
W.S. Elev (ft)	16.07	Reach Len. (ft)	80.00	76.86
71.10				
Crit W.S. (ft)	16.63	Flow Area (sq ft)		151.93
138.55				
E.G. Slope (ft/ft)	0.002786	Area (sq ft)		151.93
138.55				
Q Total (cfs)	3389.00	Flow (cfs)		1797.75
1591.25				
Top Width (ft)	93.76	Top Width (ft)		36.97

56.79					
Vel Total (ft/s)	11.67	Avg. Vel. (ft/s)			11.83
11.48					
Max Chl Dpth (ft)	5.87	Hydr. Depth (ft)			4.11
2.44					
Conv. Total (cfs)	64209.1	Conv. (cfs)			34060.8
30148.2					
Length Wtd. (ft)	74.11	Wetted Per. (ft)			40.50
59.21					
Min Ch El (ft)	10.47	Shear (lb/sq ft)			0.65
0.41					
Alpha	1.00	Stream Power (lb/ft s)			7.72
4.67					
Frctn Loss (ft)	0.22	Cum Volume (acre-ft)		0.09	2.27
1.86					
C & E Loss (ft)	0.02	Cum SA (acres)		0.22	0.48
1.80					

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid,
water surface was used.

CROSS SECTION

RIVER: Loma Alta Creek
REACH: Loma Alta Creek RS: 943

INPUT
Description: G
Station Elevation Data num= 34

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	40.21	17.9	38.21	38.5	36.21	65.14	34.21	91.9	32.21
97.6	30.2	101.5	28.2	105.3	26.2	108.7	24.2	112.9	22.2
116.7	20.2	125.5	18.2	215.2	16.2	219.3	14.2	223.6	10.3
244.1	10.3	248	14.2	252.4	16.2	291.9	16.2	296.4	14.2
300.4	12.2	304.8	10.2	315.9	10.2	321.7	12.2	327.3	14.2
408.1	16.2	453.2	16.2	641.4	16.2	688.4	18.2	718.9	20.2
744.8	22.2	767.8	22.2	781.6	32.21	813.7	41.21		

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.035	215.2	.016	252.4	.035	296.4	.016	327.3	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
215.2	252.4	381.2	371.7	369.6	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
350	813.7	28	F

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	17.87	Element	Left OB	Channel
Right OB				
Vel Head (ft)	2.68	Wt. n-Val.		0.016
0.016				
W.S. Elev (ft)	15.19	Reach Len. (ft)	381.20	371.70
369.60				
Crit W.S. (ft)	15.89	Flow Area (sq ft)		126.54

132.57				
E.G. Slope (ft/ft)	0.004181	Area (sq ft)		126.54
136.33				
Q Total (cfs)	3389.00	Flow (cfs)		1741.06
1647.95				
Top Width (ft)	106.18	Top Width (ft)		32.92
73.26				
Vel Total (ft/s)	13.08	Avg. Vel. (ft/s)		13.76
12.43				
Max Chl Dpth (ft)	4.99	Hydr. Depth (ft)		3.84
2.37				
Conv. Total (cfs)	52413.5	Conv. (cfs)		26926.7
25486.7				
Length Wtd. (ft)	371.17	Wetted Per. (ft)		36.49
57.64				
Min Ch El (ft)	10.30	Shear (lb/sq ft)		0.91
0.60				
Alpha	1.01	Stream Power (lb/ft s)		12.45
7.46				
Frctn Loss (ft)	0.25	Cum Volume (acre-ft)	0.09	2.02
1.64				
C & E Loss (ft)	0.06	Cum SA (acres)	0.22	0.42
1.70				

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for
additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid,
water surface was used.

CROSS SECTION

RIVER: Loma Alta Creek
REACH: Loma Alta Creek RS: 571

INPUT
Description: F
Station Elevation Data num= 21

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	19.2	24.6	18.2	157.4	16.2	283.8	14.2	286.5	9.1
336	9.1	349.8	14.2	648.7	14.2	785.6	18.2	894.8	20.2
901.3	22.2	907.3	24.2	913.6	26.2	919.9	28.2	955.3	30.2
959.4	32.21	964.6	36.21	995.2	38.21	1030.2	40.21	1070.3	42.21
1089.7	43.21								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	283.8	.016	349.8	.035

Bank Sta: Left	Right	Coeff Contr.	Expan.
283.8	349.8	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	260	28.2	F
400	1089.7	28.2	F

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	16.39	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.39	Wt. n-Val.	0.035	0.016	0.035
W.S. Elev (ft)	15.00	Reach Len. (ft)			
Crit W.S. (ft)	14.08	Flow Area (sq ft)	14.56	347.33	40.16
E.G. Slope (ft/ft)	0.001252	Area (sq ft)	20.22	347.33	250.07
Q Total (cfs)	3389.00	Flow (cfs)	15.76	3321.24	52.00
Top Width (ft)	442.84	Top Width (ft)	50.56	66.00	326.28
Vel Total (ft/s)	8.43	Avg. Vel. (ft/s)	1.08	9.56	1.29
Max Chl Dpth (ft)	5.90	Hydr. Depth (ft)	0.61	5.26	0.80
Conv. Total (cfs)	95766.1	Conv. (cfs)	445.4	93851.4	1469.3
Length Wtd. (ft)		Wetted Per. (ft)	23.80	69.98	50.20
Min Ch El (ft)	9.10	Shear (lb/sq ft)	0.05	0.39	0.06
Alpha	1.26	Stream Power (lb/ft s)	0.05	3.71	0.08
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

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

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

SUMMARY OF MANNING'S N VALUES

River:Loma Alta Creek

Reach	River Sta.	n1	n2	n3	n4	n5
Loma Alta Creek	6165	.03	.016	.016		
Loma Alta Creek	5292	.05	.016	.035	.016	.035
Loma Alta Creek	4864	.05	.016	.035	.016	.035
Loma Alta Creek	4819	.05	.016	.035	.016	.035
Loma Alta Creek	4163	.05	.03	.035	.016	.035
Loma Alta Creek	4056	.05	.03	.035	.016	.035

Loma Alta Creek	3840	.05	.03	.035	.016	.035
Loma Alta Creek	3792	.05	.03	.035	.016	.03
Loma Alta Creek	3500	Bridge				
Loma Alta Creek	3486	.035	.016	.035	.016	.035
Loma Alta Creek	3383*	.035	.016	.035	.016	.035
Loma Alta Creek	3279	.035	.016	.035	.016	.035
Loma Alta Creek	3250	Bridge				
Loma Alta Creek	3231	.035	.016	.035	.016	.035
Loma Alta Creek	2792	.035	.016	.035	.016	.035
Loma Alta Creek	2500	.035	.016	.035	.016	.035
Loma Alta Creek	1851	.035	.016	.035	.016	.035
Loma Alta Creek	1800	Bridge				
Loma Alta Creek	1787	.035	.016	.035	.016	.035
Loma Alta Creek	1582*	.035	.016	.035	.016	.035
Loma Alta Creek	1378*	.035	.016	.035	.016	.035
Loma Alta Creek	1173	.035	.016	.035	.016	.035
Loma Alta Creek	1096*	.035	.016	.035	.016	.035
Loma Alta Creek	1020*	.035	.016	.035	.016	.035
Loma Alta Creek	943	.035	.016	.035	.016	.035
Loma Alta Creek	571	.035	.016	.035		

SUMMARY OF REACH LENGTHS

River: Loma Alta Creek

Reach	River Sta.	Left	Channel	Right
Loma Alta Creek	6165	806	880.3	719.9
Loma Alta Creek	5292	409.2	427.2	354.9
Loma Alta Creek	4864	46.2	45.6	40
Loma Alta Creek	4819	645.9	655.9	749.4
Loma Alta Creek	4163	108.2	107	94.6
Loma Alta Creek	4056	201.2	215.5	243.2
Loma Alta Creek	3840	19.6	21.1	19.7
Loma Alta Creek	3792	334.8	333.3	309.6
Loma Alta Creek	3500	Bridge		
Loma Alta Creek	3486	112.32	106.6	90.9
Loma Alta Creek	3383*	113.25	100.4	73.1
Loma Alta Creek	3279	49.8	48.2	58.2
Loma Alta Creek	3250	Bridge		
Loma Alta Creek	3231	365.5	439.2	669.5
Loma Alta Creek	2792	228.9	292	385.4

Loma Alta Creek	2500	637.9	648.9	662
Loma Alta Creek	1851	66.3	63.3	65.4
Loma Alta Creek	1800	Bridge		
Loma Alta Creek	1787	212.1	190.1	172.6
Loma Alta Creek	1582*	212.2	212.3	212
Loma Alta Creek	1378*	212.2	212.4	212.5
Loma Alta Creek	1173	81.3	72.1	57.5
Loma Alta Creek	1096*	80.4	81.1	82.2
Loma Alta Creek	1020*	80	76.86	71.1
Loma Alta Creek	943	381.2	371.7	369.6
Loma Alta Creek	571			

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: Loma Alta Creek

Reach	River Sta.	Contr.	Expan.
Loma Alta Creek	6165	.1	.3
Loma Alta Creek	5292	.1	.3
Loma Alta Creek	4864	.1	.3
Loma Alta Creek	4819	.1	.3
Loma Alta Creek	4163	.1	.3
Loma Alta Creek	4056	.1	.3
Loma Alta Creek	3840	.1	.3
Loma Alta Creek	3792	.1	.3
Loma Alta Creek	3500	Bridge	
Loma Alta Creek	3486	.1	.3
Loma Alta Creek	3383*	.1	.3
Loma Alta Creek	3279	.1	.3
Loma Alta Creek	3250	Bridge	
Loma Alta Creek	3231	.1	.3
Loma Alta Creek	2792	.1	.3
Loma Alta Creek	2500	.1	.3
Loma Alta Creek	1851	.1	.3
Loma Alta Creek	1800	Bridge	
Loma Alta Creek	1787	.1	.3
Loma Alta Creek	1582*	.1	.3
Loma Alta Creek	1378*	.1	.3
Loma Alta Creek	1173	.1	.3
Loma Alta Creek	1096*	.1	.3
Loma Alta Creek	1020*	.1	.3
Loma Alta Creek	943	.1	.3
Loma Alta Creek	571	.1	.3

Profile Output Table - Standard Table 1

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit
W.S. E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl	
(ft) (ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	(ft)	
Loma Alta Creek	6165	PF 1	3389.00	26.20	33.40	
33.84 35.06	0.001724	11.26	415.64	228.26		0.86
Loma Alta Creek	5292	PF 1	3389.00	24.50	29.20	
30.14 32.42	0.006215	16.71	327.37	381.95		1.52
Loma Alta Creek	4864	PF 1	3389.00	24.20	28.03	

28.65	29.89	0.004604	14.38	381.27	756.30		1.35
Loma Alta Creek	4819		PF 1	3389.00	24.20	27.87	
28.46	29.66	0.005108	14.60	407.35	754.82		1.41
Loma Alta Creek	4163		PF 1	3389.00	18.90	26.75	
24.80	27.01	0.000658	4.30	828.72	832.12		0.29
Loma Alta Creek	4056		PF 1	3389.00	18.40	26.50	
25.55	26.91	0.001177	5.79	687.42	815.02		0.39
Loma Alta Creek	3840		PF 1	3389.00	17.60	26.33	
23.36	26.67	0.000816	5.02	770.09	733.75		0.34
Loma Alta Creek	3792		PF 1	3389.00	17.70	25.49	
24.29	26.57	0.002679	7.98	417.39	92.01		0.58
Loma Alta Creek	3500			Bridge			
Loma Alta Creek	3486		PF 1	3389.00	16.20	22.71	
23.72	25.58	0.004269	15.67	294.53	232.85		1.29
Loma Alta Creek	3383*		PF 1	3389.00	15.95	22.46	
23.55	25.08	0.004098	14.96	300.27	262.00		1.26
Loma Alta Creek	3279		PF 1	3389.00	15.70	21.94	
22.87	24.67	0.004630	15.31	300.03	157.42		1.33
Loma Alta Creek	3250			Bridge			
Loma Alta Creek	3231		PF 1	3389.00	15.60	21.07	
22.09	24.20	0.006318	16.72	276.52	332.99		1.52
Loma Alta Creek	2792		PF 1	3389.00	14.50	20.11	
17.40	20.28	0.000346	4.58	1104.03	304.43		0.38
Loma Alta Creek	2500		PF 1	3389.00	14.20	19.58	
17.80	20.06	0.000891	7.05	658.16	264.98		0.60
Loma Alta Creek	1851		PF 1	3389.00	12.20	19.30	
16.83	19.61	0.000446	5.58	816.34	460.17		0.42
Loma Alta Creek	1800			Bridge			
Loma Alta Creek	1787		PF 1	3389.00	12.10	18.94	
17.40	19.48	0.001056	6.43	593.46	428.78		0.56
Loma Alta Creek	1582*		PF 1	3389.00	11.67	18.39	
17.78	19.25	0.001202	8.29	476.34	470.12		0.72
Loma Alta Creek	1378*		PF 1	3389.00	11.24	18.02	
17.62	18.98	0.001255	9.16	484.37	516.25		0.73
Loma Alta Creek	1173		PF 1	3389.00	10.81	17.05	
17.05	18.60	0.001948	10.95	362.19	492.77		0.89
Loma Alta Creek	1096*		PF 1	3389.00	10.64	16.48	
16.83	18.42	0.002505	11.63	306.43	349.51		0.99
Loma Alta Creek	1020*		PF 1	3389.00	10.47	16.07	
16.63	18.18	0.002786	11.83	290.48	93.76		1.03
Loma Alta Creek	943		PF 1	3389.00	10.30	15.19	
15.89	17.87	0.004181	13.76	259.11	106.18		1.24
Loma Alta Creek	571		PF 1	3389.00	9.10	15.00	
14.08	16.39	0.001252	9.56	402.04	442.84		0.73

ERRORS WARNINGS AND NOTES
Errors Warnings and Notes for Plan : LA_Exist

River: Loma Alta Creek Reach: Loma Alta Creek RS: 6165 Profile: PF 1
Warning:Divided flow computed for this cross-section.
River: Loma Alta Creek Reach: Loma Alta Creek RS: 5292 Profile: PF 1
Warning:Divided flow computed for this cross-section.
Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.

This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate
the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was
used.
River: Loma Alta Creek Reach: Loma Alta Creek RS: 4864 Profile: PF 1
Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate
the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was
used.
River: Loma Alta Creek Reach: Loma Alta Creek RS: 4819 Profile: PF 1
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was
used.
River: Loma Alta Creek Reach: Loma Alta Creek RS: 4163 Profile: PF 1
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was
used.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
River: Loma Alta Creek Reach: Loma Alta Creek RS: 4056 Profile: PF 1
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was
used.
River: Loma Alta Creek Reach: Loma Alta Creek RS: 3840 Profile: PF 1
Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was
used.
River: Loma Alta Creek Reach: Loma Alta Creek RS: 3792 Profile: PF 1
Warning:Divided flow computed for this cross-section.
Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
River: Loma Alta Creek Reach: Loma Alta Creek RS: 3500 Profile: PF 1
Warning:Pier drag coefficient of 2.0 assumed for Class B flow.
Note: The momentum method has computed a class B profile.
River: Loma Alta Creek Reach: Loma Alta Creek RS: 3500 Profile: PF 1 Upstream
Warning:The composite Mannings n value for the channel was larger than the largest entered n value or smaller than the
smallest entered n value.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
River: Loma Alta Creek Reach: Loma Alta Creek RS: 3500 Profile: PF 1 Downstream
Warning:The energy equation could not be balanced within the specified number

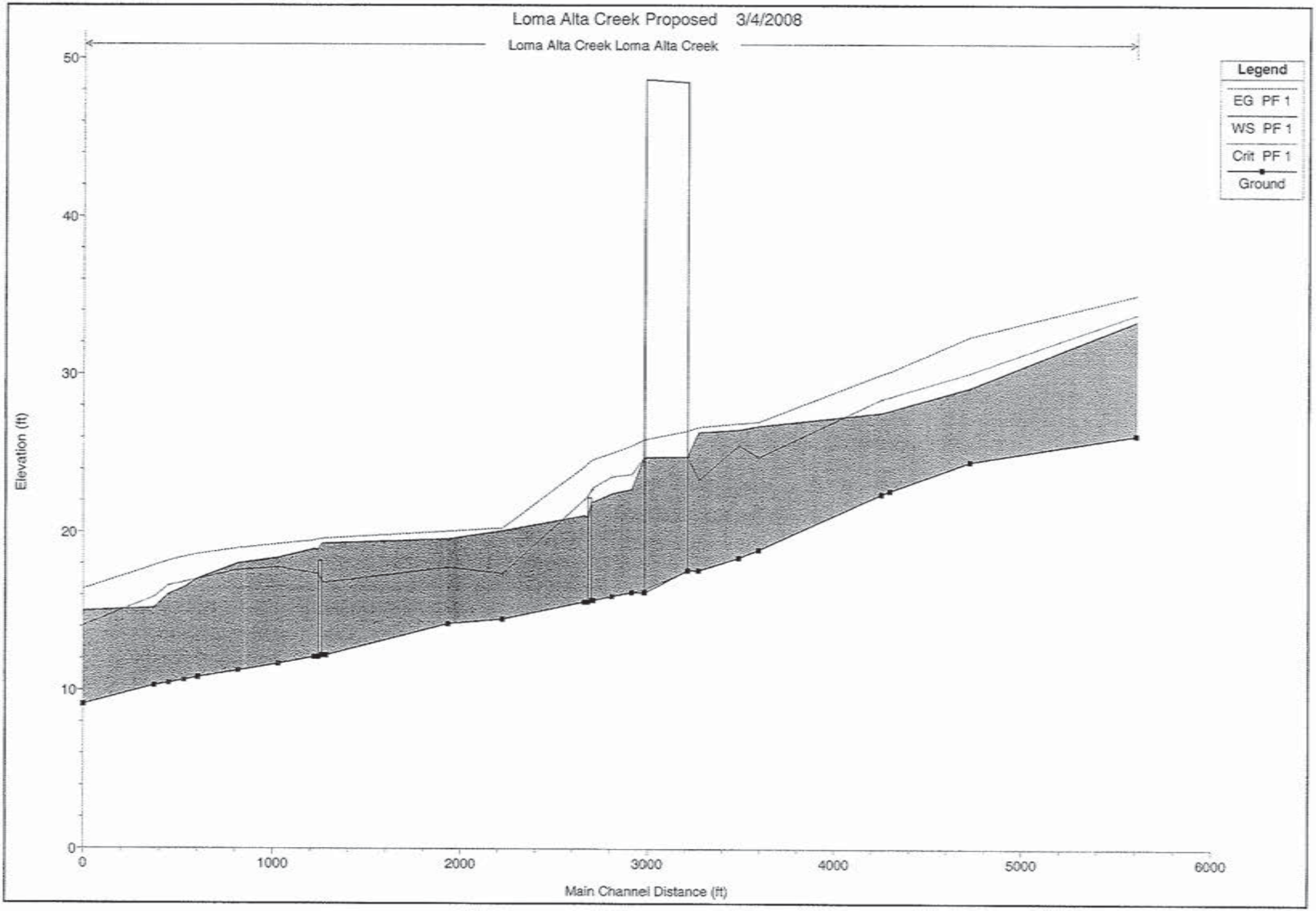
of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
River: Loma Alta Creek Reach: Loma Alta Creek RS: 3486 Profile: PF 1
Warning:Divided flow computed for this cross-section.
Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Note: The energy method has computed a class B profile.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
River: Loma Alta Creek Reach: Loma Alta Creek RS: 3383* Profile: PF 1
Warning:Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was
used.
River: Loma Alta Creek Reach: Loma Alta Creek RS: 3279 Profile: PF 1
Warning:Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
River: Loma Alta Creek Reach: Loma Alta Creek RS: 3250 Profile: PF 1
Note: Momentum answer is not valid if the water surface is above the low chord or if there is weir flow. The momentum
answer has been disregarded.
River: Loma Alta Creek Reach: Loma Alta Creek RS: 3250 Profile: PF 1 Upstream
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
River: Loma Alta Creek Reach: Loma Alta Creek RS: 3250 Profile: PF 1 Downstream
Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
River: Loma Alta Creek Reach: Loma Alta Creek RS: 3231 Profile: PF 1
Warning:Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
River: Loma Alta Creek Reach: Loma Alta Creek RS: 2792 Profile: PF 1
Warning:Divided flow computed for this cross-section.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was
used.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
River: Loma Alta Creek Reach: Loma Alta Creek RS: 2500 Profile: PF 1
Warning:Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was
used.
River: Loma Alta Creek Reach: Loma Alta Creek RS: 1851 Profile: PF 1
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
River: Loma Alta Creek Reach: Loma Alta Creek RS: 1800 Profile: PF 1 Upstream

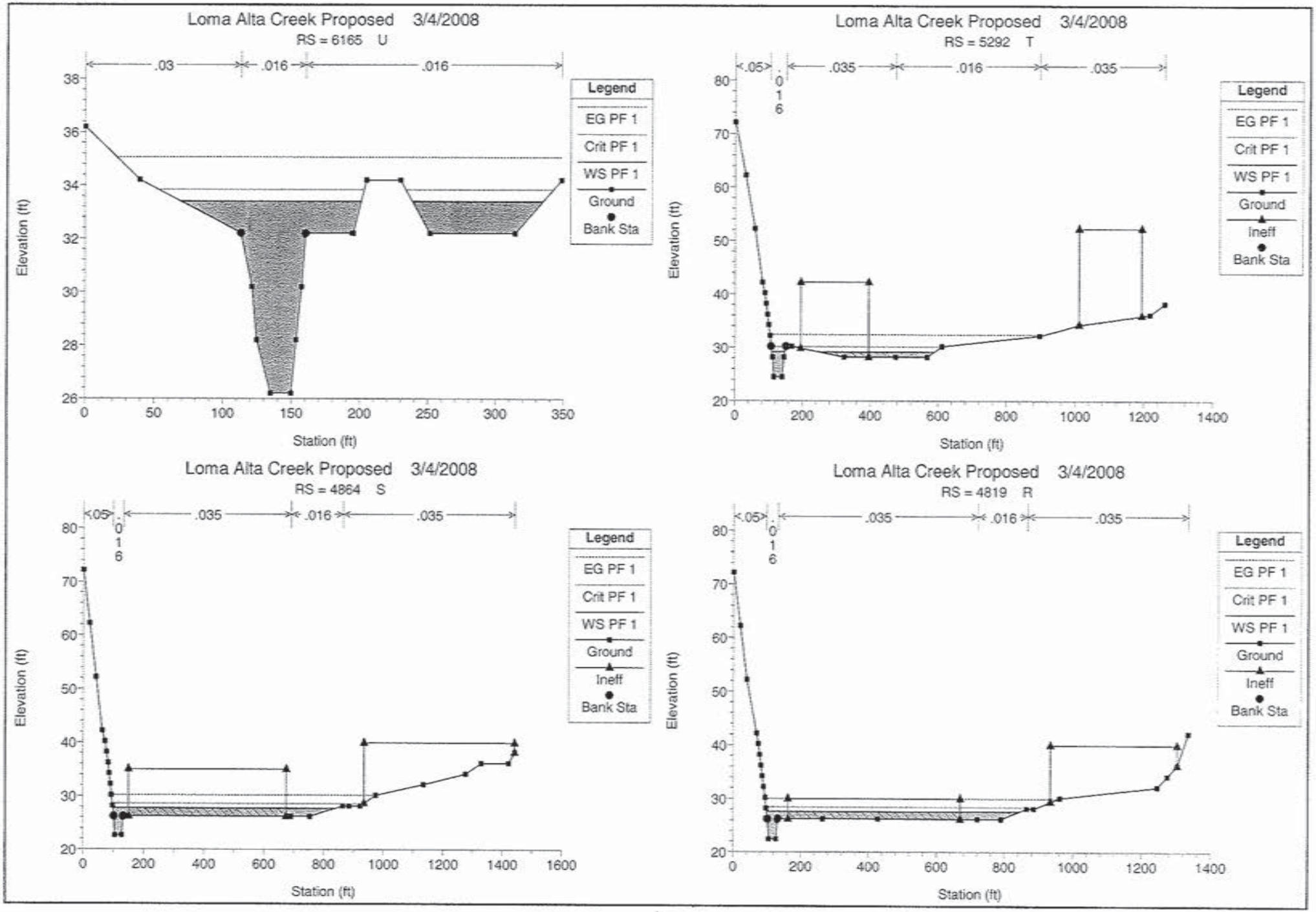
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
River: Loma Alta Creek Reach: Loma Alta Creek RS: 1800 Profile: PF 1
Downstream
Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
River: Loma Alta Creek Reach: Loma Alta Creek RS: 1787 Profile: PF 1
Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
River: Loma Alta Creek Reach: Loma Alta Creek RS: 1582* Profile: PF 1
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was
used.
River: Loma Alta Creek Reach: Loma Alta Creek RS: 1378* Profile: PF 1
Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was
used.
River: Loma Alta Creek Reach: Loma Alta Creek RS: 1173 Profile: PF 1
Warning:The energy equation could not be balanced within the specified number of iterations. The program selected the water
surface that had the least amount of error between computed and assumed values.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The
program defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was
used.
River: Loma Alta Creek Reach: Loma Alta Creek RS: 1096* Profile: PF 1
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was
used.
River: Loma Alta Creek Reach: Loma Alta Creek RS: 1020* Profile: PF 1
Warning:Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was
used.
River: Loma Alta Creek Reach: Loma Alta Creek RS: 943 Profile: PF 1
Warning:Divided flow computed for this cross-section.
Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was
used.
River: Loma Alta Creek Reach: Loma Alta Creek RS: 571 Profile: PF 1
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was
used.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

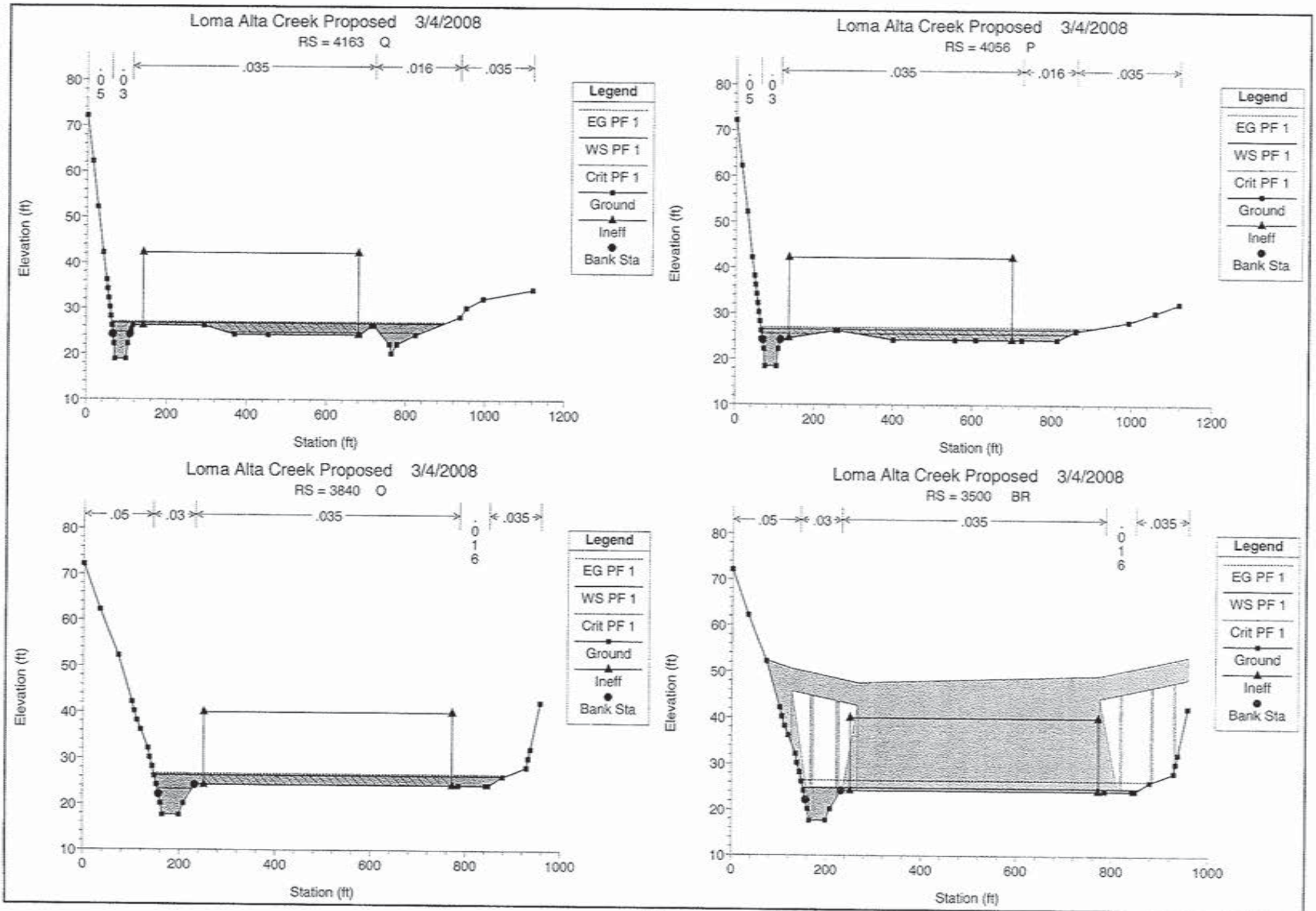
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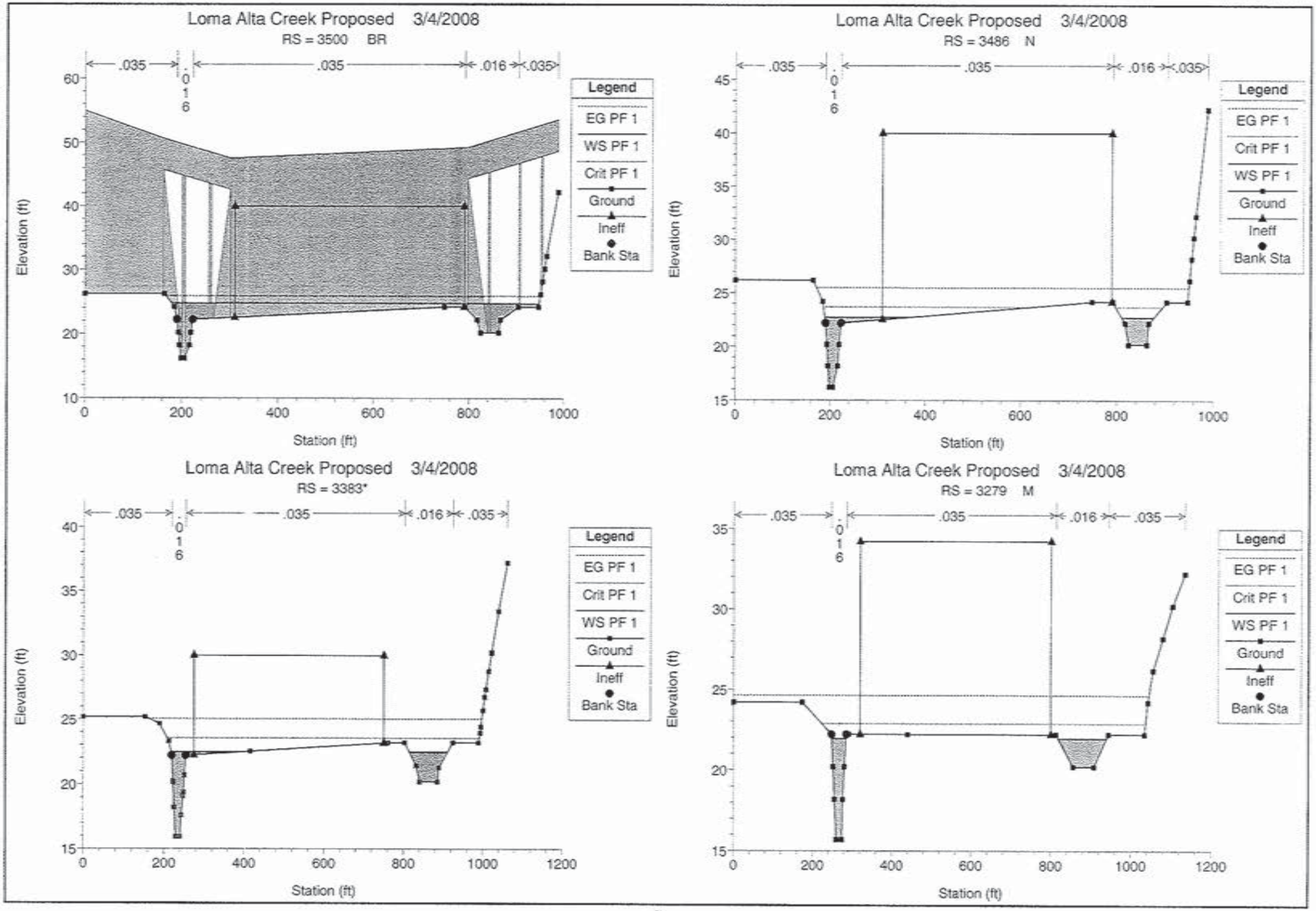
HEC-RAS Plan: LA_Prop River: Loma Alta Creek Reach: Loma Alta Creek Profile: PF 1

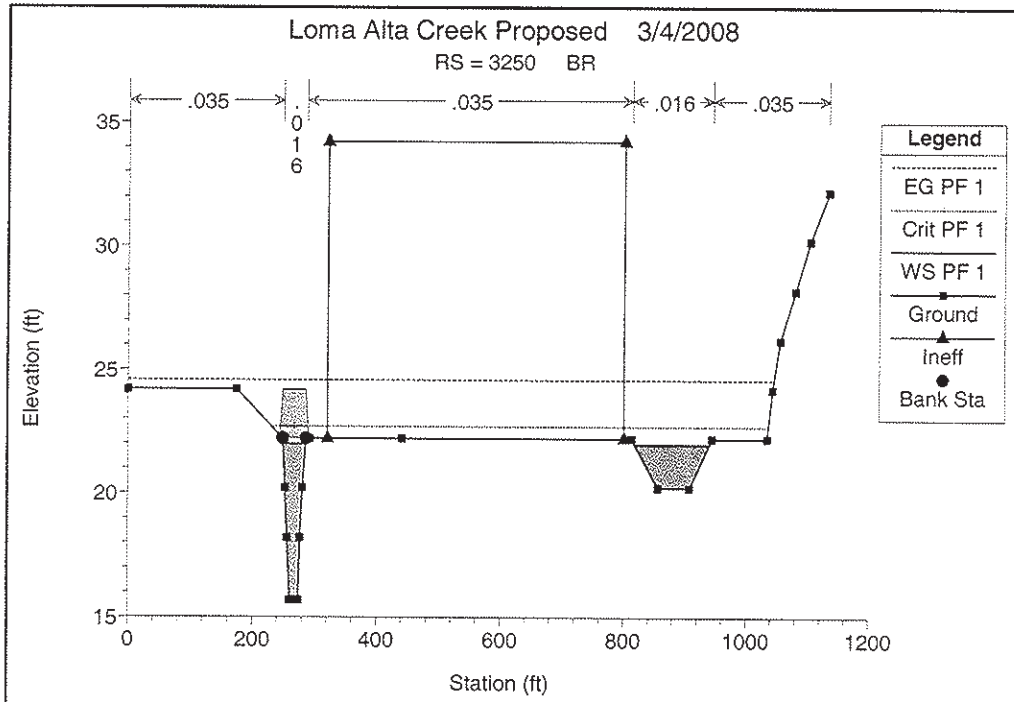
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Loma Alta Creek	6165	PF 1	3389.00	26.20	33.40	33.84	35.06	0.001724	11.26	415.64	228.26	0.86
Loma Alta Creek	5292	PF 1	3389.00	24.50	29.20	30.14	32.42	0.006215	16.71	327.37	381.95	1.52
Loma Alta Creek	4864	PF 1	3389.00	22.66	27.77	28.63	30.22	0.003889	15.20	362.54	741.22	1.25
Loma Alta Creek	4819	PF 1	3389.00	22.45	27.62	28.46	30.05	0.003977	15.28	392.55	744.99	1.26
Loma Alta Creek	4163	PF 1	3389.00	18.90	26.77	24.80	27.03	0.000644	4.26	835.57	832.81	0.29
Loma Alta Creek	4056	PF 1	3389.00	18.40	26.53	25.55	26.93	0.001138	5.71	695.64	817.23	0.38
Loma Alta Creek	3840	PF 1	3389.00	17.60	26.37	23.36	26.70	0.000794	4.97	777.89	734.75	0.33
Loma Alta Creek	3500		Bridge									
Loma Alta Creek	3486	PF 1	3389.00	16.20	22.76	23.72	25.51	0.004052	15.38	304.37	248.45	1.26
Loma Alta Creek	3383*	PF 1	3389.00	15.95	22.49	23.55	25.04	0.003977	14.80	304.44	276.66	1.25
Loma Alta Creek	3279	PF 1	3389.00	15.70	21.95	22.87	24.64	0.004556	15.21	302.21	158.04	1.32
Loma Alta Creek	3250		Bridge									
Loma Alta Creek	3231	PF 1	3389.00	15.60	21.08	22.09	24.18	0.006258	16.65	277.87	335.67	1.52
Loma Alta Creek	2792	PF 1	3389.00	14.50	20.11	17.40	20.28	0.000346	4.58	1104.03	304.43	0.38
Loma Alta Creek	2500	PF 1	3389.00	14.20	19.58	17.80	20.06	0.000891	7.05	658.16	264.98	0.60
Loma Alta Creek	1851	PF 1	3389.00	12.20	19.30	16.83	19.61	0.000446	5.58	816.34	460.17	0.42
Loma Alta Creek	1800		Bridge									
Loma Alta Creek	1787	PF 1	3389.00	12.10	18.94	17.40	19.48	0.001056	6.43	593.46	428.78	0.56
Loma Alta Creek	1582*	PF 1	3389.00	11.67	18.39	17.78	19.25	0.001202	8.29	476.34	470.12	0.72
Loma Alta Creek	1378*	PF 1	3389.00	11.24	18.02	17.62	18.98	0.001255	9.16	484.37	516.25	0.73
Loma Alta Creek	1173	PF 1	3389.00	10.81	17.05	17.05	18.60	0.001948	10.95	362.19	492.77	0.89
Loma Alta Creek	1096*	PF 1	3389.00	10.64	16.48	16.83	18.42	0.002505	11.63	306.43	349.51	0.99
Loma Alta Creek	1020*	PF 1	3389.00	10.47	16.07	16.63	18.18	0.002786	11.83	290.48	93.76	1.03
Loma Alta Creek	943	PF 1	3389.00	10.30	15.19	15.89	17.87	0.004181	13.76	259.11	106.18	1.24
Loma Alta Creek	571	PF 1	3389.00	9.10	15.00	14.08	16.39	0.001252	9.56	402.04	442.84	0.73

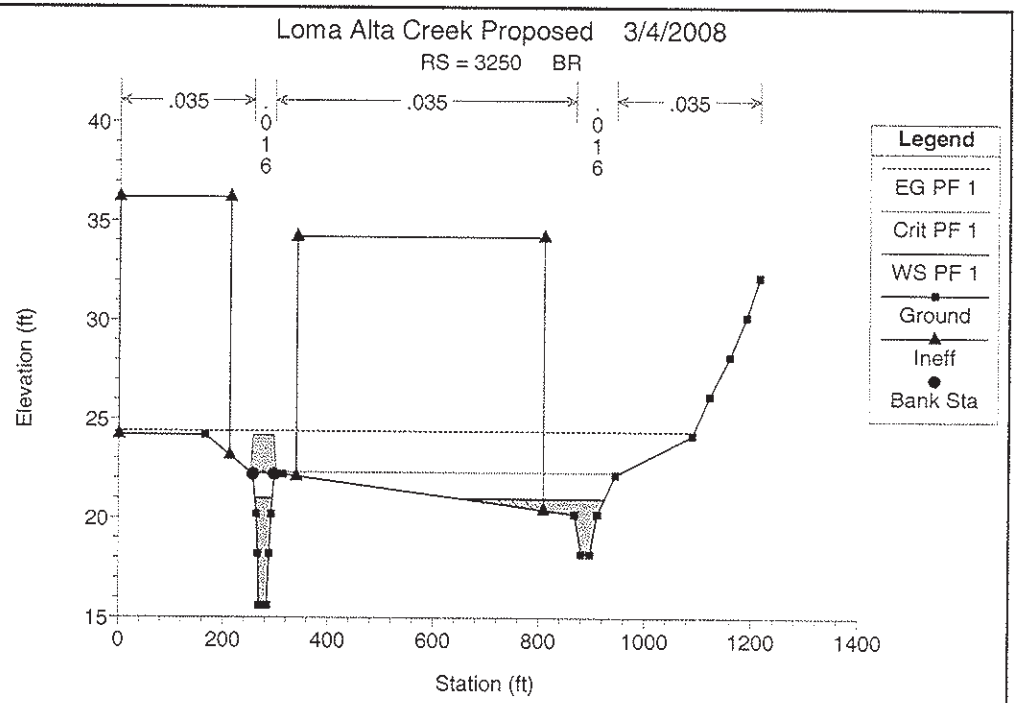

Loma Alta Creek Proposed 3/4/2008
Loma Alta Creek Loma Alta Creek
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Elevation (ft)
Main Channel Distance (ft)
0
10
20
30
40
50
0
1000
2000
3000
4000
5000
6000

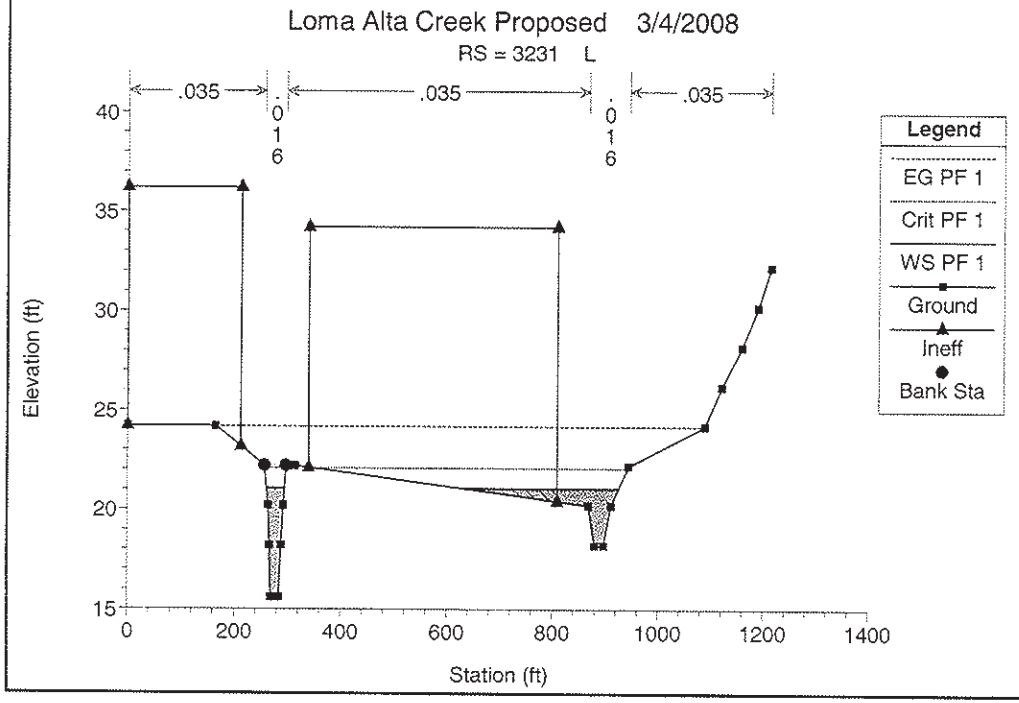

Loma Alta Creek Proposed 3/4/2008
RS = 6165 U
.03
.016
.016
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
Loma Alta Creek Proposed 3/4/2008
RS = 5292 T
.05
.035
.016
.035
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Loma Alta Creek Proposed 3/4/2008
RS = 4864 S
.05
.035
.016
.035
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Loma Alta Creek Proposed 3/4/2008
RS = 4819 R
.05
.035
.016
.035
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

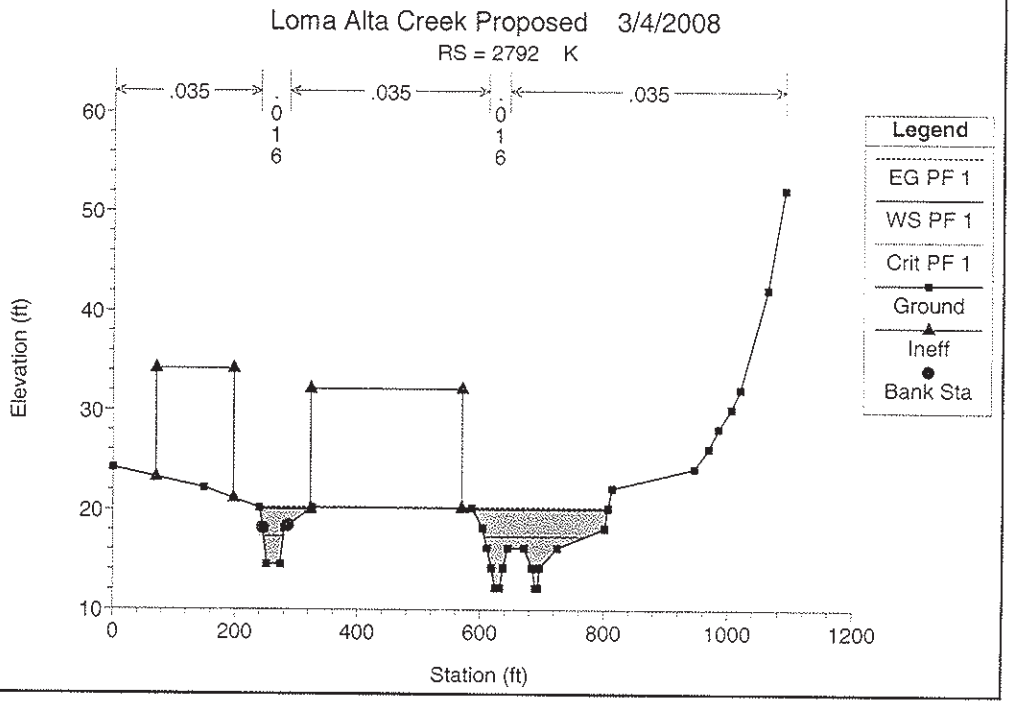

Loma Alta Creek Proposed 3/4/2008
RS = 4163 Q
.05
.03
.035
.016
.035
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Loma Alta Creek Proposed 3/4/2008
RS = 4056 P
.05
.03
.035
.016
.035
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Loma Alta Creek Proposed 3/4/2008
RS = 3840 O
.05
.03
.035
.016
.035
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
Loma Alta Creek Proposed 3/4/2008
RS = 3500 BR
.05
.03
.035
.016
.035
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

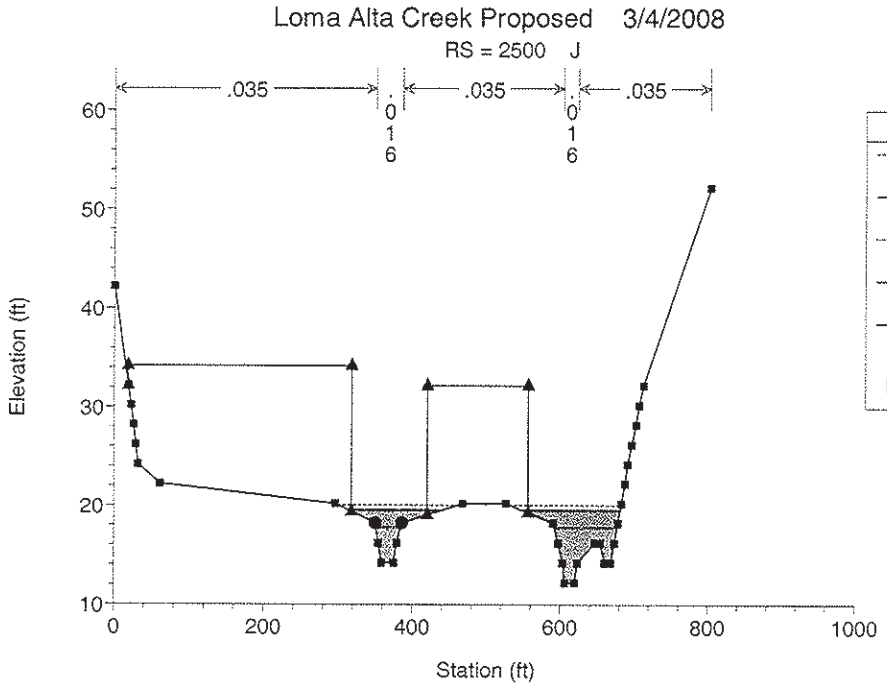

Loma Alta Creek Proposed 3/4/2008
RS = 3500 BR
.035
.016
.035
.016
.035
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Loma Alta Creek Proposed 3/4/2008
RS = 3486 N
Loma Alta Creek Proposed 3/4/2008
RS = 3383*
Loma Alta Creek Proposed 3/4/2008
RS = 3279 M

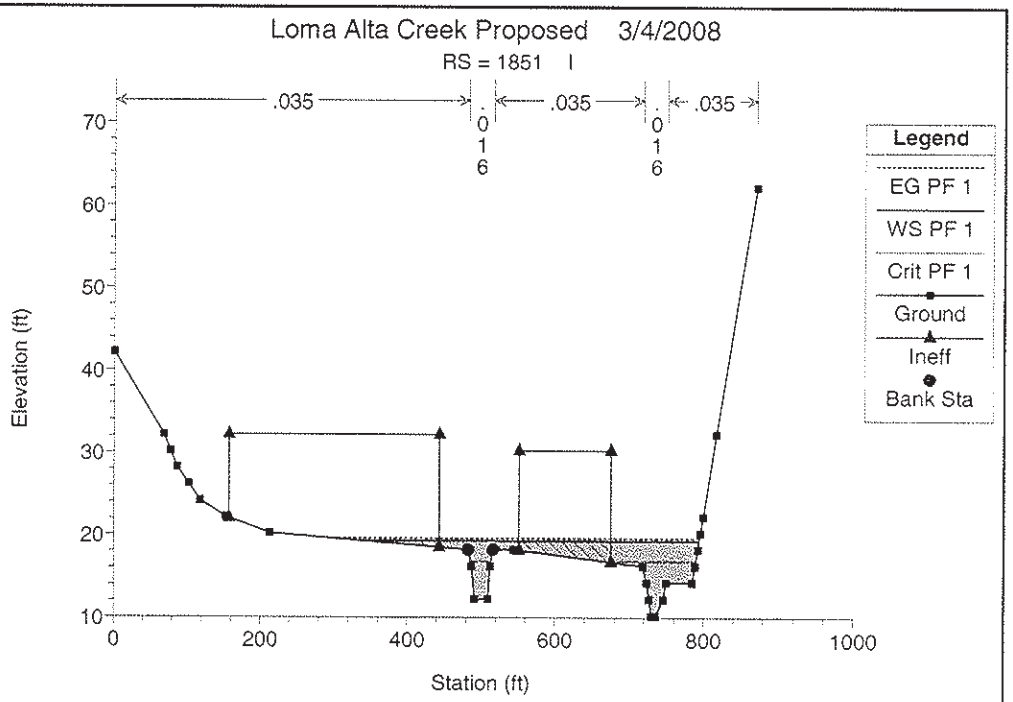

Loma Alta Creek Proposed 3/4/2008
RS = 3250 BR
.035
.016
.035
.035
.016
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

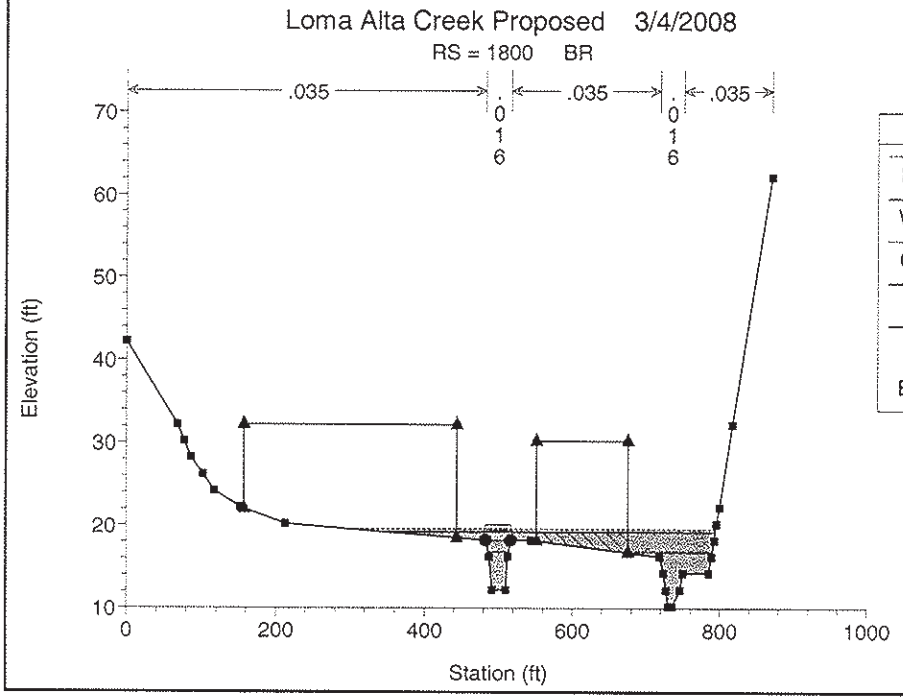

Loma Alta Creek Proposed 3/4/2008
RS = 3250 BR
.035
.035
.035
.016
.016
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

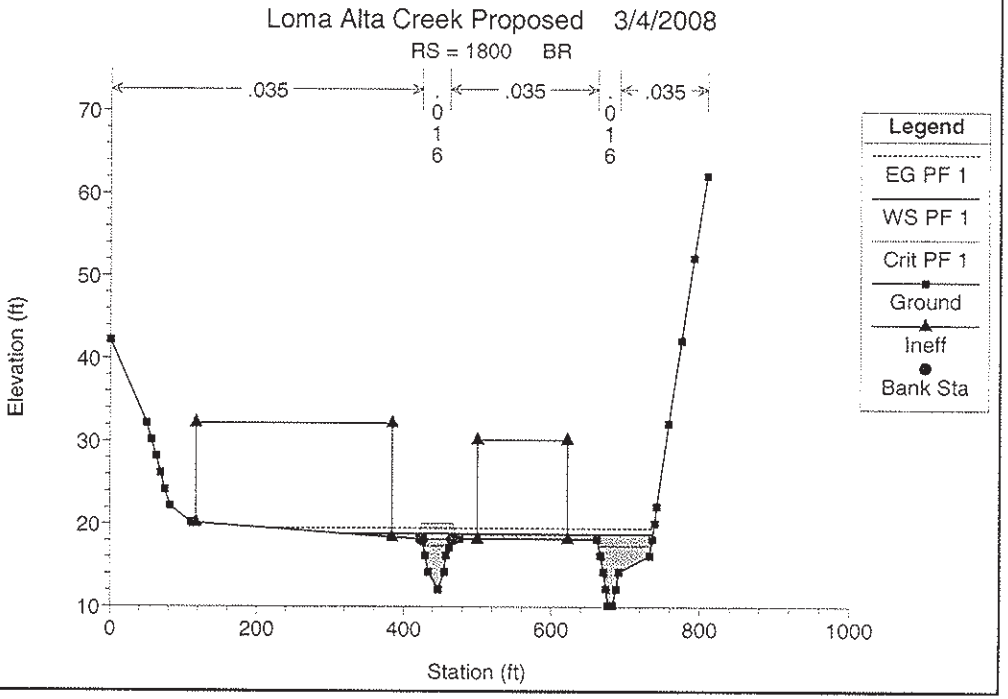

Loma Alta Creek Proposed 3/4/2008
RS = 3231 L
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.035
.035
.016
.016
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

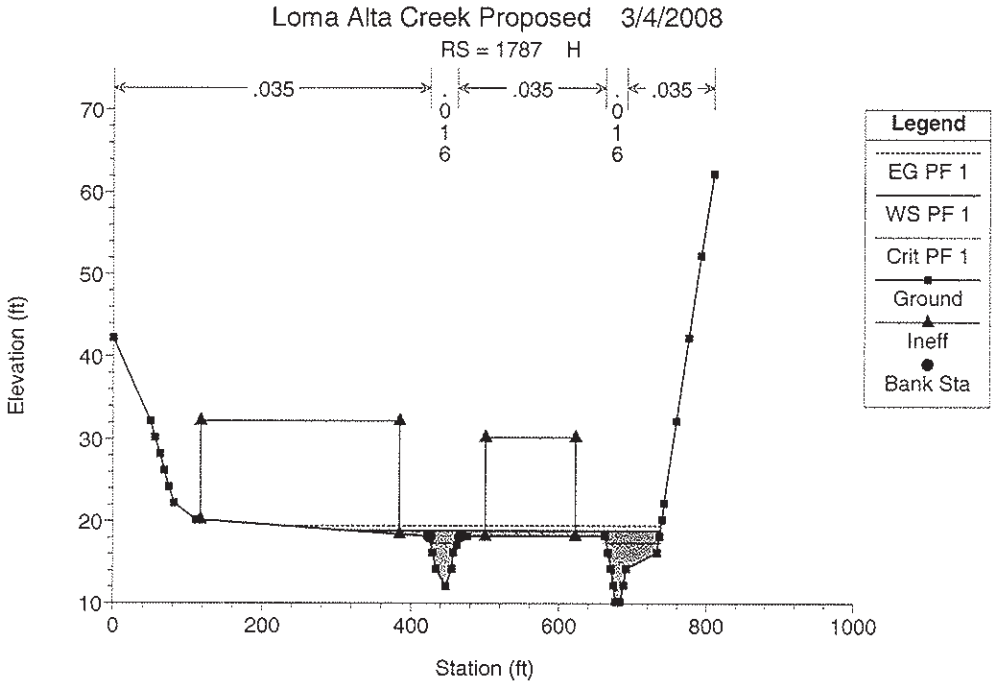

Loma Alta Creek Proposed 3/4/2008
RS = 2792 K
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.035
.035
.016
.016
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

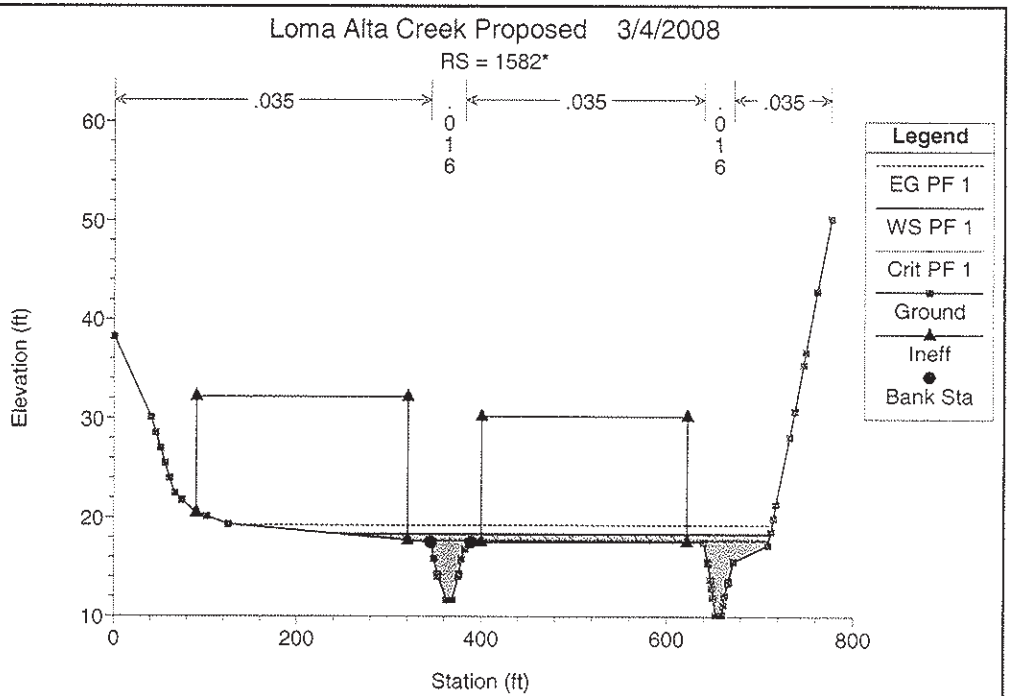

Loma Alta Creek Proposed 3/4/2008
RS = 2500 J
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.035
.035
.016
.016
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
10
20
30
40
50
60
0
200
400
600
800
1000

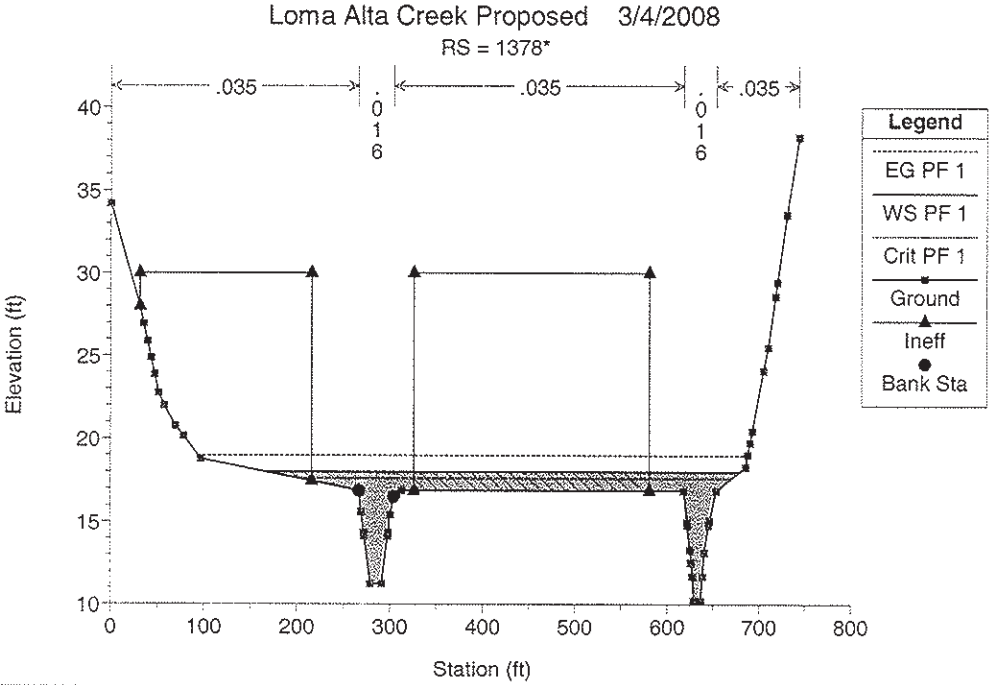

Loma Alta Creek Proposed 3/4/2008
RS = 1851 I
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.035
.035
.016
.016
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
10
20
30
40
50
60
70
0
200
400
600
800
1000

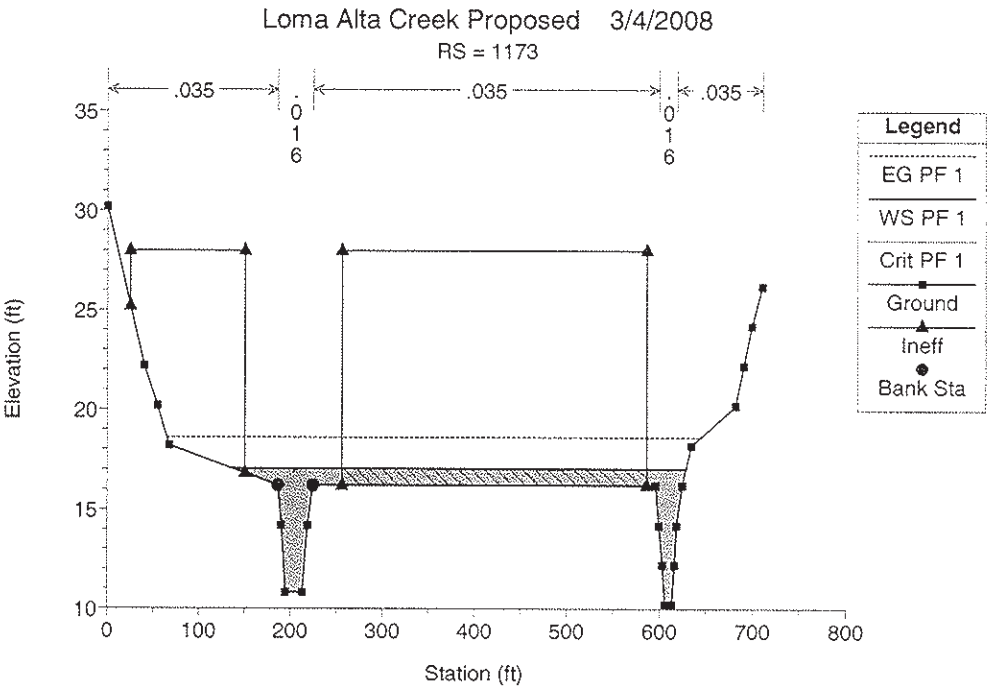

Loma Alta Creek Proposed 3/4/2008
RS = 1800 BR
.035
.035
.035
.016
.016
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
10
20
30
40
50
60
70
0
200
400
600
800
1000

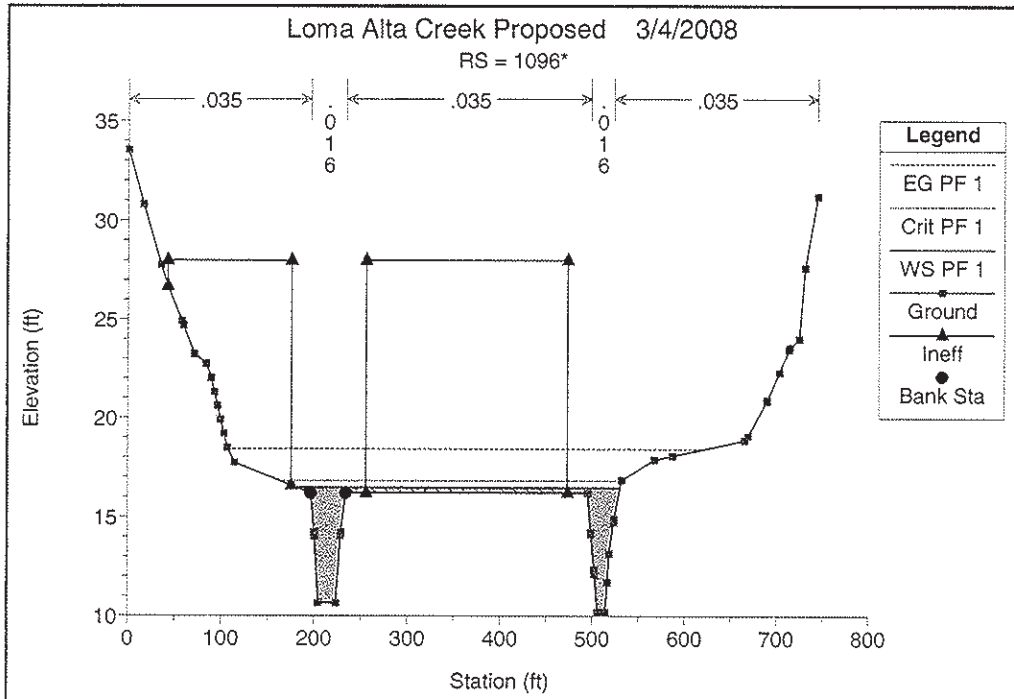

Loma Alta Creek Proposed 3/4/2008
RS = 1800 BR
.035
.035
.035
.016
.016
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
10
20
30
40
50
60
70
0
200
400
600
800
1000

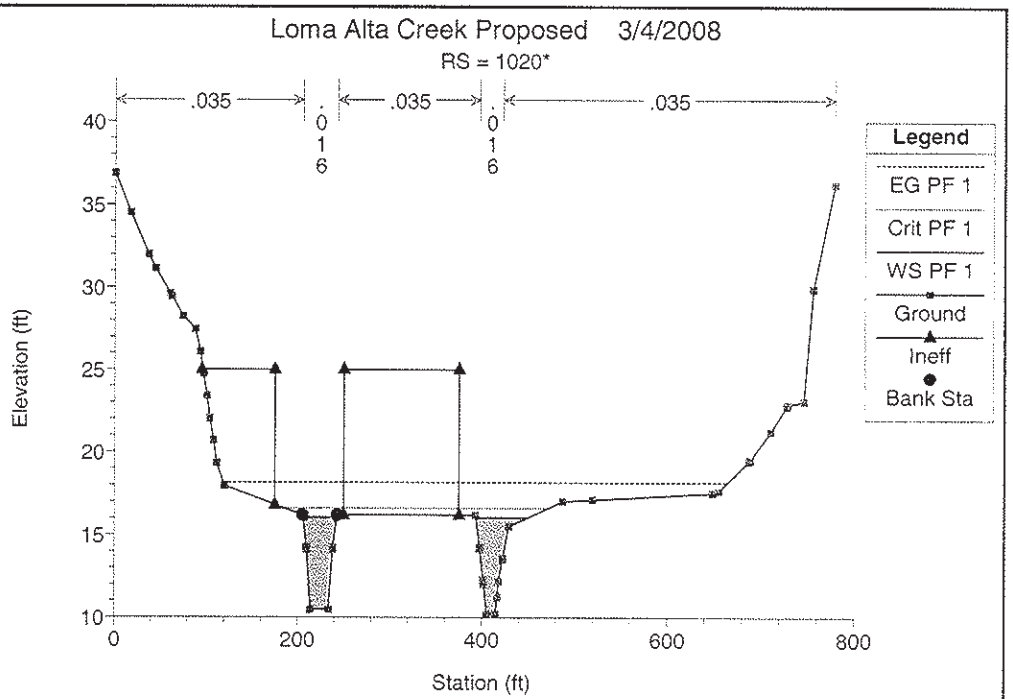

Loma Alta Creek Proposed 3/4/2008
RS = 1787 H
.035
.016
.035
.016
.035
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

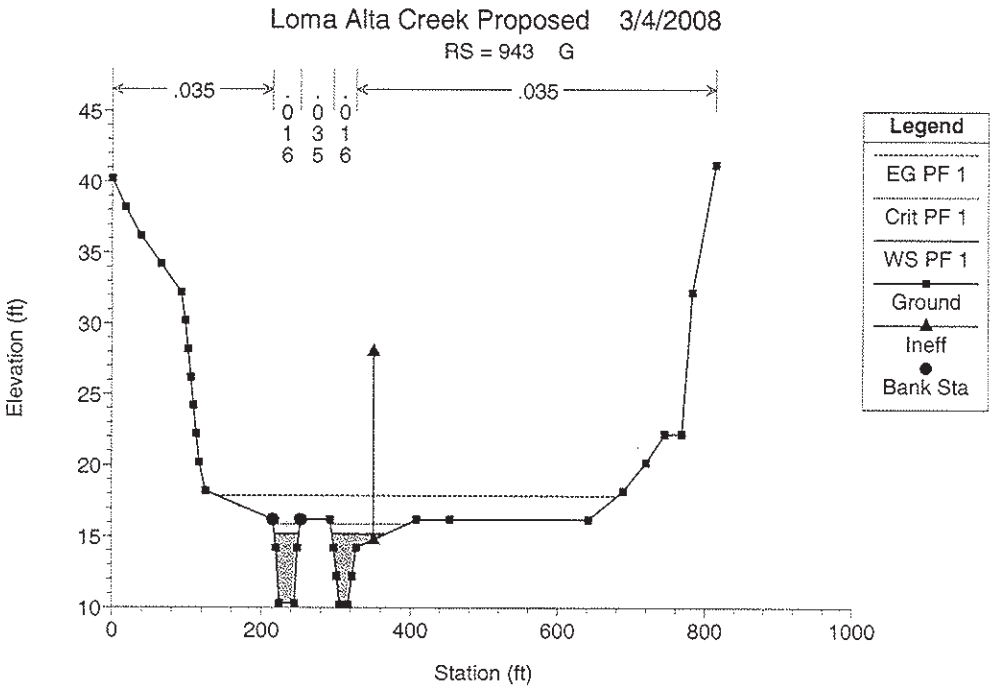

Loma Alta Creek Proposed 3/4/2008
RS = 1582*
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.016
.035
.016
.035
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

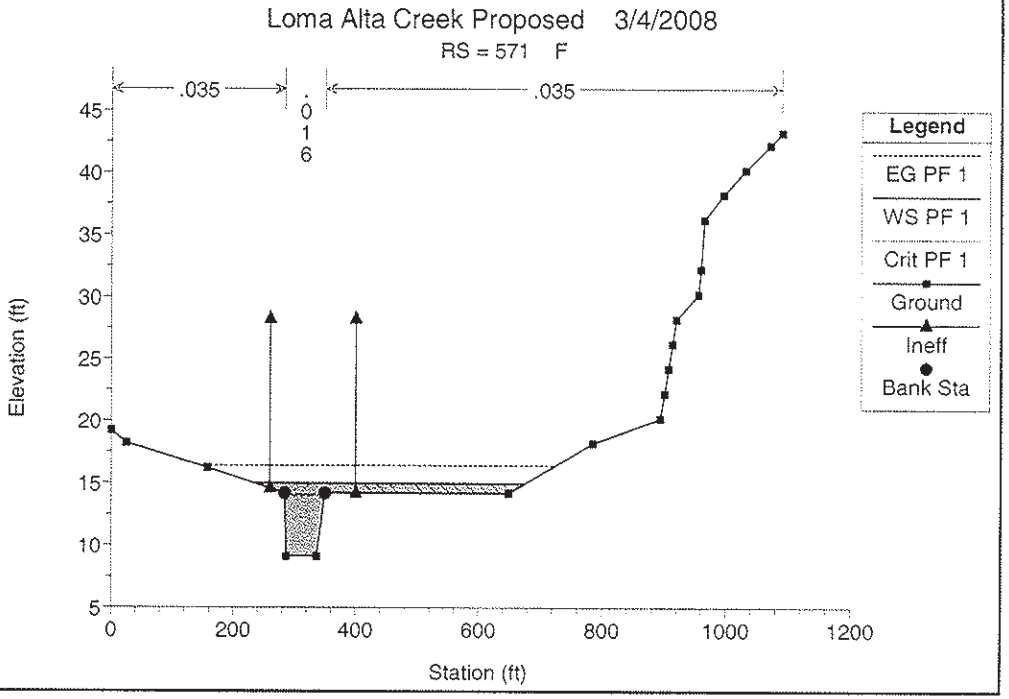

Loma Alta Creek Proposed 3/4/2008
RS = 1378*
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.016
.035
.016
.035
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


Loma Alta Creek Proposed 3/4/2008
RS = 1173
.035
.016
.035
.016
.035
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


Loma Alta Creek Proposed 3/4/2008
RS = 1096*
.035
.016
.035
.016
.035
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


Loma Alta Creek Proposed 3/4/2008
RS = 1020*
.035
.016
.035
.016
.035
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


Loma Alta Creek Proposed 3/4/2008
RS = 943 G
.035
.016
.035
.016
.035
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


Loma Alta Creek Proposed 3/4/2008
RS = 571 F
.035
.016
.035
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

LA_Prop.rep

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
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PROJECT DATA
Project Title: Loma Alta Proposed
Project File : LA_Prop.prj
Run Date and Time: 3/4/2008 11:23:57 AM

Project in English units

Project Description:
Loma Alta Creek Proposed 100-yr Model

PLAN DATA

Plan Title: Loma Alta Creek Proposed
Plan File : p:\1683_T064_I5_Floodplain\420_Env_ Stud\Loma Alta\HEC-RAS\Final\Proposed\LA_Prop.p01

Geometry Title: Loma Alta Proposed
Geometry File : p:\1683_T064_I5_Floodplain\420_Env_ Stud\Loma Alta\HEC-RAS\Final\Proposed\LA_Prop.g01

Flow Title : 100-year
Flow File : p:\1683_T064_I5_Floodplain\420_Env_ Stud\Loma Alta\HEC-RAS\Final\Proposed\LA_Prop.f01

Plan Summary Information:

Number of:	Cross Sections	= 22	Multiple Openings	=	0
	Culverts	= 0	Inline Structures	=	0
	Bridges	= 3	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: 100-year
Flow File : p:\1683_TO64_I5_Floodplain\420_Env_ Stud\Loma Alta\HEC-RAS\Final\Proposed\LA_Prop.f01

Flow Data (cfs)

River	Reach	RS	PF 1
Loma Alta Creek	Loma Alta Creek	6165	3389
Loma Alta Creek	Loma Alta Creek	5292	3389

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
Loma Alta Creek	Loma Alta Creek	PF 1	Known WS = 33.4	Known WS = 15

GEOMETRY DATA

Geometry Title: Loma Alta Proposed
Geometry File : p:\1683_TO64_I5_Floodplain\420_Env_ Stud\Loma Alta\HEC-RAS\Final\Proposed\LA_Prop.g01

CROSS SECTION

RIVER: Loma Alta Creek
REACH: Loma Alta Creek RS: 6165

INPUT
Description: U
Station Elevation Data num= 17

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	36.2	39.5	34.2	113	32.2	121.1	30.2	124.6	28.2
134.9	26.2	149.7	26.2	153.3	28.2	157.3	30.2	160.2	32.2
194.2	32.2	195	32.2	204.6	34.2	229.6	34.2	251.4	32.2
314.2	32.2	348.4	34.2						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.03	113	.016	160.2	.016

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
113	160.2	806	880.3	719.9	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	35.06	Element	Left OB	Channel

Right OB				
Vel Head (ft)	1.66	Wt. n-Val.	0.030	0.016
0.016				
W.S. Elev (ft)	33.40	Reach Len. (ft)	806.00	880.30
719.90				
Crit W.S. (ft)	33.84	Flow Area (sq ft)	26.46	248.44
140.74				
E.G. Slope (ft/ft)	0.001724	Area (sq ft)	26.46	248.44
140.74				
Q Total (cfs)	3389.00	Flow (cfs)	38.70	2797.43
552.87				
Top Width (ft)	228.26	Top Width (ft)	44.10	47.20
136.96				
Vel Total (ft/s)	8.15	Avg. Vel. (ft/s)	1.46	11.26
3.93				
Max Chl Dpth (ft)	7.20	Hydr. Depth (ft)	0.60	5.26
1.03				
Conv. Total (cfs)	81630.7	Conv. (cfs)	932.1	67381.7
13317.0				
Length Wtd. (ft)	843.85	Wetted Per. (ft)	44.12	49.78
137.17				
Min Ch El (ft)	26.20	Shear (lb/sq ft)	0.06	0.54
0.11				
Alpha	1.61	Stream Power (lb/ft s)	0.09	6.05
0.43				
Frctn Loss (ft)		Cum Volume (acre-ft)	2.12	25.10
80.46				
C & E Loss (ft)		Cum SA (acres)	3.90	5.10
47.14				

Warning: Divided flow computed for this cross-section.

CROSS SECTION

RIVER: Loma Alta Creek
REACH: Loma Alta Creek RS: 5292

INPUT
Description: T
Station Elevation Data num= 24

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	72.21	30.6	62.21	58.9	52.21	80.8	42.21	88.3	40.21
92.7	38.21	96.3	36.21	99.6	34.21	103.9	32.21	107.2	30.2
111.4	28.2	114.8	24.5	140	24.5	145	28.2	151.2	30.2
168	30.2	323	28.2	475	28.2	567.7	28.2	610.5	30.2
897.3	32.21	1012	34.21	1218.6	36.21	1261	38.21		

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.05	103.9	.016	151.2	.035	475	.016	897.3	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
107.2	151.2	409.2	427.2	354.9	.1 .3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
195	395	42.21	F
1012	1194	52.21	F

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	32.42	Element	Left OB	Channel
Right OB				
Vel Head (ft)	3.22	Wt. n-Val.		0.016
0.021				
W.S. Elev (ft)	29.20	Reach Len. (ft)	409.20	427.20
354.90				
Crit W.S. (ft)	30.14	Flow Area (sq ft)		144.81
182.56				
E.G. Slope (ft/ft)	0.006215	Area (sq ft)		144.81
292.67				
Q Total (cfs)	3389.00	Flow (cfs)		2419.58
969.42				
Top Width (ft)	381.95	Top Width (ft)		38.78
343.17				
Vel Total (ft/s)	10.35	Avg. Vel. (ft/s)		16.71
5.31				
Max Chl Dpth (ft)	4.70	Hydr. Depth (ft)		3.73
0.94				
Conv. Total (cfs)	42988.7	Conv. (cfs)		30691.9
12296.9				
Length Wtd. (ft)	403.79	Wetted Per. (ft)		42.00
194.03				
Min Ch El (ft)	24.50	Shear (lb/sq ft)		1.34
0.37				
Alpha	1.94	Stream Power (lb/ft s)		22.35
1.94				
Frctn Loss (ft)	2.50	Cum Volume (acre-ft)	1.88	21.12
76.88				
C & E Loss (ft)	0.16	Cum SA (acres)	3.49	4.23
43.18				

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

CROSS SECTION

RIVER: Loma Alta Creek
REACH: Loma Alta Creek RS: 4864

INPUT
Description: S
Station Elevation Data num= 26

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	72.21	20.5	62.21	42	52.21	62.6	42.21	72.7	40.21
77.7	38.21	82.7	36.21	85.8	34.21	90.1	32.21	92.9	30.2
97.4	28.2	101.1	26.2	104.7	22.66	126.8	22.66	131.9	26.2
690	26.2	753.5	26.2	863.3	28.2	884.8	28.2	922.4	28.2

973.8	30.2	1134	32.21	1276.2	34.21	1329.2	36.21	1420.7	36.21
1440.9	38.21								

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.05	97.4	.016	131.9	.035	690	.016	863.3	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
101.1	131.9	46.2	45.6	40	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
150	675	35	F
935	1440.9	40	F

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	30.22	Element	Left OB	Channel
Right OB				
Vel Head (ft)	2.46	Wt. n-Val.	0.016	0.016
0.019				
W.S. Elev (ft)	27.77	Reach Len. (ft)	46.20	45.60
40.00				
Crit W.S. (ft)	28.63	Flow Area (sq ft)	2.27	141.84
218.44				
E.G. Slope (ft/ft)	0.003889	Area (sq ft)	2.27	141.84
1040.13				
Q Total (cfs)	3389.00	Flow (cfs)	10.23	2156.14
1222.63				
Top Width (ft)	741.22	Top Width (ft)	2.90	30.80
707.53				
Vel Total (ft/s)	9.35	Avg. Vel. (ft/s)	4.52	15.20
5.60				
Max Chl Dpth (ft)	5.11	Hydr. Depth (ft)	0.78	4.61
1.20				
Conv. Total (cfs)	54342.3	Conv. (cfs)	164.1	34573.5
19604.7				
Length Wtd. (ft)	43.57	Wetted Per. (ft)	3.29	33.36
182.54				
Min Ch El (ft)	22.66	Shear (lb/sq ft)	0.17	1.03
0.29				
Alpha	1.81	Stream Power (lb/ft s)	0.75	15.69
1.63				
Frctn Loss (ft)	1.96	Cum Volume (acre-ft)	1.86	19.72
71.45				
C & E Loss (ft)	0.23	Cum SA (acres)	3.48	3.89
38.90				

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for
additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid,
water surface was used.

CROSS SECTION

RIVER: Loma Alta Creek
REACH: Loma Alta Creek RS: 4819

INPUT
Description: R
Station Elevation Data num= 26

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	72.21	20	62.21	39.6	52.21	69.2	42.21	74.4	40.21
78.1	38.21	82.1	36.21	86	34.21	90	32.21	94.2	30.2
97.6	28.2	101.2	26.2	105.3	22.45	126.2	22.45	131.8	26.2
264.6	26.22	427.33	26.22	720.5	26.2	789.9	26.2	865.7	28.2
886	28.2	962.1	30.2	1244.3	32.21	1273.3	34.21	1301.8	36.21
1333.9	42.21								

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.05	97.6	.016	131.8	.035	720.5	.016	865.7	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
101.2	131.8	645.9	655.9	749.4	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
162	670	30	F
935	1301.9	40	F

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	30.05	Element	Left OB	Channel
Right OB				
Vel Head (ft)	2.43	Wt. n-Val.	0.016	0.016
0.022				
W.S. Elev (ft)	27.62	Reach Len. (ft)	645.90	655.90
749.40				
Crit W.S. (ft)	28.46	Flow Area (sq ft)	1.81	139.95
250.79				
E.G. Slope (ft/ft)	0.003977	Area (sq ft)	1.81	139.95
963.78				
Q Total (cfs)	3389.00	Flow (cfs)	7.70	2139.15
1242.14				
Top Width (ft)	744.99	Top Width (ft)	2.55	30.60
711.84				
Vel Total (ft/s)	8.63	Avg. Vel. (ft/s)	4.26	15.28
4.95				
Max Chl Dpth (ft)	5.17	Hydr. Depth (ft)	0.71	4.57
1.23				
Conv. Total (cfs)	53738.8	Conv. (cfs)	122.2	33920.2
19696.5				
Length Wtd. (ft)	709.62	Wetted Per. (ft)	2.92	33.20
203.86				
Min Ch El (ft)	22.45	Shear (lb/sq ft)	0.15	1.05
0.31				
Alpha	2.10	Stream Power (lb/ft s)	0.66	16.00
1.51				
Frctn Loss (ft)	0.17	Cum Volume (acre-ft)	1.86	19.57
70.53				
C & E Loss (ft)	0.01	Cum SA (acres)	3.47	3.86
38.24				

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

water surface was used.

CROSS SECTION

RIVER: Loma Alta Creek
REACH: Loma Alta Creek RS: 4163

INPUT
Description: Q
Station Elevation Data num= 32

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	72.21	14.2	62.21	27.7	52.21	41.7	42.21	49.9	36.21
52.4	34.21	55.4	32.21	57.9	30.2	61.1	28.2	63.8	26.2
66.1	24.2	69.1	22.2	71.6	18.9	98.7	18.9	103.4	22.2
108.2	24.2	112	25.22	115.7	26.2	293.5	26.2	370	24.2
453.8	24.2	683.7	24.2	711.8	26.2	719.7	26.2	758.4	22.2
763.3	20.2	776.8	22.2	823.5	24.2	936.1	28.2	952	30.2
994.9	32.21	1120	34.21						

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.05	61.1	.03	112	.035	719.7	.016	936.1	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
66.1	108.2	108.2	107	94.6	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
141	680	42.21	F

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	27.03	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.26	Wt. n-Val.	0.030	0.030
0.017				
W.S. Elev (ft)	26.77	Reach Len. (ft)	108.20	107.00
94.60				
Crit W.S. (ft)	24.80	Flow Area (sq ft)	3.83	285.89
545.85				
E.G. Slope (ft/ft)	0.000644	Area (sq ft)	3.83	285.89
1549.40				
Q Total (cfs)	3389.00	Flow (cfs)	4.67	1218.78
2165.55				
Top Width (ft)	832.81	Top Width (ft)	3.07	42.10
787.64				
Vel Total (ft/s)	4.06	Avg. Vel. (ft/s)	1.22	4.26
3.97				
Max Chl Dpth (ft)	7.87	Hydr. Depth (ft)	1.25	6.79
2.20				
Conv. Total (cfs)	133512.7	Conv. (cfs)	184.1	48014.9
85313.7				
Length Wtd. (ft)	100.13	Wetted Per. (ft)	4.01	45.79
249.80				
Min Ch El (ft)	18.90	Shear (lb/sq ft)	0.04	0.25
0.09				
Alpha	1.01	Stream Power (lb/ft s)	0.05	1.07
0.35				
Frctn Loss (ft)	0.08	Cum Volume (acre-ft)	1.82	16.36
48.92				
C & E Loss (ft)	0.01	Cum SA (acres)	3.43	3.31
25.35				

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

CROSS SECTION

RIVER: Loma Alta Creek
REACH: Loma Alta Creek RS: 4056

INPUT
Description: P
Station Elevation Data num= 28

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	72.21	13.9	62.21	28.9	52.21	42.1	42.21	48.1	38.21
50.9	36.21	54	34.21	56.6	32.21	59.6	30.2	62.7	28.2
65.6	26.2	69	24.2	72.4	22.2	75.7	18.4	104.7	18.4
109.1	22.2	114.6	24.2	253.6	26.2	260.8	26.2	400.2	24.2
556.9	24.2	609.3	24.2	725	24.2	813.6	24.2	860.4	26.2
992.5	28.2	1058.2	30.2	1117.8	32.21				

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.05	62.7	.03	114.6	.035	725	.016	860.4	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
69	114.6	201.2	215.5	243.2	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
136	700	42.21	F

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	26.93	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.40	Wt. n-Val.	0.030	0.030
0.019				
W.S. Elev (ft)	26.53	Reach Len. (ft)	201.20	215.50
243.20				
Crit W.S. (ft)	25.55	Flow Area (sq ft)	4.61	313.48
377.55				
E.G. Slope (ft/ft)	0.001138	Area (sq ft)	4.61	313.48
1403.42				
Q Total (cfs)	3389.00	Flow (cfs)	7.79	1789.39
1591.82				
Top Width (ft)	817.23	Top Width (ft)	3.88	45.60
767.74				
Vel Total (ft/s)	4.87	Avg. Vel. (ft/s)	1.69	5.71
4.22				
Max Chl Dpth (ft)	8.13	Hydr. Depth (ft)	1.19	6.87
1.85				
Conv. Total (cfs)	100465.1	Conv. (cfs)	231.0	53045.3
47188.8				
Length Wtd. (ft)	225.09	Wetted Per. (ft)	4.53	49.64
203.79				
Min Ch El (ft)	18.40	Shear (lb/sq ft)	0.07	0.45
0.13				

Alpha	1.08	Stream Power (lb/ft s)	0.12	2.56
0.55				
Frctn Loss (ft)	0.21	Cum Volume (acre-ft)	1.81	15.63
45.71				
C & E Loss (ft)	0.02	Cum SA (acres)	3.42	3.20
23.66				

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

CROSS SECTION

RIVER: Loma Alta Creek
REACH: Loma Alta Creek RS: 3840

INPUT
Description: O
Station Elevation Data num= 26

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	72.21	33.8	62.21	72.7	52.21	101.1	42.21	105.6	40.21
111.5	38.21	119.2	36.21	134.4	32.21	138	30.2	143.5	28.2
147.3	26.2	152	24.2	156.4	22.2	160.3	20.2	164.2	17.6
198.2	17.6	207.7	20.2	231.3	24.2	785	24.2	841.7	24.2
847.5	24.2	877.5	26.2	927.9	28.2	931.9	30.2	936.2	32.21
957	42.21								

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.05	143.5	.03	231.3	.035	785	.016	847.5	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
156.4	231.3	354.4	354.4	329.3	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
250	771	40	F

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	26.70	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.33	Wt. n-Val.	0.030	0.030
0.021				
W.S. Elev (ft)	26.37	Reach Len. (ft)	59.50	59.50
59.50				
Crit W.S. (ft)	23.36	Flow Area (sq ft)	19.45	516.68
241.76				
E.G. Slope (ft/ft)	0.000794	Area (sq ft)	19.45	516.68
1371.15				
Q Total (cfs)	3389.00	Flow (cfs)	41.48	2568.47
779.06				
Top Width (ft)	734.75	Top Width (ft)	9.42	74.90
650.43				
Vel Total (ft/s)	4.36	Avg. Vel. (ft/s)	2.13	4.97
3.22				
Max Chl Dpth (ft)	8.77	Hydr. Depth (ft)	2.07	6.90
1.87				
Conv. Total (cfs)	120280.5	Conv. (cfs)	1472.1	91158.5
27649.8				

Length Wtd. (ft)	59.50	Wetted Per. (ft)	10.30	76.86
129.50				
Min Ch El (ft)	17.60	Shear (lb/sq ft)	0.09	0.33
0.09				
Alpha	1.12	Stream Power (lb/ft s)	0.20	1.66
0.30				
Frctn Loss (ft)	0.11	Cum Volume (acre-ft)	1.75	13.57
37.96				
C & E Loss (ft)	0.13	Cum SA (acres)	3.39	2.90
19.70				

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

BRIDGE

RIVER: Loma Alta Creek
REACH: Loma Alta Creek RS: 3500

INPUT
Description:
Distance from Upstream XS = 59.5
Deck/Roadway Width = 229
Weir Coefficient = 2.6
Upstream Deck/Roadway Coordinates
num= 10

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
0	55	0	126.8	50.7	0
126.8	50.7	45.7	265.9	47.6	42.6
265.9	47.6	0	773.9	49.3	0
773.9	49.3	44.3	966.7	53.7	48.7
966.7	53.7	0	1000	57.2	0

Upstream Bridge Cross Section Data
Station Elevation Data num= 26

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	72.21	33.8	62.21	72.7	52.21	101.1	42.21	105.6	40.21
111.5	38.21	119.2	36.21	134.4	32.21	138	30.2	143.5	28.2
147.3	26.2	152	24.2	156.4	22.2	160.3	20.2	164.2	17.6
198.2	17.6	207.7	20.2	231.3	24.2	785	24.2	841.7	24.2
847.5	24.2	877.5	26.2	927.9	28.2	931.9	30.2	936.2	32.21
957	42.21								

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.05	143.5	.03	231.3	.035	785	.016	847.5	.035

Bank Sta: Left	Right	Coeff Contr.	Expan.
156.4	231.3	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
250	771	40	F

Downstream Deck/Roadway Coordinates
num= 10

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
0	55	0	161.8	50.7	0
161.8	50.7	45.7	300.8	47.6	42.6
300.8	47.6	0	797.5	49.3	44.3
797.5	49.3	0	990.3	53.7	48.7
990.3	53.7	0	1000	57.2	0

Downstream Bridge Cross Section Data
Station Elevation Data num= 24

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	26.2	164	26.2	184.7	24.2	190.3	22.2	193.1	20.2
195.5	18.2	199	16.2	205.9	16.2	216.1	18.2	218.7	20.2
222.8	22.2	748.6	24.2	791.6	24.2	817.1	22.2	825	20.2
862.6	20.2	866.4	22.2	904.2	24.2	946.68	24.2	950.6	26.2
955.1	28.2	959.7	30.2	963.9	32.21	988.1	42.21		

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.035	190.3	.016	222.8	.035	791.6	.016	904.2	.035

Bank Sta: Left	Right	Coeff Contr.	Expan.
190.3	222.8	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
310	790	40	F

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

Number of Abutments = 3

Abutment Data
Upstream num= 2

Sta	Elev	Sta	Elev
126.8	45.7	168.8	18.2

Downstream num= 2

Sta	Elev	Sta	Elev
161.8	45.7	203.8	16.2

Abutment Data
Upstream num= 2

Sta	Elev	Sta	Elev
223.8	18.2	265.9	42.6

Downstream num= 2

Sta	Elev	Sta	Elev
258.8	18.2	300.8	42.6

Abutment Data
Upstream num= 2

Sta	Elev	Sta	Elev
773.9	44.3	815.8	22.2

Downstream num= 2

Sta	Elev	Sta	Elev
797.5	44.31	839.4	20.2

Number of Piers = 5

```
Pier Data
Pier Station     Upstream=   168.8    Downstream=   203.8
Upstream     num=        2
    Width   Elev    Width   Elev
       6       0       6      60
Downstream     num=        2
    Width   Elev    Width   Elev
       6       0       6      60

Pier Data
Pier Station     Upstream=   223.8    Downstream=   258.8
Upstream     num=        2
    Width   Elev    Width   Elev
       6       0       6      60
Downstream     num=        2
    Width   Elev    Width   Elev
       6       0       6      60

Pier Data
Pier Station     Upstream=   818.8    Downstream=   842.4
Upstream     num=        2
    Width   Elev    Width   Elev
       4       0       4      60
Downstream     num=        2
    Width   Elev    Width   Elev
       4       0       4      60

Pier Data
Pier Station     Upstream=   882.9    Downstream=   906.5
Upstream     num=        2
    Width   Elev    Width   Elev
       4       0       4      60
Downstream     num=        2
    Width   Elev    Width   Elev
       4       0       4      60

Pier Data
Pier Station     Upstream=   929.7    Downstream=   953.3
Upstream     num=        2
    Width   Elev    Width   Elev
       4       0       4      60
Downstream     num=        2
    Width   Elev    Width   Elev
       4       0       4      60

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
       Energy
       Momentum                Cd   =       2
Selected Low Flow Methods = Highest Energy Answer

High Flow Method
       Energy Only

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

BRIDGE OUTPUT  Profile #PF 1
```

E.G. US. (ft)	26.70	Element	Inside BR US
Inside BR DS			
W.S. US. (ft)	26.37	E.G. Elev (ft)	26.46
25.90			
Q Total (cfs)	3389.00	W.S. Elev (ft)	24.83
24.78			
Q Bridge (cfs)	3389.00	Crit W.S. (ft)	24.83
24.78			
Q Weir (cfs)		Max Chl Dpth (ft)	7.23
8.40			
Weir Sta Lft (ft)		Vel Total (ft/s)	9.99
7.91			
Weir Sta Rgt (ft)		Flow Area (sq ft)	339.37
428.20			
Weir Submerg		Froude # Chl	0.81
0.48			
Weir Max Depth (ft)		Specif Force (cu ft)	2052.26
1701.96			
Min El Weir Flow (ft)	47.61	Hydr Depth (ft)	3.18
2.45			
Min El Prs (ft)	48.48	W.P. Total (ft)	125.88
210.85			
Delta EG (ft)	1.19	Conv. Total (cfs)	40738.4
61157.7			
Delta WS (ft)	3.61	Top Width (ft)	106.62
174.89			
BR Open Area (sq ft)	5104.11	Frctn Loss (ft)	
BR Open Vel (ft/s)	9.99	C & E Loss (ft)	
Coef of Q		Shear Total (lb/sq ft)	1.16
0.39			
Br Sel Method	Energy only	Power Total (lb/ft s)	11.63
3.08			

Warning: For the final momentum answer at the bridge, the upstream energy was computed lower than
the downstream energy. This is not physically possible, the momentum answer has been
disregarded.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid,
energy was used.
Warning: The energy equation could not be balanced within the specified number of iterations. The
program used critical depth for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for
additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid,
energy was used.

CROSS SECTION

RIVER: Loma Alta Creek
REACH: Loma Alta Creek RS: 3486

INPUT
Description: N
Station Elevation Data num= 24

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	26.2	164	26.2	184.7	24.2	190.3	22.2	193.1	20.2
195.5	18.2	199	16.2	205.9	16.2	216.1	18.2	218.7	20.2
222.8	22.2	748.6	24.2	791.6	24.2	817.1	22.2	825	20.2
862.6	20.2	866.4	22.2	904.2	24.2	946.68	24.2	950.6	26.2
955.1	28.2	959.7	30.2	963.9	32.21	988.1	42.21		

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.035	190.3	.016	222.8	.035	791.6	.016	904.2	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
190.3	222.8	112.32	106.6	90.9	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
310	790	40	F

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	25.51	Element	Left OB	Channel
Right OB				
Vel Head (ft)	2.75	Wt. n-Val.	0.035	0.016
0.017				
W.S. Elev (ft)	22.76	Reach Len. (ft)	112.32	106.60
90.90				
Crit W.S. (ft)	23.72	Flow Area (sq ft)	0.44	150.02
153.91				
E.G. Slope (ft/ft)	0.004052	Area (sq ft)	0.44	150.02
160.79				
Q Total (cfs)	3389.00	Flow (cfs)	0.49	2307.89
1080.63				
Top Width (ft)	248.45	Top Width (ft)	1.57	32.50
214.38				
Vel Total (ft/s)	11.13	Avg. Vel. (ft/s)	1.11	15.38
7.02				
Max Chl Dpth (ft)	6.56	Hydr. Depth (ft)	0.28	4.62
1.00				
Conv. Total (cfs)	53241.3	Conv. (cfs)	7.7	36257.0
16976.7				
Length Wtd. (ft)	101.50	Wetted Per. (ft)	1.67	35.73
155.02				
Min Ch El (ft)	16.20	Shear (lb/sq ft)	0.07	1.06
0.25				
Alpha	1.43	Stream Power (lb/ft s)	0.07	16.34
1.76				
Frctn Loss (ft)	0.23	Cum Volume (acre-ft)	1.74	11.63
35.81				
C & E Loss (ft)	0.16	Cum SA (acres)	3.38	2.54
18.43				

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may

indicate the need for
additional cross sections.
Note: The energy method has computed a class B profile.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid,
energy was used.

CROSS SECTION

RIVER: Loma Alta Creek
REACH: Loma Alta Creek RS: 3383*

INPUT
Description:
Station Elevation Data num= 35

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	25.2	153.29	25.2	188.91	24.66	212.75	23.3	219.2	22.2
222.34	20.24	222.48	20.15	225.3	18.2	229.4	15.95	239.8	15.95
243.07	17.58	247.42	19.08	248.49	19.36	250.71	20.68	254.2	22.2
260.13	22.21	414.74	22.52	760.63	23.2	802.05	23.2	831.21	21.44
840.25	20.2	884.8	20.2	888.39	21.29	924.1	23.2	988.65	23.2
993.34	23.96	994.86	24.44	999.73	25.73	1004.02	26.78	1007.06	27.37
1014.56	28.79	1021.41	30.19	1021.76	30.25	1038.85	33.42	1060.85	37.21

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.035	219.2	.016	254.2	.035	802.05	.016	924.1	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
219.2	254.2	113.25	100.4	73.1	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
275	750	30	F

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	25.04	Element	Left OB	Channel
Right OB				
Vel Head (ft)	2.56	Wt. n-Val.	0.035	0.016
0.016				
W.S. Elev (ft)	22.49	Reach Len. (ft)	113.25	100.40
73.10				
Crit W.S. (ft)	23.55	Flow Area (sq ft)	0.24	153.17
151.03				
E.G. Slope (ft/ft)	0.003977	Area (sq ft)	0.24	153.17
166.04				
Q Total (cfs)	3389.00	Flow (cfs)	0.17	2267.16
1121.67				
Top Width (ft)	276.66	Top Width (ft)	1.67	35.00
239.98				
Vel Total (ft/s)	11.13	Avg. Vel. (ft/s)	0.72	14.80
7.43				
Max Chl Dpth (ft)	6.54	Hydr. Depth (ft)	0.14	4.38
1.28				
Conv. Total (cfs)	53737.7	Conv. (cfs)	2.7	35949.2
17785.8				
Length Wtd. (ft)	91.44	Wetted Per. (ft)	1.70	38.12
117.95				
Min Ch El (ft)	15.95	Shear (lb/sq ft)	0.03	1.00
0.32				
Alpha	1.33	Stream Power (lb/ft s)	0.03	14.77

2.36				
Frctn Loss (ft)	0.41	Cum Volume (acre-ft)	1.74	11.26
35.47				
C & E Loss (ft)	0.06	Cum SA (acres)	3.38	2.46
17.96				

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid,
water surface was used.

CROSS SECTION

RIVER: Loma Alta Creek
REACH: Loma Alta Creek RS: 3279

INPUT
Description: M
Station Elevation Data num= 22

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	24.2	173.5	24.2	248.1	22.2	251.7	20.2	255.1	18.2
259.8	15.7	273.7	15.7	276.4	18.2	280	20.2	285.6	22.2
291.3	22.2	440	22.2	812.5	22.2	855.5	20.2	907	20.2
944	22.2	1033.5	22.2	1042.1	24.2	1054.8	26.2	1079.4	28.2
1103.1	30.2	1133.6	32.21						

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.035	248.1	.016	285.6	.035	812.5	.016	944	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
248.1	285.6	49.8	48.2	58.2	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
320	800	34.21	F

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	24.64	Element	Left OB	Channel
Right OB				
Vel Head (ft)	2.69	Wt. n-Val.		0.016
0.016				
W.S. Elev (ft)	21.95	Reach Len. (ft)	9.00	9.00
9.00				
Crit W.S. (ft)	22.87	Flow Area (sq ft)		150.32
151.89				
E.G. Slope (ft/ft)	0.004556	Area (sq ft)		150.32
151.89				
Q Total (cfs)	3389.00	Flow (cfs)		2285.64
1103.36				
Top Width (ft)	158.04	Top Width (ft)		36.37
121.67				
Vel Total (ft/s)	11.21	Avg. Vel. (ft/s)		15.21
7.26				
Max Chl Dpth (ft)	6.25	Hydr. Depth (ft)		4.13
1.25				
Conv. Total (cfs)	50206.9	Conv. (cfs)		33861.0
16345.9				
Length Wtd. (ft)	9.00	Wetted Per. (ft)		39.79

121.76					
Min Ch El (ft)	15.70	Shear (lb/sq ft)			1.07
0.35					
Alpha	1.38	Stream Power (lb/ft s)			16.34
2.58					
Frctn Loss (ft)	0.39	Cum Volume (acre-ft)		1.74	10.91
35.20					
C & E Loss (ft)	0.01	Cum SA (acres)		3.38	2.38
17.66					

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid,
energy was used.

BRIDGE

RIVER: Loma Alta Creek
REACH: Loma Alta Creek RS: 3250

INPUT
Description:
Distance from Upstream XS = 9
Deck/Roadway Width = 20
Weir Coefficient = 2.6
Upstream Deck/Roadway Coordinates
num= 4

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
243.1	22.205	0	248.1	24.205	22.205	285.6	24.205	22.205
290.6	22.205	0						

Upstream Bridge Cross Section Data
Station Elevation Data num= 22

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	24.2	173.5	24.2	248.1	22.2	251.7	20.2	255.1	18.2
259.8	15.7	273.7	15.7	276.4	18.2	280	20.2	285.6	22.2
291.3	22.2	440	22.2	812.5	22.2	855.5	20.2	907	20.2
944	22.2	1033.5	22.2	1042.1	24.2	1054.8	26.2	1079.4	28.2
1103.1	30.2	1133.6	32.21						

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.035	248.1	.016	285.6	.035	812.5	.016	944	.035

Bank Sta: Left	Right	Coeff Contr.	Expan.
248.1	285.6	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
320	800	34.21	F

Downstream Deck/Roadway Coordinates
num= 4

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
250.9	22.205	0	255.9	24.205	22.205	296.4	24.205	22.205
301.4	22.205	0						

Downstream Bridge Cross Section Data
Station Elevation Data num= 21

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	24.2	164.8	24.2	255.9	22.2	262.8	20.2	265.9	18.2

268.3	15.6	283.7	15.6	287.9	18.2	291.4	20.2	296.4	22.2
313.5	22.2	866.8	20.2	879.5	18.2	896.7	18.2	910.4	20.2
943.6	22.2	1088.6	24.2	1120.2	26.2	1158.7	28.2	1189.2	30.2
1213.6	32.21								

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.035	255.9	.016	296.4	.035	866.8	.016	943.6	.035

Bank Sta: Left Right Coeff Contr. Expan.
255.9 296.4 .1 .3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	212	36.21	F
339	808	34.21	F

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

Number of Bridge Coefficient Sets = 1

Low Flow Methods and Data
Energy
Selected Low Flow Methods = Highest Energy Answer

High Flow Method
Energy Only

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

BRIDGE OUTPUT Profile #PF 1

E.G. US. (ft)	24.64	Element	Inside BR US
Inside BR DS			
W.S. US. (ft)	21.95	E.G. Elev (ft)	24.59
24.40			
Q Total (cfs)	3389.00	W.S. Elev (ft)	21.98
20.99			
Q Bridge (cfs)	2269.17	Crit W.S. (ft)	22.69
22.32			
Q Weir (cfs)		Max Chl Dpth (ft)	6.28
5.39			
Weir Sta Lft (ft)		Vel Total (ft/s)	11.05
12.79			
Weir Sta Rgt (ft)		Flow Area (sq ft)	306.64
264.91			
Weir Submerg		Froude # Chl	1.30
1.59			
Weir Max Depth (ft)		Specif Force (cu ft)	1829.42
1919.01			
Min El Weir Flow (ft)	20.21	Hydr Depth (ft)	1.93
1.78			

Min El Prs (ft)	22.21	W.P. Total (ft)	162.81
152.50			
Delta EG (ft)	0.46	Conv. Total (cfs)	51023.3
40894.1			
Delta WS (ft)	0.87	Top Width (ft)	159.28
309.81			
BR Open Area (sq ft)	159.59	Frctn Loss (ft)	0.04
0.11			
BR Open Vel (ft/s)	18.33	C & E Loss (ft)	0.03
0.08			
Coef of Q		Shear Total (lb/sq ft)	0.52
0.74			
Br Sel Method	Energy only	Power Total (lb/ft s)	5.73
9.53			

Note: Momentum answer is not valid if the water surface is above the low chord or if there is weir flow. The momentum answer has been disregarded.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Loma Alta Creek
REACH: Loma Alta Creek RS: 3231

INPUT
Description: L
Station Elevation Data num= 21

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	24.2	164.8	24.2	255.9	22.2	262.8	20.2	265.9	18.2
268.3	15.6	283.7	15.6	287.9	18.2	291.4	20.2	296.4	22.2
313.5	22.2	866.8	20.2	879.5	18.2	896.7	18.2	910.4	20.2
943.6	22.2	1088.6	24.2	1120.2	26.2	1158.7	28.2	1189.2	30.2
1213.6	32.21								

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.035	255.9	.016	296.4	.035	866.8	.016	943.6	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
255.9	296.4	365.5	439.2	669.5	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	212	36.21	F
339	808	34.21	F

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	24.18	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.10	Wt. n-Val.		0.016	

0.018					
W.S. Elev (ft)	21.08	Reach Len. (ft)	365.50	439.20	669.50
Crit W.S. (ft)	22.09	Flow Area (sq ft)		126.71	151.16
E.G. Slope (ft/ft)	0.006258	Area (sq ft)		126.71	212.89
Q Total (cfs)	3389.00	Flow (cfs)		2109.99	1279.02
Top Width (ft)	335.67	Top Width (ft)		33.84	301.83
Vel Total (ft/s)	12.20	Avg. Vel. (ft/s)		16.65	8.46
Max Chl Dpth (ft)	5.48	Hydr. Depth (ft)		3.74	1.29
Conv. Total (cfs)	42840.7	Conv. (cfs)		26672.6	16168.2
Length Wtd. (ft)	580.52	Wetted Per. (ft)		37.13	117.35
Min Ch El (ft)	15.60	Shear (lb/sq ft)		1.33	0.50
Alpha	1.34	Stream Power (lb/ft s)		22.20	4.26
Frctn Loss (ft)	0.13	Cum Volume (acre-ft)	1.74	10.88	35.17
C & E Loss (ft)	0.09	Cum SA (acres)	3.38	2.37	17.63

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid,
energy was used.

CROSS SECTION

RIVER: Loma Alta Creek
REACH: Loma Alta Creek RS: 2792

INPUT
Description: K
Station Elevation Data num= 33

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	24.2	148.8	22.2	239.7	20.2	245	18.2	251.3	14.5
274.5	14.5	280.7	18.2	286.3	18.45	326.1	20.2	586.1	20.2
603.7	18.2	610.7	16.2	617.6	14.2	624.2	12.2	632.2	12.2
637.5	14.2	645.1	16.2	671.6	16.2	683.9	14.2	689.7	12.2
694.5	12.2	697	14.2	725.3	16.2	802.5	18.2	807.4	20.2
813.5	22.2	946	24.2	969.2	26.2	984.7	28.2	1004.9	30.2
1019.4	32.21	1063.3	42.21	1090.4	52.21				

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.035	239.7	.016	286.3	.035	610.7	.016	645.1	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
245	286.3	228.9	292	385.4	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
70	197	34.21	F
323	570	32.21	F

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	20.28	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.17	Wt. n-Val.	0.016	0.016	0.026
W.S. Elev (ft)	20.11	Reach Len. (ft)	228.90	292.00	385.40
Crit W.S. (ft)	17.40	Flow Area (sq ft)	4.84	187.18	912.02
E.G. Slope (ft/ft)	0.000346	Area (sq ft)	4.84	187.18	912.04
Q Total (cfs)	3389.00	Flow (cfs)	7.76	858.09	2523.15
Top Width (ft)	304.43	Top Width (ft)	5.06	41.30	258.06
Vel Total (ft/s)	3.07	Avg. Vel. (ft/s)	1.60	4.58	2.77
Max Chl Dpth (ft)	7.91	Hydr. Depth (ft)	0.96	4.53	3.55
Conv. Total (cfs)	182092.6	Conv. (cfs)	416.8	46105.8	135570.0
Length Wtd. (ft)	358.00	Wetted Per. (ft)	5.41	43.33	260.29
Min Ch El (ft)	14.50	Shear (lb/sq ft)	0.02	0.09	0.08
Alpha	1.17	Stream Power (lb/ft s)	0.03	0.43	0.21
Frctn Loss (ft)	0.19	Cum Volume (acre-ft)	1.72	9.30	26.52
C & E Loss (ft)	0.03	Cum SA (acres)	3.36	1.99	13.33

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

CROSS SECTION

RIVER: Loma Alta Creek
REACH: Loma Alta Creek RS: 2500

INPUT
Description: J
Station Elevation Data num= 36

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	42.21	18.5	32.21	22.4	30.2	25.8	28.2	28.8	26.2
31.8	24.2	61.3	22.2	296	20.2	349.9	18.2	354	16.2
358.4	14.2	374.6	14.2	379.2	16.2	385.8	18.2	467.5	20.2
526.1	20.2	590.1	18.2	596.7	16.2	602.9	14.2	606	12.2
619.2	12.2	623	14.2	646.5	16.2	653.9	16.2	659.8	14.2

668.3	14.2	673.2	16.2	678	18.2	682.9	20.2	687.7	22.2
690.8	24.2	696.8	26.2	702.1	28.2	706.4	30.2	712.1	32.21
802.4	52.21								

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.035	349.9	.016	385.8	.035	602.9	.016	623	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
349.9	385.8	637.9	648.9	662	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
18.5	318	34.21	F
420	556	32.21	F

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	20.06	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.48	Wt. n-Val.	0.035	0.016
0.023				
W.S. Elev (ft)	19.58	Reach Len. (ft)	637.90	648.90
662.00				
Crit W.S. (ft)	17.80	Flow Area (sq ft)	25.17	152.07
480.93				
E.G. Slope (ft/ft)	0.000891	Area (sq ft)	25.69	152.07
488.55				
Q Total (cfs)	3389.00	Flow (cfs)	27.21	1071.57
2290.22				
Top Width (ft)	264.98	Top Width (ft)	37.21	35.90
191.87				
Vel Total (ft/s)	5.15	Avg. Vel. (ft/s)	1.08	7.05
4.76				
Max Chl Dpth (ft)	7.38	Hydr. Depth (ft)	0.79	4.24
3.01				
Conv. Total (cfs)	113566.8	Conv. (cfs)	911.8	35908.8
76746.2				
Length Wtd. (ft)	657.71	Wetted Per. (ft)	31.92	37.51
162.78				
Min Ch El (ft)	14.20	Shear (lb/sq ft)	0.04	0.23
0.16				
Alpha	1.17	Stream Power (lb/ft s)	0.05	1.59
0.78				
Frctn Loss (ft)	0.40	Cum Volume (acre-ft)	1.64	8.16
20.33				
C & E Loss (ft)	0.05	Cum SA (acres)	3.25	1.73
11.34				

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid,
water surface was used.

CROSS SECTION

RIVER: Loma Alta Creek
REACH: Loma Alta Creek RS: 1851

INPUT

Description: I

Station Elevation Data num= 29

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	42.21	67.7	32.21	76.8	30.2	86.2	28.2	102.2	26.2
117.2	24.2	152.1	22.2	212.4	20.2	481.7	18.2	486.6	16.2
490.8	12.2	509.5	12.2	512.3	16.2	515.9	18.2	543.3	18.2
717.7	16.2	723.2	14.2	726.4	12.2	729.4	10.2	735	10.2
745.9	12.2	749.6	14.2	785	14.2	788.7	16.2	792.4	18.2
795.3	20.2	799.3	22.2	816.7	32.21	870	62.21		

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.035	481.7	.016	515.9	.035	717.7	.016	749.6	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
481.7	515.9	66.3	63.3	65.4	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
157	443	32.21	F
551	675	30.2	F

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	19.61	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.31	Wt. n-Val.	0.035	0.016
0.022				
W.S. Elev (ft)	19.30	Reach Len. (ft)	21.55	21.55
21.55				
Crit W.S. (ft)	16.83	Flow Area (sq ft)	36.94	186.26
593.14				
E.G. Slope (ft/ft)	0.000446	Area (sq ft)	81.20	186.26
828.43				
Q Total (cfs)	3389.00	Flow (cfs)	32.10	1039.31
2317.60				
Top Width (ft)	460.17	Top Width (ft)	147.87	34.20
278.09				
Vel Total (ft/s)	4.15	Avg. Vel. (ft/s)	0.87	5.58
3.91				
Max Chl Dpth (ft)	9.10	Hydr. Depth (ft)	0.95	5.45
3.85				
Conv. Total (cfs)	160531.1	Conv. (cfs)	1520.3	49230.3
109780.5				
Length Wtd. (ft)	21.55	Wetted Per. (ft)	38.70	38.79
157.67				
Min Ch El (ft)	12.20	Shear (lb/sq ft)	0.03	0.13
0.10				
Alpha	1.16	Stream Power (lb/ft s)	0.02	0.75
0.41				
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.86	5.64
10.32				
C & E Loss (ft)	0.00	Cum SA (acres)	1.89	1.21
7.77				

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

BRIDGE

RIVER: Loma Alta Creek
REACH: Loma Alta Creek RS: 1800

INPUT
Description:
Distance from Upstream XS = 21.55
Deck/Roadway Width = 20
Weir Coefficient = 2.6
Upstream Deck/Roadway Coordinates
num= 4

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
476.7	18.205	0	481.7	20.205	18.205	515.9	20.205	18.205
520.9	18.205	0						

Upstream Bridge Cross Section Data
Station Elevation Data num= 29

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	42.21	67.7	32.21	76.8	30.2	86.2	28.2	102.2	26.2
117.2	24.2	152.1	22.2	212.4	20.2	481.7	18.2	486.6	16.2
490.8	12.2	509.5	12.2	512.3	16.2	515.9	18.2	543.3	18.2
717.7	16.2	723.2	14.2	726.4	12.2	729.4	10.2	735	10.2
745.9	12.2	749.6	14.2	785	14.2	788.7	16.2	792.4	18.2
795.3	20.2	799.3	22.2	816.7	32.21	870	62.21		

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.035	481.7	.016	515.9	.035	717.7	.016	749.6	.035

Bank Sta: Left Right Coeff Contr. Expan.
481.7 515.9 .1 .3
Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
157	443	32.21	F
551	675	30.2	F

Downstream Deck/Roadway Coordinates
num= 4

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
419.4	18.205	0	424.4	20.205	18.205	466.7	20.205	18.205
471.7	18.205	0						

Downstream Bridge Cross Section Data
Station Elevation Data num= 34

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	42.21	49.6	32.21	55.9	30.2	62.7	28.2	68.5	26.2
74.4	24.2	81.8	22.2	110.3	20.2	424.4	18.2	428.8	16.2
433.3	14.2	446.5	12.1	446.8	12.1	454.9	14.2	457.2	16.2
461.6	17.13	466.7	18.2	476.2	18.2	661.8	18.2	666.1	16.2
670	14.2	673.2	12.2	675.7	10.2	682.7	10.2	687.5	12.2
690.8	14.2	732.7	16.2	736.1	18.2	739.2	20.2	742.2	22.2
758.4	32.21	775.3	42.21	791.8	52.21	809	62.21		

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.035	424.4	.016	461.6	.035	661.8	.016	690.8	.035

Bank Sta: Left Right Coeff Contr. Expan.
424.4 466.7 .1 .3
Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
117	384	32.21	F
500	622	30.2	F

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

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
       Energy
Selected Low Flow Methods = Highest Energy Answer

High Flow Method
       Energy Only

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

BRIDGE OUTPUT  Profile #PF 1


  E.G. US. (ft)                19.61    Element                Inside BR US
Inside BR DS
  W.S. US. (ft)                19.30    E.G. Elev (ft)               19.60
19.54
  Q Total (cfs)              3389.00    W.S. Elev (ft)               19.27
18.89
  Q Bridge (cfs)              570.96    Crit W.S. (ft)               16.83
17.39
  Q Weir (cfs)                          Max Chl Dpth (ft)             7.07
 6.79
  Weir Sta Lft (ft)                     Vel Total (ft/s)              4.43
 6.19
  Weir Sta Rgt (ft)                     Flow Area (sq ft)           765.41
547.09
  Weir Submerg                          Froude # Chl                  0.34
 0.54
  Weir Max Depth (ft)                   Specif Force (cu ft)        2600.77
2039.94
  Min El Weir Flow (ft)        10.21    Hydr Depth (ft)               4.07
 3.00
  Min El Prs (ft)              18.21    W.P. Total (ft)             265.04
273.34
  Delta EG (ft)                 0.13    Conv. Total (cfs)         131978.2
86766.4
  Delta WS (ft)                 0.36    Top Width (ft)              417.20
371.72
  BR Open Area (sq ft)        143.89    Frctn Loss (ft)               0.02
 0.03
  BR Open Vel (ft/s)            3.97    C & E Loss (ft)               0.03
 0.03
  Coef of Q                             Shear Total (lb/sq ft)        0.12
 0.19
  Br Sel Method          Energy only    Power Total (lb/ft s)         0.53
 1.18
```

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.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid,
energy was used.
Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid,
energy was used.

CROSS SECTION

RIVER: Loma Alta Creek
REACH: Loma Alta Creek RS: 1787

INPUT
Description: H
Station Elevation Data num= 34

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	42.21	49.6	32.21	55.9	30.2	62.7	28.2	68.5	26.2
74.4	24.2	81.8	22.2	110.3	20.2	424.4	18.2	428.8	16.2
433.3	14.2	446.5	12.1	446.8	12.1	454.9	14.2	457.2	16.2
461.6	17.13	466.7	18.2	476.2	18.2	661.8	18.2	666.1	16.2
670	14.2	673.2	12.2	675.7	10.2	682.7	10.2	687.5	12.2
690.8	14.2	732.7	16.2	736.1	18.2	739.2	20.2	742.2	22.2
758.4	32.21	775.3	42.21	791.8	52.21	809	62.21		

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.035	424.4	.016	461.6	.035	661.8	.016	690.8	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
424.4	466.7	212.1	190.1	172.6	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
117	384	32.21	F
500	622	30.2	F

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	19.48	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.55	Wt. n-Val.	0.035	0.019	0.021
W.S. Elev (ft)	18.94	Reach Len. (ft)	212.10	190.10	172.60
Crit W.S. (ft)	17.40	Flow Area (sq ft)	24.63	174.90	393.93
E.G. Slope (ft/ft)	0.001056	Area (sq ft)	42.79	174.90	483.99
Q Total (cfs)	3389.00	Flow (cfs)	24.43	1125.23	2239.34
Top Width (ft)	428.78	Top Width (ft)	115.94	42.30	270.54
Vel Total (ft/s)	5.71	Avg. Vel. (ft/s)	0.99	6.43	5.68
Max Chl Dpth (ft)	8.74	Hydr. Depth (ft)	0.61	4.13	

2.65					
Conv. Total (cfs)	104287.4	Conv. (cfs)	751.7	34626.0	68909.7
Length Wtd. (ft)	179.65	Wetted Per. (ft)	40.40	44.55	152.51
Min Ch El (ft)	12.10	Shear (lb/sq ft)	0.04	0.26	0.17
Alpha	1.08	Stream Power (lb/ft s)	0.04	1.67	0.97
Frctn Loss (ft)	0.20	Cum Volume (acre-ft)	0.77	5.41	9.38
C & E Loss (ft)	0.03	Cum SA (acres)	1.71	1.19	7.37

Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Loma Alta Creek
REACH: Loma Alta Creek RS: 1582*

INPUT
Description:
Station Elevation Data num= 47

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	38.21	40.31	30.09	45.43	28.57	50.96	27.03	55.67	25.53
60.47	24.03	66.48	22.48	74.18	21.76	89.65	20.49	101.25	20.14
124.81	19.35	344.93	17.53	348.41	15.91	351.97	14.27	352.81	14.09
362.4	11.67	368.8	11.67	375.59	14.07	376.3	14.27	378.43	15.81
382.5	16.82	389.05	17.53	401.26	17.53	639.7	17.53	643.62	15.58
643.92	15.42	647.17	13.74	648.64	12.86	650.09	11.94	652.37	10.2
659.53	10.2	661.19	11.17	662.5	12.07	666.12	13.4	666.84	13.62
671.87	15.53	708.76	17.24	711.75	18.61	714.48	19.97	717.12	21.33
731.38	28.15	737.08	30.76	746.26	35.4	748.75	36.68	760.69	42.83
760.79	42.88	775.93	50.21						

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.035	344.93	.016	382.5	.035	639.7	.016	671.87	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
344.93	389.05	212.2	212.3	212	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
90	320	32.21	F
400	622	30.2	F

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	19.25	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.86	Wt. n-Val.	0.035	0.016	0.018
W.S. Elev (ft)	18.39	Reach Len. (ft)	212.20	212.30	212.00
Crit W.S. (ft)	17.78	Flow Area (sq ft)	18.82	180.88	

276.64					
E.G. Slope (ft/ft)	0.001202	Area (sq ft)	44.53	180.88	
467.14					
Q Total (cfs)	3389.00	Flow (cfs)	22.98	1499.29	
1866.74					
Top Width (ft)	470.12	Top Width (ft)	103.79	44.12	
322.22					
Vel Total (ft/s)	7.11	Avg. Vel. (ft/s)	1.22	8.29	
6.75					
Max Chl Dpth (ft)	8.19	Hydr. Depth (ft)	0.76	4.10	
2.76					
Conv. Total (cfs)	97741.9	Conv. (cfs)	662.7	43240.8	
53838.4					
Length Wtd. (ft)	212.14	Wetted Per. (ft)	24.93	46.26	
103.67					
Min Ch El (ft)	11.67	Shear (lb/sq ft)	0.06	0.29	
0.20					
Alpha	1.10	Stream Power (lb/ft s)	0.07	2.43	
1.35					
Frctn Loss (ft)	0.26	Cum Volume (acre-ft)	0.56	4.64	
7.50					
C & E Loss (ft)	0.01	Cum SA (acres)	1.17	1.00	
6.20					

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

CROSS SECTION

RIVER: Loma Alta Creek
REACH: Loma Alta Creek RS: 1378*

INPUT
Description:
Station Elevation Data num= 47

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	34.2	31.03	27.97	34.97	26.93	39.22	25.87	42.85	24.86
46.54	23.85	51.17	22.75	57.09	21.98	68.99	20.77	77.93	20.17
96.05	18.77	265.47	16.87	268.02	15.61	270.63	14.34	271.26	14.14
278.3	11.24	290.8	11.24	297.05	14.13	297.7	14.34	299.65	15.41
303.4	16.51	311.4	16.87	326.31	16.87	617.6	16.87	621.14	14.96
621.41	14.81	624.34	13.28	625.67	12.53	626.98	11.68	629.03	10.2
636.37	10.2	638.6	11.68	640.35	13.14	645.21	14.8	646.18	15.04
652.93	16.87	684.81	18.29	687.4	19.02	689.76	19.74	692.04	20.46
704.37	24.09	709.29	25.48	717.23	28.59	719.37	29.44	729.7	33.51
729.78	33.55	742.87	38.2						

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.035	265.47	.016	303.4	.035	617.6	.016	652.93	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
265.47	303.4	212.2	212.4	212.5	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
31.03	215	30	F
325	580	30	F

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	18.98	Element	Left OB	Channel
Right OB				
Vel Head (ft)	0.96	Wt. n-Val.	0.035	0.016
0.018				
W.S. Elev (ft)	18.02	Reach Len. (ft)	212.20	212.40
212.50				
Crit W.S. (ft)	17.62	Flow Area (sq ft)	43.95	186.95
253.47				
E.G. Slope (ft/ft)	0.001255	Area (sq ft)	59.36	186.95
547.70				
Q Total (cfs)	3389.00	Flow (cfs)	60.28	1713.15
1615.57				
Top Width (ft)	516.25	Top Width (ft)	102.89	37.93
375.43				
Vel Total (ft/s)	7.00	Avg. Vel. (ft/s)	1.37	9.16
6.37				
Max Chl Dpth (ft)	7.82	Hydr. Depth (ft)	0.87	4.93
2.10				
Conv. Total (cfs)	95654.4	Conv. (cfs)	1701.5	48353.6
45599.3				
Length Wtd. (ft)	212.44	Wetted Per. (ft)	50.47	40.22
123.82				
Min Ch El (ft)	11.24	Shear (lb/sq ft)	0.07	0.36
0.16				
Alpha	1.26	Stream Power (lb/ft s)	0.09	3.34
1.02				
Frctn Loss (ft)	0.33	Cum Volume (acre-ft)	0.31	3.74
5.03				
C & E Loss (ft)	0.06	Cum SA (acres)	0.67	0.80
4.50				

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for
additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid,
water surface was used.

CROSS SECTION

RIVER: Loma Alta Creek
REACH: Loma Alta Creek RS: 1173

INPUT
Description:
Station Elevation Data num= 23

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	30.2	40	22.2	54.6	20.2	67.3	18.2	186	16.2
189.7	14.2	194.2	10.81	212.8	10.81	218.5	14.2	224.3	16.2
595.5	16.2	598.9	14.2	602.7	12.2	605.7	10.2	613.2	10.2
616	12.2	618.2	14.2	624.3	16.2	634	18.2	681.5	20.2
690	22.2	698.7	24.2	709.8	26.2				

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.035	186	.016	224.3	.035	598.9	.016	618.2	.035

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

186 224.3 81.3 72.1 57.5 .1 .3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
25	150	28	F
256	586	28	F

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	18.60	Element	Left OB	Channel
Right OB				
Vel Head (ft)	1.55	Wt. n-Val.	0.035	0.016
0.017				
W.S. Elev (ft)	17.05	Reach Len. (ft)	81.30	72.10
57.50				
Crit W.S. (ft)	17.05	Flow Area (sq ft)	19.62	179.94
162.63				
E.G. Slope (ft/ft)	0.001948	Area (sq ft)	21.36	179.94
442.60				
Q Total (cfs)	3389.00	Flow (cfs)	24.53	1970.40
1394.07				
Top Width (ft)	492.77	Top Width (ft)	50.35	38.30
404.11				
Vel Total (ft/s)	9.36	Avg. Vel. (ft/s)	1.25	10.95
8.57				
Max Chl Dpth (ft)	6.85	Hydr. Depth (ft)	0.55	4.70
2.19				
Conv. Total (cfs)	76784.6	Conv. (cfs)	555.9	44643.4
31585.3				
Length Wtd. (ft)	65.91	Wetted Per. (ft)	36.01	41.21
77.58				
Min Ch El (ft)	10.81	Shear (lb/sq ft)	0.07	0.53
0.25				
Alpha	1.14	Stream Power (lb/ft s)	0.08	5.82
2.19				
Frctn Loss (ft)	0.13	Cum Volume (acre-ft)	0.11	2.84
2.61				
C & E Loss (ft)	0.01	Cum SA (acres)	0.30	0.62
2.60				

Warning: The energy equation could not be balanced within the specified number of iterations. The
program selected the water surface that had the least amount of error between computed and
assumed values.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical
depth, the calculated water surface came back below critical depth. This indicates that there
is not a valid subcritical answer. The program defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid,
water surface was used.

CROSS SECTION

RIVER: Loma Alta Creek
REACH: Loma Alta Creek RS: 1096*

INPUT
Description:
Station Elevation Data num= 47

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	33.54	16.28	30.81	35.02	27.77	42.09	26.68	57.46	24.92
59.25	24.69	70.82	23.22	83.59	22.73	88.77	22.01	92.32	21.3
95.77	20.6	98.87	19.9	102.69	19.19	106.14	18.49	114.15	17.74
195.73	16.2	199.46	14.25	199.77	14.05	204	10.64	223.23	10.64
228.14	14.08	228.4	14.23	233.67	16.2	494.3	16.2	498	14.23
498.17	14.14	501.61	12.37	502.14	12.11	505.4	10.2	514.1	10.2
516.48	11.71	518.35	13.18	523.09	14.75	523.53	14.9	531.77	16.87
567.09	17.89	586.81	18.08	665.03	18.87	669.1	19.09	688.88	20.84
689.65	20.91	702.98	22.3	713.29	23.47	714.31	23.58	724.36	24.01
730.4	27.6	744.43	31.2						

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.035	195.73	.016	233.67	.035	498	.016	523.09	.035

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
195.73 233.67 80.4 81.1 82.2 .1 .3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
42.09	175	28	F
255	472.6	28	F

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	18.42	Element	Left OB	Channel
Right OB				
Vel Head (ft)	1.94	Wt. n-Val.	0.035	0.016
0.016				
W.S. Elev (ft)	16.48	Reach Len. (ft)	80.40	81.10
82.20				
Crit W.S. (ft)	16.83	Flow Area (sq ft)	2.15	162.88
141.40				
E.G. Slope (ft/ft)	0.002505	Area (sq ft)	2.15	162.88
203.37				
Q Total (cfs)	3389.00	Flow (cfs)	1.24	1894.14
1493.62				
Top Width (ft)	349.51	Top Width (ft)	15.09	37.94
296.49				
Vel Total (ft/s)	11.06	Avg. Vel. (ft/s)	0.58	11.63
10.56				
Max Chl Dpth (ft)	6.28	Hydr. Depth (ft)	0.14	4.29
1.79				
Conv. Total (cfs)	67708.3	Conv. (cfs)	24.9	37842.7
29840.7				
Length Wtd. (ft)	81.60	Wetted Per. (ft)	15.09	41.16
81.82				
Min Ch El (ft)	10.64	Shear (lb/sq ft)	0.02	0.62
0.27				
Alpha	1.02	Stream Power (lb/ft s)	0.01	7.20
2.86				
Frctn Loss (ft)	0.15	Cum Volume (acre-ft)	0.09	2.56
2.19				
C & E Loss (ft)	0.04	Cum SA (acres)	0.24	0.55
2.13				

Note: Multiple critical depths were found at this location. The critical depth

with the lowest, valid,
water surface was used.

CROSS SECTION

RIVER: Loma Alta Creek
REACH: Loma Alta Creek RS: 1020*

INPUT
Description:
Station Elevation Data num= 47

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	36.87	17.09	34.51	36.76	31.99	44.19	31.15	60.31	29.64
62.19	29.45	74.34	28.24	87.74	27.47	93.19	26.1	96.91	24.75
100.54	23.4	103.78	22.05	107.79	20.7	111.42	19.34	119.82	17.97
205.47	16.2	209.23	14.3	209.53	14.12	213.8	10.47	233.67	10.47
238.07	14.14	238.31	14.26	243.03	16.2	393.1	16.2	397.1	14.26
397.29	14.17	401.01	12.28	401.57	12.02	405.1	10.2	415	10.2
416.96	11.22	418.49	12.16	422.39	13.48	422.76	13.6	429.53	15.53
487.6	17.04	520.01	17.14	648.57	17.53	655.25	17.65	687.76	19.48
689.02	19.55	710.94	21.25	727.88	22.75	729.55	22.89	746.08	23.1
756	29.91	779.07	36.21						

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.035	205.47	.016	243.03	.035	397.1	.016	422.39	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
205.47	243.03	80	76.86	71.1	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
94.95	175	25	F
250	375	25	F

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	18.18	Element	Left OB	Channel
Right OB				
Vel Head (ft)	2.12	Wt. n-Val.		0.016
0.016				
W.S. Elev (ft)	16.07	Reach Len. (ft)	80.00	76.86
71.10				
Crit W.S. (ft)	16.63	Flow Area (sq ft)		151.93
138.55				
E.G. Slope (ft/ft)	0.002786	Area (sq ft)		151.93
138.55				
Q Total (cfs)	3389.00	Flow (cfs)		1797.75
1591.25				
Top Width (ft)	93.76	Top Width (ft)		36.97
56.79				
Vel Total (ft/s)	11.67	Avg. Vel. (ft/s)		11.83
11.48				
Max Chl Dpth (ft)	5.87	Hydr. Depth (ft)		4.11
2.44				
Conv. Total (cfs)	64209.1	Conv. (cfs)		34060.8
30148.2				
Length Wtd. (ft)	74.11	Wetted Per. (ft)		40.50
59.21				
Min Ch El (ft)	10.47	Shear (lb/sq ft)		0.65
0.41				
Alpha	1.00	Stream Power (lb/ft s)		7.72

4.67				
Frctn Loss (ft)	0.22	Cum Volume (acre-ft)	0.09	2.27
1.86				
C & E Loss (ft)	0.02	Cum SA (acres)	0.22	0.48
1.80				

Warning: Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid,
water surface was used.

CROSS SECTION

RIVER: Loma Alta Creek
REACH: Loma Alta Creek RS: 943

INPUT
Description: G
Station Elevation Data num= 34

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	40.21	17.9	38.21	38.5	36.21	65.14	34.21	91.9	32.21
97.6	30.2	101.5	28.2	105.3	26.2	108.7	24.2	112.9	22.2
116.7	20.2	125.5	18.2	215.2	16.2	219.3	14.2	223.6	10.3
244.1	10.3	248	14.2	252.4	16.2	291.9	16.2	296.4	14.2
300.4	12.2	304.8	10.2	315.9	10.2	321.7	12.2	327.3	14.2
408.1	16.2	453.2	16.2	641.4	16.2	688.4	18.2	718.9	20.2
744.8	22.2	767.8	22.2	781.6	32.21	813.7	41.21		

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.035	215.2	.016	252.4	.035	296.4	.016	327.3	.035

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
215.2	252.4	381.2	371.7	369.6	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
350	813.7	28	F

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	17.87	Element	Left OB	Channel
Right OB				
Vel Head (ft)	2.68	Wt. n-Val.		0.016
0.016				
W.S. Elev (ft)	15.19	Reach Len. (ft)	381.20	371.70
369.60				
Crit W.S. (ft)	15.89	Flow Area (sq ft)		126.54
132.57				
E.G. Slope (ft/ft)	0.004181	Area (sq ft)		126.54
136.33				
Q Total (cfs)	3389.00	Flow (cfs)		1741.06
1647.95				
Top Width (ft)	106.18	Top Width (ft)		32.92
73.26				
Vel Total (ft/s)	13.08	Avg. Vel. (ft/s)		13.76
12.43				
Max Chl Dpth (ft)	4.99	Hydr. Depth (ft)		3.84
2.37				
Conv. Total (cfs)	52413.5	Conv. (cfs)		26926.7

25486.7					
Length Wtd. (ft)	371.17	Wetted Per. (ft)			36.49
57.64					
Min Ch El (ft)	10.30	Shear (lb/sq ft)			0.91
0.60					
Alpha	1.01	Stream Power (lb/ft s)			12.45
7.46					
Frctn Loss (ft)	0.25	Cum Volume (acre-ft)		0.09	2.02
1.64					
C & E Loss (ft)	0.06	Cum SA (acres)		0.22	0.42
1.70					

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for
additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid,
water surface was used.

CROSS SECTION

RIVER: Loma Alta Creek
REACH: Loma Alta Creek RS: 571

INPUT
Description: F
Station Elevation Data num= 21

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	19.2	24.6	18.2	157.4	16.2	283.8	14.2	286.5	9.1
336	9.1	349.8	14.2	648.7	14.2	785.6	18.2	894.8	20.2
901.3	22.2	907.3	24.2	913.6	26.2	919.9	28.2	955.3	30.2
959.4	32.21	964.6	36.21	995.2	38.21	1030.2	40.21	1070.3	42.21
1089.7	43.21								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.035	283.8	.016	349.8	.035

Bank Sta: Left	Right	Coeff Contr.	Expan.
283.8	349.8	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
0	260	28.2	F
400	1089.7	28.2	F

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	16.39	Element		Left OB	Channel
Right OB					
Vel Head (ft)	1.39	Wt. n-Val.		0.035	0.016
0.035					
W.S. Elev (ft)	15.00	Reach Len. (ft)			
Crit W.S. (ft)	14.08	Flow Area (sq ft)		14.56	347.33
40.16					
E.G. Slope (ft/ft)	0.001252	Area (sq ft)		20.22	347.33
250.07					
Q Total (cfs)	3389.00	Flow (cfs)		15.76	3321.24

52.00				
Top Width (ft)	442.84	Top Width (ft)	50.56	66.00
326.28				
Vel Total (ft/s)	8.43	Avg. Vel. (ft/s)	1.08	9.56
1.29				
Max Chl Dpth (ft)	5.90	Hydr. Depth (ft)	0.61	5.26
0.80				
Conv. Total (cfs)	95766.1	Conv. (cfs)	445.4	93851.4
1469.3				
Length Wtd. (ft)		Wetted Per. (ft)	23.80	69.98
50.20				
Min Ch El (ft)	9.10	Shear (lb/sq ft)	0.05	0.39
0.06				
Alpha	1.26	Stream Power (lb/ft s)	0.05	3.71
0.08				
Frctn Loss (ft)		Cum Volume (acre-ft)		
C & E Loss (ft)		Cum SA (acres)		

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

SUMMARY OF MANNING'S N VALUES

River:Loma Alta Creek

Reach	River Sta.	n1	n2	n3	n4	n5
Loma Alta Creek	6165	.03	.016	.016		
Loma Alta Creek	5292	.05	.016	.035	.016	.035
Loma Alta Creek	4864	.05	.016	.035	.016	.035
Loma Alta Creek	4819	.05	.016	.035	.016	.035
Loma Alta Creek	4163	.05	.03	.035	.016	.035
Loma Alta Creek	4056	.05	.03	.035	.016	.035
Loma Alta Creek	3840	.05	.03	.035	.016	.035
Loma Alta Creek	3500	Bridge				
Loma Alta Creek	3486	.035	.016	.035	.016	.035
Loma Alta Creek	3383*	.035	.016	.035	.016	.035
Loma Alta Creek	3279	.035	.016	.035	.016	.035
Loma Alta Creek	3250	Bridge				
Loma Alta Creek	3231	.035	.016	.035	.016	.035

Loma Alta Creek	2792	.035	.016	.035	.016	.035
Loma Alta Creek	2500	.035	.016	.035	.016	.035
Loma Alta Creek	1851	.035	.016	.035	.016	.035
Loma Alta Creek	1800	Bridge				
Loma Alta Creek	1787	.035	.016	.035	.016	.035
Loma Alta Creek	1582*	.035	.016	.035	.016	.035
Loma Alta Creek	1378*	.035	.016	.035	.016	.035
Loma Alta Creek	1173	.035	.016	.035	.016	.035
Loma Alta Creek	1096*	.035	.016	.035	.016	.035
Loma Alta Creek	1020*	.035	.016	.035	.016	.035
Loma Alta Creek	943	.035	.016	.035	.016	.035
Loma Alta Creek	571	.035	.016	.035		

SUMMARY OF REACH LENGTHS

River: Loma Alta Creek

Reach	River Sta.	Left	Channel	Right
Loma Alta Creek	6165	806	880.3	719.9
Loma Alta Creek	5292	409.2	427.2	354.9
Loma Alta Creek	4864	46.2	45.6	40
Loma Alta Creek	4819	645.9	655.9	749.4
Loma Alta Creek	4163	108.2	107	94.6
Loma Alta Creek	4056	201.2	215.5	243.2
Loma Alta Creek	3840	354.4	354.4	329.3
Loma Alta Creek	3500	Bridge		
Loma Alta Creek	3486	112.32	106.6	90.9
Loma Alta Creek	3383*	113.25	100.4	73.1
Loma Alta Creek	3279	49.8	48.2	58.2
Loma Alta Creek	3250	Bridge		
Loma Alta Creek	3231	365.5	439.2	669.5
Loma Alta Creek	2792	228.9	292	385.4
Loma Alta Creek	2500	637.9	648.9	662
Loma Alta Creek	1851	66.3	63.3	65.4
Loma Alta Creek	1800	Bridge		
Loma Alta Creek	1787	212.1	190.1	172.6
Loma Alta Creek	1582*	212.2	212.3	212
Loma Alta Creek	1378*	212.2	212.4	212.5
Loma Alta Creek	1173	81.3	72.1	57.5
Loma Alta Creek	1096*	80.4	81.1	82.2
Loma Alta Creek	1020*	80	76.86	71.1
Loma Alta Creek	943	381.2	371.7	369.6
Loma Alta Creek	571			

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: Loma Alta Creek

Reach	River Sta.	Contr.	Expan.
Loma Alta Creek	6165	.1	.3
Loma Alta Creek	5292	.1	.3
Loma Alta Creek	4864	.1	.3
Loma Alta Creek	4819	.1	.3
Loma Alta Creek	4163	.1	.3
Loma Alta Creek	4056	.1	.3
Loma Alta Creek	3840	.1	.3
Loma Alta Creek	3500	Bridge	
Loma Alta Creek	3486	.1	.3
Loma Alta Creek	3383*	.1	.3
Loma Alta Creek	3279	.1	.3
Loma Alta Creek	3250	Bridge	
Loma Alta Creek	3231	.1	.3
Loma Alta Creek	2792	.1	.3
Loma Alta Creek	2500	.1	.3
Loma Alta Creek	1851	.1	.3
Loma Alta Creek	1800	Bridge	
Loma Alta Creek	1787	.1	.3
Loma Alta Creek	1582*	.1	.3
Loma Alta Creek	1378*	.1	.3
Loma Alta Creek	1173	.1	.3
Loma Alta Creek	1096*	.1	.3
Loma Alta Creek	1020*	.1	.3
Loma Alta Creek	943	.1	.3
Loma Alta Creek	571	.1	.3

Profile Output Table - Standard Table 1

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit
W.S. E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude #	Chl
(ft) (ft)	(ft/ft)	(ft/s)	(cfs) (sq ft)	(ft)	(ft)	
Loma Alta Creek	6165	PF 1	3389.00	26.20	33.40	
33.84 35.06	0.001724	11.26	415.64	228.26		0.86
Loma Alta Creek	5292	PF 1	3389.00	24.50	29.20	
30.14 32.42	0.006215	16.71	327.37	381.95		1.52
Loma Alta Creek	4864	PF 1	3389.00	22.66	27.77	
28.63 30.22	0.003889	15.20	362.54	741.22		1.25
Loma Alta Creek	4819	PF 1	3389.00	22.45	27.62	
28.46 30.05	0.003977	15.28	392.55	744.99		1.26
Loma Alta Creek	4163	PF 1	3389.00	18.90	26.77	
24.80 27.03	0.000644	4.26	835.57	832.81		0.29
Loma Alta Creek	4056	PF 1	3389.00	18.40	26.53	
25.55 26.93	0.001138	5.71	695.64	817.23		0.38
Loma Alta Creek	3840	PF 1	3389.00	17.60	26.37	
23.36 26.70	0.000794	4.97	777.89	734.75		0.33
Loma Alta Creek	3500		Bridge			
Loma Alta Creek	3486	PF 1	3389.00	16.20	22.76	
23.72 25.51	0.004052	15.38	304.37	248.45		1.26
Loma Alta Creek	3383*	PF 1	3389.00	15.95	22.49	
23.55 25.04	0.003977	14.80	304.44	276.66		1.25
Loma Alta Creek	3279	PF 1	3389.00	15.70	21.95	

22.87	24.64	0.004556	15.21	302.21	158.04		1.32
Loma Alta Creek	3250			Bridge			
Loma Alta Creek	3231		PF 1	3389.00	15.60	21.08	
22.09	24.18	0.006258	16.65	277.87	335.67		1.52
Loma Alta Creek	2792		PF 1	3389.00	14.50	20.11	
17.40	20.28	0.000346	4.58	1104.03	304.43		0.38
Loma Alta Creek	2500		PF 1	3389.00	14.20	19.58	
17.80	20.06	0.000891	7.05	658.16	264.98		0.60
Loma Alta Creek	1851		PF 1	3389.00	12.20	19.30	
16.83	19.61	0.000446	5.58	816.34	460.17		0.42
Loma Alta Creek	1800			Bridge			
Loma Alta Creek	1787		PF 1	3389.00	12.10	18.94	
17.40	19.48	0.001056	6.43	593.46	428.78		0.56
Loma Alta Creek	1582*		PF 1	3389.00	11.67	18.39	
17.78	19.25	0.001202	8.29	476.34	470.12		0.72
Loma Alta Creek	1378*		PF 1	3389.00	11.24	18.02	
17.62	18.98	0.001255	9.16	484.37	516.25		0.73
Loma Alta Creek	1173		PF 1	3389.00	10.81	17.05	
17.05	18.60	0.001948	10.95	362.19	492.77		0.89
Loma Alta Creek	1096*		PF 1	3389.00	10.64	16.48	
16.83	18.42	0.002505	11.63	306.43	349.51		0.99
Loma Alta Creek	1020*		PF 1	3389.00	10.47	16.07	
16.63	18.18	0.002786	11.83	290.48	93.76		1.03
Loma Alta Creek	943		PF 1	3389.00	10.30	15.19	
15.89	17.87	0.004181	13.76	259.11	106.18		1.24
Loma Alta Creek	571		PF 1	3389.00	9.10	15.00	
14.08	16.39	0.001252	9.56	402.04	442.84		0.73

ERRORS WARNINGS AND NOTES
Errors Warnings and Notes for Plan : LA_Prop

River: Loma Alta Creek Reach: Loma Alta Creek RS: 6165 Profile: PF 1
Warning:Divided flow computed for this cross-section.
River: Loma Alta Creek Reach: Loma Alta Creek RS: 5292 Profile: PF 1
Warning:Divided flow computed for this cross-section.
Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate
the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was
used.
River: Loma Alta Creek Reach: Loma Alta Creek RS: 4864 Profile: PF 1
Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate
the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was
used.
River: Loma Alta Creek Reach: Loma Alta Creek RS: 4819 Profile: PF 1
Note: Multiple critical depths were found at this location. The critical

depth with the lowest, valid, water surface was
used.
River: Loma Alta Creek Reach: Loma Alta Creek RS: 4163 Profile: PF 1
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was
used.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
River: Loma Alta Creek Reach: Loma Alta Creek RS: 4056 Profile: PF 1
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was
used.
River: Loma Alta Creek Reach: Loma Alta Creek RS: 3840 Profile: PF 1
Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
River: Loma Alta Creek Reach: Loma Alta Creek RS: 3500 Profile: PF 1
Warning:For the final momentum answer at the bridge, the upstream energy was computed lower than the downstream energy. This
is not physically possible, the momentum answer has been disregarded.
River: Loma Alta Creek Reach: Loma Alta Creek RS: 3500 Profile: PF 1
Upstream
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
River: Loma Alta Creek Reach: Loma Alta Creek RS: 3500 Profile: PF 1
Downstream
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
River: Loma Alta Creek Reach: Loma Alta Creek RS: 3486 Profile: PF 1
Warning:Divided flow computed for this cross-section.
Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Note: The energy method has computed a class B profile.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
River: Loma Alta Creek Reach: Loma Alta Creek RS: 3383* Profile: PF 1
Warning:Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was
used.
River: Loma Alta Creek Reach: Loma Alta Creek RS: 3279 Profile: PF 1
Warning:Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
River: Loma Alta Creek Reach: Loma Alta Creek RS: 3250 Profile: PF 1
Note: Momentum answer is not valid if the water surface is above the low chord or if there is weir flow. The momentum
answer has been disregarded.
River: Loma Alta Creek Reach: Loma Alta Creek RS: 3250 Profile: PF 1
Upstream
Note: Multiple critical depths were found at this location. The critical

depth with the lowest, valid, energy was used.
River: Loma Alta Creek Reach: Loma Alta Creek RS: 3250 Profile: PF 1
Downstream
Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
River: Loma Alta Creek Reach: Loma Alta Creek RS: 3231 Profile: PF 1
Warning:Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
River: Loma Alta Creek Reach: Loma Alta Creek RS: 2792 Profile: PF 1
Warning:Divided flow computed for this cross-section.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was
used.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
River: Loma Alta Creek Reach: Loma Alta Creek RS: 2500 Profile: PF 1
Warning:Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was
used.
River: Loma Alta Creek Reach: Loma Alta Creek RS: 1851 Profile: PF 1
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
River: Loma Alta Creek Reach: Loma Alta Creek RS: 1800 Profile: PF 1
Upstream
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
River: Loma Alta Creek Reach: Loma Alta Creek RS: 1800 Profile: PF 1
Downstream
Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
River: Loma Alta Creek Reach: Loma Alta Creek RS: 1787 Profile: PF 1
Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
River: Loma Alta Creek Reach: Loma Alta Creek RS: 1582* Profile: PF 1
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was
used.
River: Loma Alta Creek Reach: Loma Alta Creek RS: 1378* Profile: PF 1
Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was
used.
River: Loma Alta Creek Reach: Loma Alta Creek RS: 1173 Profile: PF 1
Warning:The energy equation could not be balanced within the specified number of iterations. The program selected the water
surface that had the least amount of error between computed and assumed values.
Warning:During the standard step iterations, when the assumed water surface was

set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The
program defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was
used.
River: Loma Alta Creek Reach: Loma Alta Creek RS: 1096* Profile: PF 1
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was
used.
River: Loma Alta Creek Reach: Loma Alta Creek RS: 1020* Profile: PF 1
Warning:Divided flow computed for this cross-section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was
used.
River: Loma Alta Creek Reach: Loma Alta Creek RS: 943 Profile: PF 1
Warning:Divided flow computed for this cross-section.
Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was
used.
River: Loma Alta Creek Reach: Loma Alta Creek RS: 571 Profile: PF 1
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was
used.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

Appendix C

Location Hydraulic Study Form

Floodplain Encroachment Form

Planning Studies

Backup Data

LOCATION HYDRAULIC STUDY FORM

Dist. *11* Co. *SD* Rte. *005* K.P.
EA Bridge No. *57-0125*
Floodplain Description:
Year-round flowing creek channelized through urbanized areas and several bridge crossing. Location of interest: I-5 / Loma Alta Creek Intersection

1. Description of Proposal (include any physical barriers i.e. concrete barriers, soundwalls, etc. and design elements to minimize floodplain impacts)

This project includes an improvement to the I-5 / Bridge over Loma Alta Creek with 10+4+buffer alternative. The alternative requires the existing I-5 bridge to be widened and would not have a significant impact to the existing floodplain.

2. ADT: Current **143,500** Projected **300,200** ***(year 2030)***
(Projected ADT values taken from Wilson & Company's Traffic Demand Forecasting Report for the I-5 North Coast Corridor Project)

3. Hydraulic Data: Base Flood Q_{100}= *3,389* ft^3 / s ***(Calculated from Rick Engineering Location Hydraulic Study)***

WSE_{100}= **26.37 feet (Upstream face of I-5 Bridge)**
The flood of record, if greater than Q_{100}:
Q= *N/A* ft^3 / s WSE= *N/A*
Overtopping flood Q=***(no increase from existing condition)*** ft^3 / s
WSE= ***(no increase from existing condition)***

Are NFIP maps and studies available? YES **X** NO_____

4. Is the highway location alternative within a regulatory floodway ?
YES ***X*** NO_____

5. Attach map with flood limits outlined showing all buildings or other improvements within the base floodplain. ***(See Appendix 'A')***

Potential Q_{100} backwater damages:

A. Residences? NO___YES ***(no increase from existing condition)***
B. Other Bldgs? NO___YES ***(no increase from existing condition)***
C. Crops? NO***X*** YES _____
D. Natural and beneficial

FLOODPLAIN VALUES? NO **X** YES_____

6. Type of Traffic:

A. Emergency supply or evacuation route?	NO_____	YES__X____
B. Emergency vehicle access?	NO_____	YES__X____
C. Practicable detour available?	NO_____	YES__X____
D. School bus or mail route?	NO_____	YES__X____

7. Estimated duration of traffic interruption for 100-year event hours: ***There are no significant changes to the I-5 bridge crossing the Loma Alta Creek. Traffic interruptions are not anticipated. (no increase from proposed improvements).***

8. Estimated value of Q_{100} flood damages (if any) – moderate risk level.

A.	Roadway	$ ***(no increase from existing condition)***
B	Property	$ ***(no increase from existing condition)***
	Total	$ ***(no increase from existing condition)***

9. Assessment of Level of Risk Low__X____
Moderate____
High_____

For High Risk projects, during design phase, additional Design Study Risk Analysis May be necessary to determine design alternative.

Is there any longitudinal encroachment, significant encroachment, or any support of incompatible
Floodplain development? NO__X____YES _____

If yes, provide evaluation and discussion of practicability of alternatives in accordance with 23 CFR 650.113

Information developed to comply with the Federal requirement for the Location Hydraulic Study shall be retained in the project files.

Signature – Hydraulic/Project Engineer_____Date_____

FLOODPLAIN ENCROACHMENT REPORT SUMMARY

Dist. *11* Co. ***SD*** Rte. *005* K.P.
Bridge No. *57-0125*
Limits: ***I-5 / Loma Alta Creek Intersection***

Floodplain Description: **Year-round flowing creek channelized through urbanized areas and several bridge crossings.**

		No	Yes
1.	Is the proposed action a longitudinal encroachment of the base floodplain?	*X*	___
2.	Are the risks associated with the implementation of the proposed action significant?	*X*	___
3.	Will the proposed action support probable incompatible floodplain development?	*X*	___
4.	Are there any significant impacts on natural and beneficial floodplain values?	*X*	___
5.	Routine construction procedures are required to minimize impacts on the floodplain. Are there any special mitigation measures necessary to minimize impacts or restore and preserve natural and beneficial floodplain values? If yes, explain.	*X*	___
6.	Does the proposed action constitute a significant floodplain encroachment as defined in 23 CFR, Section 650.105(q).	*X*	___
7.	Are Location Hydraulic Studies that document the above answers on file? If not explain.	___	*X*

PREPARED BY:

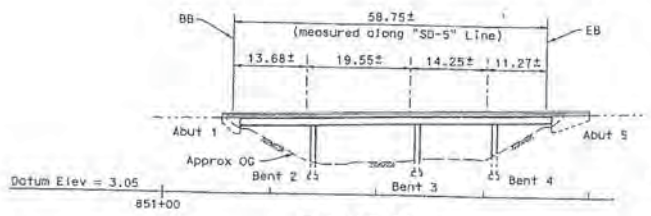
_____ _____
Signature - Dist. Hydraulic Engineer Date

_____ _____
Signature - Dist. Environmental Branch Chief Date

_____ _____
Signature - Dist. Project Engineer Date

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION - DIVISION OF STRUCTURES

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT
11	SD	5	



ELEVATION
1 : 400

ANNOTATION

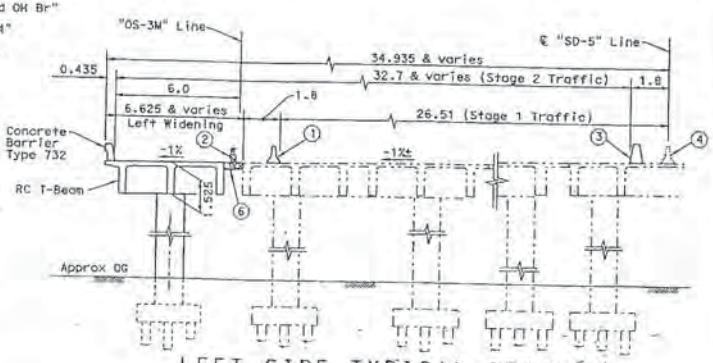
1. Temporary Railing (Type K) – See rail plan
2. Remove existing Barrier Rail (Type 9) and Overhang
3. Concrete Barrier Type 60A
4. Existing Barrier to be removed after Stage 1 Construction
5. Approach Slab Type N(9S)
6. Closure Pour
7. Paint "Oceanside Blvd OH Br"
8. Paint "Br No. 57-0124"

Notes:
1. Dimensions measured normal to "SD-5" line
2. All piles are Class C, 400 kN, Alternative "V" (closed ended pipe pile)

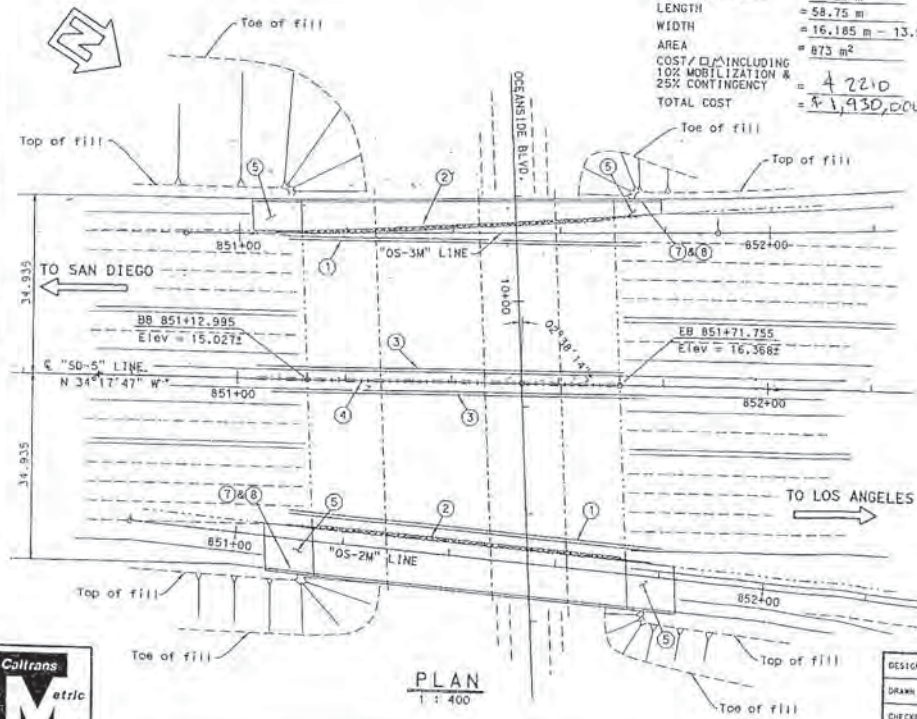
DATE OF ESTIMATE	~~12-14-04~~ 1-05-05
BRIDGE REMOVAL	=
STRUCTURE DEPTH	= 1.525 m
LENGTH	= 58.75 m
WIDTH	= 16.185 m – 13.545 m
AREA	= 873 m²
COST/ $\square$M INCLUDING 10% MOBILIZATION & 25% CONTINGENCY	= 4 221D
TOTAL COST	= $ 1,930,000

LEGEND

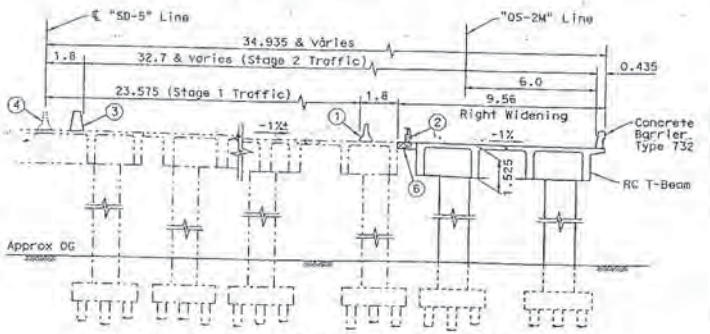
- Indicates Existing Structure
- Indicates New Construction
- Indicates Concrete Removal Limits



LEFT SIDE TYPICAL SECTION
1 : 100



PLAN
1 : 400



RIGHT SIDE TYPICAL SECTION
1 : 100

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

DESIGNED BY	Xiahong Li	DATE	11-03-04
DRAWN BY	Ralph Nakaoka	DATE	11-08-04
CHECKED BY		DATE	
APPROVED		DATE	

STRUCTURE DESIGN SECTION **18**

PLANNING STUDY

OCEANSIDE BLVD OH (WIDEN)

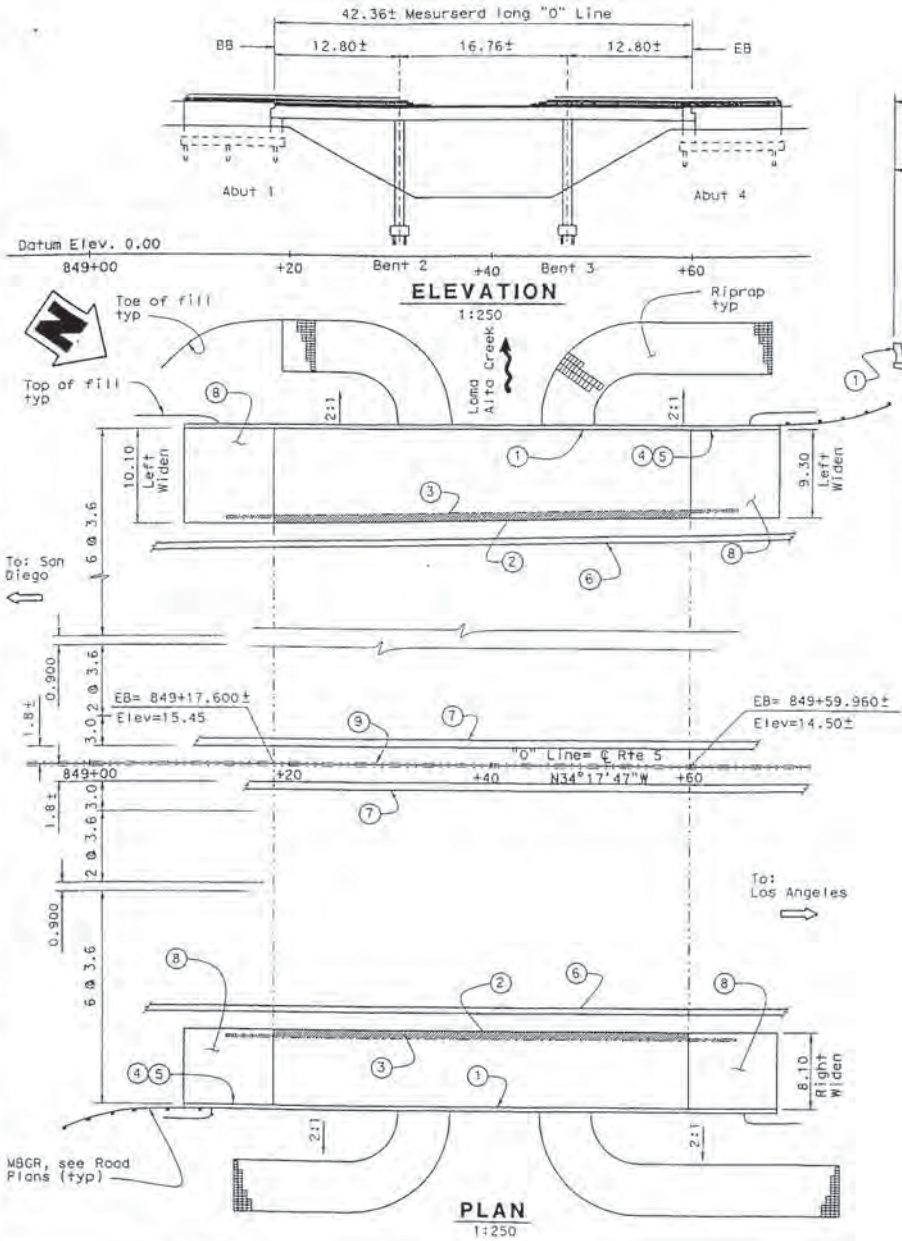
BRIDGE NO. 57-0124	CU 11
SCALE: Varies	EA 11-235800

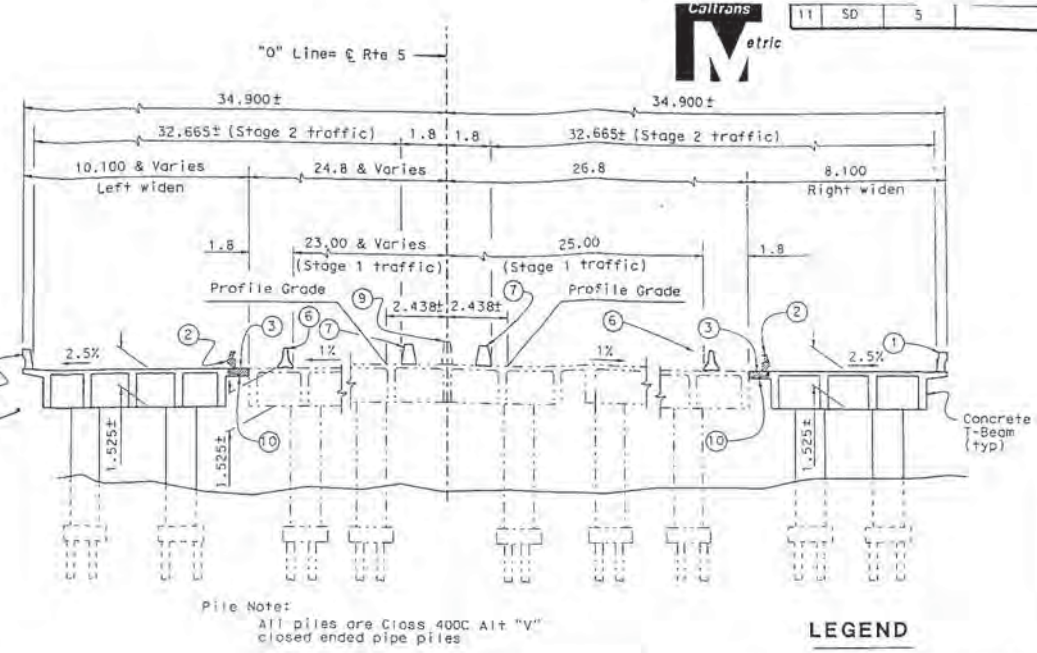
FILE => 57-0124_admdr.dgn

STRUCTURES DESIGN ADVANCE PLANNING STUDY SHEET (METRIC) (REV. 01-13-04)

USERNAME => PHONGMO DATE PLOTTED => 20-DEC-2004 TIME PLOTTED => 13:18

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION - DIVISION OF STRUCTURES





Pile Note:
All piles are Class 400C Alt "V" closed ended pipe piles

TYPICAL SECTION

1:100

LEGEND

- Denotes existing structure
- Denotes new Structure
- Bridge Removel

DATE OF ESTIMATE	=	1-6-05 - PGA
BRIDGE REMOVAL	=	—
STRUCTURE DEPTH	=	1.525
LENGTH	=	42.36
WIDTH	=	18.20-17.40
AREA	=	754.01
COST/ □ INCLUDING 10% MOBILIZATION & 25% CONTINGENCY	=	$2414
TOTAL COST	=	$1,821,020

NOTES

1. Concrete Barrier Type 732
2. Existing Barrier Type 9 to be removed
3. Existing overhang to be removed
4. Paint "LOMA ALTA CREEK BR."
5. Paint "BR. NO. 57-0125"
6. Temporary Railing (Type K) for stage 1 traffic – see road plans
7. Concrete Barrier Type 60A
8. Approach Slab Type N(9S)
9. Existing Barrier, to be removed after stage 1
10. Closure Pour

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

DESIGNED BY	Xiahong Li	DATE	
DRAWN BY	SURAJ DUTTA	DATE	11/21/04
CHECKED BY	Gary Hight	DATE	
APPROVED		DATE	

STRUCTURE DESIGN SECTION 18

LOMA ALTA CREEK BRIDGE (WIDEN)
ADVANCED PLANING STUDY

BRIDGE NO. 57-0125	DU 11
SCALE: VARIES	EA 235800

FILE =3457-04bps.dgn

STRUCTURES DESIGN ADVANCE PLANNING STUDY SHEET (METRIC) (REV.12-1-01)

Federal Emergency Management Agency

Washington, D.C. 20472

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

IN REPLY REFER TO:
Case No.: 96-09-207P

The Honorable Dick Lyon
Mayor, City of Oceanside
300 North Coast Highway
Oceanside, California 92054

Community: City of Oceanside, California
Community No.: 060294
Panels Affected: 0009 C
Effective Date of
This Revision: MAR 04 1997

102-I-A-C

Dear Mayor Lyon:

This responds to a request that the Federal Emergency Management Agency (FEMA) revise the effective Flood Insurance Rate Map (FIRM) and Flood Insurance Study (FIS) report for your community in accordance with Part 65 of the National Flood Insurance Program (NFIP) regulations. In a letter dated August 12, 1992, [redacted], requested that FEMA revise the FIRM and FIS report to show the effects of placement of fill along Loma Alta Creek from approximately 2,350 feet downstream to just downstream of Crouch Street.

All data required to complete our review of this request were submitted with letters from [redacted]. Because this Letter of Map Revision (LOMR) shows the effects of a publicly sponsored flood-control project that reduces flooding to existing development, fees were not assessed for the review.

We have completed our review of the submitted data and the flood data shown on the effective FIRM and FIS report. We have revised the FIRM and FIS report to modify the elevations and floodplain and floodway boundary delineations of the flood having a 1-percent chance of being equaled or exceeded in any given year (base flood) along Loma Alta Creek from approximately 2,350 feet downstream to approximately 1,075 feet upstream of Crouch Street. As a result of the modifications, the base flood elevations (BFEs) for Loma Alta Creek increased; the width of the Special Flood Hazard Area (SFHA), the area that would be inundated by the base flood, increased in some areas and decreased in other areas; and the width of the regulatory floodway increased in some areas and decreased in other areas. The modifications are shown on the enclosed annotated copy of FIRM Panel 0009 C; Profile Panels 07P and 08P; and affected portions of the Summary of Discharges Table and Floodway Data Table. This LOMR hereby revises the above-referenced panel(s) of the effective FIRM and the affected portions of the FIS report, both dated June 18, 1987. With his August 12, 1996, letter [redacted] submitted information showing that all affected property owners have been notified of the increase in BFEs and floodway revision.

The modifications are effective as of the date shown on the first page of this letter. The map panel as listed above and as modified by this letter will be used for all flood insurance policies and renewals issued for your community.

The following table is a partial listing of existing and modified BFEs:

Location	Existing BFE (feet)*	Modified BFE (feet)*
Approximately 2,350 feet downstream of Crouch Street	26	26
Approximately 480 feet downstream of Crouch Street	32	35
Approximately 1,075 feet upstream of Crouch Street	42	42

*Referenced to the National Geodetic Vertical Datum, rounded to the nearest whole foot

Public notification of the proposed modified BFEs will be given in the *North County Times* on or about March 20 and March 27, 1997. A copy of this notification is enclosed. In addition, a notice of changes will be published in the *Federal Register*. Within 90 days of the second publication in the *North County Times*, a citizen may request that FEMA reconsider the determination made by this LOMR. Any request for reconsideration must be based on scientific or technical data. All interested parties are on notice that, until the 90-day period elapses, the determination to modify the BFEs presented in this LOMR may itself be modified.

Because this LOMR will not be printed and distributed to primary users, such as local insurance agents and mortgage lenders, your community will serve as a repository for these new data. We encourage you to disseminate the information reflected by this LOMR throughout the community, so that interested persons, such as property owners, local insurance agents, and mortgage lenders, may benefit from the information. We also encourage you to prepare a related article for publication in your community's local newspaper. This article should describe the assistance that officials of your community will give to interested persons by providing these data and interpreting the NFIP maps.

We are processing a FIRM and FIS report for San Diego County, California and its incorporated areas in our countywide format. The countywide FIRM and FIS report, which include flood hazard information for your community, will become effective on June 19, 1997. Because the effective date has already been established, we will not incorporate the modifications made by this LOMR into the countywide FIRM and FIS report before they become effective. Therefore, the modifications made by this LOMR will be superseded when the countywide FIRM and FIS report become effective. After the effective date, we will issue a letter to revalidate the modifications made by this LOMR and revise the newly effective FIRM and FIS report.

The floodway is provided to your community as a tool to regulate floodplain development. Therefore, the floodway modifications described in this LOMR, while acceptable to FEMA, must also be acceptable to your community and adopted by appropriate community action, as specified in Paragraph 60.3(d) of the NFIP regulations.

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

The basis of this LOMR is, in whole or in part, a channel-modification project. NFIP regulations, as cited in Paragraph 60.3(b)(7), require that communities assure that the flood-carrying capacity within the altered

or relocated portion of any watercourse is maintained. This provision is incorporated into your community's existing floodplain management regulations. Consequently, the ultimate responsibility for maintenance of the modified channel rests with your community.

This determination has been made pursuant to Section 206 of the Flood Disaster Protection Act of 1973 (Public Law 93-234) and is in accordance with the National Flood Insurance Act of 1968, as amended (Title XIII of the Housing and Urban Development Act of 1968, Public Law 90-448), 42 U.S.C. 4001-4128, and 44 CFR Part 65. Pursuant to Section 1361 of the National Flood Insurance Act of 1968, as amended, communities participating in the NFIP are required to adopt and enforce floodplain management regulations that meet or exceed minimum NFIP criteria. These criteria are the minimum and do not supersede any State or local requirements of a more stringent nature. This includes adoption of the effective FIRM to which the regulations apply and the modifications described in this LOMR. Our records show that your community has met this requirement.

A Consultation Coordination Officer (CCO) has been designated to assist your community. The CCO will be the primary liaison between your community and FEMA. For information regarding your CCO, please contact:

Ms. Dorothy M. Lacey
Director, Mitigation Division
Federal Emergency Management Agency, Region IX
The Presidio of San Francisco, Building 105
San Francisco, California 94129-1250
(415) 923-7177

If you have any questions regarding floodplain management regulations for your community or the NFIP in general, please contact the CCO for your community at the telephone number cited above. If you have any technical questions regarding this LOMR, please contact Mr. John Magnotti of our staff in Washington, DC, either by telephone at (202) 646-3932 or by facsimile at (202) 646-4596.

Sincerely,

Frederick H. Sharrocks, Jr., Chief
Hazard Identification Branch
Mitigation Directorate

Enclosures

cc: [redacted]

```
1*****************************************
 *  HEC-2 WATER SURFACE PROFILES           *
 *                                         *
 *  Version   4.6.2;  May 1991             *
 *                                         *
 *  RUN DATE    21JAN97    TIME   16:11:34  *
 *****************************************
```

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

MICHAEL BAKER JR., INC.
RECEIVED
JAN 30 1997
ALEXANDRIA, VIRGINIA

HEC-2 used for LOMR

THIS RUN EXECUTED 21JAN97 16:11:34

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

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


T1      LOMA ALTA CREEK
T2      SUBCRITICAL RUN     FILE NAME:  LOMA14.DAT
T3      PREPARED BY ODAY 1/21/97 (REF:BAKER, October 17, 1996)

J1  ICHECK     INQ        NINV       IDIR       STRT       METRIC     HVINS      Q          WSEL       FQ

                2.                                                                           25.9

J2  NPROF      IPLOT      PRFVS      XSECV      XSECH      FN         ALLDC      IBW        CHNIM      ITRACE

     1.                   -1.                                          -1                                15

J3  VARIABLE CODES FOR SUMMARY PRINTOUT

    110        150        200

NC      .045       .045       .045       .100       .300
QT         2       3800       3800
ET                             9.1
X1      18.9      27.00     170.00     213.00        .00        .00        .00        .00        .00        0.
GR      90.0         .0       80.0       40.0       70.0       80.0       60.0      100.0       50.0      125.0
GR      40.0      150.0       30.0      170.0       21.1      180.0       21.1      202.0       26.0      213.0
GR      26.0      685.0       24.0      755.0       23.8      785.0       23.6      810.0       22.0      838.0
GR      20.9      845.0       22.0      855.0       23.1      870.0       22.0      895.0       21.4      900.0
GR      22.0      910.0       23.9      930.0       24.0      950.0       23.9      995.0       26.0     1010.0
(       28.0     1170.0       29.2     1285.0


NH         3      0.055        425      0.045        455      0.055     1297.5
ET                             9.1
X1      19.0         30        425        455        410        410        410          0        425        900
GR       132          0        130          9        120         59        110        120        100        180
GR        90        221         80        270         70        315         60      342.5         50        370
GR        40      397.5         30      417.5         28        420         26        425       21.2        430
GR      21.2        450         26        455         26      642.5         24        670         24      797.5
GR        22      802.5       22.1        850       23.4        871       22.2      877.5         22      887.5
GR        24        965         26        985         28     1057.5         30     1127.5         32     1297.5


NH         3      0.055        736      0.045        800      0.055       1250
ET                             9.1
X1      19.5         30        736        800        470        470        470          0        736        880
GR       115          0        120         20        122         30        124         40        124         78
GR       122         90        120        100        110        135        100        156         90        178
GR        80        195         70        216         60        235         50        250         40        305
GR        40        450         38        650         36        664         34        718         32        724
```

GR	30	736	22.3	754	22.5	788	30	800	28	818
GR	26	832	24	865	28	980	30	1142	32	1250
NH	3	0.055	736	0.045	780	0.055	950			
ET			9.1						730	880
X1	20	39	736	780	330	330	330	0	0	0
GR	142	0	140	8	130	35	120	68	110	100
GR	100	116	90	135	82	143	82	190	82	212
GR	80	217	70	238	60	261	50	301	48	306
GR	46	312	44	320	42	355	40	395	38	420
GR	36	495	34	612	32	709	30	730	28	736
GR	23.0	746	22.6	764	22.7	772	29	780	30.7	790
GR	31.6	812	29.9	820	30	850	28	860	26.5	865
	26.5	875	28	880	30	935	31.9	950		
NH	3	0.055	722	0.045	780	0.055	945			
ET			9.1						720	870
X1	20.05	20	722	780	290	290	290	0	0	0
GR	40	532	38	658	36	670	34	683	33	690
GR	32.4	710	31	722	24.2	725	23.9	750	24.0	760
GR	33	780	32	800	28.6	825	32	855	31.6	856
GR	32.2	890	31.4	920	31.9	925	50	930	50	945
NH	3	0.055	662	0.04	740	0.055	1170			
ET			9.1						660	790
X1	20.1	20	662	740	310	310	310	0	0	0
GR	50	360	48	380	48	450	40	595	38	605
GR	36	625	34	635	32.2	662	31.7	690	31.7	695
GR	25.4	700	25.2	715	25.3	730	28	735	32	737
GR	32	740	34	800	36	830	36	1005	38	1170
	3	0.055	750	0.045	815	0.055	840			
ET			9.1						690	815
X1	20.2	14	750	815	50	50	50	0	0	0
GR	38	610	36	628	34	635	32	665	32	695
GR	30	710	30	730	28	735	26	750	26	790
GR	32.8	805	33	815	34	820	36	840		
NH	3	0.055	785	0.045	822.9	0.055	1065			
ET			9.1						700	830
X1	20.3	34	785	822.9	55	55	55	0	0	0
GR	70	20	68	35	66	40	64	50	62	58
GR	60	82	58	90	56	106	54	120	52	130
GR	50	142	48	150	46	180	44	190	42	220
GR	42	240	42	260	42	350	44	380	44	435
GR	42	550	40	606	38	616	38	707	36	715
GR	31.2	738	34.1	785	33.5	804.8	26.3	813.3	25.7	822.9
GR	34	840	36	868	36	880	38	1065		

NC	0.045	0.045	0.045	0.3	0.5					
ET			9.1						710	851
X1	20.4	39	810	851	330	330	330	0	0	0
X3	10									
GR	106	0	104	8	102	15	100	20	98	25
GR	96	35	94	48	92	52	90	55	88	70
GR	86	80	84	90	82	98	80	107	78	148
GR	76	162	70	182	60	210	58	218	56	228
GR	54	235	52	240	50	255	48	320	46	430
GR	44	530	42	610	40	702	38	710	36	713
GR	36	722	30.7	755	34.6	785	34.7	810	28.6	830
GR	28.6	850	35.7	851	38	920	40	1010		
ET			9.1						630	830
SB	1.25	1.50	2.50	0	31.5	1.5	150	0	29.7	29.5
X1	20.6	51	770	830	110	110	110	0	0	0
X2	0	0	1	34.5	35.7	0	0	0	0	0
X3	10									
BT	12		69.2	69.2	479.8	46.4	46.4	595.5	38.9	38.9
BT	699.8	37.0	37.0	772.2	35.9	35.0	835.5	35.7	34.5	920.9
BT	35.7	34.5	1003.2	36.6	36.6	1146.4	43.4	43.4	1194.6	44.2
BT	44.2	1219.9	50.3	50.3	1435.5	66.3	66.3			
GR	140	5	130	30	120	50	110	72	100	92
GR	90	110	80	125	76	134	74	150	72	170
GR	70	182	68	190	66	203	64	210	62	218
GR	60	235	58	252	56	280	54	304	52	325
GR	50	345	48	375	46	385	44	395	44	420
GR	42	440	40	485	36	500	34.3	530	34.1	570
GR	36	590	36	670	33.8	680	33.2	720	36	740
GR	34	750	36	770	28.8	790	28.8	825	36	830
GR	38	890	40	1020	42	1115	44	1130	46	1176
GR	50	1230	52	1250	54	1282	56	1300	58	1322
G	60	1346								
ET			9.1						680	850
X1	21.0	49	790	840	205	205	205	0	0	0
GR	160	15	150	58	140	82	130	102	120	124
GR	110	147	100	170	90	199	80	233	78	250
GR	76	260	74	273	72	292	70	308	68	313
GR	66	319	64	323	62	327	60	332	58	340
GR	56	348	54	352	52	367	50	393	48	450
GR	46	495	44	500	39	590	35.6	640	38.5	675
GR	38.5	693	34.5	715	34	732.8	33.6	744.7	36.4	756.8
GR	32.5	773	38	790	32.5	805	32.5	820	39	840
GR	35	860	36	880	36	900	39	1000	40	1242
GR	44	1266	46	1270	48	1278	50	1280		

NC	0.045	0.045	0.045	0.1	0.3					
ET			9.1						750	1164
X1	22.0	33	769.7	809.6	620	620	620	0	0	0
GR	174.3	0	173.2	63.3	152.9	128.7	152.5	148.2	129.3	252.1
GR	129.2	265.9	121.5	280.9	120.6	294.3	101.1	359.4	61.3	451.4
GR	50.6	467.5	50.2	499.4	44.1	517.6	40.1	616.6	45.1	627
GR	45.1	670.1	39.1	685	36.7	719.4	37.6	736.1	35.9	750.4
GR	36.9	769.7	34.1	776.6	34.1	790.2	40.3	809.6	38.8	883.7
GR	38.8	1104.8	38.5	1163.8	42.8	1186.9	41.2	1235.5	52.4	1284.5
GR	68.6	1338	83.2	1382.9	92	1430.8				

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

*PROF 1

CRITICAL DEPTH TO BE CALCULATED AT ALL CROSS SECTIONS
0

CCHV= .100 CEHV= .300
*SECNO 18.900

; DIVIDED FLOW

18.900	5.00	25.90	24.82	25.90	26.19	.29	.00	.00	30.00
3800.0	.0	718.4	3081.6	.0	144.4	737.7	.0	.0	26.00
.00	.00	4.98	4.18	.000	.045	.045	.000	20.90	174.61
.004238	0.	0.	0.	0	18	0	.00	358.95	1009.29

FLOW DISTRIBUTION FOR SECNO= 18.90 CWSEL= 25.90

STA=	175.	213.	755.	785.	810.	838.	845.	855.	870.	895.	900.	910.	930.
PER Q=	18.9	3.5	5.4	5.3	10.4	4.7	6.8	6.4	10.6	3.1	6.2	6.8	
AREA=	144.4	63.2	60.0	55.0	86.8	31.1	44.5	50.2	83.7	21.0	42.0	59.0	
VEL=	5.0	2.1	3.4	3.6	4.6	5.8	5.8	4.8	4.8	5.6	5.6	4.4	
DEPTH=	3.8	.1	2.0	2.2	3.1	4.4	4.4	3.3	3.3	4.2	4.2	2.9	

STA=	930.	950.	995.	1009.
PER Q=	3.4	7.7	.8	
AREA=	39.0	87.7	14.3	
VEL=	3.4	3.4	2.1	
DEPTH=	1.9	1.9	1.0	

1490 NH CARD USED
*SECNO 19.000

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.72

19.000	5.86	27.06	24.82	.00	27.15	.09	.94	.02	26.00
3800.0	.9	516.9	3282.2	1.4	151.8	1448.3	11.7	4.5	26.00
.05	.64	3.40	2.27	.055	.045	.055	.000	21.20	422.35
.001438	410.	410.	410.	3	19	0	.00	601.10	1023.45

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

FLOW DISTRIBUTION FOR SECNO= 19.00 CWSEL= 27.06

STA=	422.	425.	455.	643.	798.	850.	871.	888.	965.	1023.
PER Q=	.0	13.6	5.6	24.6	20.1	6.5	5.8	21.6	2.2	
AREA=	1.4	151.8	198.9	446.9	258.3	90.5	77.3	314.7	61.6	
VEL=	.6	3.4	1.1	2.1	3.0	2.7	2.9	2.6	1.3	
DEPTH=	.5	5.1	1.1	2.9	4.9	4.3	4.7	4.1	1.1	

1 NH CARD USED
*SECNO 19.500

3265 DIVIDED FLOW

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .37

19.500	5.66	27.96	27.50	.00	28.82	.86	1.44	.23	30.00
3800.0	.0	2223.7	1576.3	.0	250.6	337.3	23.5	8.9	30.00
.07	.00	8.87	4.67	.000	.045	.055	.000	22.30	740.76
.010430	470.	470.	470.	3	11	0	.00	216.72	978.98

FLOW DISTRIBUTION FOR SECNO= 19.50 CWSEL= 27.96

STA=	741.	800.	832.	865.	979.
PER Q=	58.5	1.0	14.6	25.9	
AREA=	250.6	13.5	97.8	225.9	
VEL=	8.9	2.7	5.7	4.4	
DEPTH=	4.5	.4	3.0	2.0	

1490 NH CARD USED
*SECNO 20.000

3265 DIVIDED FLOW

20.000	8.06	30.66	30.34	.00	31.87	1.21	2.94	.11	28.00
3800.0	34.7	2910.4	854.9	12.3	295.8	216.5	27.7	10.5	29.00
.08	2.83	9.84	3.95	.055	.045	.055	.000	22.60	723.04
.007721	330.	330.	330.	2	14	0	.00	190.58	940.24

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

FLOW DISTRIBUTION FOR SECNO= 20.00 CWSEL= 30.66

STA=	723.	736.	780.	865.	875.	935.	940.
PER Q=	.9	76.6	5.3	6.7	10.4	.1	
AREA=	12.3	295.8	64.6	41.6	108.5	1.7	
VEL=	2.8	9.8	3.1	6.1	3.6	1.1	
DEPTH=	.9	6.7	.8	4.2	1.8	.3	

.0 NH CARD USED
SECNO 20.050

3265 DIVIDED FLOW

20.050	8.92	32.82	30.84	.00	33.61	.80	1.70	.04	31.00
3800.0	28.2	3173.1	598.7	16.3	409.9	213.8	31.6	11.9	33.00
.09	1.73	7.74	2.80	.055	.045	.055	.000	23.90	696.10
.004613	290.	290.	290.	3	8	0	.00	225.08	925.25

FLOW DISTRIBUTION FOR SECNO= 20.05 CWSEL= 32.82

STA=	696.	722.	780.	825.	855.	925.	925.
PER Q=	.7	83.5	5.8	6.7	3.3	.0	
AREA=	16.3	409.9	69.6	75.5	68.5	.1	
VEL=	1.7	7.7	3.1	3.4	1.8	.5	
DEPTH=	.6	7.1	1.5	2.5	1.0	.5	

1490 NH CARD USED
*SECNO 20.100

20.100	9.06	34.26	33.11	.00	35.26	1.00	1.58	.06	32.20
3800.0	69.7	3552.1	178.2	31.3	428.3	75.6	35.8	13.3	32.00
.10	2.23	8.29	2.36	.055	.040	.055	.000	25.20	633.74
.005695	310.	310.	310.	2	11	0	.00	170.05	803.79

FLOW DISTRIBUTION FOR SECNO= 20.10 CWSEL= 34.26

STA=	634.	662.	740.	800.	804.
PER Q=	1.8	93.5	4.7	.0	
AREA=	31.3	428.3	75.1	.5	
VEL=	2.2	8.3	2.4	.5	
DEPTH=	1.1	5.5	1.3	.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

1490 NH CARD USED
*SECNO 20.200

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.92

20.200	9.19	35.19	31.45	.00	35.47	.28	.13	.07	26.00
3800.0	1476.2	2305.8	18.0	485.3	477.9	15.7	36.6	13.5	33.00
.10	3.04	4.82	1.15	.055	.045	.055	.000	26.00	630.81
.001538	50.	50.	50.	2	14	0	.00	201.18	831.99

FLOW DISTRIBUTION FOR SECNO= 20.20 CWSEL= 35.19

STA=	631.	635.	665.	695.	710.	730.	735.	750.	815.	820.	832.
PER Q=	.0	3.1	5.8	4.5	8.7	2.8	13.9	60.7	.3	.1	
AREA=	2.5	66.0	96.0	63.0	104.0	31.0	123.0	477.9	8.5	7.2	
VEL=	.7	1.8	2.3	2.7	3.2	3.4	4.3	4.8	1.5	.8	
DEPTH=	.6	2.2	3.2	4.2	5.2	6.2	8.2	7.4	1.7	.6	

1490 NH CARD USED
*SECNO 20.300

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3[illegible] CRITICAL DEPTH ASSUMED

20.300	9.35	35.05	35.05	.00	36.67	1.61	.21	.40	34.10
3800.0	999.4	1812.1	988.5	148.6	155.6	96.8	37.5	13.7	25.70
.10	6.72	11.65	10.21	.055	.045	.055	.000	25.70	719.53
.020717	55.	55.	55.	0	8	0	.00	135.24	854.77

FLOW DISTRIBUTION FOR SECNO= 20.30 CWSEL= 35.05

STA=	720.	738.	785.	823.	840.	855.
PER Q=	5.6	20.7	47.7	25.5	.5	
AREA=	35.6	113.0	155.6	89.0	7.8	
VEL=	5.9	7.0	11.6	10.9	2.5	
DEPTH=	1.9	2.4	4.1	5.2	.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

CCHV= .300 CEHV= .500
*SECNO 20.400

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 3.20

20.400	9.65	38.25	35.45	.00	38.59	.34	1.55	.38	34.70
3800.0	1840.6	1779.0	180.4	444.1	331.2	98.2	42.3	15.0	35.70
.12	4.14	5.37	1.84	.045	.045	.045	.000	28.60	708.99
.002018	330.	330.	330.	4	19	0	.00	222.39	931.38

FLOW DISTRIBUTION FOR SECNO= 20.40 CWSEL= 38.25

STA=	709.	713.	722.	755.	785.	810.	851.	920.	931.
PER Q=	.2	1.4	18.1	20.6	8.3	46.8	4.7	.0	
AREA=	3.9	20.3	161.8	168.1	90.1	331.2	96.8	1.4	
VEL=	1.5	2.5	4.2	4.7	3.5	5.4	1.9	.4	
DEPTH=	1.0	2.3	4.9	5.6	3.6	8.1	1.4	.1	

SPECIAL BRIDGE

5227 DOWNSTREAM ELEV IS 35.96 , NOT 38.25 HYDRAULIC JUMP OCCURS DOWNSTREAM (IF LOW FLOW CONTROLS)

SB	XK	XKOR	COFQ	RDLEN	BWC	BWP	BAREA	SS	ELCHU	ELCHD
	1.25	1.50	2.50	.00	31.50	1.50	150.00	.00	29.70	29.50

*SECNO 20.600
6870 D.S. ENERGY OF 38.59 IS HIGHER THAN COMPUTED ENERGY OF 38.58

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

PRESSURE AND WEIR FLOW, Weir Submergence Based on TRAPEZOIDAL Shape

EGPRS	EGLWC	H3	QWEIR	QPR	BAREA	TRAPEZOID AREA	ELLC	ELTRD	WEIRLN
53.20	39.87	.00	3247.	560.	150.	144.	34.50	35.70	432.

20.600	9.68	38.48	.00	.00	38.59	.12	.00	.00	36.00
3800.0	2028.0	1667.9	104.1	965.9	490.6	96.1	45.4	15.9	36.00
.14	2.10	3.40	1.08	.045	.045	.045	.000	28.80	490.71
.000716	110.	110.	110.	2	0	6	.00	430.33	921.04

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

FLOW DISTRIBUTION FOR SECNO= 20.60 CWSEL= 38.48

STA=	491.	530.	570.	590.	670.	720.	740.	770.	830.	921.
PER Q=	5.5	10.5	3.6	8.4	15.4	4.4	5.5	43.9	2.7	
AREA=	111.3	171.1	68.5	198.2	234.9	77.5	104.3	490.6	96.1	
VEL=	1.9	2.3	2.0	1.6	2.5	2.2	2.0	3.4	1.1	
DEPTH=	2.8	4.3	3.4	2.5	4.7	3.9	3.5	8.2	1.1	

NO 21.000

3265 DIVIDED FLOW

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .46

21.000	6.18	38.68	37.31	.00	38.94	.26	.27	.07	38.00
3800.0	1990.4	974.8	834.7	486.2	202.9	270.7	51.3	17.8	39.00
.15	4.09	4.80	3.08	.045	.045	.045	.000	32.50	594.71
.003355	205.	205.	205.	2	8	0	.00	392.03	989.32

FLOW DISTRIBUTION FOR SECNO= 21.00 CWSEL= 38.68

STA=	595.	640.	675.	715.	733.	745.	757.	773.	790.	840.	880.	900.	989.
PER Q=	4.7	4.0	4.1	10.7	8.4	5.3	8.9	6.5	25.7	9.4	5.2	7.3	
AREA=	69.7	57.0	51.2	78.8	58.1	44.5	68.5	58.3	202.9	97.4	53.6	119.7	
VEL=	2.5	2.6	3.0	5.2	5.5	4.5	4.9	4.2	4.8	3.7	3.7	2.3	
DEPTH=	1.5	1.6	1.3	4.4	4.9	3.7	4.2	3.4	4.1	2.4	2.7	1.3	

C .= .100 CEHV= .300
*SECNO 22.000

3265 DIVIDED FLOW

22.000	6.56	40.66	39.72	.00	40.88	.22	1.94	.00	36.90
3800.0	1215.4	953.6	1630.9	299.0	192.0	625.0	66.1	24.2	40.30
.20	4.06	4.97	2.61	.045	.045	.045	.000	34.10	602.72
.002927	620.	620.	620.	3	9	0	.00	509.33	1175.41

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

FLOW DISTRIBUTION FOR SECNO= 22.00 CWSEL= 40.66

STA=	603.	617.	685.	719.	736.	750.	770.	810.	884.	1105.	1164.	1175.
PER Q=	.1	.1	8.8	6.4	6.5	10.2	25.1	4.2	29.3	8.9	.6	
AREA=	3.9	3.4	95.0	58.6	55.9	82.2	192.0	82.3	411.4	118.6	12.5	
VEL=	.8	1.4	3.5	4.1	4.4	4.7	5.0	1.9	2.7	2.8	1.9	
DEPTH=	.3	.0	2.8	3.5	3.9	4.3	4.8	1.1	1.9	2.0	1.1	

```
T1      METHOD 1 FLOODWAY PROFILE
T2      FLOODWAY LIMITS SET USING OPTION 1 ENCROACHMENT
T3      PREPARED BY BAKER MAY 16, 1996

J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

              3.0                           0.0                           26.3

J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

    15.0                -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 18.900

3470 ENCROACHMENT STATIONS= 200.0 1000.0 TYPE= 1 TARGET= 800.000

18.900	5.40	26.30	.00	25.90	26.51	.21	.00	.00	100000.00
3800.0	.0	131.3	3668.7	.0	40.6	999.0	.0	.0	26.00
.00	.00	3.23	3.67	.000	.045	.045	.000	20.90	200.00
.003531	0.	0.	0.	0	0	0	.00	800.00	1000.00

1490 NH CARD USED
*SECNO 19.000

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.45

3470 ENCROACHMENT STATIONS= 425.0 900.0 TYPE= 1 TARGET= 475.000

19.000	6.17	27.37	.00	27.06	27.49	.12	.97	.01	26.00
3800.0	.0	601.4	3198.6	.0	160.9	1267.7	11.6	6.0	26.00
.04	.00	3.74	2.52	.000	.045	.055	.000	21.20	425.00
.001691	410.	410.	410.	2	0	0	.00	475.00	900.00

1490 NH CARD USED
*SECNO 19.500

5 DIVIDED FLOW

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .37

3470 ENCROACHMENT STATIONS= 736.0 880.0 TYPE= 1 TARGET= 144.000

19.500	5.97	28.27	.00	27.96	29.50	1.23	1.68	.33	30.00
3800.0	.0	2639.7	1160.3	.0	268.5	186.9	21.8	9.2	30.00
.06	.00	9.83	6.21	.000	.045	.055	.000	22.30	740.02
.012045	470.	470.	470.	2	0	0	.00	121.77	880.00

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

1490 NH CARD USED
*SECNO 20.000

3265 DIVIDED FLOW

3470 ENCROACHMENT STATIONS= 730.0 880.0 TYPE= 1 TARGET= 150.000

20.000	8.59	31.19	.00	30.66	32.40	1.21	2.90	.00	28.00
3800.0	41.9	3068.5	689.5	13.1	318.6	164.9	25.4	10.2	29.00
.07	3.20	9.63	4.18	.055	.045	.055	.000	22.60	730.00
.006700	330.	330.	330.	2	0	0	.00	137.80	880.00

1490 NH CARD USED
*SECNO 20.050

3470 ENCROACHMENT STATIONS= 720.0 870.0 TYPE= 1 TARGET= 150.000

20.050	9.28	33.18	.00	32.82	33.92	.73	1.47	.05	31.00
3800.0	7.2	3185.0	607.8	4.1	431.3	194.4	29.1	11.2	33.00
.08	1.75	7.38	3.13	.055	.045	.055	.000	23.90	720.00
.003958	290.	290.	290.	2	0	0	.00	150.00	870.00

1490 NH CARD USED
*SECNO 20.100

3470 ENCROACHMENT STATIONS= 660.0 790.0 TYPE= 1 TARGET= 130.000

20.100	9.22	34.42	.00	34.26	35.39	.97	1.40	.07	32.20
3800.0	8.7	3581.7	209.6	4.3	441.8	79.6	33.2	12.2	32.00
.09	2.02	8.11	2.63	.055	.040	.055	.000	25.20	660.00
.005223	310.	310.	310.	2	0	0	.00	130.00	790.00

1490 NH CARD USED
*SECNO 20.200

3301 HV CHANGED MORE THAN HVINS

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

3470 ENCROACHMENT STATIONS= 690.0 815.0 TYPE= 1 TARGET= 125.000

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
20.200	9.24	35.24	.00	35.19	35.60	.35	.15	.06	26.00
3800.0	1294.3	2505.7	.0	339.9	481.2	.0	34.0	12.3	100000.00
.09	3.81	5.21	.00	.055	.045	.000	.000	26.00	690.00
.001856	50.	50.	50.	2	0	0	.00	125.00	815.00

1490 NH CARD USED
*SECNO 20.300

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS= 700.0 830.0 TYPE= 1 TARGET= 130.000

20.300	9.53	35.23	35.23	35.05	37.07	1.84	.25	.44	34.10
3800.0	1185.0	2046.6	568.5	160.4	162.3	55.4	34.8	12.5	25.70
.10	7.39	12.61	10.25	.055	.045	.055	.000	25.70	718.68
.022936	55.	55.	55.	20	8	0	.00	111.32	830.00

CCHV= .300 CEHV= .500
*SECNO 20.400

3301 HV CHANGED MORE THAN HVINS

2 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 3.53

3470 ENCROACHMENT STATIONS= 710.0 851.0 TYPE= 1 TARGET= 141.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 34.70 ELREA= 100000.00

20.400	10.07	38.67	.00	38.25	39.00	.33	1.48	.45	34.70
3800.0	2025.3	1774.7	.0	485.4	348.2	.0	39.4	13.4	100000.00
.11	4.17	5.10	.00	.045	.045	.000	.000	28.60	710.00
.001842	330.	330.	330.	4	0	0	.00	141.00	851.00

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

SPECIAL BRIDGE

5227 DOWNSTREAM ELEV IS 35.96 , NOT 38.67 HYDRAULIC JUMP OCCURS DOWNSTREAM (IF LOW FLOW CONTROLS)

SB	XK	XKOR	COFQ	RDLEN	BWC	BWP	BAREA	SS	ELCHU	ELCHD
	1.25	1.50	2.50	.00	31.50	1.50	150.00	.00	29.70	29.50

*SECNO 20.600
6870 D.S. ENERGY OF 39.00 IS HIGHER THAN COMPUTED ENERGY OF 38.85
PRESSURE AND WEIR FLOW, Weir Submergence Based on TRAPEZOIDAL Shape

EGPRS	EGLWC	H3	QWEIR	QPR	BAREA	TRAPEZOID AREA	ELLC	ELTRD	WEIRLN
53.61	39.86	.00	3372.	420.	150.	144.	34.50	35.70	452.

3470 ENCROACHMENT STATIONS= 630.0 830.0 TYPE= 1 TARGET= 200.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 36.00 ELREA= 100000.00

20.600	9.98	38.78	.00	38.48	39.00	.22	.00	.00	36.00
3800.0	1609.5	2190.4	.0	557.9	508.6	.0	41.8	13.8	100000.00
.12	2.89	4.31	.00	.045	.045	.000	.000	28.80	630.00
.001158	110.	110.	110.	2	0	7	.00	200.00	830.00

*SECNO 21.000

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .47

3470 ENCROACHMENT STATIONS= 680.0 850.0 TYPE= 1 TARGET= 170.000

21.000	6.54	39.04	.00	38.68	39.61	.58	.44	.18	38.00
3800.0	2403.9	1374.0	22.1	397.9	220.6	10.4	45.8	14.7	39.00
.13	6.04	6.23	2.13	.045	.045	.045	.000	32.50	680.00
.005180	205.	205.	205.	2	0	0	.00	170.00	850.00

CCHV= .100 CEHV= .300
*SECNO 22.000

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

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.59

3470 ENCROACHMENT STATIONS= 750.0 1164.0 TYPE= 1 TARGET= 414.000

22.000	7.27	41.37	.00	40.66	41.56	.19	1.91	.04	36.90
3800.0	419.7	1004.9	2375.3	98.3	220.7	868.0	58.7	18.9	40.30
.18	4.27	4.55	2.74	.045	.045	.045	.000	34.10	750.00
.002042	620.	620.	620.	2	0	0	.00	414.00	1164.00

THIS RUN EXECUTED 21JAN97 16:11:34

****
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

PREPARED BY ODAY 1/21/97

SUMMARY PRINTOUT TABLE 110

	SECNO	CWSEL	DIFKWS	EG	TOPWID	QLOB	QCH	QROB	PERENC	STENCL	STCHL	STCHR	STENCR
	18.900	25.90	.00	26.19	358.95	.00	718.43	3081.57	.00	.00	170.00	213.00	.00
	18.900	26.30	.40	26.51	800.00	.00	131.33	3668.67	800.00	200.00	170.00	213.00	1000.00
*	19.000	27.06	.00	27.15	601.10	.90	516.91	3282.19	.00	.00	425.00	455.00	.00
*	19.000	27.37	.31	27.49	475.00	.00	601.38	3198.62	475.00	425.00	425.00	455.00	900.00
*	19.500	27.96	.00	28.82	216.72	.00	2223.65	1576.35	.00	.00	736.00	800.00	.00
*	19.500	28.27	.31	29.50	121.77	.00	2639.72	1160.28	144.00	736.00	736.00	800.00	880.00
	20.000	30.66	.00	31.87	190.58	34.73	2910.41	854.86	.00	.00	736.00	780.00	.00
	20.000	31.19	.53	32.40	137.80	41.94	3068.53	689.54	150.00	730.00	736.00	780.00	880.00
	20.050	32.82	.00	33.61	225.08	28.23	3173.11	598.67	.00	.00	722.00	780.00	.00
	20.050	33.18	.37	33.92	150.00	7.24	3184.99	607.77	150.00	720.00	722.00	780.00	870.00
	20.100	34.26	.00	35.26	170.05	69.71	3552.08	178.20	.00	.00	662.00	740.00	.00
	20.100	34.42	.17	35.39	130.00	8.73	3581.67	209.60	130.00	660.00	662.00	740.00	790.00
*	20.200	35.19	.00	35.47	201.18	1476.16	2305.81	18.04	.00	.00	750.00	815.00	.00
*	20.200	35.24	.05	35.60	125.00	1294.31	2505.69	.00	125.00	690.00	750.00	815.00	815.00
*	20.300	35.05	.00	36.67	135.24	999.41	1812.06	988.53	.00	.00	785.00	822.90	.00
*	20.300	35.23	.18	37.07	111.32	1184.96	2046.56	568.48	130.00	700.00	785.00	822.90	830.00
*	20.400	38.25	.00	38.59	222.39	1840.59	1779.00	180.42	.00	.00	810.00	851.00	.00
*	20.400	38.67	.41	39.00	141.00	2025.32	1774.68	.00	141.00	710.00	810.00	851.00	851.00
*	20.600	38.48	.00	38.59	430.33	2027.99	1667.92	104.09	.00	.00	770.00	830.00	.00
*	20.600	38.78	.30	39.00	200.00	1609.55	2190.45	.00	200.00	630.00	770.00	830.00	830.00
*	21.000	38.68	.00	38.94	392.03	1990.41	974.85	834.74	.00	.00	790.00	840.00	.00
*	21.000	39.04	.36	39.61	170.00	2403.94	1373.99	22.08	170.00	680.00	790.00	840.00	850.00

	SECNO	CWSEL	DIFKWS	EG	TOPWID	QLOB	QCH	QROB	PERENC	STENCL	STCHL	STCHR	STENCR
	22.000	40.66	.00	40.88	509.33	1215.44	953.64	1630.92	.00	.00	769.70	809.60	.00
*	22.000	41.37	.71	41.56	414.00	419.73	1004.95	2375.32	414.00	750.00	769.70	809.60	1164.00

PREPARED BY ODAY 1/21/97

SUMMARY PRINTOUT TABLE 150

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
	18.900	.00	.00	.00	20.90	3800.00	25.90	24.82	26.19	42.38	4.98	882.07	583.74
	18.900	.00	.00	.00	20.90	3800.00	26.30	.00	26.51	35.31	3.23	1039.70	639.47
*	19.000	410.00	.00	.00	21.20	3800.00	27.06	24.82	27.15	14.38	3.40	1601.49	1002.18
*	19.000	410.00	.00	.00	21.20	3800.00	27.37	.00	27.49	16.91	3.74	1428.57	924.22
*	19.500	470.00	.00	.00	22.30	3800.00	27.96	27.50	28.82	104.30	8.87	587.86	372.09
	19.500	470.00	.00	.00	22.30	3800.00	28.27	.00	29.50	120.45	9.83	455.42	346.24
	20.000	330.00	.00	.00	22.60	3800.00	30.66	30.34	31.87	77.21	9.84	524.59	432.47
	20.000	330.00	.00	.00	22.60	3800.00	31.19	.00	32.40	67.00	9.63	496.57	464.23
	20.050	290.00	.00	.00	23.90	3800.00	32.82	30.84	33.61	46.13	7.74	639.92	559.47
	20.050	290.00	.00	.00	23.90	3800.00	33.18	.00	33.92	39.58	7.38	629.89	604.03
	20.100	310.00	.00	.00	25.20	3800.00	34.26	33.11	35.26	56.95	8.29	535.24	503.55
	20.100	310.00	.00	.00	25.20	3800.00	34.42	.00	35.39	52.23	8.11	525.67	525.78
*	20.200	50.00	.00	.00	26.00	3800.00	35.19	31.45	35.47	15.38	4.82	978.93	968.89
*	20.200	50.00	.00	.00	26.00	3800.00	35.24	.00	35.60	18.56	5.21	821.09	882.00
*	20.300	55.00	.00	.00	25.70	3800.00	35.05	35.05	36.67	207.17	11.65	401.01	264.01
*	20.300	55.00	.00	.00	25.70	3800.00	35.23	35.23	37.07	229.36	12.61	378.16	250.91
*	20.400	330.00	.00	.00	28.60	3800.00	38.25	35.45	38.59	20.18	5.37	873.57	845.91
*	20.400	330.00	.00	.00	28.60	3800.00	38.67	.00	39.00	18.42	5.10	833.52	885.48
*	20.600	110.00	35.70	34.50	28.80	3800.00	38.48	.00	38.59	7.16	3.40	1552.63	1420.21
	20.600	110.00	35.70	34.50	28.80	3800.00	38.78	.00	39.00	11.58	4.31	1066.49	1116.76
*	21.000	205.00	.00	.00	32.50	3800.00	38.68	37.31	38.94	33.55	4.80	959.86	656.01
*	21.000	205.00	.00	.00	32.50	3800.00	39.04	.00	39.61	51.80	6.23	628.86	527.99
	22.000	620.00	.00	.00	34.10	3800.00	40.66	39.72	40.88	29.27	4.97	1115.95	702.37
*	22.000	620.00	.00	.00	34.10	3800.00	41.37	.00	41.56	20.42	4.55	1187.04	840.91

PREPARED BY ODAY 1/21/97

SUMMARY PRINTOUT TABLE 150

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
	18.900	3800.00	25.90	.00	.00	.00	358.95	.00
	18.900	3800.00	26.30	.40	.00	.40	800.00	.00
*	19.000	3800.00	27.06	.00	1.16	.00	601.10	410.00
*	19.000	3800.00	27.37	.31	1.07	.31	475.00	410.00
*	19.500	3800.00	27.96	.00	.90	.00	216.72	470.00
	19.500	3800.00	28.27	.31	.91	.31	121.77	470.00
	20.000	3800.00	30.66	.00	2.70	.00	190.58	330.00
	20.000	3800.00	31.19	.53	2.91	.53	137.80	330.00
	20.050	3800.00	32.82	.00	2.15	.00	225.08	290.00
	20.050	3800.00	33.18	.37	2.00	.37	150.00	290.00
	20.100	3800.00	34.26	.00	1.44	.00	170.05	310.00
	20.100	3800.00	34.42	.17	1.24	.17	130.00	310.00
*	20.200	3800.00	35.19	.00	.93	.00	201.18	50.00
*	20.200	3800.00	35.24	.05	.82	.05	125.00	50.00
*	20.300	3800.00	35.05	.00	-.14	.00	135.24	55.00
*	20.300	3800.00	35.23	.18	-.01	.18	111.32	55.00
*	20.400	3800.00	38.25	.00	3.20	.00	222.39	330.00
*	20.400	3800.00	38.67	.41	3.43	.41	141.00	330.00
*	20.600	3800.00	38.48	.00	.23	.00	430.33	110.00
	20.600	3800.00	38.78	.30	.11	.30	200.00	110.00
*	21.000	3800.00	38.68	.00	.20	.00	392.03	205.00
*	21.000	3800.00	39.04	.36	.26	.36	170.00	205.00
	22.000	3800.00	40.66	.00	1.98	.00	509.33	620.00
*	22.000	3800.00	41.37	.71	2.34	.71	414.00	620.00

SUMMARY OF ERRORS AND SPECIAL NOTES

WARNING SECNO= 19.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO= 19.000 PROFILE= 2 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 19.500 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO= 19.500 PROFILE= 2 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 20.200 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO= 20.200 PROFILE= 2 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

CAUTION SECNO= 20.300 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 20.300 PROFILE= 1 MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 20.300 PROFILE= 2 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 20.300 PROFILE= 2 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 20.300 PROFILE= 2 20 TRIALS ATTEMPTED TO BALANCE WSEL

WARNING SECNO= 20.400 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO= 20.400 PROFILE= 2 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

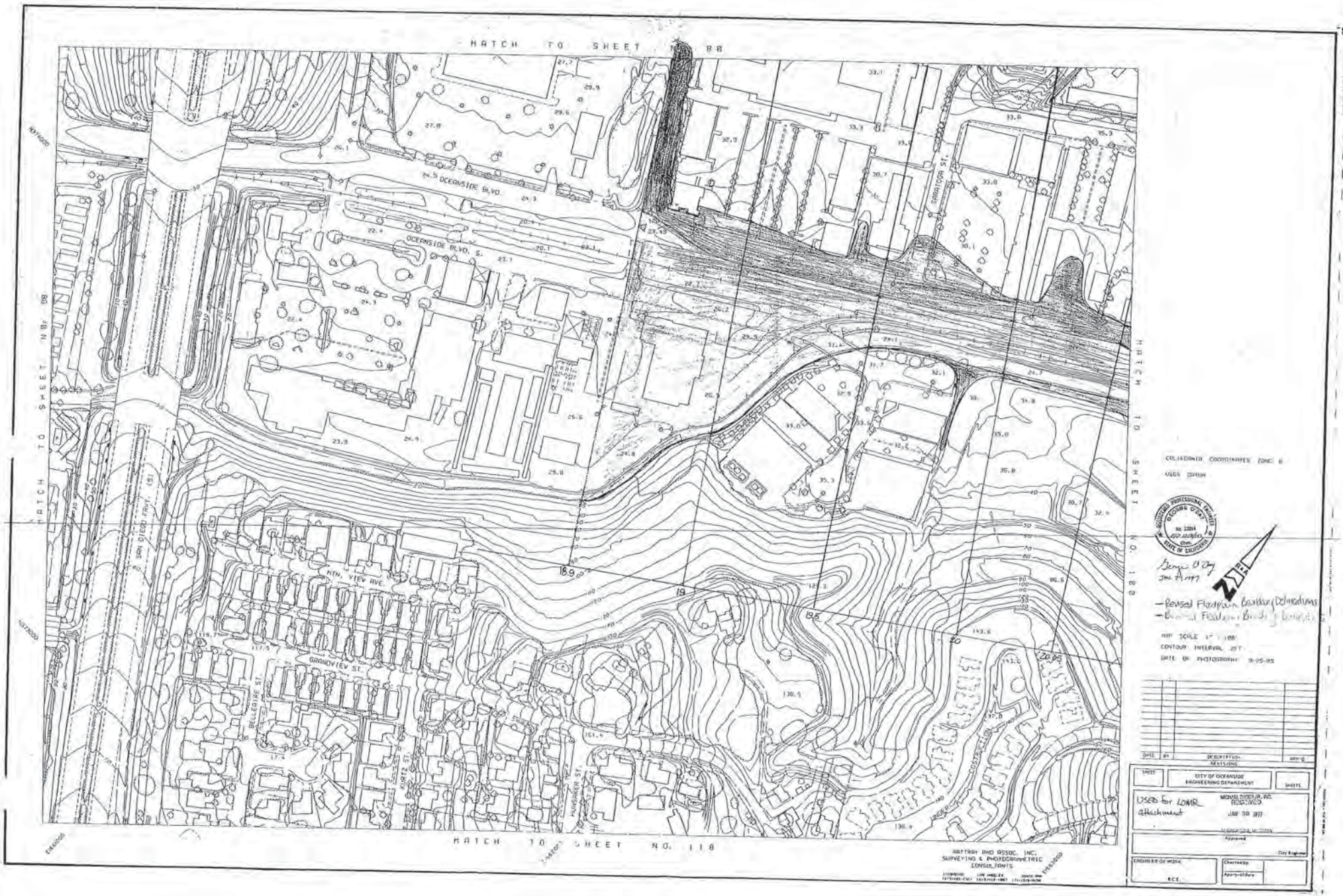
CAUTION SECNO= 20.600 PROFILE= 1 HYDRAULIC JUMP D.S.
WARNING SECNO= 20.600 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
CAUTION SECNO= 20.600 PROFILE= 2 HYDRAULIC JUMP D.S.

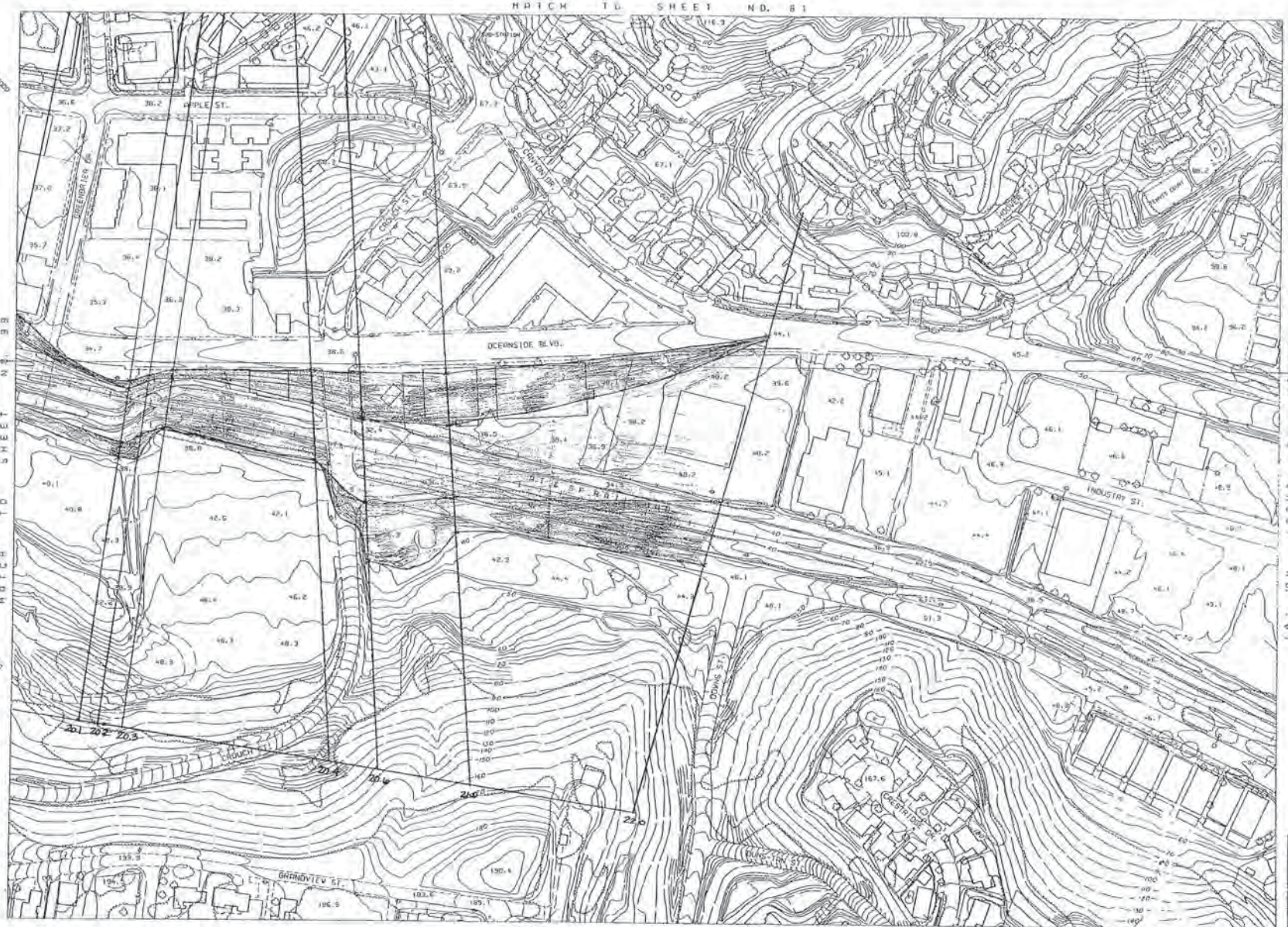
WARNING SECNO= 21.000 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
WARNING SECNO= 21.000 PROFILE= 2 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= 22.000 PROFILE= 2 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

FLOODWAY DATA, PREPARED BY ODAY 1/21/97
PROFILE NO. 2

STATION	FLOODWAY WIDTH	FLOODWAY SECTION AREA	FLOODWAY MEAN VELOCITY	WATER SURFACE ELEVATION WITH FLOODWAY	WITHOUT FLOODWAY	DIFFERENCE
18.900	800.	1040.	3.7	26.3	25.9	.4
19.000	475.	1429.	2.7	27.4	27.1	.3
19.500	140.	455.	8.3	28.3	28.0	.3
20.000	150.	497.	7.7	31.2	30.7	.5
20.050	150.	630.	6.0	33.2	32.8	.4
20.100	130.	526.	7.2	34.5	34.3	.2
20.200	125.	821.	4.6	35.3	35.2	.1
20.300	111.	378.	10.0	35.3	35.1	.2
20.400	141.	834.	4.6	38.7	38.3	.4
20.600	200.	1066.	3.6	38.8	38.5	.3
21.000	170.	629.	6.0	39.1	38.7	.4
22.000	414.	1187.	3.2	41.4	40.7	.7


MATCH TO SHEET NO. 88
MATCH TO SHEET NO. 88
MATCH TO SHEET NO. 118
MATCH TO SHEET NO. 118
OCEANSIDE BLVD.
OCEANSIDE BLVD. S.
SARATOGA ST.
SAN DIEGO FWY. (5)
MTN. VIEW AVE.
GRANDVIEW ST.
BELLEAIRE ST.
KURTZ ST.
HUNSAKER ST.
COLEPORTO COORDINATES ZONE II
USGS DATUM
SCALE 1" = 100'
CONTOUR INTERVAL 2FT
DATE OF PHOTOGRAPHY: 9-05-95
DESCRIPTION
REVISIONS
CITY OF OCEANSIDE
ENGINEERING DEPARTMENT
USED for LOMR
Attachment
RECEIVED
JAN 30 1997
Approved
City Engineer
ENGINEER OF WORK
R.C.E.
Checked by
Approved



ER PERSON COORDINATES ZONE 6

USGS DATUM

— Revised Floodplain Boundary Delineation
— Revised Floodway Boundary Delineation

HOR. SCALE 1" = 100'

CONTOUR INTERVAL 2FT

DATE OF PHOTOGRAPH 3-25-85

DATE	BY	DESCRIPTION OF REVISIONS	APP'D

SHEET

CITY OF OCEANSIDE
ENGINEERING DEPARTMENT

NO. SHEETS

USED for LOMR attachment

JUN 30 1987

ALEXANDRIA, VIRGINIA

Approved

City Engineer

ENGINEER OF WORK

R.C.E.

Checked by

Approved date

```
W    W    AAA    4  4     222
W    W   A   A  4  4    2   2
W    W   A   A  4  4        2
W    W   A   A  44444      2
W W W    AAAAA     4     2
WW WW    A   A     4    2
W    W   A   A     4   22222
```

```
LL              000000     MM       MM     AAAAAA     FFFFFFFFFF
LL              000000     MM       MM     AAAAAA     FFFFFFFFFF
LL            OO      OO   MMMM   MMMM   AA    AA   FF
LL            OO      OO   MMMM   MMMM   AA    AA   FF
LL            OO      OO   MM MM MM MM   AA    AA   FF
LL            OO      OO   MM  MMM  MM   AA    AA   FF
LL            OO      OO   MM       MM   AA    AA   FFFFFFFF
LL            OO      OO   MM       MM   AA    AA   FFFFFFFF
LL            OO      OO   MM       MM   AAAAAAAAAA FF
LL            OO      OO   MM       MM   AAAAAAAAAA FF
LL            OO      OO   MM       MM   AA    AA   FF
LL            OO      OO   MM       MM   AA    AA   FF
LLLLLLLL LLL    000000     MM       MM   AA    AA   FF
LL LLLLLL LL    000000     MM       MM   AA    AA   FF
```

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DDDDDDDD       AAAAAA     TTTTTTTTTT       ;;;;       222222
DDDDDDDD       AAAAAA     TTTTTTTTTT       ;;;;       222222
DD      DD   AA    AA       TT            ;;;;     22      22
DD      DD   AA    AA       TT            ;;;;     22      22
DD      DD   AA    AA       TT                           22
DD      DD   AA    AA       TT                           22
DD      DD   AA    AA       TT            ;;;;         22
DD      DD   AA    AA       TT            ;;;;         22
DD      DD   AAAAAAAAAA     TT            ;;;;       22
DD      DD   AAAAAAAAAA     TT            ;;;;       22
DD      DD   AA    AA       TT              ;;     22
DD      DD   AA    AA       TT              ;;     22
DDDDDDDD     AA    AA       TT            ;;     2222222222
DDDDDDDD     AA    AA       TT            ;;     2222222222
```

```
W    W    AAA    4  4     222
W    W   A   A  4  4    2   2
W    W   A   A  4  4        2
W    W   A   A  44444      2
W W W    AAAAA     4     2
WW WW    A   A     4    2
W    W   A   A     4   22222
```

City of Oceanside CA

- Loma Alta Creek
- Floodway Run
  (with D & M revisions)
- 7-13-82
  GTC

FINAL

```
VAX/VMS  WA42        LOMAF    13-JUL-1982 06:59   TTC1:  13-JUL-1982 06:59   _DRB1:[TED]LOMAF.DAT;2  VAX/VMS
VAX/VMS  WA42        LOMAF    13-JUL-1982 06:59   TTC1:  13-JUL-1982 06:59   _DRB1:[TED]LOMAF.DAT;2  VAX/VMS
VAX/VMS  WA42        LOMAF    13-JUL-1982 06:59   TTC1:  13-JUL-1982 06:59   _DRB1:[TED]LOMAF.DAT;2  VAX/VMS
```

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  HEC?   LEASE DATED NOV 76 UPDATED APRIL 1980
  ERRO   ORR -  01,02,03,04
  MODIFICATION -  50,51,52,53,54
**********************************************
T1         @                    LOMA ALTA CREEK
T2                  CITY OF OCEANSIDE CA.-FLOOD INSURANCE STUDY
T3                               100-FLOODWAY
```

J1	ICHECK	INQ	NINV	IDIR	STRT	METRIC	HVINS	Q	WSEL	FQ
	0.	2.	0.	0.	0.000000	0.00	0.0	0.	12.000	0.000
J2	NPROF	IPLOT	PRFVS	XSECV	XSECH	FN	ALLDC	IBW	CHNIM	ITRACE
	1.000	0.000	-1.000	0.000	0.000	0.000	0.000	0.000	0.000	15.000
J3	VARIABLE CODES FOR SUMMARY PRINTOUT									
	110.000	200.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

NC	0.045	0.045	0.045	0.100	0.300	0.000	0.000	0.000	0.000	0.000
QT	2.000	3800.000	3800.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
ET	0.000	0.000	9.100	0.000	0.000	0.000	0.000	0.000	250.000	550.000
X1	10.000	12.000	370.000	470.000	0.000	0.000	0.000	0.000	0.000	0.000
GR	20.000	0.000	10.000	220.000	10.000	370.000	5.400	375.000	5.400	465.000
GR	10.000	470.000	15.000	870.000	20.000	950.000	25.000	1050.200	30.000	1170.000
GR	35.000	1280.000	36.000	1530.000	0.000	0.000	0.000	0.000	0.000	0.000
NC	0.045	0.045	0.070	0.100	0.300	0.000	0.000	0.000	0.000	0.000
ET	0.000	0.000	9.100	0.000	0.000	0.000	0.000	0.000	400.000	800.000

X1	100	17.000	506.800	1065.600	440.000	000	440.000	0.000	0.000	0.000
GR	300	0.000	31.400	41.300	18.400	800	14.600	88.200	11.700	293.900
GR	10.200	496.900	10 200	506.800	5.400	522.000	5.400	808.500	6.700	756.500
GR	8.900	1025 200	22.800	1065.600	24.500	1157.400	22.100	1225.600	24.000	1275.500
GR	33.400	1389.500	32.800	1438.800	0.000	0.000	0.000	0.000	0.000	0.000
NC	0 045	0.045	0.045	0.100	0.300	0.000	0.000	0.000	0.000	0.000
ET	0.000	0.000	9.100	0.000	0.000	0.000	0.000	0.000	450.000	800.000
X1	10.300	25.000	515.600	724.000	80.000	80.000	80.000	0.000	0.000	0.000
GR	43.700	0.000	42.400	26.100	29.800	60.500	20.300	126.000	12.800	178.600
GR	7.500	304.400	7.300	421.300	6.400	515.600	6.200	608.300	5.400	628.500
GR	5.400	645.700	7.100	663.500	8.900	724.000	9.100	869.800	9.800	976.800
GR	15.500	1063.700	25.000	1114.000	29.200	1134.700	33.200	1204.900	32.200	1275.100
GR	27 400	1319.500	28.000	1354.100	27.900	1397.800	39.200	1437.400	39.200	1459.400
ET	0.000	0.000	9.100	0.000	0.000	0.000	0.000	0.000	600.000	900.000
X1	11.100	20.000	729.700	779.400	810.000	720.000	740.000	0.000	0.000	0.000
GR	37.200	0.000	30.700	143.200	26.800	165.000	16.900	371.100	11.300	458.900
GR	11.200	586.300	10.300	729.700	4.200	742.200	4.200	771.900	4.200	779.400
GR	4 200	837.700	11.100	937.400	12.000	1092.900	13.700	1209.100	19.200	1353.200
GR	22.100	1443.800	24.800	1446.200	27.200	1523.700	29.600	1594.700	29.500	1643.100
SB	1.250	1.500	2.500	0.000	31.500	1.500	165.000	0.000	4.660	4.210
ET	0 000	0.000	9.100	0.000	0.000	0.000	0.000	0.000	650.000	950.000
X1	11.300	18.000	725.500	802.100	110.000	110.000	110.000	0.000	0.000	0.000
X2	0.000	0.000	1.000	9.710	10.700	0.000	0.000	0.000	0.000	0.000
BT	9.000	251.600	23.300	23.300	412.200	14.500	14.500	540.500	10.700	10.700
BT	743.100	10.700	9.710	774.600	10.700	9.710	879.300	10.100	10.100	1008.700
BT	10.600	10.600	1142.400	12.500	12.500	1323.300	17.900	17.900	0.000	0.000
GR	38.700	0.000	35.300	147.100	32.900	332.800	18.900	359.000	13.500	458.200
GR	11.200	604.500	9.400	725.500	4.600	742.700	4.600	753.700	4.600	784.500
GR	4.600	802.100	10.900	996.300	11.200	1133.000	15.800	1280.800	26.500	1520.200
GR	28.900	1591.200	28.000	1613 700	35.700	1707.800	0.000	0.000	0.000	0.000

ET	000	0 000	9 100	0. 000	0. 000	000	0. 000	0. 000	510. 000	640. 000
X1	12. 100	15. 000	530. 000	590. 000	540. 000	580. 000	560. 000	0. 000	0. 000	0. 000
GR	47. 000	0. 000	45. 000	25. 000	45. 000	160. 000	25. 000	225. 000	15. 000	250. 000
GR	10. 000	530. 000	6. 000	540. 000	6. 000	580. 000	10. 000	590. 000	15. 000	1120. 000
GR	20. 000	1140. 000	25. 000	1160. 000	30. 000	1200. 000	35. 000	1220. 000	40. 000	1310. 000
NC	0. 040	0. 040	0. 018	0. 100	0. 300	0. 000	0. 000	0. 000	0. 000	0. 000
ET	0 000	0 000	9. 100	0. 000	0. 000	0. 000	0. 000	0. 000	518. 000	740. 000
X1	13 000	23. 000	519. 200	554. 400	370. 000	370. 000	370. 000	0. 000	0. 000	0. 000
GR	53. 400	0. 000	47. 500	207. 900	22. 100	248. 300	32. 700	311. 300	26. 200	391. 100
GR	15. 600	413. 300	13. 300	519. 200	6. 700	528. 200	6. 700	540. 700	13. 000	554. 400
GR	13. 500	589. 600	5. 600	618. 600	11. 300	641. 300	12. 000	650. 500	12. 000	904. 600
GR	15. 000	967. 300	13. 500	992. 800	9. 700	1001. 000	16. 900	1026. 000	18. 300	1048. 900
GR	18. 300	1062. 600	34. 900	1086. 500	40. 100	1179. 600	0. 000	0. 000	0. 000	0. 000
ET	0. 000	0. 000	9. 100	0. 000	0. 000	0. 000	0. 000	0. 000	630. 000	964. 000
X1	14 100	21. 000	657. 500	698. 000	860. 000	850. 000	855. 000	0. 000	0. 000	0. 000
GR	62. 000	0. 000	62. 800	68. 200	64. 000	152. 400	62. 600	163. 000	35. 400	226. 100
GR	26. 600	269. 500	21. 200	307. 100	15. 600	408. 900	15. 500	626. 300	15. 800	657. 500
GR	9. 800	669. 400	9 800	681. 300	15. 200	698. 000	13. 800	866. 800	16. 000	886. 800
GR	7. 100	909. 200	7. 100	911. 900	9. 600	926. 200	10. 600	955. 400	58. 900	1046. 100
GR	62. 600	1081. 700	0. 000	0. 000	0. 000	0. 000	0. 000	0. 000	0. 000	0. 000
ET	0 000	0 000	9. 100	0. 000	0. 000	0. 000	0. 000	0. 000	630. 000	975. 000
X1	14. 300	20. 000	659. 500	701. 800	45. 000	45. 000	45. 000	0. 000	0. 000	0. 000
GR	62. 500	0. 000	64. 200	135. 300	63. 300	150. 000	34. 800	203. 500	30. 000	215. 800
GR	18. 800	332. 200	14. 500	455. 400	15. 300	632. 200	15. 800	659. 500	9. 700	675. 400
GR	10 100	688. 300	14. 200	701. 800	14. 400	864. 600	15. 100	890. 500	6. 500	909. 700
GR	6. 500	917. 100	10. 200	933. 000	10. 200	958. 900	60. 200	1054. 400	65. 000	1101. 500
ET	0. 000	0. 000	9. 100	0. 000	0. 000	0. 000	0. 000	0. 000	922. 900	1260. 000

X1	000	22 000	922.900	963 600	665.000	000	665.000	0.000	0.000	0.000
GR	100	0.200	80.700	144.500	63.300	600	75.600	301.400	71.800	471.400
GR	300	564 700	18.500	613.800	17.100	.300	14.900	894.700	17.100	922.900
GR	10.100	935.800	10.200	947.500	15.800	963.600	17.200	1133.800	17.200	1158.700
GR	6.700	1182.200	6 900	1191 300	9.100	1218.500	9.500	1237.500	11.700	1250.700
GR	32.400	1296.900	32.800	1359.100	0.000	0.000	0.000	0.000	0.000	0.000
ET	0 000	0.000	9.100	0.000	0.000	0.000	0.000	0.000	833.100	1400.000

X1	16 000	33.000	833.100	878.600	300.000	300.000	300.000	0.000	0.000	0.000
GR	76.500	0 000	82.400	119.600	59.200	158.100	59.500	166.700	26.500	230.500
GR	23.800	235.100	23.800	279.400	36.500	383.600	34.300	501.800	23.000	536.100
GR	20 100	619 300	16.600	808.000	17.800	833.100	11.400	849.800	11.400	863.900
GR	16.900	878.600	15.800	900.600	19.000	1098.600	17.200	1175.600	18.100	1194.100
GR	8.300	1226.000	10.100	1265.200	8.400	1287.400	13.300	1316.000	14.100	1348.100
GR	12.000	1393.000	8.700	1471.300	10.700	1515.100	22.800	1605.100	39.700	1670.000
GR	62.800	1728.500	74.900	1744.600	81.900	1802.200	0.000	0.000	0.000	0.000
ET	0.000	0.000	9.100	0.000	0.000	0.000	0.000	0.000	746.400	1450.000

X1	17 100	23.000	746.400	784.500	420.000	435.000	430.000	0.000	0.000	0.000
GR	77.400	0.000	85 000	101.200	59.600	140.300	59.600	151.300	23.700	210.100
GR	23 300	256.900	22.800	415.300	21.400	591.300	19.400	714.500	21.400	746.400
GR	12.300	762.300	12.300	773.500	20.300	784.500	17.500	835.100	19.600	1141.100
GR	19 000	1352.300	15 500	1396.500	14.600	1421.400	21.000	1451.100	21.200	1509.400
GR	22 400	1585.900	31 700	1737.100	41.200	1883.400	0.000	0.000	0.000	0.000
NC	0 045	0.045	0.040	0.100	0.300	0.000	0.000	0.000	0.000	0.000
ET	0 000	0.000	9 100	0.000	0.000	0.000	0.000	0.000	744.900	1442.000

X1	17.300	21.000	744.900	781.600	30 000	30.000	30.000	0.000	0.000	0.000
GR	80.800	0.000	86.000	100.500	60.100	137.500	60.300	148.700	24.600	205.400
GR	22.900	415.100	21.200	545.100	21.000	744.900	12.800	759.400	12.800	771.300
GR	20.300	781.600	18.600	814.000	20.200	1341.100	13.800	1355.800	13.800	1386.000
GR	16.400	1405.500	14.200	1429.100	21.100	1443.200	20.800	1536.200	33.300	1708.700
GR	42.600	1846.400	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

X1	.3.100	21.000	750.200	793.500	230.000	[illegible].000	220.000	0.000	0.000	0.000
GR	92.000	0.000	92.600	73.700	59.300	125.800	59.100	136.100	23.900	188.700
GR	23.400	379.700	23.400	571 100	21.400	750.200	12.300	763.400	12.300	771.500
GR	20.100	793.500	20.000	969.700	20.400	1211.300	20.500	1367.900	18.400	1387.700
GR	18 400	1418.100	22 100	1428.200	23.000	1479.700	22.800	1508.700	40.200	1543.300
GR	46.600	1587 900	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
ET	0.000	0.000	9 100	0.000	0.000	0.000	0.000	0.000	715.000	1425.000

X1	18.300	25.000	726.400	772.800	332.000	332.000	332.000	0.000	0.000	0.000
GR	101 700	0.000	97.400	235.800	92 900	277.200	78.800	358.300	91.600	465.700
GR	85.000	524.400	32.500	699.100	16.400	726.400	15.500	741.800	15.500	772.800
GR	17.500	788.400	17.500	805.600	15.500	839.700	16.800	976.800	17.800	1125.700
GR	19.400	1291.800	17.800	1368.600	19.400	1397.600	20.600	1419.000	24.000	1434.800
GR	25.500	1486.500	25.400	1505.900	44.400	1552.100	48.000	1583.300	50.500	1675.900
ET	0.000	0 000	9.100	0.000	0.000	0.000	0.000	0.000	183.000	960.000

X1	18.400	24.000	183.000	232.100	260.000	260.000	260.000	0.000	0.000	0.000
GR	117 400	0.000	117.400	8.100	114.000	10.300	114.000	26.800	88.600	85.300
GR	19.300	183.000	15.800	201.900	16.600	218.600	22.700	232.100	22.000	616.800
GR	23.900	851.800	19.000	873.600	17.500	882.200	17.500	896.700	21.500	908.600
GR	21.500	933.900	23.800	941.600	25.100	1051.800	32.300	1274.400	38.500	1408.800
GR	44.600	1455.000	48.100	1501.000	49.500	1522.600	68.000	1575.600	0.000	0.000
ET	0.000	0.000	9.100	0.000	0.000	0.000	0.000	0.000	174.000	945.000

X1	18.600	28.000	176 600	226.300	100.000	100.000	100.000	0.000	0.000	0.000
GR	120.800	0.000	118 600	28.600	116.600	29.900	116.600	47.300	22.000	176.600
GR	17.700	186 300	16 500	200.800	17.200	217.500	23.200	226.300	23.700	452.700
GR	23.900	673.600	23.900	798.300	22.300	799.200	22.300	859.500	18.700	877.500
GR	18.700	891.600	21.300	911.200	23.200	923.700	19.800	932.800	24.000	947.900
GR	25.700	1054.600	32.000	1233.700	40.800	1382.200	43.300	1406.000	51.800	1430.400
GR	57.600	1461.400	60.900	1490.700	74.800	1525.900	0.000	0.000	0.000	0.000
ET	0.000	0.000	9.100	0.000	0.000	0.000	0.000	0.000	200.000	1000.000

X1	700	26.000	200.200	237.800	738.000	000	738.000	0.000	0.000	0.000
GR	700	0.000	73.300	90.800	25.500	200	20.400	203.900	20.400	218.900
GR	28.700	237.800	24.800	246.800	25.400	586.500	23.900	820.600	22.700	834.400
GR	18.900	846.500	23.000	877.100	23.000	893.800	20.800	911.400	24.200	932.800
GR	22.700	940.900	24.200	994.100	24.800	1036.200	20.200	1054.000	23.300	1072.500
GR	23.800	1159.800	23.800	1316.000	28.900	1392.100	50.600	1522.600	67.000	1629.700
GR	73.000	1655.900	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
ET	0.000	0.000	9.100	0.000	0.000	0.000	0.000	0.000	200.000	1000.000
X1	18.900	27.000	208.300	240.000	50.000	50.000	50.000	0.000	0.000	0.000
GR	96.400	0.000	82.500	74.800	30.400	183.900	24.100	208.300	19.200	219.500
GR	24.900	240.000	24.200	260.700	25.900	469.000	23.700	737.200	24.300	809.600
GR	24.900	829.600	19.200	849.400	23.300	877.500	20.500	913.400	23.300	926.400
GR	24.100	1010.400	25.500	1020.800	21.000	1038.100	25.200	1057.300	23.000	1070.000
GR	25.000	1127.700	23.800	1208.600	23.700	1359.800	43.200	1477.900	57.900	1574.100
GR	68.300	1655.000	66.200	1712.200	0.000	0.000	0.000	0.000	0.000	0.000
ET	0.000	0.000	9.100	0.000	0.000	0.000	0.000	0.000	432.300	980.000
X1	19.000	28.000	432.300	481.800	450.000	300.000	450.000	0.000	0.000	0.000
GR	131.500	0.000	118.100	55.400	74.400	330.000	64.200	380.100	28.700	432.300
GR	20.200	454.500	28.700	481.800	23.500	494.100	27.200	552.800	25.400	768.900
GR	26.500	809.100	22.300	824.100	22.300	857.100	23.100	866.500	20.800	891.800
GR	24.500	917.800	25.000	990.200	26.500	1156.500	21.200	1175.400	24.500	1198.100
GR	22.700	1297.700	22.700	1397.800	32.400	1493.800	42.100	1571.900	40.200	1653.900
GR	43.100	1863.400	53.400	2033.200	60.000	2098.800	0.000	0.000	0.000	0.000
ET	0.000	0.000	9.100	0.000	0.000	0.000	0.000	0.000	625.000	750.000
X1	20.000	29.000	606.900	699.600	745.000	745.000	745.000	0.000	0.000	0.000
GR	138.800	0.000	133.600	44.200	122.900	76.300	116.500	128.400	96.500	168.500
GR	90.900	296.500	77.400	422.400	35.200	606.900	26.600	637.300	24.600	680.400
GR	27.400	699.600	27.400	783.600	29.200	820.300	28.500	832.200	24.700	846.300
GR	29.300	871.800	29.800	949.900	28.100	1042.800	28.100	1152.800	30.300	1167.300
GR	33.400	1334.700	33.400	1464.500	54.500	1499.900	52.400	1564.800	45.700	1593.000

ET	9.000	0.000	9.100	0.000	0.000	0.000	0.000	0.000	325.000	797.000
X1	20.100	24.000	320.300	797.000	580.000	580.000	580.000	0.000	0.000	0.000
GR	77.600	0.000	55.700	163.000	39.300	267.300	32.700	320.300	27.900	345.100
GR	28.600	478.000	29.900	671.400	29.900	737.800	28.700	775.500	31.800	782.300
GR	33.800	797.000	33.600	862.800	34.000	922.400	34.300	1048.500	35.100	1197.600
GR	37.500	1339.100	37.500	1454.400	37.100	1515.300	45.600	1628.400	45.700	1674.600
GR	45.700	1747.200	71.500	1832.100	81.900	1864.000	81.900	1973.100	0.000	0.000
NC	0.045	0.045	0.070	0.100	0.300	0.000	0.000	0.000	0.000	0.000
ET	0.000	0.000	9.100	0.000	0.000	0.000	0.000	0.000	325.000	820.000
X1	20.200	29.000	748.600	825.600	45.000	45.000	45.000	0.000	0.000	0.000
GR	76.400	0.000	51.400	170.500	37.000	252.500	34.000	310.400	28.600	325.100
GR	29.900	341.600	29.700	504.000	30.900	704.400	31.100	733.200	34.600	748.600
GR	30.200	768.900	30.800	783.400	28.700	792.600	29.000	809.600	33.200	825.600
GR	34.200	909.900	33.800	952.600	35.400	1182.200	37.500	1462.700	37.500	1512.500
GR	41.100	1550.100	36.000	1571.000	45.600	1604.400	45.700	1756.200	46.800	1813.900
GR	66.600	1887.600	71.200	1900.300	82.700	1940.400	83.500	1969.400	0.000	0.000
ET	0.000	0.000	9.100	0.000	0.000	0.000	0.000	0.000	315.000	852.000
X1	20.300	31.000	801.200	851.800	45.000	45.000	45.000	0.000	0.000	0.000
GR	78.600	0.000	66.500	45.900	41.900	208.700	34.400	260.900	31.800	315.200
GR	32.400	474.700	35.600	629.800	35.800	728.200	30.100	746.200	30.100	757.900
GR	33.800	791.500	33.800	801.200	29.800	809.100	30.000	845.200	33.500	851.800
GR	34.200	874.200	34.200	921.100	33.700	954.500	35.600	1160.900	39.100	1407.100
GR	37.600	1470.000	37.900	1527.900	43.400	1574.700	38.400	1607.700	46.300	1647.100
GR	45.900	1813.000	50.600	1887.100	67.500	1933.100	86.900	1984.400	91.500	1998.400
GR	92.000	2022.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
ET	0.000	0.000	9.100	0.000	0.000	0.000	0.000	0.000	554.000	860.000

X1	400	36.000	808.900	850.700	343.000	000	340.000	0.000	0.000	0.000
GR	1 700	0.000	89.100	86.400	80.500	300	80.500	118.500	74.500	147.100
GR	72.700	199 500	55.700	239.100	44.300	327.100	33.400	470.300	35.500	595.900
GR	39.000	722 200	30.700	751.000	34.600	785.100	34.700	808.900	28.300	823.400
GR	28.300	850.700	35.700	858.000	35.600	990.000	42.500	1161.800	49.400	1174.100
GR	50.500	1257.500	66.500	1382.400	67.100	1422.300	61.100	1455.500	38.700	1518.000
GR	37.500	1543 900	38.900	1578 000	44.500	1602 400	44.500	1736.900	42.000	1767.000
GR	38.600	1780.400	47.400	1814.500	48.300	1941.700	48.300	2000.600	100.300	2121.400
GR	100.500	2147.200	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SB	1.250	1.500	2.500	0.000	31.500	1.500	150.000	0.000	29.700	29.500
ET	0.000	0.000	9.100	0.000	0.000	0.000	0.000	0.000	630.000	870.000

X1	20.600	39.000	803.200	862.400	100.000	100.000	100.000	0.000	0.000	0.000
X2	0 000	0.000	1.000	34.500	35.700	0.000	0.000	0.000	0.000	0.000
BT	12.000	231.400	69.200	69.200	479.800	46.400	46.400	595.500	38.900	38.900
BT	699.800	37.000	37.000	772.200	35.000	835.900	835.500	35.700	34.500	920.900
BT	35.700	34.500	1003.200	36.600	36 600	1146.400	43.400	43.400	1194.600	44.200
BT	44.200	1219.900	50.300	50.300	1435.500	66.300	66.300	0.000	0.000	0.000
GR	145.200	0.000	115.000	80.300	70.400	154.200	70.400	186.300	66.800	214.900
GR	53.600	300.500	43.100	436.000	34.300	560.300	34.100	588.700	36.200	632.500
GR	36.600	717.400	33.800	724.200	33.200	764.200	35.500	778.800	33.400	788.200
GR	35.700	803.200	28.800	817.700	28.800	848.900	36.000	862.400	34.500	986.400
GR	37.000	1046.900	37.900	1127.900	44.400	1190.600	45.200	1252.200	48.600	1263.000
GR	54.900	1337.600	66.800	1443.800	67.000	1497.500	44.300	1550.100	44.300	1606.600
GR	42.000	1666.000	44.300	1770.100	47.900	1868.900	46.400	1905.600	50.100	1729.400
GR	52.000	2108 900	92.800	2208.800	107.100	2243.700	101.400	2277.000	0.000	0.000
NC	0.045	0.045	0.040	0.100	0.300	0.000	0.000	0.000	0.000	0.000
ET	0.000	0.000	9.100	0.000	0.000	0.000	0.000	0.000	690.000	850.000

X1	21.000	36.000	792.600	830.000	205.000	205.000	205.000	0.000	0.000	0.000
GR	157.000	0.000	105 000	127.600	84.700	203.700	66.800	323.100	65.000	366.900
GR	45.300	430.300	45.300	500.000	38.100	544.700	35.600	637.300	38.700	652.500
GR	38.700	689.900	34.500	705.100	34.000	732.800	33.600	744.700	36.400	756.800
GR	32.500	773.000	38.500	792.600	32.500	804.900	32.500	815.300	39.000	830.000

GR	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
GR	[illegible].700	1310.300	63.000	1394.500	64.300	1[illegible]800	64.300	1612.100	61.700	1628.600
GR	[illegible].300	1638.300	64.300	1719.000	63.100	1[illegible]700	63.700	1784.800	73.700	1808.100
GR	80.400	1849.900	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
ET	0.000	0.000	9.100	0.000	0.000	0.000	0.000	0.000	750.000	1164.000
X1	22.000	33.000	769.700	809.600	605.000	608.000	608.000	0.000	0.000	0.000
GR	174.300	0.000	173.200	63.300	152.900	128.700	152.500	148.200	129.300	252.100
GR	129.200	265.900	121.500	280.900	120.600	294.300	101.100	359.400	61.300	451.400
GR	50.600	467.500	50.200	499.400	44.100	517.600	40.100	616.600	45.100	627.000
GR	45.100	670.100	39.100	685.000	36.700	719.400	37.600	736.100	35.900	750.400
GR	36.900	769.700	34.100	776.600	34.100	790.200	40.300	809.600	38.800	883.700
GR	38.800	1104.800	38.500	1163.800	42.800	1186.900	41.200	1235.500	52.400	1284.500
GR	68.600	1338.000	83.200	1382.900	92.000	1430.800	0.000	0.000	0.000	0.000
ET	0.000	0.000	9.100	0.000	0.000	0.000	0.000	0.000	731.000	1045.000
X1	23.000	22.000	786.700	823.000	730.000	730.000	730.000	0.000	0.000	0.000
GR	152.200	0.000	122.500	515.600	78.100	609.800	68.900	627.800	52.800	642.600
GR	52.800	676.900	51.600	693.200	40.900	730.600	40.900	761.400	43.100	773.300
GR	43.100	786.700	36.800	809.300	41.900	823.000	44.200	1045.200	44.300	1173.000
GR	45.300	1235.700	48.800	1313.800	48.800	1362.900	60.900	1378.500	72.800	1430.600
GR	82.700	1483.600	85.500	1517.700	0.000	0.000	0.000	0.000	0.000	0.000
ET	0.000	0.000	9.100	0.000	0.000	0.000	0.000	0.000	680.000	820.600
X1	24.000	28.000	780.100	820.600	796.000	796.000	796.000	0.000	0.000	0.000
GR	240.100	0.000	124.900	349.800	108.500	373.300	108.600	383.000	62.300	441.100
GR	59.400	479.300	53.600	516.300	54.500	578.600	50.100	598.400	50.100	676.900
GR	43.300	720.700	45.500	736.700	43.700	758.700	47.300	771.700	47.300	780.100
GR	40.600	802.500	46.800	820.600	49.200	886.300	51.600	989.100	51.600	1197.200
GR	51.800	1230.400	55.500	1264.300	57.500	1431.300	76.300	1466.500	77.300	1544.600
GR	83.500	1551.200	92.400	1623.600	100.700	1651.100	0.000	0.000	0.000	0.000
ET	0.000	0.000	9.100	0.000	0.000	0.000	0.000	0.000	680.000	820.000

X1	[illegible]00	27.000	792.800	835.100	506.000	[illegible]000	506.000	0.000	0.000	0.000
GR	1[illegible]00	0.000	115.600	361.900	116.900	[illegible]300	101.900	394.400	102.100	405.000
GR	72.000	443.500	66.600	535.700	68.000	560.100	69.300	670.100	51.900	708.100
GR	49.200	729.700	46.900	734.100	49.900	747.100	48.200	756.100	48.100	781.200
GR	50.200	792.800	43.100	805.200	43.400	818.600	50.000	835.100	51.100	849.600
GR	52.500	992.200	55.900	1200.700	57.700	1257.500	62.100	1548.500	84.000	1591.400
GR	84.000	1651.500	84.000	1672.400	0.000	0.000	0.000	0.000	0.000	0.000
ET	0.000	0.000	9.100	0.000	0.000	0.000	0.000	0.000	716.000	1010.000
X1	26.000	30.000	795.100	843.700	508.000	508.000	508.000	0.000	0.000	0.000
GR	169.900	0.000	91.400	548.000	88.500	578.600	88.000	654.900	60.900	698.700
GR	56.100	718.900	55.500	731.900	49.800	737.600	52.200	745.100	53.000	758.100
GR	50.800	774.600	53.100	783.200	53.500	795.100	46.200	812.000	51.000	821.900
GR	54.400	843.700	54.300	1008.000	56.700	1123.500	57.200	1288.100	57.000	1316.400
GR	62.300	1331.800	61.100	1448.200	66.600	1476.800	68.200	1552.900	73.300	1668.000
GR	76.100	1711.600	75.000	1787.000	78.700	1797.400	81.100	1864.700	81.100	1940.800
ET	0.000	0.000	9.100	0.000	0.000	0.000	0.000	0.000	796.000	1115.000
X1	27.000	29.000	795.500	856.200	530.000	530.000	530.000	0.000	0.000	0.000
GR	213.600	0.000	153.000	531.300	153.000	547.300	95.700	683.500	56.100	738.900
GR	56.800	753.000	56.400	761.200	52.300	769.100	53.700	773.900	53.000	795.500
GR	48.500	816.800	52.300	835.500	55.700	856.200	56.400	987.100	55.100	1182.200
GR	55.500	1331.800	58.600	1395.200	58.000	1453.700	62.500	1458.300	64.200	1540.400
GR	66.800	1699.500	66.900	1742.100	77.800	1745.700	84.200	1828.200	87.000	1921.400
GR	88.500	1984.600	96.500	2001.700	99.000	2112.000	99.100	2152.700	0.000	0.000
ET	0.000	0.000	9.100	0.000	0.000	0.000	0.000	0.000	800.000	1085.000
X1	28.000	26.000	800.100	851.800	312.000	312.000	312.000	0.000	0.000	0.000
GR	217.600	0.000	192.200	433.600	77.800	622.800	63.300	636.200	62.300	717.200
GR	57.000	720.200	58.700	740.700	54.500	751.700	58.500	775.200	56.200	800.100
GR	52.000	816.400	55.400	843.400	60.800	851.800	58.900	963.800	57.700	1160.000
GR	59.700	1331.000	60.700	1377.200	66.000	1584.000	65.700	1662.500	70.000	1679.700
GR	70.500	1754.000	72.900	1767.400	79.200	1976.000	82.700	2026.200	88.200	2045.700

ET	?. 000	0. 000	9 100	0. 000	0. 000	^ 000	0. 000	0. 000	773. 300	1050. 000
X1	29. 000	28. 000	773. 300	841. 700	484. 000	484. 000	484. 000	0. 000	0. 000	0. 000
GR	159. 800	0. 000	107. 500	174. 900	85. 500	274. 100	80. 300	305. 500	73. 300	503. 800
GR	65. 700	737. 400	66 800	743. 600	60. 900	757. 000	62. 400	773. 300	61. 300	812. 400
GR	55. 500	826. 500	59. 700	841. 700	60. 000	1044. 500	61. 900	1161. 100	63. 000	1266. 700
GR	66. 700	1301 900	67. 400	1339. 800	60. 900	1356. 000	63. 800	1532. 700	67. 200	1546. 300
GR	67. 100	1599. 400	64 900	1624. 900	66. 700	1859. 200	70. 800	1974. 000	72. 900	2017. 600
GR	76. 300	2037. 400	78. 800	2184. 100	83. 300	2262. 700	0. 000	0. 000	0. 000	0. 000
GT	2. 000	2200. 000	2200. 000	0. 000	0. 000	0. 000	0. 000	0. 000	0. 000	0. 000
ET	0. 000	0. 000	9. 100	0. 000	0. 000	0. 000	0. 000	0. 000	776. 100	1000. 000
X1	30 000	24. 000	776. 100	839. 900	533. 000	533. 000	533. 000	0. 000	0. 000	0. 000
GR	129. 300	0. 000	103. 700	577. 700	101. 600	602. 300	91. 400	634. 700	91. 400	647. 400
GR	74. 900	704. 000	75. 500	717. 800	66. 400	733. 900	66. 200	751. 500	63. 500	756. 300
GR	63. 500	776. 100	55. 500	818. 800	60. 900	839. 900	62. 400	1087. 400	63. 800	1284. 300
GR	64. 900	1338. 000	68. 300	1355. 200	66. 900	1371. 700	80. 400	1439. 900	81. 100	1465. 800
GR	79. 700	1476. 800	79. 700	1513. 300	101. 700	1550. 700	102. 600	1598. 000	0. 000	0. 000
ET	0. 000	0. 000	10. 400	0. 000	0. 000	0. 000	0. 000	0. 000	0. 000	0. 000
X1	31. 000	23. 000	775. 200	826. 500	637. 000	637. 000	637. 000	0. 000	0. 000	0. 000
GR	201. 700	0. 000	140. 100	532. 100	103. 600	626. 100	97. 000	632. 000	94. 800	646. 500
GR	76. 100	693. 000	75. 400	711. 900	70. 000	716. 900	71. 200	727. 300	66. 800	742. 500
GR	68. 700	746. 900	68. 300	768. 400	68. 900	775. 200	59. 700	805. 400	64. 600	826. 500
GR	65. 800	1003. 400	69. 500	1139. 800	79. 300	1222. 900	91. 800	1345. 700	97. 300	1432. 600
GR	104. 900	1452. 400	104. 900	1496. 000	106. 100	1502. 800	0. 000	0. 000	0. 000	0. 000
ET	0. 000	0. 000	9. 100	0. 000	0. 000	0. 000	0. 000	0. 000	712. 000	960. 000
X1	32. 000	23. 000	712. 100	749. 900	651. 000	651. 000	651. 000	0. 000	0. 000	0. 000
GR	186. 800	0. 200	134. 200	376. 200	109. 300	439. 700	109. 800	451. 400	98. 400	528. 400
GR	91. 700	546. 000	93. 300	560. 100	79. 400	643. 500	82. 100	655. 100	74. 900	662. 600
GR	75. 600	679. 100	73. 400	712. 100	67. 200	737. 800	71. 700	749. 900	69. 600	775. 900
GR	72. 000	962. 500	75. 200	1087. 900	81. 100	1153. 200	94. 800	1228. 400	101. 300	1245. 600

GR	104.300	1313.100	100.900	1387.100	109.900	1428.400	0.000	0.000	0.000	0.000
ET	.000	0.000	10.400	0.000	0.000	.000	0.000	0.000	0.000	0.000
X1	32.100	24.000	851.800	908.800	429.000	382.000	396.000	0.000	0.000	0.000
GR	128.700	0.000	107.900	244.400	101.500	356.400	85.800	542.700	83.200	665.500
GR	84.900	700.200	79.600	714.500	81.900	720.500	79.300	749.500	77.400	834.600
GR	77.700	851.800	69.000	873.400	77.100	908.800	75.900	923.300	73.300	957.400
GR	79.200	1114.300	76.200	1165.500	87.000	1273.800	89.800	1374.500	97.400	1461.400
GR	101.000	1467.800	104.500	1539.100	109.100	1639.600	110.200	1681.200	0.000	0.000
SB	1.250	1.500	2.500	0.000	25.500	1.500	144.000	0.000	70.200	69.700
X1	32.300	24.000	647.400	999.000	176.000	176.000	176.000	0.000	0.000	0.000
X2	0.000	0.000	1.000	75.700	79.800	0.000	0.000	0.000	0.000	0.000
BT	9.000	412.200	96.300	96.300	640.800	81.100	81.100	765.600	80.100	80.100
BT	787.000	79.800	75.700	813.000	79.800	75.700	886.600	78.800	78.800	1022.500
BT	80.600	80.600	1211.100	85.500	85.500	1365.100	92.400	92.400	0.000	0.000
GR	120.600	0.000	109.500	78.000	98.000	162.800	96.900	180.100	98.000	198.400
GR	91.100	337.900	87.500	489.000	83.700	623.400	82.900	647.400	85.500	677.300
GR	78.700	693.200	79.000	711.400	79.900	832.900	73.300	841.500	73.300	882.200
GR	77.900	891.000	80.900	999.000	86.100	1131.000	88.200	1177.000	92.800	1199.000
GR	101.700	1334.300	104.500	1373.200	111.300	1454.400	112.000	1529.400	0.000	0.000
X1	33.000	20.000	756.500	856.900	352.000	352.000	352.000	0.000	0.000	0.000
GR	145.200	0.000	127.200	83.600	105.100	189.400	89.200	314.800	82.000	462.800
GR	82.000	539.200	83.100	559.900	81.100	577.700	81.600	595.100	81.800	642.100
GR	81.500	756.500	78.200	781.600	78.200	826.700	86.700	856.900	103.400	909.000
GR	118.300	987.800	118.400	1004.700	117.100	1040.300	118.200	1082.800	128.200	1213.300
X1	34.000	21.000	748.600	816.600	688.000	685.000	688.000	0.000	0.000	0.000
GR	169.400	0.000	129.900	164.100	109.300	293.900	101.800	395.700	95.000	528.200
GR	96.300	552.400	88.400	559.900	89.300	571.100	90.000	615.500	88.000	636.600
GR	83.900	706.200	89.600	748.600	85.600	769.700	88.100	816.600	91.800	863.500
GR	98.300	922.900	108.600	997.000	114.800	1012.200	115.600	1059.700	116.700	1123.900
GR	125.600	1167.500	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

X1	.000	25.000	718.900	772.400	455.000	.000	455.000	0.000	0.000	0.000
GR	220.900	0.200	210.600	113.000	129.500	447.700	99.100	565.600	95.800	606.700
GR	97.300	620.800	94.600	645.900	96.800	675.400	92.400	698.200	93.300	718.900
GR	90.600	737.600	94.200	772.400	93.500	798.100	95.700	806.700	100.700	890.100
GR	105.300	924.400	107.300	937.400	108.000	973.900	111.900	1032.200	118.400	1052.400
GR	119.100	1079.700	123.000	1096.400	123.000	1119.800	130.100	1133.200	132.700	1199.600
ET	0.000	0.000	9.100	0.000	0.000	0.000	0.000	0.000	589.000	857.000

X1	36.000	31.000	599.100	671.400	550.000	550.000	550.000	0.000	0.000	0.000
GR	228.200	0.000	173.200	264.200	165.300	311.700	106.300	529.500	106.400	544.000
GR	103.100	562.700	102.300	589.100	97.600	631.100	104.300	671.400	105.200	718.500
GR	102.300	730.400	98.500	756.100	103.900	777.200	103.900	818.400	98.600	845.200
GR	111.400	882.600	131.200	915.800	132.700	956.300	120.800	987.800	112.600	1015.700
GR	120.700	1077.100	122.100	1087.400	137.700	1104.400	143.700	1146.600	153.800	1180.900
GR	163.200	1200.100	165.000	1239.400	165.000	1270.900	202.100	1328.300	199.500	1349.900
GR	199.100	1393.200	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

X1	36.100	22.000	521.600	574.200	50.000	50.000	50.000	0.000	0.000	0.000
GR	227.200	0.000	142.600	374.800	111.100	478.900	105.800	504.600	105.100	521.600
GR	100.400	538.500	103.000	555.700	103.900	574.200	104.900	671.000	104.000	802.700
GR	103.900	815.900	98.500	838.800	110.600	878.600	132.000	916.300	133.000	954.800
GR	123.400	974.800	111.000	988.200	112.600	1022.100	118.700	1062.600	131.200	1074.200
GR	139.300	1113.400	158.800	1168.200	0.000	0.000	0.000	0.000	0.000	0.000
ET	0.000	0.000	9.100	0.000	0.000	0.000	0.000	0.000	500.000	775.000

X1	36.200	23.000	558.800	569.100	50.000	50.000	50.000	0.000	0.000	0.000
GR	228.300	0.000	148.700	384.100	145.600	399.300	125.300	438.400	108.400	477.100
GR	105.500	496.500	101.200	509.000	101.200	521.100	103.500	530.600	104.900	558.800
GR	101.400	569.100	101.400	752.400	107.400	773.700	108.100	815.500	110.900	876.200
GR	132.400	913.000	134.700	953.400	123.600	996.600	122.400	1027.100	129.700	1060.600
GR	133.700	1081.900	158.900	1129.900	158.900	1154.300	0.000	0.000	0.000	0.000
NC	0.035	0.035	0.040	0.100	0.300	0.000	0.000	0.000	0.000	0.000

X1	[illegible] 100	16.000	543.100	592.600	139.000	[illegible] 000	154.000	0.000	0.000	0.000
GR	109.800	502.200	111.100	543.100	102.900	554.400	101.000	571.500	110.900	592.600
GR	111.700	708.400	109.200	766.900	110.200	792.000	112.500	797.700	107.800	812.200
GR	125.200	859.700	131.400	929.500	134.600	941.800	135.200	981.600	134.400	995.000
GR	152.900	1039.500	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
ET	0.000	0.000	9.100	0.000	0.000	0.000	0.000	0.000	440.000	595.700
X1	37.300	17.000	511.900	595.700	84.000	84.000	84.000	0.000	0.000	0.000
GR	242.500	0.000	160.200	329.500	105.100	438.900	105.100	460.200	108.000	511.900
GR	105.200	522.700	104.700	542.300	102.700	545.100	102.700	560.700	119.000	595.700
GR	113.300	662.400	113.700	751.300	110.200	760.700	115.300	836.000	132.400	864.600
GR	135.300	945.100	135.500	967.300	0.000	0.000	0.000	0.000	0.000	0.000
ET	0.000	0.000	9.100	0.000	0.000	0.000	0.000	0.000	402.000	504.000
X1	38.100	19.000	407.800	503.300	475.000	451.000	462.000	0.000	0.000	0.000
GR	181.700	0.200	155.200	257.100	155.300	273.600	120.600	326.000	120.600	341.400
GR	109.900	364.300	109.900	388.700	111.500	407.800	107.600	447.400	106.800	489.700
GR	114.300	503.300	114.300	540.700	115.000	690.500	121.900	857.700	136.700	880.400
GR	136.700	917.400	142.100	923.300	147.000	967.100	152.400	987.800	0.000	0.000
ET	0.000	0.000	9.100	0.000	0.000	0.000	0.000	0.000	455.000	512.000
X1	38.300	25.000	455.600	511.900	77.000	77.000	77.000	0.000	0.000	0.000
GR	178.200	0.000	154.500	230.700	154.500	260.400	121.400	309.100	119.100	348.200
GR	111.400	361.000	109.800	388.000	111.700	413.300	112.000	455.600	107.400	464.400
GR	107.400	493.600	115.800	511.900	114.900	538.100	120.400	543.100	127.000	607.600
GR	126.900	668.500	118.000	686.400	119.400	744.700	125.200	754.600	127.700	770.600
GR	127.600	865.200	136.000	882.600	137.500	920.000	141.500	982.000	149.900	1034.000
ET	0.000	0.000	9.100	0.000	0.000	0.000	0.000	0.000	415.000	586.000

X1	.100	21.000	526.600	586.000	282.000	.000	271.000	0.000	0.000	0.000
GR	193.600	0.000	148.400	196.600	147.400	243.900	131.000	283.300	130.700	297.400
GR	126.500	301.600	140.100	340.100	112.300	382.500	112.900	425.400	112.900	473.200
GR	115.900	526.600	109.400	537.400	109.400	567.600	122.400	586.000	124.800	674.300
GR	125.700	753.000	137.700	898.200	137.700	933.400	159.000	966.400	158.200	981.600
GR	158.700	992.400	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
ET	0.000	0.000	9.100	0.000	0.000	0.000	0.000	0.000	439.000	629.000
X1	39.300	19.000	571.700	629.200	77.000	77.000	77.000	0.000	0.000	0.000
GR	196.000	0.000	143.600	242.400	143.600	271.700	132.600	328.400	125.800	355.500
GR	119.500	397.500	117.700	436.000	114.400	439.300	114.200	490.600	118.600	571.700
GR	111.300	586.300	111.300	601.700	126.300	629.200	128.100	765.600	133.800	809.600
GR	138.700	904.200	138.700	944.000	160.000	970.600	162.300	1036.800	0.000	0.000
ET	0.000	0.000	10.400	0.000	0.000	0.000	0.000	0.000	0.000	0.000
X1	40.100	27.000	561.400	597.900	382.000	382.000	382.000	0.000	0.000	0.000
GR	189.000	0.000	148.500	261.300	147.500	300.300	133.400	325.300	133.400	359.400
GR	127.100	382.100	126.400	414.700	118.300	459.100	118.300	521.800	118.900	551.300
GR	120.800	561.400	114.000	570.600	113.600	582.100	123.100	597.900	128.000	683.500
GR	131.100	833.500	126.900	848.100	130.000	862.800	130.800	876.200	140.000	892.100
GR	141.000	907.000	141.000	951.900	139.300	961.400	144.400	975.000	146.900	1024.300
GR	166.300	1057.100	170.300	1112.100	0.000	0.000	0.000	0.000	0.000	0.000
X1	40.300	26.000	556.600	591.300	84.000	84.000	84.000	0.000	0.000	0.000
GR	207.000	0.000	165.000	219.100	159.400	231.800	147.500	250.800	140.400	352.800
GR	126.400	367.100	119.300	477.100	118.800	544.000	123.000	556.600	113.100	577.200
GR	122.200	591.300	130.200	722.700	130.700	819.000	130.800	854.400	126.400	869.400
GR	129.700	881.900	131.400	897.800	141.100	925.700	142.000	966.000	139.000	973.700
GR	143.400	988.200	146.100	1026.500	154.600	1038.600	155.100	1056.000	164.100	1066.500
GR	167.400	1122.400	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

X1	00	21.000	581.900	628.700	143.000	00	139.000	0.000	0.000	0.000
GR	1[illegible]400	0.000	163.900	363.600	158.800	[illegible]100	148.700	409.800	124.900	428.100
GR	120.900	557.400	120.900	571.100	124.200	581.900	115.100	599.200	132.100	628.700
GR	132.300	812.400	130.700	880.200	125.400	888.800	132.100	907.900	132.900	929.500
GR	142.400	949.700	142.500	994.400	138.700	999.400	145.700	1027.100	150.100	1051.300
GR	159.400	1098.400	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
X1	41.300	22.000	591.500	632.200	70.000	70.000	70.000	0.000	0.000	0.000
GR	215.400	0.200	169.500	385.800	164.300	400.100	164.900	414.400	125.400	469.200
GR	125.400	509.500	122.200	569.800	126.500	591.500	118.900	609.800	131.100	632.200
GR	132.600	739.600	133.800	839.500	131.300	876.400	126.900	896.700	132.500	913.000
GR	133.300	944.200	142.000	964.900	142.900	1001.600	138.700	1017.900	146.500	1038.100
GR	147.900	1047.200	161.200	1094.000	0.000	0.000	0.000	0.000	0.000	0.000
X1	42.100	23.000	666.600	712.100	497.000	497.000	497.000	0.000	0.000	0.000
X3	10.000	0.000	0.000	0.000	0.000	712.100	0.000	0.000	0.000	0.000
GR	290.900	0.200	183.100	460.200	150.600	545.800	129.600	570.900	128.000	621.200
GR	126.300	652.900	128.900	666.600	125.200	678.900	137.100	712.100	133.500	738.100
GR	136.900	806.500	141.200	829.400	141.200	843.700	129.000	873.800	129.000	891.400
GR	137.300	915.400	141.300	934.100	137.400	976.100	138.800	1084.100	139.100	1114.700
GR	140.800	1148.400	156.300	1213.300	162.600	1236.800	0.000	0.000	0.000	0.000
X1	42.300	25.000	670.700	715.000	68.000	68.000	68.000	0.000	0.000	0.000
X3	10.000	0.000	0.000	0.000	0.000	715.000	0.000	0.000	0.000	0.000
GR	294.100	0.000	177.200	478.000	160.000	502.000	157.900	525.800	142.900	558.300
GR	133.000	586.700	133.700	605.800	127.600	628.500	129.400	670.700	126.400	694.100
GR	135.800	715.000	137.100	810.400	137.800	847.800	130.800	867.000	130.800	891.400
GR	140.400	923.100	141.400	951.500	135.400	1014.400	135.900	1046.700	138.500	1087.400
GR	138.500	1117.800	142.100	1157.800	145.100	1199.200	161.600	1244.300	178.900	1271.300

X1	3.000	31.000	645.000	754.100	238.000	[illegible].000	238.000	0.000	0.000	0.000
GR	245.200	0.200	172.200	441.500	163.000	463.300	163.000	468.800	156.100	493.900
GR	150.600	585.800	135.800	612.000	134.300	645.000	130.700	665.500	130.800	674.900
GR	129.600	684.600	132.200	707.900	129.000	721.100	138.000	754.100	138.500	790.100
GR	132.800	815.500	137.400	850.000	131.000	866.800	136.800	879.500	141.200	935.800
GR	141.800	983.100	138.700	1000.500	139.000	1072.700	138.500	1089.400	143.400	1118.000
GR	139.500	1140.200	139.500	1173.000	143 200	1208.900	159.200	1243.000	172.900	1262.500
GR	190.400	1300.200	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
X1	44.000	27.000	793.300	855.500	664.000	660.000	649.000	0.000	0.000	0.000
GR	278.400	0.000	179.000	361.600	149.800	455.100	142.700	494.100	141.500	536.100
GR	141 100	637.500	138.700	653.800	141.400	668.300	138.800	684.400	138.100	706.200
GR	138 700	793.300	134.500	810.400	138.800	859.500	141.700	926.200	141.300	1089.600
GR	142 700	1134.500	145.900	1162.900	144.300	1171.900	144.700	1211.500	154.800	1219.200
GR	162.900	1274.200	167.700	1316.400	167.600	1401.400	165.300	1505.000	162.600	1649.700
GR	174.800	1751.600	181.400	1802.400	0.000	0.000	0.000	0.000	0.000	0.000
ET	0.000	0.000	9.100	0.000	0.000	0.000	0.000	0.000	725.000	920.000
X1	45.000	26.000	821.900	914.700	363.000	374.000	370.000	0.000	0.000	0.000
GR	213.900	0.000	177.400	351.100	157.900	449.900	153.400	510.800	155.700	549.100
GR	146.100	558.500	147.800	569.300	147.800	586.900	152.000	602.300	152.600	610.500
GR	143.700	716.100	141.100	799.400	143.600	821.900	138.100	855.100	142.200	880.200
GR	143.700	914.700	140.500	954.500	144.300	998.800	144.300	1066.500	149.200	1080.600
GR	173.400	1429.700	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
ET	0.000	0.000	9.100	0.000	0.000	0.000	0.000	0.000	739.000	816.000
X1	46.000	27.000	739.800	816.800	205.000	213.000	224.000	0.000	0.000	0.000
GR	221.800	0.200	169.900	317.400	164.200	405.000	160.700	414.200	163.400	421.700
GR	161.600	516.500	158.200	546.200	149.200	558.500	149.800	567.600	149.500	579.700
GR	153.600	588.900	153.600	614.000	142.400	739.800	141.400	796.600	143.200	816.800
GR	144.900	1000.500	146.800	1084.300	152.000	1099.300	153.300	1144.800	149.300	1165.100
GR	149.300	1317.800	150.500	1453.700	153.500	1570.300	155.900	1713.800	176.400	1811.200

QT	? 000	1700. 000	1700. 000	0. 000	0. 000	?. 000	0. 000	0. 000	0. 000	0. 000
ET	?00	0 000	9. 100	0. 000	0. 000	. 000	0. 000	0. 000	453. 000	750. 000
X1	47. 000	15. 000	427. 000	702. 000	337. 000	309. 000	318. 000	0. 000	0. 000	0. 000
GR	207. 800	0. 200	192. 400	308. 200	169. 000	356. 100	170. 200	367. 400	150. 600	399. 500
GR	154. 300	427 000	144. 200	461. 100	145. 400	620. 100	145. 100	824. 300	149. 400	902. 000
GR	158. 900	956. 300	156 100	959. 800	155. 900	1006. 900	165. 200	1016. 400	165. 200	1132. 300
ET	0. 000	0. 000	9. 100	0. 000	0. 000	0. 000	0. 000	0. 000	328. 000	538. 000
X1	48. 000	20. 000	328. 200	538. 100	660. 000	660. 000	660. 000	0. 000	0. 000	0. 000
GR	255. 800	0. 000	193. 400	133. 300	172. 500	176. 000	172. 500	184. 300	155. 700	219. 300
GR	157. 000	231. 600	153. 600	256. 500	153. 600	282. 200	149. 500	328. 200	147. 500	429. 600
GR	149. 500	538. 100	149. 200	672. 900	151. 300	734. 800	161. 300	754. 600	161. 400	800. 100
GR	159. 600	814. 400	173. 700	850. 900	182. 800	894. 500	185. 600	978. 300	183. 000	1021. 400
ET	0. 000	0. 000	9. 100	0. 000	0. 000	0. 000	0. 000	0. 000	580. 000	726. 000
X1	49. 000	24. 000	639. 300	726. 200	770. 000	780. 000	781. 000	0. 000	0. 000	0. 000
GR	233. 700	0. 000	226. 900	20. 200	166. 200	167. 600	166. 200	176. 000	161. 200	195. 300
GR	160. 400	212. 300	161. 500	221. 700	157. 600	237. 600	157. 800	265. 300	154. 900	280. 700
GR	156. 300	345. 600	157. 600	454. 700	156. 300	577. 200	156. 400	639. 300	154. 900	677. 100
GR	152. 500	692. 500	152. 500	700. 400	165. 200	726. 200	166. 200	761. 200	157. 800	783. 200
GR	160. 100	803 800	169. 900	832. 400	180. 000	854. 900	191. 200	907. 200	0. 000	0. 000
ET	0. 000	0. 000	10. 400	0. 000	0. 000	0. 000	0. 000	0. 000	0. 000	0. 000
X1	50. 000	21. 000	343. 200	586. 300	695. 000	697. 000	696. 000	0. 000	0. 000	0. 000
GR	239. 500	0. 200	238. 900	51. 200	229. 600	85. 800	189. 500	173. 300	170. 300	211. 200
GR	170. 900	285. 300	171. 600	298. 300	166. 400	308. 200	165. 800	319. 800	164. 800	343. 200
GR	161. 800	359. 400	162. 300	397. 100	162. 300	496. 500	164. 700	586. 300	176. 600	656. 900
GR	190. 600	713. 600	193. 200	730. 800	186. 500	740. 300	184. 400	753. 500	184. 500	789. 800
GR	203. 500	811. 100	0. 000	0. 000	0. 000	0. 000	0. 000	0. 000	0. 000	0. 000

X1	51.000	20.000	471.400	570.400	471.000	.000	455.000	0.000	0.000	0.000
GR	248.300	0.000	213.400	130.000	202.800	191.600	189.700	293.000	181.300	351.300
GR	181.300	357.200	177.600	366.900	168.000	375.500	169.400	389.600	168.800	399.300
GR	167.200	419.900	163.500	428.500	165.500	440.800	165.400	471.400	162.100	506.800
GR	167.900	570.400	177.500	630.300	188.300	714.700	194.400	769.300	194.100	816.200
X1	52.000	17.000	419.900	648.100	242.000	249.000	246.000	0.000	0.000	0.000
GR	259.200	0.400	240.200	100.700	204.800	240.400	180.000	355.300	174.100	379.700
GR	174.200	395.100	169.500	403.000	171.400	419.900	168.100	447.000	168.100	491.700
GR	166.900	578.100	170.000	648.100	171.300	710.600	180.100	758.500	196.500	786.000
GR	197.400	828.500	193.100	849.400	0.000	0.000	0.000	0.000	0.000	0.000
X1	52.100	17.000	476.900	738.500	532.000	532.000	532.000	0.000	0.000	0.000
GR	274.800	0.000	220.600	126.500	198.200	220.800	191.800	335.200	189.000	407.200
GR	181.700	445.500	175.800	464.600	175.500	476.900	176.300	504.200	173.800	543.600
GR	173.600	587.800	173.100	637.700	175.600	738.500	186.500	813.700	193.600	850.300
GR	202.700	869.000	202.800	910.100	0.000	0.000	0.000	0.000	0.000	0.000
X1	52.300	22.000	410.000	519.600	139.000	139.000	139.000	0.000	0.000	0.000
GR	265.300	0.000	242.100	47.900	217.300	131.700	201.800	256.500	192.900	339.900
GR	183.000	410.000	174.500	451.600	173.800	474.700	173.800	482.400	176.700	487.700
GR	178.200	519.600	177.100	539.800	174.600	552.600	177.200	599.000	177.300	656.900
GR	179.100	738.900	190.400	829.600	200.900	866.300	204.600	882.600	205.700	922.900
GR	210.100	930.800	212.800	951.900	0.000	0.000	0.000	0.000	0.000	0.000
X1	53.000	22.000	267.700	424.100	400.000	400.000	400.000	0.000	0.000	0.000
GR	250.600	0.400	220.700	160.600	202.400	221.100	185.100	267.700	181.800	312.100
GR	177.200	366.500	177.200	377.300	184.600	424.100	180.400	478.700	178.000	488.600
GR	181.000	500.000	181.900	511.200	178.100	527.700	181.300	533.700	184.100	571.300
GR	181.300	579.900	180.500	599.900	184.300	646.300	198.700	766.400	209.700	844.800
GR	219.500	910.300	223.500	951.700	0.000	0.000	0.000	0.000	0.000	0.000

X1	700	19.000	342.500	467.200	722.000	000	722.000	0.000	0.000	0.000
GR	3 600	0 000	238.500	139.400	226.000	700	225.500	183.400	204.200	276.700
GR	192.900	342.500	188 600	409 400	185.200	436.400	193.700	467.200	189.900	524.400
GR	190.900	609.100	193 100	633.300	192.400	646.300	189.800	657.100	198.600	680.200
GR	208.100	748 200	208.800	760.300	216.500	804.300	226.600	875.300	0.000	0.000
X1	54.100	16 000	388.900	484.600	651.000	651.000	651.000	0.000	0.000	0.000
GR	258.400	0.000	237.700	214.000	226.500	256.300	203.500	320.900	197.800	372.600
GR	206.400	388.900	194.600	438.600	194.900	457.100	200.100	484.600	198.200	498.500
GR	200.600	511.500	197.300	523.600	203.800	569.500	199.800	603.900	202.200	612.000
GR	228 600	991.700	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
X1	54.300	23.000	492.500	577.900	88.000	88.000	88.000	0.000	0.000	0.000
GR	254.700	0.200	237.900	187.000	230.000	214.700	209.100	272.300	200.600	320.700
GR	197.800	369.800	209.300	381.000	209.300	388.000	196.000	423.200	198.000	442.600
GR	203.100	458.900	200.600	467.200	201.400	492.500	200.600	509.700	196.700	522.200
GR	195.000	547.500	201.100	577.900	201.700	629.600	212.200	693.200	220.500	764.000
GR	221.600	864.100	222.400	918.900	230.800	987.800	0.000	0.000	0.000	0.000
ET	0.000	0.000	9.100	0.000	0.000	0.000	0.000	0.000	465.000	565.000
X1	55.000	27.000	520.700	565.100	675.000	651.000	651.000	0.000	0.000	0.000
GR	280.100	0.000	237.500	160.300	231.500	203.900	220.100	326.000	213.600	361.400
GR	212.500	397.300	205.300	412.500	214.000	430.300	206.400	449.600	208.300	463.900
GR	205.100	478.700	205.500	486.400	209.100	520.700	204.400	541.800	204.900	557.700
GR	208.100	565.100	206.000	643.000	209.300	702.900	214.900	781.400	221.000	880.200
GR	221.300	950.600	227.300	1004.900	229.800	1057.100	235.800	1069.200	235.900	1094.900
GR	236.900	1113.800	233.700	1128.800	0.000	0.000	0.000	0.000	0.000	0.000
ET	0.000	0.000	10.400	0.000	0.000	0.000	0.000	0.000	0.000	0.000

X1	[illegible] 000	23.000	576.100	639.700	972.000	[illegible] 000	972.000	0.000	0.000	0.000
GR	[illegible] 300	0.200	250.500	235.600	241.300	297.800	224.500	423.000	225.100	433.600
GR	220.900	465.900	220.900	480.000	226.500	488.600	216.400	506.200	217.700	520.300
GR	217.000	529.700	215.300	533.700	216.300	552.400	221.500	576.100	214.500	601.200
GR	214.500	613.300	219.600	639.700	216.000	795.900	217.700	929.900	239.500	1048.300
GR	240.200	1065.200	238.600	1065.400	238.900	1111.200	0.000	0.000	0.000	0.000
X1	57.000	33.000	599.700	650.500	532.000	532.000	532.000	0.000	0.000	0.000
GR	244.500	0.000	239.200	119.200	238.000	150.400	233.500	227.700	231.200	290.100
GR	231.500	335.500	230.000	351.700	230.000	375.700	231.000	412.200	227.000	474.700
GR	231.100	498.500	231.300	507.500	222.200	526.400	225.100	539.200	222.600	556.300
GR	222.600	568.700	226.200	586.300	225.600	599.700	221.000	610.500	220.000	630.500
GR	224.900	650.500	223.400	827.400	227.300	971.000	225.300	979.200	228.500	984.200
GR	228.900	1040.100	237.800	1061.000	236.700	1070.300	237.300	1105.000	239.900	1116.500
GR	237.800	1122.200	241.200	1134.700	247.700	1195.900	0.000	0.000	0.000	0.000
X1	57.100	28.000	672.500	726.200	403.000	466.000	429.000	0.000	0.000	0.000
GR	257.600	0.000	260.000	59.600	257.700	193.100	252.000	281.800	231.100	490.600
GR	230.000	550.200	230.900	570.400	227.600	582.700	229.600	598.600	226.500	622.100
GR	229.300	672.500	223.800	691.200	223.800	704.000	229.100	726.200	229.000	741.400
GR	227.600	752.600	231.800	912.700	232.200	975.900	233.500	1028.000	233.700	1059.700
GR	237.500	1097.800	242.700	1202.300	240.800	1335.600	240.500	1429.500	241.300	1582.900
GR	245.800	1589.500	243.800	1617.600	246.200	1739.900	0.000	0.000	0.000	0.000
SB	1.250	1.500	2.500	0.000	19.500	1.500	90.000	0.000	224.500	223.500
X1	57.300	24.000	674.500	726.200	106.000	106.000	106.000	0.000	0.000	0.000
X2	0.000	0.000	1.000	228.500	230.600	0.000	0.000	0.000	0.000	0.000
BT	10.000	215.300	239.000	239.000	447.700	230.400	230.400	552.400	228.500	228.500
BT	600.800	230.600	230.600	640.000	230.600	228.500	659.500	230.600	228.500	693.400
BT	230.600	230.600	828.700	230.900	230.900	910.300	232.200	232.200	968.600	235.100
BT	235.100	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
GR	268.800	0.000	262.300	71.900	247.800	167.400	242.500	249.400	234.200	387.600
GR	232.000	482.200	228.900	542.500	231.500	570.600	229.500	591.300	231.100	600.800

GR	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
GR	100	1003.800	235.500	1218.300	238.800	1(900	237.600	1487.200	238.000	1541.500
GR	100	1552.500	241.100	1566.400	243.400	1 700	246.300	1807.000	0.000	0.000
ET	000	0.000	9.100	0.000	0.000	000	0.000	0.000	560.000	840.000
X1	59.000	23.000	592.000	670.500	431.000	431.000	431.000	0.000	0.000	0.000
GR	285.600	0.000	268.100	402.300	262.200	447.000	244.300	529.700	238.000	555.000
GR	233.300	560.300	233.300	566.900	236.200	573.500	235.500	586.900	231.500	592.000
GR	235.600	609.600	235.600	615.500	233.200	622.300	232.900	653.400	235.700	670.500
GR	232.600	694.300	233.300	819.200	234.800	875.100	235.500	950.800	251.000	1056.400
GR	258.700	1145.900	262.900	1232.000	267.800	1310.100	0.000	0.000	0.000	0.000
ET	0.000	0.000	10.400	0.000	0.000	0.000	0.000	0.000	0.000	0.000
X1	59.000	19.000	649.400	713.900	935.000	880.000	880.000	0.000	0.000	0.000
GR	313.700	0.000	286.500	268.600	277.500	308.000	256.300	396.200	249.600	439.500
GR	246.700	482.000	247.100	571.700	246.800	579.900	247.500	607.200	247.300	649.400
GR	244.200	660.800	246.500	676.500	244.200	692.500	246.400	713.900	245.600	763.100
GR	247.100	835.300	267.500	934.300	278.100	1007.800	290.300	1095.100	0.000	0.000
ET	0.000	0.000	9.100	0.000	0.000	0.000	0.000	0.000	676.000	825.000
X1	60.000	21.000	707.300	736.300	451.000	451.000	451.000	0.000	0.000	0.000
GR	298.100	0.000	296.800	111.100	281.300	253.800	265.000	365.400	256.200	440.600
GR	253.500	560.300	250.900	681.500	252.200	696.300	254.000	707.300	250.100	719.600
GR	252.700	736.300	252.300	742.900	250.800	755.900	253.000	777.700	253.100	786.700
GR	250.200	818.100	251.800	823.400	253.200	879.300	274.800	1041.000	285.800	1149.700
GR	290.300	1217.700	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
ET	0.000	0.000	10.400	0.000	0.000	0.000	0.000	0.000	0.000	0.000
X1	61.000	20.000	436.400	827.800	431.000	449.000	447.000	0.000	0.000	0.000
GR	314.600	0.000	289.000	247.900	285.400	271.700	266.000	367.600	257.400	436.400
GR	256.000	533.000	256.000	661.100	256.000	792.200	256.600	808.000	258.700	827.800
GR	258.500	838.400	257.100	869.400	258.100	987.300	258.800	1150.600	261.900	1294.200
GR	265.300	1409.100	268.100	1566.600	273.600	1719.000	273.600	1742.100	283.500	1845.800

X1	62.000	19.000	641.000	822.100	392.000	.000	400.000	0.000	0.000	0.000
GR	323.600	0.200	292.800	336.600	288.200	378.800	266.600	490.600	262.500	641.000
GR	259.800	688.800	257.500	772.600	257.500	800.500	263.400	822.100	263.400	842.600
GR	262.100	851.400	264.200	889.600	268.900	908.100	268.300	920.900	273.700	945.500
GR	273.800	956.500	293.000	1108.300	301.400	1172.100	306.100	1233.500	0.000	0.000
X1	63.000	15.000	727.700	784.900	678.000	605.000	638.000	0.000	0.000	0.000
GR	328.900	0.000	300.500	217.800	294.800	266.600	273.300	409.400	271.700	462.400
GR	269.100	626.100	269.400	703.700	270.200	727.700	267.300	737.200	280.800	784.900
GR	280.800	791.100	279.400	798.300	281.800	827.400	300.300	1013.300	310.700	1107.400
X1	64.000	17.000	729.500	781.000	843.000	843.000	843.000	0.000	0.000	0.000
GR	334.400	0.000	311.200	284.000	305.700	335.500	298.600	448.800	284.300	599.900
GR	280.900	695.600	281.600	729.500	278.600	745.100	278.600	760.900	284.000	781.000
GR	286.500	844.300	287.100	911.200	292.000	964.200	298.800	995.200	300.800	1017.200
GR	303.500	1031.500	313.700	1095.800	0.000	0.000	0.000	0.000	0.000	0.000
X1	65.000	23.000	476.000	584.500	554.000	517.000	532.000	0.000	0.000	0.000
GR	302.400	0.000	298.200	157.300	300.700	210.900	300.800	324.900	297.300	413.800
GR	290.300	476.000	288.300	535.200	288.700	566.700	292.300	584.500	291.900	628.900
GR	290.600	646.100	292.700	665.900	298.900	784.000	298.900	800.500	307.300	827.200
GR	307.300	832.700	304.600	838.400	307.000	854.000	307.000	870.500	309.400	890.300
GR	312.900	1021.200	315.600	1085.400	329.800	1184.200	0.000	0.000	0.000	0.000
X1	66.000	16.000	566.000	697.800	601.000	579.000	598.000	0.000	0.000	0.000
GR	347.000	0.000	332.600	178.200	327.000	239.800	306.600	479.800	300.000	566.000
GR	296.300	608.300	297.800	633.800	300.400	697.800	312.900	740.500	312.900	767.800
GR	316.900	778.100	315.400	788.900	322.100	815.700	322.500	826.900	325.800	879.100
GR	335.400	964.400	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

X1	000	24.000	522.000	671.200	510.000	000	539.000	0.000	0.000	0.000
GR	3[illegible].400	0.200	336.700	71.000	327.300	[illegible].300	320.500	307.300	319.100	392.200
GR	310.300	452.500	306.700	467.500	305.500	493.400	308.900	522.000	306.100	612.700
GR	302.800	623.900	309.500	671.200	312.800	702.400	309.900	769.500	307.100	788.400
GR	310.500	819.000	316.400	878.400	324.300	916.900	323.700	935.200	328.800	957.400
GR	331.000	984.700	329.100	1006.000	335.100	1025.600	343.900	1065.900	0.000	0.000
X1	68.000	20.000	626.700	753.700	464.000	451.000	451.000	0.000	0.000	0.000
GR	342.400	0.000	347.700	84.400	345.700	141.000	334.800	274.500	325.800	404.800
GR	319.000	570.000	315.400	626.700	308.800	650.700	312.100	712.800	312.500	753.700
GR	324.100	795.900	327.700	813.700	332.100	845.000	332.100	855.100	340.300	883.500
GR	340.300	896.900	337.800	918.200	338.700	943.500	347.700	950.600	351.700	1010.600
X1	69.000	14.000	477.400	558.500	627.000	649.000	638.000	0.000	0.000	0.000
GR	372.800	0.000	350.700	213.600	341.900	327.500	328.200	438.400	326.000	477.400
GR	323.300	498.900	324.900	525.800	324.900	558.500	335.600	624.500	345.600	704.000
GR	348.300	732.100	347.500	756.500	354.000	769.300	357.200	783.600	0.000	0.000
EJ	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Q	QLOB	QCH	QROB	ALOB	ACH	AROB	[illegible]L	TWA	LEFT/RIGHT
TI	VLOB	VCH	VROB	XNL	XNCH	XNR	[illegible]N	ELMIN	SSTA
SLOPE	XLOBL	YLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*PROF 1

CCHV= 0.100 CEHV= 0.300
*SECNO 10.000

10.00	6.60	12.00	0.00	12.00	12.25	0.25	0.00	0.00	10.00
3800.	701.	2883.	216.	344.	637.	160.	0.	0.	10.00
0.00	2.04	4.53	1.35	0.045	0.045	0.045	0.000	5.40	176.00
0.001667	0.	0.	0	0	0	0	0.00	454.00	630.00

FLOW DISTRIBUTION FOR SECNO= 10.00 CNSEL= 12.00

STA=	176	220.	370.	470.	630.
PER Q=	1.6	16.9	75.9	5.7	
AREA=	44.0	300.0	637.0	160.0	
VEL=	1.3	2.1	4.5	1.3	

CCHV= 0.100 CEHV= 0.300
*SECNO 10.100

10.10	7.06	12.46	0.00	0.00	12.48	0.02	0.20	0.02	10.20
3800.	218.	3582.	0.	350.	3382.	0.	25.	6.	22.80
0.12	0.62	1.06	0.00	0.045	0.070	0.045	0.070	5.40	239.79
0.000210	440.	440.	440.	2	0	0	0.00	795.76	1035.56

FLOW DISTRIBUTION FOR SECNO= 10.10 CNSEL= 12.46

STA=	240	294.	497.	507.	1066.
PER Q=	0.1	5.1	0.5	94.3	
AREA=	20.6	307.1	22.4	3382.2	
VEL=	0.3	0.6	0.8	1.1	

Q	QLOB	QCH	QROB	ALOB	ACH	AROB	WOL	TWA	LEFT/RIGHT
TIF	VLOB	VCH	VROB	XNL	XNCH	XNR	N	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	IAR	TOPWID	ENDST

CCHV= 0 100 CEHV= 0 300

*SECNO 10.300

10.30	7.08	12.48	0.00	0.00	12.49	0.02	0.01	0.00	6.40
3800.	1541.	1519.	740.	1417.	1211.	885.	31.	8.	8.90
0.14	1.09	1.25	0.84	0.045	0.045	0.045	0.066	5.40	186.31
0.000138	80.	80.	80.	2	0	0	0.00	831.27	1017.58

FLOW DISTRIBUTION FOR SECNO= 10.30 CWSEL= 12.48

STA=	186.	304.	421.	516.	724.	870.	977.	1018.
PER Q=	5.5	17.9	17.1	40.0	11.9	6.9	0.7	
AREA=	293.8	593.3	530.5	1210.5	506.7	323.7	54.6	
VEL=	0.7	1.1	1.2	1.3	0.9	0.8	0.5	

*SECNO 11 100

11.10	8.41	12.61	0.00	0.00	12.68	0.07	0.17	0.02	10.30
3800.	416.	963.	2422.	453.	380.	1161.	79.	21.	4.20
0.24	0.92	2.54	2.09	0.045	0.045	0.045	0.053	4.20	438.41
0.000406	810.	740.	720.	0	0	0	0.00	695.98	1134.39

FLOW DISTRIBUTION FOR SECNO= 11.10 CWSEL= 12.61

STA=	438.	459.	586.	730.	779.	838.	937.	1093.	1134.
PER Q=	0.2	3.7	7.0	25.3	35.5	25.1	3.0	0.1	
AREA=	13.4	172.9	266.3	379.7	490.1	494.2	164.4	12.6	
VEL=	0.5	0.8	1.0	2.5	2.8	1.9	0.7	0.3	

Q	QLOB	QCH	QROB	ALOB	ACH	AROB	QL	TWA	LEFT/RIGHT
TI:	VLOB	VCH	VROB	XNL	XNCH	XNR	IN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

SPECIAL BRIDGE

5227 DOWNSTREAM ELEV IS 10.67 , NOT 12.61 HYDRAULIC JUMP OCCURS DOWNSTREAM (IF LOW FLOW CONTROLS)

SB XX	XKOR	CDFQ	RDLEN	BNC	BNP	BAREA	SS	ELCHU	ELCHD
1.25	1.50	2.50	0.00	31.50	1.50	165.00	0.00	4.66	4.21

*SECNO 11.300
PRESSURE AND WEIR FLOW

EGPRS	EGLWC	H3	QWEIR	QPR	BAREA	TRAPEZOID AREA	ELLC	ELTRD
24.96	14.56	0.00	3261.	540.	165.	152.	9.71	10.70

11.30	8.20	12.80	0.00	0.00	12.85	0.06	0.18	0.00	9.40
3800.	387.	1398.	2015.	384.	587.	1261.	84.	23.	4.60
0.26	1.01	2.38	1.60	0.045	0.045	0.045	0.053	4.60	502.75
0.000349	110.	110.	110.	2	0	7	0.00	681.64	1184.39

FLOW DISTRIBUTION FOR SECNO= 11.30 CWSEL= 12.80

STA=	503.	605.	726.	802.	996.	1133.	1184.
PER Q=	1.1	9.0	36.8	46.8	5.6	0.6	
AREA=	81.4	302.4	586.8	980.6	239.2	41.1	
VEL=	0.5	1.1	2.4	1.8	0.9	0.5	

```
   Q          GLOB       QCH        QROB       ALOB       ACH        AROB       'L         TWA    LEFT/RIGHT
   TIP        VLOB       VCH        VROB       XNL        XNCH       XNR        N         ELMIN        SSTA
   SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT       AR       TOPWID       ENDST

CCHV=    0.100 CEHV=    0.300
*SECNO 12.100

3301 HV CHANGED MORE THAN HVINS

    12.10      6.75      12.75      0.00       0.00      13.38      0.63      0.36      0.17      10.00
    3800.       374.      2717       709.       213.       366.       404.      105.       31.       10.00
     0.28      1.75       7.43      1.75      0.040      0.025      0.040     0.044      6.00      375.41
 0.001452       540        560.       580.         2          0          0      0.00     507.21     882.62

FLOW DISTRIBUTION FOR SECNO=      12.10          CNSEL=      12.75

STA=      375.       530.       590.       883.
  PER Q=      9.9       71.5       18.7
    ARFA=     213.4      365.6      403.9
     VEL=       1.8        7.4        1.8

CCHV=    0.100 CEHV=    0.300
*SECNO 13.000

3265 DIVIDED FLOW

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
    13.00      7.72      13.32      13.32      0.00      14.27      0.95      0.71      0.10      13.30
    3800.         0.      1758.      2042.        0.       160.       628.      113.       35.       13.00
     0.30      0.02      10.98       3.25     0.010      0.018      0.040     0.040      5.60      518.41
 0.002668       370.       370.       370.         2          8          0      0.00     420.53    1013.56
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Q	QLOB	QCH	QROB	ALOB	ACH	AROB	WTOL	TWA	LEFT/RIGHT
TI	VLOB	VCH	VROB	XNL	XNCH	XNR	CHN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

FLOW DISTRIBUTION FOR SECNO= 13.00 CNSEL= 13.32

STA=	518.	554.	577.	619.	641.	651.	905.	932.	1001.	1014.
PER Q=	46.3	0.1	13.3	15.7	1.1	20.3	0.7	1.0	1.7	
AREA=	160.1	3.5	109.3	110.5	15.3	334.7	18.1	14.1	22.7	
VEL=	11.0	0.6	4.6	5.4	2.7	2.3	1.5	2.7	2.8	

*SECNO 14.100

3265 DIVIDED FLOW

14.10	8.56	15.66	0.00	0.00	16.23	0.57	1.92	0.04	15.80
3800.	9.	1351.	2440.	25.	157.	617.	128.	44.	15.20
0.34	0.37	8.63	3.95	0.040	0.018	0.040	0.034	7.10	407.83
0.001921	860.	855	850.	2	0	0	0.00	538.12	964.90

FLOW DISTRIBUTION FOR SECNO= 14.10 CNSEL= 15.66

STA=	408.	626.	643.	698.	867.	884.	909.	912.	926.	955.	965.
PER Q=	0.2	0.0	35.6	9.2	0.6	9.9	4.1	16.7	21.8	1.8	
AREA=	23.6	1.3	156.5	195.6	15.7	92.2	23.1	104.5	162.3	24.0	
VEL=	0.4	0.3	8.6	1.8	1.5	4.1	6.8	6.1	5.1	2.8	

*SECNO 14.300

14.30	9.52	16.02	0.00	0.00	16.31	0.29	0.06	0.03	15.80
3800.	285.	1190.	2325.	247.	184.	792.	129.	44.	14.20
0.34	1.16	6.48	2.94	0.040	0.018	0.040	0.034	6.50	411.53
0.000918	45.	45	45.	2	0	0	0.00	558.51	970.04

SECNO	DEPTH	CWSEL	CRITWS	WSELR	EG	HV	HL	CLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	TL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	I	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	IRAR	TOPWID	ENDST

FLOW DISTRIBUTION FOR SECNO= 14.30 CWSEL= 16.02

STA=	412.	455.	632	660.	702.	865.	891.	910.	917.	933.	959.	970.
PER Q=	0.8	6.4	0.2	31.3	12.0	1.2	8.4	9.4	13.8	14.5	1.8	
AREA=	33.6	200.0	13.1	183.7	281.8	33.2	100.4	70.5	122.1	151.0	32.5	
VEL=	0.9	1.2	0.7	6.5	1.6	1.3	3.2	5.1	4.3	3.6	2.1	

*SECNO 15.000

3265 DIVIDED FLOW

15.00	9.89	16.59	0.00	0.00	16.89	0.31	0.57	0.01	17.10
3800.	97.	1027.	2675.	103.	172.	713.	146.	51.	15.80
0.39	0.94	5.99	3.75	0.040	0.018	0.040	0.031	6.70	793.57
0.000814	665.	665.	665.	2	0	0	0.00	358.81	1261.59

FLOW DISTRIBUTION FOR SECNO= 15.00 CWSEL= 16.59

STA=	794.	895.	916.	964	1058.	1182.	1191.	1219.	1238.	1251.	1262.
PER Q=	2.1	0.4	27.0	0.6	8.3	11.4	27.2	14.5	7.2	1.3	
AREA=	85.0	18.1	171.6	37.0	109.2	89.0	233.4	138.3	78.9	26.6	
VEL=	0.9	0.9	6.0	0.6	2.9	4.8	4.4	4.0	3.5	1.8	

*SECNO 16.000

SECNO	DEPTH	CWSEL	CRIWS	WSELR	EG	HV	HL	BLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	WL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	XN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

3265 DIVIDED FLOW

16.00	8.67	16.97	0.00	0.00	17.02	0.05	0.10	0.03	17.80
3800.	1.	412.	3387.	5.	160.	2093.	157.	55.	16.90
0.43	0.16	2.57	1.62	0.040	0.018	0.040	0.030	8.30	788.09
0.000180	300.	300.	300.	2	0	0	0.00	529.28	1561.73

FLOW DISTRIBUTION FOR SECNO= 16.00 CWSEL= 16.97

STA=	788.	816.	879.	1226.	1265.	1287.	1316.	1348.	1393.	1471.	1515.	1562.
PER Q=	0.0	10.9	4.7	15.7	8.8	7.6	3.0	5.7	23.9	15.7	4.1	
AREA=	5.1	160.4	178.3	304.6	171.4	175.0	104.9	176.0	518.3	318.4	146.2	
VEL=	0.2	2.6	1.0	2.0	1.9	1.7	1.1	1.2	1.8	1.9	1.1	

*SECNO 17 100

3265 DIVIDED FLOW

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

17.10	7.57	19.87	19.87	0.00	20.56	0.70	0.18	0.19	21.40
3800.	5.	1686.	2109.	9.	174.	874.	174.	61.	20.30
0.46	0.61	9.68	2.41	0.040	0.018	0.040	0.029	12.30	685.65
0.001888	420.	430.	435.	20	13	0	0.00	724.69	1445.85

Q	QLOB	QCH	QROB	ALOB	ACH	AROB	WOL	TWA	LEFT/RIGHT
TII...	VLOB	VCH	VROB	XNL	XNCH	XNR	N	ELMIN	SSTA
SLO.	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	RAR	TOPWID	ENDST

FLOW DISTRIBUTION FOR SECNO= 17.10 CNSEL= 19.87

STA=	686.	715.	722.	785.	835.	1141.	1352.	1397.	1421.	1446.
PER Q=	0.1	0.0	44.4	2.4	20.6	3.5	9.3	14.5	5.1	
AREA=	6.8	1.7	174.2	50.7	403.4	120.0	115.7	120.0	64.4	
VEL=	0.6	0.6	9.7	1.8	1.9	1.1	3.1	4.6	3.0	

CCHV= 0.100 CEHV= 0.300
*SECNO 17.300

3301 HV CHANGED MORE THAN HVINS

17.30	7.73	20.53	0.00	0.00	20.67	0.14	0.05	0.06	21.00
3800.	0.	764.	3036.	0.	186.	1156.	175.	61.	20.30
0.46	0.00	4.11	2.63	0.045	0.040	0.045	0.029	12.80	745.73
0.001598	30.	30.	30.	3	0	0	0.00	696.31	1442.04

FLOW DISTRIBUTION FOR SECNO= 17.30 CNSEL= 20.53

STA=	746.	782.	814.	1341.	1356.	1386.	1406.	1429.	1442.
PER Q=	20.1	1.3	22.5	3.9	25.2	11.3	12.9	2.9	
AREA=	185.8	35.0	595.8	51.9	203.3	105.9	123.4	40.9	
VEL=	4.1	1.4	1.4	2.9	4.7	4.1	4.0	2.6	

*SECNO 18.100
3685 20 TRIALS ATTEMPTED WSEL, CNSEL

Q	QLOB	QCH	QROB	ALOB	ACH	AROB	PL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	N	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

18.10	8.84	21.14	21.14	0.00	21.75	0.61	0.60	0.14	21.40
3800.	0.	1965.	1835.	0.	237.	657.	180.	65.	20.10
0.47	0.00	8.29	2.79	0.045	0.040	0.045	0.030	12.30	750.57
0.009753	230.	220.	220.	20	16	0	0.00	675.02	1425.59

FLOW DISTRIBUTION FOR SECNO= 18.10 CWSEL= 21.14

STA=	751	794.	970.	1211.	1368.	1388.	1418.	1426.
PER Q=	51.7	13.5	14.5	5.6	3.1	10.8	0.8	
AREA=	237.1	192.8	228.1	108.7	33.5	83.4	10.3	
VEL=	8.3	2.7	2.4	2.0	3.5	4.9	3.0	

*SECNO 18.300

3301 HV CHANGED MORE THAN HVINS

18.30	6.45	21.95	0.00	0.00	21.98	0.02	0.16	0.06	16.40
3800.	20.	483.	3297.	26.	292.	2794.	196.	70.	15.50
0.54	0.77	1.65	1.18	0.045	0.040	0.045	0.030	15.50	716.98
0.000170	332.	332.	332.	3	0	0	0.00	708.30	1425.29

FLOW DISTRIBUTION FOR SECNO= 18.30 CWSEL= 21.95

STA=	717.	726.	773	788.	806.	840.	977.	1126.	1292.	1369.	1398.	1419.	1425.
PER Q=	0.5	12.7	3.0	2.3	6.5	29.1	21.9	14.1	6.5	2.9	0.7	0.0	
AREA=	26.1	292.5	85.1	76.6	185.9	795.6	692.8	556.9	257.5	97.2	41.8	4.3	
VEL=	0.8	1.7	1.3	1.2	1.3	1.4	1.2	1.0	1.0	1.0	0.7	0.3	

Q	QLOB	QCH	QROB	ALOB	ACH	AROB	AL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	N	ELMIN	SSTA
SLOF	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	JRAR	TOPWID	ENDST

*SECNO 18.400

3265 DIVIDED FLOW

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL, CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

18.40	6.94	22.74	22.74	0.00	23.52	0.78	0.13	0.23	19.30
3800.	28	2172.	1600.	8.	249.	401.	207.	74.	22.70
0.55	3.37	8.73	3.99	0.045	0.040	0.045	0.031	15.80	178.15
0.006619	260.	260.	260.	20	8	0	0.00	611.01	938.04

FLOW DISTRIBUTION FOR SECNO= 18.40 CWSEL= 22.74

STA=	178.	183.	232.	617.	708.	874.	882.	897.	909.	934.	938.
PER Q=	0.7	57.2	5.6	1.2	3.3	7.4	16.2	5.8	2.6	0.1	
AREA=	8.3	249.9	149.3	33.7	31.1	38.6	76.0	38.5	31.3	2.6	
VEL=	3.4	8.7	1.4	1.4	4.0	7.2	8.1	5.7	3.1	1.9	

*SECNO 18.600

3265 DIVIDED FLOW

Q	QLOB	QCH	QROB	ALOB	ACH	AROB	WTL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	N	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST
18.60	6.83	23.33	0.00	0.00	24.21	0.88	0.66	0.03	22.00
3800.	2	2286	1512.	1	260.	301.	208.	75.	23.20
0.56	1.78	8.79	5.02	0.045	0.040	0.045	0.031	16.50	174.78
0.006640	100	100	100.	2	0	0	0.00	258.67	945.50

FLOW DISTRIBUTION FOR SECNO= 18.60 CHSEL= 23.33

STA=	175	177.	226	287.	860.	878.	892.	911.	924.	933.	946.
PER Q=	0.1	60.2	0.0	4.5	7.1	12.9	10.3	1.0	1.7	2.3	
AREA=	1.2	260.0	4.0	62.6	51.0	65.3	65.3	13.5	16.7	22.4	
VEL=	1.8	8.8	0.4	2.7	5.3	7.5	6.0	2.8	3.9	3.8	

*SECNO 18.700

3265 DIVIDED FLOW

3301 HV CHANGED MORE THAN HVINS

18.70	6.95	25.85	0.00	0.00	25.91	0.06	1.61	0.08	25.50
3800.	0.	363.	3437.	0.	126.	1861.	230.	87.	28.70
0.66	0.32	2.87	1.85	0.045	0.040	0.045	0.032	18.90	199.41
0.001076	738	738	738.	5	0	0	0.00	1134.06	1346.55

Q	QLOB	QCH	QROB	ALOB	ACH	AROB		TWA	LEFT/RIGHT
TIM	VLOB	VCH	VROB	XNL	XNCH	XNR		ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IOC	ICONT	AR	TOPWID	ENDST

FLOW DISTRIBUTION FOR SECNO= 18.70 CWSEL= 25.85

STA=	199	200.	238	587.	821.	847.	877.	911.	933.	994.	1054.	1073.	1160.
PER Q=	0.0	9.5	6.0	9.0	6.8	12.2	7.6	4.5	7.5	5.7	5.5	10.0	
AREA=	0.1	126.2	255.1	280.3	96.2	149.9	117.0	71.6	146.9	116.3	75.8	200.5	
VEL=	0.3	2.9	0.9	1.2	2.7	3.1	2.5	2.4	1.9	1.9	2.7	1.9	
STA=	1160.	1316.	1347										
PER Q=	14.7	0.9											
AREA=	319.8	31.3											
VEL=	1.7	1.1											

*SECNO 18.900

18.90	6.71	25.91	0.00	0.00	25.96	0.06	0.05	0.00	24.10
3800.	6.	367.	3427.	6	127.	1962.	232.	88.	24.90
0.67	0.97	2.90	1.75	0.045	0.040	0.045	0.032	19.20	201.31
0.001031	50.	50.	50.	2	0	0	0.00	1171.85	1373.16

FLOW DISTRIBUTION FOR SECNO= 18.90 CWSEL= 25.91

STA=	201.	208.	240.	469.	737.	810.	849.	878.	913.	926.	1010.	1057.	1128.
PER Q=	0.2	9.7	5.4	8.8	5.9	6.0	10.1	10.1	3.6	8.8	5.7	5.7	
AREA=	6.3	126.7	206.3	296.6	138.0	102.5	130.8	143.8	52.1	185.3	111.3	132.9	
VEL=	1.0	2.9	1.0	1.1	1.6	2.2	2.9	2.7	2.6	1.8	1.9	1.6	
STA=	1128.	1209.	1360.	1373.									
PER Q=	4.5	15.2	0.4										
AREA=	121.8	326.0	14.7										
VEL=	1.4	1.8	1.1										

Q	QLOB	QCH	QROB	ALOB	ACH	AROB		TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	N	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 19.000

3265 DIVIDED FLOW

19.00	6.05	26.25	0.00	0.00	26.33	0.09	0.36	0.01	28.70
3800.	0.	289.	3512.	0.	106.	1516.	246.	95.	28.70
0.71	0.00	2.70	2.32	0.045	0.040	0.045	0.033	20.20	438.71
0.001304	450	450	300	2	0	0	0.00	811.57	1432.89

FLOW DISTRIBUTION FOR SECNO= 19.00 CWSEL= 26.25

STA=	439.	482.	769.	857.	892.	918.	990.	1175.	1198.	1298.	1398.	1433.
PER Q=	7.6	3.4	11.8	11.4	6.8	4.4	4.5	5.4	15.8	25.9	2.9	
AREA=	106.4	111.7	171.1	142.0	93.5	108.3	131.5	77.1	263.5	355.0	62.2	
VEL=	2.7	1.2	2.6	3.1	2.8	1.6	1.3	2.7	2.3	2.8	1.7	

*SECNO 20.000

3265 DIVIDED FLOW

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

Q	QLOB	QCH	QROB	ALOB	ACH	AROB		TWA	LEFT/RIGHT
TIM	VLOB	VCH	VROB	XNL	XNCH	XNR		ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IOC	ICONT	XAR	TOPWID	ENDST
20.00	4 60	29 20	29.20	0.00	29.86	0.66	2.12	0.17	35.20
3800.	0	1866.	1934.	0.	229.	441.	265.	106.	27.40
0.74	0 00	8.16	4.39	0.045	0.040	0.045	0.034	24.60	628.10
0.010339	745.	745.	745	20	14	0	0.00	420.77	1160.08

FLOW DISTRIBUTION FOR SECNO= 20.00 CWSEL= 29.20

STA=	628.	700.	784.	820.	832.	846.	871.	1043.	1153.	1160.
PER Q=	49 1	19.8	2.7	0.2	6.0	8.4	2.0	11.5	0.2	
AREA=	228.8	151.5	33.2	4.2	36.7	56.2	33.3	121.4	4.0	
VEL=	8.2	5.0	3.1	1.7	6.2	5.7	2.3	3.6	2.2	

*SECNO 20.100

3301 HV CHANGED MORE THAN HVINS

20.10	3 93	31.83	0.00	0.00	31.97	0.14	2.06	0.05	32.70
3800.	0.	3800	0.	0	1247.	0.	278.	111.	33.80
0.79	0.00	3.05	0.00	0.045	0.040	0.045	0.034	27.90	324.82
0.001773	580	580.	580.	5	0	0	0.00	457.67	782.49

FLOW DISTRIBUTION FOR SECNO= 20.10 CWSEL= 31.83

STA=	325.	797.
PER Q=	100.0	
AREA=	1247.0	
VEL=	3.0	

Q	QLOB	QCH	QROB	ALOB	ACH	AROB	[illegible]	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	I	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CURAR	TOPWID	ENDST

CCHV= 0.100 CEHV= 0.300
*SECNO 20.200

3265 DIVIDED FLOW

20.20	3.25	31.85	0.00	0.00	32.18	0.33	0.15	0.06	34.60
3800.	3452.	348.	0.	730.	112.	0.	279.	112.	33.20
0.80	4.73	3.10	0.00	0.045	0.070	0.045	0.035	28.60	316.23
0.009300	45.	45	45.	2	0	0	0.00	479.54	820.49

FLOW DISTRIBUTION FOR SECNO= 20.20 CWSEL= 31.85

STA=	316	325.	342	504.	704.	733.	737.	826.
PER Q=	1.6	6.8	45.3	35.2	1.9	0.1	9.2	
AREA=	14.4	43.0	334.2	312.2	24.7	1.3	112.1	
VEL=	4.2	6.0	5.2	4.3	2.9	1.6	3.1	

*SECNO 20.300

3265 DIVIDED FLOW

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

20.30	3.67	33.47	33.47	0.00	34.25	0.77	0.66	0.13	33.80
3800.	2698.	1102.	0.	385.	154.	0.	280.	112.	33.50
0.80	7.02	7.17	0.00	0.045	0.070	0.045	0.035	29.80	280.31
0.026704	45.	45.	45.	20	8	0	0.00	349.14	851.74

Q	QLOB	QCH	QROB	ALOB	ACH	AROB	WL	TWA	LEFT/RIGHT
TIM	VLOB	VCH	VROB	XNL	XNCH	XNR	N	ELMIN	SSTA
SLOPL	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	RAR	TOPWID	ENDST

FLOW DISTRIBUTION FOR SECNO= 20.30 CWSEL= 33.47

STA=	280.	315.	475	527.	746	759.	789.	852.
PER Q=	3.7	38.3	2.6	3.5	12.6	10.3	29.0	
AREA=	29.2	218.6	27.8	17.9	39.4	51.6	153.6	
VEL=	4.8	6.7	3.6	7.4	12.1	7.6	7.2	

*SECNO 20.400

3265 DIVIDED FLOW

3301 HV CHANGED MORE THAN HVINS

20.40	8.28	36.58	0.00	0.00	36.79	0.22	2.49	0.06	34.70
3800.	2086.	1338.	376.	611.	300.	168.	286.	116.	28.30
0.83	3.41	4.47	2.24	0.045	0.070	0.045	0.036	28.30	428.53
0.003338	343	340	338.	6	0	0	0.00	508.51	1014.39

FLOW DISTRIBUTION FOR SECNO= 20.40 CWSEL= 36.58

STA=	429.	470	596.	650.	751.	785.	809.	851.	858.	990.	1014.
PER Q=	4.5	22.2	1.0	6.9	16.7	3.6	35.2	3.7	5.9	0.4	
AREA=	66.4	267.5	29.4	68.2	134.0	45.9	299.7	33.4	122.7	11.9	
VEL=	2.6	3.2	1.3	3.8	4.7	3.0	4.5	4.2	1.8	1.2	

Q	QLOB	QCH	QROB	ALOB	ACH	AROB	L	TWA	LEFT/RIGHT
TIM	VLOB	VCH	VROB	XNL	XNCH	XNR	N	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

SPECIAL BRIDGE

5227 DOWNSTREAM ELEV IS 35.96 ,NOT 36.58 HYDRAULIC JUMP OCCURS DOWNSTREAM (IF LOW FLOW CONTROLS)

SB	XK	XKCR	COFQ	RDLEN	BWC	BWP	BAREA	SS	ELCHU	ELCHD
	1.25	1.50	2.50	0.00	31.50	1.50	150.00	0.00	29.70	29.50

*SECNO 20.600
1860 XLCEL OF 935.90 EXCEEDS RDEL OF 35.00
PRESSURE AND WEIR FLOW

EGPRS	EGLWC	H3	QWEIR	QPR	BAREA	TRAPEZOID AREA	ELLC	ELTRD
51.52	39.74	0.00	2607.	1194.	150.	144.	34.50	35.70

	20.60	9.18	37.98	0.00	0.00	38.05	0.08	1.26	0.00	35.70
	3800.	1741.	1102.	957.	796.	445.	515.	289.	117.	36.00
	0.84	2.19	2.48	1.86	0.045	0.070	0.045	0.037	28.80	508.37
0.000998		100.	100.	100.	2	0	6	0.00	620.26	1128.63

FLOW DISTRIBUTION FOR SECNO= 20.60 CWSEL= 37.98

STA=	508.	560	589	633.	717.	764.	779.	803.	862.	986.	1047.	1129.
PER Q=	3.9	7.1	6.8	5.0	14.3	3.4	5.3	29.0	18.1	6.3	0.8	
AREA=	95.4	107.2	123.8	133.8	197.9	52.9	84.5	444.6	338.0	134.7	42.6	
VEL=	1.6	2.5	2.1	1.4	2.7	2.4	2.4	2.5	2.0	1.8	0.7	

SECNO	DLOB	CWSEL	CRIWS	WSELR	EG	HV	HL	ULOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	PL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	N	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

CCHV= 0.100 CEHV= 0.300
*SECNO 21.000

3265 DIVIDED FLOW

21.00	5.73	38.23	0.00	0.00	38.39	0.16	0.31	0.02	38.50
3800.	1630.	564.	1606.	487.	130.	658.	296.	120.	39.00
0.86	3.35	4.33	2.44	0.045	0.040	0.045	0.037	32.50	543.88
0.002588	205.	205.	205.	2	0	0	0.00	679.84	1280.00

FLOW DISTRIBUTION FOR SECNO= 21.00 CWSEL= 38.23

STA=	544.	637.	733.	745.	757.	773.	792.	830.	1025.	1142.	1280.
PER Q=	7.0	14.8	6.3	3.7	6.5	4.6	14.9	31.8	5.0	5.4	
AREA=	127.9	152.5	52.7	39.1	61.3	53.7	130.4	414.6	115.5	128.4	
VEL=	2.1	3.7	4.5	3.6	4.0	3.3	4.3	2.9	1.7	1.6	

*SECNO 22.000

3265 DIVIDED FLOW

22.00	6.10	40.20	0.00	0.00	40.62	0.42	2.15	0.08	36.90
3800.	1272.	1211.	1317.	254.	174.	457.	311.	128	40.30
0.89	5.00	6.97	2.88	0.045	0.040	0.045	0.037	34.10	614.11
0.005157	605.	608.	608.	3	0	0	0.00	488.15	1172.94

SECNO	DEPTH	CWSEL	CRIWS	WSELR	EG	HV		OLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB		TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR		ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

FLOW DISTRIBUTION FOR SECNO= 22.00 CWSEL= 40.20

STA=	614.	685.	719.	736.	750.	770.	810.	884.	1105.	1164.	1173.
PER Q=	0.1	8.6	6.7	7.0	11.1	31.9	2.4	24.2	7.6	0.4	
AREA=	1.6	79.1	50.9	49.3	73.4	173.6	48.5	309.7	91.5	7.8	
VEL=	1.4	4.1	5.0	5.4	5.8	7.0	1.9	3.0	3.2	2.1	

*SECNO 23.000

23.00	7.70	44.50	0.00	0.00	45.19	0.69	4.49	0.08	43.10
3800.	1057.	1528.	1214.	182.	173.	356.	325.	136.	41.90
0.92	5.81	8.81	3.42	0.045	0.040	0.045	0.037	36.80	718.02
0.007454	730.	730.	730.	3	0	0	0.00	467.56	1185.57

FLOW DISTRIBUTION FOR SECNO= 23.00 CWSEL= 44.50

STA=	718.	731.	761.	773.	787.	823.	1045.	1173.	1186.
PER Q=	2.5	19.5	4.1	1.8	40.2	31.0	1.0	0.0	
AREA=	22.7	110.9	29.8	18.8	173.4	322.3	32.0	1.3	
VEL=	4.1	6.7	5.2	3.6	8.8	3.7	1.1	0.6	

*SECNO 24.000

24.00	8.60	49.20	0.00	0.00	49.83	0.63	4.64	0.01	47.30
3800.	1955.	1642.	204.	355.	218.	79.	337.	142.	46.80
0.96	5.51	7.55	2.56	0.045	0.040	0.045	0.037	40.60	682.64
0.004682	796.	796.	796.	2	0	0	0.00	204.04	886.68

SECNO	DEPTH	CWSEL	CRITWS	WSELK	EG	RS	HL	QLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	[illegible]	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	I	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CURAR	TOPWID	ENDST

FLOW DISTRIBUTION FOR SECNO= 24.00 CWSEL= 49.20

STA=	683	721	737.	759.	772.	780.	821.	886.
PER Q=	13.7	13.0	16.7	6.7	1.5	43.2	5.4	
AREA=	112.4	76.9	101.4	48.2	16.0	217.5	79.4	
VEL=	4.6	6.4	6.2	5.3	3.5	7.5	2.6	

*SECNO 25.000

25.00	8.58	51.68	0.00	0.00	52.78	1.10	2.81	0.14	50.20
3800.	1243	2488.	69.	225.	258.	34.	344.	145.	50.00
0.98	5.52	9.66	2.04	0.045	0.040	0.045	0.037	43.10	709.84
0.004689	506.	506.	506.	2	0	0	0.00	199.16	908.99

FLOW DISTRIBUTION FOR SECNO= 25.00 CWSEL= 51.68

STA=	710.	730.	734.	747.	756.	781.	793.	835.	850.	909.
PER Q=	2.0	2.5	6.6	3.2	14.6	3.8	65.5	1.3	0.5	
AREA=	24.7	16.0	42.7	23.7	88.7	29.4	257.6	16.4	17.3	
VEL=	3.1	5.9	5.9	5.1	6.3	5.0	9.7	2.9	1.2	

*SECNO 26.000

26.00	9.34	55.54	0.00	0.00	56.27	0.74	3.45	0.04	53.50
3800.	1243.	1881	677.	206.	227.	233.	351.	148.	54.40
1.00	6.02	8.29	2.91	0.045	0.040	0.045	0.038	46.20	731.02
0.006898	508.	508.	508.	2	0	0	0.00	336.68	1067.70

SECNO	DELTA	[illegible]	[illegible]	[illegible]	CW	HV	HL	CROSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB		TWA	LEFT/RIGHT
TIM	VLOB	VCH	VROB	XNL	XNCH	XNR		ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CURAR	TOPWID	ENDST

FLOW DISTRIBUTION FOR SECNO= 26.00 CWSEL= 55.54

STA=	731.	738.	745.	758	775	783.	795.	844.	1008.	1068.
PER Q=	1.9	6.5	5.7	10.2	5.1	3.3	49.5	15.9	1.9	
AREA=	16.5	34.1	38.2	60.1	30.9	26.7	226.8	195.6	37.0	
VEL=	4.4	7.3	5.6	6.5	6.3	4.7	8.3	3.1	2.0	

*SECNO 27.000

3301 HV CHANGED MORE THAN HVINS

27.00	9.13	57.63	0.00	0.00	57.82	0.19	1.49	0.05	53.00
3800.	497.	1667.	1636.	168.	357.	871.	363.	154.	55.70
1.04	2.96	4.66	1.88	0.045	0.040	0.045	0.038	48.50	736.75
0.001519	530.	530.	530.	3	0	0	0.00	629.40	1366.15

FLOW DISTRIBUTION FOR SECNO= 27.00 CWSEL= 57.63

STA=	737.	739.	753.	761.	769	774.	796.	856.	987.	1182.	1332.	1366.
PER Q=	0.0	0.6	0.3	1.8	2.0	8.3	43.9	9.6	19.1	14.0	0.5	
AREA=	1.7	16.7	8.5	26.0	22.3	92.6	397.4	207.8	368.3	274.9	19.5	
VEL=	0.9	1.4	1.3	2.6	3.5	3.4	4.7	1.8	2.0	1.9	0.9	

*SECNO 28.000

SECNO	DEPTH	CWSEL	CRIWS	WSELR	HV	HV	HL	OLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	L	TWA	LEFT/RIGHT
TIM	VLOB	VCH	VROB	XNL	XNCH	XNR	N	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

3265 DIVIDED FLOW

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL, CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

28.00	7.38	59.38	59.38	0.00	60.08	0.70	0.85	0.15	56.20
3800.	821	2114.	865.	182.	252.	340.	371.	158.	60.80
1.06	4.51	8.39	2.54	0.045	0.040	0.045	0.038	52.00	718.85
0.006137	312.	312.	312.	20	14	0	0.00	499.19	1303.82

FLOW DISTRIBUTION FOR SECNO= 28.00 CWSEL= 59.38

STA=	719.	720.	741.	752.	775.	800.	852.	964.	1160.	1304.
PER Q=	0.1	2.8	3.9	9.2	5.5	55.6	0.2	15.2	7.3	
AREA=	1.6	31.4	30.6	67.7	50.6	251.9	6.9	212.3	121.0	
VEL=	1.8	3.4	4.9	5.2	4.1	8.4	1.0	2.7	2.3	

*SECNO 29.000

3265 DIVIDED FLOW

29.00	7.00	62.50	0.00	0.00	62.73	0.23	2.60	0.05	62.40
3800.	34.	694.	3073.	17.	158.	817.	381.	164.	59.70
1.09	2.01	4.40	3.76	0.045	0.040	0.045	0.038	55.50	753.36
0.004748	484.	484.	484.	2	0	0	0.00	567.05	1453.58

Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TI	VLOB	VCH	VROB	XNL	XNCH	XNR		ELMIN	SSTA
SLO	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	AR	TOPWID	ENDST

FLOW DISTRIBUTION FOR SECNO= 29.00 CWSEL= 62.50

STA=	753.	757.	773	842.	1045.	1161.	1219.	1356.	1454.
PER Q=	0.1	0.7	18.3	61.7	14.5	0.5	0.2	4.0	
AREA=	2.9	13.9	157.8	537.7	180.9	17.4	3.2	78.1	
VEL=	1.8	2.0	4.4	4.4	3.0	1.0	1.9	2.0	

*SECNO 30.000

30.00	8.39	63.89	0.00	0.00	64.00	0.10	1.26	0.01	63.50
2200.	5.	1036.	1159.	8.	308.	715.	393.	170.	60.90
1.15	0.57	3.36	1.62	0.045	0.040	0.045	0.038	55.50	755.59
0.001032	533.	533.	533.	3	0	0	0.00	533.65	1289.23

FLOW DISTRIBUTION FOR SECNO= 30.00 CWSEL= 63.89

STA=	756.	776.	840.	1087.	1284.	1289.
PER Q=	0.2	47.1	46.1	6.6	0.0	
AREA=	8.1	308.2	557.1	157.7	0.2	
VEL=	0.6	3.4	1.8	0.9	0.1	

*SECNO 31.000

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL, CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY

SECNO	DEPTH	CWSEC	CRIWS	WSELR	EG	HV	HL	OLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	TOL	TWA	LEFT/RIGHT
TI	VLOB	VCH	VROB	XNL	XNCH	XNR	FN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

3720 CRITICAL DEPTH ASSUMED

31.00	6.79	66.49	66.49	0.00	67.21	0.72	1.44	0.18	68.90
2200.	0.	1367.	833.	0.	167.	238.	404.	176.	64.60
1.18	0.00	8.17	3.51	0.045	0.040	0.045	0.038	59.70	783.10
0.008377	637.	637.	637.	20	14	0	0.00	245.83	1028.94

FLOW DISTRIBUTION FOR SECNO= 31.00 CWSEL= 66.49

STA=	783.	827.	1003.	1029.
PER Q=	62.1	37.3	0.6	
AREA=	167.4	228.7	8.8	
VEL=	8.2	3.6	1.5	

*SECND 32.000

32.00	5.26	72.46	0.00	0.00	72.87	0.41	5.63	0.03	73.40
2200.	0.	629.	1571.	0.	94.	360.	410.	180.	71.70
1.22	0.00	6.72	4.36	0.045	0.040	0.045	0.038	67.20	716.01
0.008928	651.	651.	651.	5	0	0	0.00	264.34	980.36

FLOW DISTRIBUTION FOR SECNO= 32.00 CWSEL= 72.46

STA=	716.	750.	776.	963.	980.
PER Q=	28.6	9.9	61.3	0.2	
AREA=	93.6	46.9	308.9	4.1	
VEL=	6.7	4.6	4.4	1.2	

Q	QLOB	QCH	QROB	ALOB	ACH	AROB			TWA LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR			ELMIN SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CC AR		TOPWID ENDST

*SECNO 32.100

3265 DIVIDED FLOW

32.10	6.72	75.72	0.00	0.00	76.27	0.55	3.36	0.04	77.70
2200.	0.	1151.	1049.	0.	155.	277.	414.	182.	77.10
1.23	0.00	7.43	3.79	0.045	0.040	0.045	0.038	69.00	856.71
0.008419	429.	396.	382	2	0	0	0.00	261.61	1141.13

FLOW DISTRIBUTION FOR SECNO= 32.10 CWSEL= 75.72

STA=	857.	909.	957.	1114.	1141.
PER Q=	52.3	6.0	41.3	0.4	
AREA=	154.9	38.5	231.3	7.0	
VEL=	7.4	3.4	3.9	1.2	

SPECIAL BRIDGE

5227 DOWNSTREAM ELEV IS 74.77 , NOT 75.72 HYDRAULIC JUMP OCCURS DOWNSTREAM (IF LOW FLOW CONTROLS)

SB	XX	XKOR	COEQ	RDLEN	BWC	BWP	BAREA	SS	ELCHU	ELCHD
	1.25	1.50	2.50	0.00	25.50	1.50	144.00	0.00	70.20	69.70

*SECNO 32.300

3265 DIVIDED FLOW

Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIT	VLOB	VCH	VROB	XNL	XNCH	XNR	N	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	JORAR	TOPWID	ENDST

PRESSURE AND WEIR FLOW

EGPRS	EGLWC	H3	QWEIR	QPR	BAREA	TRAPEZOID AREA	ELLC	ELTRD
81.15	79.53	0.00	242.	1963.	144.	132.	75.70	79.80

32.30	6.29	79.59	0.00	0.00	80.04	0.46	3.77	0.00	82.90
2200.	0.	2200.	0.	0.	406.	0.	416.	183.	80.90
1.24	0.00	5.42	0.00	0.045	0.040	0.045	0.038	73.30	691.12
0.009500	176	176.	176.	3	0	4	0.00	218.34	951.81

FLOW DISTRIBUTION FOR SECNO= 32.30 CWSEL= 79.59

STA= 691. 999.
PER Q= 100.0
AREA= 406.0
VEL= 5.4

*SECNO 33.000

3265 DIVIDED FLOW

33.00	4.12	82.32	82.26	0.00	82.94	0.63	2.85	0.05	81.50
2200.	310.	1890.	0.	155.	278.	0.	419.	186.	86.70
1.26	2.00	6.80	0.00	0.045	0.040	0.045	0.038	78.20	456.27
0.004984	352.	352.	352.	6	14	0	0.00	363.36	841.33

Q	QLOB	QCH	QROB	ALOB	ACH	AROB	[illegible]	TWA	LEFT/RIGHT
TI[illegible]	VLOB	VCH	VROB	XNL	XNCH	XNR	I	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	JGRAR	TOPWID	ENDST

FLOW DISTRIBUTION FOR SECNO= 33.00 CWSEL= 82.32

STA=	456.	463.	539.	545.	578.	595.	642.	757.	857.
PER Q=	0.0	1.4	0.0	0.6	2.1	2.6	7.3	85.9	
AREA=	1.0	24.3	0.9	6.6	16.8	29.0	76.4	277.7	
VEL=	0.8	1.3	0.8	2.0	2.7	2.0	2.1	6.8	

*SECNO 34.000

3265 DIVIDED FLOW

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

34.00	4.28	89.88	89.88	0.00	90.60	0.72	6.07	0.03	89.60
2900.	639.	1496.	65.	169.	190.	20.	426.	191.	88.10
1.29	3.81	7.87	3.27	0.045	0.040	0.045	0.038	85.60	558.50
0.011507	688.	688.	685.	5	8	0	0.00	271.57	839.13

FLOW DISTRIBUTION FOR SECNO= 34.00 CWSEL= 89.88

STA=	558.	560.	571.	608.	637.	706.	749.	817.	839.
PER Q=	0.1	1.9	0.7	2.9	20.3	3.1	68.0	3.0	
AREA=	1.0	11.5	10.6	18.6	99.4	26.6	190.0	20.0	
VEL=	2.3	3.6	1.5	3.4	4.5	2.6	7.9	3.3	

Q	QLOB	QCH	QROB	ALOB	ACH	AROB	PL	TWA	LEFT/RIGHT
TI	VLOB	VCH	VROB	XNL	XNCH	XNR	PN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 35.000

3265 DIVIDED FLOW

35.00	4.73	95.33	95.30	0.00	96.37	1.04	5.67	0.10	93.30
2200.	481.	1506.	213.	80.	165.	45.	429.	193.	94.20
1.30	6.05	9.12	4.78	0.045	0.040	0.045	0.038	90.60	639.13
0.013556	455.	455.	455.	5	8	0	0.00	138.74	805.25

FLOW DISTRIBUTION FOR SECNO= 35.00 CWSEL= 95.33

STA=	639.	646.	656.	698.	719.	772.	798.	805.
PER Q=	0.2	0.3	4.9	16.4	68.5	8.6	1.1	
AREA=	2.5	3.6	22.2	51.3	165.1	38.0	6.5	
VEL=	2.0	2.0	4.9	7.0	9.1	5.0	3.5	

*SECNO 36.000

3265 DIVIDED FLOW

36.00	4.97	102.57	0.00	0.00	103.29	0.72	6.88	0.03	102.30
2200.	1.	1370.	829.	1.	184.	148.	433.	195.	104.30
1.33	0.93	7.44	5.59	0.045	0.040	0.045	0.038	97.60	580.28
0.011583	550.	550.	550.	4	0	0	0.00	154.23	856.79

Q	QLOB	QCH	QROB	ALOB	ACH	AROB	[illegible]L	TWA	LEFT/RIGHT
TI	VLOB	VCH	VROB	XNL	XNCH	XNR	N	ELMIN	SSTA
SLOP.	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	JRAR	TOPWID	ENDST

FLOW DISTRIBUTION FOR SECNO= 36.00 CWSEL= 102.57

STA=	580.	589	671.	756.	772.	845.	857.
PER Q=	0.0	62.3	13.8	8.2	10.0	5.7	
AREA=	1.2	184.1	53.1	32.3	39.8	23.0	
VEL=	0.9	7.4	5.7	5.6	5.5	5.4	

*SECNO 36.100

3265 DIVIDED FLOW

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

36.10	6.20	104.70	104.70	0.00	105.41	0.70	0.65	0.00	105.10
2200.	0.	787.	1413.	0.	108.	221.	434.	195.	103.90
1.33	0.00	7.28	6.39	0.045	0.040	0.045	0.038	98.50	523.03
0.014458	50.	50.	50.	20	11	0	0.00	288.41	859.21

FLOW DISTRIBUTION FOR SECNO= 36.10 CWSEL= 104.70

STA=	523.	574.	652.	803.	816.	839.	859.
PER Q=	35.8	3.1	3.3	1.5	32.8	23.6	
AREA=	108.1	31.3	36.2	9.9	80.2	63.3	
VEL=	7.3	2.2	2.0	3.3	9.0	8.2	

Q	QLOB	QCH	QROB	ALOB	ACH	AROB	[illegible]OL	TWA	LEFT/RIGHT
TI[illegible]	VLOB	VCH	VROB	XNL	XNCH	XNR	[illegible]N	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 36.200

3301 HV CHANGED MORE THAN HVINS

36.20	4.29	105.49	0.00	0.00	105.58	0.09	0.11	0.06	104.90
2200.	274.	44.	1882.	145.	24.	780.	434.	195.	101.40
1.33	1.69	1.63	2.41	0.045	0.040	0.045	0.038	101.20	496.53
0.000841	50.	50.	50.	2	0	0	0.00	270.40	766.92

FLOW DISTRIBUTION FOR SECNO= 36.20 CWSEL= 105.49

STA=	497.	509.	521.	531.	559.	569.	752.	767.
PER Q=	1.9	6.0	2.7	1.9	2.0	83.5	2.0	
AREA=	26.8	51.9	29.8	36.4	24.1	749.9	29.7	
VEL=	1.5	2.5	2.0	1.1	1.8	2.4	1.5	

CCHV= 0.100 CEHV= 0.300
*SECNO 37.100

3265 DIVIDED FLOW

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB		TWA	LEFT/RIGHT
TI	VLOB	VCH	VROB	XNL	XNCH	XNR	J	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

3720 CRITICAL DEPTH ASSUMED

37.10	7.21	108.21	108.21	0.00	110.48	2.27	0.36	0.66	111.10
2200.	0.	2199.	1.	0.	182.	0.	436.	196.	110.90
1.34	0.00	12.10	1.77	0.035	0.040	0.035	0.038	101.00	547.09
0.015623	139.	154.	171.	20	14	0	0.00	42.14	813.31

FLOW DISTRIBUTION FOR SECNO= 37.10 CNSEL= 108.21

STA=	547.	593.	812.	813.
PER Q=	100.0	0.0	0.0	
AREA=	181.7	0.3	0.2	
VEL=	12.1	1.8	1.8	

*SECNO 37.300

3265 DIVIDED FLOW

3301 HV CHANGED MORE THAN HVINS

37.30	8.01	110.71	0.00	0.00	110.85	0.14	0.16	0.21	108.00
2200.	1095.	1104.	1.	365.	370.	2.	437.	196.	119.00
1.35	3.00	2.98	0.44	0.035	0.040	0.035	0.038	102.70	427.78
0.000682	84.	84.	84.	2	0	0	0.00	158.87	768.11

Q	QLOB	QCH	QROB	ALOB	ACH	AROB	WOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	N	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CURAR	TOPWID	ENDST

FLOW DISTRIBUTION FOR SECNO= 37.30 CWSEL= 110.71

STA=	428.	439.	460.	512.	596.	768.
PER Q=	2.9	19.0	27.9	50.2	0.0	
AREA=	31.2	119.3	214.7	370.2	2.2	
VEL=	2.0	3.5	2.9	3.0	0.4	

*SECNO 38.100

3265 DIVIDED FLOW

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

38.10	4.20	111.00	111.00	0.00	112.09	1.09	0.85	0.29	111.50
2200.	171.	2029.	0.	35.	235.	0.	443.	197.	114.30
1.36	4.86	8.62	0.00	0.035	0.040	0.035	0.038	106.80	361.95
0.014018	475.	462.	451.	6	11	0	0.00	124.26	497.31

FLOW DISTRIBUTION FOR SECNO= 38.10 CWSEL= 111.00

STA=	362.	364.	389.	402.	503.
PER Q=	0.2	6.5	1.1	92.2	
AREA=	1.3	26.8	7.2	235.2	
VEL=	3.2	5.3	3.4	8.6	

Q	QLOB	QCH	QROB	ALOB	ACH	AROB		TWA	LEFT/RIGHT
TI	VLOB	VCH	VROB	XNL	XNCH	XNR		ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT		TOPWID	ENDST

*SECNO 38.300
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

38.30	4.86	112.26	112.26	0.00	113.29	1.03	0.89	0.01	112.00
2200.	515.	1685.	0.	101.	190.	0.	443.	198.	115.80
1.36	5.11	8.86	0.00	0.035	0.040	0.035	0.038	107.40	359.57
0.009782	77.	77.	77.	3	8	0	0.00	144.61	504.19

FLOW DISTRIBUTION FOR SECNO= 38.30 CWSEL= 112.26

STA=	360.	361.	389.	413.	456.	512.
PER Q=	0.1	12.0	9.6	1.8	76.6	
AREA=	0.6	44.8	38.2	17.3	190.1	
VEL=	2.2	5.9	5.5	2.3	8.9	

*SECNO 39.100

3265 DIVIDED FLOW

3301 HV CHANGED MORE THAN HVINS

39.10	5.26	114.66	0.00	0.00	115.18	0.52	1.84	0.05	115.90
2200.	871.	1329.	0.	204.	201.	0.	445.	199.	122.40
1.38	4.28	6.61	0.00	0.035	0.040	0.035	0.038	109.40	378.91
0.004877	282.	271.	269.	2	0	0	0.00	171.89	575.04

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	AL	TWA	LEFT/RIGHT
TIT	VLOB	VCH	VROB	XNL	XNCH	XNR	N	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

FLOW DISTRIBUTION FOR SECNO= 39.10 CWSEL= 114.66

STA=	379.	383.	425.	473.	504.	596.
PER Q=	0.6	19.2	16.4	3.4	60.4	
AREA=	4.2	88.1	83.9	27.4	201.2	
VEL=	2.9	4.8	4.3	2.7	6.6	

*SECNO 39.300

3265 DIVIDED FLOW

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

39.30	5.05	116.35	116.35	0.00	117.41	1.06	0.57	0.16	118.60
2200.	1019.	1181.	0.	150.	127.	0.	446.	199.	126.30
1.38	6.80	9.32	0.00	0.035	0.040	0 035	0.038	111.30	437.35
0.012306	77.	77.	77.	20	11	0	0.00	127.69	610.96

FLOW DISTRIBUTION FOR SECNO= 39.30 CWSEL= 116.35

STA=	437.	439.	491.	530.	629.
PER Q=	0.3	36.4	9.6	53.7	
AREA=	1.9	105.3	42.7	126.7	
VEL=	3.7	7.6	4.9	9.3	

SECNO	DEPTH	CWSEL	CRITWS	WSELK	EG	HV	HL	OLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB		TWA	LEFT/RIGHT
TIM	VLOB	VCH	VROB	XNL	XNCH	XNR	J	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 40.100

3265 DIVIDED FLOW

40.10	6.72	120.32	0.00	0.00	121.07	0.75	3.63	0.03	120.80
2200.	1071.	1129.	0.	194.	139.	0.	449.	200.	123.10
1.40	5.53	8.10	0.00	0.035	0.040	0.035	0.038	113.60	448.04
0.007564	382.	382.	382.	3	0	0	0.00	142.02	593.27

FLOW DISTRIBUTION FOR SECNO= 40.10 CWSEL= 120.32

STA=	448.	459.	522.	551.	559.	598.
PER Q=	1.9	33.9	12.2	0.7	51.3	
AREA=	11.2	126.5	50.7	5.3	139.5	
VEL=	3.7	5.9	5.3	2.9	8.1	

*SECNO 40.300

3265 DIVIDED FLOW

7188 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

40.30	7.97	121.07	121.07	0.00	122.08	1.01	0.78	0.08	123.00
2200.	1134.	1066.	0.	167.	115.	0.	449.	200.	122.20
1.40	6.78	9.25	0.00	0.035	0.040	0.035	0.038	113.10	449.67
0.011733	84.	84.	84.	3	12	0	0.00	130.07	589.55

Q	QLOB	QCH	QROB	ALOB	ACH	AROB	'L	TWA	LEFT/RIGHT
TIF	VLOB	VCH	VROB	XNL	XNCH	XNR	'N	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

FLOW DISTRIBUTION FOR SECNO= 40.30 CWSEL= 121.07

STA=	450.	477.	544.	551.	591.
PER Q=	4.7	45.2	1.7	48.5	
AREA=	24.3	135.2	7.7	115.3	
VEL=	4.2	7.3	4.8	9.2	

*SECNO 41.100

3265 DIVIDED FLOW

3685 20 TRIALS ATIEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

41.10	8.37	123.47	123.47	0.00	124.57	1.10	1.68	0.03	124.20
2200.	959.	1241.	0.	153.	127.	0.	450.	201.	132.10
1.40	6.27	9.74	0.00	0.035	0.040	0.035	0.038	115.10	474.26
0.012145	143.	139.	134.	20	8	0	0.00	135.71	613.73

FLOW DISTRIBUTION FOR SECNO= 41.10 CWSEL= 123.47

STA=	474.	557.	571.	580.	629.
PER Q=	26.9	14.1	2.6	56.4	
AREA=	106.9	35.2	10.8	127.4	
VEL=	5.5	8.8	5.4	9.7	

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HI	DLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB		TWA	LEFT/RIGHT
TIF.	VLOB	VCH	VROB	XNL	XNCH	XNR		ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 41.300

3265 DIVIDED FLOW

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

41.30	7.04	125.94	125.94	0.00	126.86	0.91	0.83	0.02	126.50
2200.	1290.	910.	0.	187.	105.	0.	451.	201.	131.10
1.41	6.90	8.64	0.00	0.035	0.040	0.035	0.038	118.90	468.44
0.011559	70.	70.	70.	20	10	0	0.00	150.15	622.73

FLOW DISTRIBUTION FOR SECNO= 41.30 CWSEL= 125.94

STA=	468.	469.	510.	570.	589.	632.
PER Q=	0.0	3.0	44.6	11.0	41.4	
AREA=	0.2	21.9	129.3	35.4	105.3	
VEL=	1.7	3.0	7.6	6.8	8.6	

*SECNO 42.100

3470 ENCROACHMENT STATIONS= 0.0 712.1 TYPE= 1 TARGET= 712.099

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 128.90 ELREA= 100000.00

42.10	5.39	130.59	0.00	0.00	131.31	0.71	4.43	0.02	128.90
2200.	1663.	537.	0.	241.	84.	0.	454.	203.	100000.00
1.43	6.91	6.38	0.00	0.035	0.040	0.035	0.038	125.20	569.72
0.007078	497.	497.	497.	4	0	0	0.00	124.23	693.94

Q	QLOB	QCH	QROB	ALOB	ACH	AROB	PL	TWA	LEFT/RIGHT
TIM	VLOB	VCH	VROB	XNL	XNCH	XNR	WSEL	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

FLOW DISTRIBUTION FOR SECNO= 42.10 CWSEL= 130.59

STA=	570.	571.	621.	653.	667.	712.
PER Q=	0.1	21.6	40.3	13.7	24.4	
AREA=	0.6	90.1	109.1	41.0	84.1	
VEL=	1.9	5.3	8.1	7.3	6.4	

*SECNO 42.300

3301 HV CHANGED MORE THAN HVINS

3689 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS= 0.0 715.0 TYPE= 1 TARGET= 714.999

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE,ELLEA= 129.40 ELREA= 100000.00

42.30	4.73	131.13	131.13	0.00	132.50	1.36	0.68	0.19	129.40
2900.	1276.	924.	0.	134.	101.	0.	455.	203.	100000.00
1.43	9.50	9.19	0.00	0.035	0.040	0.035	0.038	126.40	615.36
0.015079	68	68.	68.	20	15	0	0.00	89.26	704.62

FLOW DISTRIBUTION FOR SECNO= 42.30 CWSEL= 131.13

STA=	615.	629.	671.	715.
PER Q=	7.9	50.1	42.0	
AREA=	23.2	111.1	100.5	
VEL=	7.4	9.9	9.2	

SECNO	DEPTH	CWSEL	CRIWS	WSELR	EG	HV	HF	QLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB		TWA	LEFT/RIGHT
TIM	VLOB	VCH	VROB	XNL	XNCH	XNR		ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 43.000

3265 DIVIDED FLOW

3301 HV CHANGED MORE THAN HVINS

43.00	5.37	134.37	0.00	0.00	135.05	0.69	2.49	0.07	134.30
2200.	0.	2020.	180.	0.	296.	41.	456.	203.	138.00
1.44	0.04	6.83	4.36	0.035	0.040	0.035	0.038	129.00	643.58
0.007687	238.	238.	238.	2	0	0	0.00	131.27	874.17

FLOW DISTRIBUTION FOR SECNO= 43.00 CWSEL= 134.37

STA=	641.	754.	816.	827.	867.	874.
PER Q=	91.8	0.7	1.3	3.4	2.8	
AREA=	295.8	4.8	9.2	14.9	12.4	
VEL=	6.8	3.1	3.1	5.0	4.9	

*SECNO 44.000

3265 DIVIDED FLOW

44.00	5.25	139.75	0.00	0.00	140.43	0.67	5.37	0.00	138.70
2200.	737.	1436.	27.	156.	194.	11.	461.	206.	138.80
1.47	4.72	7.40	2.44	0.035	0.040	0.035	0.039	134.50	646.64
0.008849	664.	649.	660.	5	0	0	0.00	213.12	878.78

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	QLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	'L	TWA	LEFT/RIGHT
TIM	VLOB	VCH	VROB	XNL	XNCH	XNR	N	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

FLOW DISTRIBUTION FOR SECNO= 44.00 CWSEL= 139.75

STA=	647.	654.	659.	684.	706.	793.	856.	879.
PER Q=	0.4	0.4	0.3	6.2	26.2	65.3	1.2	
AREA=	3.8	3.0	2.8	28.4	118.0	194.0	11.1	
VEL=	2.6	2.6	2.4	4.8	4.9	7.4	2.4	

*SECNO 45.000

3265 DIVIDED FLOW

45.00	5.31	143.41	0.00	0.00	143.91	0.50	3.46	0.02	143.60
2200.	511.	1134.	555.	109.	184.	102.	465.	208.	143.70
1.49	4.67	6.18	5.44	0.035	0.040	0.035	0.039	138.10	725.41
0.010006	363.	370.	374.	3	0	0	0.00	249.83	988.42

FLOW DISTRIBUTION FOR SECNO= 45.00 CWSEL= 143.41

STA=	729.	799.	820.	915.	955.	988.
PER Q=	18.1	5.1	51.6	13.0	12.2	
AREA=	85.4	24.0	183.7	52.6	49.3	
VEL=	4.7	4.7	6.2	5.4	5.4	

*SECNO 46.000

46.00	3.70	145.10	0.00	0.00	145.51	0.41	1.60	0.01	142.40
2200.	159.	1406.	635.	41.	239.	194.	467.	209.	143.20
1.50	3.87	5.89	3.27	0.035	0.040	0.035	0.039	141.40	709.44
0.005581	205.	224.	213.	2	0	0	0.00	300.01	1009.45

SECNO	DEPTH	CWSEL	CRITWS	WSELR	EG	HV	HL	QLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB		TWA	LEFT/RIGHT
TIP	VLOB	VCH	VROB	XNL	XNCH	XNR	J	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

FLOW DISTRIBUTION FOR SECNO= 46.00 CWSEL= 145.10

STA=	709.	740.	817.	1001.	1009.
PER Q=	7.2	63.9	28.9	0.0	
AREA=	41.0	238.5	193.4	0.9	
VEL=	3.9	5.9	3.3	0.7	

*SECNO 47.000

47.00	2.51	146.71	0.00	0.00	146.82	0.11	1.27	0.03	154.30
1700.	0.	1700.	0.	0.	636.	0.	471.	212.	149.40
1.53	0.00	2.67	0.00	0.035	0.040	0.035	0.039	144.20	452.63
0.002806	337.	318.	309.	3	0	0	0.00	400.75	853.38

FLOW DISTRIBUTION FOR SECNO= 47.00 CWSEL= 146.71

STA=	453.	902.
PER Q=	100.0	
AREA=	635.6	
VEL=	2.7	

*SECNO 48.000

49.00	2.39	149.89	0.00	0.00	150.24	0.36	3.35	0.07	149.50
1700.	1.	1462	236	1.	291.	79.	478.	218.	149.50
1.57	1.54	5.02	2.98	0.035	0.040	0.035	0.039	147.50	323.86
0.011830	660.	660.	660.	3	0	0	0.00	369.28	693.14

Q	QLOB	QCH	QROB	ALOB	ACH	AROB	'L	TWA	LEFT/RIGHT
TIM	VLOB	VCH	VROB	XNL	XNCH	XNR	.N	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

FLOW DISTRIBUTION FOR SECNO= 48.00 CWSEL= 149.89

STA=	324.	328.	538.	673.	693.
PER Q=	0.1	86.0	13.0	0.9	
AREA=	0.8	291.1	72.3	6.9	
VEL=	1.5	5.0	3.0	2.3	

*SECNO 49.000

3265 DIVIDED FLOW

49.00	4.60	157.10	0.00	0.00	157.46	0.36	7.22	0.00	156.40
1700.	775.	925.	0.	215.	165.	0.	485.	224.	165.20
1.61	3.61	5.60	0.00	0.035	0.040	0.035	0.039	152.50	269.00
0.007465	770.	781.	780.	2	0	0	0.00	352.14	709.75

FLOW DISTRIBUTION FOR SECNO= 49.00 CWSEL= 157.10

STA=	269.	281.	346.	413.	577.	639.	726.
PER Q=	2.9	27.6	3.2	3.6	8.3	54.4	
AREA=	12.9	97.5	27.0	30.4	46.7	165.2	
VEL=	3.9	4.8	2.0	2.0	3.0	5.6	

*SECNO 50.000

50.00	2.17	163.97	0.00	0.00	164.46	0.49	6.96	0.04	164.80
1700.	0.	1700.	0.	0.	303.	0.	491.	229.	164.70
1.65	0.00	5.61	0.00	0.035	0.040	0.035	0.039	161.80	347.68
0.014082	695.	696.	697.	4	0	0	0.00	211.30	558.99

SECNO	DEPTH	CNSEL	CNTNS	WSELK	EG	HV	HL	OLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB		TWA	LEFT/RIGHT
TIE	VLOB	VCH	VROB	XNL	XNCH	XNR	J	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

FLOW DISTRIBUTION FOR SECNO= 50.00 CNSEL= 163.97

STA=	348.	586.
PER Q=	100.0	
AREA=	303.3	
VEL=	5.6	

*SECNO 51.000

51.00	5.11	167.21	0.00	0.00	167.54	0.33	3.07	0.02	165.40
1700.	442.	1259.	0.	104.	266.	0.	494.	230.	167.90
1.68	4.27	4.72	0.00	0.035	0.040	0.035	0.039	162.10	419.69
0.003915	471.	455.	453.	3	0	0	0.00	143.21	562.90

FLOW DISTRIBUTION FOR SECNO= 51.00 CNSEL= 167.21

STA=	420.	429.	441.	471.	570.
PER Q=	3.6	10.1	12.3	74.0	
AREA=	16.1	33.4	54.0	266.2	
VEL=	3.8	5.1	3.9	4.7	

*SECNO 52.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

52.00	2.27	169.17	169.17	0.00	169.86	0.69	1.90	0.11	171.40
1700.	0.	1700.	0.	0.	256.	0.	496.	231.	170.00
1.69	0.00	6.65	0.00	0.035	0.040	0.035	0.039	166.90	438.19
0.021779	242.	246.	249.	3	18	0	0.00	191.25	629.43

Q	QLOB	QCH	QROB	ALOB	ACH	AROB	WL	TWA	LEFT/RIGHT
TIM	VLOB	VCH	VROB	XNL	XNCH	XNR	WN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IOC	ICONT	CORAR	TOPWID	ENDST

FLOW DISTRIBUTION FOR SECNO= 52.00 CWSEL= 169.17

STA= 438. 648.
PER Q= 100.0
AREA= 255.6
VEL= 6.6

*SECNO 52.100

3265 DIVIDED FLOW

52.10	2.67	175.77	0.00	0.00	176.07	0.30	6.17	0.04	175.50
1700.	1.	1699.	0.	1.	387.	0.	500.	234.	175.60
1.72	0.95	4.39	0.04	0.035	0.040	0.035	0.039	173.10	465.86
0.007184	532.	532.	532.	6	0	0	0.00	247.34	739.67

FLOW DISTRIBUTION FOR SECNO= 52.10 CWSEL= 175.77

STA= 466. 477. 739. 740.
PER Q= 0.1 99.9 0.0
AREA= 1.5 387.0 0.1
VEL= 0.9 4.4 0.0

*SECNO 52.300

SECNO	DEPTH	CNSEL	CRINS	WSELK	EG	HV	HL	OLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB		TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	J	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

3265 DIVIDED FLOW

3685 20 TRIALS ATTEMPTED WSEL, CNSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

52.30	3.71	177.51	177.51	0.00	178.18	0.67	1.31	0.11	183.00
1700.	0.	1030.	670.	0.	147.	114.	501.	235.	178.20
1.73	0.00	6.99	5.90	0.035	0.040	0.035	0.039	173.80	436.86
0.012899	139.	139.	139.	20	12	0	0.00	202.34	666.51

FLOW DISTRIBUTION FOR SECNO= 52.30 CNSEL= 177.51

STA=	437.	520.	540.	553.	599.	657.	667.
PER Q=	60.6	0.2	8.4	29.1	1.8	0.1	
AREA=	147.4	1.6	21.3	74.7	15.1	1.0	
VEL=	7.0	1.7	6.7	6.6	2.0	1.1	

*SECNO 53.000

3265 DIVIDED FLOW

53.00	4.30	181.50	0.00	0.00	181.94	0.44	3.73	0.02	185.10
1700.	0.	1194.	506.	0.	214.	109.	504.	237.	184.60
1.75	0.00	5.59	4.64	0.035	0.040	0.035	0.039	177.20	315.70
0.007053	400.	400.	400.	4	0	0	0.00	186.60	612.06

SECNO	DEPTH	CWSEL	CRITWS	WSELK	EG	HV	HL	OLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	AL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	XN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

FLOW DISTRIBUTION FOR SECNO= 53.00 CWSEL= 181.50

STA=	316.	424	479.	489.	500.	506.	528.	534.	536.	600.	612.
PER Q=	70.3	1.1	8.1	7.4	0.1	7.3	3.1	0.0	1.8	0.8	
AREA=	213.8	7.8	22.7	22.7	1.5	25.0	10.8	0.3	12.0	6.1	
VEL=	5.6	2.4	6.1	5.5	1.4	5.0	4.8	0.8	2.5	2.2	

*SECNO 54.000

3265 DIVIDED FLOW

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

54.00	5.76	190.96	190.96	0.00	191.68	0.72	6.25	0.08	192.90
1700.	0.	1517.	183.	0.	213.	61.	508.	240.	193.70
1.78	0.00	7.11	3.00	0.035	0.040	0.035	0.039	185.20	372.63
0.010864	722.	722.	722.	6	11	0	0.00	193.96	660.15

FLOW DISTRIBUTION FOR SECNO= 54.00 CWSEL= 190.96

STA=	373.	467	524.	609.	657.	660.
PER Q=	89.3	1.5	8.5	0.5	0.3	
AREA=	213.4	8.5	47.7	2.8	1.8	
VEL=	7.1	2.9	3.0	3.0	2.9	

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	GLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB		TWA	LEFT/RIGHT
TIM	VLOB	VCH	VROB	XNL	XNCH	XNR		ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CURAR	TOPWID	ENDST

*SECNO 54.100

3265 DIVIDED FLOW

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

54.10	4.67	199.27	199.27	0.00	200.31	1.04	7.63	0.10	206.40
1700.	46.	1533.	121.	12.	180.	28.	512.	242.	200.10
1.80	3.84	8.50	4.28	0.035	0.040	0.035	0.039	194.60	359.23
0.012695	651.	651.	651.	3	15	0	0.00	112.35	537.54

FLOW DISTRIBUTION FOR SECNO= 54.10 CWSEL= 199.27

STA=	359	373.	375.	485.	499.	504.	524.	538.
PER Q=	2.3	0.4	90.2	0.8	0.6	1.9	3.8	
AREA=	9.9	2.1	180.3	4.2	3.1	7.1	13.8	
VEL=	3.9	3.6	8.5	3.1	3.1	4.6	4.7	

*SECNO 54.300

3265 DIVIDED FLOW

3301 HV CHANGED MORE THAN HVINS

54.30	5.58	200.58	0.00	0.00	200.86	0.28	0.47	0.08	201.40
1700.	709.	991.	0.	179.	221.	0.	513.	242.	201.10
1.81	3.96	4.48	0.00	0.035	0.040	0.035	0.039	195.00	321.09
0.002941	88.	88.	88.	2	0	0	0.00	156.70	575.30

Q	QLOB	QCH	QROB	ALOB	ACH	AROB	WPL	TWA	LEFT/RIGHT
TIM..	VLOB	VCH	VROB	XNL	XNCH	XNR	..N	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CURAR	TOPWID	ENDST

FLOW DISTRIBUTION FOR SECNO= 54.30 CWSEL= 200.58

STA=	321.	370.	373.	423.	443.	451.	578.
PER Q=	11.4	0.5	6.2	21.9	1.7	58.3	
AREA=	67.7	3.8	27.7	69.4	10.6	221.2	
VEL=	2.9	2.3	3.8	5.4	2.6	4.5	

*SECNO 55.000

3265 DIVIDED FLOW

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

55.00	3.46	207.86	207.86	0.00	208.53	0.66	3.67	0.11	209.10
1700.	567.	670.	464.	89.	88.	96.	518.	245.	208.10
1.83	4.40	7.58	4.83	0.035	0.040	0.035	0.038	704.40	407.08
0.014208	675.	651.	651.	20	14	0	0.00	209.76	676.85

FLOW DISTRIBUTION FOR SECNO= 55.00 CWSEL= 207.86

STA=	407.	413.	418.	450.	461.	479.	486.	509.	565.	643.	677.
PER Q=	2.3	2.2	0.6	1.9	6.4	11.0	8.8	39.4	18.3	9.0	
AREA=	6.9	6.7	2.7	8.1	17.7	19.7	26.6	88.2	64.5	31.6	
VEL=	5.6	5.6	3.9	4.1	6.2	9.5	5.6	7.6	4.8	4.8	

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HI	OLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB		TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR		ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 56.000

3265 DIVIDED FLOW

56.00	3.43	217.93	0.00	0.00	218.25	0.32	9.69	0.03	221.50
1700.	357.	498.	846.	73.	93.	226.	525.	251.	219.60
1.90	4.89	5.34	3.74	0.035	0.040	0.035	0.039	214.50	503.53
0.007374	972.	972.	972.	5	0	0	0.00	317.56	931.16

FLOW DISTRIBUTION FOR SECNO= 56.00 CWSEL= 217.93

STA=	504.	506.	520.	530.	534.	552.	560.	640.	796.	930.	931.
PER Q=	0.3	2.4	0.8	2.1	14.1	1.1	29.3	17.0	32.8	0.0	
AREA=	2.0	12.4	5.5	7.1	39.9	6.1	93.1	81.0	145.0	0.1	
VEL=	2.8	3.3	2.5	5.1	6.0	3.1	5.3	3.6	3.8	0.9	

*SECNO 57.000

3265 DIVIDED FLOW

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

57.00	4.60	224.60	224.60	0.00	225.21	0.62	4.44	0.09	225.60
1700.	343.	1031	326.	67.	140.	111.	530.	255.	224.90
1.92	5.13	7.35	2.94	0.035	0.040	0.035	0.039	220.00	521.42
0.009502	532.	532.	532.	3	11	0	0.00	283.94	871.50

Q	QLOB	QCH	QROB	ALOB	ACH	AROB	[illegible]	TWA	LEFT/RIGHT
TIML	VLOB	VCH	VROB	XNL	XNCH	XNR	[illegible]	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CURAR	TOPWID	ENDST

FLOW DISTRIBUTION FOR SECNO= 57.00 CNSEL= 224.60

STA=	521.	526.	537.	556.	569.	578.	651.	827.	871.
PER Q=	1.5	3.4	3.3	9.6	2.3	60.6	14.6	4.6	
AREA=	6.0	12.7	13.6	24.8	9.8	140.3	84.6	26.4	
VEL=	4.4	4.6	4.1	6.6	4.1	7.3	2.9	2.9	

*SECNO 57.100

3265 DIVIDED FLOW

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

57.10	5.01	228.81	228.81	0.00	229.59	0.78	4.20	0.05	229.30
1700.	345.	1252.	103.	77.	159.	34.	533.	257.	229.10
1.94	4.50	7.86	3.05	0.035	0.040	0.035	0.039	223.80	578.20
0.010097	403.	429.	466.	2	8	0	0.00	179.72	798.67

FLOW DISTRIBUTION FOR SECNO= 57.10 CNSEL= 228.81

STA=	578.	583.	592.	622.	664.	726.	753.	799.
PER Q=	0.5	1.0	5.5	13.2	73.7	1.0	5.0	
AREA=	2.7	5.8	20.2	48.0	159.3	5.8	27.8	
VEL=	3.0	3.0	4.7	4.7	7.9	3.0	3.0	

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

SPECIAL BRIDGE

5227 DOWNSTREAM ELEV IS 228.49 , NOT 228.81 HYDRAULIC JUMP OCCURS DOWNSTREAM (IF LOW FLOW CONTROLS)

SB	XK	XKOR	CDFQ	RDLEN	BWC	BWP	BAREA	SS	ELCHU	ELCHD
	1.25	1.50	2.50	0.00	19.50	1.50	90.00	0.00	224.50	223.50

*SECNO 57.300

3265 DIVIDED FLOW

3301 HV CHANGED MORE THAN HVINS

PRESSURE AND WEIR FLOW

EGPRS	EGLWC	H3	QWEIR	QFR	BAREA	TRAPEZOID AREA	ELLC	ELTRD
237.12	233.75	0.00	827.	873.	90.	72.	228.50	230.60

97.30	5.32	230.92	0.00	0.00	231.00	0.08	1.41	0.00	228.60
1700.	453.	559.	688.	235.	199.	363.	534.	258.	228.50
1.95	1.92	2.81	1.90	0.035	0.040	0.035	0.039	225.60	503.12
0.000956	106.	106.	106.	2	0	6	0.00	437.71	955.19

SECNO	DEPTH	CWSEL	CRIWS	WSELR	EG	HV	HL	OLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	OL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	ON	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

FLOW DISTRIBUTION FOR SECNO= 57.30 CWSEL= 230.92

STA=	503.	543.	564.	591.	600.	618.	675.	726.	900.	955.
PER Q=	3.1	1.7	0.6	0.4	1.9	19.0	32.9	38.3	2.1	
AREA=	39.9	22.2	10.5	6.0	20.8	136.0	199.0	326.6	36.3	
VEL=	1.3	1.3	1.0	1.0	1.5	2.4	2.8	2.0	1.0	

*SECNO 58.000

3265 DIVIDED FLOW

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

58.00	2.80	234.30	234.30	0.00	234.90	0.60	1.08	0.16	231.50
1700.	73.	343.	1285.	13	64.	199.	539.	261.	235.70
1.97	5.46	5.39	6.46	0.035	0.040	0.035	0.039	231.50	559.17
0.017539	431.	431.	431.	20	11	0	0.00	243.76	856.58

FLOW DISTRIBUTION FOR SECNO= 58.00 CWSEL= 234.30

STA=	559.	560.	567.	569.	592.	671.	694.	819.	857.
PER Q=	0.1	2.2	0.2	1.8	20.1	3.3	68.4	3.9	
AREA=	0.6	6.6	1.1	5.0	63.6	11.1	169.0	18.7	
VEL=	2.9	5.6	3.3	6.0	5.4	5.0	6.9	3.5	

SECNO	DEPTH	CNSEL	CRIWS	WSELR	EG	HV	HL	QLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB		TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	N	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 59.000

3265 DIVIDED FLOW

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

59.00	3.17	247.37	247.37	0.00	247.87	0.50	12.83	0.01	247.30
1700.	149.	810.	741.	56.	127.	141.	545.	267.	246.40
2.01	2.68	6.39	5.25	0.035	0.040	0.035	0.039	244.20	472.18
0.012227	935.	880.	880.	6	8	0	0.00	331.89	836.61

FLOW DISTRIBUTION FOR SECNO= 59.00 CNSEL= 247.37

STA=	472.	482.	572.	580.	602.	649.	714.	763.	835.	837.
PER Q=	0.4	7.0	0.5	0.8	0.0	47.7	23.0	20.6	0.0	
AREA=	3.3	42.1	3.4	6.3	0.5	126.8	67.4	73.6	0.2	
VEL=	2.3	2.8	2.6	2.0	0.5	6.4	5.8	4.8	1.2	

*SECNO 60.000

3265 DIVIDED FLOW

60.00	2.98	253.08	0.00	0.00	253.53	0.45	5.66	0.00	254.00
1700.	712.	239.	749.	135.	42.	138.	549.	270.	252.70
2.04	5.27	5.69	5.44	0.035	0.040	0.035	0.039	250.10	580.09
0.012868	451.	451.	451.	4	0	0	0.00	283.22	874.33

Q	QLOB	QCH	QROB	ALOB	ACH	AROB	TL	TWA	LEFT/RIGHT
TIT.	VLOB	VCH	VROB	XNL	XNCH	XNR	.N	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

FLOW DISTRIBUTION FOR SECNO= 60.00 CWSEL= 253.08

STA=	580	682.	696.	702.	736.	743.	756.	778.	818.	823.	874.
PER Q=	33.1	8.5	0.4	14.0	0.7	7.4	8.1	16.1	4.9	6.8	
AREA=	110.3	22.6	2.3	41.9	3.8	19.8	25.6	45.0	11.0	32.5	
VEL=	5.1	6.4	2.8	5.7	3.3	6.4	5.3	6.1	7.6	3.6	

*SECNO 61.000

3265 DIVIDED FLOW

61.00	1.46	257.46	0.00	0.00	257.66	0.20	4.10	0.03	257.40
1700.	0.	1690.	10.	0.	472.	9.	553.	274.	258.70
2.07	0.04	3.58	1.12	0.035	0.040	0.035	0.039	256.00	435.96
0.006956	431.	447.	449.	4	0	0	0.00	429.87	911.30

FLOW DISTRIBUTION FOR SECNO= 61.00 CWSEL= 257.46

STA=	436.	828.	869.	911.
PER Q=	99.4	0.1	0.5	
AREA=	471.9	1.4	7.4	
VEL=	3.6	1.1	1.1	

*SECNO 62.000

62.00	3.12	260.62	0.00	0.00	261.21	0.59	3.43	0.12	262.50
1700.	0.	1700.	0.	0.	276.	0.	556.	276.	263.40
2.09	0.00	6.15	0.00	0.035	0.040	0.035	0.039	257.50	674.21
0.010865	392.	400.	407.	3	0	0	0.00	137.73	811.94

Q	QLOB	QCH	QROB	ALOB	ACH	AROB		TWA	LEFT/RIGHT
TI[illegible]	VLOB	VCH	VROB	XNL	XNCH	XNR		ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CURAR	TOPWID	ENDST

FLOW DISTRIBUTION FOR SECNO= 62.00 CWSEL= 260.62

STA= 674. 822.
PER Q= 100.0
AREA= 276.5
VEL= 6.1

*SECNO 63.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

63.00	3.05	270.35	270.35	0.00	270.91	0.56	8.07	0.00	270.20
1700.	1518.	182.	0.	252.	32.	0.	560.	279.	280.80
2.12	6.03	5.75	0.00	0.035	0.040	0.035	0.039	267.30	523.95
0.014034	678.	638.	605.	16	6	0	0.00	224.01	747.96

FLOW DISTRIBUTION FOR SECNO= 63.00 CWSEL= 270.35

STA= 524. 626. 704. 728. 785.
PER Q= 36.7 50.1 2.6 10.7
AREA= 114.7 123.9 13.1 31.6
VEL= 5.4 6.9 3.4 5.8

*SECNO 64.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

64.00	4.19	282.79	282.79	0.00	283.65	0.85	10.72	0.09	281.60
1700.	541.	1159.	0.	103.	141.	0.	565.	283.	284.00
2.15	5.27	8.22	0.00	0.035	0.040	0.035	0.039	278.60	642.31
0.011579	843.	843.	843	5	11	0	0.00	134.20	776.51

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	TOL	TWA	LEFT/RIGHT
TIN	VLOB	VCH	VROB	XNL	XNCH	XNR	N	ELMIN	SSTA
SLOPE	XLOBL	XLCH	YLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

FLOW DISTRIBUTION FOR SECNO= 64.00 CWSEL= 282.79

STA=	642.	696.	730.	781.
PER Q=	13.1	18.8	68.2	
AREA=	50.5	52.3	141.0	
VEL=	4.4	6.1	8.2	

*SECNO 65.000

3265 DIVIDED FLOW

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

65.00	2.90	291.20	291.20	0.00	292.15	0.95	7.46	0.03	290.30
1700.	12.	1678.	10.	4.	213.	4.	568.	284.	292.30
2.17	3.25	7.87	2.49	0.035	0.040	0.035	0.039	288.30	467.97
0.017060	554.	532.	517.	11	19	0	0.00	124.78	651.79

FLOW DISTRIBUTION FOR SECNO= 65.00 CWSEL= 291.20

STA=	468.	476.	585.	646.	652.
PER Q=	0.7	98.7	0.4	0.3	
AREA=	3.6	213.3	2.4	1.7	
VEL=	3.3	7.9	2.5	2.5	

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB		TWA	LEFT/RIGHT
TIT	VLOB	VCH	VROB	XNL	YNCH	XNR		ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST
*SECNO 66.000									
66.00	4.04	300.34	0.00	0.00	301.03	0.68	8.85	0.03	300.00
1700.	1.	1699.	0.	1.	256.	0.	572.	286.	300.40
2.20	1.49	6.63	0.00	0.035	0.040	0.035	0.039	296.30	561.51
0.012948	601.	598	579.	5	0	0	0.00	134.90	696.41

FLOW DISTRIBUTION FOR SECNO= 66.00 CWSEL= 300.34

STA=	562.	566.	698.
PER Q=	0.1	99.9	
AREA=	0.8	256.4	
VEL=	1.5	6.6	

*SECNO 67.000

3265 DIVIDED FLOW

67.00	5.07	307.87	0.00	0.00	308.57	0.69	7.54	0.00	308.90
1700.	502.	1185.	13.	72.	180.	5.	575.	288.	309.50
2.22	6.94	6.59	2.77	0.035	0.040	0.035	0.039	302.80	462.62
0.015399	510.	539.	550.	4	0	0	0.00	167.17	795.33

FLOW DISTRIBUTION FOR SECNO= 67.00 CWSEL= 307.87

STA=	463.	468.	493.	513.	671.	788.	795.
PER Q=	0.6	20.8	8.2	69.7	0.3	0.4	
AREA=	2.9	45.8	23.6	179.8	2.0	2.7	
VEL=	3.6	7.7	5.9	6.6	2.8	2.8	

SECNO	DEPTH	CWSEL	CRITWS	WSELR	EG	HV	HL	OLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	OL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	N	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 68.000

68.00	4.63	313.43	0.00	0.00	314.04	0.61	5.47	0.01	315.40
1700.	0.	1696.	4.	0.	270.	2.	578.	289.	312.50
2.24	0.00	6.27	2.45	0.035	0.040	0.035	0.039	308.80	633.86
0.009715	461.	451.	451.	5	0	0	0.00	123.23	757.09

FLOW DISTRIBUTION FOR SECNO= 68.00 CWSEL= 313.43

STA=	634.	754.	757.
PER Q=	99.8	0.2	
AREA=	270.4	1.6	
VEL=	6.3	2.5	

*SECNO 69.000
7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

69.00	3.65	326.95	326.95	0.00	327.98	1.04	7.80	0.13	326.00
1700.	26.	1605.	70.	8.	193.	13.	581.	291.	324.90
2.26	3.24	8.32	5.38	0.035	0.040	0.035	0.039	323.30	460.62
0.015861	627.	638	649.	14	15	0	0.00	110.50	571.12

FLOW DISTRIBUTION FOR SECNO= 69.00 CWSEL= 326.95

STA=	461.	477.	559.	571.
PER Q=	1.5	94.4	4.1	
AREA=	7.9	192.9	12.9	
VEL=	3.2	8.3	5.4	

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  HEC     ASE DATED NOV 76 UPDATED APRIL 1980
  ERRO      R -  01,02,03,04
  MODIFICATION -  50,51,52,53,54
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T1                                   LOMA ALTA CREEK
T2                        OCEANSIDE CA.-FLOOD INSURANCE STUDY
T3                                     FLOODWAY

J1   ICHECK      INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ
        0.        3.        0.        0.  0.000000      0.00      0.0       0.      13.000    0.000
J2   NPROF      IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE
     15.000     0.000    -1.000     0.000     0.000     0.000     0.000     0.000     0.000     15.000
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   SECNO     DEPTH     CWSEL     CRIWS     WSELK     EO        HV        HL        QLOSS    BANK ELEV
   Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA    LEFT/RIGHT
   TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       WTN       ELMIN       SSTA
   SLOPE     XLOBL     XLCH      XLOBR     ITRIAL    IDC       ICONT     CORAR     TOPWID      ENDST

*PROF 2

CCHV=   0.100 CEHV=   0.300
*SECNO 10.000

3470 ENCROACHMENT STATIONS=      250.0      550.0  TYPE=      1  TARGET=      300.000
    10.00      7.60     13.00      0.00     12.00     13.17      0.17      0.00      0.00     10.00
    3800.      732.     2708.      360.      360.      737.      200.        0.        0.     10.00
     0.00      2.03      3.67      1.80     0.045     0.045     0.045     0.000      5.40    250.00
 0.000905        0.        0.        0.         0         0         0      0.00    300.00    550.00


FLOW DISTRIBUTION FOR SECNO=     10.00          CWSEL=     13.00

STA=      250.      370.      470.      550.
  PER Q=     19.3      71.3       9.5
    AREA=    360.0     737.0     200.0
     VEL=      2.0       3.7       1.8

CCHV=   0.100 CEHV=   0.300
*SECNO 10.100

3470 ENCROACHMENT STATIONS=      400.0      800.0  TYPE=      1  TARGET=      400.000
    10.10      7.97     13.37      0.00     12.46     13.41      0.03      0.23      0.01     10.20
    3800.      362.     3438.        0.      304.     2301.        0.        20.        4.  100000.00
     0.03      1.19      1.49      0.00     0.045     0.070     0.045     0.070      5.40    400.00
 0.000330      440.      440.      440.         2         0         0      0.00    400.00    800.00
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TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	[illegible]N	ELMIN	SSTA
SLOP	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	[illegible]AR	TOPWID	ENDST

FLOW DISTRIBUTION FOR SECNO= 10.10 CWSEL= 13.37

STA=	400.	497.	507.	1066.
PER Q=	8.4	1.1	90.5	
AREA=	272.7	31.4	2301.0	
VEL=	1.2	1.3	1.5	

CCHV= 0.100 CEHV= 0.300
*SECNO 10.300

3470 ENCROACHMENT STATIONS=		450.0	800.0	TYPE=	1	TARGET=	350.000		
10.30	7.98	13.38	0.00	12.48	13.43	0.05	0.02	0.00	6.40
3800.	757.	2583.	455.	438.	1400.	337.	24.	4.	8.90
0.10	1.73	1.85	1.35	0.045	0.045	0.045	0.066	5.40	450.00
0.000247	80.	80.	80.	2	0	0	0.00	350.00	800.00

FLOW DISTRIBUTION FOR SECNO= 10.30 CWSEL= 13.38

STA=	450.	516.	724.	800.
PER Q=	19.9	68.1	12.0	
AREA=	437.6	1400.0	336.8	
VEL=	1.7	1.8	1.4	

*SECNO 11.100

3470 ENCROACHMENT STATIONS=		600.0	900.0	TYPE=	1	TARGET=	300.000		

Q	QLOB	QCH	QROB	ALOB	ACH	AROB	WOL	CLOSS	BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	ITN	TWA	LEFT/RIGHT
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	ELMIN	SSTA
								TOPWID	ENDST
11.10	9.37	13.57	0.00	12.61	13.65	0.08	0.21	0.01	10.30
3800.	431.	1027.	2342.	371.	427.	996.	58.	10.	4.20
0.19	1.16	2.40	2.35	0.045	0.045	0.045	0.053	4.20	600.00
0.000312	810.	740.	720.	2	0	0	0.00	300.00	900.00

FLOW DISTRIBUTION FOR SECNO= 11.10 CWSEL= 13.57

STA=	600.	730.	779.	838.	900.
PER Q=	11.3	27.0	37.2	24.4	
AREA=	371.1	427.5	546.2	449.3	
VEL=	1.2	2.4	2.6	2.1	

SPECIAL BRIDGE

SB	XK	XKOR	COFQ	RDLEN	BWC	BWP	BAREA	SS	ELCHU	ELCHD
	1.25	1.50	2.50	0.00	31.50	1.50	165.00	0.00	4.66	4.21

*SECNO 11.300
PRESSURE AND WEIR FLOW

EGPRS	EGLWC	H3	QWEIR	QPR	BAREA	TRAPEZOID AREA	ELLC	ELTRD
25.92	13.66	0.01	3396.	426.	165.	152.	9.71	10.70

Q	QLOB	QCH	QROB	ALOB	ACH	AROB		OLOSS	BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR		TWA	LEFT/RIGHT
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CURAR	ELMIN	SSTA
								TOPWID	ENDST

3470 ENCROACHMENT STATIONS= 650.0 950.0 TYPE= 1 TARGET= 300.000

11.30	9.06	13.66	0.00	12.80	13.72	0.07	0.08	0.00	9.40
3800.	364.	1518.	1918.	279.	653.	985.	63.	11.	4.60
0.20	1.30	2.33	1.95	0.045	0.045	0.045	0.053	4.60	650.00
0.000288	110.	110.	110.	2	0	6	0.00	300.00	950.00

FLOW DISTRIBUTION FOR SECNO= 11.30 CWSEL= 13.66

STA=	650.	726.	802.	950.
PER Q=	9.6	39.9	50.5	
AREA=	279.1	652.6	984.9	
VEL=	1.3	2.3	1.9	

CCHV- 0.100 CEHV= 0.300
*SECNO 12.100

3301 HV CHANGED MORE THAN HVINS

3470 ENCROACHMENT STATIONS= 510.0 640.0 TYPE= 1 TARGET= 130.000

12.10	7.45	13.45	0.00	12.75	14.25	0.79	0.31	0.22	10.00
3800.	180.	3155.	464.	66.	407.	161.	79.	13.	10.00
0.23	2.75	7.74	2.88	0.040	0.025	0.040	0.045	6.00	510.00
0.001365	540.	560.	580.	2	0	0	0.00	130.00	640.00

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	BANK ELEV
Q	GLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TNA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	ITN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

FLOW DISTRIBUTION FOR SECNO= 12.10 CWSEL= 13.45

STA=	510.	530.	590.	640.
PER Q=	4.7	83.0	12.2	
AREA=	65.6	407.5	161.1	
VEL=	2.8	7.7	2.9	

CCHV= 0.100 CEHV= 0.300
*SECNO 13.000

3470 ENCROACHMENT STATIONS=		518.0	740.0	TYPE=	1	TARGET=	222.000		
13.00	8.27	13.87	0.00	13.32	15.00	1.12	0.65	0.10	13.30
3800.	1.	1999.	1800.	1.	180.	459.	85.	15.	13.00
0.24	0.95	11.12	3.92	0.040	0.018	0.040	0.040	5.60	518.00
0 009347	370.	370.	370.	2	0	0	0.00	222.00	740.00

FLOW DISTRIBUTION FOR SECNO= 13.00 CWSEL= 13.87

STA=	518.	519.	554.	590.	619.	641.	651.	740.
PER Q=	0.0	52.6	0.8	15.4	17.6	1.6	11.9	
AREA=	0.7	179.7	22.0	125.4	123.2	20.5	167.8	
VEL=	1.0	11.1	1.3	4.7	5.4	3.1	2.7	

*SECNO 14.100

Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	I	ELMIN	SSTA
SLOPL	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	IAR	TOPWID	ENDST

3301 HV CHANGED MORE THAN HVINS

3470 ENCROACHMENT STATIONS=			630.0	964.0	TYPE=	1	TARGET=	334.000	
14.10	9.00	16.10	0.00	15.66	16.53	0.43	1.46	0.07	15.80
3800.	9.	1330.	2461.	12.	175.	735.	100.	20.	15.20
0.29	0.76	7.62	3.35	0.040	0.018	0.040	0.034	7.10	630.00
0.001307	860.	855.	850.	2	0	0	0.00	334.00	964.00

FLOW DISTRIBUTION FOR SECNO= 14.10 CWSEL= 16.10

STA=	630.	658.	698.	867.	887.	909.	912.	926.	955.	964.
PER Q=	0.2	35.0	13.1	1.0	9.4	3.7	15.2	20.5	1.8	
AREA=	12.0	174.6	270.9	24.1	102.0	24.3	110.9	175.3	27.6	
VEL=	0.8	7.6	1.8	1.5	3.5	5.8	5.2	4.4	2.5	

*SECNO 14.300

3470 ENCROACHMENT STATIONS=			630.0	975.0	TYPE=	1	TARGET=	345.000	
14.30	9.78	16.28	0.00	16.02	16.59	0.31	0.05	0.01	15.80
3800.	19.	1273.	2507.	22.	194.	857.	101.	21.	14.20
0.29	0.68	6.56	2.92	0.040	0.018	0.040	0.034	6.50	630.00
0.000875	45.	45.	45.	2	0	0	0.00	340.50	970.50

TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	ITN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

FLOW DISTRIBUTION FOR SECNO= 14.30 CNSEL= 16.28

STA=	630.	632.	660.	702.	865.	891.	910.	917.	933.	959.	971.
PER Q=	0.0	0.5	33.5	14.6	1.5	8.9	9.6	14.2	15.2	2.0	
AREA=	2.2	19.8	194.0	321.7	39.5	105.1	72.3	126.0	157.4	35.3	
VEL=	0.8	0.9	6.6	1.7	1.5	3.2	5.0	4.3	3.7	2.1	

*SECNO 15.000

3265 DIVIDED FLOW

3470 ENCROACHMENT STATIONS= 922.9 1260.0 TYPE= 1 TARGET= 337.100

15.00	10.13	16.83	0.00	16.59	17.13	0.29	0.54	0.00	17.10
3800.	0.	1072.	2728.	0.	182.	765.	117.	25.	15.80
0.34	0.00	5.91	3.57	0.040	0.018	0.040	0.031	6.70	923.40
0.000746	665.	665.	665.	2	0	0	0.00	266.02	1260.00

FLOW DISTRIBUTION FOR SECNO= 15.00 CNSEL= 16.83

STA=	923.	964.	1089.	1182.	1191.	1219.	1238.	1251.	1260.
PER Q=	28.2	1.1	8.5	11.3	27.4	14.7	7.4	1.4	
AREA=	181.6	64.6	114.9	91.3	240.2	143.1	82.2	28.3	
VEL=	5.9	0.7	2.8	4.7	4.3	3.9	3.4	1.9	

Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	N	ELMIN	SSTA
SLOPI	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	AR	TOPWID	ENDST

*SECNO 16.000

3265 DIVIDED FLOW

3470 ENCROACHMENT STATIONS= 833.1 1400.0 TYPE= 1 TARGET= 566.900

16.00	8.88	17.18	0.00	16.97	17.32	0.14	0.18	0.02	17.80
3800.	0.	733.	3067.	0.	170.	1211.	125.	27.	16.90
0.36	0.00	4.32	2.53	0.040	0.018	0.040	0.030	8.30	834.71
0.000479	300.	300.	300.	2	0	0	0.00	354.33	1400.00

FLOW DISTRIBUTION FOR SECNO= 16.00 CWSEL= 17.18

STA=	835.	879.	901.	986.	1226.	1265.	1287.	1316.	1348.	1393.	1400.
PER Q=	19.3	0.3	1.0	7.2	26.7	15.0	13.1	5.5	10.2	1.7	
AREA=	169.7	18.3	59.1	128.4	312.9	176.1	181.1	111.8	185.5	37.3	
VEL=	4.3	0.7	0.6	2.1	3.2	3.2	2.8	1.9	2.1	1.7	

*SECNO 17.100

3265 DIVIDED FLOW

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL, CWSEL

Q	QLOB	QCH	QROB	XLOB	XCH	XROB	VEL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS= 746.4 1450.0 TYPE= 1 TARGET= 703.600

17.10	7.51	19.81	19.81	19.87	20.57	0.76	0.38	0.19	21.40
3800.	0.	1725.	2075.	0.	172.	837.	136.	33.	20.30
0.38	0.00	10.02	2.48	0.040	0.018	0.040	0.029	12.30	749.18
0.002038	420.	430.	435.	20	9	0	0.00	686.91	1445.58

FLOW DISTRIBUTION FOR SECNO= 17.10 CWSEL= 19.81

STA=	749.	785.	835.	1141.	1352.	1397.	1421.	1446.
PER Q=	45.4	2.3	19.9	3.0	9.3	14.8	5.2	
AREA=	172.2	48.3	386.0	108.0	113.2	118.6	63.0	
VEL=	10.0	1.8	2.0	1.1	3.1	4.7	3.1	

CCHV= 0.100 CEHV= 0.300
*SECNO 17 300

3301 HV CHANGED MORE THAN HVINS

3470 ENCROACHMENT STATIONS= 744.9 1442.0 TYPE= 1 TARGET= 697.100

17.30	7.75	20.55	0.00	20.53	20.69	0.14	0.05	0.06	21.00
3800.	0.	760.	3040.	0.	186.	1167.	137.	33.	20.30
0.39	0.00	4.08	2.61	0.045	0.040	0.045	0.029	12.80	749.70
0.001569	30	30.	30.	3	0	0	0.00	696.30	1442.00

Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR		ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	AR	TOPWID	ENDST

FLOW DISTRIBUTION FOR SECNO= 17.30 CWSEL= 20.55

STA=	746.	782.	814.	1341.	1356.	1386.	1406.	1429.	1442.
PER Q=	20.0	1.3	22.8	3.9	25.0	11.3	12.8	2.9	
AREA=	186.4	35.5	604.2	52.1	203.7	106.2	123.8	41.1	
VEL=	4.1	1.4	1.4	2.9	4.7	4.0	3.9	2.6	

*SECNO 18.100
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS= 750.2 1450.0 TYPE= 1 TARGET= 699.800

18.10	8.87	21.17	21.17	21.14	21.75	0.59	0.59	0.14	21.40
3800.	0.	1942.	1858.	0.	238.	670.	143.	37.	20.10
0.40	0.00	8.16	2.77	0.045	0.040	0.045	0.030	12.30	750.54
0.005552	230.	220.	220.	20	17	0	0.00	675.11	1425.65

FLOW DISTRIBUTION FOR SECNO= 18.10 CWSEL= 21.17

STA=	751.	794.	970.	1211.	1368.	1388.	1418.	1426.
PER Q=	51.1	13.7	14.7	5.8	3.1	10.7	0.8	
AREA=	238.0	196.5	233.2	112.0	34.0	84.1	10.4	
VEL=	8.2	2.6	2.4	2.0	3.5	4.8	2.9	

TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	.WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 18.300

3301 HV CHANGED MORE THAN HVINS

3470 ENCROACHMENT STATIONS= 715.0 1425.0 TYPE= 1 TARGET= 710.000

18.30	6.45	21.95	0.00	21.95	21.97	0.02	0.16	0.06	16.40
3800.	20.	484.	3296.	26.	292.	2790.	158.	42.	15.50
0.47	0.77	1.65	1.18	0.045	0.040	0.045	0.030	15.50	716.99
0.000171	332.	332.	332.	3	0	0	0.00	708.01	1425.00

FLOW DISTRIBUTION FOR SECNO= 18.30 CWSEL= 21.95

STA=	717.	726.	773.	788.	806.	840.	977.	1126.	1292.	1369.	1398.	1419.	1425.
PER Q=	0.5	12.7	3.0	2.3	6.5	29.1	21.9	14.1	6.5	2.5	0.7	0.0	
AREA=	26.1	292.2	85.0	76.5	185.8	794.9	692.1	556.1	257.1	97.1	41.7	4.2	
VEL=	0.8	1.7	1.3	1.2	1.3	1.4	1.2	1.0	1.0	1.0	0.7	0.3	

*SECNO 18.400

3265 DIVIDED FLOW

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL, CWSEL

TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPF	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	WAR	TOPWID	ENDST

3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS= 183.0 960.0 TYPE= 1 TARGET= 777.000

18.40	6.94	22.74	22.74	22.74	23.51	0.77	0.13	0.22	19.30
3800.	0.	2149.	1651.	0.	249.	400.	169.	46.	22.70
0.48	0.00	8.64	4.13	0.045	0.040	0.045	0.031	15.80	183.00
0.007085	260.	260.	260.	20	8	0	0.00	605.83	938.04

FLOW DISTRIBUTION FOR SECNO= 18.40 CWSEL= 22.74

STA=	183.	232.	617.	708.	874.	882.	897.	909.	934.	938.
PER Q=	56.6	5.7	1.3	3.4	7.6	16.7	5.9	2.6	0.1	
AREA=	248.8	148.3	33.5	31.0	38.6	75.9	38.5	31.3	2.6	
VEL=	8.6	1.5	1.4	4.1	7.5	8.4	5.9	3.2	2.0	

*SECNO 18.600

3265 DIVIDED FLOW

3470 ENCROACHMENT STATIONS= 174.0 945.0 TYPE= 1 TARGET= 771.000

18.60	6.85	23.35	0.00	23.33	24.22	0.87	0.68	0.03	22.00
3800.	2.	2280.	1518.	1.	261.	304.	171.	47.	23.20
0.49	1.78	8.74	4.99	0.045	0.040	0.045	0.031	16.50	174.76
0.006539	100.	100.	100.	2	0	0	0.00	265.28	945.00

TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	JTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

FLOW DISTRIBUTION FOR SECNO= 18.60 CWSEL= 23.35

STA=	175.	177.	226.	294.	860.	878.	892.	911.	924.	933.	945.
PER Q=	0.1	60.0	0.1	4.6	7.1	12.8	10.3	1.0	1.7	2.3	
AREA=	1.2	260.8	5.0	63.5	51.3	65.5	65.6	13.7	16.8	22.6	
VEL=	1.8	8.7	0.5	2.7	5.3	7.4	5.9	2.8	3.9	3.9	

*SECNO 18.700

3265 DIVIDED FLOW

3301 HV CHANGED MORE THAN HVINS

3470 ENCROACHMENT STATIONS=	200.0	1000.0	TYPE=	1	TARGET=	800.000			
18.70	7.34	26.24	0.00	25.85	26.34	0.10	2.04	0.08	25.50
3800.	0.	495	3305.	0.	139.	1423.	189.	56.	28.70
0.57	0.38	3.57	2.32	0.045	0.040	0.045	0.032	18.90	200.00
0.001522	738.	738.	739.	4	0	0	0.00	788.72	1000.00

FLOW DISTRIBUTION FOR SECNO= 18.70 CWSEL= 26.24

STA=	200.	200.	238.	587.	821.	847.	877.	894.	911.	933.	994.	1000.
PER Q=	0.0	13.0	14.4	17.2	9.5	16.6	4.0	6.9	6.5	11.5	0.5	
AREA=	0.1	138.6	389.5	372.1	106.4	161.9	54.1	76.4	80.0	171.0	11.8	
VEL=	0.4	3.6	1.4	1.8	3.4	3.9	2.8	3.4	3.1	2.5	1.7	

TIME.	VLOB	VCH	VROB	XNL	XNCH	XNR	'TN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	AR	TOPWID	ENDST

*SECNO 18.900

3470 ENCROACHMENT STATIONS=			200.0	1000.0	TYPE=	1	TARGET=	800.000	
18.90	7.12	26.32	0.00	25.91	26.41	0.08	0.07	0.00	24.10
3800.	12.	477.	3311.	10.	140.	1553.	191.	57.	24.90
0.58	1.25	3.41	2.13	0.045	0.040	0.045	0.032	19.20	200.00
0.001251	50.	50.	50.	2	0	0	0.00	800.00	1000.00

FLOW DISTRIBUTION FOR SECNO= 18.90 CNSEL= 26.32

STA=	200.	208.	240.	261.	469.	737.	810.	830.	849.	878.	913.	926.	1000.
PER Q=	0.3	12.5	1.7	9.6	16.6	9.1	1.5	6.7	12.8	13.1	4.7	11.4	
AREA=	9.6	139.9	36.7	265.1	408.4	168.2	34.5	84.6	142.5	158.8	57.5	196.7	
VEL=	1.2	3.4	1.7	1.4	1.5	2.0	1.7	3.0	3.4	3.1	3.1	2.2	

*SECNO 19.000

3265 DIVIDED FLOW

3470 ENCROACHMENT STATIONS=			432.3	980.0	TYPE=	1	TARGET=	547.700	
19.00	6.63	26.83	0.00	26.25	27.07	0.24	0.62	0.05	28.70
3800.	0.	586.	3214.	0.	128.	848.	200.	61.	28.70
0.60	0.00	4.58	3.79	0.045	0.040	0.045	0.033	20.20	437.18
0.003309	450.	450.	300.	2	0	0	0.00	482.17	980.00

TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	JTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

FLOW DISTRIBUTION FOR SECNO= 19.00 CWSEL= 26.83

STA=	437.	482.	494.	547.	769.	809.	824.	857.	867.	892.	918.	980.
PER Q=	15.4	0.9	6.2	4.9	1.6	3.2	20.5	5.0	17.7	14.0	10.6	
AREA=	128.0	13.1	88.0	122.8	35.4	36.5	149.5	38.8	123.5	108.7	131.6	
VEL=	4.6	2.5	2.7	1.5	1.7	3.3	5.2	4.9	5.5	4.9	3.1	

*SECNO 20.000

3301 HV CHANGED MORE THAN HVINS

3470 ENCROACHMENT STATIONS=		625.0	750.0	TYPE=	1	TARGET=	125.000		
20.00	5.58	30.18	0.00	29.20	31.43	1.25	4.06	0.30100000.00	
3800.	0.	2889.	911.	0.	301.	140.	213.	66.	27.40
0.62	0.00	9.61	6.49	0.045	0.040	0.045	0.034	24.60	625.00
0.010602	745.	745.	745.	4	0	0	0.00	125.00	750.00

FLOW DISTRIBUTION FOR SECNO= 20.00 CWSEL= 30.18

STA=	625.	700.	750.
PER Q=	76.0	24.0	
AREA=	300.5	140.3	
VEL=	9.6	6.5	

TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	ITN	ELMIN	SSTA
SLOPF	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	IAR	TOPWID	ENDST

*SECNO 20.100

3301 HV CHANGED MORE THAN HVINS

3470 ENCROACHMENT STATIONS=			325.0	797.0	TYPE=	1	TARGET=	472.000	
20.10	4.69	32.59	0.00	31.83	32.68	0.09	1.13	0.12	100000.00
3800.	0.	3800.	0.	0.	1599.	0.	226.	70.	100000.00
0.69	0.00	2.38	0.00	0.045	0.040	0.045	0.034	27.90	325.00
0.000789	580.	580.	580.	4	0	0	0.00	463.10	788.10

FLOW DISTRIBUTION FOR SECNO= 20.10 CWSEL= 32.59

STA= 325. 797.
PER Q= 100.0
AREA= 1598.5
VEL= 2.4

CCHV= 0.100 CEHV= 0.300
*SECNO 20.200

3265 DIVIDED FLOW

3470 ENCROACHMENT STATIONS=			325.0	820.0	TYPE=	1	TARGET=	495.000	
20.20	3.99	32.59	0.00	31.85	32.76	0.17	0.06	0.02	34.60
3800.	3464.	336.	0.	1021.	157.	0.	228.	71.	100000.00
0.69	3.39	2.14	0.00	0.045	0.070	0.045	0.035	28.60	325.00
0.003075	45.	45.	45.	2	0	0	0.00	476.94	820.00

TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

FLOW DISTRIBUTION FOR SECNO= 20.20 CWSEL= 32.59

STA=	325.	342.	504.	704.	733.	740.	826.
PER Q=	5.9	43.4	38.6	3.0	0.2	8.8	
AREA=	55.6	454.1	460.1	46.0	4.9	156.7	
VEL=	4.1	3.6	3.2	2.5	1.5	2.1	

*SECNO 20.300

3265 DIVIDED FLOW

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL, CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS= 315.0 852.0 TYPE= 1 TARGET= 537.000

20.30	3.68	33.48	33.48	33.47	34.33	0.86	0.31	0.21	33.80
3800.	2659.	1141.	0.	357.	154.	0.	228.	71.	33.50
0.70	7.44	7.41	0.00	0.045	0.070	0.045	0.035	29.80	315.00
0.028460	45	45.	45.	20	11	0	0.00	314.85	851.76

FLOW DISTRIBUTION FOR SECNO= 20.30 CWSEL= 33.48

STA=	315.	315.	475.	527.	746.	759.	789.	852.
PER Q=	0.0	39.9	2.7	3.6	13.0	10.7	30.0	
AREA=	0.3	219.6	28.1	18.0	39.5	51.8	153.9	
VEL=	1.8	6.9	3.7	7.7	12.5	7.9	7.4	

TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	[illegible]N	ELMIN	SSTA
SLOP	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	[illegible]AR	TOPWID	ENDST

*SECNO 20.400

3265 DIVIDED FLOW

3470 ENCROACHMENT STATIONS= 554.0 860.0 TYPE= 1 TARGET= 306.000

20.40	8.80	37.10	0.00	36.58	37.47	0.36	3.08	0.05	34.70
3800.	1885.	1719.	195.	437.	321.	40.	234.	73.	28.30
0.72	4.32	5.35	4.88	0.045	0.070	0.045	0.036	28.30	554.00
0.004368	343.	340.	339.	5	0	0	0.00	256.82	860.00

FLOW DISTRIBUTION FOR SECNO= 20.40 CWSEL= 37.10

STA=	554.	596.	677.	751.	785.	809.	851.	858.	860.
PER Q=	7.1	3.2	9.9	23.5	6.1	45.2	5.0	0.1	
AREA=	81.6	64.4	80.7	151.6	58.2	321.3	37.2	2.8	
VEL=	3.3	1.9	4.6	5.9	4.0	5.4	5.1	1.9	

SPECIAL BRIDGE

5227 DOWNSTREAM ELEV IS 35.96 ,NOT 37.10 HYDRAULIC JUMP OCCURS DOWNSTREAM (IF LOW FLOW CONTROLS)

SECNO	DEL YY	[illegible]	[illegible]	[illegible]					
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

SB	XX	XKOR	CORO	RDLEN	BWC	BNP	BAREA	SS	ELCHU	ELCHD
	1.25	1.50	2.50	0.00	31.50	1.50	150.00	0.00	29.70	29.50

*SECNO 20.600
1860 XLCEL OF 935.90 EXCEEDS RDEL OF 35.00
PRESSURE AND WEIR FLOW

EGPRS	EGLWC	HG	QWEIR	QPR	BAREA	TRAPEZOID AREA	ELLC	ELTRD
52.05	39.89	0.00	2782.	1018.	150.	144.	34.50	35.70

3470 ENCROACHMENT STATIONS= 630.0 870.0 TYPE= 1 TARGET= 240.000

20.60	9.11	37.91	0.00	37.98	38.18	0.27	0.71	0.00	35.70
3800.	1831.	1932	37.	462.	441.	15.	236.	74.	36.00
0.72	3.96	4.39	2.48	0.045	0.070	0.045	0.037	28.80	630.00
0.003161	100.	100.	100.	2	0	6	0.00	240.00	870.00

FLOW DISTRIBUTION FOR SECNO= 20.60 CWSEL= 37.91

STA=	630.	633.	717.	724.	764.	779.	788.	803.	862.	870.
PER Q=	0.2	8.2	1.7	23.2	5.9	3.6	5.5	50.8	1.0	
AREA=	4.4	128.1	18.4	176.3	52.0	32.5	50.4	440.6	14.9	
VEL=	1.9	2.4	3.4	5.0	4.3	4.2	4.1	4.4	2.5	

SECNO	DEPTH	CWSEL	CRIWS	WSELR	[illegible]	[illegible]	[illegible]	TWA	LEFT/RIGHT
Q	LOB	QCH	QROB	ALOB	ACH	AROB	[illegible]	ELMIN	SSTA
TIME	LOB	VCH	VROB	XNL	XNCH	XNR	[illegible]	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	[illegible]	TOPWID	ENDST

CCHV= 0.100 CEHV= 0.300
*SECNO 21.000

3265 DIVIDED FLOW

3301 HV CHANGED MORE THAN HVINS

3470 ENCROACHMENT STATIONS= 690.0 850.0 TYPE= 1 TARGET= 160.000

21.00	5.99	38.49	0.00	38.23	39.34	0.86	0.99	0.18	38.50
3800.	2664.	1109.	26.	368.	140.	10.	239.	75.	39.00
0.73	7.24	7.95	2.67	0.045	0.040	0.045	0.037	32.50	690.66
0.008317	205.	205.	205.	2	0	0	0.00	147.59	850.00

FLOW DISTRIBUTION FOR SECNO= 21.00 CWSEL= 38.49

STA=	691.	705.	733.	745.	757.	773.	793.	830.	850.
PER Q=	3.5	24.4	12.4	7.6	12.9	9.4	29.2	0.7	
AREA=	28.8	117.4	55.8	42.2	65.4	58.6	139.6	9.8	
VEL=	4.7	7.9	8.4	6.8	7.5	6.1	7.9	2.7	

*SECNO 22.000

3301 HV CHANGED MORE THAN HVINS

Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

3470 ENCROACHMENT STATIONS= 750.0 1164.0 TYPE= 1 TARGET= 414.000

22.00	7.25	41.35	0.00	40.20	41.56	0.21	2.15	0.06	36.90
3800.	408.	1099.	2293.	98.	220.	861.	251.	79.	40.30
0.78	4.17	5.00	2.66	0.045	0.040	0.045	0.037	34.10	750.00
0.001954	605.	608	608.	2	0	0	0.00	414.00	1164.00

FLOW DISTRIBUTION FOR SECNO= 22.00 CNSEL= 41.35

STA=	750.	750.	770.	810.	884.	1105.	1164.	1164.
PER Q=	0.0	10.7	28.9	7.7	40.7	11.9	0.0	
AREA=	2.2	95.7	219.9	134.2	566.2	160.0	0.6	
VEL=	0.8	4.2	5.0	2.2	2.7	2.8	0.5	

*SECNO 23.000

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL, CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS= 731.0 1045.0 TYPE= 1 TARGET= 314.000

23.00	7.61	44.41	44.41	44.50	45.28	0.87	2.68	0.20	43.10
3800.	961.	1655.	1184.	153.	170.	302.	266.	85.	41.90
0.81	6.28	9.73	3.91	0.045	0.040	0.045	0.037	36.80	731.00
0.009315	730.	730.	730.	20	9	0	0.00	314.00	1045.00

TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	[illegible]N	ELMIN	SSTA
SLOPI	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	[illegible]AR	TOPWID	ENDST

FLOW DISTRIBUTION FOR SECNO= 23.00 CWSEL= 44.41

STA=	731.	761.	773.	787.	823.	1045.
PER Q=	19.2	4.3	1.8	43.6	31.2	
AREA=	106.7	28.7	17.6	170.2	302.5	
VEL=	6.8	5.7	3.8	9.7	3.9	

*SECNO 24.000

3470 ENCROACHMENT STATIONS= 680.0 820.6 TYPE= 1 TARGET= 140.600

24.00	8.94	49.54	0.00	49.20	50.16	0.62	4.85	0.03	47.30
3800.	2133.	1667.	0.	388.	231.	0.	277.	89.	100000.00
0.84	5.50	7.22	0.00	0.045	0.040	0.045	0.037	40.60	680.51
0.004297	796.	796.	796.	3	0	0	0.00	140.09	820.60

FLOW DISTRIBUTION FOR SECNO= 24.00 CWSEL= 49.54

STA=	681.	721.	737.	759.	772.	780.	821.
PER Q=	15.1	13.9	17.9	7.4	1.8	43.9	
AREA=	125.4	82.2	108.7	52.5	18.8	230.9	
VEL=	4.6	6.4	6.3	5.4	3.7	7.2	

*SECNO 25.000

3301 HV CHANGED MORE THAN HVINS

SECNO	DEPTH	CWSEL		ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
Q	QLOB	QCH	QROB	XNL	XNCH	XNR	ITN	ELMIN	SSTA
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	ITN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

3470 ENCROACHMENT STATIONS= 680.0 820.0 TYPE= 1 TARGET= 140.000

25.00	8.98	52.08	0.00	51.68	53.32	1.23	2.97	0.18	50.20
3800.	1740.	2060.	0.	259.	198.	0.	284.	91.	100000.00
0.86	6.71	10.42	0.00	0.045	0.040	0.045	0.037	43.10	707.69
0.008528	506.	506.	506.	2	0	0	0.00	112.31	820.00

FLOW DISTRIBUTION FOR SECNO= 25.00 CWSEL= 52.08

STA=	708.	730.	734.	747.	756.	781.	793.	835.
PER Q=	3.5	3.3	9.0	4.6	19.8	5.6	54.2	
AREA=	33.2	17.8	48.0	27.3	98.9	34.1	197.6	
VEL=	4.0	7.1	7.2	6.3	7.6	6.2	10.4	

*SECNO 26.000

3301 HV CHANGED MORE THAN HVINS

3470 ENCROACHMENT STATIONS= 716.0 1010.0 TYPE= 1 TARGET= 294.000

26.00	9.75	55.95	0.00	55.54	56.49	0.54	3.10	0.07	53.50
3800.	1228.	1763.	810.	234.	247.	266.	291.	93.	54.40
0.88	5.24	7.15	3.04	0.045	0.040	0.045	0.037	46.20	722.16
0.004578	509.	508.	509.	3	0	0	0.00	287.84	1010.00

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   Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA    LEFT/RIGHT
   TIME      VLOB      VCH       VROB      XNL       XNCH      XNR                 ELMIN       SSTA
   SLOPE     XLOBL     XLCH      YLOBR     ITRIAL    IDC       ICONT       AR      TOPWID      ENDST

FLOW DISTRIBUTION FOR SECNO=      26.00          CWSEL=      55.95

STA=      722.      732.      738.      745.      758.      775.      783.      795.      844.      1008.      1010.
  PER Q=      0.0       1.9       6.1       5.7       9.9       5.0       3.5      46.4      21.1       0.2
   AREA=      2.2      18.8      37.1      43.5      66.8      34.4      31.5     246.7     262.8       3.3
    VEL=      0.8       3.9       6.3       5.0       5.6       5.5       4.3       7.1       3.1       2.1

*SECNO 27.000

3470 ENCROACHMENT STATIONS=      796.0     1115.0  TYPE=      1  TARGET=      319.000
   27.00      9.47     57.97      0.00     57.63     58.41      0.44      1.92      0.01100000.00
   3800.        0.     2391.     1409.        0.      375.      507.      300.        97.      55.70
     0.91      0.00      6.38      2.78     0.045     0.040     0.045     0.038     48.50     796.00
 0.002928      530.      530.      530.         3         0         0      0.00     319.00    1115.00

FLOW DISTRIBUTION FOR SECNO=      27.00          CWSEL=      57.97

STA=      796.      856.      987.     1115.
  PER Q=     62.9      18.3      18.8
   AREA=    375.0     251.4     255.4
    VEL=      6.4       2.8       2.8

*SECNO 28.000

3265 DIVIDED FLOW
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SECNO	DEPTH	CWSEL	CRIWS						
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED NSEL, CNSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=			800.0	1085.0	TYPE=	1	TARGET=	285.000	
28.00	8.20	60.20	60.20	59.38	61.41	1.21	1.37	0.23	56.20
3800.	0.	2900.	900.	0.	293.	253.	306.	99.	60.80
0.92	0.60	9.70	3.56	0.045	0.040	0.045	0.038	52.00	800.00
0.007254	312.	312.	312.	20	9	0	0.00	248.79	1085.00

FLOW DISTRIBUTION FOR SECNO= 28.00 CNSEL= 60.20

STA=	800.	800.	852.	964.	1085.
PER Q=	0.0	76.3	2.8	20.9	
AREA=	0.4	292.9	49.9	202.7	
VEL=	0.6	9.9	2.1	3.9	

*SECNO 29.000

3301 HV CHANGED MORE THAN HVINS

3470 ENCROACHMENT STATIONS=			773.3	1050.0	TYPE=	1	TARGET=	276.700	

Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	I	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	AR	TOPWID	ENDST
29.00	7.83	63.33	0.00	62.50	63.59	0.25	2.08	0.10	62.40
3800.	0.	889.	2911.	0.	215.	724.	314.	101.	59.70
0.96	0.00	4.14	4.02	0.045	0.040	0.045	0.038	55.50	773.30
0.002846	484.	484.	484.	2	0	0	0.00	276.70	1050.00

FLOW DISTRIBUTION FOR SECNO= 29.00 CWSEL= 63.33

STA=	773.	842.	1045.	1050.
PER Q=	23.4	75.2	1.4	
AREA=	214.7	706.3	18.1	
VEL=	4.1	4.0	2.9	

*SECNO 30.000

3470 ENCROACHMENT STATIONS= 776.1 1000.0 TYPE= 1 TARGET= 223.900

30.00	8.92	64.42	0.00	63.89	64.55	0.13	0.95	0.01	63.50
2200.	0.	1171.	1029.	0.	341.	486.	325.	105.	60.90
1.01	0.00	3.43	2.12	0.045	0.040	0.045	0.038	55.50	776.10
0.000957	533.	533.	533.	3	0	0	0.00	223.90	1000.00

FLOW DISTRIBUTION FOR SECNO= 30.00 CWSEL= 64.42

STA=	776.	840.	1000.
PER Q=	53.2	46.8	
AREA=	341.3	485.7	
VEL=	3.4	2.1	

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   Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA    LEFT/RIGHT
   TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN       SSTA
   SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID      ENDST


*SECNO 31.000
 2800 NAT Q1=     240.37   WSEL=      66.49  ENC Q1=     240.37  WSEL=      67.49  RATIO=  0.0000
 NAT Q1=     460.   RATIOS LOB,CH,ROB=  0.0005  0.4596  0.5399  WSEL=      67.49

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=      775.2      842.4  TYPE=      4  TARGET=        0.478
   31.00       7.07      66.77      66.77      66.49      68.57       1.80       1.54       0.50      68.90
    2200.         0.      1997.       203.         0.       180.         34.       332.       107.      64.60
    1.02       0.00      11.12       6.05      0.045      0.040      0.045      0.038      59.70     782.19
 0.014545       637.       637.       637.         20         15          0       0.00      60.18     842.37


FLOW DISTRIBUTION FOR SECNO=      31.00          CWSEL=      66.77

STA=      782.       827.       842.
  PER Q=     90.8        9.2
   AREA=    179.6       33.6
    VEL=     11.1        6.1

*SECNO 32.000
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   Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA    LEFT/RIGHT
   TIME       VLOB       VCH        VROB       XNL        XNCH       XNR          1        ELMIN        SSTA
   SLOP       XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT       IAR       TOPWID       ENDST


3301 HV CHANGED MORE THAN HVINS


3470 ENCROACHMENT STATIONS=       712.0       960.0  TYPE=       1  TARGET=       248.000
     32.00       5.78      72.98       0.00      72.46      73.22       0.24       4.50       0.16      73.40
     2200.         0.       547.      1653.         0.        112.       466.       338.       109.       71.70
     1.07       0.00       4.88       3.55      0.045      0.040      0.045      0.038      67.20     713.83
 0.004025        651.       651.       651.          5          0          0       0.00     246.17     960.00

FLOW DISTRIBUTION FOR SECNO=      32.00          CWSEL=      72.98

STA=      714.       750.       776.       960.
  PER Q=     24.9       10.1       65.0
    AREA=   112.1       60.7      404.9
     VEL=     4.9        3.7        3.5

*SECNO 32.100
 2800 NAT Q1=     239.76  WSEL=      75.72  ENC Q1=     239.76  WSEL=      76.72  RATIO=  0.0000
 NAT Q1=     472.   RATIOS LOB,CH,ROB=  0.0000  0.3839  0.6161  WSEL=      76.72

3265 DIVIDED FLOW


3301 HV CHANGED MORE THAN HVINS
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   Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA    LEFT/RIGHT
   TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN       SSTA
   SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID      ENDST


3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=      851.8      965.3  TYPE=      4  TARGET=         0.492
     32.10       7.20      76.20      76.20      75.72      77.53       1.33       2.65       0.33      77.70
     2200.         0.      1769.       432.         0.       177.        77.        342.       110.       77.10
      1.08       0.00       9.97       5.58      0.045      0.040      0.045      0.038      69.00     855.54
 0.013842       429.       396.       382.         20         11          0       0.00      94.87     965.29


FLOW DISTRIBUTION FOR SECNO=     32.10          CWSEL=      76.20

STA=      856.       909.       923.       957.       965.
 PER Q=    80.4        0.0       13.1        6.5
   AREA=  177.4        0.5       54.4       22.5
    VEL=   10.0        1.1        5.3        6.4


SPECIAL BRIDGE

5227 DOWNSTREAM ELEV IS      74.77 , NOT      76.20 HYDRAULIC JUMP OCCURS DOWNSTREAM (IF LOW FLOW CONTROLS)

SB  XK         XKQR       CQFQ       RDLEN      BWC        BWP        BAREA      SS         ELCHU      ELCHD
     1.25       1.50       2.50       0.00      25.50       1.50     144.00       0.00      70.20      69.70

*SECNO 32.300
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Q	QLOB	QCH	QROB	ALOB	ACH	AROB	[illegible]	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	I	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	[illegible]RAR	TOPWID	ENDST

PRESS FLOW BECAUSE EGLWC OF 81.92 EXCEEDS 1.5 DEPTH
2800 NAT Q1= 225.72 WSEL= 79.59 ENC Q1= 431.70 WSEL= 80.59 RATIO= -0.9125
NAT Q1= 432. RATIOS LOB,CH,ROB= 0.0000 1.0000 0.0000 WSEL= 80.59
WATER EL=CHANGE FROM NATURAL PROFILES BRIDGE

3470 ENCROACHMENT STATIONS= 647.4 999.0 TYPE= 4 TARGET= 0.000

32.30	6.77	80.07	0.00	79.59	80.34	0.27	1.45	0.11	82.90
2200.	0.	2200.	0.	0.	528.	0.	343.	111.	80.90
1.10	0.00	4.17	0.00	0.045	0.040	0.045	0.038	73.30	690.01
0.005464	176.	176.	176.	0	0	4	0.00	278.97	968.98

FLOW DISTRIBUTION FOR SECNO= 32.30 CWSEL= 80.07

STA= 690. 999.
PER Q= 100.0
AREA= 528.1
VEL= 4.2

*SECNO 33.000
2800 NAT Q1= 263.26 WSEL= 82.32 ENC Q1= 345.62 WSEL= 83.32 RATIO= -0.3129
NAT Q1= 543. RATIOS LOB,CH,ROB= 0.3640 0.6360 0.0000 WSEL= 83.32

3301 HV CHANGED MORE THAN HVINS

3470 ENCROACHMENT STATIONS= 756.5 856.9 TYPE= 4 TARGET= 0.364

Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST
33.00	3.96	82.16	0.00	82.32	83.24	1.07	2.66	0.24	81.50
2200.	0.	2200.	0.	0.	265.	0.	347.	113.	86.70
1.11	0.00	8.31	0.00	0.045	0.040	0.045	0.038	78.20	756.50
0.011125	352.	352.	352.	3	0	0	0.00	84.28	840.78

FLOW DISTRIBUTION FOR SECNO= 33.00 CWSEL= 82.16

STA= 757. 857.
PER Q= 100.0
AREA= 264.7
VEL= 8.3

*SECNO 34.000
2800 NAT Q1= 205.09 WSEL= 89.88 ENC Q1= 232.23 WSEL= 90.88 RATIO= -0.1324
NAT Q1= 438. RATIOS LOB,CH,ROB= 0.4239 0.5303 0.0458 WSEL= 90.88

3470 ENCROACHMENT STATIONS= 748.6 816.6 TYPE= 4 TARGET= 0.470

34.00	4.87	90.47	90.25	89.88	91.89	1.42	8.55	0.10	89.60
2200.	0.	2200.	0.	0.	230.	0.	351.	114.	88.10
1.13	0.00	9.56	0.00	0.045	0.040	0.045	0.038	85.60	748.60
0.013967	688.	688.	685.	15	11	0	0.00	68.00	816.60

FLOW DISTRIBUTION FOR SECNO= 34.00 CWSEL= 90.47

STA= 749. 817.
PER Q= 100.0
AREA= 230.2
VEL= 9.6

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   Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA    LEFT/RIGHT
   TIME       VLOB       VCH        VROB       XNL        XNCH       XNR                   ELMIN       SSTA
   SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT        AR       TOPWID      ENDST

*SECNO 35.000
 2800 NAT Q1=     188.95  WSEL=      95.33  ENC Q1=     206.50  WSEL=      96.33  RATIO= -0.0929
 NAT Q1=     338.   RATIOS LOB,CH,ROB=   0.2531   0.6111   0.1359  WSEL=      96.33

3470 ENCROACHMENT STATIONS=      718.9      772.4  TYPE=      4  TARGET=        0.389
    35.00       5.77      96.37       0.00      95.33      97.92       1.54       5.99       0.04      93.30
    2200.         0.      2200.         0.         0.       221.         0.       353.       114.      94.20
     1.14       0.00       9.97       0.00      0.045      0.040      0.045      0.038      90.60     718.90
 0.012443        455.       455.       455.          3          0          0       0.00      53.50     772.40

FLOW DISTRIBUTION FOR SECNO=      35.00          CWSEL=      96.37

STA=      719.       772.
  PER Q=     100.0
   AREA=     220.6
    VEL=      10.0

*SECNO 36.000

3269 DIVIDED FLOW

3301 HV CHANGED MORE THAN HVINS


3470 ENCROACHMENT STATIONS=      589.0      857.0  TYPE=      1  TARGET=      268.000
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TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	ITN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST
36.00	5.27	102.87	0.00	102.57	103.43	0.56	5.41	0.10	102.30
2200.	0.	1350.	850.	0	206.	171.	357.	116.	104.30
1.17	0.03	6.55	4.96	0.045	0.040	0.045	0.038	97.60	589.00
0.007972	550.	550.	550.	4	0	0	0.00	151.62	857.00

FLOW DISTRIBUTION FOR SECNO= 36.00 CWSEL= 102.87

STA=	589.	671.	730.	756.	773.	845.	857.
PER Q=	61.4	0.0	14.4	8.3	10.1	5.8	
AREA=	206.3	0.3	60.9	37.3	46.1	26.6	
VEL=	6.5	0.9	5.2	4.9	4.8	4.8	

*SECNO 36.100

3265 DIVIDED FLOW

3685 20 TRIALS ATTEMPTED WSEL/CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS= 522.0 850.0 TYPE= 1 TARGET= 328.000

36.10	6.28	104.78	104.78	104.70	105.45	0.67	0.51	0.03100000.00	
2200.	0.	807.	1393.	0.	112.	226.	357.	116.	103.90
1.17	0.00	7.21	6.17	0.045	0.040	0.045	0.038	98.50	522.76
0.013616	50.	50.	50.	20	16	0	0.00	297.62	850.00

Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR		ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	AR	TOPWID	ENDST

FLOW DISTRIBUTION FOR SECNO= 36.10 CWSEL= 104.78

STA=	523.	574.	659.	803.	816.	839.	850.
PER Q=	36.7	3.8	4.1	1.7	33.0	20.7	
AREA=	112.0	37.3	44.3	10.9	81.9	51.2	
VEL=	7.2	2.2	2.1	3.4	8.9	8.9	

*SECNO 36.200

3301 HV CHANGED MORE THAN HVINS

3470 ENCROACHMENT STATIONS=		500.0	775.0	TYPE=	1	TARGET=	275.000		
36.20	4.33	105.53	0.00	105.49	105.61	0.08	0.11	0.06	104.90
2200.	275.	45.	1880.	145.	24.	787.	358.	116.	101.40
1.17	1.90	1.82	2.39	0.045	0.040	0.045	0.038	101.20	500.00
0.000814	50.	50.	50.	2	0	0	0.00	267.06	767.06

FLOW DISTRIBUTION FOR SECNO= 36.20 CWSEL= 105.53

STA=	500.	509.	521.	531.	559.	569.	752.	767.
PER Q=	1.9	6.0	2.7	1.9	2.0	83.4	2.0	
AREA=	25.0	52.4	30.2	37.5	24.5	756.7	30.3	
VEL=	1.7	2.5	2.0	1.1	1.8	2.4	1.5	

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   TIME .    VLOB       VCH       VROB       XNL       XNCH       XNR .     WTN       ELMIN       SSTA
   SLOPE     XLOBL      XLCH      XLOBR      ITRIAL    IDC        ICONT     CORAR     TOPWID      ENDST

CCHV=    0.100 CEHV=    0.300
*SECNO 37.100
 2800 NAT Q1=      176.01  NSEL=      108.21  ENC Q1=      233.53  WSEL=      109.21  RATIO= -0.3268
 NAT Q1=      235.   RATIOS LOB,CH,ROB=  0.0000   0.9921   0.0079  WSEL=      109.21

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATIEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=      543.1      592.6  TYPE=      4  TARGET=        0.008
     37.10      7.17    108.17    108.17    108.21    110.48      2.31      0.35      0.67    111.10
     2200.        0.     2200.        0.        0.     180.        0.      360.      117.     110.90
      1.18      0.00     12.20      0.00     0.035     0.040     0.035     0.038    101.00    547.13
-0.019968      139.      154.      171.        20        14         0      0.00     39.65    586.79


FLOW DISTRIBUTION FOR SECNO=      37.10          CWSEL=     108.17

STA=    547.      593.
  PER Q=     100.0
   AREA=     180.4
   VEL=       12.2

*SECNO 37.300
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TIME	VLOB	VCH	VROB	XNL	XNCH	XNR		ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	AR	TOPWID	ENDST

3301 HV CHANGED MORE THAN HVINS

3470 ENCROACHMENT STATIONS= 440.0 595.7 TYPE= 1 TARGET= 155.700

37.30	8.02	110.72	0.00	110.71	110.87	0.15	0.18	0.22	108.00
2200.	1018.	1182.	0.	328.	371.	0.	361.	117.	100000.00
1.18	3.10	3.19	0.00	0.035	0.040	0 035	0.038	102.70	440.00
0.000778	84.	84.	84.	2	0	0	0.00	137.90	577.90

FLOW DISTRIBUTION FOR SECNO= 37.30 CWSEL= 110.72

STA=	440.	460.	512.	596.
PER Q=	16.4	29.9	53.7	
AREA=	113.3	215.1	370.8	
VEL=	3.2	3.1	3.2	

*SECNO 38.100

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS= 402.0 504.0 TYPE= 1 TARGET= 102.000

38.10	4.15	110.95	110.95	111.00	112.36	1.41	0.99	0.38	111.50
2200.	0.	2200.	0.	0.	231.	0.	366.	118.	114.30
1.20	0.00	9.52	0.00	0.035	0.040	0.035	0.038	106.80	413.41
0.017336	475.	462.	451.	6	11	0	0.00	83.81	497.22

Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

FLOW DISTRIBUTION FOR SECNO= 38.10 CWSEL= 110.95

STA= 413. 503.
PER Q= 100.0
AREA= 231.0
VEL= 9.5

*SECNO 38.300

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS= 455.0 512.0 TYPE= 1 TARGET= 57.000

38.30	4.93	112.33	112.33	112.26	114.33	2.01	1.27	0.18	112.00
2200.	0.	2200	0.	0.	194.	0.	366.	118.	115.80
1.20	1.90	11.37	0.00	0.035	0.040	0.035	0.038	107.40	455.00
0.015788	77.	77.	77.	4	11	0	0.00	49.34	504.34

FLOW DISTRIBUTION FOR SECNO= 38.30 CWSEL= 112.33

STA= 455. 456. 512.
PER Q= 0.0 100.0
AREA= 0.2 193.5
VEL= 1.9 11.4

Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	I	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	R	TOPWID	ENDST

*SECNO 39.100

3265 DIVIDED FLOW

3301 HV CHANGED MORE THAN HVINS

3470 ENCROACHMENT STATIONS= 415.0 586.0 TYPE= 1 TARGET= 171.000

39.10	6.22	115.62	0.00	114.66	115.99	0.37	1.49	0.16	115.90
2200.	855.	1345.	0.	225.	248.	0.	368.	119.	100000.00
1.22	3.79	5.43	0.00	0.035	0.040	0.035	0.038	109.40	415.00
0.002742	282.	271.	269.	3	0	0	0.00	156.06	576.41

FLOW DISTRIBUTION FOR SECNO= 39.10 CNSEL= 115.62

STA=	415.	425.	473.	522.	586.
PER Q=	5.0	25.7	8.2	61.2	
AREA=	29.1	130.3	66.1	247.6	
VEL=	3.8	4.3	2.7	5.4	

*SECNO 39.300

3265 DIVIDED FLOW

TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS= 439.0 629.0 TYPE= 1 TARGET= 190.000

39.30	5.18	116.48	116.48	116.35	117.42	0.94	0.37	0.17	118.60
2200.	1050.	1150.	0.	160.	131.	0.	369.	119.	100000.00
1.22	6.56	8.77	0.00	0.035	0.040	0.035	0.038	111.30	439.00
0.010602	77.	77.	77.	20	10	0	0.00	128.85	611.19

FLOW DISTRIBUTION FOR SECNO= 39.30 CWSEL= 116.48

STA=	439.	439.	491.	533.	629.
PER Q=	0.0	37.3	10.4	52.3	
AREA=	0.6	111.8	47.8	131.1	
VEL=	1.8	7.3	4.8	8.8	

*SECNO 40.100
2800 NAT Q1= 252.96 WSEL= 120.32 ENC Q1= 252.96 WSEL= 121.32 RATIO= 0.0000
NAT Q1= 431. RATIOS LOB,CH,ROB= 0.5936 0.4064 0.0000 WSEL= 121.32

3265 DIVIDED FLOW

Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFTXIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR		ELMIN	SSTA
SLOPE	CLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	R	TOPWID	ENDST

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS= 520.4 597.9 TYPE= 4 TARGET= 0.413

40.10	7.16	120.76	120.76	120.32	122.29	1.53	4.35	0.18	120.80
2200.	559.	1641.	0.	77.	154.	0.	371.	120.	123.10
1.23	7.29	10.68	0.00	0.035	0.040	0.035	0.038	113.60	520.35
0.012269	382.	382.	382.	4	11	0	0.00	73.42	594.02

FLOW DISTRIBUTION FOR SECNO= 40.10 CWSEL= 120.76

STA=	520.	522.	551.	561.	598.
PER Q=	0.7	22.8	1.9	74.6	
AREA=	3.6	63.8	9.2	153.7	
VEL=	4.4	7.9	4.4	10.7	

*SECNO 40.300
2800 NAT Q1= 203.11 WSEL= 121.07 ENC Q1= 203.11 WSEL= 122.07 RATIO= 0.0000
NAT Q1= 355. RATIOS LOB,CH,ROB= 0.6195 0.3805 0.0000 WSEL= 122.07

3265 DIVIDED FLOW

TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

3470 ENCROACHMENT STATIONS= 522.5 591.3 TYPE= 4 TARGET= 0.427

40.30	8.68	121.78	121.75	121.07	123.47	1.69	1.13	0.05	123.00
2200.	694.	1506.	0.	76.	137.	0.	372.	120.	122.20
1.23	9.13	10.99	0.00	0.035	0.040	0.035	0.038	113.10	522.46
0.014783	84.	84.	84.	4	11	0	0.00	62.04	590.66

FLOW DISTRIBUTION FOR SECNO= 40.30 CWSEL= 121.78

STA=	522.	544.	553.	591.
PER Q=	27.6	4.0	68.5	
AREA=	62.6	13.4	137.0	
VEL=	9.7	6.5	11.0	

*SECNO 41.100
2800 NAT Q1= 199.63 WSEL= 123.47 ENC Q1= 199.63 WSEL= 124.47 RATIO= 0.0000
NAT Q1= 344. RATIOS LOB,CH,ROB= 0.5539 0.4461 0.0000 WSEL= 124.47

3265 DIVIDED FLOW

7189 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS= 559.8 628.7 TYPE= 4 TARGET= 0.420

41.10	9.04	124.14	124.14	123.47	126.04	1.90	2.12	0.06	124.20
2200.	479.	1721.	0.	54.	149.	0.	372.	121.	132.10
1.24	8.92	11.58	0.00	0.035	0.040	0.035	0.038	115.10	559.81
0.015509	143.	139.	134.	4	8	0	0.00	54.76	614.89

TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	[illegible]N	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	AR	TOPWID	ENDST

FLOW DISTRIBUTION FOR SECNO= 41.10 CWSEL= 124.14

STA=	560.	571.	592.	629.
PER Q=	16.3	5.5	78.2	
AREA=	36.6	17.2	148.6	
VEL=	9.8	7.1	11.6	

*SECNO 41.300
2800 NAT Q1= 204.63 WSEL= 125.94 ENC Q1= 204.63 WSEL= 126.94 RATIO= 0.0000
NAT Q1= 376. RATIOS LOB,CH,ROB= 0.6733 0.3267 0.0000 WSEL= 126.94
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS= 561.9 632.2 TYPE= 4 TARGET= 0.455

41.30	7.86	126.76	126.76	125.94	128.36	1.60	1.05	0.03	126.50
2200.	825.	1375.	0.	87.	131.	0.	373.	121.	131.10
1.24	9.52	10.50	0.00	0.035	0.040	0.035	0.038	118.90	561.89
0.014408	70.	70.	70.	20	10	0	0.00	62.34	624.23

FLOW DISTRIBUTION FOR SECNO= 41.30 CWSEL= 126.76

STA=	562.	570.	592.	632.
PER Q=	16.0	21.5	62.5	
AREA=	34.4	52.3	131.0	
VEL=	10.2	9.0	10.5	

TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	ITN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 42.100

3301 HV CHANGED MORE THAN HVINS

3470 ENCROACHMENT STATIONS= 0.0 712.1 TYPE= 1 TARGET= 712.099

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 128.90 ELREA= 100000.00

42.10	6.01	131.21	0.00	130.59	131.68	0.47	3.21	0.11	128.90
2200.	1694.	506.	0.	301.	102.	0.	376.	122.	100000.00
1.26	5.63	4.98	0.00	0.035	0.040	0.035	0.038	125.20	568.98
0.003644	497.	497.	497.	4	0	0	0.00	126.69	695.67

FLOW DISTRIBUTION FOR SECNO= 42.10 CWSEL= 131.21

STA=	569.	571.	621.	653.	667.	712.
PER Q=	0.1	25.4	38.1	13.4	23.0	
AREA=	1.5	121.2	128.7	49.4	101.5	
VEL=	1.9	4.6	6.5	6.0	5.0	

*SECNO 42.300

3301 HV CHANGED MORE THAN HVINS

7189 MINIMUM SPECIFIC ENERGY

TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	[illegible]N	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	[illegible]AR	TOPWID	ENDST

3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS= 0.0 715.0 TYPE= 1 TARGET= 714.999

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 129.40 ELREA= 100000.00

42.30	4.73	131.13	131.13	131.13	132.50	1.36	0.45	0.27	129.40
2200.	1276.	924.	0.	134.	101.	0.	377.	122.	100000.00
1.26	9.50	9.19	0.00	0.035	0.040	0.035	0.038	126.40	615.36
0.015079	68.	68.	69.	5	15	0	0.00	89.26	704.62

FLOW DISTRIBUTION FOR SECNO= 42.30 CWSEL= 131.13

STA=	615.	629.	671.	715.
PER Q=	7.9	50.1	42.0	
AREA=	23.2	111.1	100.5	
VEL=	7.4	9.9	9.2	

*SECNO 43.000
2800 NAT Q1= 250.93 WSEL= 134.37 ENC Q1= 361.42 WSEL= 135.37 RATIO= -0.4403
NAT Q1= 415. RATIOS LOB, CH, ROB= 0.0081 0.8717 0.1199 WSEL= 135.37

3301 HV CHANGED MORE THAN HVINS

3470 ENCROACHMENT STATIONS= 645.0 754.1 TYPE= 4 TARGET= 0.128

Q	GLOB	OCH	QROB	ALOB	ACH	AROB	HL	GLOSS	BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	JOL	TWA	LEFT/RIGHT
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	ELMIN	SSTA
								TOPWID	ENDST
43.00	5.40	134.40	0.00	134.37	135.24	0.84	2.69	0.05	134.30
2200.	0.	2200.	0.	0.	299.	0.	378.	122.	138.00
1.27	0.00	7.35	0.00	0.035	0.040	0.035	0.038	129.00	645.00
0.008795	238	238.	238.	3	0	0	0.00	95.90	740.90

FLOW DISTRIBUTION FOR SECNO= 43.00 CWSEL= 134.40

STA= 645. 754.
PER Q= 100.0
AREA= 299.3
VEL= 7.4

*SECNO 44.000
2800 NAT Q1= 233.88 WSEL= 139.75 ENC Q1= 242.66 WSEL= 140.75 RATIO= -0.0376
NAT Q1= 469. RATIOS LOB,CH,ROB= 0.4415 0.5170 0.0415 WSEL= 140.75

3470 ENCROACHMENT STATIONS= 793.3 855.5 TYPE= 4 TARGET= 0.483

44.00	5.98	140.48	0.00	139.75	141.80	1.32	6.41	0.14	138.70
2200.	0.	2200.	0.	0.	239.	0.	382.	124.	138.80
1.29	0.00	9.22	0.00	0.035	0.040	0.035	0.039	134.50	793.30
0.011177	664.	649.	660.	4	0	0	0.00	62.20	855.50

FLOW DISTRIBUTION FOR SECNO= 44.00 CWSEL= 140.48

STA= 793. 856.
PER Q= 100.0
AREA= 238.6
VEL= 9.2

Q	QLOB	QCH	QROB	ALOB	ACH	AROB		TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR		ELMIN	SSTA
SLOPE	XLOBL	YLCH	XLOBR	ITRIAL	IDC	ICONT	CURAR	TOPWID	ENDST

*SECNO 45.000

3301 HV CHANGED MORE THAN HVINS

3470 ENCROACHMENT STATIONS=			725.0	920.0	TYPE=	1	TARGET=	195.000	
45.00	6.09	144.19	0.00	143.41	144.58	0.39	2.69	0.09	143.60
2200.	863.	1328.	8.	185.	255.	4.	385.	125.	143.70
1.31	4.66	5.20	2.17	0.035	0.040	0.035	0.039	138.10	725.00
0.005138	363.	370.	374.	2	0	0	0.00	195.00	920.00

FLOW DISTRIBUTION FOR SECNO= 45.00 CNSEL= 144.19

STA=	725.	799.	822.	915.	920.
PER Q=	30.7	8.6	60.4	0.4	
AREA=	143.8	41.5	255.5	3.7	
VEL=	4.7	4.6	5.2	2.2	

*SECNO 46.000

3301 HV CHANGED MORE THAN HVINS

3470 ENCROACHMENT STATIONS=			739.0	816.0	TYPE=	1	TARGET=	77.000	
46.00	3.88	145.28	0.00	145.10	146.46	1.18	1.64	0.24	142.40
2200.	8	2192.	0.	2.	251.	0.	387.	125.	100000.00
1.32	3.38	8.74	0.00	0.035	0.040	0.035	0.039	141.40	739.00
0.011760	205.	224.	213.	2	0	0	0.00	77.00	816.00

Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

FLOW DISTRIBUTION FOR SECNO= 46.00 CWSEL= 145.28

STA=	739.	740.	817.
PER Q=	0.4	99.6	
AREA=	2.3	250.8	
VEL=	3.4	8.7	

*SECNO 47.000

3301 HV CHANGED MORE THAN HVINS

3470 ENCROACHMENT STATIONS=			453.0	750.0	TYPE=	1	TARGET=	297.000	
47.00	3.29	147.49	0.00	146.71	147.58	0.08	1.01	0.11	100000.00
1700.	0.	1700.	0.	0.	730.	0.	390.	127.	100000.00
1.36	0.00	2.33	0.00	0.035	0.040	0.035	0.039	144.20	453.00
0 001205	337.	318.	309.	3	0	0	0.00	297.00	750.00

FLOW DISTRIBUTION FOR SECNO= 47.00 CWSEL= 147.49

STA=	453.	902.
PER Q=	100.0	
AREA=	729.7	
VEL=	2.3	

Q	QLOB	QCH	QROB	ALOB	ACH	AROB	WPL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR		ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	WAR	TOPWID	ENDST

*SECNO 48.000

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=			328.0	538.0	TYPE=	1	TARGET=	210.000	
48.00	2.25	149.75	149.75	149.89	150.40	0.65	2.10	0.17	149.50
1700.	0.	1700.	0.	0.	263.	0.	398.	131.	100000.00
1.39	0.06	6.47	0.00	0.035	0.040	0.035	0.039	147.50	328.00
0.022533	660.	660.	660.	20	19	0	0.00	210.00	538.00

FLOW DISTRIBUTION FOR SECNO= 48.00 CWSEL= 149.75

STA=	328.	328.	538.
PER Q=	0.0	100.0	
AREA=	0.0	262.7	
VEL=	0.1	6.5	

*SECNO 49.000

3470 ENCROACHMENT STATIONS=			580.0	726.0	TYPE=	1	TARGET=	146.000	
49.00	5.40	157.90	0.00	157.10	158.38	0.48	7.96	0.02	156.40
1700.	389.	1311.	0.	92.	222.	0.	403.	134.	100000.00
1.43	4.25	5.91	0.00	0.035	0.040	0.035	0.039	152.50	580.00
0.009799	770.	781.	780.	6	0	0	0.00	131.37	711.37

Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

FLOW DISTRIBUTION FOR SECNO= 49.00 CWSEL= 157.90

STA=	580.	639.	726
PER Q=	22.9	77.1	
AREA=	91.7	221.9	
VEL=	4.2	5.9	

*SECNO 50.000

2800 NAT Q1=	143.26	WSEL=	163.97	ENC Q1=	335.50	WSEL=	164.97	RATIO=	-1.3419
NAT Q1=	336.	RATIOS LOB,CH,ROB=	0.0001	0.9998	0.0001	WSEL=	164.97		

3470 ENCROACHMENT STATIONS=	343.2	586.3	TYPE=	4	TARGET=	0.000			
50.00	2.16	163.96	0.00	163.97	164.46	0.50	6.07	0.01	164.80
1700.	0.	1700.	0.	0.	300.	0.	408.	136.	164.70
1.46	0.00	5.67	0.00	0.035	0.040	0.035	0.039	161.80	347.77
0.014592	695	696.	697.	4	0	0	0.00	210.57	558.34

FLOW DISTRIBUTION FOR SECNO= 50.00 CWSEL= 163.96

STA=	348.	586.
PER Q=	100.0	
AREA=	299.6	
VEL=	5.7	

*SECNO 51.000

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   Q          QLOB       QCH        QROB       ALOB       ACH        AROB                  TWA    LEFT/RIGHT
   TIME       VLOB       VCH        VROB       XNL        XNCH       XMR                   ELMIN       SSTA
   SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      ...XAR     TOPWID      ENDST

 2800 NAT Q1=     271.68  WSEL=     167.21  ENC Q1=     318.72  WSEL=     168.21  RATIO= -0.1731
 NAT Q1=     457.   RATIOS LOB, CH, ROB=  0.3028   0.6971   0.0001  WSEL=     168.21

3470 ENCROACHMENT STATIONS=      471.4      570.4  TYPE=      4  TARGET=        0.303
    51.00      5.52    167.62      0.00    167.21    168.11      0.49      3.65      0.00    165.40
    1700.         0.     1700.        0.        0.       303.       0.       411.      138.     167.90
     1.48      0.00      5.60      0.00     0.035     0.040     0.035     0.039    162.10    471.40
0.005071       471.       455       453         1         0         0      0.00     95.86    567.26

FLOW DISTRIBUTION FOR SECNO=     51.00          CWSEL=     167.62

STA=      471.       570.
  PER Q=     100.0
   AREA=     303.4
    VEL=       5.6

*SECNO 52.000
 2800 NAT Q1=     115.19  WSEL=     169.17  ENC Q1=     282.84  WSEL=     170.17  RATIO= -1.4554
 NAT Q1=     283.   RATIOS LOB, CH, ROB=  0.0017   0.9981   0.0002  WSEL=     170.17

3470 ENCROACHMENT STATIONS=      419.9      649.1  TYPE=      4  TARGET=        0.002
    52.00      2.57    169.47      0.00    169.17    169.93      0.45      1.81      0.00    171.40
    1700.         0.     1700.        0.        0.       314.       0.       413.      139.     170.00
     1.50      0.00      5.41      0.00     0.035     0.040     0.035     0.039    166.90    435.73
0.011651       242.       246.      249.         3         0         0      0.00    200.47    636.20
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    Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA    LEFT/RIGHT
    TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        TN         ELMIN       SSTA
    SLOPE      XLOBL      YLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID      ENDST

FLOW DISTRIBUTION FOR SECNO=      52.00          CWSEL=     169.47

STA=      436.       648.
  PER Q=     100.0
   AREA=     314.3
    VEL=       5.4

*SECNO 52.100
 2800 NAT Q1=     200.57  USEL=     175.77  ENC Q1=     432.96  WSEL=     176.77  RATIO= -1.1586
 NAT Q1=     441.   RATIOS LOB,CH,ROB=  0.0151   0.9817   0.0031   WSEL=     176.77

3265 DIVIDED FLOW


3470 ENCROACHMENT STATIONS=      476.9      738.5  TYPE=       4  TARGET=         0.018
    52.10       2.43     175.53       0.00     175.77     175.94       0.41       6.01       0.00     175.50
    1700.          0.       1700.          0.         0.       333.          0.       417.       141.      175.60
     1.52       0.00       5.11       0.00      0.035      0.040      0.035      0.039     173.10     476.90
 0.010952        532.        532.        532.          5          0          0       0.00     220.47     735.72

FLOW DISTRIBUTION FOR SECNO=      52.10          CWSEL=     175.53

STA=      477.       739.
  PER Q=     100.0
   AREA=     332.6
    VEL=       5.1
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 Q         QLOB      QCH       QROB      ALOB      ACH       AROB      VOL       TWA    LEFT/RIGHT
 TIME      VLOB      VCH       VROB      XNL       XNCH      XNR       I         ELMIN       SSTA
 SLOP      YLOBL     YLCH      YLOBR     ITRIAL    IDC       ICONT     IAR       TOPWID      ENDST

*SECNO 52.300
 2800 NAT Q1=     149.68  WSEL=     177.51  ENC Q1=     159.23  WSEL=     178.51  RATIO= -0.0571
 NAT Q1=     336.   RATIOS LOB,CH,ROB=  0.0000  0.4708  0.5292  WSEL=     178.51

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=      410.0      519.6  TYPE=      4  TARGET=          0.529
    52.30      4.34    178.14    178.14    177.51    179.32      1.17      1.93      0.23    183.00
   1700.        0.     1700.       0.        0.       196.        0.       418.       142.     178.20
     1.53      0.00      8.69      0.00      0.035     0.040     0.035     0.039    173.80    433.77
 0.018217      139.      139.      139.        20        14         0      0.00     84.63    518.40

FLOW DISTRIBUTION FOR SECNO=      52.30          CWSEL=     178.14

STA=      434.       520.
  PER Q=     100.0
   AREA=     195.7
    VEL=       8.7

*SECNO 53.000
 2800 NAT Q1=     202.42  WSEL=     181.50  ENC Q1=     234.28  WSEL=     182.50  RATIO= -0.1574
 NAT Q1=     388.   RATIOS LOB,CH,ROB=  0.0000  0.6032  0.3968  WSEL=     182.50
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   Q          QLOB       QCH        QROB       ALOB       ACH        AROB       'DL        TWA    LEFT/RIGHT
   TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        .TN        ELMIN       SSTA
   SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IOC        ICONT      CORAR      TOPWID      ENDST


3301 HV CHANGED MORE THAN HVINS


3470 ENCROACHMENT STATIONS=       267.7       424.1  TYPE=       4  TARGET=         0.397
     53.00       5.29     182.49       0.00    181.50     182.96       0.46       3.57       0.07     185.10
     1700.          0.     1700.          0.        0.      312.          0.       420.       143.      184.60
      1.55       0.00       5.45       0.00     0.035      0.040      0.035      0.039     177.20     302.77
 0.005278       400.       400.       400.         3          0          0       0.00     108.01     410.78

FLOW DISTRIBUTION FOR SECNO=     53.00          CWSEL=     182.49

STA=      303.       424.
  PER Q=     100.0
    AREA=    311.8
     VEL=      5.5

*SECNO 54 000
 2800 NAT Q1=     163.10  WSEL=     190.96  ENC Q1=     233.88  WSEL=     191.96  RATIO= -0.4339
 NAT Q1=     332.   RATIOS LOB,CH,ROB=  0.0000  0.7042  0.2958  WSEL=     191.96

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
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Q	QLOB	QCH	QROB	ALOB	ACH	AROB			TWA LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR		ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT		TOPWID	ENDST

3470 ENCROACHMENT STATIONS= 342.5 467.2 TYPE= 4 TARGET= 0.296

54.00	5.48	190.68	190.68	190.96	191.92	1.24	6.46	0.23	192.90
1700.	0.	1700.	0.	0.	190.	0.	424.	144.	193.70
1.57	0.00	8.95	0.00	0.035	0.040	0.035	0.039	185.20	377.07
0.018374	722.	722.	722.	20	8	0	0.00	79.18	456.25

FLOW DISTRIBUTION FOR SECNO= 54.00 CWSEL= 190.68

STA= 377. 467.
PER Q= 100.0
AREA= 190.0
VEL= 8.9

*SECNO 54 100
2800 NAT Q1= 150.88 WSEL= 199.27 ENC Q1= 209.60 WSEL= 200.27 RATIO= -0.3892
NAT Q1= 264. RATIOS LOB,CH,ROB= 0.0612 0.7938 0.1450 WSEL= 200.27

3470 ENCROACHMENT STATIONS= 388.9 484.6 TYPE= 4 TARGET= 0.206

54.10	5.13	199.73	0.00	199.27	200.76	1.02	8.81	0.02	206.40
1700.	0.	1700.	0.	0.	209.	0.	427.	145.	200.10
1.59	0.00	8.12	0.00	0.035	0.040	0.035	0.039	194.60	416.98
0.010386	651.	651.	651.	3	0	0	0.00	65.68	482.66

Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	XTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

FLOW DISTRIBUTION FOR SECNO= 54.10 CWSEL= 199.73

STA= 417. 485
PER Q= 100.0
AREA= 209.5
VEL= 8.1

*SECNO 54.300
2800 NAT Q1= 313.49 WSEL= 200.58 ENC Q1= 313.49 WSEL= 201.58 RATIO= 0.0000
NAT Q1= 501. RATIOS LOB,CH,ROB= 0.4915 0.5052 0.0032 WSEL= 201.58

3265 DIVIDED FLOW

3301 HV CHANGED MORE THAN HVINS

3470 ENCROACHMENT STATIONS= 430.8 577.9 TYPE= 4 TARGET= 0.374

54.30	5.93	200.93	0.00	200.58	201.42	0.49	0.61	0.05	201.40
1700.	290	1410.	0.	57.	246.	0.	428.	145.	201.10
1.60	5.05	5.74	0.00	0.035	0.040	0.035	0.039	195.00	430.77
0.004959	88.	88.	88.	3	0	0	0.00	107.09	577.05

FLOW DISTRIBUTION FOR SECNO= 54.30 CWSEL= 200.93

STA=	431	443.	452.	478.	578.
PER Q=	14.0	3.0	0.1	82.9	
AREA=	41.9	13.7	1.9	245.7	
VEL=	5.7	3.7	0.9	5.7	

TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	MTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	AR	TOPWID	ENDST

*SECNO 55.000

3265 DIVIDED FLOW

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL, CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS= 465.0 565.0 TYPE= 1 TARGET= 100.000

55.00	4.01	208.41	208.41	207.86	209.54	1.13	5.35	0.19	209.10
1700.	738.	962.	0.	89.	110.	0.	431.	147.	100000.00
1.62	9.26	8.74	0.00	0.035	0.040	0.035	0.039	204.40	465.00
0.015659	675.	651.	651.	20	19	0	0.00	90.34	565.00

FLOW DISTRIBUTION FOR SECNO= 55.00 CWSEL= 208.41

STA=	465.	479.	486.	514.	565.
PER Q=	11.4	15.9	16.1	56.6	
AREA=	25.1	24.0	40.4	110.0	
VEL=	7.7	11.3	6.8	8.7	

*SECNO 56.000

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   Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA     LEFT/RIGHT
   TIME       VLOB       VCH        VROB       XNL        XNCH       XNR        ATN        ELMIN       SSTA
   SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID      ENDST

 2800 NAT Q1=     197.97  WSEL=     217.93  ENC Q1=     197.97  WSEL=     218.93  RATIO=  0.0000
 NAT Q1=     496.   RATIOS LOB,CH,ROB=  0.1983  0.2026  0.5991  WSEL=     218.93

3265 DIVIDED FLOW


3301 HV CHANGED MORE THAN HVINS


3470 ENCROACHMENT STATIONS=      576.1      794.2  TYPE=      4  TARGET=        0.601
    56.00      4.47    218.97      0.00    217.93    219.41      0.44      9.80      0.07    221.50
   1700.         0.      857.      843.        0.      142.      186.      437.      150.     219.60
     1.67      0.00      6.05      4.52     0.035     0.040     0.035     0.039    214.50    585.17
0.007033      972.      972.      972.         5         0         0      0.00    178.42    794.19

FLOW DISTRIBUTION FOR SECNO=      56.00          CWSEL=     218.97

STA=      585.      640.      794.
  PER Q=     50.4      49.6
    AREA=    141.6     186.3
    VEL=       6.1       4.5

*SECNO 57.000
 2800 NAT Q1=     174.40  WSEL=     224.60  ENC Q1=     174.40  WSEL=     225.60  RATIO=  0.0000
 NAT Q1=     432.   RATIOS LOB,CH,ROB=  0.1995  0.3852  0.4154  WSEL=     225.60
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Q	QLOB	QCH	QROB	ALOB	ACH	AROB		TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR		ELMIN	SSTA
SLOPE	XLOBI	XLCH	XLOBR	ITRIAL	IDC	ICONT	CURAR	TOPWID	ENDST

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS=		599.7	680.6	TYPE=	4	TARGET=	0.596		
57.00	5.37	225.37	225.37	224.60	226.65	1.28	4.77	0.25	225.60
1700.	0.	1642.	58.	0.	178.	18.	441.	152.	224.90
1.69	0.00	9.22	3.22	0.035	0.040	0.035	0.039	220.00	600.24
0.011842	532.	532.	532.	13	8	0	0.00	80.37	680.61

FLOW DISTRIBUTION FOR SECNO= 57.00 CWSEL= 225.37

STA=	600.	651.	681.
PER Q=	96.6	3.4	
AREA=	178.2	18.0	
VEL=	9.2	3.2	

*SECNO 57.100
2800 NAT Q1= 169.19 WSEL= 228.81 ENC Q1= 193.98 WSEL= 229.81 RATIO= -0.1465
NAT Q1= 351. RATIOS LOB,CH,ROB= 0.2890 0.5526 0.1585 WSEL= 229.81

3470 ENCROACHMENT STATIONS=		672.5	726.2	TYPE=	4	TARGET=	0.447		
57.10	6.01	229.81	0.00	228.81	230.80	1.00	4.13	0.03	229.30
1700.	0.	1700.	0.	0.	212.	0.	443.	152.	229.10
1.70	0.00	8.02	0.00	0.035	0.040	0.035	0.039	223.80	672.50
0.007951	403.	429.	466.	3	0	0	0.00	53.70	726.20

Q	GLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIT	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

FLOW DISTRIBUTION FOR SECNO= 57.10 CWSEL= 229.81

STA=	673.	726.
PER Q=	100.0	
AREA=	212.0	
VEL=	8.0	

SPECIAL BRIDGE

3227 DOWNSTREAM ELEV IS 228.49 ,NOT 229.81 HYDRAULIC JUMP OCCURS DOWNSTREAM (IF LOW FLOW CONTROLS)

SB	XR	XKOR	COEQ	RDLEN	BWC	BWP	BAREA	SS	ELCHU	ELCHD
	1.25	1.50	2.50	0.00	19.50	1.50	90.00	0.00	224.50	223.50

*SECNO 57.300
2800 NAT Q1= 549.85 WSEL= 230.92 ENC Q1= 549.85 WSEL= 231.92 RATIO= 0.0000
NAT Q1= 1064. RATIOS LOB,CH,ROB= 0.2973 0.2497 0.4531 WSEL= 231.92
WATER EL=CHANGE FROM NATURAL PROFILES BRIDGE

3470 ENCROACHMENT STATIONS= 654.3 805.3 TYPE= 4 TARGET= 0.483

57.30	6.32	231.92	0.00	230.92	232.06	0.14	0.22	0.09	228.60
1700.	180.	823.	696.	68.	251.	251.	443.	152.	228.50
1.71	2.66	3.29	2.78	0.035	0.040	0.035	0.039	225.60	654.33
0.000962	106.	106.	106.	0	0	6	0.00	150.95	805.28

FLOW DISTRIBUTION FOR SECNO= 57.30 CWSEL= 231.92

STA=	654.	675.	726.	805.
PER Q=	10.6	48.4	41.0	
AREA=	67.7	250.6	250.9	
VEL=	2.7	3.3	2.8	

Q	QLOB	QCH	QROB	ALOB	ACH	AROB	[illegible]	CLOSS	BANK ELEV
TIM	VLOB	VCH	VROB	XNL	XNCH	XNR		TWA	LEFT/RIGHT
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CURAR	ELMIN	SSTA
								TOPWID	ENDST

*SECNO 58.000

3268 DIVIDED FLOW

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS= 560.0 840.0 TYPE= 1 TARGET= 280.000

58.00	2.85	234.35	234.35	234.30	234.93	0.57	1.06	0.13	231.50
1700.	72.	342.	1286.	14.	66.	203.	448.	154.	235.70
1.73	5.27	5.16	6.33	0.035	0.040	0.035	0.039	231.50	560.00
0.015426	431.	431.	431.	20	13	0	0.00	227.59	840.00

FLOW DISTRIBUTION FOR SECNO= 58.00 CWSEL= 234.35

STA=	560.	560.	567	569.	592.	671.	694.	819.	840.
PER Q=	0.0	2.2	0.2	1.7	20.1	3.3	68.1	4.1	
AREA=	0.3	7.0	1.3	5.2	66.3	11.8	175.3	16.1	
VEL=	2.0	5.5	3.2	5.7	5.2	4.8	6.6	4.4	

*SECNO 59.000
2800 NAT Q1= 153.74 WSEL= 247.37 ENC Q1= 153.74 WSEL= 248.37 RATIO= 0.0000
NAT Q1= 453. RATIOS LOB,CH,ROB= 0.2637 0.3210 0.4153 WSEL= 248.37

Q	GLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIN	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

3301 HV CHANGED MORE THAN HVINS

3470 ENCROACHMENT STATIONS=			649.4	720.5	TYPE=	4	TARGET=	0.661	
59.00	3.92	248.12	248.11	247.37	249.43	1.31	14.28	0.22	247.30
1700.	0.	1619.	81.	0.	175.	12.	452.	157.	246.40
1.76	0.00	9.27	6.89	0.035	0.040	0.035	0.039	244.20	649.40
0.017052	935	880.	880.	12	11	0	0.00	71.14	720.54

FLOW DISTRIBUTION FOR SECNO= 59.00 CWSEL= 248.12

STA=	649.	714.	721.
PER Q=	95.2	4.8	
AREA=	174.7	11.7	
VEL=	9.3	6.9	

*SECNO 60.000

3265 DIVIDED FLOW

3301 HV CHANGED MORE THAN HVINS

3470 ENCROACHMENT STATIONS= 676.0 825.0 TYPE= 1 TARGET= 149.000

Q	QLOB	QCH	QROB	ALOB	ACH	AROB		TWA	LEFT/RIGHT
TIM..	VLOB	VCH	VROB	XNL	XNCH	XNR		ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST
60.00	3.74	253.84	0.00	253.08	254.35	0.51	4.85	0.08	254.00
1700.	331.	335.	1031.	58.	63.	176.	455.	159.	252.70
1.78	5.69	5.32	5.89	0.035	0.040	0.035	0.039	250.10	676.00
0.007386	451.	451.	451.	5	0	0	0.00	147.58	825.00

FLOW DISTRIBUTION FOR SECNO= 60.00 CWSEL= 253.84

STA=	676.	682.	696.	706.	736.	743.	756.	778.	787.	818.	823.	825.
PER Q=	5.2	12.7	1.5	19.7	2.3	11.1	14.2	1.3	25.0	6.3	0.6	
AREA=	15.9	34.0	8.3	63.0	8.9	29.9	42.4	7.2	69.0	15.1	3.2	
VEL=	5.6	6.3	3.2	5.3	4.4	6.3	5.7	3.1	6.1	7.1	3.4	

*SECNO 61.000
2800 NAT Q1= 203.93 WSEL= 257.46 ENC Q1= 539.92 WSEL= 258.46 RATIO= -1.6489
NAT Q1= 589. RATIOS LOB,CH,ROB= 0.0021 0.9169 0.0810 WSEL= 258.46

3470 ENCROACHMENT STATIONS= 436.4 827.8 TYPE= 4 TARGET= 0.083

61.00	1.44	257.44	0.00	257.46	257.65	0.21	3.27	0.03	257.40				
1700.	0.	1700.	0.	0.	467.	0.	459.	161.	258.70				
1.81	0.00	3.64	0.00	0.035	0.040	0.035	0.039	256.00	436.40007261	431.	447.	449.	

FLOW DISTRIBUTION FOR SECNO= 61.00 CWSEL= 257.44

STA=	436.	828.
PER Q=	100.0	
AREA=	467.5	
VEL=	3.6	

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   Q          QLOB       QCH        QROB       ALOB       ACH        AROB       VOL        TWA    LEFT/RIGHT
   TIM        VLOB       VCH        VROB       XNL        XNCH       XNR        WTN        ELMIN       SSTA
   SLOPE      XLOBL      XLCH       XLOBR      ITRIAL     IDC        ICONT      CORAR      TOPWID      ENDST


*SECNO 62.000
 2800 NAT Q1=     163.09  WSEL=     260.62  ENC Q1=     302.78  WSEL=     261.62  RATIO= -0.8565
 NAT Q1=     303.   RATIOS LOB,CH,ROB=  0.0000  1.0000  0.0000  WSEL=     261.62

3470 ENCROACHMENT STATIONS=      641.0      822.1  TYPE=      4  TARGET=        0.000
    62.00      3.15    260.65      0.00    260.62    261.22      0.57      3.46      0.11    262.50
   1700.         0.     1700         0.        0.       280.        0.       462.       164.    263.40
     1.83      0.00      6.07      0.00     0.035     0.040     0.035     0.039    257.50    673.78
 0.010488      392.      400.      407.         2         0         0      0.00    138.25    812.03


FLOW DISTRIBUTION FOR SECNO=     62.00          CWSEL=     260.65

STA=      674.       822.
  PER Q=     100.0
   AREA=     279.9
    VEL=       6.1

*SECNO 63.000
 2800 NAT Q1=     143.50  WSEL=     270.35  ENC Q1=     143.50  WSEL=     271.35  RATIO=  0.0000
 NAT Q1=     356.   RATIOS LOB,CH,ROB=  0.9066  0.0934  0.0000  WSEL=     271.35

3301 HV CHANGED MORE THAN HVINS

7185 MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED
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Q	QLOB	QCH	QROB	ALOB	ACH	AROB	WPL		TWA	LEFT/RIGHT
TI	VLOB	VCH	VROB	XNL	XNCH	XNR			ELMIN	SSTA
SLOPE	XLOBL	XLCH	YLOBR	ITRIAL	IDC	ICONT		AR	TOPWID	ENDST

3470 ENCROACHMENT STATIONS= 652.3 784.9 TYPE= 4 TARGET= 0.597

63.00	3.97	271.27	271.27	270.35	272.34	1.08	8.34	0.15	270.20
1700.	1302.	398.	0.	153.	52.	0.	466.	165.	280.80
1.85	8.51	7.69	0.00	0.035	0.040	0.035	0.039	267.30	652.32
0.015857	678.	638.	605.	16	11	0	0.00	98.89	751.21

FLOW DISTRIBUTION FOR SECNO= 63.00 CWSEL= 271.27

STA=	652.	704	728.	785.
PER Q=	62.4	14.3	23.4	
AREA=	117.9	35.2	51.7	
VEL=	9.0	6.9	7.7	

*SECNO 64.000
2800 NAT Q1= 157.98 WSEL= 282.79 ENC Q1= 167.91 WSEL= 283.79 RATIO= -0.0628
NAT Q1= 300. RATIOS LOB,CH,ROB= 0.4404 0.5596 0.0000 WSEL= 283.79

3470 ENCROACHMENT STATIONS= 729.5 781.0 TYPE= 4 TARGET= 0.440

64.00	4.98	283.48	283.24	282.79	284.96	1.48	12.50	0.12	281.60
1700.	0.	1700	0.	0.	174.	0.	470.	167.	284.00
1.88	0.00	9.76	0.00	0.035	0.040	0.035	0.039	278.60	729.50
0.013892	843.	843.	843.	15	11	0	0.00	49.57	779.07

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	CLOSS	BANK ELEV
Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

FLOW DISTRIBUTION FOR SECNO= 64.00 CWSEL= 283.48

STA= 730. 781
PER Q= 100.0
AREA= 174.2
VEL= 9.8

*SECNO 65.000
2800 NAT Q1= 130.16 WSEL= 291.20 ENC Q1= 243.20 WSEL= 292.20 RATIO= -0.8685
NAT Q1= 262. RATIOS LOB,CH,ROB= 0.0252 0.9298 0.0450 WSEL= 292.20
3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS= 476.0 584.5 TYPE= 4 TARGET= 0.070

65.00	2.86	291.16	291.16	291.20	292.19	1.03	8.61	0.04	290.30
1700	0.	1700.	0.	0.	208.	0.	472.	168.	292.30
1.90	0.00	8.16	0.00	0.035	0.040	0.035	0.039	288.30	476.00
0.019084	554.	532.	517.	20	14	0	0.00	102.84	578.84

FLOW DISTRIBUTION FOR SECNO= 65.00 CWSEL= 291.16

STA= 476. 585
PER Q= 100.0
AREA= 208.4
VEL= 8.2

Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR		ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	AR	TOPWID	ENDST

*SECNO 66.000
2800 NAT Q1= 149.40 WSEL= 300.34 ENC Q1= 295.97 WSEL= 301.34 RATIO= -0.9811
NAT Q1= 300. RATIOS LOB,CH,ROB= 0.0128 0.9860 0.0013 WSEL= 301.34

3470 ENCROACHMENT STATIONS= 566.0 697.8 TYPE= 4 TARGET= 0.014

66.00	4.11	300.41	300.07	300.34	301.05	0.64	8.82	0.04	300.00
1700.	0.	1700	0.	0.	266.	0.	475.	169.	300.40
1.92	0.00	6.40	0.00	0.035	0.040	0.035	0.039	296.30	566.00
0.011742	601.	598.	579.	9	11	0	0.00	131.80	697.80

FLOW DISTRIBUTION FOR SECNO= 66.00 CWSEL= 300.41

STA= 566. 698.
PER Q= 100.0
AREA= 265.6
VEL= 6.4

*SECNO 67.000
2800 NAT Q1= 136.99 WSEL= 307.87 ENC Q1= 185.42 WSEL= 308.87 RATIO= -0.3535
NAT Q1= 288. RATIOS LOB,CH,ROB= 0.3232 0.6434 0.0335 WSEL= 308.87

3470 ENCROACHMENT STATIONS= 522.0 671.2 TYPE= 4 TARGET= 0.357

67.00	5.42	308.22	308.21	307.87	309.16	0.94	8.02	0.09	308.90
1700.	0.	1700.	0.	0.	219.	0.	478.	171.	309.50
1.94	0.00	7.77	0.00	0.035	0.040	0.035	0.039	302.80	544.03
0.019455	510.	539.	550.	14	11	0	0.00	118.13	662.16

Q	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	LEFT/RIGHT
TII	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

FLOW DISTRIBUTION FOR SECNO= 67.00 CWSEL= 308.22

STA= 544. 671.
PER Q= 100.0
AREA= 218.7
VEL= 7.8

*SECNO 68.000
2800 NAT Q1= 172.48 WSEL= 313.43 ENC Q1= 313.09 WSEL= 314.43 RATIO= -0.8153
NAT Q1= 316. RATIOS LOB,CH,ROB= 0.0000 0.9913 0.0087 WSEL= 314.43

3470 ENCROACHMENT STATIONS= 626.7 753.7 TYPE= 4 TARGET= 0.009

68.00	4.87	313.67	0.00	313.43	314.17	0.50	4.97	0.04	315.40
1700.	0.	1700.	0.	0.	300.	0.	481.	172.	312.50
1.96	0.00	5.67	0.00	0.035	0.040	0.035	0.039	308.80	632.97
0.007082	464.	451.	451.	4	0	0	0.00	120.73	753.70

FLOW DISTRIBUTION FOR SECNO= 68.00 CWSEL= 313.67

STA= 633. 754.
PER Q= 100.0
AREA= 299.7
VEL= 5.7

*SECNO 69.000

Q	QLOB	QCH	QROB	ALOB	ACH	AROB		TWA	LEFT/RIGHT
TIF	VLOB	VCH	VROB	XNL	XNCH	XNR		ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	[illegible]RAR	TOPWID	ENDST

2800 NAT Q1= 134.99 WSEL= 326.95 ENC Q1= 228.73 WSEL= 327.95 RATIO= -0.6945
NAT Q1= 259. RATIOS LOB,CH,ROB= 0.0541 0.8843 0.0617 WSEL= 327.95

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

3470 ENCROACHMENT STATIONS= 477.4 558.5 TYPE= 4 TARGET= 0.116

69.00	3.64	326.94	326.94	326.95	328.15	1.22	6.96	0.22	326.00
1700.	0.	1700.	0.	0.	192.	0.	484.	174.	324.90
1.98	0.00	8.85	0.00	0.035	0.040	0.035	0.039	323.30	477.40
0.018936	627.	639.	649.	20	19	0	0.00	81.10	558.50

FLOW DISTRIBUTION FOR SECNO= 69.00 CWSEL= 326.94

STA=	477.	559.
PER Q=	100.0	
AREA=	192.0	
VEL=	8.9	

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

SUMMARY PRINTOUT TABLE 110

	SECNO	CWSEL	DIFKNS	EG	TOPWID	GLOB	GCH	GROB	PERENC	STENCL	STCHL	STCHR	STENCR
	10.000	12.00	0.00	12.25	454.00	701.38	2882.91	215.71	0.00	0.00	370.00	470.00	0.00
	10.000	13.00	1.00	13.17	300.00	731.72	2708.31	359.96	300.00	250.00	370.00	470.00	550.00
	10.100	12.46	0.00	12.48	795.76	217.52	3582.48	0.00	0.00	0.00	506.80	1065.60	0.00
	10.100	13.37	0.91	13.41	400.00	361.56	3438.44	0.00	400.00	400.00	506.80	1065.60	800.00
	10.300	12.48	0.00	12.49	831.27	1541.37	1518.55	740.08	0.00	0.00	515.60	724.00	0.00
	10.300	13.38	0.91	13.43	350.00	757.35	2587.89	454.76	350.00	450.00	515.60	724.00	800.00
	11.100	12.61	0.00	12.68	695.98	415.66	962.59	2421.75	0.00	0.00	729.70	779.40	0.00
	11.100	13.57	0.96	13.65	300.00	430.72	1027.02	2342.26	300.00	600.00	729.70	779.40	900.00
*	11.300	12.80	0.00	12.85	681.64	386.69	1398.20	2015.12	0.00	0.00	725.50	802.10	0.00
	11.300	13.66	0.86	13.72	300.00	364.18	1518.00	1917.82	300.00	650.00	725.50	802.10	950.00
	12.100	12.75	0.00	13.38	507.21	374.43	2716.78	708.79	0.00	0.00	530.00	590.00	0.00
	12.100	13.45	0.70	14.25	130.00	180.50	3155.40	464.10	130.00	510.00	530.00	590.00	640.00
*	13.000	13.32	0.00	14.27	420.53	0.00	1757.59	2042.41	0.00	0.00	519.20	554.40	0.00
	13.000	13.87	0.56	15.00	222.00	0.64	1999.15	1800.21	222.00	518.00	519.20	554.40	740.00
	14.100	15.66	0.00	16.23	538.12	9.14	1351.03	2439.83	0.00	0.00	657.50	698.00	0.00
	14.100	16.10	0.44	16.53	334.00	9.17	1330.30	2460.53	334.00	630.00	657.50	698.00	964.00
	14.300	16.02	0.00	16.31	558.51	285.09	1190.31	2324.60	0.00	0.00	659.50	701.80	0.00
	14.300	16.28	0.25	16.59	340.50	19.41	1273.25	2507.34	345.00	630.00	659.50	701.80	975.00

	1[illegible]	16.59	0.00	16.89	358.81	97.25	47	2675.29	0.00	0.00	922.90	963.60	0.00
	15.[illegible]	16.83	0.24	17.13	266.02	0.00	1[illegible].44	2727.56	337.10	922.90	922.90	963.60	1200.00
	16.000	16.97	0.00	17.02	529.28	0.82	412.44	3386.73	0.00	0.00	833.10	878.60	0.00
	16.000	17.18	0.21	17.32	354.33	0.00	732.73	3067.27	566.90	833.10	833.10	878.60	1400.00
*	17.100	19.87	0.00	20.56	724.69	5.21	1685.85	2108.93	0.00	0.00	746.40	784.50	0.00
*	17.100	19.81	-0.06	20.57	686.91	0.00	1724.79	2075.21	703.60	746.40	746.40	784.50	1450.00
	17.300	20.53	0.00	20.67	696.31	0.00	764.01	3035.99	0.00	0.00	744.90	781.60	0.00
	17.300	20.55	0.02	20.69	696.30	0.00	760.46	3039.54	697.10	744.90	744.90	781.60	1442.00
*	18.100	21.14	0.00	21.75	675.02	0.00	1965.11	1834.89	0.00	0.00	750.20	793.50	0.00
*	18.100	21.17	0.02	21.75	675.11	0.00	1941.81	1858.19	699.80	750.20	750.20	793.50	1450.00
	18.300	21.95	0.00	21.98	708.30	20.13	483.34	3296.53	0.00	0.00	726.40	772.80	0.00
	18.300	21.95	-0.01	21.97	708.01	20.12	483.57	3296.31	710.00	715.00	726.40	772.80	1475.00
*	18.400	22.74	0.00	23.52	611.01	28.04	2171.96	1599.99	0.00	0.00	183.00	232.10	0.00
*	18.400	22.74	0.00	23.51	605.83	0.00	2149.26	1650.74	777.00	183.00	183.00	232.10	950.00
	18.600	23.33	0.00	24.21	258.67	2.16	2286.18	1511.66	0.00	0.00	176.60	226.30	0.00
	18.600	23.35	0.02	24.22	265.28	2.21	2280.04	1517.75	771.00	174.00	176.60	226.30	945.00
	18.700	25.85	0.00	25.91	1134.06	0.04	362.73	3437.22	0.00	0.00	200.20	237.80	0.00
	18.700	26.24	0.39	26.34	788.72	0.05	495.03	3304.92	800.00	200.00	200.20	237.80	1000.00
	18.900	25.91	0.00	25.96	1171.85	6.12	366.91	3426.97	0.00	0.00	208.30	240.00	0.00
	18.900	26.32	0.42	26.41	800.00	11.92	476.78	3311.30	800.00	200.00	208.30	240.00	1000.00
	19.000	26.25	0.00	26.33	811.57	0.00	287.57	3512.43	0.00	0.00	432.30	481.80	0.00
	19.000	26.83	0.58	27.07	482.17	0.00	585.85	3214.15	547.70	432.30	432.30	481.80	900.00
*	20.000	29.20	0.00	29.86	420.77	0.00	1866.48	1933.52	0.00	0.00	606.90	699.60	0.00
V	20.000	30.18	0.98	31.43	125.00	0.00	2889.37	910.63	125.00	625.00	606.90	699.60	750.00
	20.100	31.83	0.00	31.97	457.67	0.00	3800.00	0.00	0.00	0.00	320.30	797.00	0.00
√	20.100	32.59	0.76	32.68	463.10	0.00	3800.00	0.00	472.00	325.00	320.30	797.00	797.00

		20.100	31.85	0.00	32.18	479.54	3451.88	348.12	0.00	0.00	0.00	748.60	825.60	0.00
		20.200	32.59	0.74	32.76	476.94	3464.50	335.50	0.00	495.00	325.00	748.60	825.60	870.00
*		20.300	33.47	0.00	34.25	349.14	2698.19	1101.81	0.00	0.00	0.00	801.20	851.80	0.00
*		20.300	33.48	0.01	34.33	314.85	2659.14	1140.86	0.00	537.00	315.00	801.20	851.80	852.00
	Y	20.400	36.58	0.00	36.79	508.51	2085.61	1338.19	376.19	0.00	0.00	808.90	850.70	0.00
		20.400	37.10	0.53	37.47	256.82	1885.47	1719.15	195.38	306.00	554.00	808.90	850.70	860.00
*	Z	20.600	37.98	0.00	38.05	620.26	1740.93	1102.38	956.69	0.00	0.00	803.20	862.40	0.00
*		20.600	37.91	-0.07	38.18	240.00	1831.03	1932.09	36.88	240.00	630.00	803.20	862.40	870.00
	AA	21.000	38.23	0.00	38.39	679.84	1629.78	564.34	1605.88	0.00	0.00	792.60	830.00	0.00
		21.000	38.49	0.26	39.34	147.59	2664.48	1109.35	26.17	160.00	690.00	792.60	830.00	850.00
	AB	22.000	40.20	0.00	40.62	488.15	1272.06	1210.90	1317.03	0.00	0.00	769.70	809.60	0.00
		22.000	41.35	1.15	41.56	414.00	407.89	1099.39	2292.72	414.00	750.00	769.70	809.60	1164.00
*	AC	23.000	44.50	0.00	45.19	467.56	1057.42	1528.09	1214.48	0.00	0.00	786.70	823.00	0.00
*		23.000	44.41	-0.09	45.28	314.00	960.53	1655.44	1184.03	314.00	731.00	786.70	823.00	1045.00
	AD	24.000	49.20	0.00	49.83	204.04	1954.76	1641.70	203.55	0.00	0.00	780.10	820.60	0.00
		24.000	49.54	0.34	50.16	140.09	2133.46	1666.54	0.00	140.60	680.00	780.10	820.60	870.60
	AE	25.000	51.68	0.00	52.78	199.16	1243.07	2488.24	68.70	0.00	0.00	792.80	835.10	0.00
		25.000	52.08	0.40	53.32	112.31	1740.11	2059.89	0.00	140.00	680.00	792.80	835.10	880.00
	AF	26.000	55.54	0.00	56.27	336.68	1242.52	1880.96	676.52	0.00	0.00	795.10	843.70	0.00
		26.000	55.95	0.41	56.49	287.84	1227.59	1762.55	809.87	294.00	716.00	795.10	843.70	1010.00
	AG	27.000	57.63	0.00	57.82	629.40	497.25	1666.51	1636.24	0.00	0.00	795.50	856.20	0.00
		27.000	57.97	0.34	58.41	319.00	0.00	2391.41	1408.59	319.00	796.00	795.50	856.20	1115.00
*	AH	28.000	59.38	0.00	60.08	499.19	821.21	2114.23	864.57	0.00	0.00	800.10	851.80	0.00
*		28.000	60.20	0.82	61.41	248.79	0.24	2900.21	899.55	285.00	800.00	800.10	851.80	1085.00
	AI	29.000	62.50	0.00	62.73	567.05	33.68	693.68	3072.64	0.00	0.00	773.30	841.70	0.00
		29.000	63.33	0.84	63.59	276.70	0.00	889.11	2910.89	276.70	773.30	773.30	841.70	1050.00

	3( )	63.89	0.00	64.00	533.65	4.63	.88	1159.49	0.00	0.00	776.10	839.90	0.00
AJ	30.)	64.42	0.52	64.55	223.90	0.00	1.06	1028.94	223.90	776.10	776.10	839.90	000.00
*	31.000	66.49	0.00	67.21	245.83	0.00	1366.66	833.33	0.00	0.00	775.20	826.50	0.00
* AK	31.000	66.77	0.28	68.57	60.18	0.00	1996.68	203.32	0.48	775.20	775.20	826.50	840.00
AL	32.000	72.46	0.00	72.87	264.34	0.00	629.42	1570.58	0.00	0.00	712.10	749.90	0.00
	32.000	72.98	0.53	73.22	246.17	0.00	547.42	1652.58	248.00	712.00	712.10	749.90	960.00
	32.100	75.72	0.00	76.27	261.61	0.00	1151.14	1048.86	0.00	0.00	851.80	908.80	0.00
* AM	32.100	76.20	0.48	77.53	94.87	0.00	1768.16	431.84	0.49	851.80	851.80	908.80	960.00
* AN	32.300	79.59	0.00	80.04	218.34	0.00	2200.00	0.00	0.00	0.00	647.40	999.00	0.00
*	32.300	80.07	0.48	80.34	278.97	0.00	2200.00	0.00	0.00	647.40	647.40	999.00	972.00
	33.000	82.32	0.00	82.94	363.36	310.21	1889.79	0.00	0.00	0.00	756.50	856.90	0.00
AO	33.000	82.16	-0.15	83.24	84.28	0.00	2200.00	0.00	0.36	756.50	756.50	856.90	836.00
*	34.000	89.88	0.00	90.60	271.57	638.33	1496.24	65.43	0.00	0.00	748.60	816.60	0.00
AT	34.000	90.47	0.59	91.89	68.00	0.00	2200.00	0.00	0.47	748.60	748.60	816.60	816.60
	35.000	95.33	0.00	96.37	138.74	481.43	1509.99	212.58	0.00	0.00	718.90	772.40	0.00
AR	35.000	96.37	1.05	97.92	53.50	0.00	2200.00	0.00	0.39	718.90	718.90	772.40	772.40
	36.000	102.57	0.00	103.29	154.23	1.09	1369.71	829.20	0.00	0.00	589.10	671.40	0.00
	36.000	102.87	0.31	103.43	151.62	0.00	1350.30	849.70	268.00	589.00	589.10	671.40	857.00
*	36.100	104.70	0.00	105.41	288.41	0.00	787.35	1412.65	0.00	0.00	521.60	574.20	0.00
*	36.100	104.78	0.07	105.45	297.62	0.00	806.83	1393.17	328.00	522.00	521.60	574.20	850.00
	36.200	105.49	0.00	105.58	270.40	273.87	44.17	1881.96	0.00	0.00	558.80	569.10	0.00
	36.200	105.53	0.04	105.61	267.06	275.43	44.61	1879.96	275.00	500.00	558.80	569.10	772.00
*	37.100	108.21	0.00	110.48	42.14	0.00	2199.15	0.85	0.00	0.00	543.10	592.60	0.00
*	37.100	108.17	-0.03	110.48	39.65	0.00	2200.00	0.00	0.01	543.10	543.10	592.60	592.60
	37.300	110.71	0.00	110.85	158.87	1095.39	1103.64	0.96	0.00	0.00	511.90	595.70	0.00
	37.300	110.72	0.01	110.87	137.90	1018.42	1181.58	0.00	155.70	440.00	511.90	595.70	595.70

*	38.00	111.00	0.00	112.09	124.26	171.43	328.57	0.00	0.00	0.00	407.80	503.30	0.00
*	38.100	110.95	-0.05	112.36	83.81	0.00	2200.00	0.00	102.00	402.00	407.80	503.30	504.00
*	38.300	112.26	0.00	113.29	144.61	515.34	1684.66	0.00	0.00	0.00	455.60	511.90	0.00
*	38.300	112.33	0.07	114.33	49.34	0.38	2199.62	0.00	57.00	455.00	455.60	511.90	512.00
	39.100	114.66	0.00	115.18	171.89	870.82	1329.18	0.00	0.00	0.00	526.60	586.00	0.00
	39.100	115.62	0.97	115.99	156.06	854.67	1345.33	0.00	171.00	415.00	526.60	586.00	586.00
*	39.300	116.35	0.00	117.41	127.69	1018.60	1181.40	0.00	0.00	0.00	571.70	629.20	0.00
*	39.300	116.48	0.13	117.42	128.85	1050.07	1149.92	0.00	190.00	439.00	571.70	629.20	629.00
	40.100	120.32	0.00	121.07	142.02	1070.84	1129.16	0.00	0.00	0.00	561.40	597.90	0.00
*	40.100	120.76	0.45	122.29	73.42	558.98	1641.02	0.00	0.41	520.35	561.40	597.90	597.70
*	40.300	121.07	0.00	122.08	130.07	1133.61	1066.39	0.00	0.00	0.00	556.60	591.30	0.00
	40.300	121.78	0.71	123.47	62.04	693.75	1506.24	0.00	0.43	522.46	556.60	591.30	591.30
*	41.100	123.47	0.00	124.57	135.71	959.17	1240.82	0.00	0.00	0.00	581.90	628.70	0.00
*	41.100	124.14	0.67	126.04	54.76	479.40	1720.60	0.00	0.42	559.81	581.90	628.70	628.70
*	41.300	125.94	0.00	126.86	150.15	1290.09	909.91	0.00	0.00	0.00	591.50	632.20	0.00
*	41.300	126.76	0.81	128.36	62.34	824.91	1375.09	0.00	0.46	561.89	591.50	632.20	632.20
	42.100	130.59	0.00	131.31	124.23	1663.25	536.75	0.00	712.10	0.00	666.60	712.10	712.10
	42.100	131.21	0.62	131.68	126.69	1694.05	505.95	0.00	712.10	0.00	666.60	712.10	712.10
*	42.300	131.13	0.00	132.50	89.26	1275.80	924.20	0.00	715.00	0.00	670.70	715.00	715.00
*	42.300	131.13	0.00	132.50	89.26	1275.80	924.20	0.00	715.00	0.00	670.70	715.00	715.00
	43.000	134.37	0.00	135.05	131.27	0.00	2020.23	179.77	0.00	0.00	645.00	754.10	0.00
	43.000	134.40	0.04	135.24	95.90	0.00	2200.00	0.00	0.13	645.00	645.00	754.10	754.10
	44.000	139.75	0.00	140.43	213.12	736.92	1435.99	27.09	0.00	0.00	793.30	855.50	0.00
	44.000	140.48	0.72	141.80	62.20	0.00	2200.00	0.00	0.48	793.30	793.30	855.50	855.50
	45.000	143.41	0.00	143.91	249.83	510.88	1134.41	554.71	0.00	0.00	821.90	914.70	0.00
	45.000	144.19	0.78	144.58	195.00	863.47	1328.41	8.12	195.00	725.00	821.90	914.70	920.00

	4)	145.10	0.00	145.51	300.01	158.65	.86	635.49	0.00	0.00	739.80	816.80	0.00
	46)	145.28	0.17	146.46	77.00	7.71	.29	0.00	77.00	739.00	739.80	816.80	816.80
	47.000	146.71	0.00	146.82	400.75	0.00	1700.00	0.00	0.00	0.00	427.00	902.00	0.00
	47.000	147.49	0.79	147.58	297.00	0.00	1700.00	0.00	297.00	453.00	427.00	902.00	750.00
	48.000	149.89	0.00	150.24	369.28	1.29	1462.35	236.36	0.00	0.00	328.20	538.10	0.00
*	48.000	149.75	-0.13	150.40	210.00	0.00	1700.00	0.00	210.00	328.00	328.20	538.10	538.00
	49.000	157.10	0.00	157.46	352.14	775.41	924.59	0.00	0.00	0.00	639.30	726.20	0.00
	49.000	157.90	0.79	158.38	131.37	389.34	1310.66	0.00	146.00	580.00	639.30	726.20	726.00
	50.000	163.97	0.00	164.46	211.30	0.00	1700.00	0.00	0.00	0.00	343.20	586.30	0.00
	50.000	163.96	-0.01	164.46	210.57	0.00	1700.00	0.00	0.00	343.20	343.20	586.30	586.30
	51.000	167.21	0.00	167.54	143.21	442.21	1257.79	0.00	0.00	0.00	471.40	570.40	0.00
	51.000	167.62	0.41	168.11	95.86	0.00	1700.00	0.00	0.30	471.40	471.40	570.40	570.40
*	52.000	169.17	0.00	169.86	191.25	0.00	1700.00	0.00	0.00	0.00	419.90	648.10	0.00
	52.000	169.47	0.30	169.93	200.47	0.00	1700.00	0.00	0.00	419.90	419.90	648.10	648.10
	52.100	175.77	0.00	176.07	247.34	1.40	1698.59	0.00	0.00	0.00	476.90	738.50	0.00
	52.100	175.53	-0.23	175.94	220.47	0.00	1700.00	0.00	0.02	476.90	476.90	738.50	738.50
*	52.300	177.51	0.00	178.18	202.34	0.00	1029.73	670.27	0.00	0.00	410.00	519.60	0.00
*	52.300	178.14	0.63	179.32	84.63	0.00	1700.00	0.00	0.53	410.00	410.00	519.60	519.60
	53.000	181.50	0.00	181.94	186.60	0.00	1194.36	505.64	0.00	0.00	267.70	424.10	0.00
	53.000	182.49	1.00	182.96	108.01	0.00	1700.00	0.00	0.40	267.70	267.70	424.10	424.10
*	54.000	190.96	0.00	191.68	193.96	0.00	1517.38	182.62	0.00	0.00	342.50	467.20	0.00
*	54.000	190.68	-0.29	191.92	79.18	0.00	1700.00	0.00	0.30	342.50	342.50	467.20	467.20
*	54.100	199.27	0.00	200.31	112.35	45.75	1533.26	120.99	0.00	0.00	388.90	484.60	0.00
	54.100	199.73	0.46	200.76	65.68	0.00	1700.00	0.00	0.21	388.90	388.90	484.60	484.60
	54.300	200.58	0.00	200.86	156.70	708.91	991.09	0.00	0.00	0.00	492.50	577.90	0.00
	54.300	200.93	0.35	201.42	107.09	290.23	1409.77	0.00	0.37	430.77	492.50	577.90	577.90

*	55.[illegible] 0	207.86	0.00	208.53	209.76	566.55	[illegible].69.70	463.75	0.00	0.00	520.70	565.10	0.00
*	55.000	208.41	0.55	209.54	90 34	738 34	961.66	0.00	100.00	465.00	520.70	565.10	560.00
	56.000	217.93	0.00	218.25	317.56	356.84	497.56	845.60	0.00	0.00	576.10	639.70	0.00
	56.000	218.97	1.04	219.41	178 42	0.00	857.17	842.83	0.60	576.10	576.10	639.70	724.[illegible]
*	57.000	224.60	0.00	225.21	283.94	342.72	1030.98	326.29	0.00	0.00	599.70	650.50	0.00
*	57.000	225.37	0.77	226.65	80.37	0.00	1642.08	57.92	0.60	599.70	599.70	650.50	680.61
*	57.100	228.81	0.00	229.59	179.72	344.98	1252.40	102.61	0.00	0.00	672.50	726.20	0.00
	57.100	229.81	1.00	230.80	53.70	0.00	1700.00	0.00	0.45	672.50	672.50	726.20	726.20
*	57.300	230.92	0.00	231.00	437.71	453.01	559.09	687.89	0.00	0.00	674.50	726.20	0.00
*	57.300	231.92	1.00	232.06	150.95	180.31	823.44	696.25	0.48	654.33	674.50	726.20	800.[illegible]
*	58.000	234.30	0.00	234.90	243.76	72.84	342.51	1284.65	0.00	0.00	592.00	670.50	0.00
*	58.000	234.35	0 05	234.93	227.59	72.16	342.17	1285.67	280.00	560.00	592.00	670.50	840.00
*	59.000	247.37	0.00	247.87	331.89	149.19	810.16	740.65	0.00	0.00	649.40	713.90	0.00
	59.000	248.12	0.75	249.43	71.14	0.00	1619.07	80.93	0.66	649.40	649.40	713.90	770.50
	60.000	253.08	0.00	253.53	283 22	712.07	238.60	749.33	0.00	0.00	707.30	736.30	0.00
	60.000	253.84	0.77	254.35	147.58	330.83	335.11	1034.06	149.00	676.00	707.30	736.30	825.00
	61.000	257.46	0.00	257.66	429.87	0.00	1690.11	9.89	0.00	0.00	436.40	827.80	0.00
	61.000	257.44	-0.02	257.65	379.55	0.00	1700.00	0.00	0.08	436.40	436.40	827.80	827.80
	62.000	260.62	0.00	261.21	137.73	0.00	1700.00	0.00	0.00	0.00	641.00	822.10	0.00
	62.000	260.65	0.03	261.22	138.25	0.00	1700.00	0.00	0.00	641.00	641.00	822.10	822.10
*	63.000	270.35	0.00	270.91	224.01	1518 44	181.56	0.00	0.00	0.00	727.70	784.90	0.00
*	63.000	271.27	0.92	272.34	98.89	1302.40	397.59	0.00	0.60	652.32	727.70	784.90	784.90
*	64.000	282.79	0.00	283.65	134.20	541.37	1158.63	0.00	0.00	0.00	729.50	781.00	0.00
	64.000	283.48	0.69	284.96	49.57	0.00	1700.00	0.00	0.44	729.50	729.50	781.00	781.00
*	65.000	291.20	0.00	292.15	124.78	11.79	1677.95	10.26	0.00	0.00	476.00	584.50	0.00
*	65.000	291.16	-0.05	292.19	102.84	0.00	1700.00	0.00	0.07	476.00	476.00	584.50	584.50

	66.000	300.34	0.00	301.03	134.90	1.15	.85	0.00	0.00	0.00	566.00	697.80	0.00
	66.000	300.41	0.07	301.05	131.80	0.00	0.00	0.00	0.01	566.00	566.00	697.80	697.80
	67.000	307.87	0.00	308.57	167.17	502.24	1184.81	12.95	0.00	0.00	522.00	671.20	0.00
	67.000	308.22	0.35	309.16	118.13	0.00	1700.00	0.00	0.36	522.00	522.00	671.20	671.20
	68.000	313.43	0.00	314.04	123.23	0.00	1696.13	3.87	0.00	0.00	626.70	753.70	0.00
	68.000	313.67	0.24	314.17	120.73	0.00	1700.00	0.00	0.01	626.70	626.70	753.70	753.70
*	69.000	326.95	0.00	327.98	110.50	25.75	1604.73	69.52	0.00	0.00	477.40	558.50	0.00
*	69.000	326.94	-0.01	328.15	81.10	0.00	1700.00	0.00	0.12	477.40	477.40	558.50	558.50

SUMMAR F ERRORS

CAUTION SECNO= 11.300 PROFILE= 1 HYDRAULIC JUMP D.S.

CAUTION SECNO= 13.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 13.000 PROFILE= 1 MINIMUM SPECIFIC ENERGY

CAUTION SECNO= 17.100 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 17.100 PROFILE= 1 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 17.100 PROFILE= 1 20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO= 17.100 PROFILE= 2 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 17.100 PROFILE= 2 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 17.100 PROFILE= 2 20 TRIALS ATTEMPTED TO BALANCE WSEL

CAUTION SECNO= 18.100 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 18.100 PROFILE= 1 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 18.100 PROFILE= 1 20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO= 18.100 PROFILE= 2 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 18.100 PROFILE= 2 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 18.100 PROFILE= 2 20 TRIALS ATTEMPTED TO BALANCE WSEL

CAUTION SECNO= 18.400 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 18.400 PROFILE= 1 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 18.400 PROFILE= 1 20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO= 18.400 PROFILE= 2 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 18.400 PROFILE= 2 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 18.400. PROFILE= 2 20 TRIALS ATTEMPTED TO BALANCE WSEL

CAUTION SECNO= 20.000 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 20.000 PROFILE= 1 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 20.000 PROFILE= 1 20 TRIALS ATTEMPTED TO BALANCE WSEL

CAUTION SECNO= 20.300 PROFILE= 1 CRITICAL DEPTH ASSUMED
CAUTION SECNO= 20.300 PROFILE= 1 PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO= 20.300 PROFILE= 1 20 TRIALS ATTEMPTED TO BALANCE WSEL
CAUTION SECNO= 20.300 PROFILE= 2 CRITICAL DEPTH ASSUMED

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CAUTION  SECNO=   20.300  PROFILE= 2  20 TRIALS ATTEMPTED TO BALANCE WSEL

CAUTION     NO=   20.600  PROFILE= 1  HYDRAULIC JUMP D.S.
CAUTION  SECNO=   20.600  PROFILE= 2  HYDRAULIC JUMP D.S.

CAUTION  SECNO=   23.000  PROFILE= 2  CRITICAL DEPTH ASSUMED
CAUTION  SECNO=   23.000  PROFILE= 2  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION  SECNO=   23.000  PROFILE= 2  20 TRIALS ATTEMPTED TO BALANCE WSEL

CAUTION  SECNO=   28.000  PROFILE= 1  CRITICAL DEPTH ASSUMED
CAUTION  SECNO=   28.000  PROFILE= 1  PROBABLE MINIMUM SPECIFIC ENERGY
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CAUTION  SECNO=   28.000  PROFILE= 2  CRITICAL DEPTH ASSUMED
CAUTION  SECNO=   28.000  PROFILE= 2  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION  SECNO=   28.000  PROFILE= 2  20 TRIALS ATTEMPTED TO BALANCE WSEL

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CAUTION  SECNO=   31.000  PROFILE= 1  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION  SECNO=   31.000  PROFILE= 1  20 TRIALS ATTEMPTED TO BALANCE WSEL
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CAUTION  SECNO=   31.000  PROFILE= 2  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION  SECNO=   31.000  PROFILE= 2  20 TRIALS ATTEMPTED TO BALANCE WSEL

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CAUTION  SECNO=   32.100  PROFILE= 2  20 TRIALS ATTEMPTED TO BALANCE WSEL

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CAUTION  SECNO=   32.300  PROFILE= 2  HYDRAULIC JUMP D.S.

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CAUTION  SECNO=   34.000  PROFILE= 1  MINIMUM SPECIFIC ENERGY

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CAUTION   SECNO=   37.100  PROFILE= 2  CRITICAL DEPTH ASSUMED
CAUTION   SECNO=   37.100  PROFILE= 2  PROBABLE MINIMUM SPECIFIC ENERGY
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CAUTION   SECNO=   41.100  PROFILE= 2  CRITICAL DEPTH ASSUMED
CAUTION   SECNO=   41.100  PROFILE= 2  MINIMUM SPECIFIC ENERGY
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CAUTION    SECNO=    54.100  PROFILE= 1  MINIMUM SPECIFIC ENERGY

CAUTION    SECNO=    55.000  PROFILE= 1  CRITICAL DEPTH ASSUMED
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CAUTION  SECNO=    63.000  PROFILE= 2  MINIMUM SPECIFIC ENERGY

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CAUTION  SECNO=    64.000  PROFILE= 1  MINIMUM SPECIFIC ENERGY

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CAUTION  SECNO=    65.000  PROFILE= 1  MINIMUM SPECIFIC ENERGY
CAUTION  SECNO=    65.000  PROFILE= 2  CRITICAL DEPTH ASSUMED
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CAUTION   SECNO=    69.000  PROFILE= 2  CRITICAL DEPTH ASSUMED
CAUTION   SECNO=    69.000  PROFILE= 2  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION   SECNO=    69.000  PROFILE= 2  20 TRIALS ATTEMPTED TO BALANCE WSEL
```

FLOODWAY DATA,
PROFILE NO. 2

STATION	FLOODWAY WIDTH	FLOODWAY SECTION AREA	FLOODWAY MEAN VELOCITY	WATER SURFACE ELEVATION WITH FLOODWAY	WITHOUT FLOODWAY	DIFFERENCE
A 10.000	300.	1297.	2.9	13.0	12.0	1.0
B 10.100	400.	2605.	1.5	13.4	12.5	0.9
C 10.300	350.	2174.	1.7	13.4	12.5	0.9
D 11.100	300.	1794.	2.1	13.6	12.6	1.0
E 11.300	300.	1917.	2.0	13.7	12.8	0.9
F 12.100	130.	634.	6.0	13.5	12.8	0.7
G 13.000	222.	639.	5.9	13.9	13.3	0.6
H 14.100	334.	922.	4.1	16.1	15.7	0.4
I 14.300	341.	1073.	3.5	16.3	16.0	0.3
J 15.000	337.	946.	4.0	16.8	16.6	0.2
K 16.000	565.	1380	2.8	17.2	17.0	0.2
L 17.100	696.	1009.	3.8	19.9	19.9	0.0
M 17.300	696.	1353.	2.8	20.5	20.5	0.0
N 18.100	675.	908.	4.2	21.1	21.1	0.0
O 18.300	708.	3109.	1.2	22.0	22.0	0.0
P 18.400	755.	648.	5.9	22.7	22.7	0.0
Q 18.600	770.	566.	6.7	23.3	23.3	0.0
R 18.700	800.	1562.	2.4	26.2	25.8	0.4
S 18.900	800.	1702.	2.2	26.3	25.9	0.4
T 19.000	543.	976.	3.9	26.8	26.2	0.6
U 20.000	125.	441.	8.6	30.2	29.2	1.0
V 20.100	463.	1599.	2.4	32.6	31.8	0.8
W 20.200	495.	1177.	3.2	32.6	31.9	0.7
X 20.300	537.	511.	7.4	33.5	33.5	0.0
Y 20.400	306.	798.	4.8	37.1	36.6	0.5
Z 20.600	240.	918.	4.1	38.0	38.0	0.0
AA 21.000	159.	518.	7.3	38.5	38.2	0.3
AB 22.000	414.	1179.	3.2	41.4	40.2	1.2
AC 23.000	314.	626.	6.1	44.5	44.5	0.0
AD 24.000	140.	618.	6.1	49.5	49.2	0.3
AE 25.000	112.	457.	8.3	52.1	51.7	0.4
AF 26.000	288	747.	5.1	55.9	55.5	0.4
AG 27.000	319.	882.	4.3	57.9	57.6	0.3
AH 28.000	285.	546.	7.0	60.2	59.4	0.8
AI 29.000	277.	939.	4.0	63.3	62.5	0.8
AJ 30.000	224.	827.	2.7	64.4	63.9	0.5
AK 31.000	60.	213.	10.3	66.8	66.5	0.3
AL 32.000	246.	578.	3.8	73.0	72.5	0.5
AM 32.100	110.	255.	8.6	76.2	75.7	0.5
AN 32.300	279.	528.	4.2	80.1	79.6	0.5
AO 33.000	84.	265.	8.3	82.2	82.3	-0.1
AP 34.000	68.	230.	9.6	90.5	89.9	0.6

FLOODWAY
PROFILE NO. 2

STATION	FLOODWAY WIDTH	FLOODWAY SECTION AREA	FLOODWAY MEAN VELOCITY	WATER SURFACE ELEVATION WITH FLOODWAY	WITHOUT FLOODWAY	DIFFERENCE
AQ 35.000	54.	221.	10.0	96.3	95.3	1.0
AR 36.000	268.	378.	5.8	102.9	102.6	0.3
AS 36.100	327.	338.	6.5	104.8	104.7	0.1
AT 36.200	267.	957.	2.3	105.5	105.5	0.0
AU 37.100	40.	180.	12.2	108.2	108.2	0.0
AV 37.300	138.	699.	3.1	110.7	110.7	0.0
AW 38.100	84.	231.	9.5	111.0	111.0	0.0
AX 38.300	49.	194.	11.4	112.4	112.3	0.1
AY 39.100	161.	473.	4.7	115.7	114.7	1.0
AZ 39.300	172.	291.	7.6	116.5	116.4	0.1
BA 40.100	74.	230.	9.6	120.7	120.3	0.4
BB 40.300	68.	213.	10.3	121.8	121.1	0.7
BC 41.100	55.	202.	10.9	124.2	123.5	0.7
BD 41.300	62.	218.	10.1	126.7	125.9	0.8
BE 42.100	127.	402.	5.5	131.2	130.6	0.6
BF 42.300	89.	235.	9.4	131.1	131.1	0.0
BG 43.000	96.	299.	7.4	134.4	134.4	0.0
BH 44.000	62.	239.	9.2	140.5	139.8	0.7
45.000	195.	445.	4.9	144.2	143.4	0.8
BI 46.000	77.	253.	8.7	145.3	145.1	0.2
BJ 47.000	297.	730.	2.3	147.5	146.7	0.8
BK 48.000	210.	263.	6.5	149.9	149.9	0.0
BL 49.000	131.	314.	5.4	157.9	157.1	0.8
BM 50.000	211.	300.	5.7	164.0	164.0	0.0
BN 51.000	96.	303.	5.6	167.6	167.2	0.4
BO 52.000	200.	314.	5.4	169.5	169.2	0.3
BP 52.100	259.	333.	5.1	175.7	175.8	-0.1
BA 52.300	85.	196.	8.7	178.1	177.5	0.6
BR 53.000	108.	312.	5.5	182.5	181.5	1.0
BS 54.000	79.	190.	8.9	190.8	191.0	-0.2
BT 54.100	66.	209.	8.1	199.8	199.3	0.5
BU 54.300	146.	303.	5.6	201.0	200.6	0.4
BV 55.000	100.	199.	8.5	208.4	207.9	0.5
BW 56.000	209.	328.	5.2	218.9	217.9	1.0
BX 57.000	80.	196.	8.7	225.4	224.6	0.8
BY 57.100	54.	212.	8.0	229.8	228.8	1.0
BZ 57.300	151.	569.	3.0	231.9	230.9	1.0
CA 58.000	280.	283.	6.0	234.4	234.3	0.1
CB 59.000	71.	186.	9.1	248.2	247.4	0.8
CC 60.000	149.	297.	5.7	253.9	253.1	0.8
CD 61.000	380.	467.	3.6	257.5	257.5	0.0
CE 62.000	138.	280.	6.1	260.6	260.6	0.0

FLOODWAY DATA,
PROFILE NO. 2

STATION	FLOODWAY WIDTH	FLOODWAY SECTION AREA	FLOODWAY MEAN VELOCITY	WATER SURFACE ELEVATION WITH FLOODWAY	WITHOUT FLOODWAY	DIFFERENCE
CF 63.000	99.	205.	8.3	271.2	270.3	0.9
CG 64.000	50.	174.	9.8	283.5	282.8	0.7
CH 65.000	103.	208.	8.2	291.2	291.2	0.0
CI 66.000	132.	266.	6.4	300.4	300.3	0.1
CJ 67.000	118.	219.	7.8	308.2	307.9	0.3
CK 68.000	121.	300.	5.7	313.6	313.4	0.2
CL 69.000	81.	192.	8.9	326.9	326.9	0.0

I-5 North Coast Widening Floodplain Studies
Caltrans
DE Project 1683

RECORD OF CONVERSATION

DATE: 09/21/07 **TIME:** 8:30 AM **DE FILE No.** 1683-300

RECORDED BY: Glen Parker

SPOKE WITH: Ray Martinez

TELEPHONE No. 703-317-6251

NATURE OF CALL: ☐ Incoming ☒ Outgoing ☐ Meeting

DISTRIBUTION: Ray Martinez (Michael Baker), Glen Parker (Dokken Engineering), Tim Brownson (Caltrans), Wen Cheng (Michael Baker), Mike Skowronek (Michael Baker)

SUBJECT OF CONVERSATION: Acceptable FEMA floodplain modeling procedures

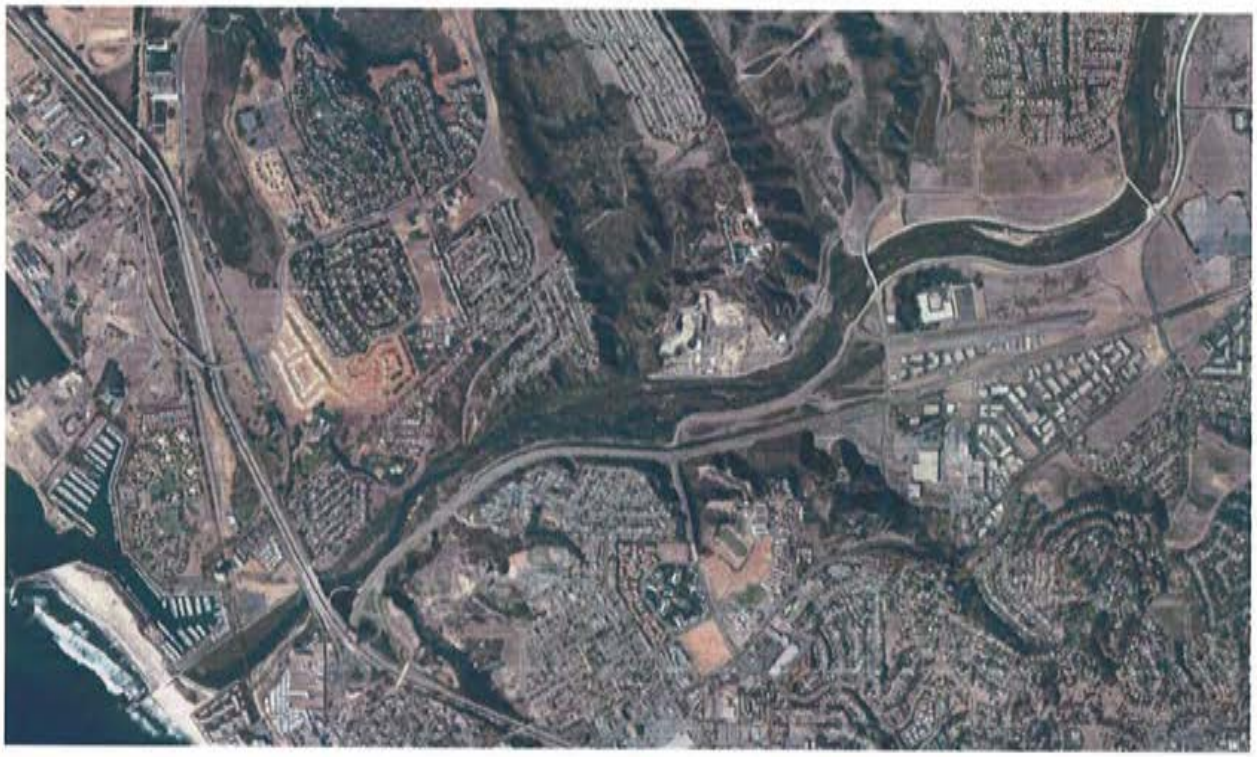
ITEMS DISCUSSED:

Available Backup Data to generate previously approved floodplain models: Glen explained that a formal request has been submitted for backup floodplain information for lagoons and creeks along I-5 with Zone AE floodplains between San Diego and Oceanside. In some cases the HEC-2 data provided by Michael Baker Corporation was limited and did not have enough information to recreate previously generated floodplain models with reasonable accuracy. Glen said in these cases, Dokken Engineering would prefer to create HEC-RAS models which tie in with FEMA cross sections to use as a basis for existing conditions. Ray said Dokken Engineering must use their expertise to decide whether the existing FEMA data can be reused and to document efforts in a Technical Studies Data Notebook (TSDN). There have been past situations which required an existing model to be recreated and it is acceptable to FEMA as long as the appropriate documentation supports the procedure. Glen agreed to document the scenarios where existing models could not be used with accuracy.

Coordination with FEMA and Caltrans: Glen said that Caltrans is in the planning phase for the I-5 North Coast Widening, which will widen I-5 from San Diego to Oceanside. At this point in time, a preferred alternative has not been identified and therefore no coordination has occurred between Caltrans and FEMA to begin processing LOMRs. Glen said the final design of this project would likely occur in different phases several years in the future. It would be beneficial to coordinate with FEMA when needed during the process. Glen asked who the appropriate FEMA contacts may be to continue coordination when needed throughout the process. Ray said to coordinate with Wen Chen and Michael Skowronek, who work at the RMC for FEMA Region IX and can act as Outreach Coordinators on behalf of FEMA, when appropriate depending on the development of the project.

SECTION 11

San Luis Rey River Location Hydraulic Study



SECTION 11: SAN LUIS REY RIVER LOCATION HYDRAULIC STUDY

11.0 PROJECT PURPOSE AND VICINITY MAP



Figure 1: Project Vicinity Map
The I-5 Bridge is located in the City of Oceanside in the Northwestern region of San Diego County.
(Thomas Bros. pages 1085-J-6, 1086-A-6)

This study was prepared for Caltrans for the purpose of determining impacts to the San Luis Rey River base (100-year) flood from the proposed improvements to the Interstate-5 freeway.

This study specifically addresses the following:

1.) The San Luis Rey River 100-year floodplain as it presently exists,

2.) The San Luis Rey River 100-year floodplain after the I-5 Bridge has been widened.

3.) Performing a risk assessment associated with any possible encroachment, including impacts on natural and beneficial floodplain values, probable incompatible floodplain development, and special mitigation measures needed (if any) to minimize impacts to the floodplain.

The proposed improvements to the I-5 Bridge over the San Luis Rey River require that the bridge be widened within a range of 7.5 to 26.6 feet to the east. The existing I-5 Bridge consists of two bridges spaced 24 feet apart. Both the left bridge (57-0713L) and right bridge (57-0713R) contain five bents with supporting pier walls. To accommodate the widening, the pier walls will also be extended to the east. The existing I-5 Bridge will be widened minimally to the west due to its clearance with the North Coast Highway Bridge, located approximately 8 feet downstream. This portion of the San Luis Rey River is designated as a 100-year Zone A99 floodplain, which is a special hazard area protected by a levee system. Results are provided in this study, which demonstrate that a negligible change in water surface elevation would occur to the existing conditions of the San Luis Rey River 100-year floodplain if the I-5 Bridge was widened.

11.1 DESCRIPTION OF WATERSHED



Figure 2: Regional Basin Area

The existing watershed of the San Luis Rey River is composed of 558 square miles, which is the largest drainage basin in the San Diego region. The watershed is bounded by the Moserate Mountains to the north, the Cleveland National Forest and Camp Pendleton to the northwest, and Escondido, San Diego, and other cities to the south. The basin is roughly 50 miles long by 16 miles wide and is divided into two hydrologic units, 903.11 and 903.32, by Henshaw Dam, which controls 36% of the watershed.

Unlike most major Rivers in Southern California, the San Luis Rey River has undergone relatively little channelization. The only significant segment of the River that has been channelized is within the City of Oceanside. However, the cumulative impacts of various land uses practices in the basin appear to be degrading the river's environmental value. Operations such as sand mining have contributed an increasing rate of bed erosion in the central reaches of the River.

11.2 FLOODPLAIN MODELING METHODOLOGY

The area of analysis ranged from 3,200 feet upstream to 2,500 feet downstream of the I-5 San Luis Rey River Bridges. In this region, constrictions occur as the flow passes under I-5, North Coast Highway, Metro Link Railroad and Pacific Street. The channel top widths range from 425 to 685 feet. Within the project limits, the channel bottom elevations range from 2.2 feet to 6.7 feet (NAVD 88). West of Pacific Street, the San Luis Rey River opens and outlets into the Pacific Ocean. Currently, five corrugated metal pipes (CMP) and one corrugated steel pipe arch (CSPA) passing under Pacific Street (Figure 3) serve as the last major constriction in the San Luis Rey River downstream of I-5. Pacific Street is also currently being rebuilt approximately 500 feet east of its current location. The existing Pacific Street roadway will be removed and the mouth of the San Luis Rey River will be opened up. This will eliminate the major back flow effects from the current conditions. The Pacific Street Bridge currently under construction was assumed as the existing condition for the effective model.

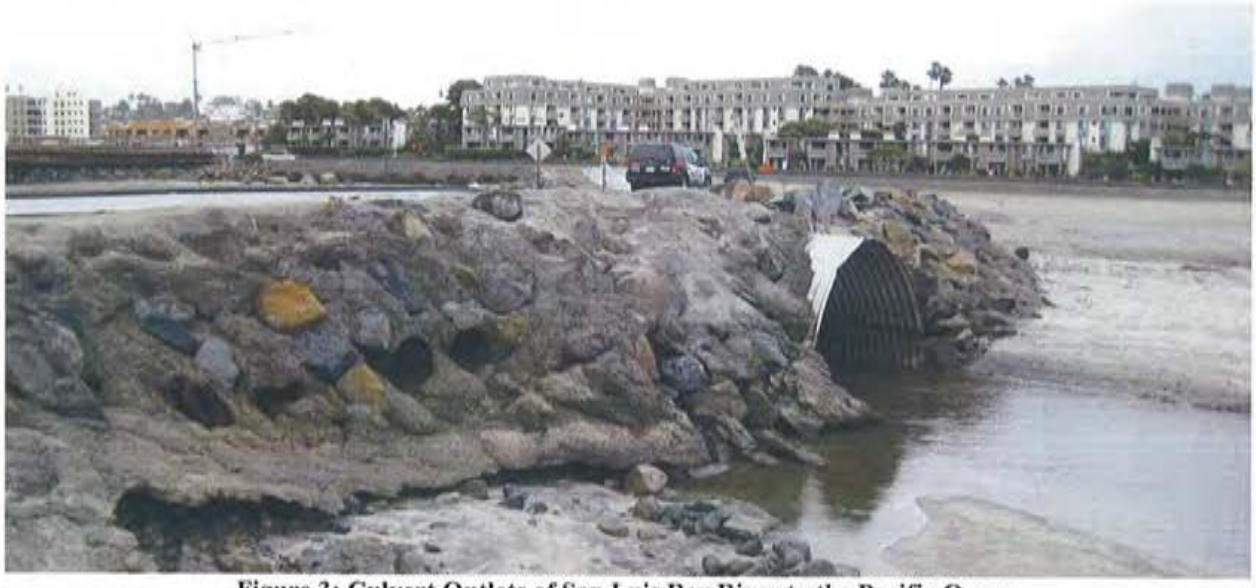


Figure 3: Culvert Outlets of San Luis Rey River to the Pacific Ocean.

Topography generated by the Army Corps of Engineers was used for the San Luis Rey River model. It should be noted that the topography data provided by the Army Corps of Engineers was based on a September 1998 aerial survey. Consequently, the digital terrain model from which the cross sections were generated showed the horizontal water surface elevations of the river rather than the channel bottom elevations. As this was during the summer, low-flow months of the river, the Corps lowered the horizontal ground surface points by 2 to 4 feet. These values were estimates and not based on field measurements. To supplement this topography, the grading plan for the proposed Pacific Street Bridge was used for the cross sections at the river mouth outlet into the Pacific Ocean. The topography obtained from the Corps utilized NGVD 29 Survey Vertical Datum. A program provided by National Geodetic Survey of National Oceanic Atmospheric Administration, "VERTCON" was used for vertical datum conversion to NAVD 88.

11.3. HEC-RAS INPUT

The HEC-RAS River Analysis System v3.1.3 is a graphically based computer program which has been developed by the U.S. Army Corps of Engineers Hydrologic Engineering Center. Input required by the software includes channel cross sectional geometry, channel roughness coefficients, starting water elevation, and a 100-yr storm event discharge. For this study, HEC-RAS was analyzed using the Standard Step Method under a mixed flow regime.

11.3.1 Cross Sectional Geometry

San Luis Rey River is in a FEMA Zone A99, indicating that it is protected by federal flood protection systems, and that no base flood elevations have been determined. The majority of the cross sections were placed perpendicular to the channel flow path. Some cross sections were skewed to allow channel reach lengths to accurately model the channel and the existing NCTD Railroad crossing. To better define the channel terrain, the cross sections were placed

closely together at locations where islands, depressions, expansions/contractions, and bridges occur. All results are provided in English units using NAVD 88.

11.3.1.1 Bridges

The bridges within the study area include the Pacific Street Bridge, the Metro Link Railroad Bridge, the Pacific Coast Highway Bridge, and the I-5 Bridge.

The Bridges are modeled at the following cross sections:

- Cross section #800 – Pacific Street Bridge
- Cross section #1200 – Metro Link Railroad Bridge
- Cross section #2430 – Pacific Coast Highway Bridge
- Cross section #2500 – I-5 Bridge(s)

Expansion/ contraction coefficients (0.1 and 0.3) are utilized throughout the modeled reach to represent energy losses due to gradual transitions in the geometry of the river channel. The existing bridges were modeled from as-builts (see Appendix C), and information gathered in the field. The San Luis Rey River Bridge (Widen) Advance Planning Study, dated 7-19-2005, was used to model the proposed widening of the I-5 Bridge. In addition, the bridge piers were modeled with diameters 25% larger. This approach was used to account for debris which could catch on the bridge piers and provide additional blockage to the flow. The highest energy answer was used to analyze the bridges in this model.



Figure 4: Pacific Street Bridge under construction, completion date October 2008.

The furthest downstream bridge is the Pacific Street Culvert (Figure 3). Which was constructed as a temporary crossing in 2005 when then Pacific Street was washed out due to high flows and substantial river currents. This is the last major constriction point of the San Luis Rey River. The river passes through a 22 foot wide by 15 foot tall CSPA

and five 2.5 foot CMP. A new Pacific Street Bridge, currently under construction (Figure 4), will span the river above the floodplain on three bridge bents. This will relieve the major constriction caused by Pacific Street. The bridge piers were modeled as 8.75 feet in diameter to account for debris.



Figure 5: Metro Link Railroad Bridge.

The Metro Link Railroad Bridge crosses the San Luis Rey River approximately 1200 feet upstream of the Pacific Ocean (Figure 5). The bridge deck is above the floodplain and will have no contact with the floodwaters. The bridge is supported on six concrete piers. The piers are wedge shaped, larger at the base than at the top. They were modeled as 10 foot piers to account for the variance of width and for debris.

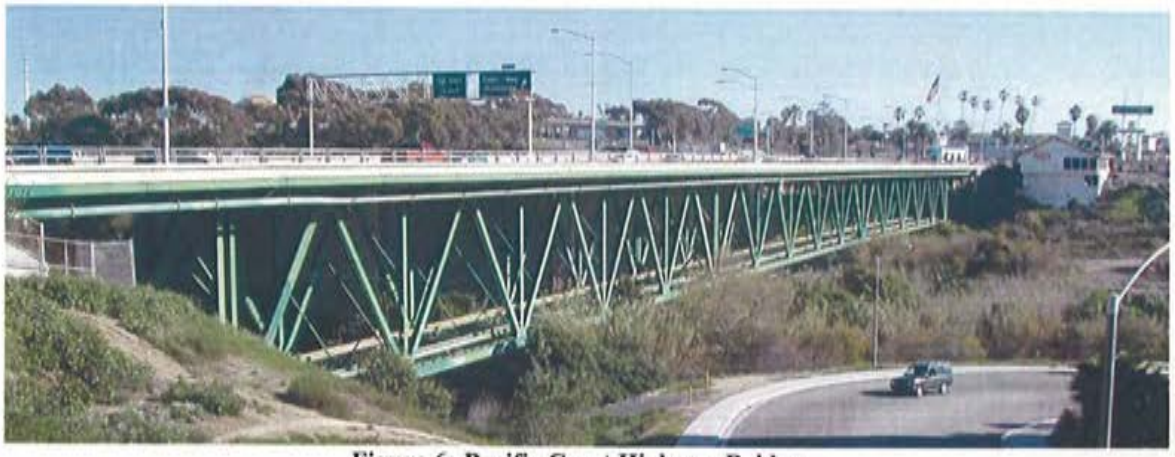


Figure 6: Pacific Coast Highway Bridge.

The existing Pacific Coast Highway (PCH) Bridge crosses the San Luis Rey River directly downstream of the I-5. The bridge deck is supported within the floodplain on

two pier walls (Figure 7) and a structural steel frame that is above the 100-yr floodplain. Since the structural steel frame supporting the bridge deck would not have contact with the floodwaters, it was left out of the bridge model. The bridge was modeled supported on two pier walls, 7.5 feet wide to account for debris.



Figure 7: Pacific Coast Highway Bridge pier wall.

Currently, the I-5 Bridges (Figure 8) are skewed 13° from the perpendicular of the San Luis Rey River. Studies have shown that bridge skews of less than or equal to 20° from the perpendicular of the flow line can be treated as a cross section with no skew (Hydraulic Reference Manual, 5-29). The I-5 Bridge falls under this category.



Figure 8: I-5 Bridges and the PCH Bridge.



Figure 9: I-5 Bridges pier walls.

The existing and proposed bridge decks are entirely above 100-year flood levels. The primary concern of modeling the possible encroachment of the San Luis Rey River from the I-5 Bridge widening was the extension of existing pier walls into the floodplain. The HEC-RAS bridge modeling option was utilized to simulate the widening. In both existing and proposed conditions, five rows of piers exist throughout the entire width of the bridge. The existing pier walls are 6 feet wide (Figure 9). The proposed bridge piers were modeled as 7.5 feet wide to account for possible debris and the pier walls were lengthened by approximately 26.6 feet.

11.3.1.2 Ineffective Flow Areas

Within the study area the San Luis Rey River channel is relatively straight and no areas of ineffective flow areas were required to model the floodplain.

11.3.1.3 Flood Insurance Study (FIS) Cross Sections

The San Luis Rey River basin is located in a Zone A99, a special hazard area protected by a levee system. The levee is located on the north side of the San Luis Rey River from west of the I-5 Bridges to Pacific Street. In a 100-year storm event, the levee will be sufficient to protect the houses built within the floodway. Title 44 of the Code of Federal Regulations, Part 65 – Identification and Mapping of Special Hazard Areas states that proposed floodplain models must tie into existing FEMA approved water surface profiles within "one-half foot." Though no base flood elevations have been determined, the river ties into the Pacific Ocean at a Zone AE where the base flood elevation has been determined to be 6 feet (NGVD 29).

11.3.1.4 Existing Floodplain Conditions

The project study area is in a Zone A99, and there have been no floodplain water surface elevations determined. A new existing model was required for comparison with the effects of the proposed bridge improvements. An existing conditions model was created based on the bridge plans for the Pacific Street Bridge, currently in construction, and topography received from the Army Corps of Engineers. Additional information for the existing model was obtained from a report titled *Pacific Street Bridge, Oceanside, California – Final Hydrology and Hydraulics Report,* by West Consultants, dated November 21, 2003.

11.3.2 Manning's Roughness Coefficient



Figure 3: Scattered Brush and Heavy Weeds



Figure 4: Light brush and trees



Figure 5: Scattered brush and heavy weeds



Figure 6: Sand, clean earth, straight and uniform

Each cross section contains a left overbank, main channel, and right overbank, which represent the different regions of the waterway in terms of roughness coefficients. The main channel is the base of the river, typically the low flow region of the river. The left and right overbanks represent the more vegetated banks of the river. Manning's Roughness Coefficients were obtained from *Haestad Methods*, *Floodplain Modeling Using HEC-RAS,*

first edition, and through field verification. For the north and south side slopes of the channel, a minimum roughness value of 0.03 was used to mimic a floodplain with high grass. In addition, a roughness value of 0.04 was used to model the scattered brush and heavy weeds for most of the right overbank. The left overbank upstream of the I-5 consisted of light brush and trees, a roughness value of 0.05. For the main channel, a clean straight stream was modeled with a Manning's number of 0.025. At the mouth of the river, a Manning's value of 0.018 was used to model sand on the beach.

11.3.3 Starting Water Elevation

The model was run in a mixed flow regime condition. The San Luis Rey River is in a FEMA Zone A99, which means that base flood elevations have not been determined. The river ties into the Pacific Ocean at a Zone AE where the base flood elevation has been determined to be 6 feet (NGVD 29), and was modeled as 8.2 feet (NAVD 88). Upstream, the slope of the channel was determined to be 0.000072 and used as the upstream boundary condition. The model does not tie exactly into the stated starting water surface elevation. The boundary condition was adjusted above and below the Zone AE determined elevation to test its impact on the floodplain elevations upstream. The sensitivity testing concluded that the boundary conditions did not affect the project area.

11.3.4 Discharge

FEMA FIS San Diego County, California and Incorporated Areas – Table 4 – Summary of Discharges, provided a discharge of 51,000 cfs at the river mouth. A higher discharge, 53,000 cfs, was used by West Consultants and was the discharge previously used by the U.S. Army Corps of Engineers. To maintain a conservative approach, 53,000 cfs was selected for the 100-year storm discharge.

11.4 HEC-RAS OUTPUT

The water surface elevations which are displayed in the output of this study are based on flooding that would occur during a 100-year storm. Appendix A contains water surface elevations, channel velocity, top width, flow regime, and bottom elevations for each cross section. Appendix B contains water surface elevations of each cross section, as well as other hydraulic results for comparison. As shown in Table A, no significant change to the existing 100-year floodplain would occur from the widening to the east side of I-5 and the addition of the proposed bridges.

Table A: Floodplain Comparison

River Station	Q Total	Exist W.S. Elevation	Prop W.S. Elevation	Change in Elevation	Existing Top Width	Proposed Top Width	Change in Width
	(cfs)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)
6042	53000	24.68	24.68	0.00	486.28	486.27	-0.01
5475	53000	24.15	24.14	-0.01	535.67	535.65	-0.02
4960	53000	22.3	22.29	-0.01	512.64	512.6	-0.04
4412	53000	22.52	22.51	-0.01	559.53	559.47	-0.06
3787	53000	21.48	21.48	0.00	475	474.91	-0.09
3305	53000	20.71	20.7	-0.01	470.3	470.27	-0.03
3089	53000	20.99	20.98	-0.01	489.37	489.34	-0.03
2839	53000	19.1	19.07	-0.03	421.34	421.23	-0.11
2748	53000	19.44	19.42	-0.02	436.13	436.04	-0.09
2500	53000	I-5 Bridge					
2477	53000	18.82	18.82	0.00	634.1	634.1	0
2430	53000	South Coast Highway Bridge					
2424	53000	19.09	19.09	0.00	683.93	683.93	0
2220	53000	17.55	17.55	0.00	545	545	0
1829	53000	15.13	15.13	0.00	519.75	519.75	0
1622	53000	14.52	14.52	0.00	594.28	594.28	0
1475	53000	15.11	15.11	0.00	647.66	647.66	0
1207	53000	15.29	15.29	0.00	662.38	662.38	0
1200	53000	NCTD Railroad Bridge					
1182	53000	13.9	13.9	0.00	654.58	654.58	0
844	53000	13.51	13.51	0.00	558.32	558.32	0
800	53000	Pacific Street Bridge					
761	53000	10.61	10.61	0.00	549.65	549.65	0
619	53000	9.91	9.91	0.00	527.34	527.34	0
264	53000	10.64	10.64	0.00	523.42	523.42	0
102	53000	9.44	9.44	0.00	524.89	524.89	0
0	53000	8.49	8.49	0.00	598.35	598.35	0

11.4.1 Warning Messages

Warning messages encountered during the proposed model include the following:

The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections, displayed at cross sections #0, #264, #761, #800, #884, #1200, #1475, #1622, #1829, #2220, #2424, #2430, #2839, #3089, #3305, #4960, and #5475. This message is common where the velocity between cross sections increases or decreases by more than 25 percent. This is due to obstructions such as bridges and additional cross sections are not normally added.

The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections, displayed at cross sections #844, #2424, #3089, #3305, # 4960, and #5475. Portions of the Carmel Valley Creek were relatively uniform and allowed for cross sections to be placed several hundred feet apart. These changes are appropriate based on the spacing of the sections.

The energy loss was greater than 1.0 ft (0.3 m) between the current and previous cross section. This may indicate the need for additional cross sections, displayed at cross sections #1829, #2220, and #4960. This message is occurring because of the changes and spacing of consecutive cross sections. These changes are appropriate based on the spacing of the sections.

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. This appeared at cross section #102, and #2220. To address this warning message, the model was run in a mixed flow regime instead of subcritical flow. This warning occurs in transitional flow between subcritical and supercritical flow. Since the model was run in a mixed flow regime, these cross sections are considered valid.

During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth, displayed at cross sections # 102, and #1829. This situation was confirmed with a Froude number equal to or close to 1, and the model was run under a mixed flow regime as a result to the warning.

11.5 RISK ASSESSMENT

Encroachment is defined by the Federal Emergency Management Agency (FEMA) as "construction, placement of fill, or similar alteration of topography in the floodplain that reduces the area available to convey floodwaters," and by the Federal Highway Administration (FHWA) as "an action within the base floodplain" (*Environmental Handbook Vol. 1*). Since I-5 Bridge widening is entirely above the 100-year floodplain, and only requires pier walls to be extended into the 100-year floodplain, minimal impacts will occur below the 100-year floodplain elevation. As proven in the hydraulic analysis provided in Appendix 'B', the extension of pier walls would not prevent the San Luis Rey River from conveying the 100-year storm within the

same limits as current conditions, both upstream and downstream of the proposed widening. Although the proposed work can be interpreted as an encroachment by both definitions, it is not a significant encroachment and does not create any greater risks. In addition, the County of San Diego Ordinance #9830 (New Series), which states that the increase shall be no more than 2/10 of 1 foot in the floodway of the San Luis Rey River is satisfied.

Natural and beneficial floodplain values, as defined in Chapter 17 "Definitions" in the Caltrans Standard Environmental Reference (SER), include fish, wildlife, plants, outdoor recreation, aquaculture, forestry, etc., that are found within a designated floodplain. Listed below are the beneficial uses of San Luis Rey River obtained from the Water Quality Control Plan for the San Diego Basin along with a short description and determination of impacts.

- Municipal and domestic supply. Includes uses of water for community, military, or individual water supply systems including, but not limited to drinking water. These water uses do not occur around the project site and therefore will remain unaffected.

- Freshwater replenishment. Includes uses of water for natural or artificial maintenance of surface water quantity or quality (e.g., salinity). The I-5 project does not affect the flow of the San Luis Rey River and therefore will not affect the freshwater replenishment downstream.

- Agricultural supply. This includes uses of water for farming, horticulture, or ranching, including but not limited to, irrigation, stock watering, or support of vegetation for range grazing. These items will not be affected since the agricultural areas along San Luis Rey River are considerably upstream of the I-5 crossing.

- Industrial service supply. This includes uses of water for industrial activities that do not depend primarily on water quality including, but not limited to, mining, cooling water supply, hydraulic conveyance, gravel washing, fire protection, or oil well re-pressurization. These activities do not occur around the project site and therefore will remain unaffected.

- Hydropower generation. Includes uses of water for hydropower generation. This activity does not occur near the I-5 Bridge and will not be affected by the planned widening.

- Contact and non-contact water recreation. Includes the uses of water for recreational activities involving proximity to water and contact with water, where ingestion of water is reasonably possible. These uses include, but are not limited to, swimming, wading, water-skiing, skin and SCUBA diving, diving, surfing, white water activities, fishing, use of natural hot springs, picnicking, sunbathing, hiking, beachcombing, camping, boating, tidepool and marine life study, hunting, sightseeing, or aesthetic enjoyment in conjunction with the above activities. It is unlikely that water recreation along the San Luis Rey River would take place in the immediate vicinity of the I-5 Bridge; however, the proposed conditions would not alter the amount of water recreation that may occur within the San Luis Rey River.

- Warm freshwater habitat. This includes uses of water that support warm water ecosystems including, but not limited to, preservation or enhancement of aquatic habitats,

vegetation, fish or wildlife, including invertebrates. The construction areas associated with the bridge widening may impact a limited amount of warm freshwater habitat. Currently, a Natural Environment Study (NES) is being prepared to support the I-5 North Coast Widening Project. The NES will assess if any warm freshwater habitat may be impacted and what mitigation measures, if any, are needed.

- Cold freshwater habitat. Includes uses of water that support cold water ecosystems including, but not limited to, preservation of enhancement of aquatic habitats, vegetation, fish or wildlife, including invertebrates. The construction areas associated with the bridge widening may impact a limited amount of cold freshwater habitat. Currently, a Natural Environment Study (NES) is being prepared to support the I-5 North Coast Widening Project. The NES will assess if any cold freshwater habitat may be impacted and what mitigation measures, if any, are needed.

- Wildlife habitat. This includes uses of water that supports terrestrial ecosystems including, but not limited to, preservation and enhancement of terrestrial habitats, vegetation, wildlife, or wildlife water and food sources. The construction areas associated with the bridge widening may impact a limited amount of wildlife habitat. Currently, an NES is being prepared to support the I-5 North Coast Widening Project. The NES will assess if any wildlife habitat may be impacted and what mitigation measures, if any, are needed.

Since the I-5 widening causes very minimal change on the floodplain, the natural and beneficial Floodplain Values of the San Luis Rey River would not be harmed by the extension existing pier walls. The proposed bridge is above the floodplain and only the extension of pier walls will encroach upon the floodplain, no significant impacts will occur to the San Luis Rey River, beyond what currently exists. The floodplain will not be significantly restricted and its values will not be altered. The widening would incorporate proposed improvements without causing any greater risks (to life or property within the floodplain). The expansion of the I-5 Bridge over the San Luis Rey River would cause no significant impacts to the 100-year floodplain.

11.6 SUMMARY AND CONCLUSION

From the water surface profiles generated by the HEC-RAS model, it was determined that only a slight change in water surface elevation occurred during the 100-year storm event. The extension of pier walls generates a minimal hydraulic impact to the existing floodplain upstream of the I-5 Bridge. Due to the flatness of the San Luis Rey River geometry, a small increase in water surface elevations would require a significant distance upstream to taper back into the existing floodplain. Since the change is slight and the proposed floodplain remains inside the FEMA floodplain, impacts to the existing floodplain are considered negligible.

APPENDIX A

Cross Section Locations Exhibit

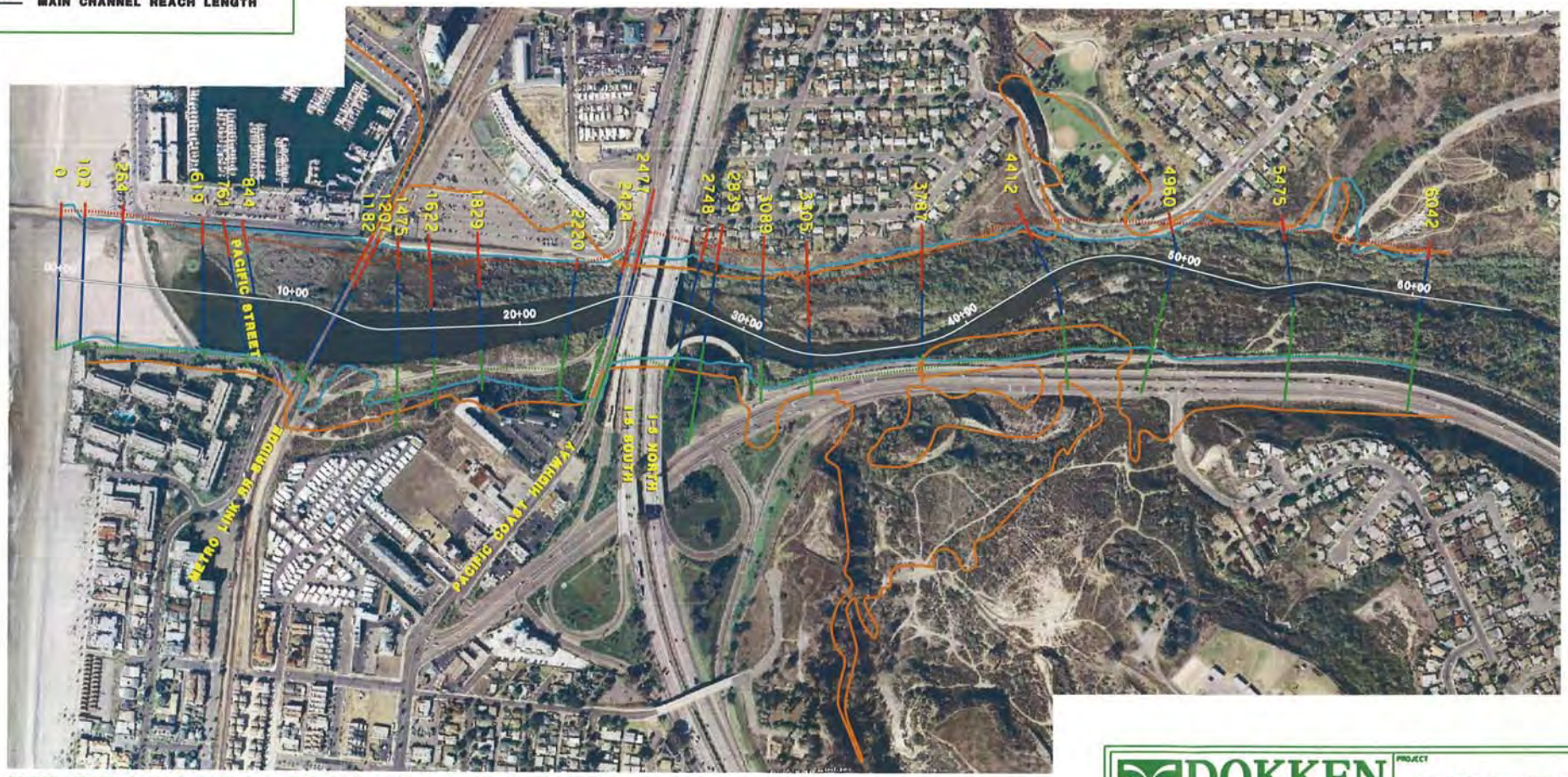
Flood Insurance Rate Map (FIRM)

Summary of Discharges

LEGEND:

- FEMA FLOODPLAIN
- PROPOSED FLOODPLAIN
- INEFFECTIVE FLOW AREA
- # CROSS SECTION RIVER STATION
- RIGHT OVERBANK CROSS SECTION
- LEFT OVERBANK CROSS SECTION
- MAIN CHANNEL CROSS SECTION
- RIGHT OVERBANK REACH LENGTH
- LEFT OVERBANK REACH LENGTH
- 00+00 MAIN CHANNEL REACH LENGTH

SCALE 1" =450'



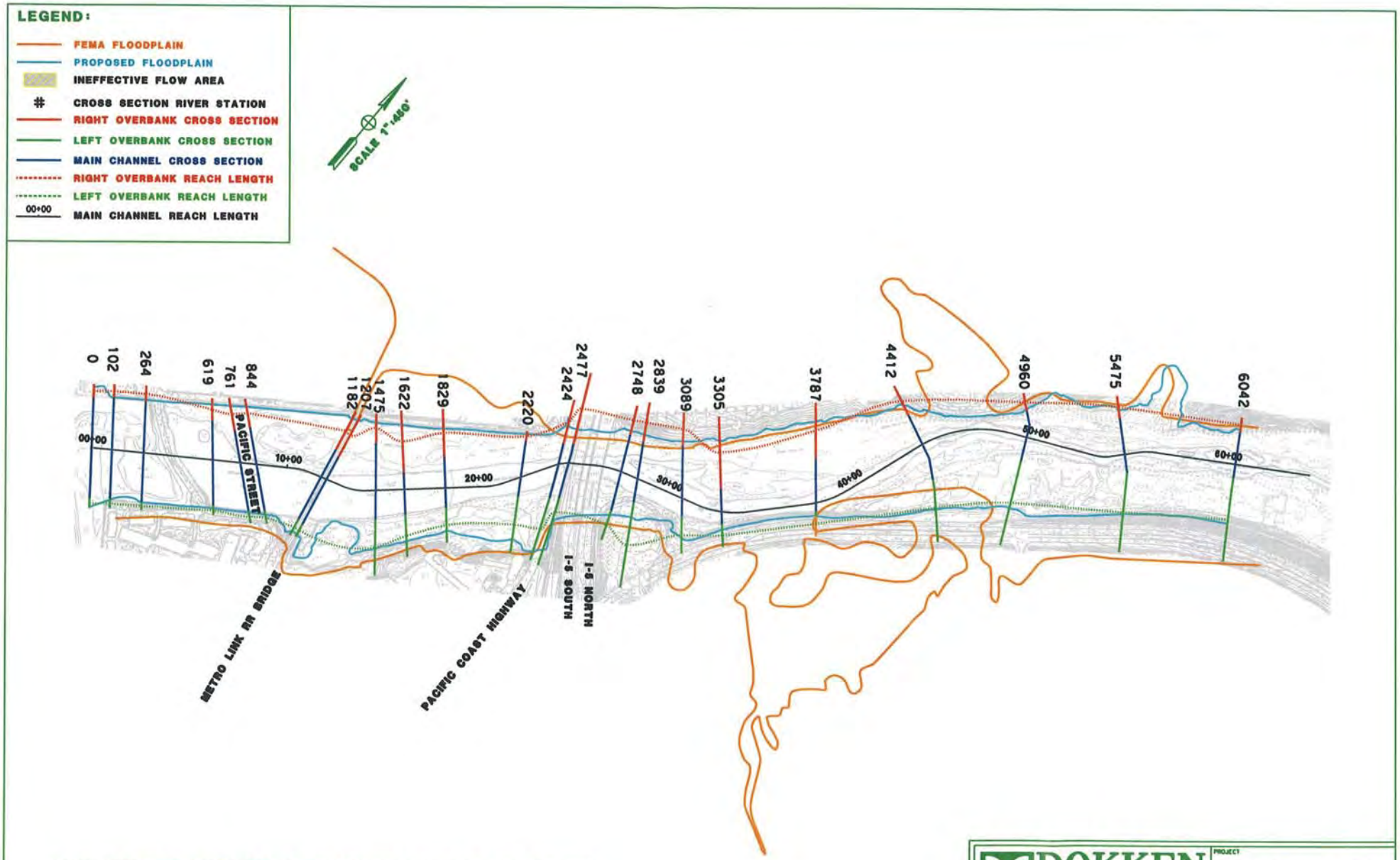
NOTES: -00+00 placed in FEMA Zone AE where base flood elevation has been determined

DOKKEN ENGINEERING
5675 RUFFIN ROAD
SUITE 350
SAN DIEGO, CA 92123
(858) 514-8377

PROJECT

SAN LUIS REY RIVER/I-5
CROSS SECTION
LOCATIONS

FEBRUARY 2006



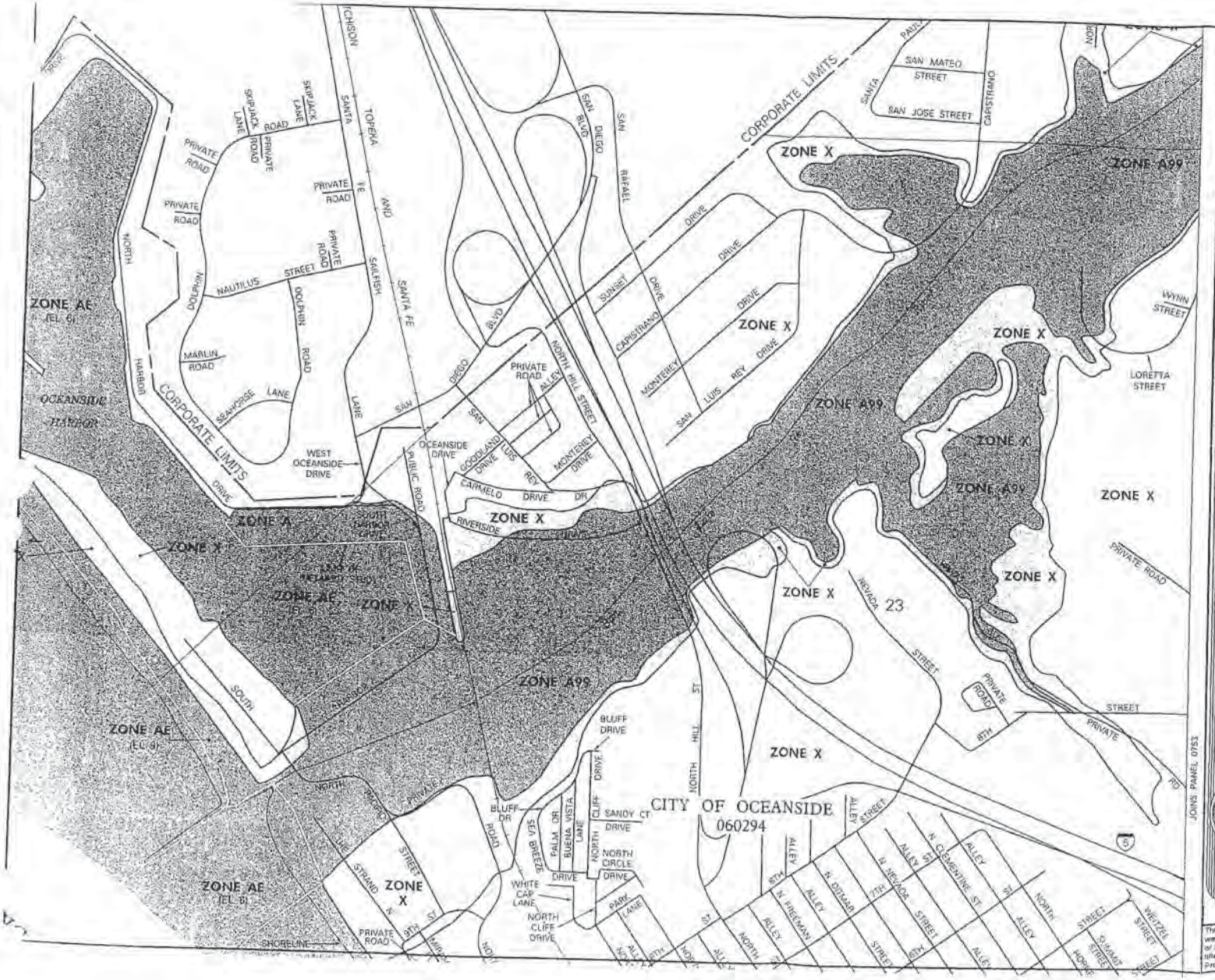
NOTES: -00+00 placed in FEMA Zone AE where base flood elevation has been determined

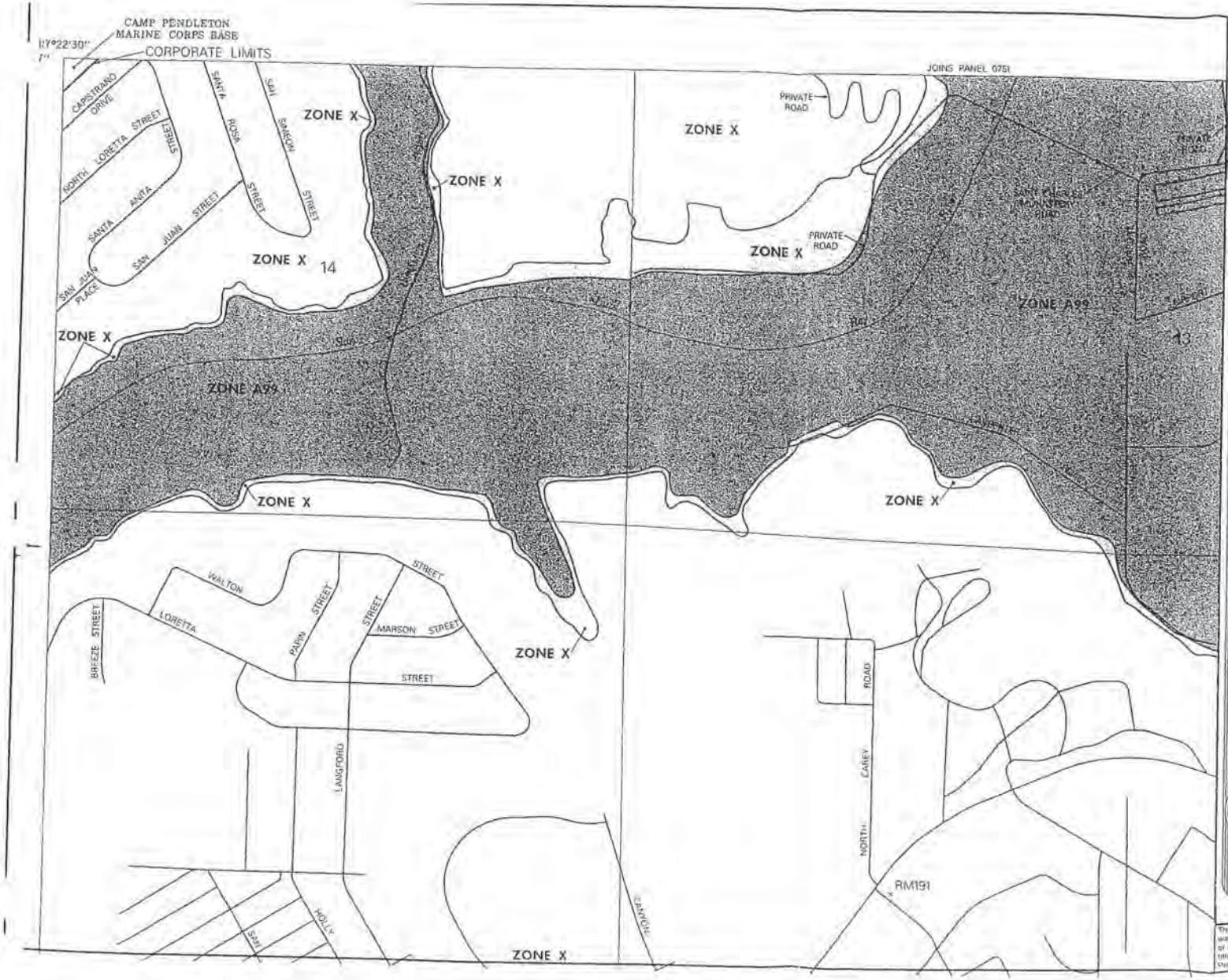
DOKKEN ENGINEERING
5675 RUFFIN ROAD
SUITE 250
SAN DIEGO, CA 92123
(858) 514-8377

PROJECT

SAN LUIS REY RIVER/I-5
CROSS SECTION
LOCATIONS

FEBRUARY 2006


CORPORATE LIMITS
ZONE X
ZONE A99
ZONE AE
(EL 6)
ZONE A
ZONE AE
(EL 9)
ZONE AE
(EL 8)
OCEANSIDE HARBOR
CITY OF OCEANSIDE
060294
SAN MATEO STREET
SAN JOSE STREET
SAN DIEGO BLVD
SANTA FE AND TOPEKA RAILROAD
NORTH HARBOR DRIVE
SOUTH HARBOR DRIVE
PRIVATE ROAD
SKIPJACK LANE
NAUTILUS STREET
DOLPHIN ROAD
MARLIN ROAD
SEAHORSE LANE
SALMON LANE
WEST OCEANSIDE DRIVE
OCEANSIDE DRIVE
PUBLIC ROAD
GOODLAND DRIVE
CARMELO DRIVE
RIVERSIDE DRIVE
SAN LUIS REY
MONTEREY DRIVE
CAPISTRANO DRIVE
SUNSET DRIVE
NORTH HILL STREET
WYNN STREET
LORETTA STREET
NEVADA STREET
BLUFF DRIVE
CLIFF DRIVE
SANDY CT
SEA BREEZE DRIVE
PALM DR
BUENA VISTA LANE
NORTH CIRCLE DRIVE
WHITE CAP LANE
NORTH CLIFF DRIVE
PARK LANE
SHORELINE
JOINS PANEL 0753
APPROXIMATE SCALE IN FEET
500 0 500
NATIONAL FLOOD INSURANCE PROGRAM
FIRM
FLOOD INSURANCE RATE MAP
SAN DIEGO COUNTY, CALIFORNIA AND INCORPORATED AREAS
PANEL 734 OF 2375
(SEE MAP INDEX FOR PANELS NOT PRINTED)
CONTAINS COMMUNITY
NUMBER PANEL SUFFIX
OCEANSIDE, CITY OF 060294 0734 G
SAN DIEGO COUNTY, UNINCORPORATED AREAS 060284 0734 G
MAP NUMBER
06073C0734 G
MAP REVISED:
JANUARY 19, 2001
Federal Emergency Management Agency
This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov



APPROXIMATE SCALE IN FEET
500 0 500

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

SAN DIEGO COUNTY, CALIFORNIA AND INCORPORATED AREAS

PANEL 753 OF 2375
(SEE MAP INDEX FOR PANELS NOT PRINTED)

CONTAINS: COMMUNITY	NUMBER	PANEL	SUFFIX
OCEANSIDE, CITY OF	060294	0753	G
SAN DIEGO COUNTY, UNINCORPORATED AREAS	060284	0753	G

MAP NUMBER
06073C0753 G

MAP REVISED:
JANUARY 19, 2001

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

Table 4. Summary of Discharges (Cont'd)

Flooding Source and Location	Drainage Area (Square Miles)	Peak Discharges (cfs) 10-Year	50-Year	100-Year	500-Year
Samagutuma Creek					
At Mouth	6.4	900	2,600	4,000	7,000
San Clemente Canyon Creek					
Upstream of Confluence with Rose Canyon Creek	18.4	1,400	4,200	6,900	16,000
Upstream of Genesee Avenue	15.3	1,200	3,600	5,600	12,000
Upstream of Interstate Highway 805	12.5	1,000	3,100	4,900	11,000
San Diego River					
At Confluence with Murphy Canyon Creek	420.0	3,100	17,000	36,000	112,000
Just Downstream of Confluence of San Vicente Creek	290.0	2,500	--[1]	31,000	--[1]
San Dieguito River					
Upstream of Camino Del Mar Bridge	--[1]	5,700	31,400	41,800	90,000
Upstream of Atchison, Topeka & Santa Fe Railway Bridge	--[1]	5,700	31,400	41,800	90,000
Upstream of Jimmy Durante Bridge	--[1]	5,800	32,100	42,400	90,000
Upstream of U.S. Interstate Highway 5 Bridge	--[1]	5,900	32,500	42,800	90,000
San Elijo Creek					
0.1 Mile Upstream of El Camino Road	5.4	500	1,600	2,100	5,500
San Luis Rey River					
At Mouth	560.0	6,600	31,000	51,000	120,000
Downstream of Confluence with Moosa Canyon	355.6	6,200	30,000	48,000	110,000
Downstream of Confluence with Keys Canyon	252.3	5,000	25,000	41,000	98,000
Upstream of Confluence with Keys Canyon	180.4	4,000[2]	20,000	33,000	85,000
Downstream of Palma	167.3	4,000[2]	18,000	30,000	78,000
Downstream of Confluence with Puma Creek	126.7	4,000[2]	16,800	28,000	72,800
Upstream of Confluence with Puma Creek	71.5	5,000	15,000	24,500	64,000

[1]Data Not Available
[2]Discharge Decreases With Increasing Area Due to Breakouts From the Low Flow Channel

APPENDIX B

Results Summary

HEC-RAS Cross Section Input/Output

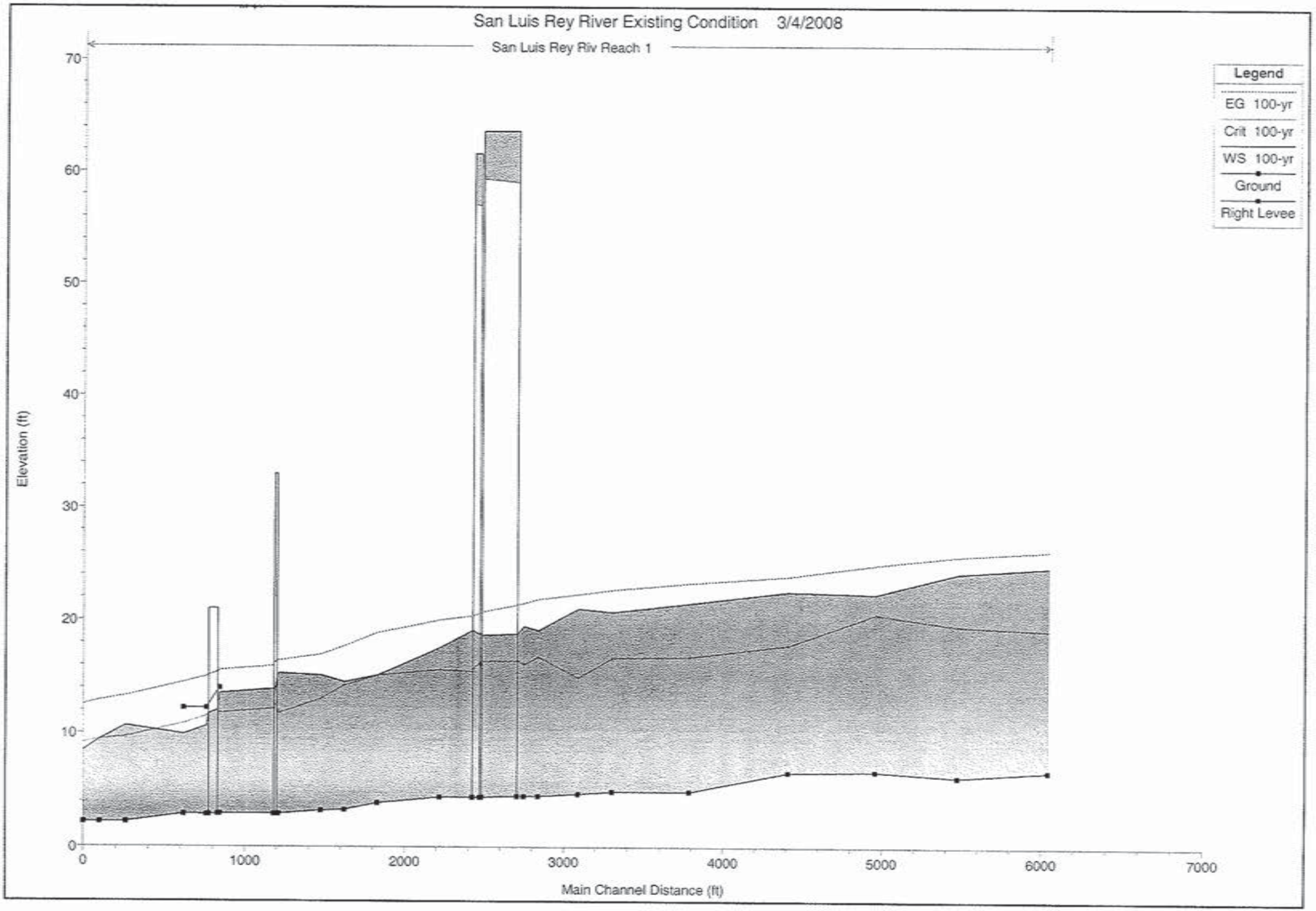
Existing

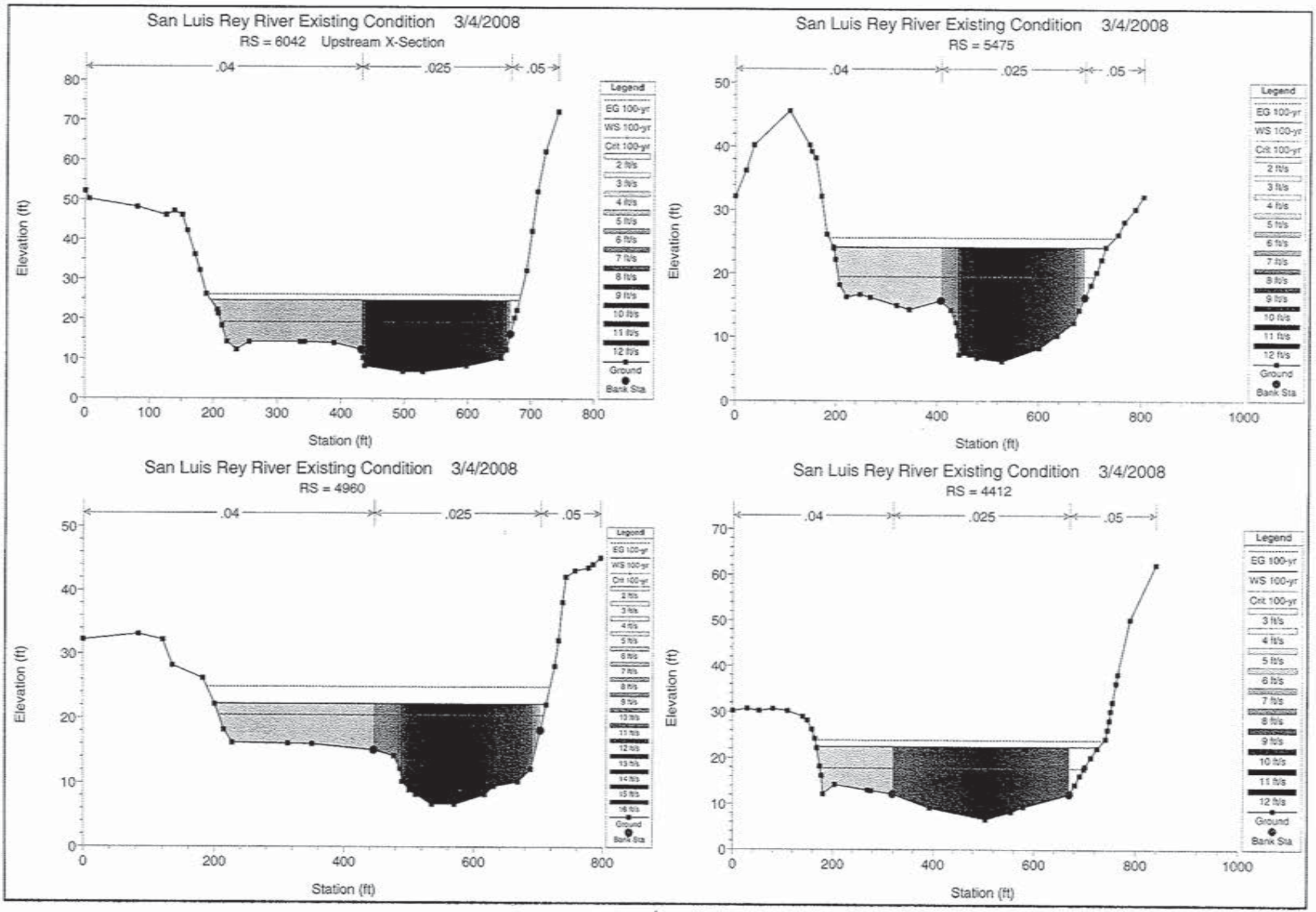
Proposed

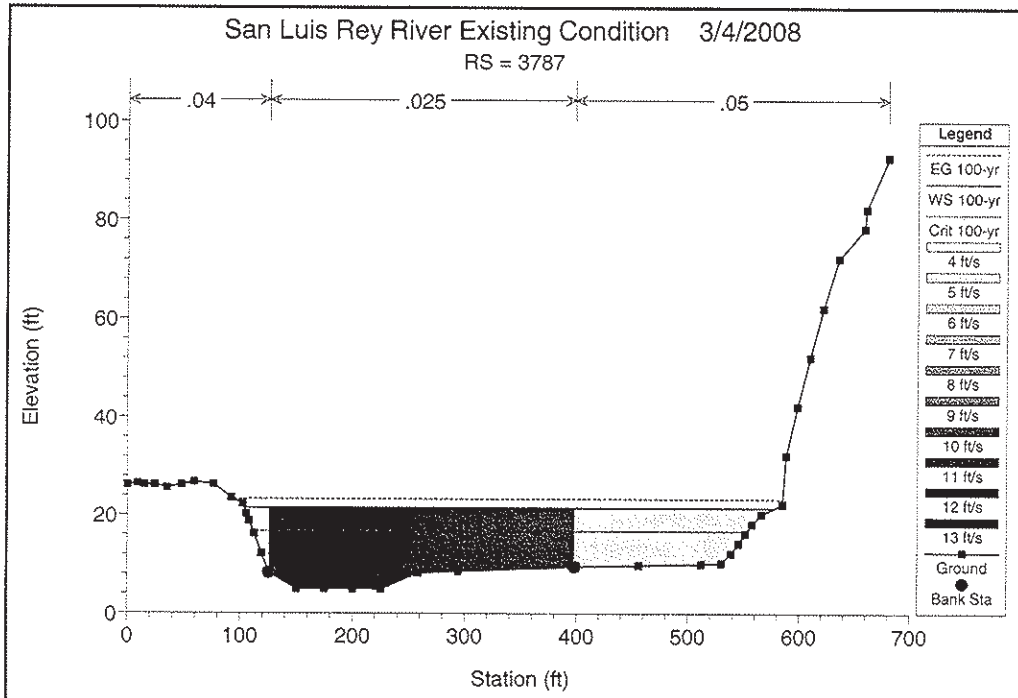
EXISTING

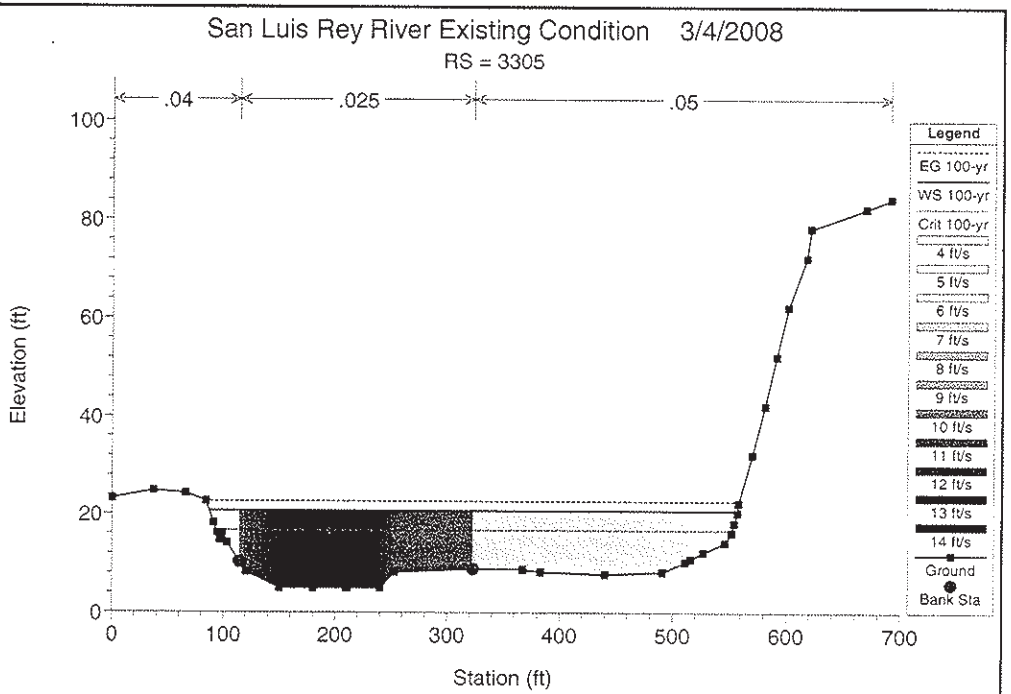
HEC-RAS Plan: SLR_Existing River: San Luis Rey Riv Reach: Reach 1 Profile: 100-yr

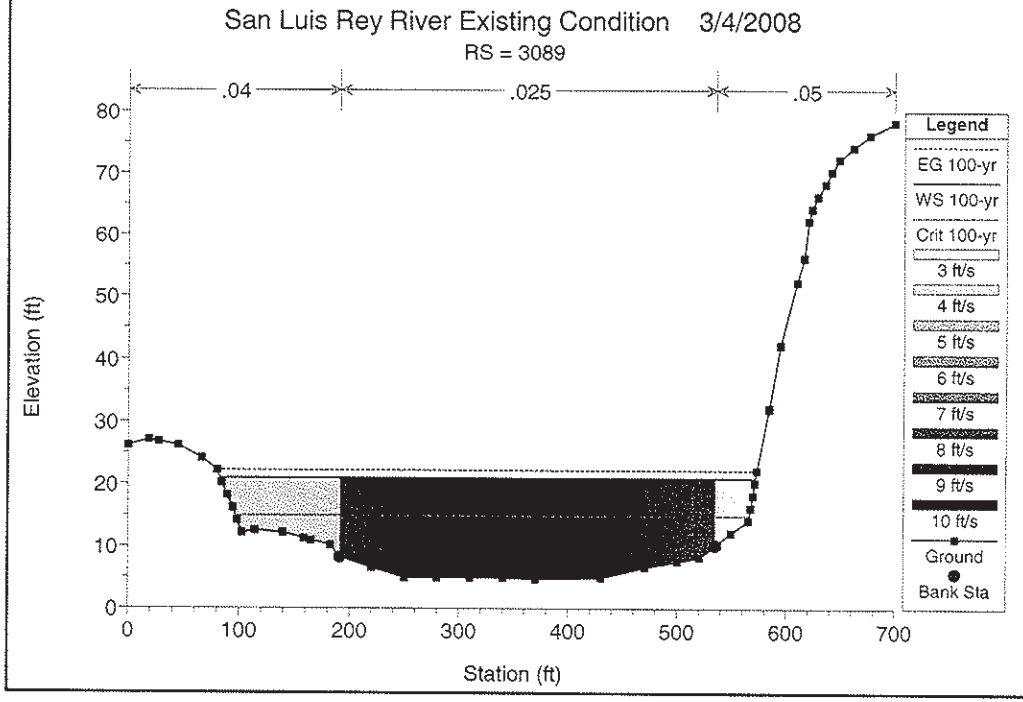
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach 1	6042	100-yr	53000.00	6.70	24.68	19.14	26.12	0.000765	10.59	6374.05	486.28	0.46
Reach 1	5475	100-yr	53000.00	6.20	24.15	19.50	25.66	0.000861	10.56	6170.08	535.67	0.48
Reach 1	4960	100-yr	53000.00	6.70	22.30	20.53	24.90	0.001900	13.89	4748.18	512.64	0.69
Reach 1	4412	100-yr	53000.00	6.60	22.52	17.82	23.87	0.000873	9.86	6303.02	559.53	0.48
Reach 1	3787	100-yr	53000.00	4.90	21.48	16.78	23.24	0.001078	11.45	5813.06	475.00	0.53
Reach 1	3305	100-yr	53000.00	4.90	20.71	16.68	22.64	0.001351	12.74	5784.57	470.30	0.60
Reach 1	3089	100-yr	53000.00	4.70	20.99	14.93	22.24	0.000650	9.29	6440.09	489.37	0.42
Reach 1	2839	100-yr	53000.00	4.50	19.10	16.76	21.83	0.001891	13.54	4279.87	421.34	0.69
Reach 1	2748	100-yr	53000.00	4.50	19.44	16.11	21.47	0.001428	11.46	4725.38	436.13	0.59
Reach 1	2500		Bridge									
Reach 1	2477	100-yr	53000.00	4.40	18.82	16.09	20.62	0.001360	11.83	5844.76	634.10	0.59
Reach 1	2430		Bridge									
Reach 1	2424	100-yr	53000.00	4.40	19.09	15.46	20.35	0.000891	10.00	6628.63	683.93	0.48
Reach 1	2220	100-yr	53000.00	4.40	17.55	15.62	19.99	0.001852	13.14	4632.48	545.00	0.68
Reach 1	1829	100-yr	53000.00	3.90	15.13	15.13	18.88	0.003609	16.73	3881.12	519.75	0.92
Reach 1	1622	100-yr	53000.00	3.30	14.52	14.25	17.69	0.003195	16.31	4429.03	594.28	0.88
Reach 1	1475	100-yr	53000.00	3.20	15.11	13.02	16.95	0.001662	11.46	5319.23	647.66	0.63
Reach 1	1207	100-yr	53000.00	2.90	15.29	11.75	16.43	0.000966	9.03	6341.82	662.38	0.48
Reach 1	1200		Bridge									
Reach 1	1182	100-yr	53000.00	2.90	13.90	12.16	15.95	0.001096	12.16	5344.75	654.58	0.70
Reach 1	844	100-yr	53000.00	2.90	13.51	11.76	15.57	0.001076	11.79	4678.49	558.32	0.69
Reach 1	800		Bridge									
Reach 1	761	100-yr	53000.00	2.86	10.61	11.49	15.00	0.003513	17.28	3227.87	549.65	1.18
Reach 1	619	100-yr	53000.00	2.89	9.91	10.85	14.49	0.003639	17.45	3144.90	527.34	1.20
Reach 1	264	100-yr	53000.00	2.20	10.64	9.66	13.27	0.001614	13.02	4072.06	523.42	0.82
Reach 1	102	100-yr	53000.00	2.20	9.44	9.44	12.87	0.002485	14.86	3573.70	524.89	1.00
Reach 1	0	100-yr	53000.00	2.20	8.49	9.17	12.52	0.003544	16.24	3340.47	598.35	1.17

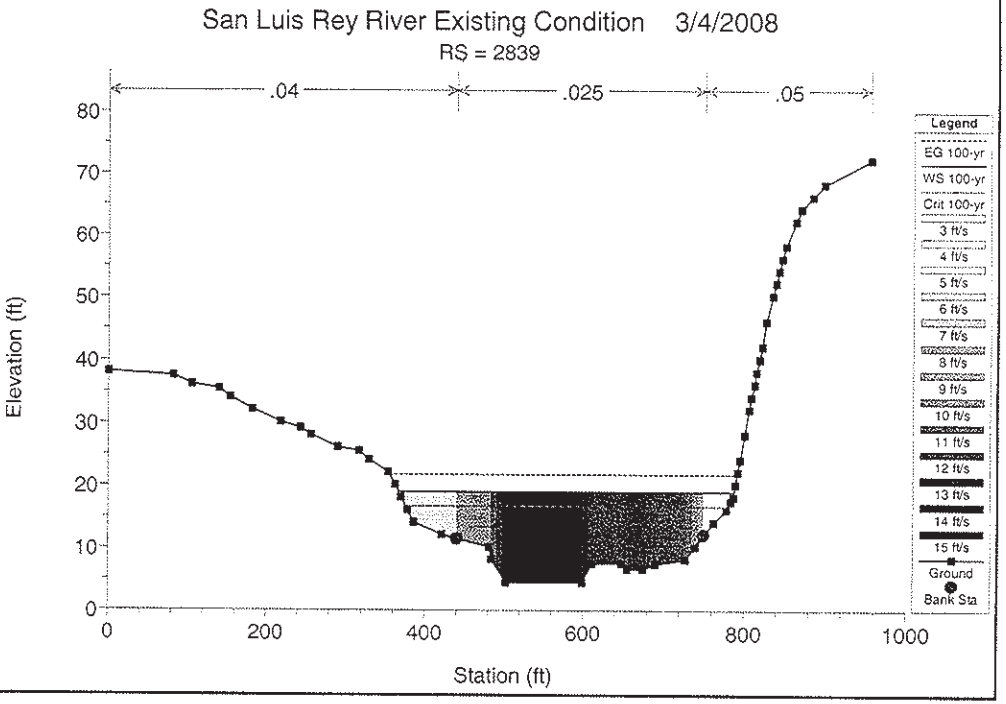

San Luis Rey River Existing Condition 3/4/2008
San Luis Rey Riv Reach 1
Legend
EG 100-yr
Crit 100-yr
WS 100-yr
Ground
Right Levee
Elevation (ft)
Main Channel Distance (ft)
0
10
20
30
40
50
60
70
0
1000
2000
3000
4000
5000
6000
7000

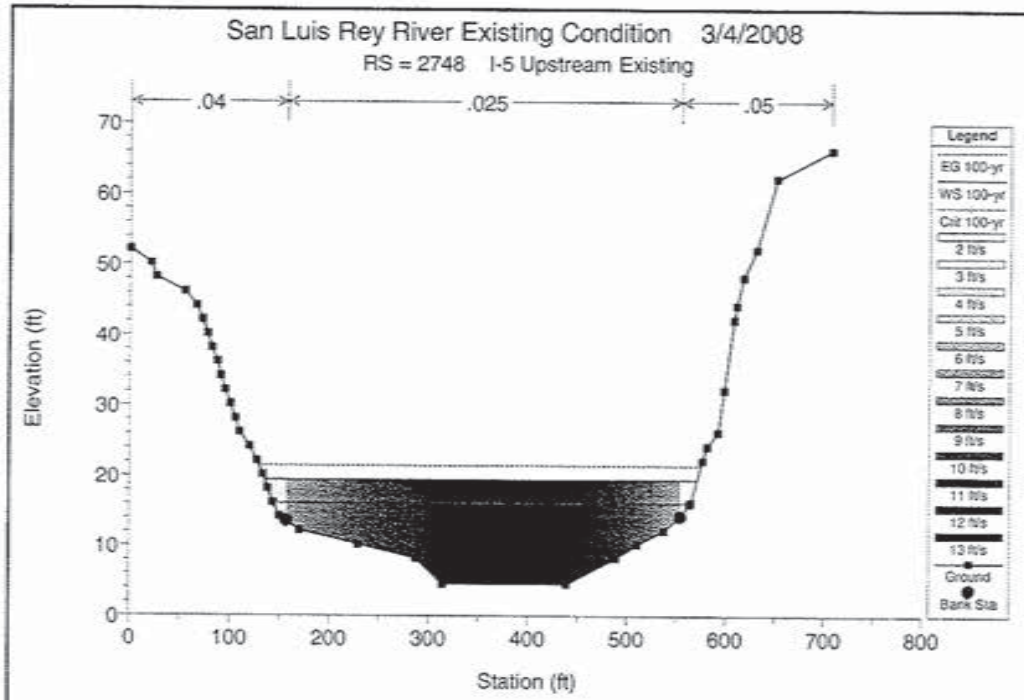

San Luis Rey River Existing Condition 3/4/2008
RS = 6042 Upstream X-Section
.04
.025
.05
Elevation (ft)
Station (ft)
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
Ground
Bank Sta
San Luis Rey River Existing Condition 3/4/2008
RS = 5475
San Luis Rey River Existing Condition 3/4/2008
RS = 4960
San Luis Rey River Existing Condition 3/4/2008
RS = 4412

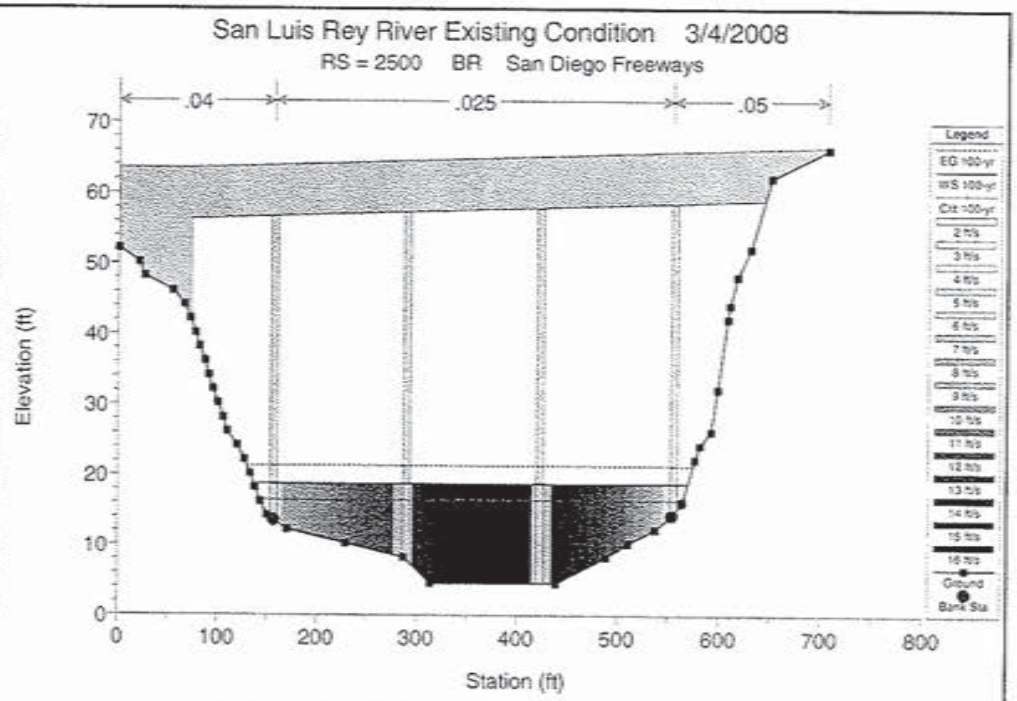

San Luis Rey River Existing Condition 3/4/2008
RS = 3787
.04
.025
.05
Elevation (ft)
Station (ft)
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
4 ft/s
5 ft/s
6 ft/s
7 ft/s
8 ft/s
9 ft/s
10 ft/s
11 ft/s
12 ft/s
13 ft/s
Ground
Bank Sta

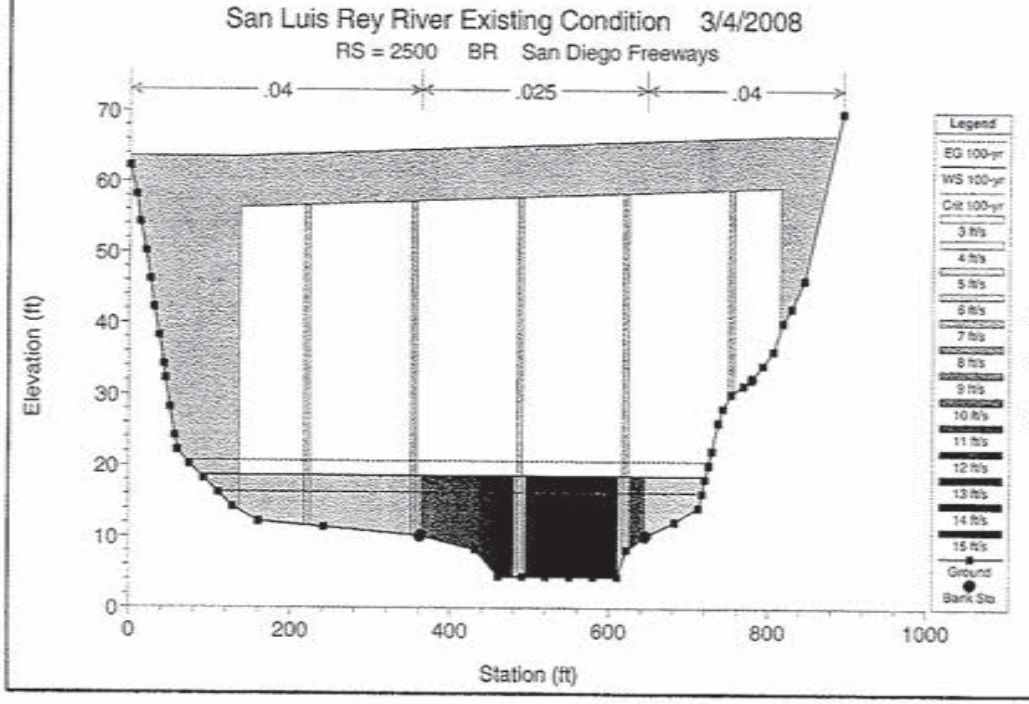

San Luis Rey River Existing Condition 3/4/2008
RS = 3305
.04
.025
.05
Elevation (ft)
Station (ft)
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
4 ft/s
5 ft/s
6 ft/s
7 ft/s
8 ft/s
9 ft/s
10 ft/s
11 ft/s
12 ft/s
13 ft/s
14 ft/s
Ground
Bank Sta

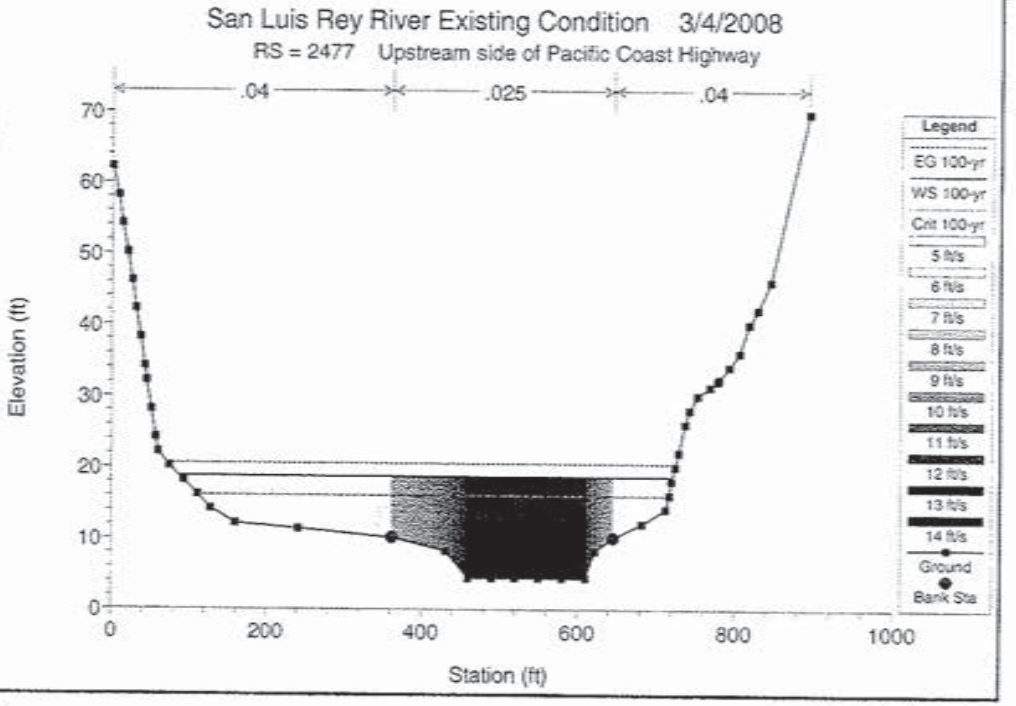

San Luis Rey River Existing Condition 3/4/2008
RS = 3089
.04
.025
.05
Elevation (ft)
Station (ft)
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
3 ft/s
4 ft/s
5 ft/s
6 ft/s
7 ft/s
8 ft/s
9 ft/s
10 ft/s
Ground
Bank Sta

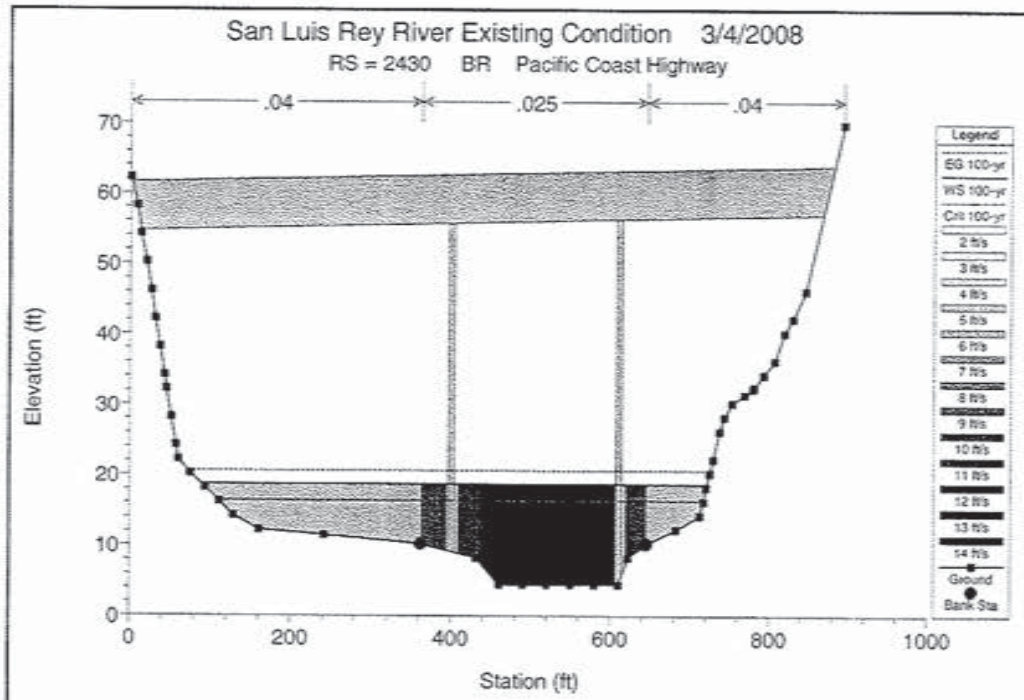

San Luis Rey River Existing Condition 3/4/2008
RS = 2839
.04
.025
.05
Elevation (ft)
Station (ft)
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
3 ft/s
4 ft/s
5 ft/s
6 ft/s
7 ft/s
8 ft/s
9 ft/s
10 ft/s
11 ft/s
12 ft/s
13 ft/s
14 ft/s
15 ft/s
Ground
Bank Sta

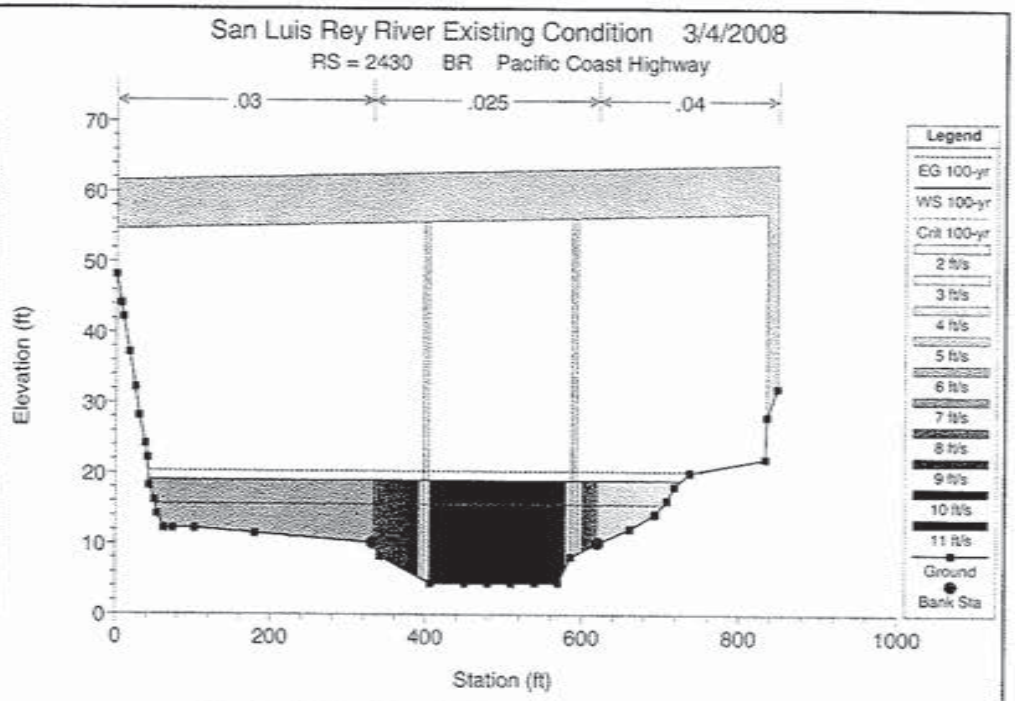

San Luis Rey River Existing Condition 3/4/2008
RS = 2748 I-5 Upstream Existing
.04
.025
.05
Elevation (ft)
Station (ft)
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
Ground
Bank Sta

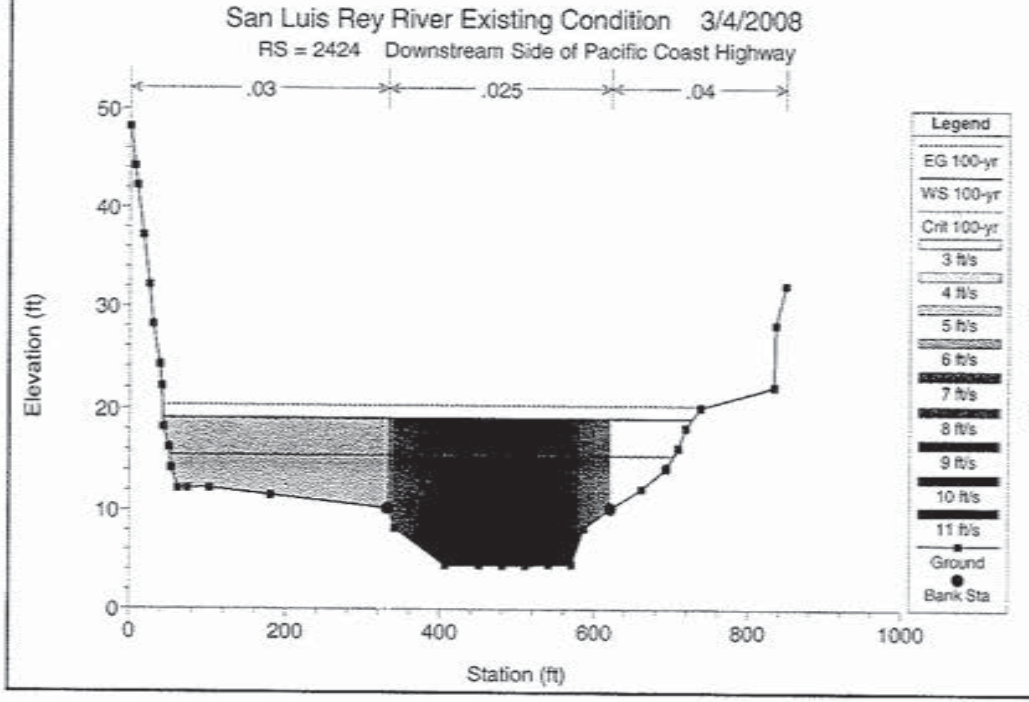

San Luis Rey River Existing Condition 3/4/2008
RS = 2500 BR San Diego Freeways
.04
.025
.05
Elevation (ft)
Station (ft)
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
Ground
Bank Sta

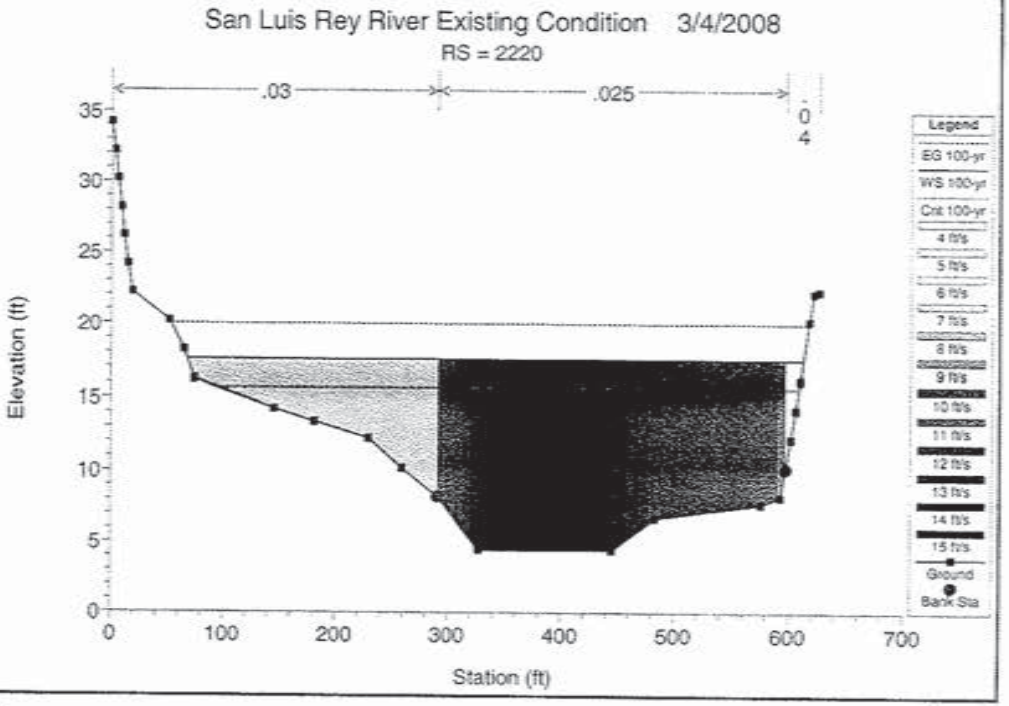

San Luis Rey River Existing Condition 3/4/2008
RS = 2500 BR San Diego Freeways
.04
.025
.04
Elevation (ft)
Station (ft)
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
Ground
Bank Sta

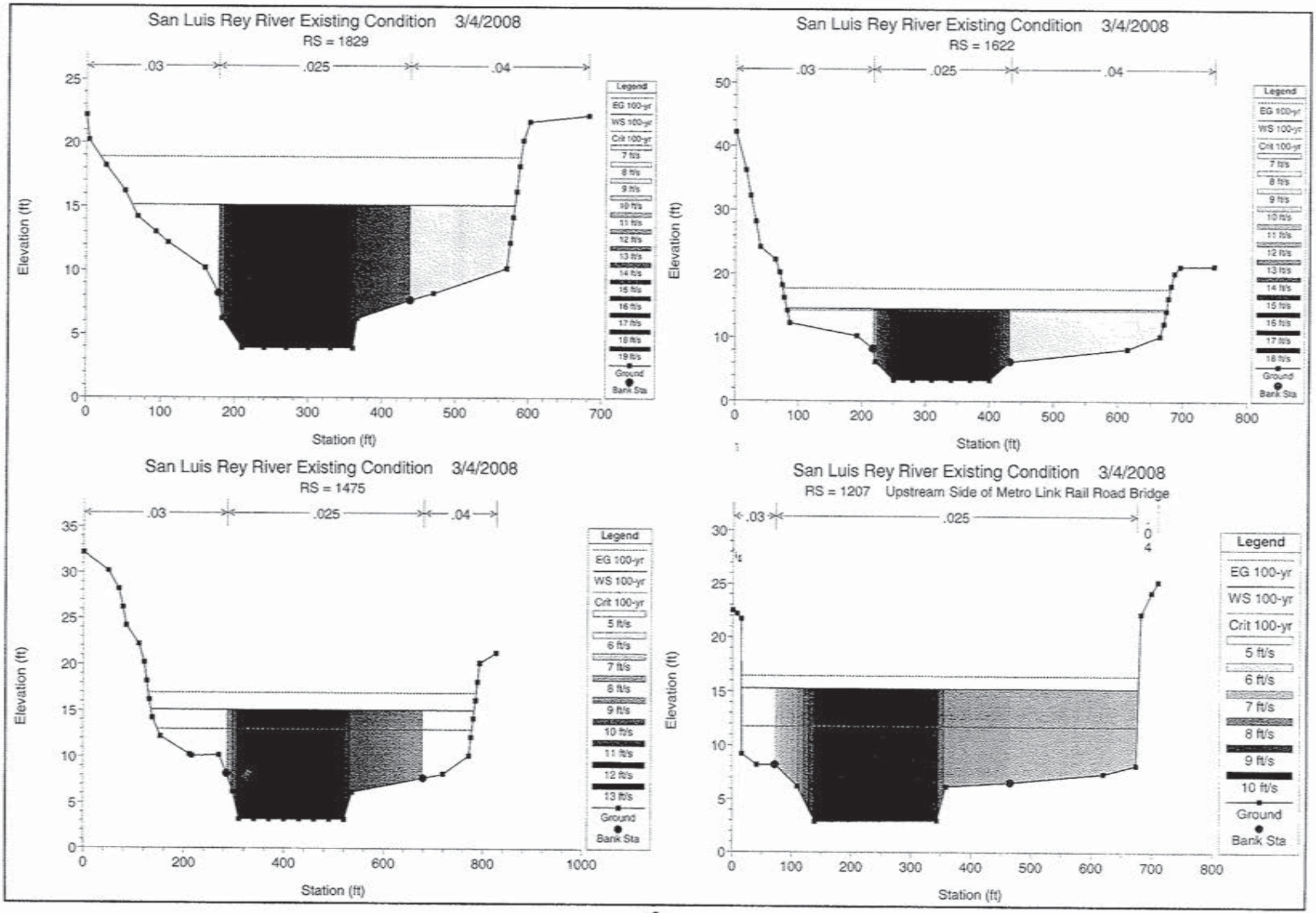

San Luis Rey River Existing Condition 3/4/2008
RS = 2477 Upstream side of Pacific Coast Highway
.04
.025
.04
Elevation (ft)
Station (ft)
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
Ground
Bank Sta

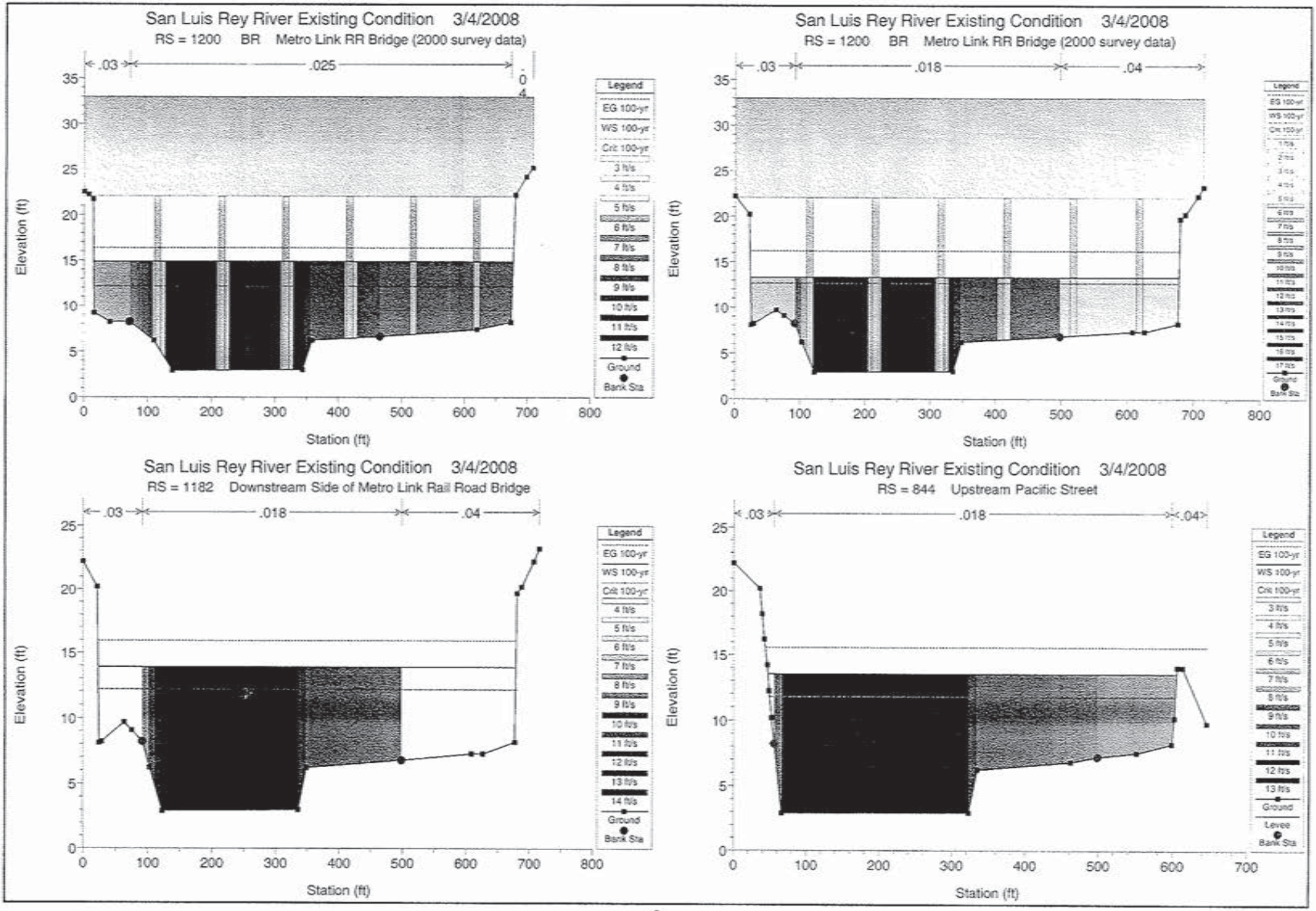

San Luis Rey River Existing Condition 3/4/2008
RS = 2430 BR Pacific Coast Highway
.04
.025
.04
Elevation (ft)
Station (ft)
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
2 ft/s
3 ft/s
4 ft/s
5 ft/s
6 ft/s
7 ft/s
8 ft/s
9 ft/s
10 ft/s
11 ft/s
12 ft/s
13 ft/s
14 ft/s
Ground
Bank Sta

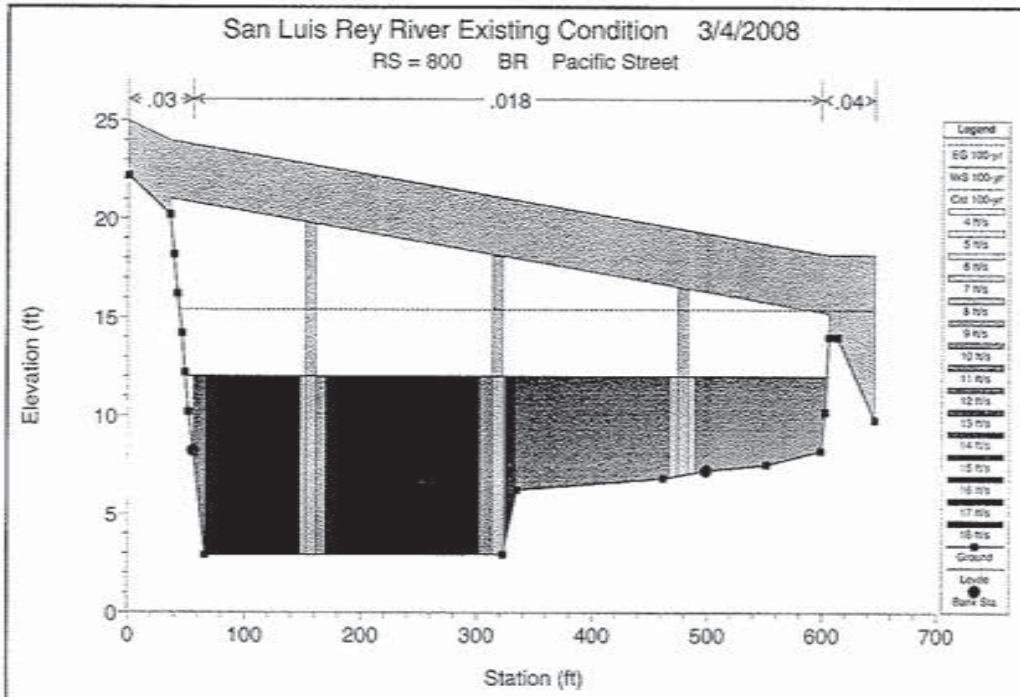

San Luis Rey River Existing Condition 3/4/2008
RS = 2430 BR Pacific Coast Highway
.03
.025
.04
Elevation (ft)
Station (ft)
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
2 ft/s
3 ft/s
4 ft/s
5 ft/s
6 ft/s
7 ft/s
8 ft/s
9 ft/s
10 ft/s
11 ft/s
Ground
Bank Sta

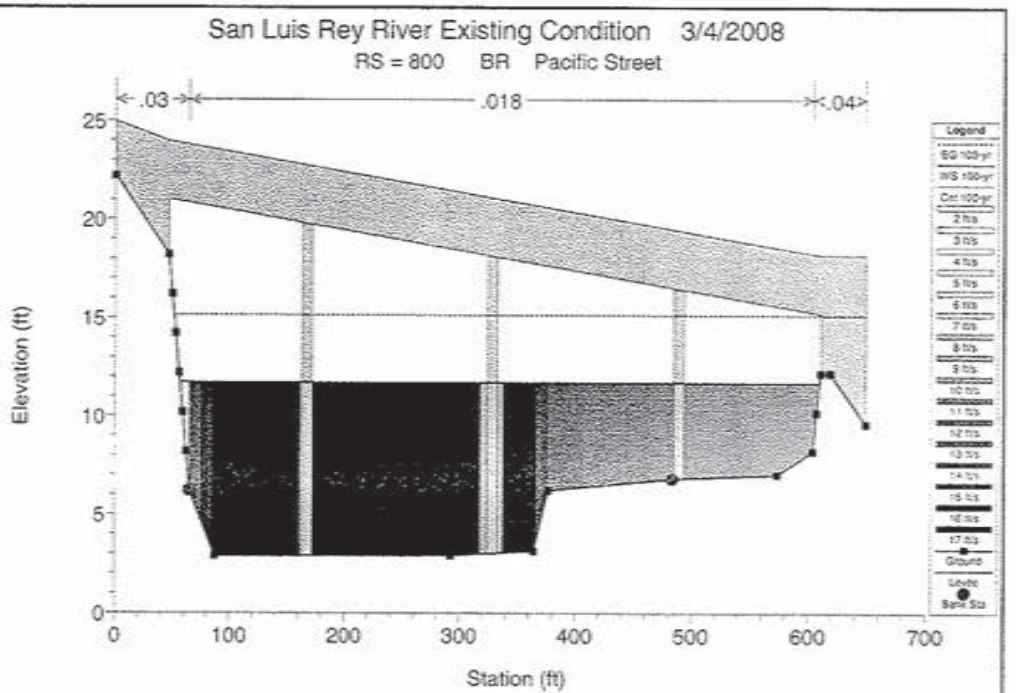

San Luis Rey River Existing Condition 3/4/2008
RS = 2424 Downstream Side of Pacific Coast Highway
.03
.025
.04
Elevation (ft)
Station (ft)
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
3 ft/s
4 ft/s
5 ft/s
6 ft/s
7 ft/s
8 ft/s
9 ft/s
10 ft/s
11 ft/s
Ground
Bank Sta

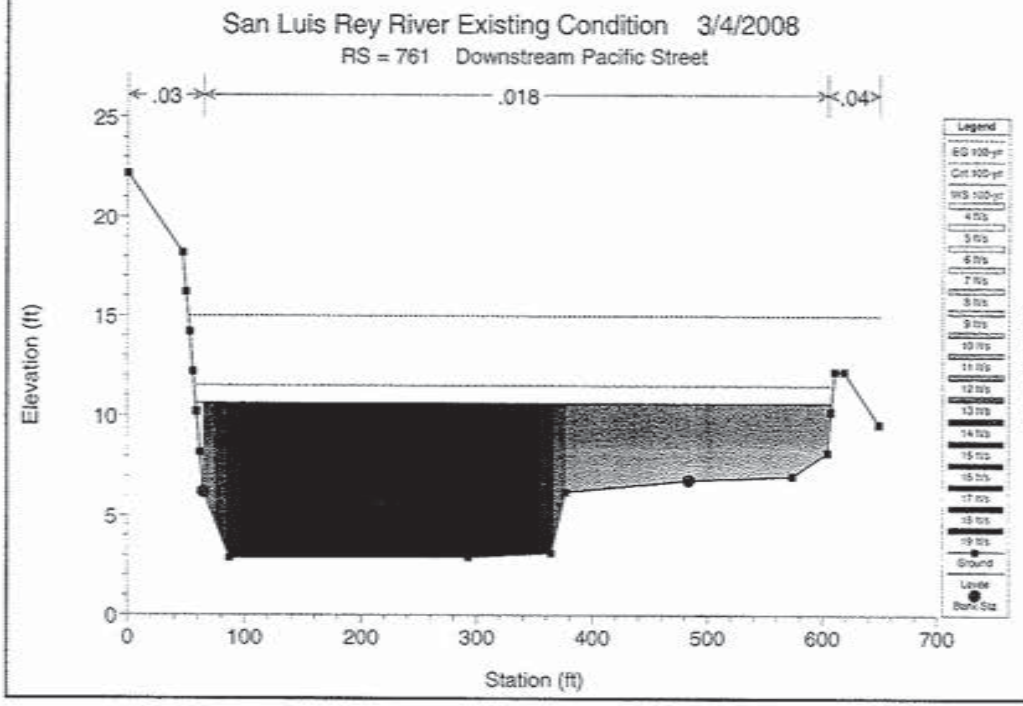

San Luis Rey River Existing Condition 3/4/2008
RS = 2220
.03
.025
Elevation (ft)
Station (ft)
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
4 ft/s
5 ft/s
6 ft/s
7 ft/s
8 ft/s
9 ft/s
10 ft/s
11 ft/s
12 ft/s
13 ft/s
14 ft/s
15 ft/s
Ground
Bank Sta

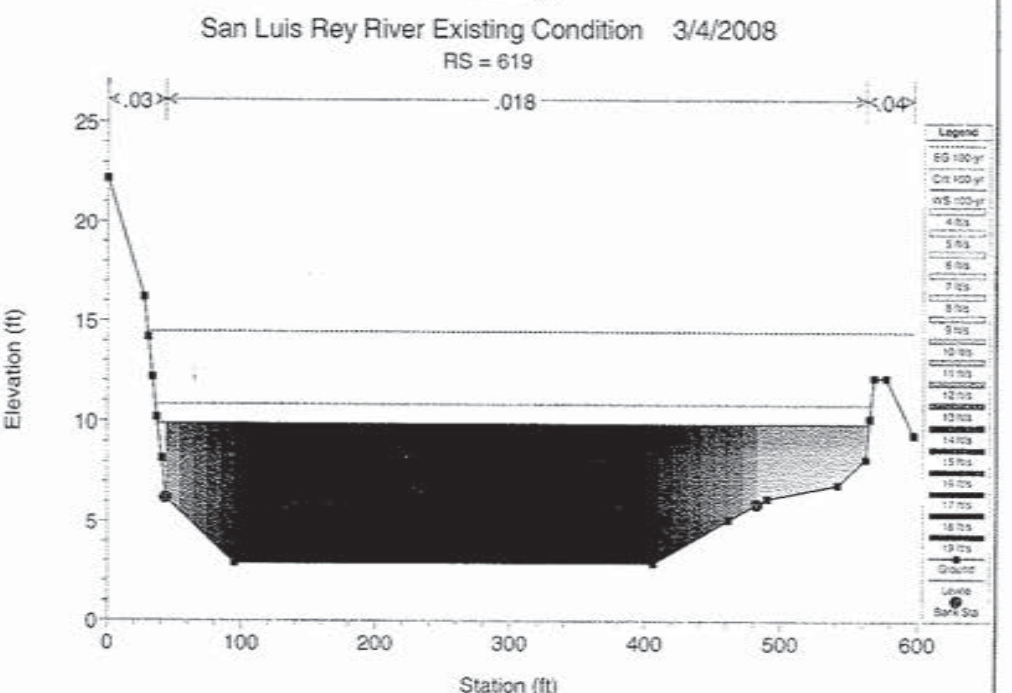

San Luis Rey River Existing Condition 3/4/2008
RS = 1829
.03
.025
.04
Elevation (ft)
Station (ft)
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
7 ft/s
8 ft/s
9 ft/s
10 ft/s
11 ft/s
12 ft/s
13 ft/s
14 ft/s
15 ft/s
16 ft/s
17 ft/s
18 ft/s
19 ft/s
Ground
Bank Sta
San Luis Rey River Existing Condition 3/4/2008
RS = 1622
.03
.025
.04
Elevation (ft)
Station (ft)
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
7 ft/s
8 ft/s
9 ft/s
10 ft/s
11 ft/s
12 ft/s
13 ft/s
14 ft/s
15 ft/s
16 ft/s
17 ft/s
18 ft/s
Ground
Bank Sta
San Luis Rey River Existing Condition 3/4/2008
RS = 1475
.03
.025
.04
Elevation (ft)
Station (ft)
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
5 ft/s
6 ft/s
7 ft/s
8 ft/s
9 ft/s
10 ft/s
11 ft/s
12 ft/s
13 ft/s
Ground
Bank Sta
San Luis Rey River Existing Condition 3/4/2008
RS = 1207 Upstream Side of Metro Link Rail Road Bridge
.03
.025
Elevation (ft)
Station (ft)
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
5 ft/s
6 ft/s
7 ft/s
8 ft/s
9 ft/s
10 ft/s
Ground
Bank Sta

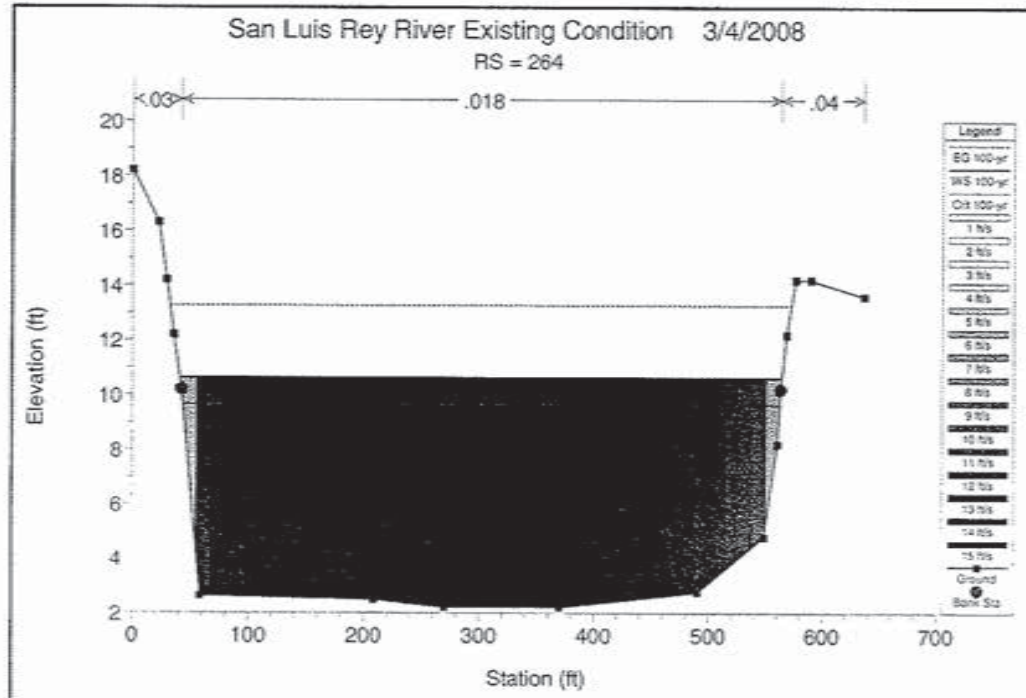

San Luis Rey River Existing Condition 3/4/2008
RS = 1200 BR Metro Link RR Bridge (2000 survey data)
.03
.025
.04
Elevation (ft)
Station (ft)
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
3 ft/s
4 ft/s
5 ft/s
6 ft/s
7 ft/s
8 ft/s
9 ft/s
10 ft/s
11 ft/s
12 ft/s
Ground
Bank Sta
San Luis Rey River Existing Condition 3/4/2008
RS = 1200 BR Metro Link RR Bridge (2000 survey data)
.03
.018
.04
Elevation (ft)
Station (ft)
San Luis Rey River Existing Condition 3/4/2008
RS = 1182 Downstream Side of Metro Link Rail Road Bridge
.03
.018
.04
Elevation (ft)
Station (ft)
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
4 ft/s
5 ft/s
6 ft/s
7 ft/s
8 ft/s
9 ft/s
10 ft/s
11 ft/s
12 ft/s
13 ft/s
14 ft/s
Ground
Bank Sta
San Luis Rey River Existing Condition 3/4/2008
RS = 844 Upstream Pacific Street
.03
.018
.04
Elevation (ft)
Station (ft)
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
3 ft/s
4 ft/s
5 ft/s
6 ft/s
7 ft/s
8 ft/s
9 ft/s
10 ft/s
11 ft/s
12 ft/s
13 ft/s
Ground
Levee
Bank Sta

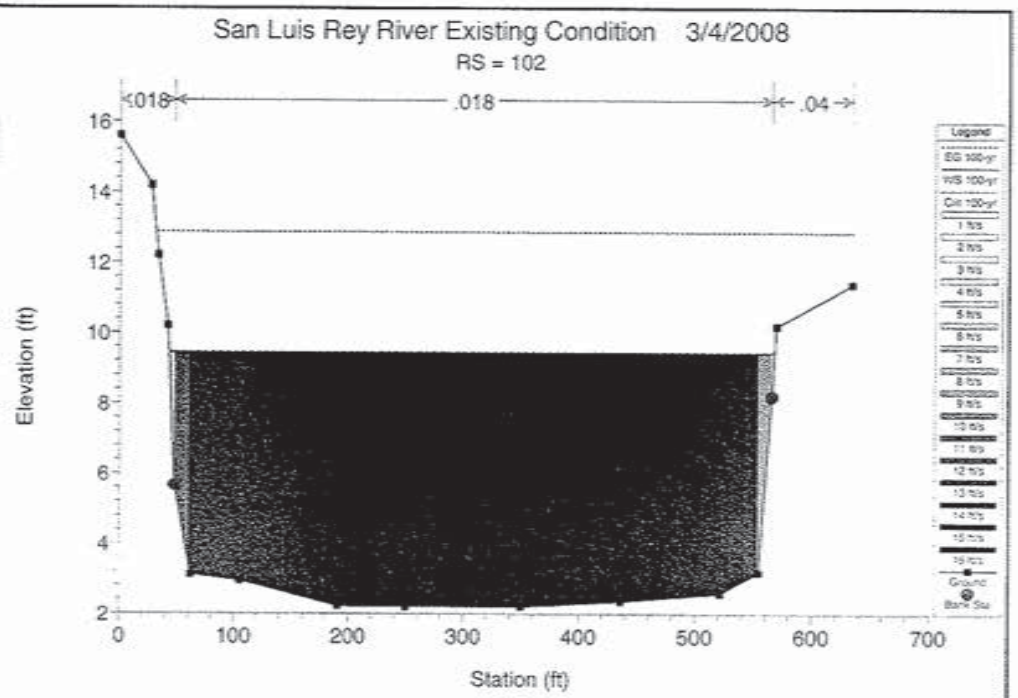

San Luis Rey River Existing Condition 3/4/2008
RS = 800 BR Pacific Street
.03
.018
.04
Elevation (ft)
Station (ft)
Legend
Ground
Levee
Bank Sta

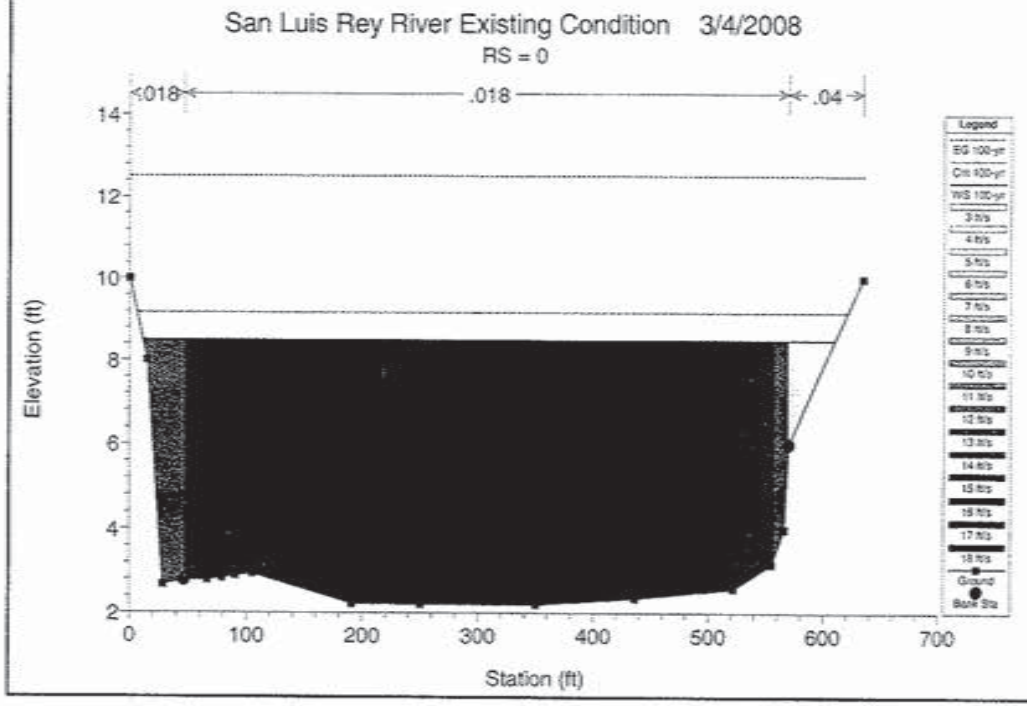

San Luis Rey River Existing Condition 3/4/2008
RS = 800 BR Pacific Street
.03
.018
.04
Elevation (ft)
Station (ft)
Legend
Ground
Levee
Bank Sta


San Luis Rey River Existing Condition 3/4/2008
RS = 761 Downstream Pacific Street
.03
.018
.04
Elevation (ft)
Station (ft)
Legend
Ground
Levee
Bank Sta


San Luis Rey River Existing Condition 3/4/2008
RS = 619
.03
.018
.04
Elevation (ft)
Station (ft)
Legend
Ground
Levee
Bank Sta


San Luis Rey River Existing Condition 3/4/2008
RS = 264
.03
.018
.04
Elevation (ft)
Station (ft)
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
Ground
Bank Sta


San Luis Rey River Existing Condition 3/4/2008
RS = 102
.018
.018
.04
Elevation (ft)
Station (ft)
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
Ground
Bank Sta


San Luis Rey River Existing Condition 3/4/2008
RS = 0
.018
.018
.04
Elevation (ft)
Station (ft)
Legend
EG 100-yr
Crit 100-yr
WS 100-yr
Ground
Bank Sta

SLR_Exist.rep

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
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PROJECT DATA
Project Title: San Luis Rey Existing
Project File : SLR_Exist.prj
Run Date and Time: 3/4/2008 5:33:32 PM

Project in English units

Project Description:
San Luis Rey River Location Hydraulic Study - Existing Condition

PLAN DATA

Plan Title: San Luis Rey River Existing Condition
Plan File : p:\1683_TO64_I5_Floodplain\420_Env_ Stud\San Luis Rey\HEC-RAS\Final\Existing\SLR_Exist.p04

Geometry Title: San Luis Rey Existing Condition
Geometry File : p:\1683_TO64_I5_Floodplain\420_Env_ Stud\San Luis Rey\HEC-RAS\Final\Existing\SLR_Exist.g10

Flow Title : 100-year Discharge
Flow File : p:\1683_TO64_I5_Floodplain\420_Env_ Stud\San Luis Rey\HEC-RAS\Final\Existing\SLR_Exist.f08

Plan Summary Information:

Number of:	Cross Sections	= 23	Multiple Openings	=	0
	Culverts	= 0	Inline Structures	=	0
	Bridges	= 4	Lateral Structures	=	0

Computational Information

Water surface calculation tolerance	= 0.01
Critical depth calculation tolerance	= 0.01
Maximum number of iterations	= 40
Maximum difference tolerance	= 0.3
Flow tolerance factor	= 0.001

Computation Options
Critical depth computed at all cross sections
Conveyance Calculation Method: At breaks in n values only
Friction Slope Method: Average Conveyance
Computational Flow Regime: Mixed Flow

FLOW DATA

Flow Title: 100-year Discharge
Flow File : p:\1683_TO64_I5_Floodplain\420_Env_ Stud\San Luis Rey\HEC-RAS\Final\Existing\SLR_Exist.f08

Flow Data (cfs)

River	Reach	RS	100-yr
San Luis Rey Riv	Reach 1	6042	53000

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
San Luis Rey Riv	Reach 1	100-yr	Normal S = 0.001	Known WS = 8.2

GEOMETRY DATA

Geometry Title: San Luis Rey Existing Condition
Geometry File : p:\1683_TO64_I5_Floodplain\420_Env_ Stud\San Luis Rey\HEC-RAS\Final\Existing\SLR_Exist.g10

CROSS SECTION

RIVER: San Luis Rey Riv
REACH: Reach 1 RS: 6042

INPUT
Description: Upstream X-Section
Station Elevation Data num= 36

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	52.2	6	50.2	81	48.2	126	46.2	139	47.2
151	46.2	159	42.2	171	36.2	179	32.2	189	26.2
206	22.2	207.62	21.27	213	18.2	221	14.2	236	12.2
256	14.2	336.15	14.2	343	14.2	389	13.9	431.8	12.2
434.6	10.2	437.3	8.2	497.4	6.7	529.2	6.7	598	8.2
653	10.2	661	12.2	667.4	16.2	674	20.2	678	22.2
693	32.2	701.58	42.18	701.6	42.2	710	52.2	722	62.2
742.577	72.2								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	431.8	.025	667.4	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
431.8	667.4	531.5	566.5	629.4	.1	.3

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	26.12	Element	Left OB	Channel
Right OB				
Vel Head (ft)	1.44	Wt. n-Val.	0.040	0.025
0.050				
W.S. Elev (ft)	24.68	Reach Len. (ft)	531.50	566.50
629.40				
Crit W.S. (ft)	19.14	Flow Area (sq ft)	2413.36	3899.34
61.35				
E.G. Slope (ft/ft)	0.000765	Area (sq ft)	2413.36	3899.34
61.35				
Q Total (cfs)	53000.00	Flow (cfs)	11583.59	41296.23
120.18				
Top Width (ft)	486.28	Top Width (ft)	236.35	235.60
14.32				
Vel Total (ft/s)	8.31	Avg. Vel. (ft/s)	4.80	10.59
1.96				
Max Chl Dpth (ft)	17.98	Hydr. Depth (ft)	10.21	16.55
4.28				
Conv. Total (cfs)	1916795.0	Conv. (cfs)	418931.4	1493517.0
4346.4				
Length Wtd. (ft)	560.43	Wetted Per. (ft)	238.92	238.37
16.67				
Min Ch El (ft)	6.70	Shear (lb/sq ft)	0.48	0.78
0.18				
Alpha	1.34	Stream Power (lb/ft s)	2.31	8.27
0.34				
Frctn Loss (ft)	0.45	Cum Volume (acre-ft)	106.73	520.18
86.33				
C & E Loss (ft)	0.01	Cum SA (acres)	15.63	45.14
11.85				

Profile #100-yr

Percent Conv	Pos Hydr Depth(ft)	Left Sta Velocity (ft) (ft/s)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)
1	LOB	0.00	431.80	11583.59	2413.36	238.92
21.86	10.21	4.80				
2	Chan	431.80	437.28	665.10	79.21	6.77
1.25	14.46	8.40				
3	Chan	437.28	442.76	959.15	90.68	5.49
1.81	16.55	10.58				
4	Chan	442.76	448.24	973.00	91.43	5.48
1.84	16.69	10.64				
5	Chan	448.24	453.72	986.32	92.18	5.48
1.86	16.82	10.70				
6	Chan	453.72	459.20	999.72	92.93	5.48
1.89	16.96	10.76				
7	Chan	459.20	464.67	1013.19	93.68	5.48
1.91	17.10	10.82				
8	Chan	464.67	470.15	1026.73	94.43	5.48
1.94	17.23	10.87				
9	Chan	470.15	475.63	1040.34	95.18	5.48
1.96	17.37	10.93				
10	Chan	475.63	481.11	1054.04	95.93	5.48
1.99	17.51	10.99				
11	Chan	481.11	486.59	1067.79	96.68	5.48

2.01	17.65	11.04					
12	Chan	486.59	492.07	1081.61	97.43	5.48	
2.04	17.78	11.10					
13	Chan	492.07	497.55	1095.51	98.18	5.48	
2.07	17.92	11.16					
14	Chan	497.55	503.03	1102.34	98.53	5.48	
2.08	17.98	11.19					
15	Chan	503.03	508.51	1102.34	98.53	5.48	
2.08	17.98	11.19					
16	Chan	508.51	513.99	1102.33	98.53	5.48	
2.08	17.98	11.19					
17	Chan	513.99	519.47	1102.34	98.53	5.48	
2.08	17.98	11.19					
18	Chan	519.47	524.94	1102.35	98.53	5.48	
2.08	17.98	11.19					
19	Chan	524.94	530.42	1102.00	98.52	5.48	
2.08	17.98	11.19					
20	Chan	530.42	535.90	1093.35	98.06	5.48	
2.06	17.90	11.15					
21	Chan	535.90	541.38	1081.22	97.40	5.48	
2.04	17.78	11.10					
22	Chan	541.38	546.86	1069.13	96.75	5.48	
2.02	17.66	11.05					
23	Chan	546.86	552.34	1057.11	96.09	5.48	
1.99	17.54	11.00					
24	Chan	552.34	557.82	1045.13	95.44	5.48	
1.97	17.42	10.95					
25	Chan	557.82	563.30	1033.22	94.79	5.48	
1.95	17.30	10.90					
26	Chan	563.30	568.78	1021.35	94.13	5.48	
1.93	17.18	10.85					
27	Chan	568.78	574.26	1009.54	93.48	5.48	
1.90	17.06	10.80					
28	Chan	574.26	579.73	997.80	92.82	5.48	
1.88	16.94	10.75					
29	Chan	579.73	585.21	986.09	92.17	5.48	
1.86	16.82	10.70					
30	Chan	585.21	590.69	974.45	91.51	5.48	
1.84	16.70	10.65					
31	Chan	590.69	596.17	962.86	90.86	5.48	
1.82	16.58	10.60					
32	Chan	596.17	601.65	949.44	90.11	5.48	
1.79	16.45	10.54					
33	Chan	601.65	607.13	930.69	89.04	5.48	
1.76	16.25	10.45					
34	Chan	607.13	612.61	911.75	87.95	5.48	
1.72	16.05	10.37					
35	Chan	612.61	618.09	892.96	86.86	5.48	
1.68	15.85	10.28					
36	Chan	618.09	623.57	874.34	85.76	5.48	
1.65	15.65	10.19					
37	Chan	623.57	629.05	855.87	84.67	5.48	
1.61	15.45	10.11					
38	Chan	629.05	634.53	837.56	83.58	5.48	
1.58	15.25	10.02					
39	Chan	634.53	640.00	819.41	82.49	5.48	
1.55	15.06	9.93					
40	Chan	640.00	645.48	801.41	81.40	5.48	
1.51	14.86	9.85					
41	Chan	645.48	650.96	783.58	80.31	5.48	
1.48	14.66	9.76					
42	Chan	650.96	656.44	736.37	77.95	5.59	
1.39	14.23	9.45					

43	Chan	656.44	661.92	611.85	70.73	5.78
1.15	12.91	8.65				
44	Chan	661.92	667.40	383.54	55.86	6.46
0.72	10.20	6.87				
45	ROB	667.40	742.58	120.18	61.35	16.67
0.23	4.28	1.96				

CROSS SECTION

RIVER: San Luis Rey Riv
REACH: Reach 1 RS: 5475

INPUT
Description:
Station Elevation Data num= 39

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	32.2	21	36.2	36.8	40.2	107	45.6	146.75	40.2
151	39.2	159	38.2	171	32.2	182	26.2	195	24.2
195.467	23.97	199	22.2	207	18.2	221	16.3	247	16.7
268	16.2	320.1	14.91	345	14.3	407.09	15.7	427	14.2
437	12.2	440	10.2	444	7.2	464	7.2	479	6.7
528	6.2	601	8.2	636	10.2	668	12.2	679	14.2
690	16.2	702	18.2	713	20.2	723	22.2	731	24.2
755	26.2	767	28.2	788	30.2	804	32.2		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	407.09	.025	690	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
407.09	690	579	515.3 478.7	.1	.3

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	25.66	Element	Left OB	Channel
Right OB				
Vel Head (ft)	1.51	Wt. n-Val.	0.040	0.025
0.050				
W.S. Elev (ft)	24.15	Reach Len. (ft)	579.00	515.30
478.70				
Crit W.S. (ft)	19.50	Flow Area (sq ft)	1745.17	4250.16
174.76				
E.G. Slope (ft/ft)	0.000861	Area (sq ft)	1745.17	4250.16
174.76				
Q Total (cfs)	53000.00	Flow (cfs)	7718.61	44884.36
397.04				
Top Width (ft)	535.67	Top Width (ft)	211.98	282.91
40.78				
Vel Total (ft/s)	8.59	Avg. Vel. (ft/s)	4.42	10.56
2.27				
Max Chl Dpth (ft)	17.95	Hydr. Depth (ft)	8.23	15.02
4.29				
Conv. Total (cfs)	1806015.0	Conv. (cfs)	263017.4	1529468.0
13529.3				
Length Wtd. (ft)	524.65	Wetted Per. (ft)	213.56	285.29
41.56				
Min Ch El (ft)	6.20	Shear (lb/sq ft)	0.44	0.80
0.23				
Alpha	1.32	Stream Power (lb/ft s)	1.94	8.46

0.51					
Frctn Loss (ft)		0.65	Cum Volume (acre-ft)	81.36	467.18
84.62					
C & E Loss (ft)		0.11	Cum SA (acres)	12.90	41.77
11.46					

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.

Profile #100-yr

Percent Conv	Pos Hydr	Depth(ft)	Velocity (ft/s)	Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)
1	LOB		0.00	407.09	7718.61	1745.17	213.56	
14.56	8.23		4.42					
2	Chan		407.09	413.67	411.64	57.19	6.60	
0.78	8.69		7.20					
3	Chan		413.67	420.25	451.49	60.46	6.60	
0.85	9.19		7.47					
4	Chan		420.25	426.83	492.81	63.72	6.60	
0.93	9.68		7.73					
5	Chan		426.83	433.41	563.92	69.54	6.71	
1.06	10.57		8.11					
6	Chan		433.41	439.99	679.93	80.27	7.25	
1.28	12.20		8.47					
7	Chan		439.99	446.57	1040.08	105.45	7.58	
1.96	16.03		9.86					
8	Chan		446.57	453.15	1254.46	111.49	6.58	
2.37	16.95		11.25					
9	Chan		453.15	459.72	1254.46	111.49	6.58	
2.37	16.95		11.25					
10	Chan		459.72	466.30	1255.95	111.58	6.58	
2.37	16.96		11.26					
11	Chan		466.30	472.88	1277.08	112.71	6.58	
2.41	17.13		11.33					
12	Chan		472.88	479.46	1304.42	114.15	6.58	
2.46	17.35		11.43					
13	Chan		479.46	486.04	1321.54	115.03	6.58	
2.49	17.48		11.49					
14	Chan		486.04	492.62	1330.00	115.47	6.58	
2.51	17.55		11.52					
15	Chan		492.62	499.20	1338.49	115.91	6.58	
2.53	17.62		11.55					
16	Chan		499.20	505.78	1347.01	116.35	6.58	
2.54	17.68		11.58					
17	Chan		505.78	512.36	1355.53	116.80	6.58	
2.56	17.75		11.61					
18	Chan		512.36	518.94	1364.09	117.24	6.58	
2.57	17.82		11.64					
19	Chan		518.94	525.52	1372.68	117.68	6.58	
2.59	17.89		11.66					
20	Chan		525.52	532.10	1374.93	117.81	6.58	
2.59	17.91		11.67					

21	Chan	532.10	538.68	1354.07	116.74	6.58
2.55	17.74	11.60				
22	Chan	538.68	545.26	1331.23	115.55	6.58
2.51	17.56	11.52				
23	Chan	545.26	551.83	1308.53	114.36	6.58
2.47	17.38	11.44				
24	Chan	551.83	558.41	1285.99	113.18	6.58
2.43	17.20	11.36				
25	Chan	558.41	564.99	1263.61	111.99	6.58
2.38	17.02	11.28				
26	Chan	564.99	571.57	1241.40	110.81	6.58
2.34	16.84	11.20				
27	Chan	571.57	578.15	1219.32	109.62	6.58
2.30	16.66	11.12				
28	Chan	578.15	584.73	1197.41	108.43	6.58
2.26	16.48	11.04				
29	Chan	584.73	591.31	1175.68	107.25	6.58
2.22	16.30	10.96				
30	Chan	591.31	597.89	1154.08	106.06	6.58
2.18	16.12	10.88				
31	Chan	597.89	604.47	1128.93	104.70	6.59
2.13	15.91	10.78				
32	Chan	604.47	611.05	1086.96	102.37	6.59
2.05	15.56	10.62				
33	Chan	611.05	617.63	1043.53	99.89	6.59
1.97	15.18	10.45				
34	Chan	617.63	624.21	1000.82	97.42	6.59
1.89	14.81	10.27				
35	Chan	624.21	630.79	958.82	94.95	6.59
1.81	14.43	10.10				
36	Chan	630.79	637.37	917.44	92.47	6.59
1.73	14.05	9.92				
37	Chan	637.37	643.94	874.16	89.84	6.59
1.65	13.65	9.73				
38	Chan	643.94	650.52	830.73	87.13	6.59
1.57	13.24	9.53				
39	Chan	650.52	657.10	788.19	84.42	6.59
1.49	12.83	9.34				
40	Chan	657.10	663.68	746.54	81.72	6.59
1.41	12.42	9.14				
41	Chan	663.68	670.26	698.96	78.71	6.62
1.32	11.96	8.88				
42	Chan	670.26	676.84	598.07	71.95	6.69
1.13	10.94	8.31				
43	Chan	676.84	683.42	493.07	64.08	6.69
0.93	9.74	7.69				
44	Chan	683.42	690.00	396.32	56.21	6.69
0.75	8.54	7.05				
45	ROB	690.00	804.00	397.04	174.76	41.56
0.75	4.29	2.27				

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

CROSS SECTION

RIVER: San Luis Rey Riv
REACH: Reach 1 RS: 4960

INPUT
Description:
Station Elevation Data num= 32

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	32.2	84	33.1	121	32.2	136	28.2	182	26.2
200	22.2	214	18.2	227	16.2	312.8	16.06	350	16
445	15.1	476	14.2	486	12.2	489	10.2	500	8.9
510	8.2	535	6.7	570	6.7	617	8.2	631	9.5
668	10.2	687.9	12.2	703	18.2	712	22.2	725	28.2
731	32.2	737	38.2	742	42.2	756	43.2	777	43.7
784	44.2	796	45.2						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	445	.025	703	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
445	703	382.1	548.1 630.3	.1	.3

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	24.90	Element	Left OB	Channel
Right OB				
Vel Head (ft)	2.61	Wt. n-Val.	0.040	0.025
0.050				
W.S. Elev (ft)	22.30	Reach Len. (ft)	382.10	548.10
630.30				
Crit W.S. (ft)	20.53	Flow Area (sq ft)	1498.75	3230.55
18.88				
E.G. Slope (ft/ft)	0.001900	Area (sq ft)	1498.75	3230.55
18.88				
Q Total (cfs)	53000.00	Flow (cfs)	8092.72	44870.12
37.16				
Top Width (ft)	512.64	Top Width (ft)	245.43	258.00
9.21				
Vel Total (ft/s)	11.16	Avg. Vel. (ft/s)	5.40	13.89
1.97				
Max Chl Dpth (ft)	15.60	Hydr. Depth (ft)	6.11	12.52
2.05				
Conv. Total (cfs)	1215768.0	Conv. (cfs)	185639.0	1029276.0
852.5				
Length Wtd. (ft)	526.11	Wetted Per. (ft)	246.16	260.30
10.08				
Min Ch El (ft)	6.70	Shear (lb/sq ft)	0.72	1.47
0.22				
Alpha	1.35	Stream Power (lb/ft s)	3.90	20.45
0.44				
Frctn Loss (ft)	0.65	Cum Volume (acre-ft)	59.80	422.94
83.56				
C & E Loss (ft)	0.38	Cum SA (acres)	9.86	38.57
11.18				

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.

Profile #100-yr

Percent Conv	Pos Hydr Depth(ft)	Left Sta Velocity (ft/s)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)
1	LOB	0.00	445.00	8092.72	1498.75	246.16
15.27	6.11	5.40				
2	Chan	445.00	451.00	411.80	43.70	6.00
0.78	7.28	9.42				
3	Chan	451.00	457.00	428.34	44.75	6.00
0.81	7.46	9.57				
4	Chan	457.00	463.00	445.15	45.79	6.00
0.84	7.63	9.72				
5	Chan	463.00	469.00	462.21	46.84	6.00
0.87	7.81	9.87				
6	Chan	469.00	475.00	479.53	47.88	6.00
0.90	7.98	10.01				
7	Chan	475.00	481.00	528.14	51.06	6.10
1.00	8.51	10.34				
8	Chan	481.00	487.00	646.62	58.41	6.30
1.22	9.74	11.07				
9	Chan	487.00	493.00	907.84	72.19	6.43
1.71	12.03	12.58				
10	Chan	493.00	499.00	1066.28	77.54	6.04
2.01	12.92	13.75				
11	Chan	499.00	505.00	1154.16	81.20	6.02
2.18	13.53	14.21				
12	Chan	505.00	511.00	1215.63	83.73	6.01
2.29	13.96	14.52				
13	Chan	511.00	517.00	1271.88	86.02	6.01
2.40	14.34	14.79				
14	Chan	517.00	523.00	1325.56	88.18	6.01
2.50	14.70	15.03				
15	Chan	523.00	529.00	1380.11	90.34	6.01
2.60	15.06	15.28				
16	Chan	529.00	535.00	1435.55	92.50	6.01
2.71	15.42	15.52				
17	Chan	535.00	541.00	1465.35	93.58	6.00
2.76	15.60	15.66				
18	Chan	541.00	547.00	1465.35	93.58	6.00
2.76	15.60	15.66				
19	Chan	547.00	553.00	1465.35	93.58	6.00
2.76	15.60	15.66				
20	Chan	553.00	559.00	1465.35	93.58	6.00
2.76	15.60	15.66				
21	Chan	559.00	565.00	1465.35	93.58	6.00
2.76	15.60	15.66				
22	Chan	565.00	571.00	1464.85	93.56	6.00
2.76	15.59	15.66				
23	Chan	571.00	577.00	1444.92	92.81	6.00
2.73	15.47	15.57				
24	Chan	577.00	583.00	1415.23	91.66	6.00
2.67	15.28	15.44				
25	Chan	583.00	589.00	1385.79	90.52	6.00

2.61	15.09	15.31				
26	Chan	589.00	595.00	1356.60	89.37	6.00
2.56	14.89	15.18				
27	Chan	595.00	601.00	1327.66	88.22	6.00
2.51	14.70	15.05				
28	Chan	601.00	607.00	1298.96	87.07	6.00
2.45	14.51	14.92				
29	Chan	607.00	613.00	1270.52	85.92	6.00
2.40	14.32	14.79				
30	Chan	613.00	619.00	1238.31	84.65	6.01
2.34	14.11	14.63				
31	Chan	619.00	625.00	1167.52	81.79	6.03
2.20	13.63	14.27				
32	Chan	625.00	631.00	1089.08	78.45	6.03
2.05	13.08	13.88				
33	Chan	631.00	637.00	1045.79	76.44	6.00
1.97	12.74	13.68				
34	Chan	637.00	643.00	1030.31	75.76	6.00
1.94	12.63	13.60				
35	Chan	643.00	649.00	1014.91	75.08	6.00
1.91	12.51	13.52				
36	Chan	649.00	655.00	999.62	74.40	6.00
1.89	12.40	13.44				
37	Chan	655.00	661.00	984.41	73.71	6.00
1.86	12.29	13.35				
38	Chan	661.00	667.00	969.30	73.03	6.00
1.83	12.17	13.27				
39	Chan	667.00	673.00	929.46	71.33	6.03
1.75	11.89	13.03				
40	Chan	673.00	679.00	852.62	67.76	6.03
1.61	11.29	12.58				
41	Chan	679.00	685.00	778.10	64.14	6.03
1.47	10.69	12.13				
42	Chan	685.00	691.00	662.77	59.09	6.25
1.25	9.85	11.22				
43	Chan	691.00	697.00	427.81	46.04	6.46
0.81	7.67	9.29				
44	Chan	697.00	703.00	230.09	31.73	6.46
0.43	5.29	7.25				
45	ROB	703.00	796.00	37.16	18.88	10.08
0.07	2.05	1.97				

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 Riv
REACH: Reach 1 RS: 4412

INPUT
Description:

Station Elevation Data num= 37

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	30.2	28.8	30.7	52.4	30.2	80	30.7	109	30.2
140	29	149	28.2	157.7	26.2	164.5	24.2	167.7	22.2
173.9	18.2	177.1	16.2	180.2	12.2	203.7	14.2	269	13
276.5	12.88	319.5	12.2	392.9	9.1	503.7	6.6	554.2	8.2
579	9.4	669.5	12.2	680.4	14.2	690.3	16.2	698	17.74
700.3	18.2	711.4	20.2	724.1	22.2	740.4	24.2	744.6	26.2
748.15	28.2	750.8	30.2	754.2	32.2	760.9	36.2	764.3	38.2
788	50.2	838.4	62.2						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	319.5	.025	669.5	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
319.5	669.5	617.2	624.6 463	.1	.3

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	23.87	Element	Left OB	Channel
Right OB				
Vel Head (ft)	1.35	Wt. n-Val.	0.040	0.025
0.050				
W.S. Elev (ft)	22.52	Reach Len. (ft)	617.20	624.60
463.00				
Crit W.S. (ft)	17.82	Flow Area (sq ft)	1359.98	4661.67
281.37				
E.G. Slope (ft/ft)	0.000873	Area (sq ft)	1359.98	4661.67
281.37				
Q Total (cfs)	53000.00	Flow (cfs)	6316.16	45977.16
706.68				
Top Width (ft)	559.53	Top Width (ft)	152.31	350.00
57.22				
Vel Total (ft/s)	8.41	Avg. Vel. (ft/s)	4.64	9.86
2.51				
Max Chl Dpth (ft)	15.92	Hydr. Depth (ft)	8.93	13.32
4.92				
Conv. Total (cfs)	1793993.0	Conv. (cfs)	213795.2	1556277.0
23920.4				
Length Wtd. (ft)	610.86	Wetted Per. (ft)	156.22	350.19
58.15				
Min Ch El (ft)	6.60	Shear (lb/sq ft)	0.47	0.73
0.26				
Alpha	1.23	Stream Power (lb/ft s)	2.20	7.15
0.66				
Frctn Loss (ft)	0.59	Cum Volume (acre-ft)	47.26	373.28
81.38				
C & E Loss (ft)	0.04	Cum SA (acres)	8.12	34.75
10.70				

Profile #100-yr

Percent Conv	Pos Hydr Depth(ft)	Left Sta Velocity (ft/s)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)
1	LOB	0.00	319.50	6316.16	1359.98	156.22
11.92	8.93	4.64				

2	Chan	319.50	327.64	712.37	85.41	8.15
1.34	10.49	8.34				
3	Chan	327.64	335.78	751.69	88.21	8.15
1.42	10.84	8.52				
4	Chan	335.78	343.92	791.85	91.01	8.15
1.49	11.18	8.70				
5	Chan	343.92	352.06	832.84	93.80	8.15
1.57	11.52	8.88				
6	Chan	352.06	360.20	874.65	96.60	8.15
1.65	11.87	9.05				
7	Chan	360.20	368.34	917.29	99.40	8.15
1.73	12.21	9.23				
8	Chan	368.34	376.48	960.72	102.20	8.15
1.81	12.56	9.40				
9	Chan	376.48	384.62	1004.96	105.00	8.15
1.90	12.90	9.57				
10	Chan	384.62	392.76	1050.00	107.80	8.15
1.98	13.24	9.74				
11	Chan	392.76	400.90	1085.90	109.96	8.14
2.05	13.51	9.87				
12	Chan	400.90	409.03	1110.62	111.46	8.14
2.10	13.69	9.96				
13	Chan	409.03	417.17	1135.56	112.95	8.14
2.14	13.88	10.05				
14	Chan	417.17	425.31	1160.72	114.45	8.14
2.19	14.06	10.14				
15	Chan	425.31	433.45	1186.09	115.94	8.14
2.24	14.24	10.23				
16	Chan	433.45	441.59	1211.69	117.44	8.14
2.29	14.43	10.32				
17	Chan	441.59	449.73	1237.50	118.93	8.14
2.33	14.61	10.40				
18	Chan	449.73	457.87	1263.54	120.43	8.14
2.38	14.80	10.49				
19	Chan	457.87	466.01	1289.78	121.92	8.14
2.43	14.98	10.58				
20	Chan	466.01	474.15	1316.25	123.42	8.14
2.48	15.16	10.66				
21	Chan	474.15	482.29	1342.93	124.91	8.14
2.53	15.35	10.75				
22	Chan	482.29	490.43	1369.82	126.41	8.14
2.58	15.53	10.84				
23	Chan	490.43	498.57	1396.92	127.90	8.14
2.64	15.71	10.92				
24	Chan	498.57	506.71	1419.65	129.15	8.14
2.68	15.87	10.99				
25	Chan	506.71	514.85	1394.22	127.77	8.14
2.63	15.70	10.91				
26	Chan	514.85	522.99	1356.25	125.67	8.14
2.56	15.44	10.79				
27	Chan	522.99	531.13	1318.72	123.57	8.14
2.49	15.18	10.67				
28	Chan	531.13	539.27	1281.58	121.47	8.14
2.42	14.92	10.55				
29	Chan	539.27	547.41	1244.88	119.37	8.14
2.35	14.67	10.43				
30	Chan	547.41	555.55	1208.27	117.26	8.14
2.28	14.41	10.30				
31	Chan	555.55	563.69	1159.79	114.44	8.15
2.19	14.06	10.13				
32	Chan	563.69	571.83	1106.15	111.23	8.15
2.09	13.67	9.94				
33	Chan	571.83	579.97	1053.71	108.03	8.15

1.99	13.27	9.75					
34	Chan	579.97	588.10	1013.83	105.54	8.14	
1.91	12.97	9.61					
35	Chan	588.10	596.24	981.21	103.48	8.14	
1.85	12.71	9.48					
36	Chan	596.24	604.38	949.03	101.43	8.14	
1.79	12.46	9.36					
37	Chan	604.38	612.52	917.29	99.38	8.14	
1.73	12.21	9.23					
38	Chan	612.52	620.66	885.97	97.34	8.14	
1.67	11.96	9.10					
39	Chan	620.66	628.80	855.10	95.29	8.14	
1.61	11.71	8.97					
40	Chan	628.80	636.94	824.66	93.24	8.14	
1.56	11.45	8.84					
41	Chan	636.94	645.08	794.67	91.19	8.14	
1.50	11.20	8.71					
42	Chan	645.08	653.22	765.11	89.14	8.14	
1.44	10.95	8.58					
43	Chan	653.22	661.36	736.01	87.09	8.14	
1.39	10.70	8.45					
44	Chan	661.36	669.50	707.37	85.04	8.14	
1.33	10.45	8.32					
45	ROB	669.50	838.40	706.68	281.37	58.15	
1.33	4.92	2.51					

CROSS SECTION

RIVER: San Luis Rey Riv
REACH: Reach 1 RS: 3787

INPUT
Description:
Station Elevation Data num= 39

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	26.2	8.8	26.5	15	26.2	24	26.2	35	25.6
48	26.2	59	26.8	76.25	26.38	92	23.5	102.2	22.2
105	20.2	107.57	18.79	112.3	16.2	118.7	12.2	125.4	8.2
150	4.9	175	4.9	200	4.9	225	4.9	258	8.2
294	8.5	398	9.4	455.7	9.7	512	10	530	10.2
538.5	12.2	545.5	14.2	551.5	16.2	557.8	18.2	566	20.2
585	22.2	588	32.2	598.4	42.2	609.6	52.2	621.2	62.2
635	72.2	658.5	78.38	660	82.2	680	92.7		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	125.4	.025	398	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
125.4	398	478	483.1	500.6	.1	.3

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	23.24	Element	Left OB	Channel
Right OB				
Vel Head (ft)	1.76	Wt. n-Val.	0.040	0.025
0.050				
W.S. Elev (ft)	21.48	Reach Len. (ft)	478.00	483.10
500.60				

Crit W.S. (ft)	16.78	Flow Area (sq ft)	147.36	3880.47
1785.23				
E.G. Slope (ft/ft)	0.001078	Area (sq ft)	147.36	3880.47
1785.23				
Q Total (cfs)	53000.00	Flow (cfs)	573.05	44435.25
7991.71				
Top Width (ft)	475.00	Top Width (ft)	22.20	272.60
180.20				
Vel Total (ft/s)	9.12	Avg. Vel. (ft/s)	3.89	11.45
4.48				
Max Chl Dpth (ft)	16.58	Hydr. Depth (ft)	6.64	14.24
9.91				
Conv. Total (cfs)	1614281.0	Conv. (cfs)	17453.9	1353414.0
243412.4				
Length Wtd. (ft)	486.78	Wetted Per. (ft)	25.88	272.99
181.66				
Min Ch El (ft)	4.90	Shear (lb/sq ft)	0.38	0.96
0.66				
Alpha	1.36	Stream Power (lb/ft s)	1.49	10.95
2.96				
Frctn Loss (ft)	0.59	Cum Volume (acre-ft)	36.58	312.04
70.40				
C & E Loss (ft)	0.02	Cum SA (acres)	6.88	30.28
9.44				

Profile #100-yr

Percent Conv	Pos Hydr Depth(ft)	Left Sta Velocity (ft/s)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)
1	LOB	0.00	125.40	573.05	147.36	25.88
1.08	6.64	3.89				
2	Chan	125.40	131.74	957.73	86.91	6.40
1.81	13.71	11.02				
3	Chan	131.74	138.08	1058.78	92.30	6.40
2.00	14.56	11.47				
4	Chan	138.08	144.42	1163.84	97.70	6.40
2.20	15.41	11.91				
5	Chan	144.42	150.76	1272.95	103.05	6.39
2.40	16.25	12.35				
6	Chan	150.76	157.10	1323.17	105.14	6.34
2.50	16.58	12.59				
7	Chan	157.10	163.44	1323.17	105.14	6.34
2.50	16.58	12.59				
8	Chan	163.44	169.78	1323.17	105.14	6.34
2.50	16.58	12.59				
9	Chan	169.78	176.12	1323.17	105.14	6.34
2.50	16.58	12.59				
10	Chan	176.12	182.46	1323.17	105.14	6.34
2.50	16.58	12.59				
11	Chan	182.46	188.80	1323.17	105.14	6.34
2.50	16.58	12.59				
12	Chan	188.80	195.13	1323.17	105.14	6.34
2.50	16.58	12.59				
13	Chan	195.13	201.47	1323.17	105.14	6.34
2.50	16.58	12.59				
14	Chan	201.47	207.81	1323.17	105.14	6.34
2.50	16.58	12.59				
15	Chan	207.81	214.15	1323.17	105.14	6.34

2.50	16.58	12.59				
16	Chan	214.15	220.49	1323.17	105.14	6.34
2.50	16.58	12.59				
17	Chan	220.49	226.83	1318.39	104.97	6.35
2.49	16.56	12.56				
18	Chan	226.83	233.17	1253.16	101.97	6.37
2.36	16.08	12.29				
19	Chan	233.17	239.51	1171.93	97.95	6.37
2.21	15.45	11.96				
20	Chan	239.51	245.85	1092.89	93.93	6.37
2.06	14.82	11.64				
21	Chan	245.85	252.19	1016.07	89.91	6.37
1.92	14.18	11.30				
22	Chan	252.19	258.53	942.00	85.90	6.37
1.78	13.55	10.97				
23	Chan	258.53	264.87	910.60	84.02	6.34
1.72	13.25	10.84				
24	Chan	264.87	271.21	904.56	83.69	6.34
1.71	13.20	10.81				
25	Chan	271.21	277.55	898.53	83.35	6.34
1.70	13.15	10.78				
26	Chan	277.55	283.89	892.53	83.02	6.34
1.68	13.10	10.75				
27	Chan	283.89	290.23	886.53	82.68	6.34
1.67	13.04	10.72				
28	Chan	290.23	296.57	880.54	82.35	6.34
1.66	12.99	10.69				
29	Chan	296.57	302.91	874.39	82.00	6.34
1.65	12.93	10.66				
30	Chan	302.91	309.25	868.21	81.65	6.34
1.64	12.88	10.63				
31	Chan	309.25	315.59	862.06	81.30	6.34
1.63	12.83	10.60				
32	Chan	315.59	321.93	855.92	80.96	6.34
1.61	12.77	10.57				
33	Chan	321.93	328.27	849.80	80.61	6.34
1.60	12.72	10.54				
34	Chan	328.27	334.60	843.70	80.26	6.34
1.59	12.66	10.51				
35	Chan	334.60	340.94	837.62	79.91	6.34
1.58	12.61	10.48				
36	Chan	340.94	347.28	831.55	79.57	6.34
1.57	12.55	10.45				
37	Chan	347.28	353.62	825.50	79.22	6.34
1.56	12.50	10.42				
38	Chan	353.62	359.96	819.47	78.87	6.34
1.55	12.44	10.39				
39	Chan	359.96	366.30	813.45	78.52	6.34
1.53	12.39	10.36				
40	Chan	366.30	372.64	807.45	78.17	6.34
1.52	12.33	10.33				
41	Chan	372.64	378.98	801.48	77.83	6.34
1.51	12.28	10.30				
42	Chan	378.98	385.32	795.52	77.48	6.34
1.50	12.22	10.27				
43	Chan	385.32	391.66	789.58	77.13	6.34
1.49	12.17	10.24				
44	Chan	391.66	398.00	783.65	76.78	6.34
1.48	12.11	10.21				
45	ROB	398.00	680.00	7991.71	1785.23	181.66
15.08	9.91	4.48				

CROSS SECTION

RIVER: San Luis Rey Riv
REACH: Reach 1 RS: 3305

INPUT
Description:
Station Elevation Data num= 38

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	23.2	37	24.8	66	24.2	84	22.6	90.9	18.2
94	16.2	96.4	14.7	99	16.2	103	14.2	114	10.2
120	8.2	150	4.9	180	4.9	210	4.9	211.2	4.9
240	4.9	253	8.2	323	8.75	367	8.7	383	8.2
440	7.75	491	8.2	511	10.2	515.5	10.76	527	12.2
546	14.2	552	16.2	554	18.2	557	20.2	558	22.2
570	32.2	581	42.2	591	52.2	601	62.2	617	72.2
620.7	78.2	669	82.2	691	84.2				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	114	.025	323	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
114	323	210.5	214.6	221.9	.1	.3

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	22.64	Element	Left OB	Channel
Right OB				
Vel Head (ft)	1.93	Wt. n-Val.	0.040	0.025
0.050				
W.S. Elev (ft)	20.71	Reach Len. (ft)	210.50	214.60
221.90				
Crit W.S. (ft)	16.68	Flow Area (sq ft)	157.82	2957.68
2669.07				
E.G. Slope (ft/ft)	0.001351	Area (sq ft)	157.82	2957.68
2669.07				
Q Total (cfs)	53000.00	Flow (cfs)	646.50	37692.21
14661.30				
Top Width (ft)	470.30	Top Width (ft)	27.04	209.00
234.26				
Vel Total (ft/s)	9.16	Avg. Vel. (ft/s)	4.10	12.74
5.49				
Max Chl Dpth (ft)	15.81	Hydr. Depth (ft)	5.84	14.15
11.39				
Conv. Total (cfs)	1441992.0	Conv. (cfs)	17589.5	1025507.0
398895.8				
Length Wtd. (ft)	215.50	Wetted Per. (ft)	30.37	209.92
236.67				
Min Ch El (ft)	4.90	Shear (lb/sq ft)	0.44	1.19
0.95				
Alpha	1.48	Stream Power (lb/ft s)	1.80	15.14
5.22				
Frctn Loss (ft)	0.20	Cum Volume (acre-ft)	34.91	274.12
44.81				
C & E Loss (ft)	0.20	Cum SA (acres)	6.61	27.61
7.06				

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

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

Profile #100-yr

Percent Conv	Pos Hydr Depth(ft)	Left Sta Velocity (ft/s)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)
1	LOB	0.00	114.00	646.50	157.82	30.37
1.22	5.84	4.10				
2	Chan	114.00	118.86	580.49	55.03	5.12
1.10	11.32	10.55				
3	Chan	118.86	123.72	712.65	61.36	4.94
1.34	12.62	11.61				
4	Chan	123.72	128.58	772.26	64.10	4.89
1.46	13.19	12.05				
5	Chan	128.58	133.44	825.14	66.70	4.89
1.56	13.72	12.37				
6	Chan	133.44	138.30	879.41	69.30	4.89
1.66	14.26	12.69				
7	Chan	138.30	143.16	935.06	71.90	4.89
1.76	14.79	13.01				
8	Chan	143.16	148.02	992.06	74.50	4.89
1.87	15.33	13.32				
9	Chan	148.02	152.88	1042.51	76.64	4.87
1.97	15.77	13.60				
10	Chan	152.88	157.74	1049.10	76.85	4.86
1.98	15.81	13.65				
11	Chan	157.74	162.60	1049.10	76.85	4.86
1.98	15.81	13.65				
12	Chan	162.60	167.47	1049.10	76.85	4.86
1.98	15.81	13.65				
13	Chan	167.47	172.33	1049.10	76.85	4.86
1.98	15.81	13.65				
14	Chan	172.33	177.19	1049.10	76.85	4.86
1.98	15.81	13.65				
15	Chan	177.19	182.05	1049.10	76.85	4.86
1.98	15.81	13.65				
16	Chan	182.05	186.91	1049.10	76.85	4.86
1.98	15.81	13.65				
17	Chan	186.91	191.77	1049.10	76.85	4.86
1.98	15.81	13.65				
18	Chan	191.77	196.63	1049.10	76.85	4.86
1.98	15.81	13.65				
19	Chan	196.63	201.49	1049.10	76.85	4.86
1.98	15.81	13.65				
20	Chan	201.49	206.35	1049.10	76.85	4.86
1.98	15.81	13.65				
21	Chan	206.35	211.21	1049.10	76.85	4.86
1.98	15.81	13.65				
22	Chan	211.21	216.07	1049.10	76.85	4.86
1.98	15.81	13.65				
23	Chan	216.07	220.93	1049.10	76.85	4.86
1.98	15.81	13.65				
24	Chan	220.93	225.79	1049.10	76.85	4.86
1.98	15.81	13.65				

25	Chan	225.79	230.65	1049.10	76.85	4.86
1.98	15.81	13.65				
26	Chan	230.65	235.51	1049.10	76.85	4.86
1.98	15.81	13.65				
27	Chan	235.51	240.37	1047.01	76.84	4.87
1.98	15.81	13.63				
28	Chan	240.37	245.23	951.61	73.40	5.01
1.80	15.10	12.97				
29	Chan	245.23	250.09	825.58	67.40	5.01
1.56	13.87	12.25				
30	Chan	250.09	254.95	721.80	61.87	4.95
1.36	12.73	11.67				
31	Chan	254.95	259.81	706.93	60.65	4.86
1.33	12.48	11.66				
32	Chan	259.81	264.67	703.33	60.46	4.86
1.33	12.44	11.63				
33	Chan	264.67	269.53	699.74	60.28	4.86
1.32	12.40	11.61				
34	Chan	269.53	274.40	696.15	60.09	4.86
1.31	12.36	11.59				
35	Chan	274.40	279.26	692.57	59.90	4.86
1.31	12.32	11.56				
36	Chan	279.26	284.12	688.99	59.72	4.86
1.30	12.29	11.54				
37	Chan	284.12	288.98	685.43	59.53	4.86
1.29	12.25	11.51				
38	Chan	288.98	293.84	681.87	59.35	4.86
1.29	12.21	11.49				
39	Chan	293.84	298.70	678.32	59.16	4.86
1.28	12.17	11.47				
40	Chan	298.70	303.56	674.78	58.98	4.86
1.27	12.13	11.44				
41	Chan	303.56	308.42	671.24	58.79	4.86
1.27	12.10	11.42				
42	Chan	308.42	313.28	667.71	58.60	4.86
1.26	12.06	11.39				
43	Chan	313.28	318.14	664.19	58.42	4.86
1.25	12.02	11.37				
44	Chan	318.14	323.00	660.68	58.23	4.86
1.25	11.98	11.35				
45	ROB	323.00	691.00	14661.30	2669.07	236.67
27.66	11.39	5.49				

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

CROSS SECTION

RIVER: San Luis Rey Riv
REACH: Reach 1 RS: 3089

INPUT
Description:
Station Elevation Data num= 48

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev

0	26.2	18.5	27.1	27.2	26.81	45	26.2	66	24.2
80	22.2	84	20.2	89	18.2	94	16.2	98	14.2
102	12.2	114	12.6	139	12.2	158	11.3	164.8	10.99
182.3	10.2	191	8.2	220	6.5	250	4.9	280	4.9
310	4.9	340	4.9	370	4.7	430	4.9	470	6.6
500	7.5	520	8.2	535	10.2	549	12.2	565	14.2
567	16.2	569	18.2	571	20.2	573	22.2	583.86	32.07
584	32.2	594	42.2	609	52.2	616	56.2	620	62.2
623	64.2	628	66.2	635	68.2	641	70.2	648	72.2
661	74.2	676	76.2	699	78.2				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	191	.025	535	.05

Bank Sta: Left	Right	Lengths: Left Channel		Right	Coeff Contr.	Expan.
191	535	285.7	250.5	194.1	.1	.3

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	22.24	Element	Left OB	Channel
Right OB				
Vel Head (ft)	1.25	Wt. n-Val.	0.040	0.025
0.050				
W.S. Elev (ft)	20.99	Reach Len. (ft)	285.70	250.50
194.10				
Crit W.S. (ft)	14.93	Flow Area (sq ft)	927.84	5227.45
284.81				
E.G. Slope (ft/ft)	0.000650	Area (sq ft)	927.84	5227.45
284.81				
Q Total (cfs)	53000.00	Flow (cfs)	3624.66	48574.90
800.44				
Top Width (ft)	489.37	Top Width (ft)	108.58	344.00
36.79				
Vel Total (ft/s)	8.23	Avg. Vel. (ft/s)	3.91	9.29
2.81				
Max Chl Dpth (ft)	16.29	Hydr. Depth (ft)	8.54	15.20
7.74				
Conv. Total (cfs)	2078678.0	Conv. (cfs)	142160.2	1905124.0
31393.7				
Length Wtd. (ft)	251.65	Wetted Per. (ft)	110.77	344.29
39.87				
Min Ch El (ft)	4.70	Shear (lb/sq ft)	0.34	0.62
0.29				
Alpha	1.19	Stream Power (lb/ft s)	1.33	5.73
0.81				
Frctn Loss (ft)	0.26	Cum Volume (acre-ft)	32.28	253.96
37.28				
C & E Loss (ft)	0.15	Cum SA (acres)	6.28	26.25
6.37				

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.

Profile #100-yr

Percent Conv	Pos Hydr	Left Sta Velocity (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)
	Depth(ft)	(ft/s)				
1	LOB	0.00	191.00	3624.66	927.84	110.77
6.84	8.54	3.91				
2	Chan	191.00	199.00	869.71	104.21	8.01
1.64	13.03	8.35				
3	Chan	199.00	207.00	922.52	107.96	8.01
1.74	13.50	8.55				
4	Chan	207.00	215.00	976.57	111.71	8.01
1.84	13.96	8.74				
5	Chan	215.00	223.00	1031.56	115.44	8.01
1.95	14.43	8.94				
6	Chan	223.00	231.00	1084.03	118.92	8.01
2.05	14.86	9.12				
7	Chan	231.00	239.00	1136.38	122.33	8.01
2.14	15.29	9.29				
8	Chan	239.00	247.00	1189.72	125.75	8.01
2.24	15.72	9.46				
9	Chan	247.00	255.00	1234.08	128.49	8.00
2.33	16.06	9.60				
10	Chan	255.00	263.00	1238.36	128.73	8.00
2.34	16.09	9.62				
11	Chan	263.00	271.00	1238.36	128.73	8.00
2.34	16.09	9.62				
12	Chan	271.00	279.00	1238.36	128.73	8.00
2.34	16.09	9.62				
13	Chan	279.00	287.00	1238.36	128.73	8.00
2.34	16.09	9.62				
14	Chan	287.00	295.00	1238.36	128.73	8.00
2.34	16.09	9.62				
15	Chan	295.00	303.00	1238.36	128.73	8.00
2.34	16.09	9.62				
16	Chan	303.00	311.00	1238.36	128.73	8.00
2.34	16.09	9.62				
17	Chan	311.00	319.00	1238.36	128.73	8.00
2.34	16.09	9.62				
18	Chan	319.00	327.00	1238.36	128.73	8.00
2.34	16.09	9.62				
19	Chan	327.00	335.00	1238.36	128.73	8.00
2.34	16.09	9.62				
20	Chan	335.00	343.00	1238.83	128.76	8.00
2.34	16.10	9.62				
21	Chan	343.00	351.00	1244.33	129.11	8.00
2.35	16.14	9.64				
22	Chan	351.00	359.00	1251.19	129.53	8.00
2.36	16.19	9.66				
23	Chan	359.00	367.00	1258.07	129.96	8.00
2.37	16.24	9.68				
24	Chan	367.00	375.00	1262.95	130.26	8.00
2.38	16.28	9.70				
25	Chan	375.00	383.00	1260.24	130.09	8.00
2.38	16.26	9.69				
26	Chan	383.00	391.00	1256.79	129.88	8.00
2.37	16.23	9.68				
27	Chan	391.00	399.00	1253.36	129.67	8.00
2.36	16.21	9.67				
28	Chan	399.00	407.00	1249.92	129.45	8.00
2.36	16.18	9.66				
29	Chan	407.00	415.00	1246.49	129.24	8.00

2.35	16.15	9.64				
30	Chan	415.00	423.00	1243.06	129.03	8.00
2.35	16.13	9.63				
31	Chan	423.00	431.00	1239.23	128.79	8.00
2.34	16.10	9.62				
32	Chan	431.00	439.00	1210.50	127.03	8.01
2.28	15.88	9.53				
33	Chan	439.00	447.00	1167.61	124.31	8.01
2.20	15.54	9.39				
34	Chan	447.00	455.00	1125.34	121.59	8.01
2.12	15.20	9.26				
35	Chan	455.00	463.00	1083.70	118.87	8.01
2.04	14.86	9.12				
36	Chan	463.00	471.00	1042.82	116.16	8.01
1.97	14.52	8.98				
37	Chan	471.00	479.00	1009.99	113.93	8.00
1.91	14.24	8.86				
38	Chan	479.00	487.00	981.78	112.01	8.00
1.85	14.00	8.76				
39	Chan	487.00	495.00	953.89	110.09	8.00
1.80	13.76	8.66				
40	Chan	495.00	503.00	925.97	108.15	8.00
1.75	13.52	8.56				
41	Chan	503.00	511.00	895.04	105.97	8.00
1.69	13.25	8.45				
42	Chan	511.00	519.00	863.74	103.73	8.00
1.63	12.97	8.33				
43	Chan	519.00	527.00	796.37	99.08	8.06
1.50	12.39	8.04				
44	Chan	527.00	535.00	685.52	90.60	8.07
1.29	11.32	7.57				
45	ROB	535.00	699.00	800.44	284.81	39.87
1.51	7.74	2.81				

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

CROSS SECTION

RIVER: San Luis Rey Riv
REACH: Reach 1 RS: 2839

INPUT
Description:
Station Elevation Data num= 56

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	38.2	81.8	37.6	105.3	36.2	139.9	35.5	153.6	34.2
181.7	32.2	217.8	30.2	242.8	29.3	256	28.2	289.7	26.2
316.8	25.6	329.6	24.2	353.8	22.2	362.3	20.2	369.8	18.2
377.8	16.2	385.55	14.2	420.95	12.2	439.7	11.57	480.7	10.2
483.8	8.2	502.2	4.5	598.5	4.5	610.8	7.5	647.6	7.5
654.96	6.6	674.6	6.6	689.95	7.4	727.25	8.2	739.4	10.2
749.5	12.2	762.1	14.2	777.55	16.2	783.5	17.5	786.7	18.2
789.1	20.2	791.6	22.2	794.7	24.2	799.8	28.2	804.8	32.2
807.7	34.2	811.6	36.2	813.8	38.2	817.7	40.2	821	42.2

825.9	46.2	833.7	50.2	837.7	52.2	841.6	54.2	845.3	56.2
850	58.2	862.4	62.2	868.6	64.2	882.9	66.2	897.3	68.2
955.33	72.2								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	439.7	.025	749.5	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
439.7	749.5	145.6	90.9	65.5	.1	.3

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	21.83	Element	Left OB	Channel
Right OB				
Vel Head (ft)	2.73	Wt. n-Val.	0.040	0.025
0.050				
W.S. Elev (ft)	19.10	Reach Len. (ft)	145.60	90.90
65.50				
Crit W.S. (ft)	16.76	Flow Area (sq ft)	390.86	3736.65
152.35				
E.G. Slope (ft/ft)	0.001891	Area (sq ft)	390.86	3736.65
152.35				
Q Total (cfs)	53000.00	Flow (cfs)	1915.76	50596.78
487.47				
Top Width (ft)	421.34	Top Width (ft)	73.26	309.80
38.28				
Vel Total (ft/s)	12.38	Avg. Vel. (ft/s)	4.90	13.54
3.20				
Max Chl Dpth (ft)	14.60	Hydr. Depth (ft)	5.34	12.06
3.98				
Conv. Total (cfs)	1218881.0	Conv. (cfs)	44058.1	1163612.0
11210.7				
Length Wtd. (ft)	91.88	Wetted Per. (ft)	73.95	311.58
39.10				
Min Ch El (ft)	4.50	Shear (lb/sq ft)	0.62	1.42
0.46				
Alpha	1.15	Stream Power (lb/ft s)	3.06	19.17
1.47				
Frctn Loss (ft)	0.15	Cum Volume (acre-ft)	27.96	228.18
36.31				
C & E Loss (ft)	0.21	Cum SA (acres)	5.68	24.37
6.20				

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

Profile #100-yr

Percent Conv	Pos Hydr Depth(ft)	Left Sta Velocity (ft/s)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)
1	LOB	0.00	439.70	1915.76	390.86	73.95
3.61	5.34	4.90				
2	Chan	439.70	446.90	541.57	55.10	7.21
1.02	7.65	9.83				
3	Chan	446.90	454.11	570.28	56.83	7.21

1.08	7.89	10.03					
4	Chan	454.11	461.31	599.58	58.57	7.21	
1.13	8.13	10.24					
5	Chan	461.31	468.52	629.47	60.30	7.21	
1.19	8.37	10.44					
6	Chan	468.52	475.72	659.93	62.03	7.21	
1.25	8.61	10.64					
7	Chan	475.72	482.93	691.85	65.29	7.63	
1.31	9.06	10.60					
8	Chan	482.93	490.13	1029.71	82.30	7.50	
1.94	11.42	12.51					
9	Chan	490.13	497.34	1277.16	92.90	7.35	
2.41	12.89	13.75					
10	Chan	497.34	504.54	1518.09	102.79	7.30	
2.86	14.27	14.77					
11	Chan	504.54	511.75	1591.24	105.17	7.20	
3.00	14.60	15.13					
12	Chan	511.75	518.95	1591.24	105.17	7.20	
3.00	14.60	15.13					
13	Chan	518.95	526.16	1591.24	105.17	7.20	
3.00	14.60	15.13					
14	Chan	526.16	533.36	1591.24	105.17	7.20	
3.00	14.60	15.13					
15	Chan	533.36	540.57	1591.24	105.17	7.20	
3.00	14.60	15.13					
16	Chan	540.57	547.77	1591.24	105.17	7.20	
3.00	14.60	15.13					
17	Chan	547.77	554.97	1591.24	105.17	7.20	
3.00	14.60	15.13					
18	Chan	554.97	562.18	1591.24	105.17	7.20	
3.00	14.60	15.13					
19	Chan	562.18	569.38	1591.24	105.17	7.20	
3.00	14.60	15.13					
20	Chan	569.38	576.59	1591.24	105.17	7.20	
3.00	14.60	15.13					
21	Chan	576.59	583.79	1591.24	105.17	7.20	
3.00	14.60	15.13					
22	Chan	583.79	591.00	1591.24	105.17	7.20	
3.00	14.60	15.13					
23	Chan	591.00	598.20	1591.24	105.17	7.20	
3.00	14.60	15.13					
24	Chan	598.20	605.41	1420.75	99.35	7.41	
2.68	13.79	14.30					
25	Chan	605.41	612.61	1145.55	87.10	7.36	
2.16	12.09	13.15					
26	Chan	612.61	619.82	1084.44	83.55	7.20	
2.05	11.60	12.98					
27	Chan	619.82	627.02	1084.44	83.55	7.20	
2.05	11.60	12.98					
28	Chan	627.02	634.23	1084.44	83.55	7.20	
2.05	11.60	12.98					
29	Chan	634.23	641.43	1084.44	83.55	7.20	
2.05	11.60	12.98					
30	Chan	641.43	648.63	1085.08	83.62	7.21	
2.05	11.61	12.98					
31	Chan	648.63	655.84	1168.10	87.59	7.25	
2.20	12.16	13.34					
32	Chan	655.84	663.04	1228.30	90.04	7.20	
2.32	12.50	13.64					
33	Chan	663.04	670.25	1228.30	90.04	7.20	
2.32	12.50	13.64					
34	Chan	670.25	677.45	1223.04	89.82	7.21	
2.31	12.47	13.62					

35	Chan	677.45	684.66	1172.62	87.61	7.21
2.21	12.16	13.38				
36	Chan	684.66	691.86	1114.35	84.96	7.21
2.10	11.79	13.12				
37	Chan	691.86	699.07	1081.42	83.42	7.21
2.04	11.58	12.96				
38	Chan	699.07	706.27	1057.48	82.31	7.21
2.00	11.42	12.85				
39	Chan	706.27	713.48	1033.75	81.19	7.21
1.95	11.27	12.73				
40	Chan	713.48	720.68	1010.23	80.08	7.21
1.91	11.12	12.62				
41	Chan	720.68	727.89	985.56	78.94	7.21
1.86	10.96	12.49				
42	Chan	727.89	735.09	867.72	73.48	7.30
1.64	10.20	11.81				
43	Chan	735.09	742.30	702.52	64.80	7.32
1.33	8.99	10.84				
44	Chan	742.30	749.50	530.56	54.83	7.34
1.00	7.61	9.68				
45	ROB	749.50	955.33	487.47	152.35	39.10
0.92	3.98	3.20				

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

CROSS SECTION

RIVER: San Luis Rey Riv
REACH: Reach 1 RS: 2748

INPUT
Description: I-5 Upstream Existing
Station Elevation Data num= 42

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	52.2	20.2	50.2	26.1	48.2	54.5	46.2	66.2	44.2
72.25	42.2	77.4	40.2	81.7	38.2	87.3	36.2	90.75	34.2
95.1	32.2	100.4	30.2	105.6	28.2	109.5	26.2	119.7	24.2
127.1	22.2	133	20.2	137.66	18.2	143	16.2	149.7	14.2
156.7	13.51	169.9	12.2	228.9	10.2	286.55	8.2	313.7	4.5
438.9	4.5	488.7	8.2	510.3	10.2	537.6	12.2	553.9	14.2
563.2	15.96	564.5	16.2	576.35	22.2	580.9	24.2	592	26.2
598.4	32.2	607.9	42.2	610.3	44.2	617.2	48.2	630.4	52.2
651	62.2	706.8	66.2						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	156.7	.025	553.9	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
156.7	553.9	271.2	271	268.4	.1	.3

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	21.47	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.03	Wt. n-Val.	0.040	0.025	0.050

W.S. Elev (ft)	19.44	Reach Len. (ft)	42.00	42.00
42.00				
Crit W.S. (ft)	16.11	Flow Area (sq ft)	81.25	4588.86
55.28				
E.G. Slope (ft/ft)	0.001428	Area (sq ft)	81.25	4588.86
55.28				
Q Total (cfs)	53000.00	Flow (cfs)	265.54	52603.11
131.35				
Top Width (ft)	436.13	Top Width (ft)	21.93	397.20
17.00				
Vel Total (ft/s)	11.22	Avg. Vel. (ft/s)	3.27	11.46
2.38				
Max Chl Dpth (ft)	14.94	Hydr. Depth (ft)	3.71	11.55
3.25				
Conv. Total (cfs)	1402487.0	Conv. (cfs)	7026.7	1391985.0
3475.8				
Length Wtd. (ft)	42.00	Wetted Per. (ft)	22.87	398.01
17.96				
Min Ch El (ft)	4.50	Shear (lb/sq ft)	0.32	1.03
0.27				
Alpha	1.04	Stream Power (lb/ft s)	1.04	11.78
0.65				
Frctn Loss (ft)	0.08	Cum Volume (acre-ft)	27.17	219.50
36.15				
C & E Loss (ft)	0.05	Cum SA (acres)	5.53	23.63
6.16				

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

Profile #100-yr

Percent Conv	Pos Hydr Depth(ft)	Left Sta Velocity (ft/s)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)
1	LOB	0.00	156.70	265.54	81.25	22.87
0.50	3.71	3.27				
2	Chan	156.70	165.94	437.89	59.01	9.28
0.83	6.39	7.42				
3	Chan	165.94	175.17	536.20	66.57	9.26
1.01	7.21	8.06				
4	Chan	175.17	184.41	583.42	69.97	9.24
1.10	7.57	8.34				
5	Chan	184.41	193.65	624.16	72.86	9.24
1.18	7.89	8.57				
6	Chan	193.65	202.89	666.00	75.76	9.24
1.26	8.20	8.79				
7	Chan	202.89	212.12	708.92	78.65	9.24
1.34	8.51	9.01				
8	Chan	212.12	221.36	752.90	81.54	9.24
1.42	8.83	9.23				
9	Chan	221.36	230.60	797.95	84.43	9.24
1.51	9.14	9.45				
10	Chan	230.60	239.83	844.75	87.37	9.24
1.59	9.46	9.67				
11	Chan	239.83	249.07	892.98	90.33	9.24
1.68	9.78	9.89				
12	Chan	249.07	258.31	942.28	93.29	9.24

1.78	10.10	10.10					
13	Chan	258.31	267.55	992.64	96.25	9.24	
1.87	10.42	10.31					
14	Chan	267.55	276.78	1044.04	99.21	9.24	
1.97	10.74	10.52					
15	Chan	276.78	286.02	1096.47	102.17	9.24	
2.07	11.06	10.73					
16	Chan	286.02	295.26	1214.42	108.98	9.32	
2.29	11.80	11.14					
17	Chan	295.26	304.50	1437.21	120.60	9.32	
2.71	13.06	11.92					
18	Chan	304.50	313.73	1675.55	132.23	9.32	
3.16	14.31	12.67					
19	Chan	313.73	322.97	1810.28	138.00	9.24	
3.42	14.94	13.12					
20	Chan	322.97	332.21	1810.28	138.00	9.24	
3.42	14.94	13.12					
21	Chan	332.21	341.44	1810.27	138.00	9.24	
3.42	14.94	13.12					
22	Chan	341.44	350.68	1810.28	138.00	9.24	
3.42	14.94	13.12					
23	Chan	350.68	359.92	1810.28	138.00	9.24	
3.42	14.94	13.12					
24	Chan	359.92	369.16	1810.28	138.00	9.24	
3.42	14.94	13.12					
25	Chan	369.16	378.39	1810.28	138.00	9.24	
3.42	14.94	13.12					
26	Chan	378.39	387.63	1810.28	138.00	9.24	
3.42	14.94	13.12					
27	Chan	387.63	396.87	1810.28	138.00	9.24	
3.42	14.94	13.12					
28	Chan	396.87	406.10	1810.28	138.00	9.24	
3.42	14.94	13.12					
29	Chan	406.10	415.34	1810.28	138.00	9.24	
3.42	14.94	13.12					
30	Chan	415.34	424.58	1810.27	138.00	9.24	
3.42	14.94	13.12					
31	Chan	424.58	433.82	1810.28	138.00	9.24	
3.42	14.94	13.12					
32	Chan	433.82	443.05	1794.81	137.36	9.25	
3.39	14.87	13.07					
33	Chan	443.05	452.29	1677.50	131.98	9.26	
3.17	14.29	12.71					
34	Chan	452.29	461.53	1545.37	125.64	9.26	
2.92	13.60	12.30					
35	Chan	461.53	470.77	1417.60	119.30	9.26	
2.67	12.92	11.88					
36	Chan	470.77	480.00	1294.29	112.96	9.26	
2.44	12.23	11.46					
37	Chan	480.00	489.24	1175.39	106.62	9.26	
2.22	11.54	11.02					
38	Chan	489.24	498.48	1044.96	99.41	9.28	
1.97	10.76	10.51					
39	Chan	498.48	507.71	910.25	91.51	9.28	
1.72	9.91	9.95					
40	Chan	507.71	516.95	790.36	84.04	9.27	
1.49	9.10	9.40					
41	Chan	516.95	526.19	694.08	77.72	9.26	
1.31	8.41	8.93					
42	Chan	526.19	535.43	603.55	71.47	9.26	
1.14	7.74	8.44					
43	Chan	535.43	544.66	500.71	63.99	9.30	
0.94	6.93	7.83					

44	Chan	544.66	553.90	372.83	53.63	9.31
0.70	5.81	6.95				
45	ROB	553.90	706.80	131.35	55.28	17.96
0.25	3.25	2.38				

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

BRIDGE

RIVER: San Luis Rey Riv
REACH: Reach 1 RS: 2500

INPUT
Description: San Diego Freeways
Distance from Upstream XS = 42
Deck/Roadway Width =223.7533
Weir Coefficient = 2.6
Upstream Deck/Roadway Coordinates
num= 4

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
0	63.615	0	72.7	63.615	0	72.7	63.615	56.299
712.8	66.634	59.318						

Upstream Bridge Cross Section Data
Station Elevation Data num= 42

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	52.2	20.2	50.2	26.1	48.2	54.5	46.2	66.2	44.2
72.25	42.2	77.4	40.2	81.7	38.2	87.3	36.2	90.75	34.2
95.1	32.2	100.4	30.2	105.6	28.2	109.5	26.2	119.7	24.2
127.1	22.2	133	20.2	137.66	18.2	143	16.2	149.7	14.2
156.7	13.51	169.9	12.2	228.9	10.2	286.55	8.2	313.7	4.5
438.9	4.5	488.7	8.2	510.3	10.2	537.6	12.2	553.9	14.2
563.2	15.96	564.5	16.2	576.35	22.2	580.9	24.2	592	26.2
598.4	32.2	607.9	42.2	610.3	44.2	617.2	48.2	630.4	52.2
651	62.2	706.8	66.2						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	156.7	.025	553.9	.05

Bank Sta: Left	Right	Coeff Contr.	Expan.
156.7	553.9	.1	.3

Downstream Deck/Roadway Coordinates
num= 6

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
0	63.615	0	137	63.615	0	137	63.615	56.299
815	66.634	59.318	815	66.634	0	894	66.634	0

Downstream Bridge Cross Section Data
Station Elevation Data num= 46

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	62.2	8	58.2	13	54.2	20	50.2	26	46.2
31	42.2	37	38.2	43	34.2	45	32.2	51	28.2
57	24.2	60	22.2	75	20.2	93	18.2	111	16.2
128	14.2	160	12.2	241.3	11.4	362	10.2	431	8.2
460	4.4	490	4.4	520	4.4	550	4.4	580	4.4
610	4.4	622	8.2	645	10.2	682.1	12.2	712	14.2

717	16.2	720	18.2	725	20.2	729	22.2	737	26.2
743	28.2	753	30.2	768.45	31.41	778.6	32.2	780	32.49
792.6	34.2	806	36.2	818	40.2	829	42.2	845	46.2
893.04	69.8								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	362	.025	645	.04

Bank Sta: Left	Right	Coeff Contr.	Expan.
362	645	.1	.3

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

Number of Piers = 5

Pier Data
Pier Station Upstream= 156.7 Downstream= 221
Upstream num= 2

Width	Elev	Width	Elev
7.5	0	7.5	60

Downstream num= 2

Width	Elev	Width	Elev
7.5	0	7.5	60

Pier Data
Pier Station Upstream= 289.7 Downstream= 354
Upstream num= 2

Width	Elev	Width	Elev
7.5	0	7.5	60

Downstream num= 2

Width	Elev	Width	Elev
7.5	0	7.5	60

Pier Data
Pier Station Upstream= 422.7 Downstream= 487
Upstream num= 2

Width	Elev	Width	Elev
7.5	0	7.5	60

Downstream num= 2

Width	Elev	Width	Elev
7.5	0	7.5	60

Pier Data
Pier Station Upstream= 555.7 Downstream= 620
Upstream num= 2

Width	Elev	Width	Elev
7.5	0	7.5	60

Downstream num= 2

Width	Elev	Width	Elev
7.5	0	7.5	60

Pier Data
Pier Station Upstream= 688.7 Downstream= 753
Upstream num= 2

Width	Elev	Width	Elev
7.5	0	7.5	60

Downstream num= 2

Width	Elev	Width	Elev
7.5	0	7.5	60

Number of Bridge Coefficient Sets = 1

Low Flow Methods and Data
Energy
Selected Low Flow Methods = Highest Energy Answer

High Flow Method
Energy Only

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

BRIDGE OUTPUT Profile #100-yr

E.G. US. (ft)	21.47	Element	Inside BR US
Inside BR DS			
W.S. US. (ft)	19.44	E.G. Elev (ft)	21.34
20.70			
Q Total (cfs)	53000.00	W.S. Elev (ft)	18.78
18.66			
Q Bridge (cfs)	53000.00	Crit W.S. (ft)	16.40
16.35			
Q Weir (cfs)		Max Chl Dpth (ft)	14.28
14.26			
Weir Sta Lft (ft)		Vel Total (ft/s)	12.69
9.98			
Weir Sta Rgt (ft)		Flow Area (sq ft)	4176.43
5308.50			
Weir Submerg		Froude # Chl	0.69
0.63			
Weir Max Depth (ft)		Specif Force (cu ft)	45303.32
46685.70			
Min El Weir Flow (ft)	63.63	Hydr Depth (ft)	10.36
9.58			
Min El Prs (ft)	59.00	W.P. Total (ft)	474.98
638.02			
Delta EG (ft)	0.85	Conv. Total (cfs)	1088526.0
1193537.0			
Delta WS (ft)	0.62	Top Width (ft)	403.27
554.14			
BR Open Area (sq ft)	23026.90	Frctn Loss (ft)	0.48
0.01			
BR Open Vel (ft/s)	12.69	C & E Loss (ft)	0.16
0.07			
Coef of Q		Shear Total (lb/sq ft)	1.30
1.02			
Br Sel Method	Energy only	Power Total (lb/ft s)	16.51
10.23			

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

CROSS SECTION

RIVER: San Luis Rey Riv
REACH: Reach 1 RS: 2477

INPUT
Description: Upstream side of Pacific Coast Highway
Station Elevation Data num= 46

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	62.2	8	58.2	13	54.2	20	50.2	26	46.2
31	42.2	37	38.2	43	34.2	45	32.2	51	28.2
57	24.2	60	22.2	75	20.2	93	18.2	111	16.2
128	14.2	160	12.2	241.3	11.4	362	10.2	431	8.2
460	4.4	490	4.4	520	4.4	550	4.4	580	4.4
610	4.4	622	8.2	645	10.2	682.1	12.2	712	14.2
717	16.2	720	18.2	725	20.2	729	22.2	737	26.2
743	28.2	753	30.2	768.45	31.41	778.6	32.2	780	32.49
792.6	34.2	806	36.2	818	40.2	829	42.2	845	46.2
893.04	69.8								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	362	.025	645	.04

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
362	645	115	53.3	94.9	.1	.3

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	20.62	Element	Left OB	Channel
Right OB				
Vel Head (ft)	1.80	Wt. n-Val.	0.040	0.025
0.040				
W.S. Elev (ft)	18.82	Reach Len. (ft)	7.00	7.00
7.00				
Crit W.S. (ft)	16.09	Flow Area (sq ft)	1810.24	3560.56
473.96				
E.G. Slope (ft/ft)	0.001360	Area (sq ft)	1810.24	3560.56
473.96				
Q Total (cfs)	53000.00	Flow (cfs)	8712.34	42121.43
2166.23				
Top Width (ft)	634.10	Top Width (ft)	274.55	283.00
76.54				
Vel Total (ft/s)	9.07	Avg. Vel. (ft/s)	4.81	11.83
4.57				
Max Chl Dpth (ft)	14.42	Hydr. Depth (ft)	6.59	12.58
6.19				
Conv. Total (cfs)	1437243.0	Conv. (cfs)	236259.3	1142240.0
58743.3				
Length Wtd. (ft)	7.00	Wetted Per. (ft)	274.89	283.95
77.77				
Min Ch El (ft)	4.40	Shear (lb/sq ft)	0.56	1.06
0.52				
Alpha	1.41	Stream Power (lb/ft s)	2.69	12.59
2.36				
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	22.87	195.81
34.82				
C & E Loss (ft)	0.01	Cum SA (acres)	4.90	21.57
5.91				

Profile #100-yr

Percent Conv	Pos Hydr Depth(ft)	Left Sta Velocity (ft/s)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)
1	LOB	0.00	362.00	8712.34	1810.24	274.89
16.44	6.59	4.81				
2	Chan	362.00	368.58	522.78	57.34	6.58
0.99	8.71	9.12				
3	Chan	368.58	375.16	541.99	58.60	6.58
1.02	8.90	9.25				
4	Chan	375.16	381.74	561.49	59.85	6.58
1.06	9.09	9.38				
5	Chan	381.74	388.33	581.26	61.11	6.58
1.10	9.28	9.51				
6	Chan	388.33	394.91	601.29	62.36	6.58
1.13	9.48	9.64				
7	Chan	394.91	401.49	621.61	63.62	6.58
1.17	9.67	9.77				
8	Chan	401.49	408.07	642.19	64.87	6.58
1.21	9.86	9.90				
9	Chan	408.07	414.65	663.03	66.13	6.58
1.25	10.05	10.03				
10	Chan	414.65	421.23	684.14	67.38	6.58
1.29	10.24	10.15				
11	Chan	421.23	427.81	705.52	68.64	6.58
1.33	10.43	10.28				
12	Chan	427.81	434.40	735.33	70.48	6.61
1.39	10.71	10.43				
13	Chan	434.40	440.98	825.03	75.64	6.64
1.56	11.49	10.91				
14	Chan	440.98	447.56	930.77	81.32	6.64
1.76	12.36	11.45				
15	Chan	447.56	454.14	1041.55	86.99	6.64
1.97	13.22	11.97				
16	Chan	454.14	460.72	1157.25	92.63	6.63
2.18	14.08	12.49				
17	Chan	460.72	467.30	1210.59	94.89	6.58
2.28	14.42	12.76				
18	Chan	467.30	473.88	1210.59	94.89	6.58
2.28	14.42	12.76				
19	Chan	473.88	480.47	1210.59	94.89	6.58
2.28	14.42	12.76				
20	Chan	480.47	487.05	1210.59	94.89	6.58
2.28	14.42	12.76				
21	Chan	487.05	493.63	1210.59	94.89	6.58
2.28	14.42	12.76				
22	Chan	493.63	500.21	1210.59	94.89	6.58
2.28	14.42	12.76				
23	Chan	500.21	506.79	1210.59	94.89	6.58
2.28	14.42	12.76				
24	Chan	506.79	513.37	1210.58	94.88	6.58
2.28	14.42	12.76				
25	Chan	513.37	519.95	1210.59	94.89	6.58
2.28	14.42	12.76				
26	Chan	519.95	526.53	1210.59	94.89	6.58
2.28	14.42	12.76				
27	Chan	526.53	533.12	1210.58	94.88	6.58
2.28	14.42	12.76				

28	Chan	533.12	539.70	1210.59	94.89	6.58
2.28	14.42	12.76				
29	Chan	539.70	546.28	1210.58	94.88	6.58
2.28	14.42	12.76				
30	Chan	546.28	552.86	1210.59	94.89	6.58
2.28	14.42	12.76				
31	Chan	552.86	559.44	1210.58	94.88	6.58
2.28	14.42	12.76				
32	Chan	559.44	566.02	1210.59	94.89	6.58
2.28	14.42	12.76				
33	Chan	566.02	572.60	1210.59	94.89	6.58
2.28	14.42	12.76				
34	Chan	572.60	579.19	1210.58	94.88	6.58
2.28	14.42	12.76				
35	Chan	579.19	585.77	1210.59	94.89	6.58
2.28	14.42	12.76				
36	Chan	585.77	592.35	1210.58	94.88	6.58
2.28	14.42	12.76				
37	Chan	592.35	598.93	1210.59	94.89	6.58
2.28	14.42	12.76				
38	Chan	598.93	605.51	1210.59	94.89	6.58
2.28	14.42	12.76				
39	Chan	605.51	612.09	1183.62	94.19	6.68
2.23	14.31	12.57				
40	Chan	612.09	618.67	950.76	83.67	6.90
1.79	12.71	11.36				
41	Chan	618.67	625.26	736.52	71.17	6.76
1.39	10.81	10.35				
42	Chan	625.26	631.84	661.56	66.13	6.61
1.25	10.05	10.00				
43	Chan	631.84	638.42	599.95	62.36	6.61
1.13	9.48	9.62				
44	Chan	638.42	645.00	540.79	58.60	6.61
1.02	8.90	9.23				
45	ROB	645.00	893.04	2166.23	473.96	77.77
4.09	6.19	4.57				

BRIDGE

RIVER: San Luis Rey Riv
REACH: Reach 1 RS: 2430

INPUT
Description: Pacific Coast Highway
Distance from Upstream XS = 7
Deck/Roadway Width = 45
Weir Coefficient = 2.6
Upstream Deck/Roadway Coordinates
num= 2

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
0	61.6	54.6	893	64	57

Upstream Bridge Cross Section Data
Station Elevation Data num= 46

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	62.2	8	58.2	13	54.2	20	50.2	26	46.2
31	42.2	37	38.2	43	34.2	45	32.2	51	28.2
57	24.2	60	22.2	75	20.2	93	18.2	111	16.2
128	14.2	160	12.2	241.3	11.4	362	10.2	431	8.2
460	4.4	490	4.4	520	4.4	550	4.4	580	4.4

610	4.4	622	8.2	645	10.2	682.1	12.2	712	14.2
717	16.2	720	18.2	725	20.2	729	22.2	737	26.2
743	28.2	753	30.2	768.45	31.41	778.6	32.2	780	32.49
792.6	34.2	806	36.2	818	40.2	829	42.2	845	46.2
893.04	69.8								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	362	.025	645	.04

Bank Sta: Left Right Coeff Contr. Expan.

Left	Right	Coeff Contr.	Expan.
362	645	.1	.3

Downstream Deck/Roadway Coordinates

num= 4

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
0	61.6	54.6	834.41	64	57	834.41	64	0
857.61	64	0						

Downstream Bridge Cross Section Data

Station Elevation Data num= 34

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	48.2	6	44.2	9	42.2	17	37.2	25	32.2
30	28.2	38	24.2	41	22.2	43	18.2	50	16.2
53	14.2	62	12.2	74	12.2	102	12.2	180	11.52
331	10.2	341	8.2	406.05	4.4	450	4.4	480	4.4
510	4.4	540	4.5	570	4.5	586	8.2	620	10.2
661	12.2	692	14.2	693.43	14.38	708	16.2	718	18.2
737	20.2	833	22.2	834.8	28.2	848.27	32.2		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.03	331	.025	620	.04

Bank Sta: Left Right Coeff Contr. Expan.

Left	Right	Coeff Contr.	Expan.
331	620	.1	.3

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

Number of Piers = 2

Pier Data
Pier Station Upstream= 400 Downstream= 400
Upstream num= 2

Width	Elev	Width	Elev
7.5	0	7.5	60

Downstream num= 2

Width	Elev	Width	Elev
7.5	0	7.5	60

Pier Data
Pier Station Upstream= 610 Downstream= 590
Upstream num= 2

Width	Elev	Width	Elev
7.5	0	7.5	58

Downstream num= 2

Width	Elev	Width	Elev

7.5 0 7.5 58

Number of Bridge Coefficient Sets = 1

Low Flow Methods and Data
Energy
Selected Low Flow Methods = Highest Energy Answer

High Flow Method
Energy Only

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

BRIDGE OUTPUT Profile #100-yr

E.G. US. (ft)	20.62	Element	Inside BR US
Inside BR DS			
W.S. US. (ft)	18.82	E.G. Elev (ft)	20.60
20.35			
Q Total (cfs)	53000.00	W.S. Elev (ft)	18.73
19.09			
Q Bridge (cfs)	53000.00	Crit W.S. (ft)	16.32
15.67			
Q Weir (cfs)		Max Chl Dpth (ft)	14.33
14.69			
Weir Sta Lft (ft)		Vel Total (ft/s)	9.44
8.23			
Weir Sta Rgt (ft)		Flow Area (sq ft)	5612.39
6437.67			
Weir Submerg		Froude # Chl	0.60
0.48			
Weir Max Depth (ft)		Specif Force (cu ft)	47084.77
50042.44			
Min El Weir Flow (ft)	61.61	Hydr Depth (ft)	9.08
9.62			
Min El Prs (ft)	56.93	W.P. Total (ft)	667.15
721.77			
Delta EG (ft)	0.27	Conv. Total (cfs)	1255049.0
1583507.0			
Delta WS (ft)	-0.28	Top Width (ft)	618.10
668.88			
BR Open Area (sq ft)	33155.16	Frctn Loss (ft)	0.06
0.00			
BR Open Vel (ft/s)	9.44	C & E Loss (ft)	0.18
0.00			
Coef of Q		Shear Total (lb/sq ft)	0.94
0.62			
Br Sel Method	Energy only	Power Total (lb/ft s)	8.84
5.14			

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

CROSS SECTION

RIVER: San Luis Rey Riv
REACH: Reach 1 RS: 2424

INPUT
Description: Downstream Side of Pacific Coast Highway
Station Elevation Data num= 34

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	48.2	6	44.2	9	42.2	17	37.2	25	32.2
30	28.2	38	24.2	41	22.2	43	18.2	50	16.2
53	14.2	62	12.2	74	12.2	102	12.2	180	11.52
331	10.2	341	8.2	406.05	4.4	450	4.4	480	4.4
510	4.4	540	4.5	570	4.5	586	8.2	620	10.2
661	12.2	692	14.2	693.43	14.38	708	16.2	718	18.2
737	20.2	833	22.2	834.8	28.2	848.27	32.2		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.03	331	.025	620	.04

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
331	620	132.5	204	231.1	.1 .3

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	20.35	Element	Left OB	Channel Right OB
Vel Head (ft)	1.26	Wt. n-Val.	0.030	0.025 0.040
W.S. Elev (ft)	19.09	Reach Len. (ft)	132.50	204.00 231.10
Crit W.S. (ft)	15.46	Flow Area (sq ft)	2161.38	3875.92 591.34
E.G. Slope (ft/ft)	0.000891	Area (sq ft)	2161.38	3875.92 591.34
Q Total (cfs)	53000.00	Flow (cfs)	12192.78	38756.63 2050.59
Top Width (ft)	683.93	Top Width (ft)	288.45	289.00 106.49
Vel Total (ft/s)	8.00	Avg. Vel. (ft/s)	5.64	10.00 3.47
Max Chl Dpth (ft)	14.69	Hydr. Depth (ft)	7.49	13.41 5.55
Conv. Total (cfs)	1775088.0	Conv. (cfs)	408363.2	1298046.0 68678.8
Length Wtd. (ft)	192.50	Wetted Per. (ft)	290.11	289.79 106.97
Min Ch El (ft)	4.40	Shear (lb/sq ft)	0.41	0.74 0.31
Alpha	1.27	Stream Power (lb/ft s)	2.34	7.44 1.07
Frctn Loss (ft)	0.24	Cum Volume (acre-ft)	20.48	191.50 34.18
C & E Loss (ft)	0.12	Cum SA (acres)	4.55	21.24 5.80

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.

Profile #100-yr

Percent Conv	Pos Hydr Depth(ft)	Left Sta Velocity (ft) (ft/s)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)
1	LOB	0.00	331.00	12192.78	2161.38	290.11
23.01	7.49	5.64				
2	Chan	331.00	337.72	502.11	64.29	6.85
0.95	9.57	7.81				
3	Chan	337.72	344.44	617.01	72.49	6.79
1.16	10.78	8.51				
4	Chan	344.44	351.16	669.90	75.88	6.73
1.26	11.29	8.83				
5	Chan	351.16	357.88	709.17	78.52	6.73
1.34	11.68	9.03				
6	Chan	357.88	364.60	749.33	81.16	6.73
1.41	12.08	9.23				
7	Chan	364.60	371.33	790.38	83.80	6.73
1.49	12.47	9.43				
8	Chan	371.33	378.05	832.29	86.44	6.73
1.57	12.86	9.63				
9	Chan	378.05	384.77	875.07	89.08	6.73
1.65	13.25	9.82				
10	Chan	384.77	391.49	918.69	91.72	6.73
1.73	13.65	10.02				
11	Chan	391.49	398.21	963.16	94.36	6.73
1.82	14.04	10.21				
12	Chan	398.21	404.93	1008.48	96.99	6.73
1.90	14.43	10.40				
13	Chan	404.93	411.65	1039.48	98.72	6.72
1.96	14.69	10.53				
14	Chan	411.65	418.37	1040.32	98.75	6.72
1.96	14.69	10.53				
15	Chan	418.37	425.09	1040.32	98.75	6.72
1.96	14.69	10.53				
16	Chan	425.09	431.81	1040.32	98.75	6.72
1.96	14.69	10.53				
17	Chan	431.81	438.53	1040.32	98.75	6.72
1.96	14.69	10.53				
18	Chan	438.53	445.26	1040.32	98.75	6.72
1.96	14.69	10.53				
19	Chan	445.26	451.98	1040.32	98.75	6.72
1.96	14.69	10.53				
20	Chan	451.98	458.70	1040.32	98.75	6.72
1.96	14.69	10.53				
21	Chan	458.70	465.42	1040.32	98.75	6.72
1.96	14.69	10.53				
22	Chan	465.42	472.14	1040.32	98.75	6.72
1.96	14.69	10.53				
23	Chan	472.14	478.86	1040.32	98.75	6.72
1.96	14.69	10.53				
24	Chan	478.86	485.58	1040.32	98.75	6.72
1.96	14.69	10.53				
25	Chan	485.58	492.30	1040.32	98.75	6.72
1.96	14.69	10.53				
26	Chan	492.30	499.02	1040.32	98.75	6.72

1.96	14.69	10.53					
27	Chan	499.02	505.74	1040.32	98.75	6.72	
1.96	14.69	10.53					
28	Chan	505.74	512.47	1040.14	98.74	6.72	
1.96	14.69	10.53					
29	Chan	512.47	519.19	1038.03	98.62	6.72	
1.96	14.67	10.53					
30	Chan	519.19	525.91	1035.39	98.47	6.72	
1.95	14.65	10.51					
31	Chan	525.91	532.63	1032.75	98.32	6.72	
1.95	14.63	10.50					
32	Chan	532.63	539.35	1030.11	98.17	6.72	
1.94	14.61	10.49					
33	Chan	539.35	546.07	1028.56	98.08	6.72	
1.94	14.59	10.49					
34	Chan	546.07	552.79	1028.55	98.08	6.72	
1.94	14.59	10.49					
35	Chan	552.79	559.51	1028.55	98.08	6.72	
1.94	14.59	10.49					
36	Chan	559.51	566.23	1028.54	98.08	6.72	
1.94	14.59	10.49					
37	Chan	566.23	572.95	1003.24	97.07	6.80	
1.89	14.44	10.33					
38	Chan	572.95	579.67	847.97	88.27	6.90	
1.60	13.13	9.61					
39	Chan	579.67	586.40	688.25	77.84	6.89	
1.30	11.58	8.84					
40	Chan	586.40	593.12	609.87	71.73	6.73	
1.15	10.67	8.50					
41	Chan	593.12	599.84	572.69	69.07	6.73	
1.08	10.28	8.29					
42	Chan	599.84	606.56	536.44	66.42	6.73	
1.01	9.88	8.08					
43	Chan	606.56	613.28	501.15	63.76	6.73	
0.95	9.49	7.86					
44	Chan	613.28	620.00	466.83	61.10	6.73	
0.88	9.09	7.64					
45	ROB	620.00	848.27	2050.59	591.34	106.97	
3.87	5.55	3.47					

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

CROSS SECTION

RIVER: San Luis Rey Riv
REACH: Reach 1 RS: 2220

INPUT
Description:
Station Elevation Data num= 27

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	34.2	3.5	32.2	6	30.2	9	28.2	11.3	26.2
14.7	24.2	19	22.2	51.8	20.2	65	18.2	73.8	16.2
145	14.2	180.72	13.35	229	12.2	259.1	10.2	290.6	8.2

327	4.4	445	4.4	482.8	6.7	575.9	7.7	593.1	8.2
597.5	10.2	602.2	12.2	606.4	14.2	610.2	16.2	618	20.2
622	22.2	626.4	22.3						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.03	290.6	.025	597.5	.04

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
290.6	597.5	343.8	389.9	420.4	.1	.3

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	19.99	Element	Left OB	Channel
Right OB				
Vel Head (ft)	2.44	Wt. n-Val.	0.030	0.025
0.040				
W.S. Elev (ft)	17.55	Reach Len. (ft)	343.80	389.90
420.40				
Crit W.S. (ft)	15.62	Flow Area (sq ft)	991.91	3581.67
58.89				
E.G. Slope (ft/ft)	0.001852	Area (sq ft)	991.91	3581.67
58.89				
Q Total (cfs)	53000.00	Flow (cfs)	5717.30	47067.31
215.39				
Top Width (ft)	545.00	Top Width (ft)	222.76	306.90
15.34				
Vel Total (ft/s)	11.44	Avg. Vel. (ft/s)	5.76	13.14
3.66				
Max Chl Dpth (ft)	13.15	Hydr. Depth (ft)	4.45	11.67
3.84				
Conv. Total (cfs)	1231454.0	Conv. (cfs)	132841.3	1093608.0
5004.5				
Length Wtd. (ft)	388.15	Wetted Per. (ft)	223.09	307.61
17.02				
Min Ch El (ft)	4.40	Shear (lb/sq ft)	0.51	1.35
0.40				
Alpha	1.20	Stream Power (lb/ft s)	2.96	17.69
1.46				
Frctn Loss (ft)	0.98	Cum Volume (acre-ft)	15.69	174.04
32.45				
C & E Loss (ft)	0.13	Cum SA (acres)	3.78	19.84
5.48				

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

Profile #100-yr

Conv	Pos Hydr Depth(ft)	Left Sta Velocity (ft/s)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	Percent
1	LOB	0.00	290.60	5717.30	991.91	223.09	
10.79	4.45	5.76					

2	Chan	290.60	297.74	799.41	69.43	7.18
1.51	9.73	11.51				
3	Chan	297.74	304.87	904.06	74.74	7.18
1.71	10.47	12.10				
4	Chan	304.87	312.01	1013.78	80.06	7.18
1.91	11.22	12.66				
5	Chan	312.01	319.15	1128.48	85.38	7.18
2.13	11.96	13.22				
6	Chan	319.15	326.29	1248.04	90.70	7.18
2.35	12.71	13.76				
7	Chan	326.29	333.42	1325.76	93.86	7.14
2.50	13.15	14.12				
8	Chan	333.42	340.56	1326.87	93.89	7.14
2.50	13.15	14.13				
9	Chan	340.56	347.70	1326.87	93.89	7.14
2.50	13.15	14.13				
10	Chan	347.70	354.83	1326.87	93.89	7.14
2.50	13.15	14.13				
11	Chan	354.83	361.97	1326.87	93.89	7.14
2.50	13.15	14.13				
12	Chan	361.97	369.11	1326.87	93.89	7.14
2.50	13.15	14.13				
13	Chan	369.11	376.25	1326.87	93.89	7.14
2.50	13.15	14.13				
14	Chan	376.25	383.38	1326.87	93.89	7.14
2.50	13.15	14.13				
15	Chan	383.38	390.52	1326.87	93.89	7.14
2.50	13.15	14.13				
16	Chan	390.52	397.66	1326.87	93.89	7.14
2.50	13.15	14.13				
17	Chan	397.66	404.80	1326.87	93.89	7.14
2.50	13.15	14.13				
18	Chan	404.80	411.93	1326.87	93.89	7.14
2.50	13.15	14.13				
19	Chan	411.93	419.07	1326.87	93.89	7.14
2.50	13.15	14.13				
20	Chan	419.07	426.21	1326.87	93.89	7.14
2.50	13.15	14.13				
21	Chan	426.21	433.34	1326.87	93.89	7.14
2.50	13.15	14.13				
22	Chan	433.34	440.48	1326.87	93.89	7.14
2.50	13.15	14.13				
23	Chan	440.48	447.62	1321.36	93.68	7.14
2.49	13.13	14.11				
24	Chan	447.62	454.76	1262.63	91.20	7.15
2.38	12.78	13.84				
25	Chan	454.76	461.89	1191.92	88.10	7.15
2.25	12.34	13.53				
26	Chan	461.89	469.03	1122.86	85.00	7.15
2.12	11.91	13.21				
27	Chan	469.03	476.17	1055.45	81.90	7.15
1.99	11.48	12.89				
28	Chan	476.17	483.30	989.94	78.81	7.15
1.87	11.04	12.56				
29	Chan	483.30	490.44	956.71	77.16	7.14
1.81	10.81	12.40				
30	Chan	490.44	497.58	945.43	76.61	7.14
1.78	10.73	12.34				
31	Chan	497.58	504.72	934.21	76.07	7.14
1.76	10.66	12.28				
32	Chan	504.72	511.85	923.03	75.52	7.14
1.74	10.58	12.22				
33	Chan	511.85	518.99	911.92	74.97	7.14

1.72	10.50	12.16					
34	Chan		518.99	526.13	900.85	74.42	7.14
1.70	10.43	12.10					
35	Chan		526.13	533.27	889.84	73.88	7.14
1.68	10.35	12.04					
36	Chan		533.27	540.40	878.88	73.33	7.14
1.66	10.27	11.99					
37	Chan		540.40	547.54	867.98	72.78	7.14
1.64	10.20	11.93					
38	Chan		547.54	554.68	857.13	72.24	7.14
1.62	10.12	11.87					
39	Chan		554.68	561.81	846.34	71.69	7.14
1.60	10.04	11.81					
40	Chan		561.81	568.95	835.60	71.14	7.14
1.58	9.97	11.75					
41	Chan		568.95	576.09	824.90	70.59	7.14
1.56	9.89	11.69					
42	Chan		576.09	583.23	804.59	69.56	7.14
1.52	9.75	11.57					
43	Chan		583.23	590.36	776.24	68.07	7.14
1.46	9.54	11.40					
44	Chan		590.36	597.50	646.97	62.48	7.57
1.22	8.75	10.36					
45	ROB		597.50	626.40	215.39	58.89	17.02
0.41	3.84	3.66					

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

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

CROSS SECTION

RIVER: San Luis Rey Riv
REACH: Reach 1 RS: 1829

INPUT
Description:
Station Elevation Data num= 27

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	22.2	3.5	20.2	26	18.2	52	16.2	69	14.2
93.3	13.02	110	12.2	160	10.2	178	8.2	183	6.2
210	3.9	240	3.9	270	3.9	300	3.9	330	3.9
360	3.9	366	6.2	438.1	7.66	470	8.2	569.8	10.2
574.5	12.2	578.8	14.2	583.3	16.2	587.4	18.2	592.4	20.2
601	21.7	681.7	22.2						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.03	178	.025	438.1	.04

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
178	438.1	209.9	206.9	213.2	.1	.3

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	18.88	Element	Left OB	Channel

Right OB				
Vel Head (ft)	3.76	Wt. n-Val.	0.030	0.025
0.040				
W.S. Elev (ft)	15.13	Reach Len. (ft)	209.90	206.90
213.20				
Crit W.S. (ft)	15.13	Flow Area (sq ft)	385.47	2646.98
848.67				
E.G. Slope (ft/ft)	0.003609	Area (sq ft)	385.47	2646.98
848.67				
Q Total (cfs)	53000.00	Flow (cfs)	2537.70	44278.89
6183.41				
Top Width (ft)	519.75	Top Width (ft)	116.87	260.10
142.78				
Vel Total (ft/s)	13.66	Avg. Vel. (ft/s)	6.58	16.73
7.29				
Max Chl Dpth (ft)	11.23	Hydr. Depth (ft)	3.30	10.18
5.94				
Conv. Total (cfs)	882264.8	Conv. (cfs)	42243.8	737088.7
102932.2				
Length Wtd. (ft)	208.15	Wetted Per. (ft)	117.13	261.02
143.85				
Min Ch El (ft)	3.90	Shear (lb/sq ft)	0.74	2.28
1.33				
Alpha	1.30	Stream Power (lb/ft s)	4.88	38.22
9.68				
Frctn Loss (ft)	0.71	Cum Volume (acre-ft)	10.25	146.16
28.07				
C & E Loss (ft)	0.18	Cum SA (acres)	2.43	17.30
4.72				

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

Profile #100-yr

Percent Conv	Pos Hydr Depth(ft)	Left Sta Velocity (ft/s)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)
1	LOB	0.00	178.00	2537.70	385.47	117.13
4.79	3.30	6.58				
2	Chan	178.00	184.05	670.61	49.04	6.44
1.27	8.11	13.68				
3	Chan	184.05	190.10	872.41	56.09	6.07
1.65	9.27	15.55				
4	Chan	190.10	196.15	954.69	59.21	6.07

1.80	9.79	16.12					
5	Chan	196.15	202.20	1039.91	62.32	6.07	
1.96	10.30	16.69					
6	Chan	202.20	208.24	1128.03	65.44	6.07	
2.13	10.82	17.24					
7	Chan	208.24	214.29	1197.86	67.77	6.06	
2.26	11.20	17.67					
8	Chan	214.29	220.34	1202.57	67.90	6.05	
2.27	11.23	17.71					
9	Chan	220.34	226.39	1202.57	67.90	6.05	
2.27	11.23	17.71					
10	Chan	226.39	232.44	1202.57	67.90	6.05	
2.27	11.23	17.71					
11	Chan	232.44	238.49	1202.57	67.90	6.05	
2.27	11.23	17.71					
12	Chan	238.49	244.54	1202.57	67.90	6.05	
2.27	11.23	17.71					
13	Chan	244.54	250.59	1202.57	67.90	6.05	
2.27	11.23	17.71					
14	Chan	250.59	256.63	1202.57	67.90	6.05	
2.27	11.23	17.71					
15	Chan	256.63	262.68	1202.57	67.90	6.05	
2.27	11.23	17.71					
16	Chan	262.68	268.73	1202.57	67.90	6.05	
2.27	11.23	17.71					
17	Chan	268.73	274.78	1202.57	67.90	6.05	
2.27	11.23	17.71					
18	Chan	274.78	280.83	1202.57	67.90	6.05	
2.27	11.23	17.71					
19	Chan	280.83	286.88	1202.57	67.90	6.05	
2.27	11.23	17.71					
20	Chan	286.88	292.93	1202.57	67.90	6.05	
2.27	11.23	17.71					
21	Chan	292.93	298.98	1202.57	67.90	6.05	
2.27	11.23	17.71					
22	Chan	298.98	305.03	1202.57	67.90	6.05	
2.27	11.23	17.71					
23	Chan	305.03	311.07	1202.57	67.90	6.05	
2.27	11.23	17.71					
24	Chan	311.07	317.12	1202.57	67.90	6.05	
2.27	11.23	17.71					
25	Chan	317.12	323.17	1202.57	67.90	6.05	
2.27	11.23	17.71					
26	Chan	323.17	329.22	1202.57	67.90	6.05	
2.27	11.23	17.71					
27	Chan	329.22	335.27	1202.57	67.90	6.05	
2.27	11.23	17.71					
28	Chan	335.27	341.32	1202.57	67.90	6.05	
2.27	11.23	17.71					
29	Chan	341.32	347.37	1202.57	67.90	6.05	
2.27	11.23	17.71					
30	Chan	347.37	353.42	1202.57	67.90	6.05	
2.27	11.23	17.71					
31	Chan	353.42	359.47	1202.57	67.90	6.05	
2.27	11.23	17.71					
32	Chan	359.47	365.51	993.16	62.08	6.44	
1.87	10.26	16.00					
33	Chan	365.51	371.56	810.70	53.72	6.08	
1.53	8.88	15.09					
34	Chan	371.56	377.61	794.08	52.94	6.05	
1.50	8.75	15.00					
35	Chan	377.61	383.66	775.64	52.20	6.05	
1.46	8.63	14.86					

36	Chan	383.66	389.71	757.39	51.46	6.05
1.43	8.51	14.72				
37	Chan	389.71	395.76	739.29	50.72	6.05
1.39	8.38	14.58				
38	Chan	395.76	401.81	721.38	49.98	6.05
1.36	8.26	14.43				
39	Chan	401.81	407.86	703.65	49.24	6.05
1.33	8.14	14.29				
40	Chan	407.86	413.90	686.09	48.50	6.05
1.29	8.02	14.15				
41	Chan	413.90	419.95	668.71	47.75	6.05
1.26	7.89	14.00				
42	Chan	419.95	426.00	651.50	47.01	6.05
1.23	7.77	13.86				
43	Chan	426.00	432.05	634.49	46.27	6.05
1.20	7.65	13.71				
44	Chan	432.05	438.10	617.64	45.53	6.05
1.17	7.53	13.57				
45	ROB	438.10	681.70	6183.41	848.67	143.85
11.67	5.94	7.29				

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

CROSS SECTION

RIVER: San Luis Rey Riv
REACH: Reach 1 RS: 1622

INPUT
Description:
Station Elevation Data num= 30

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	42.2	16	36.2	23.4	32.2	32	28.2	39	24.2
63	22.2	70	20.2	74	18.2	77	16.2	82	14.2
86	12.2	192	10.2	217	8.2	221	6.2	250	3.3
280	3.3	310	3.3	340	3.3	370	3.3	400	3.3
432	6.2	615	8.2	665	10.2	671	12.2	675	14.2
678	16.2	682	18.2	687	20.2	696	21.2	748.3	21.3

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.03	217	.025	432	.04

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
217	432	171.5 147.6	151.2	.1	.3

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	17.69	Element	Left OB	Channel
Right OB				
Vel Head (ft)	3.17	Wt. n-Val.	0.030	0.025
0.040				
W.S. Elev (ft)	14.52	Reach Len. (ft)	171.50	147.60
151.20				
Crit W.S. (ft)	14.25	Flow Area (sq ft)	490.24	2308.11
1630.68				
E.G. Slope (ft/ft)	0.003195	Area (sq ft)	490.24	2308.11
1630.68				
Q Total (cfs)	53000.00	Flow (cfs)	3219.73	37646.54
12133.72				
Top Width (ft)	594.28	Top Width (ft)	135.80	215.00
243.48				
Vel Total (ft/s)	11.97	Avg. Vel. (ft/s)	6.57	16.31
7.44				
Max Chl Dpth (ft)	11.22	Hydr. Depth (ft)	3.61	10.74
6.70				
Conv. Total (cfs)	937711.5	Conv. (cfs)	56965.7	666067.8
214678.0				
Length Wtd. (ft)	149.60	Wetted Per. (ft)	136.43	215.75
244.42				
Min Ch El (ft)	3.30	Shear (lb/sq ft)	0.72	2.13
1.33				
Alpha	1.43	Stream Power (lb/ft s)	4.71	34.80
9.90				
Frctn Loss (ft)	0.34	Cum Volume (acre-ft)	8.14	134.39
22.01				
C & E Loss (ft)	0.40	Cum SA (acres)	1.83	16.18
3.77				

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for
additional cross sections.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

Profile #100-yr

Percent Conv	Pos Hydr Depth(ft)	Left Sta Velocity (ft/s)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)
1	LOB	0.00	217.00	3219.73	490.24	136.43
6.07	3.61	6.57				
2	Chan	217.00	222.00	454.95	37.65	5.48
0.86	7.53	12.08				
3	Chan	222.00	227.00	609.48	43.35	5.02
1.15	8.67	14.06				
4	Chan	227.00	232.00	669.18	45.85	5.02
1.26	9.17	14.60				
5	Chan	232.00	237.00	731.10	48.35	5.02
1.38	9.67	15.12				
6	Chan	237.00	242.00	795.19	50.85	5.02
1.50	10.17	15.64				
7	Chan	242.00	247.00	861.41	53.35	5.02

1.63	10.67	16.15				
8	Chan	247.00	252.00	925.42	55.65	5.01
1.75	11.13	16.63				
9	Chan	252.00	257.00	939.80	56.10	5.00
1.77	11.22	16.75				
10	Chan	257.00	262.00	939.80	56.10	5.00
1.77	11.22	16.75				
11	Chan	262.00	267.00	939.80	56.10	5.00
1.77	11.22	16.75				
12	Chan	267.00	272.00	939.80	56.10	5.00
1.77	11.22	16.75				
13	Chan	272.00	277.00	939.80	56.10	5.00
1.77	11.22	16.75				
14	Chan	277.00	282.00	939.80	56.10	5.00
1.77	11.22	16.75				
15	Chan	282.00	287.00	939.80	56.10	5.00
1.77	11.22	16.75				
16	Chan	287.00	292.00	939.80	56.10	5.00
1.77	11.22	16.75				
17	Chan	292.00	297.00	939.80	56.10	5.00
1.77	11.22	16.75				
18	Chan	297.00	302.00	939.80	56.10	5.00
1.77	11.22	16.75				
19	Chan	302.00	307.00	939.80	56.10	5.00
1.77	11.22	16.75				
20	Chan	307.00	312.00	939.80	56.10	5.00
1.77	11.22	16.75				
21	Chan	312.00	317.00	939.80	56.10	5.00
1.77	11.22	16.75				
22	Chan	317.00	322.00	939.80	56.10	5.00
1.77	11.22	16.75				
23	Chan	322.00	327.00	939.80	56.10	5.00
1.77	11.22	16.75				
24	Chan	327.00	332.00	939.80	56.10	5.00
1.77	11.22	16.75				
25	Chan	332.00	337.00	939.80	56.10	5.00
1.77	11.22	16.75				
26	Chan	337.00	342.00	939.80	56.10	5.00
1.77	11.22	16.75				
27	Chan	342.00	347.00	939.80	56.10	5.00
1.77	11.22	16.75				
28	Chan	347.00	352.00	939.80	56.10	5.00
1.77	11.22	16.75				
29	Chan	352.00	357.00	939.80	56.10	5.00
1.77	11.22	16.75				
30	Chan	357.00	362.00	939.80	56.10	5.00
1.77	11.22	16.75				
31	Chan	362.00	367.00	939.80	56.10	5.00
1.77	11.22	16.75				
32	Chan	367.00	372.00	939.80	56.10	5.00
1.77	11.22	16.75				
33	Chan	372.00	377.00	939.80	56.10	5.00
1.77	11.22	16.75				
34	Chan	377.00	382.00	939.80	56.10	5.00
1.77	11.22	16.75				
35	Chan	382.00	387.00	939.80	56.10	5.00
1.77	11.22	16.75				
36	Chan	387.00	392.00	939.80	56.10	5.00
1.77	11.22	16.75				
37	Chan	392.00	397.00	939.80	56.10	5.00
1.77	11.22	16.75				
38	Chan	397.00	402.00	933.72	55.92	5.01
1.76	11.18	16.70				

39	Chan	402.00	407.00	881.15	54.06	5.02
1.66	10.81	16.30				
40	Chan	407.00	412.00	820.46	51.79	5.02
1.55	10.36	15.84				
41	Chan	412.00	417.00	761.52	49.53	5.02
1.44	9.91	15.38				
42	Chan	417.00	422.00	704.35	47.26	5.02
1.33	9.45	14.90				
43	Chan	422.00	427.00	648.98	45.00	5.02
1.22	9.00	14.42				
44	Chan	427.00	432.00	595.44	42.73	5.02
1.12	8.55	13.94				
45	ROB	432.00	748.30	12133.72	1630.68	244.42
22.89	6.70	7.44				

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for
additional cross sections.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION

RIVER: San Luis Rey Riv
REACH: Reach 1 RS: 1475

INPUT
Description:
Station Elevation Data num= 34

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	32.2	49	30.2	70	28.2	78	26.2	85	24.2
110	22.2	121	20.2	126	18.2	131	16.2	137	14.2
153	12.2	211	10.27	216	10.1	270	10.2	285	8.2
297	6.2	310	3.2	340	3.2	370	3.2	400	3.2
430	3.2	460	3.2	490	3.2	520	3.2	536	6.2
678.9	7.76	719	8.2	771	10.2	775.4	12.2	780	14.2
784.2	16.2	788.2	18.2	792.7	20.2	825.6	21.3		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.03	285	.025	678.9	.04

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
285	678.9	400.7	263.3	141.7	.1	.3

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	16.95	Element	Left OB	Channel
Right OB				
Vel Head (ft)	1.84	Wt. n-Val.	0.030	0.025
0.040				
W.S. Elev (ft)	15.11	Reach Len. (ft)	400.70	263.30
141.70				
Crit W.S. (ft)	13.02	Flow Area (sq ft)	638.08	4060.77
620.38				
E.G. Slope (ft/ft)	0.001662	Area (sq ft)	638.08	4060.77
620.38				
Q Total (cfs)	53000.00	Flow (cfs)	3365.14	46546.81
3088.05				

Top Width (ft)	647.66	Top Width (ft)	150.74	393.90
103.02				
Vel Total (ft/s)	9.96	Avg. Vel. (ft/s)	5.27	11.46
4.98				
Max Chl Dpth (ft)	11.91	Hydr. Depth (ft)	4.23	10.31
6.02				
Conv. Total (cfs)	1300014.0	Conv. (cfs)	82541.9	1141726.0
75745.5				
Length Wtd. (ft)	252.32	Wetted Per. (ft)	151.18	394.69
104.11				
Min Ch El (ft)	3.20	Shear (lb/sq ft)	0.44	1.07
0.62				
Alpha	1.19	Stream Power (lb/ft s)	2.31	12.24
3.08				
Frctn Loss (ft)	0.31	Cum Volume (acre-ft)	5.92	123.60
18.10				
C & E Loss (ft)	0.21	Cum SA (acres)	1.26	15.14
3.17				

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

Profile #100-yr

Percent Conv	Pos Hydr Depth(ft)	Left Sta Velocity (ft/s)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)
1	LOB	0.00	285.00	3365.14	638.08	151.18
6.35	4.23	5.27				
2	Chan	285.00	294.16	645.43	70.32	9.29
1.22	7.68	9.18				
3	Chan	294.16	303.32	890.45	85.58	9.37
1.68	9.34	10.40				
4	Chan	303.32	312.48	1234.42	103.98	9.34
2.33	11.35	11.87				
5	Chan	312.48	321.64	1354.98	109.13	9.16
2.56	11.91	12.42				
6	Chan	321.64	330.80	1354.97	109.13	9.16
2.56	11.91	12.42				
7	Chan	330.80	339.96	1354.97	109.13	9.16
2.56	11.91	12.42				
8	Chan	339.96	349.12	1354.97	109.13	9.16
2.56	11.91	12.42				
9	Chan	349.12	358.28	1354.97	109.13	9.16
2.56	11.91	12.42				
10	Chan	358.28	367.44	1354.97	109.13	9.16
2.56	11.91	12.42				
11	Chan	367.44	376.60	1354.97	109.13	9.16
2.56	11.91	12.42				
12	Chan	376.60	385.77	1354.98	109.13	9.16
2.56	11.91	12.42				
13	Chan	385.77	394.93	1354.97	109.13	9.16
2.56	11.91	12.42				
14	Chan	394.93	404.09	1354.97	109.13	9.16
2.56	11.91	12.42				
15	Chan	404.09	413.25	1354.97	109.13	9.16
2.56	11.91	12.42				
16	Chan	413.25	422.41	1354.97	109.13	9.16

2.56	11.91	12.42					
17	Chan		422.41	431.57	1354.97	109.13	9.16
2.56	11.91	12.42					
18	Chan		431.57	440.73	1354.97	109.13	9.16
2.56	11.91	12.42					
19	Chan		440.73	449.89	1354.98	109.13	9.16
2.56	11.91	12.42					
20	Chan		449.89	459.05	1354.97	109.13	9.16
2.56	11.91	12.42					
21	Chan		459.05	468.21	1354.97	109.13	9.16
2.56	11.91	12.42					
22	Chan		468.21	477.37	1354.97	109.13	9.16
2.56	11.91	12.42					
23	Chan		477.37	486.53	1354.97	109.13	9.16
2.56	11.91	12.42					
24	Chan		486.53	495.69	1354.97	109.13	9.16
2.56	11.91	12.42					
25	Chan		495.69	504.85	1354.97	109.13	9.16
2.56	11.91	12.42					
26	Chan		504.85	514.01	1354.98	109.13	9.16
2.56	11.91	12.42					
27	Chan		514.01	523.17	1330.16	108.18	9.22
2.51	11.81	12.30					
28	Chan		523.17	532.33	1078.30	95.81	9.32
2.03	10.46	11.25					
29	Chan		532.33	541.49	850.28	82.74	9.22
1.60	9.03	10.28					
30	Chan		541.49	550.65	818.33	80.64	9.16
1.54	8.80	10.15					
31	Chan		550.65	559.81	802.89	79.72	9.16
1.51	8.70	10.07					
32	Chan		559.81	568.97	787.57	78.81	9.16
1.49	8.60	9.99					
33	Chan		568.97	578.13	772.37	77.89	9.16
1.46	8.50	9.92					
34	Chan		578.13	587.30	757.29	76.97	9.16
1.43	8.40	9.84					
35	Chan		587.30	596.46	742.33	76.06	9.16
1.40	8.30	9.76					
36	Chan		596.46	605.62	727.49	75.14	9.16
1.37	8.20	9.68					
37	Chan		605.62	614.78	712.77	74.23	9.16
1.34	8.10	9.60					
38	Chan		614.78	623.94	698.17	73.31	9.16
1.32	8.00	9.52					
39	Chan		623.94	633.10	683.69	72.39	9.16
1.29	7.90	9.44					
40	Chan		633.10	642.26	669.33	71.48	9.16
1.26	7.80	9.36					
41	Chan		642.26	651.42	655.09	70.56	9.16
1.24	7.70	9.28					
42	Chan		651.42	660.58	640.98	69.64	9.16
1.21	7.60	9.20					
43	Chan		660.58	669.74	626.99	68.73	9.16
1.18	7.50	9.12					
44	Chan		669.74	678.90	613.12	67.81	9.16
1.16	7.40	9.04					
45	ROB		678.90	825.60	3088.05	620.38	104.11
5.83	6.02	4.98					

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may

indicate the need for
additional cross sections.

CROSS SECTION

RIVER: San Luis Rey Riv
REACH: Reach 1 RS: 1207

INPUT
Description: Upstream Side of Metro Link Rail Road Bridge
All negative station
ground points taken from topographic data, not surveyed.
All
other ground points from survey data, June 2000.
Copied from
2267.5

Station Elevation Data num= 17

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	22.5	7	22.2	14	21.7	15.5	9.2	40.6	8.2
68.75	8.2	71.3	8.2	109	6.2	138.5	2.9	342.7	3
358.2	6.2	465.2	6.6	619.3	7.4	673.5	8.2	680.7	22.2
698	24.2	708.36	25.2						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.03	71.3	.025	673.5	.04

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
71.3	465.2	30.4	30.2	32.6	.1	.3

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	16.43	Element	Left OB	Channel
Right OB				
Vel Head (ft)	1.13	Wt. n-Val.	0.030	0.025
0.025				
W.S. Elev (ft)	15.29	Reach Len. (ft)	10.10	10.10
10.10				
Crit W.S. (ft)	11.75	Flow Area (sq ft)	385.43	4259.51
1696.88				
E.G. Slope (ft/ft)	0.000966	Area (sq ft)	385.43	4259.51
1696.88				
Q Total (cfs)	53000.00	Flow (cfs)	2007.04	38442.23
12550.74				
Top Width (ft)	662.38	Top Width (ft)	56.53	393.90
211.95				
Vel Total (ft/s)	8.36	Avg. Vel. (ft/s)	5.21	9.03
7.40				
Max Chl Dpth (ft)	12.39	Hydr. Depth (ft)	6.82	10.81
8.01				
Conv. Total (cfs)	1705231.0	Conv. (cfs)	64574.9	1236847.0
403809.4				
Length Wtd. (ft)	10.10	Wetted Per. (ft)	61.96	394.46
216.28				
Min Ch El (ft)	2.90	Shear (lb/sq ft)	0.38	0.65
0.47				
Alpha	1.05	Stream Power (lb/ft s)	1.95	5.88
3.50				
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	1.21	98.46
14.33				
C & E Loss (ft)	0.04	Cum SA (acres)	0.31	12.76

2.66

Profile #100-yr

Percent Conv	Pos Hydr Depth(ft)	Left Sta Velocity (ft/s)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)
1	LOB	0.00	71.30	2007.04	385.43	61.96
3.79	6.82	5.21				
2	Chan	71.30	80.46	461.43	67.20	9.17
0.87	7.34	6.87				
3	Chan	80.46	89.62	513.50	71.65	9.17
0.97	7.82	7.17				
4	Chan	89.62	98.78	567.77	76.10	9.17
1.07	8.31	7.46				
5	Chan	98.78	107.94	624.19	80.55	9.17
1.18	8.79	7.75				
6	Chan	107.94	117.10	706.77	86.93	9.21
1.33	9.49	8.13				
7	Chan	117.10	126.26	837.70	96.29	9.22
1.58	10.51	8.70				
8	Chan	126.26	135.42	978.19	105.67	9.22
1.85	11.54	9.26				
9	Chan	135.42	144.58	1096.53	112.98	9.18
2.07	12.33	9.71				
10	Chan	144.58	153.74	1106.02	113.47	9.16
2.09	12.39	9.75				
11	Chan	153.74	162.90	1105.35	113.43	9.16
2.09	12.38	9.74				
12	Chan	162.90	172.07	1104.68	113.39	9.16
2.08	12.38	9.74				
13	Chan	172.07	181.23	1104.02	113.35	9.16
2.08	12.37	9.74				
14	Chan	181.23	190.39	1103.35	113.31	9.16
2.08	12.37	9.74				
15	Chan	190.39	199.55	1102.68	113.27	9.16
2.08	12.36	9.74				
16	Chan	199.55	208.71	1102.02	113.23	9.16
2.08	12.36	9.73				
17	Chan	208.71	217.87	1101.35	113.18	9.16
2.08	12.36	9.73				
18	Chan	217.87	227.03	1100.68	113.14	9.16
2.08	12.35	9.73				
19	Chan	227.03	236.19	1100.02	113.10	9.16
2.08	12.35	9.73				
20	Chan	236.19	245.35	1099.35	113.06	9.16
2.07	12.34	9.72				
21	Chan	245.35	254.51	1098.68	113.02	9.16
2.07	12.34	9.72				
22	Chan	254.51	263.67	1098.02	112.98	9.16
2.07	12.33	9.72				
23	Chan	263.67	272.83	1097.35	112.94	9.16
2.07	12.33	9.72				
24	Chan	272.83	281.99	1096.69	112.90	9.16
2.07	12.32	9.71				
25	Chan	281.99	291.15	1096.03	112.86	9.16
2.07	12.32	9.71				
26	Chan	291.15	300.31	1095.36	112.81	9.16
2.07	12.32	9.71				

27	Chan	300.31	309.47	1094.69	112.77	9.16	
2.07	12.31	9.71					
28	Chan	309.47	318.63	1094.03	112.73	9.16	
2.06	12.31	9.70					
29	Chan	318.63	327.79	1093.36	112.69	9.16	
2.06	12.30	9.70					
30	Chan	327.79	336.95	1092.70	112.65	9.16	
2.06	12.30	9.70					
31	Chan	336.95	346.11	1067.12	111.41	9.23	
2.01	12.16	9.58					
32	Chan	346.11	355.27	846.84	97.49	9.35	
1.60	10.64	8.69					
33	Chan	355.27	364.43	668.36	84.10	9.22	
1.26	9.18	7.95					
34	Chan	364.43	373.60	655.71	82.92	9.16	
1.24	9.05	7.91					
35	Chan	373.60	382.76	651.58	82.61	9.16	
1.23	9.02	7.89					
36	Chan	382.76	391.92	647.46	82.29	9.16	
1.22	8.98	7.87					
37	Chan	391.92	401.08	643.35	81.98	9.16	
1.21	8.95	7.85					
38	Chan	401.08	410.24	639.25	81.67	9.16	
1.21	8.91	7.83					
39	Chan	410.24	419.40	635.17	81.35	9.16	
1.20	8.88	7.81					
40	Chan	419.40	428.56	631.09	81.04	9.16	
1.19	8.85	7.79					
41	Chan	428.56	437.72	627.03	80.72	9.16	
1.18	8.81	7.77					
42	Chan	437.72	446.88	622.97	80.41	9.16	
1.18	8.78	7.75					
43	Chan	446.88	456.04	618.92	80.10	9.16	
1.17	8.74	7.73					
44	Chan	456.04	465.20	614.89	79.78	9.16	
1.16	8.71	7.71					
45	ROB	465.20	708.36	12550.74	1696.88	216.28	
23.68	8.01	7.40					

BRIDGE

RIVER: San Luis Rey Riv
REACH: Reach 1 RS: 1200

INPUT
Description: Metro Link RR Bridge (2000 survey data)
Distance from Upstream XS = 10.1
Deck/Roadway Width = 20
Weir Coefficient = 2.8
Upstream Deck/Roadway Coordinates
num= 4

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
0	33	22	892.92	33	22	892.92	33	0
900	33	0						

Upstream Bridge Cross Section Data
Station Elevation Data num= 17

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	22.5	7	22.2	14	21.7	15.5	9.2	40.6	8.2
68.75	8.2	71.3	8.2	109	6.2	138.5	2.9	342.7	3

358.2	6.2	465.2	6.6	619.3	7.4	673.5	8.2	680.7	22.2
698	24.2	708.36	25.2						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.03	71.3	.025	673.5	.04

Bank Sta: Left	Right	Coeff Contr.	Expan.
71.3	465.2	.1	.3

Downstream Deck/Roadway Coordinates
num= 4

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
0	33	22	892.92	33	22	892.92	33	0
900	33	0						

Downstream Bridge Cross Section Data
Station Elevation Data num= 19

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	22.2	22	20.2	25	8.1	29	8.2	63.5	9.7
75.5	9.07	92	8.2	102.8	6.2	122.3	2.9	335.1	3
348.2	6.2	497.6	6.8	608	7.3	626	7.3	676.5	8.2
679.8	19.7	687.4	20.2	706.5	22.2	715.1	23.2		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.03	92	.018	497.6	.04

Bank Sta: Left	Right	Coeff Contr.	Expan.
92	497.6	.1	.3

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

Number of Piers = 6

Pier Data
Pier Station Upstream= 114.75 Downstream= 114.75
Upstream num= 2

Width	Elev	Width	Elev
10	-5	10	22

Downstream num= 2

Width	Elev	Width	Elev
10	-5	10	22

Pier Data
Pier Station Upstream= 215.5 Downstream= 215.5
Upstream num= 2

Width	Elev	Width	Elev
10	-5	10	22

Downstream num= 2

Width	Elev	Width	Elev
10	-5	10	22

Pier Data
Pier Station Upstream= 316.25 Downstream= 316.25
Upstream num= 2

Width	Elev	Width	Elev

```
      10       -5       10       22
Downstream      num=        2
    Width    Elev     Width    Elev
      10       -5       10       22

Pier Data
Pier Station     Upstream=     417    Downstream=     417
Upstream      num=        2
    Width    Elev     Width    Elev
      10       -5       10       22
Downstream      num=        2
    Width    Elev     Width    Elev
      10       -5       10       22

Pier Data
Pier Station     Upstream=  517.75    Downstream=  517.75
Upstream      num=        2
    Width    Elev     Width    Elev
      10       -5       10       22
Downstream      num=        2
    Width    Elev     Width    Elev
      10       -5       10       22

Pier Data
Pier Station     Upstream=   618.5    Downstream=   618.5
Upstream      num=        2
    Width    Elev     Width    Elev
      10       -5       10       22
Downstream      num=        2
    Width    Elev     Width    Elev
      10       -5       10       22

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
       Energy
Selected Low Flow Methods = Highest Energy Answer

High Flow Method
       Energy Only

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

BRIDGE OUTPUT  Profile #100-yr


  E.G. US. (ft)                16.43    Element                Inside BR US
Inside BR DS
  W.S. US. (ft)                15.29    E.G. Elev (ft)               16.38
16.20
  Q Total (cfs)             53000.00    W.S. Elev (ft)               14.89
13.32
  Q Bridge (cfs)            53000.00    Crit W.S. (ft)               12.15
12.67
  Q Weir (cfs)                          Max Chl Dpth (ft)            11.99
10.42
  Weir Sta Lft (ft)                     Vel Total (ft/s)              9.63
11.85
```

Weir Sta Rgt (ft) 4472.79		Flow Area (sq ft)	5504.67
Weir Submerg 0.86		Froude # Chl	0.56
Weir Max Depth (ft) 40088.56		Specif Force (cu ft)	42532.73
Min El Weir Flow (ft) 7.53	33.01	Hydr Depth (ft)	9.14
Min El Prs (ft) 701.32	22.00	W.P. Total (ft)	726.10
Delta EG (ft) 1142202.0	0.48	Conv. Total (cfs)	1267931.0
Delta WS (ft) 594.27	1.39	Top Width (ft)	602.12
BR Open Area (sq ft) 0.00	9696.62	Frctn Loss (ft)	0.04
BR Open Vel (ft/s) 0.25	11.85	C & E Loss (ft)	0.14
Coef of Q 0.86		Shear Total (lb/sq ft)	0.83
Br Sel Method 10.16	Energy only	Power Total (lb/ft s)	7.96

Warning: For the final momentum answer at the bridge, the upstream energy was computed lower than
the downstream energy. This is not physically possible, the momentum answer has been
disregarded.
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 velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for
additional cross sections.

CROSS SECTION

RIVER: San Luis Rey Riv
REACH: Reach 1 RS: 1182

INPUT
Description: Downstream Side of Metro Link Rail Road Bridge
All negative
station ground points taken from topographic data, not surveyed.
All other ground points from survey data, June
2000.
Copied from 2267.5
Station Elevation Data num= 19

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	22.2	22	20.2	25	8.1	29	8.2	63.5	9.7
75.5	9.07	92	8.2	102.8	6.2	122.3	2.9	335.1	3
348.2	6.2	497.6	6.8	608	7.3	626	7.3	676.5	8.2
679.8	19.7	687.4	20.2	706.5	22.2	715.1	23.2		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.03	92	.018	497.6	.04

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

92 497.6 153 337.7 510.2 .1 .3

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	15.95	Element	Left OB	Channel
Right OB				
Vel Head (ft)	2.05	Wt. n-Val.	0.030	0.018
0.040				
W.S. Elev (ft)	13.90	Reach Len. (ft)	153.00	337.70
510.20				
Crit W.S. (ft)	12.16	Flow Area (sq ft)	339.34	3814.24
1191.17				
E.G. Slope (ft/ft)	0.001096	Area (sq ft)	339.34	3814.24
1191.17				
Q Total (cfs)	53000.00	Flow (cfs)	1549.08	46377.93
5073.00				
Top Width (ft)	654.58	Top Width (ft)	68.44	405.60
180.54				
Vel Total (ft/s)	9.92	Avg. Vel. (ft/s)	4.57	12.16
4.26				
Max Chl Dpth (ft)	11.00	Hydr. Depth (ft)	4.96	9.40
6.60				
Conv. Total (cfs)	1600902.0	Conv. (cfs)	46791.0	1400878.0
153233.5				
Length Wtd. (ft)	351.78	Wetted Per. (ft)	73.05	406.45
184.84				
Min Ch El (ft)	2.90	Shear (lb/sq ft)	0.32	0.64
0.44				
Alpha	1.34	Stream Power (lb/ft s)	1.45	7.81
1.88				
Frctn Loss (ft)	0.38	Cum Volume (acre-ft)	0.97	95.94
13.41				
C & E Loss (ft)	0.00	Cum SA (acres)	0.27	12.51
2.53				

Profile #100-yr

Percent Conv	Pos Hydr Depth(ft)	Left Sta Velocity (ft/s)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)
1	LOB	0.00	92.00	1549.08	339.34	73.05
2.92	4.96	4.57				
2	Chan	92.00	101.43	577.67	62.05	9.59
1.09	6.58	9.31				
3	Chan	101.43	110.87	847.26	78.01	9.57
1.60	8.27	10.86				
4	Chan	110.87	120.30	1137.60	93.08	9.57
2.15	9.87	12.22				
5	Chan	120.30	129.73	1366.72	103.45	9.46
2.58	10.97	13.21				
6	Chan	129.73	139.16	1376.06	103.75	9.43
2.60	11.00	13.26				
7	Chan	139.16	148.60	1375.14	103.71	9.43
2.59	10.99	13.26				
8	Chan	148.60	158.03	1374.21	103.67	9.43
2.59	10.99	13.26				
9	Chan	158.03	167.46	1373.29	103.63	9.43
2.59	10.99	13.25				

10	Chan	167.46	176.89	1372.37	103.58	9.43	
2.59	10.98	13.25					
11	Chan	176.89	186.33	1371.44	103.54	9.43	
2.59	10.98	13.25					
12	Chan	186.33	195.76	1370.52	103.50	9.43	
2.59	10.97	13.24					
13	Chan	195.76	205.19	1369.60	103.46	9.43	
2.58	10.97	13.24					
14	Chan	205.19	214.62	1368.67	103.42	9.43	
2.58	10.96	13.23					
15	Chan	214.62	224.06	1367.75	103.37	9.43	
2.58	10.96	13.23					
16	Chan	224.06	233.49	1366.83	103.33	9.43	
2.58	10.95	13.23					
17	Chan	233.49	242.92	1365.91	103.29	9.43	
2.58	10.95	13.22					
18	Chan	242.92	252.35	1364.99	103.25	9.43	
2.58	10.95	13.22					
19	Chan	252.35	261.79	1364.07	103.21	9.43	
2.57	10.94	13.22					
20	Chan	261.79	271.22	1363.15	103.17	9.43	
2.57	10.94	13.21					
21	Chan	271.22	280.65	1362.22	103.12	9.43	
2.57	10.93	13.21					
22	Chan	280.65	290.08	1361.30	103.08	9.43	
2.57	10.93	13.21					
23	Chan	290.08	299.52	1360.39	103.04	9.43	
2.57	10.92	13.20					
24	Chan	299.52	308.95	1359.46	103.00	9.43	
2.57	10.92	13.20					
25	Chan	308.95	318.38	1358.54	102.96	9.43	
2.56	10.92	13.20					
26	Chan	318.38	327.81	1357.63	102.91	9.43	
2.56	10.91	13.19					
27	Chan	327.81	337.25	1338.42	102.31	9.50	
2.53	10.85	13.08					
28	Chan	337.25	346.68	1007.39	87.05	9.71	
1.90	9.23	11.57					
29	Chan	346.68	356.11	760.63	72.83	9.48	
1.44	7.72	10.44					
30	Chan	356.11	365.54	751.97	72.20	9.43	
1.42	7.65	10.42					
31	Chan	365.54	374.98	745.78	71.84	9.43	
1.41	7.62	10.38					
32	Chan	374.98	384.41	739.60	71.48	9.43	
1.40	7.58	10.35					
33	Chan	384.41	393.84	733.45	71.13	9.43	
1.38	7.54	10.31					
34	Chan	393.84	403.27	727.32	70.77	9.43	
1.37	7.50	10.28					
35	Chan	403.27	412.71	721.21	70.41	9.43	
1.36	7.46	10.24					
36	Chan	412.71	422.14	715.12	70.06	9.43	
1.35	7.43	10.21					
37	Chan	422.14	431.57	709.06	69.70	9.43	
1.34	7.39	10.17					
38	Chan	431.57	441.00	703.01	69.34	9.43	
1.33	7.35	10.14					
39	Chan	441.00	450.44	696.98	68.98	9.43	
1.32	7.31	10.10					
40	Chan	450.44	459.87	690.97	68.63	9.43	
1.30	7.28	10.07					
41	Chan	459.87	469.30	684.99	68.27	9.43	

1.29	7.24	10.03				
42	Chan	469.30	478.73	679.02	67.91	9.43
1.28	7.20	10.00				
43	Chan	478.73	488.17	673.08	67.55	9.43
1.27	7.16	9.96				
44	Chan	488.17	497.60	667.15	67.20	9.43
1.26	7.12	9.93				
45	ROB	497.60	715.10	5073.00	1191.17	184.84
9.57	6.60	4.26				

CROSS SECTION

RIVER: San Luis Rey Riv
REACH: Reach 1 RS: 844

INPUT
Description: Upstream Pacific Street
Station Elevation Data num= 19

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	22.2	35.8	20.2	38.9	18.2	42.1	16.2	46.2	14.2
48.6	12.2	51.8	10.2	55.6	8.2	66.1	2.9	322.36	2.93
334.5	6.2	461.5	6.8	498.4	7.2	551.4	7.5	598.8	8.2
602.3	10.2	605.8	14	613.2	14	645.8	9.8		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.03	55.6	.018	598.8	.04

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	55.6	498.4		81.3	83	80.5	.1	.3

Right Levee Station= 605.8 Elevation= 14

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	15.57	Element	Left OB	Channel
Right OB				
Vel Head (ft)	2.06	Wt. n-Val.	0.030	0.018
0.018				
W.S. Elev (ft)	13.51	Reach Len. (ft)	12.50	12.50
12.50				
Crit W.S. (ft)	11.76	Flow Area (sq ft)	24.82	4038.58
615.10				
E.G. Slope (ft/ft)	0.001076	Area (sq ft)	24.82	4038.58
615.10				
Q Total (cfs)	53000.00	Flow (cfs)	73.32	47608.63
5318.05				
Top Width (ft)	558.32	Top Width (ft)	8.57	442.80
106.95				
Vel Total (ft/s)	11.33	Avg. Vel. (ft/s)	2.95	11.79
8.65				
Max Chl Dpth (ft)	10.61	Hydr. Depth (ft)	2.89	9.12
5.75				
Conv. Total (cfs)	1616021.0	Conv. (cfs)	2235.6	1451632.0
162152.5				
Length Wtd. (ft)	12.50	Wetted Per. (ft)	10.12	444.50
108.94				
Min Ch El (ft)	2.90	Shear (lb/sq ft)	0.16	0.61
0.38				
Alpha	1.03	Stream Power (lb/ft s)	0.49	7.19

3.28			
Frctn Loss (ft)	Cum Volume (acre-ft)	0.33	65.50
2.83			
C & E Loss (ft)	Cum SA (acres)	0.13	9.22
0.85			

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

Profile #100-yr

Percent Conv	Pos Hydr	Depth(ft)	Left Sta Velocity (ft/s)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)
1	LOB		0.00	55.60	73.32	24.82	10.12
0.14	2.89		2.95				
2	Chan		55.60	65.90	794.42	81.46	11.54
1.50	7.91		9.75				
3	Chan		65.90	76.20	1395.51	109.26	10.32
2.63	10.61		12.77				
4	Chan		76.20	86.49	1397.66	109.26	10.30
2.64	10.61		12.79				
5	Chan		86.49	96.79	1397.40	109.25	10.30
2.64	10.61		12.79				
6	Chan		96.79	107.09	1397.13	109.23	10.30
2.64	10.61		12.79				
7	Chan		107.09	117.39	1396.87	109.22	10.30
2.64	10.61		12.79				
8	Chan		117.39	127.68	1396.60	109.21	10.30
2.64	10.61		12.79				
9	Chan		127.68	137.98	1396.34	109.20	10.30
2.63	10.60		12.79				
10	Chan		137.98	148.28	1396.07	109.19	10.30
2.63	10.60		12.79				
11	Chan		148.28	158.58	1395.81	109.17	10.30
2.63	10.60		12.79				
12	Chan		158.58	168.87	1395.55	109.16	10.30
2.63	10.60		12.78				
13	Chan		168.87	179.17	1395.28	109.15	10.30
2.63	10.60		12.78				
14	Chan		179.17	189.47	1395.02	109.14	10.30
2.63	10.60		12.78				
15	Chan		189.47	199.77	1394.75	109.12	10.30
2.63	10.60		12.78				
16	Chan		199.77	210.07	1394.49	109.11	10.30
2.63	10.60		12.78				
17	Chan		210.07	220.36	1394.22	109.10	10.30
2.63	10.59		12.78				
18	Chan		220.36	230.66	1393.96	109.09	10.30
2.63	10.59		12.78				
19	Chan		230.66	240.96	1393.69	109.07	10.30

2.63	10.59	12.78					
20	Chan		240.96	251.26	1393.43	109.06	10.30
2.63	10.59	12.78					
21	Chan		251.26	261.55	1393.17	109.05	10.30
2.63	10.59	12.78					
22	Chan		261.55	271.85	1392.90	109.04	10.30
2.63	10.59	12.77					
23	Chan		271.85	282.15	1392.64	109.02	10.30
2.63	10.59	12.77					
24	Chan		282.15	292.45	1392.37	109.01	10.30
2.63	10.59	12.77					
25	Chan		292.45	302.74	1392.11	109.00	10.30
2.63	10.58	12.77					
26	Chan		302.74	313.04	1391.85	108.99	10.30
2.63	10.58	12.77					
27	Chan		313.04	323.34	1385.70	108.84	10.33
2.61	10.57	12.73					
28	Chan		323.34	333.64	1024.65	91.97	10.66
1.93	8.93	11.14					
29	Chan		333.64	343.93	748.16	75.19	10.33
1.41	7.30	9.95					
30	Chan		343.93	354.23	739.71	74.59	10.30
1.40	7.24	9.92					
31	Chan		354.23	364.53	731.45	74.09	10.30
1.38	7.19	9.87					
32	Chan		364.53	374.83	723.22	73.58	10.30
1.36	7.15	9.83					
33	Chan		374.83	385.13	715.04	73.08	10.30
1.35	7.10	9.78					
34	Chan		385.13	395.42	706.89	72.58	10.30
1.33	7.05	9.74					
35	Chan		395.42	405.72	698.77	72.08	10.30
1.32	7.00	9.69					
36	Chan		405.72	416.02	690.70	71.58	10.30
1.30	6.95	9.65					
37	Chan		416.02	426.32	682.66	71.08	10.30
1.29	6.90	9.60					
38	Chan		426.32	436.61	674.66	70.58	10.30
1.27	6.85	9.56					
39	Chan		436.61	446.91	666.70	70.08	10.30
1.26	6.81	9.51					
40	Chan		446.91	457.21	658.77	69.58	10.30
1.24	6.76	9.47					
41	Chan		457.21	467.51	649.14	68.96	10.30
1.22	6.70	9.41					
42	Chan		467.51	477.80	632.07	67.87	10.30
1.19	6.59	9.31					
43	Chan		477.80	488.10	614.33	66.72	10.30
1.16	6.48	9.21					
44	Chan		488.10	498.40	596.79	65.57	10.30
1.13	6.37	9.10					
45	ROB		498.40	605.80	5318.05	615.10	108.94
10.03	5.75	8.65					

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

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

BRIDGE

RIVER: San Luis Rey Riv
REACH: Reach 1 RS: 800

INPUT
Description: Pacific Street
Distance from Upstream XS = 12.5
Deck/Roadway Width = 55.5
Weir Coefficient = 2.6
Upstream Deck/Roadway Coordinates
num= 6

Sta Hi Cord	Lo Cord		Sta Hi Cord	Lo Cord		Sta Hi Cord	Lo Cord	
0	25	0	35.8	24	0	35.8	24	21
605.8	18.2	15.2	605.8	18.2	0	650	18.2	0

Upstream Bridge Cross Section Data
Station Elevation Data num= 19

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	22.2	35.8	20.2	38.9	18.2	42.1	16.2	46.2	14.2
48.6	12.2	51.8	10.2	55.6	8.2	66.1	2.9	322.36	2.93
334.5	6.2	461.5	6.8	498.4	7.2	551.4	7.5	598.8	8.2
602.3	10.2	605.8	14	613.2	14	645.8	9.8		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.03	55.6	.018	598.8	.04

Bank Sta: Left	Right	Coeff Contr.	Expan.
55.6	498.4	.1	.3

Right Levee Station= 605.8 Elevation= 14

Downstream Deck/Roadway Coordinates
num= 6

Sta Hi Cord	Lo Cord		Sta Hi Cord	Lo Cord		Sta Hi Cord	Lo Cord	
0	25	0	46.6	24	0	46.6	24	21
610.6	18.2	15.2	610.6	18.2	0	650	18.2	0

Downstream Bridge Cross Section Data
Station Elevation Data num= 19

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	22.2	46.6	18.2	49.7	16.2	53	14.2	55.8	12.2
58.8	10.2	61.9	8.2	64.7	6.2	86.96	2.86	292.4	2.9
363.98	3.12	376.5	6.2	483.4	6.8	573.3	7	604	8.2
607.1	10.2	610.6	12.2	618.6	12.2	648.8	9.6		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.03	64.7	.018	604	.04

Bank Sta: Left	Right	Coeff Contr.	Expan.
64.7	483.4	.1	.3

Right Levee Station= 610.6 Elevation= 12.2

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

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

Number of Piers = 3

Pier Data
Pier Station Upstream= 156.5 Downstream= 167.3
Upstream num= 2

Width	Elev	Width	Elev
8.75	0	8.75	25

Downstream num= 2

Width	Elev	Width	Elev
8.75	0	8.75	25

Pier Data
Pier Station Upstream= 317.4 Downstream= 328.2
Upstream num= 2

Width	Elev	Width	Elev
8.75	0	8.75	25

Downstream num= 2

Width	Elev	Width	Elev
8.75	0	8.75	25

Pier Data
Pier Station Upstream= 478.3 Downstream= 489.1
Upstream num= 2

Width	Elev	Width	Elev
8.75	0	8.75	25

Downstream num= 2

Width	Elev	Width	Elev
8.75	0	8.75	25

Number of Bridge Coefficient Sets = 1

Low Flow Methods and Data
Energy
Selected Low Flow Methods = Highest Energy Answer

High Flow Method
Energy Only

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

BRIDGE OUTPUT Profile #100-yr

E.G. US. (ft)	15.57	Element	Inside BR US
Inside BR DS			
W.S. US. (ft)	13.51	E.G. Elev (ft)	15.40
15.13			
Q Total (cfs)	53000.00	W.S. Elev (ft)	12.01
11.73			
Q Bridge (cfs)	53000.00	Crit W.S. (ft)	12.01
11.73			
Q Weir (cfs)		Max Chl Dpth (ft)	9.11
8.87			
Weir Sta Lft (ft)		Vel Total (ft/s)	14.56

14.54			
Weir Sta Rgt (ft)		Flow Area (sq ft)	3639.49
3644.21			
Weir Submerg		Froude # Chl	0.96
0.97			
Weir Max Depth (ft)		Specif Force (cu ft)	37969.51
37978.78			
Min El Weir Flow (ft)	18.21	Hydr Depth (ft)	6.88
6.91			
Min El Prs (ft)	21.00	W.P. Total (ft)	579.27
575.30			
Delta EG (ft)	0.38	Conv. Total (cfs)	1041996.0
1058745.0			
Delta WS (ft)	2.90	Top Width (ft)	528.81
527.01			
BR Open Area (sq ft)	6893.12	Frctn Loss (ft)	
BR Open Vel (ft/s)	14.56	C & E Loss (ft)	
Coef of Q		Shear Total (lb/sq ft)	1.01
0.99			
Br Sel Method	Momentum	Power Total (lb/ft s)	14.78
14.41			

Warning: Pier drag coefficient of 2.0 assumed for Class B flow.
Warning: The momentum, Class B, supercritical, water surface downstream of the bridge had a higher
energy than the upstream cross section. This is not physically possible. The downstream water
surface has been computed by taking the momentum result inside of the bridge and performing
an energy balance.
Note: The momentum method has computed a class B profile.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid,
energy was used.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for
additional cross sections.
Note: The energy method has computed a class B profile.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid,
energy was used.

CROSS SECTION

RIVER: San Luis Rey Riv
REACH: Reach 1 RS: 761

INPUT
Description: Downstream Pacific Street
Station Elevation Data num= 19

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	22.2	46.6	18.2	49.7	16.2	53	14.2	55.8	12.2
58.8	10.2	61.9	8.2	64.7	6.2	86.96	2.86	292.4	2.9
363.98	3.12	376.5	6.2	483.4	6.8	573.3	7	604	8.2
607.1	10.2	610.6	12.2	618.6	12.2	648.8	9.6		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val

0	.03	64.7	.018	604	.04

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
64.7	483.4	188.3	141.9	103.8	.1	.3

Right Levee Station= 610.6 Elevation= 12.2

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	15.00	Element	Left OB	Channel	Right OB
Vel Head (ft)	4.39	Wt. n-Val.	0.030	0.018	0.018
W.S. Elev (ft)	10.61	Reach Len. (ft)	188.30	141.90	103.80
Crit W.S. (ft)	11.49	Flow Area (sq ft)	14.07	2782.87	430.93
E.G. Slope (ft/ft)	0.003513	Area (sq ft)	14.07	2782.87	430.93
Q Total (cfs)	53000.00	Flow (cfs)	60.82	48087.60	4851.58
Top Width (ft)	549.65	Top Width (ft)	6.52	418.70	124.42
Vel Total (ft/s)	16.42	Avg. Vel. (ft/s)	4.32	17.28	11.26
Max Chl Dpth (ft)	7.75	Hydr. Depth (ft)	2.16	6.65	3.46
Conv. Total (cfs)	894168.6	Conv. (cfs)	1026.0	811291.1	81851.5
Length Wtd. (ft)	139.24	Wetted Per. (ft)	7.88	419.32	125.15
Min Ch El (ft)	2.86	Shear (lb/sq ft)	0.39	1.46	0.76
Alpha	1.05	Stream Power (lb/ft s)	1.69	25.15	8.50
Frctn Loss (ft)		Cum Volume (acre-ft)	0.30	59.47	1.88
C & E Loss (ft)		Cum SA (acres)	0.12	8.44	0.63

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Note: The energy method has computed a class B profile.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

Profile #100-yr

Percent Conv	Pos Hydr Depth(ft)	Left Sta Velocity (ft/s)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)
1	LOB	0.00	64.70	60.82	14.07	7.88
0.11	2.16	4.32				
2	Chan	64.70	74.44	702.46	50.09	9.85
1.33	5.14	14.02				
3	Chan	74.44	84.17	1065.54	64.32	9.85
2.01	6.61	16.57				

4	Chan	84.17	93.91	1381.18	74.91	9.77	
2.61	7.69	18.44					
5	Chan	93.91	103.65	1401.55	75.48	9.74	
2.64	7.75	18.57					
6	Chan	103.65	113.39	1400.98	75.46	9.74	
2.64	7.75	18.57					
7	Chan	113.39	123.12	1400.41	75.44	9.74	
2.64	7.75	18.56					
8	Chan	123.12	132.86	1399.84	75.42	9.74	
2.64	7.75	18.56					
9	Chan	132.86	142.60	1399.27	75.40	9.74	
2.64	7.74	18.56					
10	Chan	142.60	152.33	1398.70	75.39	9.74	
2.64	7.74	18.55					
11	Chan	152.33	162.07	1398.12	75.37	9.74	
2.64	7.74	18.55					
12	Chan	162.07	171.81	1397.56	75.35	9.74	
2.64	7.74	18.55					
13	Chan	171.81	181.55	1396.98	75.33	9.74	
2.64	7.74	18.54					
14	Chan	181.55	191.28	1396.41	75.31	9.74	
2.63	7.73	18.54					
15	Chan	191.28	201.02	1395.84	75.29	9.74	
2.63	7.73	18.54					
16	Chan	201.02	210.76	1395.27	75.28	9.74	
2.63	7.73	18.54					
17	Chan	210.76	220.50	1394.70	75.26	9.74	
2.63	7.73	18.53					
18	Chan	220.50	230.23	1394.13	75.24	9.74	
2.63	7.73	18.53					
19	Chan	230.23	239.97	1393.56	75.22	9.74	
2.63	7.73	18.53					
20	Chan	239.97	249.71	1392.99	75.20	9.74	
2.63	7.72	18.52					
21	Chan	249.71	259.44	1392.42	75.18	9.74	
2.63	7.72	18.52					
22	Chan	259.44	269.18	1391.85	75.16	9.74	
2.63	7.72	18.52					
23	Chan	269.18	278.92	1391.28	75.15	9.74	
2.63	7.72	18.51					
24	Chan	278.92	288.66	1390.71	75.13	9.74	
2.62	7.72	18.51					
25	Chan	288.66	298.39	1388.54	75.06	9.74	
2.62	7.71	18.50					
26	Chan	298.39	308.13	1380.19	74.79	9.74	
2.60	7.68	18.46					
27	Chan	308.13	317.87	1371.24	74.49	9.74	
2.59	7.65	18.41					
28	Chan	317.87	327.60	1362.31	74.20	9.74	
2.57	7.62	18.36					
29	Chan	327.60	337.34	1353.41	73.91	9.74	
2.55	7.59	18.31					
30	Chan	337.34	347.08	1344.53	73.62	9.74	
2.54	7.56	18.26					
31	Chan	347.08	356.82	1335.67	73.33	9.74	
2.52	7.53	18.21					
32	Chan	356.82	366.55	1295.77	72.23	9.81	
2.44	7.42	17.94					
33	Chan	366.55	376.29	814.46	55.14	10.03	
1.54	5.66	14.77					
34	Chan	376.29	386.03	542.74	42.73	9.74	
1.02	4.39	12.70					
35	Chan	386.03	395.77	531.63	42.19	9.74	

1.00	4.33	12.60				
36	Chan	395.77	405.50	520.51	41.66	9.74
0.98	4.28	12.49				
37	Chan	405.50	415.24	509.47	41.13	9.74
0.96	4.22	12.39				
38	Chan	415.24	424.98	498.53	40.60	9.74
0.94	4.17	12.28				
39	Chan	424.98	434.71	487.69	40.06	9.74
0.92	4.11	12.17				
40	Chan	434.71	444.45	476.94	39.53	9.74
0.90	4.06	12.06				
41	Chan	444.45	454.19	466.28	39.00	9.74
0.88	4.01	11.96				
42	Chan	454.19	463.93	455.73	38.47	9.74
0.86	3.95	11.85				
43	Chan	463.93	473.66	445.27	37.93	9.74
0.84	3.90	11.74				
44	Chan	473.66	483.40	434.91	37.40	9.74
0.82	3.84	11.63				
45	ROB	483.40	610.60	4851.58	430.93	125.15
9.15	3.46	11.26				

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for
additional cross sections.
Note: The energy method has computed a class B profile.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid,
energy was used.

CROSS SECTION

RIVER: San Luis Rey Riv
REACH: Reach 1 RS: 619

INPUT
Description:
Station Elevation Data num= 18

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	22.2	27.1	16.2	30.3	14.2	33.5	12.2	36.7	10.2
40.4	8.2	43.4	6.2	94.76	2.89	406	2.9	461.9	5.1
482.7	5.91	490.12	6.2	541.5	6.9	562	8.2	565	10.2
568.1	12.2	576.7	12.2	596.9	9.4				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.03	43.4	.018	562	.04

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
43.4	482.7	368.9	355.9	348	.1	.3

Right Levee Station= 568.1 Elevation= 12.2

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	14.49	Element	Left OB	Channel
Right OB				
Vel Head (ft)	4.57	Wt. n-Val.	0.030	0.018
0.018				
W.S. Elev (ft)	9.91	Reach Len. (ft)	368.90	355.90

348.00				
Crit W.S. (ft)	10.85	Flow Area (sq ft)	10.85	2882.02
252.03				
E.G. Slope (ft/ft)	0.003639	Area (sq ft)	10.85	2882.02
252.03				
Q Total (cfs)	53000.00	Flow (cfs)	42.59	50281.19
2676.23				
Top Width (ft)	527.34	Top Width (ft)	6.17	439.30
81.87				
Vel Total (ft/s)	16.85	Avg. Vel. (ft/s)	3.92	17.45
10.62				
Max Chl Dpth (ft)	7.02	Hydr. Depth (ft)	1.76	6.56
3.08				
Conv. Total (cfs)	878628.6	Conv. (cfs)	706.0	833556.4
44366.2				
Length Wtd. (ft)	355.66	Wetted Per. (ft)	7.21	439.47
82.44				
Min Ch El (ft)	2.89	Shear (lb/sq ft)	0.34	1.49
0.69				
Alpha	1.04	Stream Power (lb/ft s)	1.34	25.99
7.37				
Frctn Loss (ft)	0.50	Cum Volume (acre-ft)	0.24	50.24
1.07				
C & E Loss (ft)	0.02	Cum SA (acres)	0.09	7.04
0.39				

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

Profile #100-yr

Percent Conv	Pos Hydr Depth(ft)	Left Sta Velocity (ft/s)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)
1	LOB	0.00	43.40	42.59	10.85	7.21
0.08	1.76	3.92				
2	Chan	43.40	53.62	515.89	41.29	10.24
0.97	4.04	12.49				
3	Chan	53.62	63.83	663.43	48.02	10.24
1.25	4.70	13.82				
4	Chan	63.83	74.05	825.44	54.74	10.24
1.56	5.36	15.08				
5	Chan	74.05	84.27	1001.31	61.47	10.24
1.89	6.02	16.29				
6	Chan	84.27	94.48	1190.51	68.20	10.24
2.25	6.68	17.46				
7	Chan	94.48	104.70	1297.09	71.74	10.22
2.45	7.02	18.08				
8	Chan	104.70	114.91	1297.12	71.74	10.22
2.45	7.02	18.08				
9	Chan	114.91	125.13	1297.02	71.74	10.22
2.45	7.02	18.08				
10	Chan	125.13	135.35	1296.91	71.73	10.22
2.45	7.02	18.08				
11	Chan	135.35	145.56	1296.81	71.73	10.22
2.45	7.02	18.08				
12	Chan	145.56	155.78	1296.71	71.73	10.22
2.45	7.02	18.08				

13	Chan	155.78	166.00	1296.61	71.72	10.22
2.45	7.02	18.08				
14	Chan	166.00	176.21	1296.51	71.72	10.22
2.45	7.02	18.08				
15	Chan	176.21	186.43	1296.41	71.72	10.22
2.45	7.02	18.08				
16	Chan	186.43	196.64	1296.31	71.71	10.22
2.45	7.02	18.08				
17	Chan	196.64	206.86	1296.21	71.71	10.22
2.45	7.02	18.08				
18	Chan	206.86	217.08	1296.11	71.71	10.22
2.45	7.02	18.08				
19	Chan	217.08	227.29	1296.01	71.70	10.22
2.45	7.02	18.07				
20	Chan	227.29	237.51	1295.90	71.70	10.22
2.45	7.02	18.07				
21	Chan	237.51	247.73	1295.80	71.70	10.22
2.44	7.02	18.07				
22	Chan	247.73	257.94	1295.70	71.69	10.22
2.44	7.02	18.07				
23	Chan	257.94	268.16	1295.60	71.69	10.22
2.44	7.02	18.07				
24	Chan	268.16	278.37	1295.50	71.69	10.22
2.44	7.02	18.07				
25	Chan	278.37	288.59	1295.40	71.68	10.22
2.44	7.02	18.07				
26	Chan	288.59	298.81	1295.30	71.68	10.22
2.44	7.02	18.07				
27	Chan	298.81	309.02	1295.20	71.68	10.22
2.44	7.02	18.07				
28	Chan	309.02	319.24	1295.10	71.67	10.22
2.44	7.02	18.07				
29	Chan	319.24	329.46	1295.00	71.67	10.22
2.44	7.02	18.07				
30	Chan	329.46	339.67	1294.89	71.67	10.22
2.44	7.01	18.07				
31	Chan	339.67	349.89	1294.79	71.66	10.22
2.44	7.01	18.07				
32	Chan	349.89	360.10	1294.70	71.66	10.22
2.44	7.01	18.07				
33	Chan	360.10	370.32	1294.59	71.66	10.22
2.44	7.01	18.07				
34	Chan	370.32	380.54	1294.49	71.65	10.22
2.44	7.01	18.07				
35	Chan	380.54	390.75	1294.39	71.65	10.22
2.44	7.01	18.07				
36	Chan	390.75	400.97	1294.29	71.65	10.22
2.44	7.01	18.07				
37	Chan	400.97	411.19	1277.97	71.11	10.22
2.41	6.96	17.97				
38	Chan	411.19	421.40	1171.38	67.50	10.22
2.21	6.61	17.35				
39	Chan	421.40	431.62	1055.01	63.40	10.22
1.99	6.21	16.64				
40	Chan	431.62	441.83	943.56	59.29	10.22
1.78	5.80	15.91				
41	Chan	441.83	452.05	837.14	55.18	10.22
1.58	5.40	15.17				
42	Chan	452.05	462.27	735.88	51.07	10.22
1.39	5.00	14.41				
43	Chan	462.27	472.48	640.44	46.99	10.22
1.21	4.60	13.63				
44	Chan	472.48	482.70	550.79	42.92	10.22

1.04	4.20	12.83				
45	ROB	482.70	568.10	2676.23	252.03	82.44
5.05	3.08	10.62				

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

CROSS SECTION

RIVER: San Luis Rey Riv
REACH: Reach 1 RS: 264

INPUT
Description:
Station Elevation Data num= 17

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	18.2	22.2	16.3	29.1	14.2	35.2	12.2	42.1	10.2
58.39	2.62	208.7	2.48	270	2.2	370	2.2	490.68	2.74
548.45	4.78	560	8.2	562.9	10.2	568	12.2	575.9	14.2
589.4	14.2	636.14	13.6						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.03	42.1	.018	562.9	.04

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
42.1	562.9	160.2	161.3	162.2	.1	.3

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	13.27	Element	Left OB	Channel
Right OB				
Vel Head (ft)	2.63	Wt. n-Val.	0.030	0.018
0.040				
W.S. Elev (ft)	10.64	Reach Len. (ft)	160.20	161.30
162.20				
Crit W.S. (ft)	9.66	Flow Area (sq ft)	0.33	4071.49
0.24				
E.G. Slope (ft/ft)	0.001614	Area (sq ft)	0.33	4071.49
0.24				
Q Total (cfs)	53000.00	Flow (cfs)	0.23	52999.64
0.13				
Top Width (ft)	523.42	Top Width (ft)	1.51	520.80
1.11				
Vel Total (ft/s)	13.02	Avg. Vel. (ft/s)	0.70	13.02
0.52				
Max Chl Dpth (ft)	8.44	Hydr. Depth (ft)	0.22	7.82
0.22				
Conv. Total (cfs)	1319157.0	Conv. (cfs)	5.8	1319148.0
3.1				
Length Wtd. (ft)	161.30	Wetted Per. (ft)	1.57	523.63
1.20				
Min Ch El (ft)	2.20	Shear (lb/sq ft)	0.02	0.78
0.02				
Alpha	1.00	Stream Power (lb/ft s)	0.01	10.20
0.01				
Frctn Loss (ft)	0.32	Cum Volume (acre-ft)	0.20	21.83
0.06				

C & E Loss (ft)	0.08	Cum SA (acres)	0.06	3.12
0.06				

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

Profile #100-yr

Percent Conv	Pos Hydr Depth(ft)	Left Sta Velocity (ft/s)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)
1	LOB	0.00	42.10	0.23	0.33	1.57
0.00	0.22	0.70				
2	Chan	42.10	54.21	265.02	39.42	13.36
0.50	3.25	6.72				
3	Chan	54.21	66.32	1157.03	93.06	12.54
2.18	7.68	12.43				
4	Chan	66.32	78.43	1274.47	97.25	12.11
2.40	8.03	13.10				
5	Chan	78.43	90.55	1277.46	97.39	12.11
2.41	8.04	13.12				
6	Chan	90.55	102.66	1280.45	97.53	12.11
2.42	8.05	13.13				
7	Chan	102.66	114.77	1283.44	97.66	12.11
2.42	8.06	13.14				
8	Chan	114.77	126.88	1286.43	97.80	12.11
2.43	8.07	13.15				
9	Chan	126.88	138.99	1289.43	97.94	12.11
2.43	8.09	13.17				
10	Chan	138.99	151.10	1292.43	98.07	12.11
2.44	8.10	13.18				
11	Chan	151.10	163.22	1295.43	98.21	12.11
2.44	8.11	13.19				
12	Chan	163.22	175.33	1298.44	98.35	12.11
2.45	8.12	13.20				
13	Chan	175.33	187.44	1301.44	98.48	12.11
2.46	8.13	13.21				
14	Chan	187.44	199.55	1304.45	98.62	12.11
2.46	8.14	13.23				
15	Chan	199.55	211.66	1307.82	98.77	12.11
2.47	8.16	13.24				
16	Chan	211.66	223.77	1319.26	99.29	12.11
2.49	8.20	13.29				
17	Chan	223.77	235.89	1334.13	99.96	12.11
2.52	8.25	13.35				
18	Chan	235.89	248.00	1349.07	100.63	12.11
2.55	8.31	13.41				
19	Chan	248.00	260.11	1364.07	101.30	12.11
2.57	8.36	13.47				
20	Chan	260.11	272.22	1378.89	101.96	12.11
2.60	8.42	13.52				
21	Chan	272.22	284.33	1383.94	102.18	12.11
2.61	8.44	13.54				
22	Chan	284.33	296.44	1383.94	102.18	12.11
2.61	8.44	13.54				
23	Chan	296.44	308.56	1383.94	102.18	12.11

2.61	8.44	13.54				
24	Chan	308.56	320.67	1383.94	102.18	12.11
2.61	8.44	13.54				
25	Chan	320.67	332.78	1383.94	102.18	12.11
2.61	8.44	13.54				
26	Chan	332.78	344.89	1383.94	102.18	12.11
2.61	8.44	13.54				
27	Chan	344.89	357.00	1383.94	102.18	12.11
2.61	8.44	13.54				
28	Chan	357.00	369.11	1383.94	102.18	12.11
2.61	8.44	13.54				
29	Chan	369.11	381.23	1377.57	101.90	12.11
2.60	8.41	13.52				
30	Chan	381.23	393.34	1362.85	101.25	12.11
2.57	8.36	13.46				
31	Chan	393.34	405.45	1348.16	100.59	12.11
2.54	8.31	13.40				
32	Chan	405.45	417.56	1333.53	99.93	12.11
2.52	8.25	13.34				
33	Chan	417.56	429.67	1318.96	99.28	12.11
2.49	8.20	13.29				
34	Chan	429.67	441.78	1304.46	98.62	12.11
2.46	8.14	13.23				
35	Chan	441.78	453.90	1290.02	97.96	12.11
2.43	8.09	13.17				
36	Chan	453.90	466.01	1275.65	97.31	12.11
2.41	8.03	13.11				
37	Chan	466.01	478.12	1261.34	96.65	12.11
2.38	7.98	13.05				
38	Chan	478.12	490.23	1247.09	95.99	12.11
2.35	7.93	12.99				
39	Chan	490.23	502.34	1187.58	93.24	12.12
2.24	7.70	12.74				
40	Chan	502.34	514.45	1079.72	88.06	12.12
2.04	7.27	12.26				
41	Chan	514.45	526.57	975.96	82.88	12.12
1.84	6.84	11.77				
42	Chan	526.57	538.68	876.43	77.70	12.12
1.65	6.42	11.28				
43	Chan	538.68	550.79	764.32	71.81	12.22
1.44	5.93	10.64				
44	Chan	550.79	562.90	265.34	39.17	13.13
0.50	3.23	6.77				
45	ROB	562.90	636.14	0.13	0.24	1.20
0.00	0.22	0.52				

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for
additional cross sections.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION

RIVER: San Luis Rey Riv
REACH: Reach 1 RS: 102

INPUT
Description:
Station Elevation Data num= 16

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	15.6	27.3	14.2	33.4	12.2	42.1	10.2	47.83	5.65
62.11	3.1	104.97	2.93	190.68	2.22	250	2.2	350	2.2
436.02	2.35	521.74	2.58	554.66	3.17	565.7	8.2	569.3	10.2
634.1	11.4								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.018	47.83	.018	565.7	.04

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
47.83	565.7	100	100	100	.1	.3

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	12.87	Element	Left OB	Channel
Vel Head (ft)	3.43	Wt. n-Val.	0.018	0.018
W.S. Elev (ft)	9.44	Reach Len. (ft)	100.00	100.00
Crit W.S. (ft)	9.44	Flow Area (sq ft)	9.07	3563.24
E.G. Slope (ft/ft)	0.002485	Area (sq ft)	9.07	3563.24
Q Total (cfs)	53000.00	Flow (cfs)	48.58	52949.70
Top Width (ft)	524.89	Top Width (ft)	4.78	517.87
Vel Total (ft/s)	14.83	Avg. Vel. (ft/s)	5.36	14.86
Max Chl Dpth (ft)	7.24	Hydr. Depth (ft)	1.90	6.88
Conv. Total (cfs)	1063297.0	Conv. (cfs)	974.7	1062288.0
Length Wtd. (ft)	100.00	Wetted Per. (ft)	6.10	519.20
Min Ch El (ft)	2.20	Shear (lb/sq ft)	0.23	1.06
Alpha	1.00	Stream Power (lb/ft s)	1.23	15.82
Frctn Loss (ft)	0.25	Cum Volume (acre-ft)	0.18	7.70
C & E Loss (ft)	0.06	Cum SA (acres)	0.05	1.19

Warning: The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.

Warning: 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.

Profile #100-yr

Percent Conv	Pos Hydr Depth(ft)	Left Sta Velocity (ft/s)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)
1	LOB	0.00	47.83	48.58	9.07	6.10
0.09	1.90	5.36				
2	Chan	47.83	59.87	682.33	58.65	12.23
1.29	4.87	11.63				
3	Chan	59.87	71.92	1063.48	76.16	12.08
2.01	6.32	13.96				
4	Chan	71.92	83.96	1089.27	77.17	12.04
2.06	6.41	14.12				
5	Chan	83.96	96.00	1102.83	77.74	12.04
2.08	6.46	14.19				
6	Chan	96.00	108.05	1116.95	78.34	12.04
2.11	6.50	14.26				
7	Chan	108.05	120.09	1141.47	79.37	12.04
2.15	6.59	14.38				
8	Chan	120.09	132.13	1170.41	80.57	12.04
2.21	6.69	14.53				
9	Chan	132.13	144.18	1199.65	81.77	12.04
2.26	6.79	14.67				
10	Chan	144.18	156.22	1229.17	82.97	12.04
2.32	6.89	14.81				
11	Chan	156.22	168.26	1258.98	84.17	12.04
2.38	6.99	14.96				
12	Chan	168.26	180.31	1289.08	85.38	12.04
2.43	7.09	15.10				
13	Chan	180.31	192.35	1319.18	86.57	12.04
2.49	7.19	15.24				
14	Chan	192.35	204.40	1331.32	87.04	12.04
2.51	7.23	15.30				
15	Chan	204.40	216.44	1332.57	87.09	12.04
2.51	7.23	15.30				
16	Chan	216.44	228.48	1333.82	87.14	12.04
2.52	7.24	15.31				
17	Chan	228.48	240.53	1335.06	87.19	12.04
2.52	7.24	15.31				
18	Chan	240.53	252.57	1336.28	87.24	12.04
2.52	7.24	15.32				
19	Chan	252.57	264.61	1336.67	87.25	12.04
2.52	7.24	15.32				
20	Chan	264.61	276.66	1336.67	87.25	12.04
2.52	7.24	15.32				
21	Chan	276.66	288.70	1336.67	87.25	12.04
2.52	7.24	15.32				
22	Chan	288.70	300.74	1336.67	87.25	12.04
2.52	7.24	15.32				
23	Chan	300.74	312.79	1336.67	87.25	12.04
2.52	7.24	15.32				
24	Chan	312.79	324.83	1336.67	87.25	12.04
2.52	7.24	15.32				
25	Chan	324.83	336.87	1336.67	87.25	12.04
2.52	7.24	15.32				
26	Chan	336.87	348.92	1336.67	87.25	12.04
2.52	7.24	15.32				
27	Chan	348.92	360.96	1333.99	87.15	12.04
2.52	7.24	15.31				
28	Chan	360.96	373.00	1327.57	86.90	12.04
2.50	7.22	15.28				
29	Chan	373.00	385.05	1321.14	86.64	12.04
2.49	7.19	15.25				

30	Chan	385.05	397.09	1314.72	86.39	12.04
2.48	7.17	15.22				
31	Chan	397.09	409.13	1308.31	86.14	12.04
2.47	7.15	15.19				
32	Chan	409.13	421.18	1301.91	85.88	12.04
2.46	7.13	15.16				
33	Chan	421.18	433.22	1295.53	85.63	12.04
2.44	7.11	15.13				
34	Chan	433.22	445.27	1288.15	85.34	12.04
2.43	7.09	15.09				
35	Chan	445.27	457.31	1278.46	84.95	12.04
2.41	7.05	15.05				
36	Chan	457.31	469.35	1268.72	84.56	12.04
2.39	7.02	15.00				
37	Chan	469.35	481.40	1259.00	84.17	12.04
2.38	6.99	14.96				
38	Chan	481.40	493.44	1249.31	83.78	12.04
2.36	6.96	14.91				
39	Chan	493.44	505.48	1239.66	83.40	12.04
2.34	6.92	14.86				
40	Chan	505.48	517.53	1230.03	83.01	12.04
2.32	6.89	14.82				
41	Chan	517.53	529.57	1208.87	82.15	12.04
2.28	6.82	14.72				
42	Chan	529.57	541.61	1149.00	79.69	12.05
2.17	6.62	14.42				
43	Chan	541.61	553.66	1087.20	77.09	12.05
2.05	6.40	14.10				
44	Chan	553.66	565.70	462.93	47.81	13.14
0.87	3.97	9.68				
45	ROB	565.70	634.10	1.72	1.39	2.56
0.00	0.62	1.23				

Warning: The energy equation could not be balanced within the specified number of iterations. The
program selected the water surface that had the least amount of error between computed and
assumed values.
Warning: 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 Riv
REACH: Reach 1 RS: 0

INPUT
Description:
Station Elevation Data num= 17

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	10	15	8	28.57	2.67	46.58	2.77	66.46	2.78
78.88	2.83	90.06	2.88	104.97	2.93	190.68	2.22	250	2.2
350	2.2	436.02	2.35	521.74	2.58	554.66	3.17	565.7	4
569.3	6	634.1	10						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.018	46.58	.018	569.3	.04

Bank Sta: Left	Right	Coeff Contr.	Expan.
46.58	569.3	.1	.3

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	12.52	Element	Left OB	Channel
Right OB				
Vel Head (ft)	4.03	Wt. n-Val.	0.018	0.018
0.040				
W.S. Elev (ft)	8.49	Reach Len. (ft)		
Crit W.S. (ft)	9.17	Flow Area (sq ft)	147.69	3142.49
50.29				
E.G. Slope (ft/ft)	0.003544	Area (sq ft)	147.69	3142.49
50.29				
Q Total (cfs)	53000.00	Flow (cfs)	1849.37	51022.04
128.59				
Top Width (ft)	598.35	Top Width (ft)	35.27	522.72
40.36				
Vel Total (ft/s)	15.87	Avg. Vel. (ft/s)	12.52	16.24
2.56				
Max Chl Dpth (ft)	6.29	Hydr. Depth (ft)	4.19	6.01
1.25				
Conv. Total (cfs)	890312.8	Conv. (cfs)	31066.4	857086.3
2160.1				
Length Wtd. (ft)		Wetted Per. (ft)	36.31	523.28
40.44				
Min Ch El (ft)	2.20	Shear (lb/sq ft)	0.90	1.33
0.28				
Alpha	1.03	Stream Power (lb/ft s)	11.27	21.57
0.70				
Frctn Loss (ft)	0.29	Cum Volume (acre-ft)		
C & E Loss (ft)	0.06	Cum SA (acres)		

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

Profile #100-yr

Percent Conv	Pos Hydr Depth(ft)	Left Sta Velocity (ft/s)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)
1	LOB	0.00	46.58	1849.37	147.69	36.31
3.49	4.19	12.52				
2	Chan	46.58	58.74	1089.98	69.52	12.16
2.06	5.72	15.68				
3	Chan	58.74	70.89	1087.13	69.41	12.16
2.05	5.71	15.66				
4	Chan	70.89	83.05	1074.27	68.91	12.16
2.03	5.67	15.59				
5	Chan	83.05	95.21	1057.91	68.28	12.16
2.00	5.62	15.49				

6	Chan	95.21	107.36	1045.29	67.79	12.16
1.97	5.58	15.42				
7	Chan	107.36	119.52	1062.53	68.46	12.16
2.00	5.63	15.52				
8	Chan	119.52	131.67	1094.38	69.69	12.16
2.06	5.73	15.70				
9	Chan	131.67	143.83	1126.61	70.91	12.16
2.13	5.83	15.89				
10	Chan	143.83	155.99	1159.21	72.13	12.16
2.19	5.93	16.07				
11	Chan	155.99	168.14	1192.18	73.36	12.16
2.25	6.03	16.25				
12	Chan	168.14	180.30	1225.52	74.58	12.16
2.31	6.14	16.43				
13	Chan	180.30	192.46	1258.89	75.79	12.16
2.38	6.23	16.61				
14	Chan	192.46	204.61	1272.17	76.27	12.16
2.40	6.27	16.68				
15	Chan	204.61	216.77	1273.56	76.32	12.16
2.40	6.28	16.69				
16	Chan	216.77	228.92	1274.94	76.37	12.16
2.41	6.28	16.69				
17	Chan	228.92	241.08	1276.33	76.42	12.16
2.41	6.29	16.70				
18	Chan	241.08	253.24	1277.67	76.47	12.16
2.41	6.29	16.71				
19	Chan	253.24	265.39	1278.04	76.48	12.16
2.41	6.29	16.71				
20	Chan	265.39	277.55	1278.04	76.48	12.16
2.41	6.29	16.71				
21	Chan	277.55	289.71	1278.04	76.48	12.16
2.41	6.29	16.71				
22	Chan	289.71	301.86	1278.04	76.48	12.16
2.41	6.29	16.71				
23	Chan	301.86	314.02	1278.04	76.48	12.16
2.41	6.29	16.71				
24	Chan	314.02	326.17	1278.04	76.48	12.16
2.41	6.29	16.71				
25	Chan	326.17	338.33	1278.04	76.48	12.16
2.41	6.29	16.71				
26	Chan	338.33	350.49	1278.04	76.48	12.16
2.41	6.29	16.71				
27	Chan	350.49	362.64	1274.17	76.34	12.16
2.40	6.28	16.69				
28	Chan	362.64	374.80	1267.01	76.09	12.16
2.39	6.26	16.65				
29	Chan	374.80	386.96	1259.86	75.83	12.16
2.38	6.24	16.61				
30	Chan	386.96	399.11	1252.73	75.57	12.16
2.36	6.22	16.58				
31	Chan	399.11	411.27	1245.62	75.31	12.16
2.35	6.20	16.54				
32	Chan	411.27	423.42	1238.53	75.06	12.16
2.34	6.17	16.50				
33	Chan	423.42	435.58	1231.45	74.80	12.16
2.32	6.15	16.46				
34	Chan	435.58	447.74	1222.62	74.48	12.16
2.31	6.13	16.42				
35	Chan	447.74	459.89	1211.79	74.08	12.16
2.29	6.09	16.36				
36	Chan	459.89	472.05	1201.00	73.68	12.16
2.27	6.06	16.30				
37	Chan	472.05	484.21	1190.25	73.29	12.16

2.25	6.03	16.24				
38	Chan	484.21	496.36	1179.54	72.89	12.16
2.23	6.00	16.18				
39	Chan	496.36	508.52	1168.86	72.49	12.16
2.21	5.96	16.12				
40	Chan	508.52	520.67	1158.23	72.10	12.16
2.19	5.93	16.06				
41	Chan	520.67	532.83	1122.63	70.76	12.16
2.12	5.82	15.86				
42	Chan	532.83	544.99	1053.69	68.12	12.16
1.99	5.60	15.47				
43	Chan	544.99	557.14	981.52	65.30	12.16
1.85	5.37	15.03				
44	Chan	557.14	569.30	689.67	53.75	12.70
1.30	4.42	12.83				
45	ROB	569.30	634.10	128.59	50.29	40.44
0.24	1.25	2.56				

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

SUMMARY OF MANNING'S N VALUES

River:San Luis Rey Riv

Reach	River Sta.	n1	n2	n3
Reach 1	6042	.04	.025	.05
Reach 1	5475	.04	.025	.05
Reach 1	4960	.04	.025	.05
Reach 1	4412	.04	.025	.05
Reach 1	3787	.04	.025	.05
Reach 1	3305	.04	.025	.05
Reach 1	3089	.04	.025	.05
Reach 1	2839	.04	.025	.05
Reach 1	2748	.04	.025	.05
Reach 1	2500	Bridge		
Reach 1	2477	.04	.025	.04
Reach 1	2430	Bridge		
Reach 1	2424	.03	.025	.04
Reach 1	2220	.03	.025	.04
Reach 1	1829	.03	.025	.04
Reach 1	1622	.03	.025	.04
Reach 1	1475	.03	.025	.04
Reach 1	1207	.03	.025	.04
Reach 1	1200	Bridge		
Reach 1	1182	.03	.018	.04
Reach 1	844	.03	.018	.04
Reach 1	800	Bridge		
Reach 1	761	.03	.018	.04
Reach 1	619	.03	.018	.04
Reach 1	264	.03	.018	.04
Reach 1	102	.018	.018	.04
Reach 1	0	.018	.018	.04

SUMMARY OF REACH LENGTHS

River: San Luis Rey Riv

Reach	River Sta.	Left	Channel	Right
Reach 1	6042	531.5	566.5	629.4
Reach 1	5475	579	515.3	478.7
Reach 1	4960	382.1	548.1	630.3
Reach 1	4412	617.2	624.6	463
Reach 1	3787	478	483.1	500.6
Reach 1	3305	210.5	214.6	221.9
Reach 1	3089	285.7	250.5	194.1
Reach 1	2839	145.6	90.9	65.5
Reach 1	2748	271.2	271	268.4
Reach 1	2500	Bridge		
Reach 1	2477	115	53.3	94.9
Reach 1	2430	Bridge		
Reach 1	2424	132.5	204	231.1
Reach 1	2220	343.8	389.9	420.4
Reach 1	1829	209.9	206.9	213.2
Reach 1	1622	171.5	147.6	151.2
Reach 1	1475	400.7	263.3	141.7
Reach 1	1207	30.4	30.2	32.6
Reach 1	1200	Bridge		
Reach 1	1182	153	337.7	510.2
Reach 1	844	81.3	83	80.5
Reach 1	800	Bridge		
Reach 1	761	188.3	141.9	103.8
Reach 1	619	368.9	355.9	348
Reach 1	264	160.2	161.3	162.2
Reach 1	102	100	100	100
Reach 1	0			

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: San Luis Rey Riv

Reach	River Sta.	Contr.	Expan.
Reach 1	6042	.1	.3
Reach 1	5475	.1	.3
Reach 1	4960	.1	.3
Reach 1	4412	.1	.3
Reach 1	3787	.1	.3
Reach 1	3305	.1	.3
Reach 1	3089	.1	.3
Reach 1	2839	.1	.3
Reach 1	2748	.1	.3
Reach 1	2500	Bridge	
Reach 1	2477	.1	.3
Reach 1	2430	Bridge	
Reach 1	2424	.1	.3
Reach 1	2220	.1	.3
Reach 1	1829	.1	.3
Reach 1	1622	.1	.3
Reach 1	1475	.1	.3
Reach 1	1207	.1	.3
Reach 1	1200	Bridge	
Reach 1	1182	.1	.3

Reach 1	844		.1	.3
Reach 1	800	Bridge		
Reach 1	761		.1	.3
Reach 1	619		.1	.3
Reach 1	264		.1	.3
Reach 1	102		.1	.3
Reach 1	0		.1	.3

Profile Output Table - Standard Table 1

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.
E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl	
			(cfs)	(ft)	(ft)	(ft)
(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)		
Reach 1	6042	100-yr	53000.00	6.70	24.68	19.14
26.12	0.000765	10.59	6374.05	486.28	0.46	
Reach 1	5475	100-yr	53000.00	6.20	24.15	19.50
25.66	0.000861	10.56	6170.08	535.67	0.48	
Reach 1	4960	100-yr	53000.00	6.70	22.30	20.53
24.90	0.001900	13.89	4748.18	512.64	0.69	
Reach 1	4412	100-yr	53000.00	6.60	22.52	17.82
23.87	0.000873	9.86	6303.02	559.53	0.48	
Reach 1	3787	100-yr	53000.00	4.90	21.48	16.78
23.24	0.001078	11.45	5813.06	475.00	0.53	
Reach 1	3305	100-yr	53000.00	4.90	20.71	16.68
22.64	0.001351	12.74	5784.57	470.30	0.60	
Reach 1	3089	100-yr	53000.00	4.70	20.99	14.93
22.24	0.000650	9.29	6440.09	489.37	0.42	
Reach 1	2839	100-yr	53000.00	4.50	19.10	16.76
21.83	0.001891	13.54	4279.87	421.34	0.69	
Reach 1	2748	100-yr	53000.00	4.50	19.44	16.11
21.47	0.001428	11.46	4725.38	436.13	0.59	
Reach 1	2500		Bridge			
Reach 1	2477	100-yr	53000.00	4.40	18.82	16.09
20.62	0.001360	11.83	5844.76	634.10	0.59	
Reach 1	2430		Bridge			
Reach 1	2424	100-yr	53000.00	4.40	19.09	15.46
20.35	0.000891	10.00	6628.63	683.93	0.48	
Reach 1	2220	100-yr	53000.00	4.40	17.55	15.62
19.99	0.001852	13.14	4632.48	545.00	0.68	
Reach 1	1829	100-yr	53000.00	3.90	15.13	15.13
18.88	0.003609	16.73	3881.12	519.75	0.92	
Reach 1	1622	100-yr	53000.00	3.30	14.52	14.25
17.69	0.003195	16.31	4429.03	594.28	0.88	
Reach 1	1475	100-yr	53000.00	3.20	15.11	13.02
16.95	0.001662	11.46	5319.23	647.66	0.63	
Reach 1	1207	100-yr	53000.00	2.90	15.29	11.75
16.43	0.000966	9.03	6341.82	662.38	0.48	
Reach 1	1200		Bridge			
Reach 1	1182	100-yr	53000.00	2.90	13.90	12.16
15.95	0.001096	12.16	5344.75	654.58	0.70	
Reach 1	844	100-yr	53000.00	2.90	13.51	11.76
15.57	0.001076	11.79	4678.49	558.32	0.69	
Reach 1	800		Bridge			
Reach 1	761	100-yr	53000.00	2.86	10.61	11.49

15.00	0.003513	17.28	3227.87	549.65	1.18	
Reach 1	619	100-yr	53000.00	2.89	9.91	10.85
14.49	0.003639	17.45	3144.90	527.34	1.20	
Reach 1	264	100-yr	53000.00	2.20	10.64	9.66
13.27	0.001614	13.02	4072.06	523.42	0.82	
Reach 1	102	100-yr	53000.00	2.20	9.44	9.44
12.87	0.002485	14.86	3573.70	524.89	1.00	
Reach 1	0	100-yr	53000.00	2.20	8.49	9.17
12.52	0.003544	16.24	3340.47	598.35	1.17	

ERRORS WARNINGS AND NOTES
Errors Warnings and Notes for Plan : SLR_Existing

River: San Luis Rey Riv Reach: Reach 1 RS: 5475 Profile: 100-yr
  Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
  Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
  This may indicate the need for additional cross sections.
River: San Luis Rey Riv Reach: Reach 1 RS: 4960 Profile: 100-yr
  Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
  Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
  This may indicate the need for additional cross sections.
  Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate
  the need for additional cross sections.
River: San Luis Rey Riv Reach: Reach 1 RS: 3305 Profile: 100-yr
  Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
  Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
  This may indicate the need for additional cross sections.
River: San Luis Rey Riv Reach: Reach 1 RS: 3089 Profile: 100-yr
  Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
  Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
  This may indicate the need for additional cross sections.
River: San Luis Rey Riv Reach: Reach 1 RS: 2839 Profile: 100-yr
  Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
River: San Luis Rey Riv Reach: Reach 1 RS: 2748 Profile: 100-yr
  Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
River: San Luis Rey Riv Reach: Reach 1 RS: 2500 Profile: 100-yr Upstream
  Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
River: San Luis Rey Riv Reach: Reach 1 RS: 2430 Profile: 100-yr Upstream
  Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
River: San Luis Rey Riv Reach: Reach 1 RS: 2424 Profile: 100-yr
  Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
  Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
  This may indicate the need for additional cross sections.
River: San Luis Rey Riv Reach: Reach 1 RS: 2220 Profile: 100-yr

Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate
the need for additional cross sections.
River: San Luis Rey Riv Reach: Reach 1 RS: 1829 Profile: 100-yr
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate
the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The
program defaulted to critical depth.
River: San Luis Rey Riv Reach: Reach 1 RS: 1622 Profile: 100-yr
Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
River: San Luis Rey Riv Reach: Reach 1 RS: 1475 Profile: 100-yr
Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
River: San Luis Rey Riv Reach: Reach 1 RS: 1200 Profile: 100-yr
Warning:For the final momentum answer at the bridge, the upstream energy was computed lower than the downstream energy. This
is not physically possible, the momentum answer has been disregarded.
River: San Luis Rey Riv Reach: Reach 1 RS: 1200 Profile: 100-yr Upstream
Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
River: San Luis Rey Riv Reach: Reach 1 RS: 1200 Profile: 100-yr Downstream
Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
River: San Luis Rey Riv Reach: Reach 1 RS: 844 Profile: 100-yr
Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
River: San Luis Rey Riv Reach: Reach 1 RS: 800 Profile: 100-yr
Warning:Pier drag coefficient of 2.0 assumed for Class B flow.
Warning:The momentum, Class B, supercritical, water surface downstream of the bridge had a higher energy than the upstream
cross section. This is not physically possible. The downstream water surface has been computed by taking the
momentum result inside of the bridge and performing an energy balance.
Note: The momentum method has computed a class B profile.
River: San Luis Rey Riv Reach: Reach 1 RS: 800 Profile: 100-yr Upstream
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
River: San Luis Rey Riv Reach: Reach 1 RS: 800 Profile: 100-yr Downstream
Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Note: The energy method has computed a class B profile.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
River: San Luis Rey Riv Reach: Reach 1 RS: 761 Profile: 100-yr

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

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

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

River: San Luis Rey Riv Reach: Reach 1 RS: 619 Profile: 100-yr

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

River: San Luis Rey Riv Reach: Reach 1 RS: 264 Profile: 100-yr

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

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

River: San Luis Rey Riv Reach: Reach 1 RS: 102 Profile: 100-yr

Warning:The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.

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

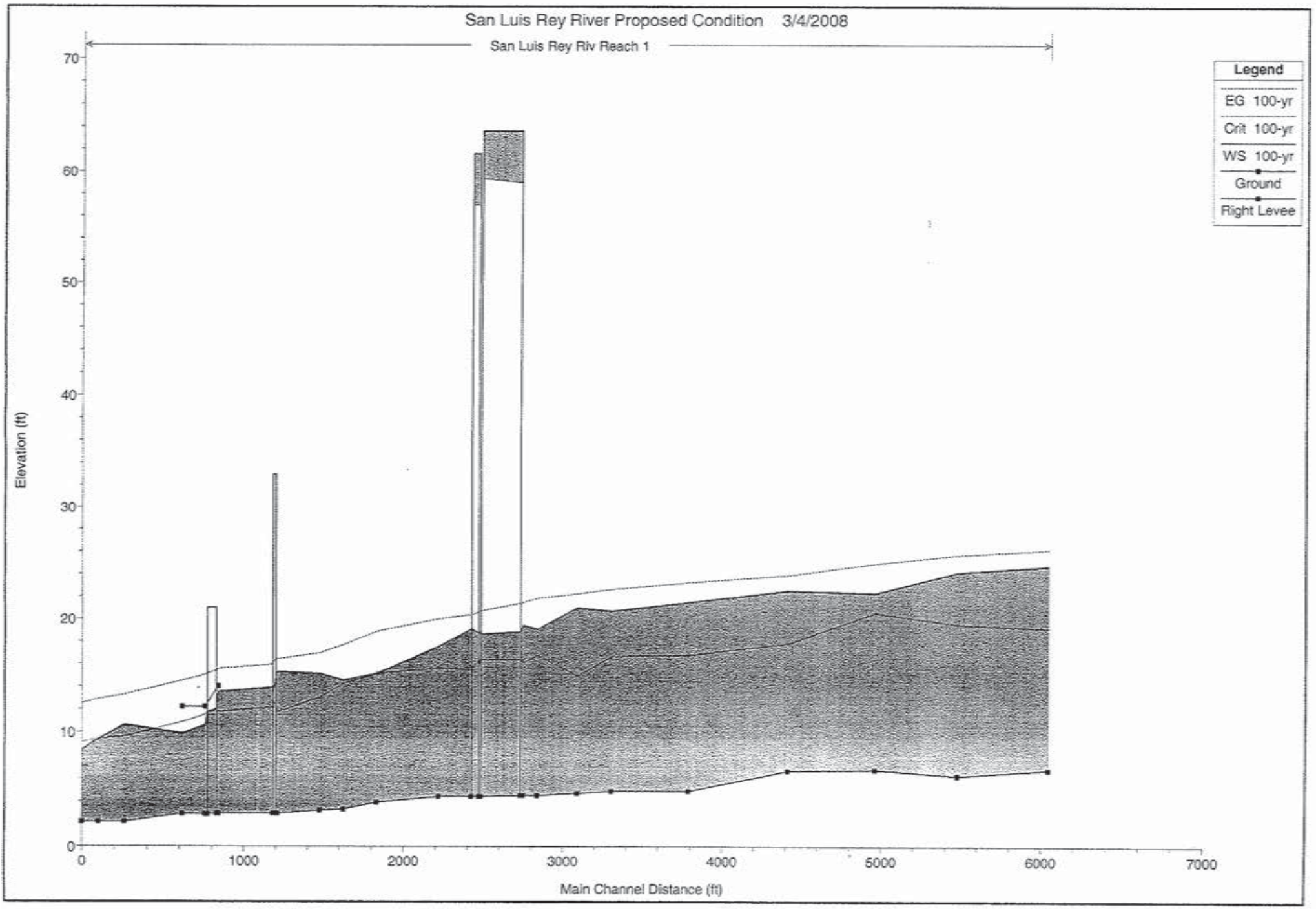
River: San Luis Rey Riv Reach: Reach 1 RS: 0 Profile: 100-yr

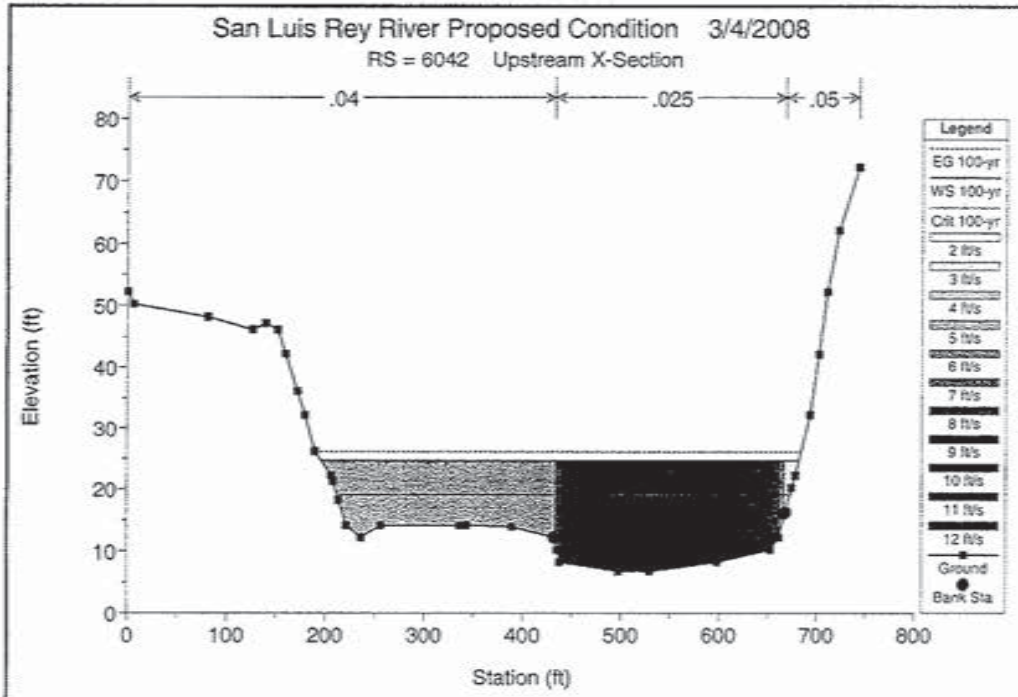
Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

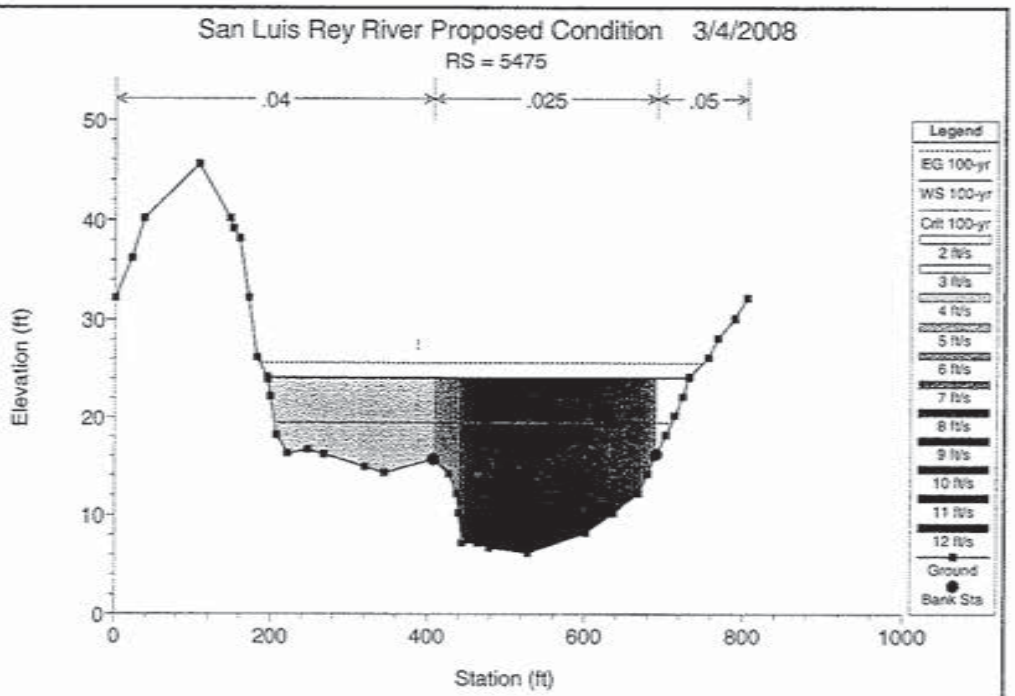
PROSPOSED

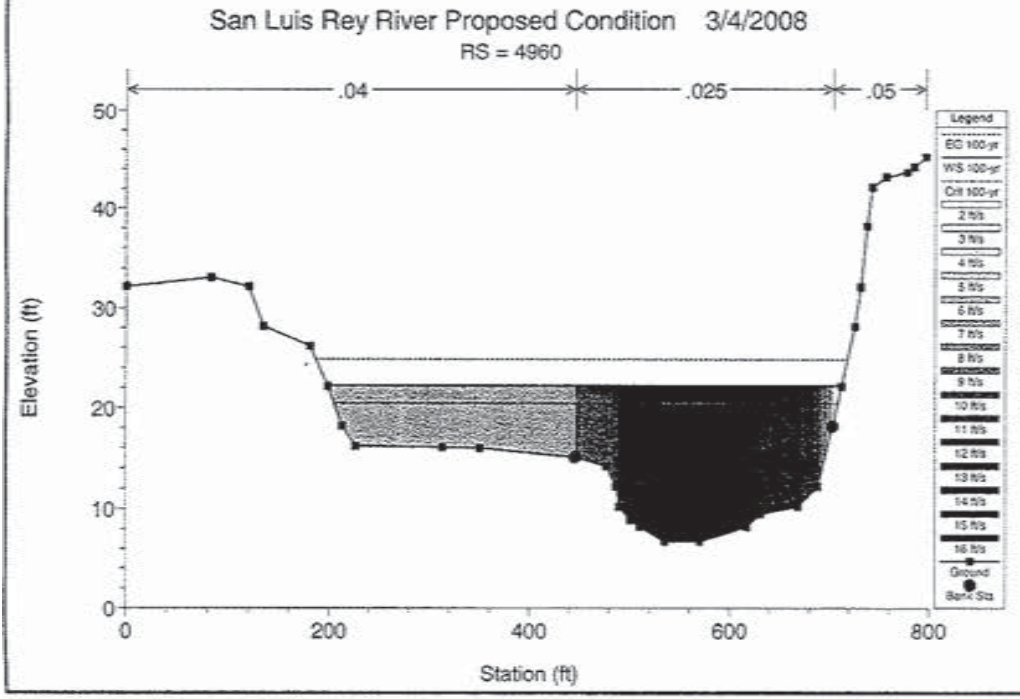
HEC-RAS Plan: SLR_Prop River: San Luis Rey Riv Reach: Reach 1 Profile: 100-yr

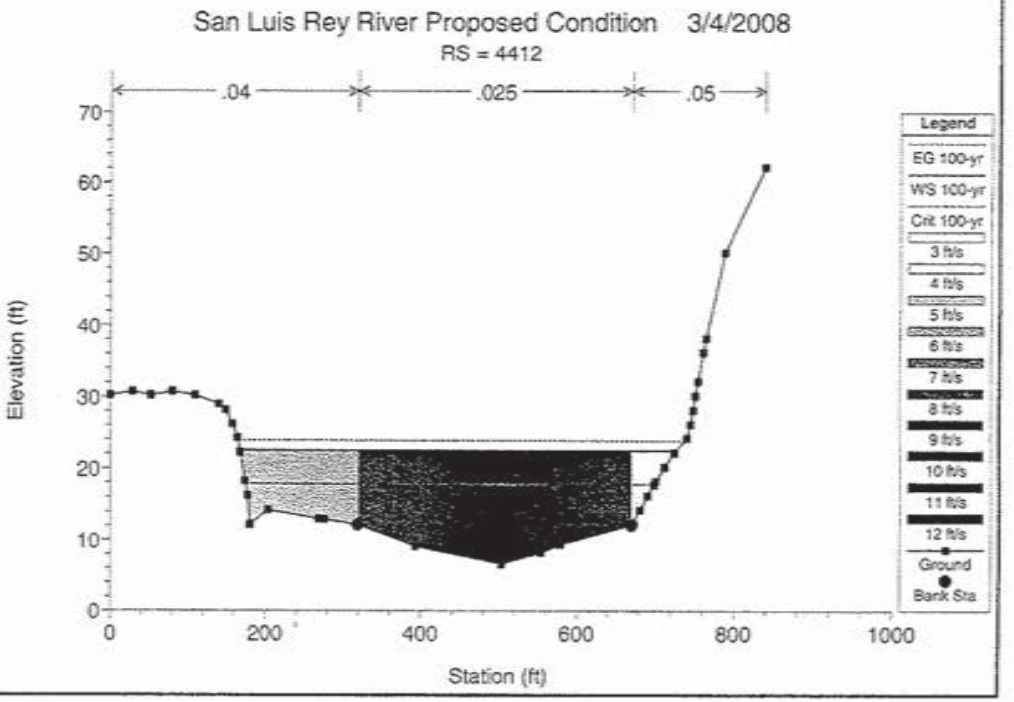
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Reach 1	6042	100-yr	53000.00	6.70	24.68	19.14	26.12	0.000765	10.59	6373.00	486.27	0.46
Reach 1	5475	100-yr	53000.00	6.20	24.14	19.50	25.65	0.000862	10.56	6168.66	535.65	0.48
Reach 1	4960	100-yr	53000.00	6.70	22.29	20.53	24.90	0.001904	13.90	4744.61	512.60	0.69
Reach 1	4412	100-yr	53000.00	6.60	22.51	17.82	23.87	0.000874	9.87	6299.34	559.47	0.48
Reach 1	3787	100-yr	53000.00	4.90	21.48	16.78	23.23	0.001080	11.46	5809.02	474.91	0.54
Reach 1	3305	100-yr	53000.00	4.90	20.70	16.68	22.63	0.001355	12.76	5779.18	470.27	0.60
Reach 1	3089	100-yr	53000.00	4.70	20.98	14.93	22.23	0.000652	9.30	6434.78	489.34	0.42
Reach 1	2839	100-yr	53000.00	4.50	19.07	16.76	21.82	0.001903	13.57	4270.55	421.23	0.69
Reach 1	2748	100-yr	53000.00	4.50	19.42	16.11	21.45	0.001437	11.48	4716.52	436.04	0.60
Reach 1	2500		Bridge									
Reach 1	2477	100-yr	53000.00	4.40	18.82	16.09	20.62	0.001360	11.83	5844.76	634.10	0.59
Reach 1	2430		Bridge									
Reach 1	2424	100-yr	53000.00	4.40	19.09	15.46	20.35	0.000891	10.00	6628.63	683.93	0.48
Reach 1	2220	100-yr	53000.00	4.40	17.55	15.62	19.99	0.001852	13.14	4632.48	545.00	0.68
Reach 1	1829	100-yr	53000.00	3.90	15.13	15.13	18.88	0.003609	16.73	3881.12	519.75	0.92
Reach 1	1622	100-yr	53000.00	3.30	14.52	14.25	17.69	0.003195	16.31	4429.03	594.28	0.88
Reach 1	1475	100-yr	53000.00	3.20	15.11	13.02	16.95	0.001662	11.46	5319.23	647.66	0.63
Reach 1	1207	100-yr	53000.00	2.90	15.29	11.75	16.43	0.000966	9.03	6341.82	662.38	0.48
Reach 1	1200		Bridge									
Reach 1	1182	100-yr	53000.00	2.90	13.90	12.16	15.95	0.001096	12.16	5344.75	654.58	0.70
Reach 1	844	100-yr	53000.00	2.90	13.51	11.76	15.57	0.001076	11.79	4678.49	558.32	0.69
Reach 1	800		Bridge									
Reach 1	761	100-yr	53000.00	2.86	10.61	11.49	15.00	0.003513	17.28	3227.87	549.65	1.18
Reach 1	619	100-yr	53000.00	2.89	9.91	10.85	14.49	0.003639	17.45	3144.90	527.34	1.20
Reach 1	264	100-yr	53000.00	2.20	10.64	9.66	13.27	0.001614	13.02	4072.06	523.42	0.82
Reach 1	102	100-yr	53000.00	2.20	9.44	9.44	12.87	0.002485	14.86	3573.70	524.89	1.00
Reach 1	0	100-yr	53000.00	2.20	8.49	9.17	12.52	0.003544	16.24	3340.47	598.35	1.17

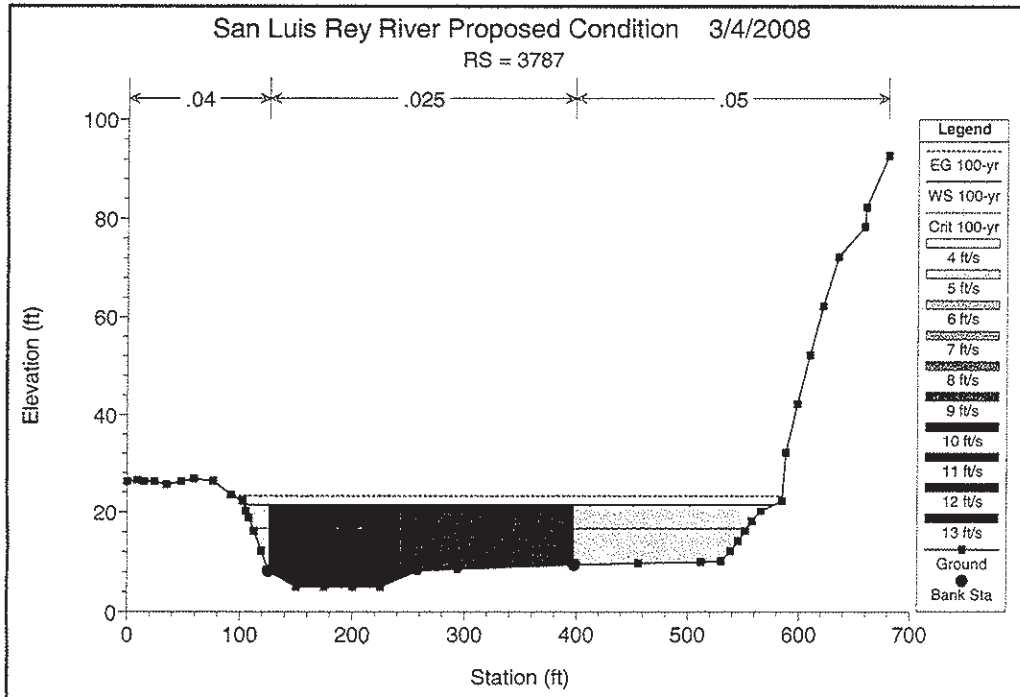

San Luis Rey River Proposed Condition 3/4/2008
San Luis Rey Riv Reach 1
Legend
EG 100-yr
Crit 100-yr
WS 100-yr
Ground
Right Levee
Elevation (ft)
70
60
50
40
30
20
10
0
0
1000
2000
3000
4000
5000
6000
7000
Main Channel Distance (ft)

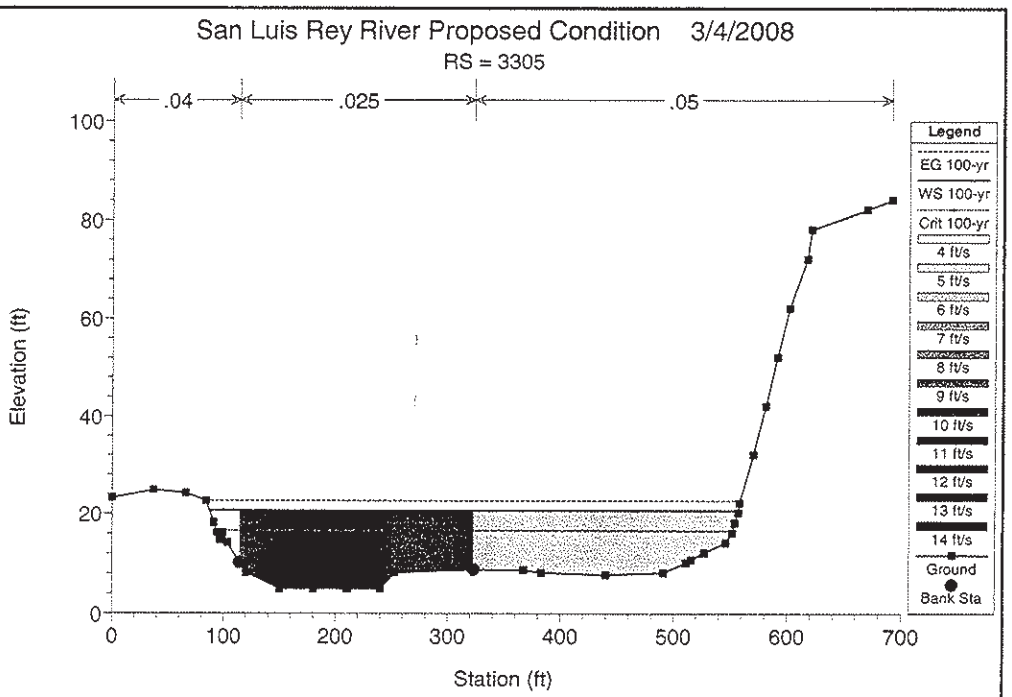

San Luis Rey River Proposed Condition 3/4/2008
RS = 6042 Upstream X-Section
.04
.025
.05
Elevation (ft)
Station (ft)
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
Ground
Bank Sta

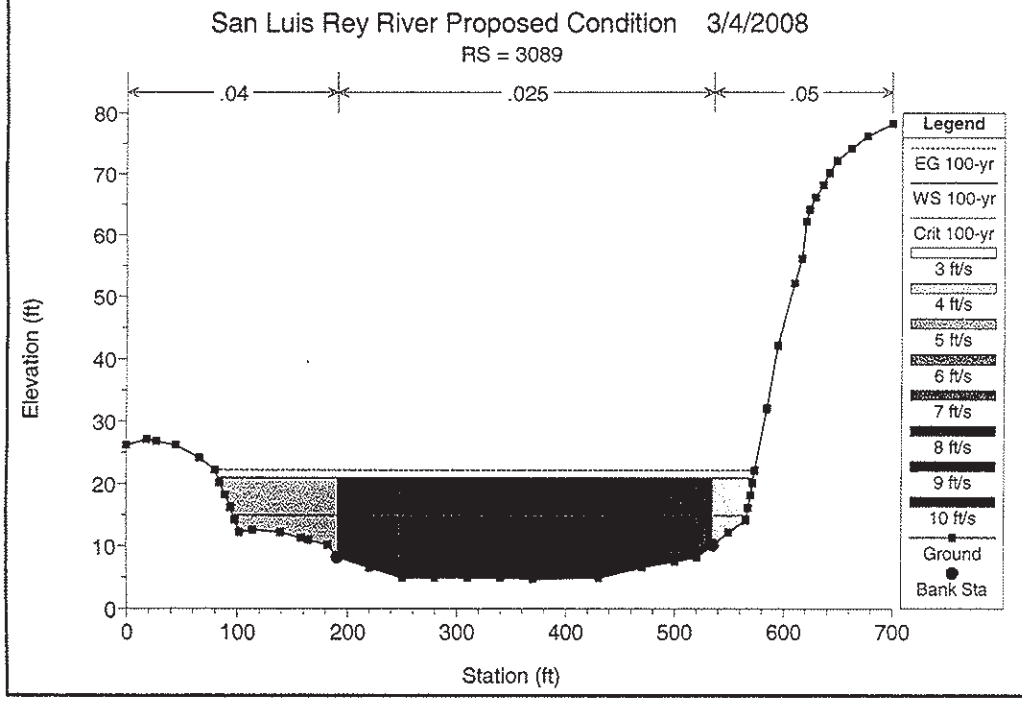

San Luis Rey River Proposed Condition 3/4/2008
RS = 5475
.04
.025
.05
Elevation (ft)
Station (ft)
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
Ground
Bank Sta

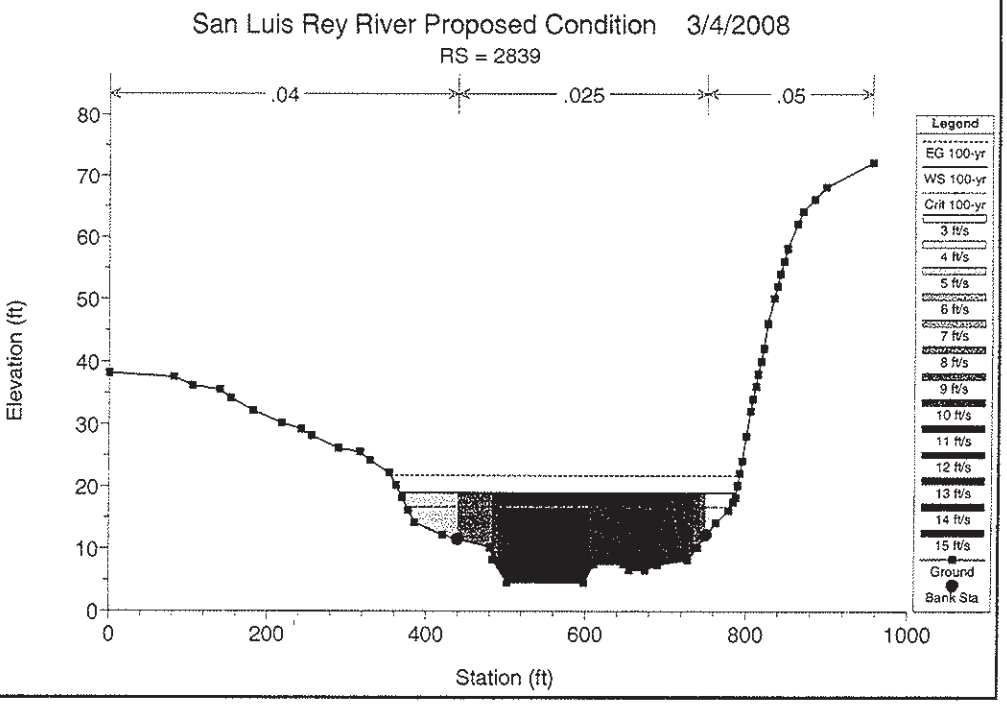

San Luis Rey River Proposed Condition 3/4/2008
RS = 4960
.04
.025
.05
Elevation (ft)
Station (ft)
Legend
Ground
Bank Sta

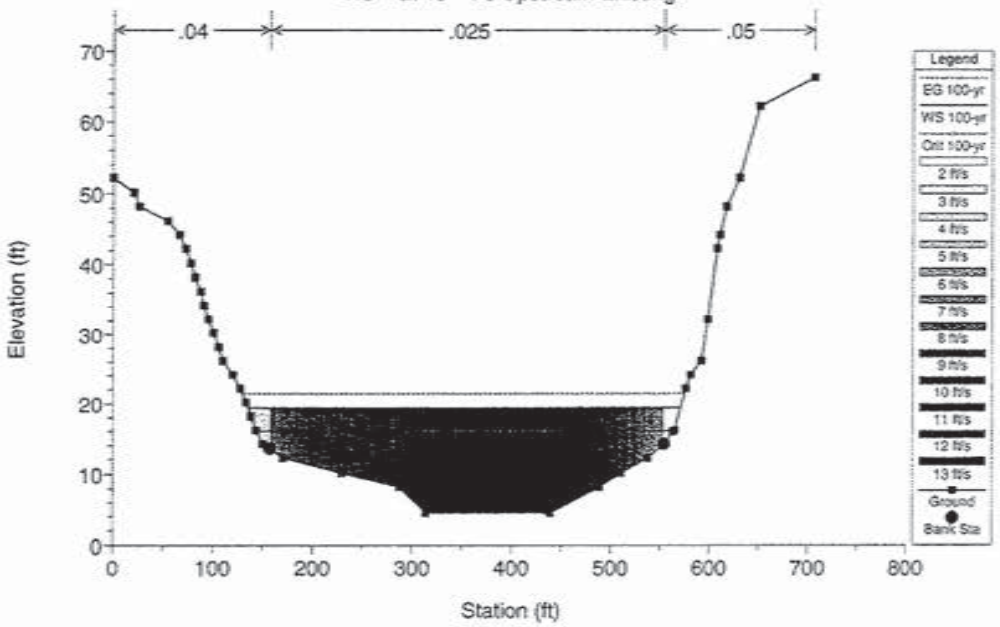

San Luis Rey River Proposed Condition 3/4/2008
RS = 4412
.04
.025
.05
Elevation (ft)
Station (ft)
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
Ground
Bank Sta

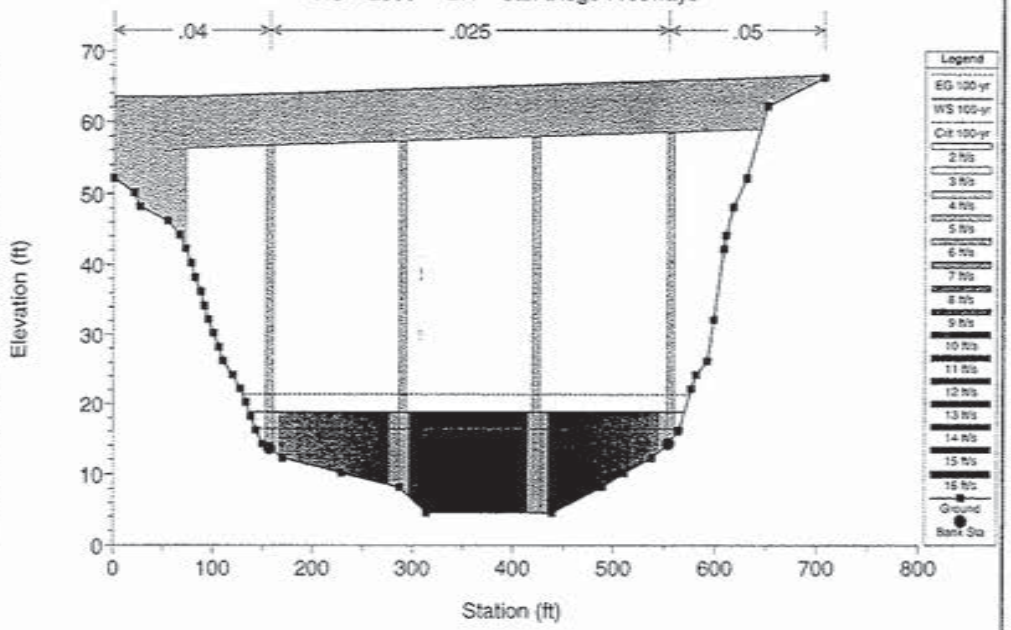

San Luis Rey River Proposed Condition 3/4/2008
RS = 3787
.04
.025
.05
Elevation (ft)
Station (ft)
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
4 ft/s
5 ft/s
6 ft/s
7 ft/s
8 ft/s
9 ft/s
10 ft/s
11 ft/s
12 ft/s
13 ft/s
Ground
Bank Sta

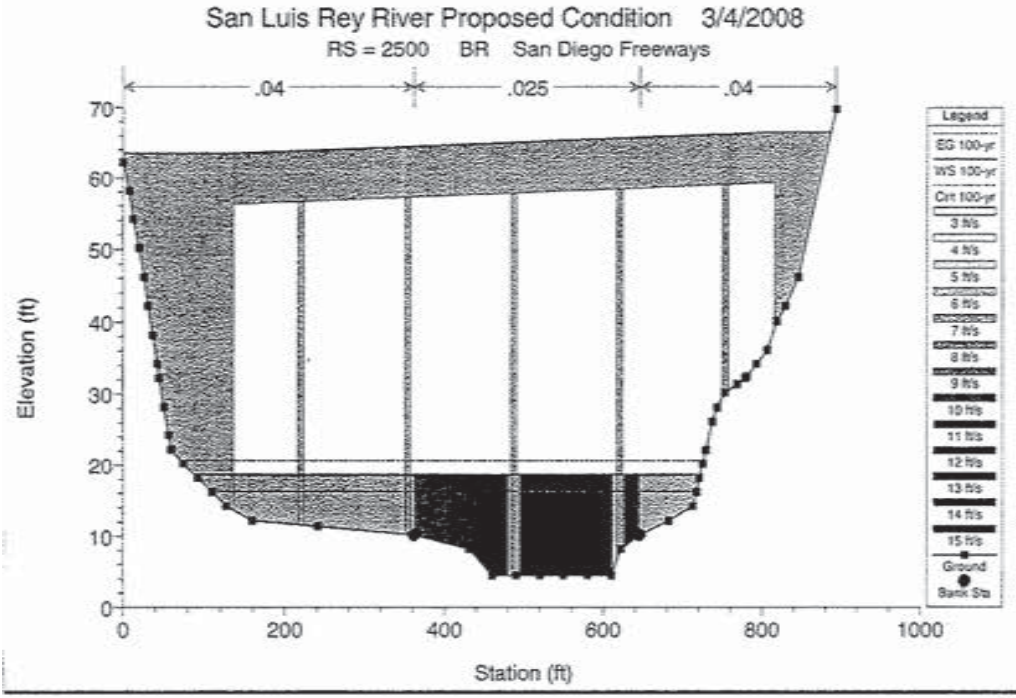

San Luis Rey River Proposed Condition 3/4/2008
RS = 3305
.04
.025
.05
Elevation (ft)
Station (ft)
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
4 ft/s
5 ft/s
6 ft/s
7 ft/s
8 ft/s
9 ft/s
10 ft/s
11 ft/s
12 ft/s
13 ft/s
14 ft/s
Ground
Bank Sta

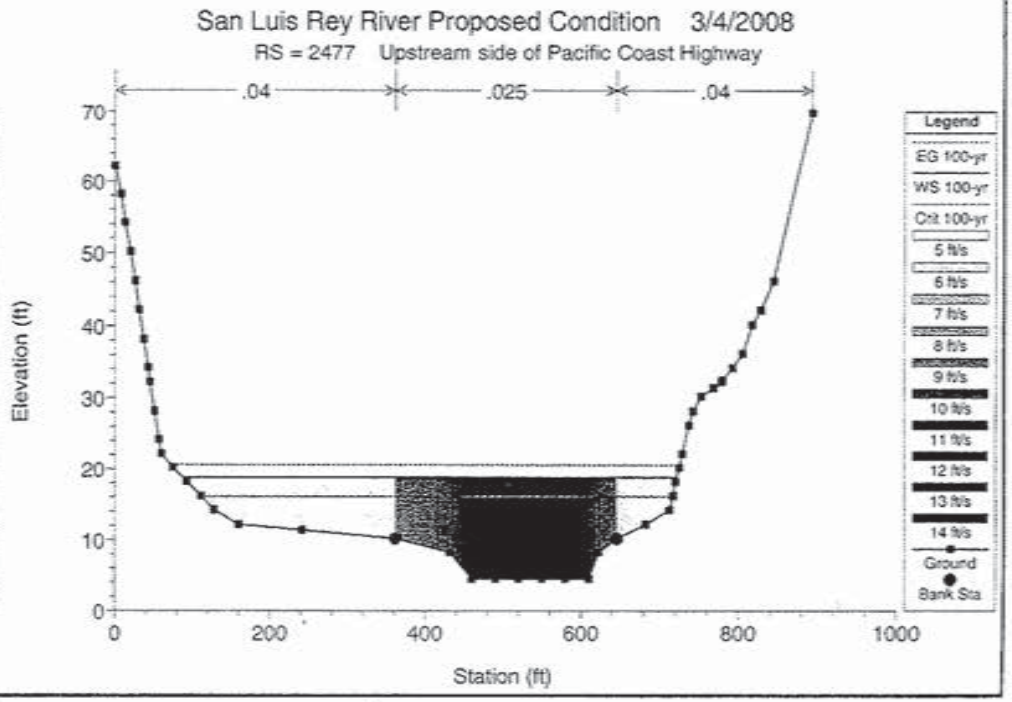

San Luis Rey River Proposed Condition 3/4/2008
RS = 3089
.04
.025
.05
Elevation (ft)
Station (ft)
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
3 ft/s
4 ft/s
5 ft/s
6 ft/s
7 ft/s
8 ft/s
9 ft/s
10 ft/s
Ground
Bank Sta

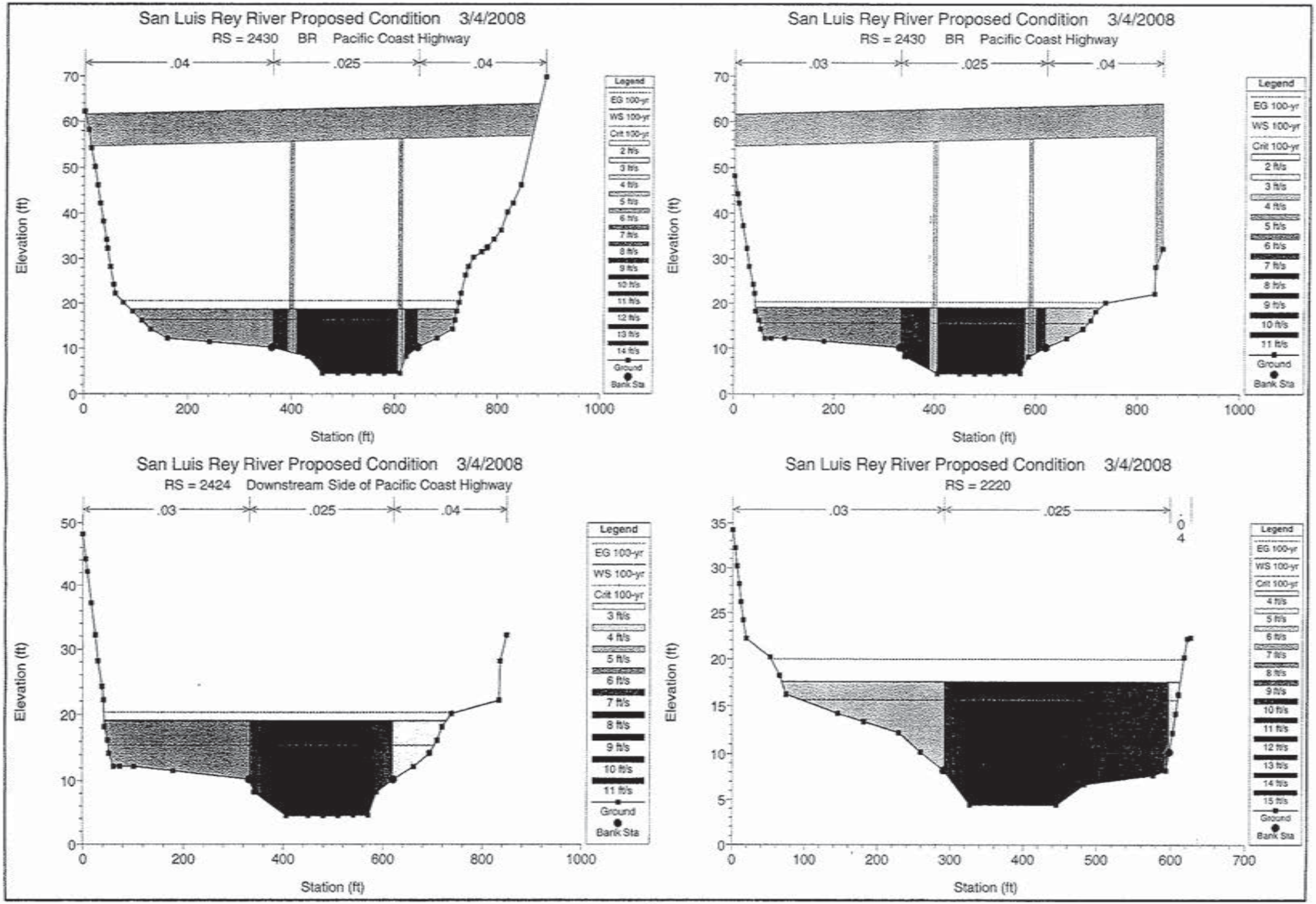

San Luis Rey River Proposed Condition 3/4/2008
RS = 2839
.04
.025
.05
Elevation (ft)
Station (ft)
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
3 ft/s
4 ft/s
5 ft/s
6 ft/s
7 ft/s
8 ft/s
9 ft/s
10 ft/s
11 ft/s
12 ft/s
13 ft/s
14 ft/s
15 ft/s
Ground
Bank Sta

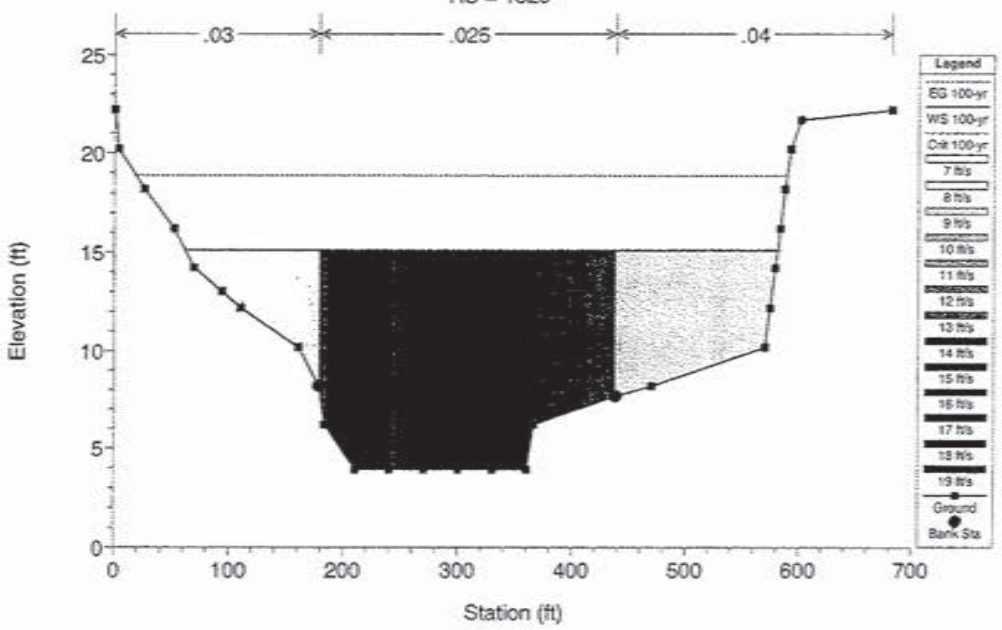

San Luis Rey River Proposed Condition 3/4/2008
RS = 2748 I-5 Upstream Existing
.04
.025
.05
Elevation (ft)
Station (ft)
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
Ground
Bank Sta

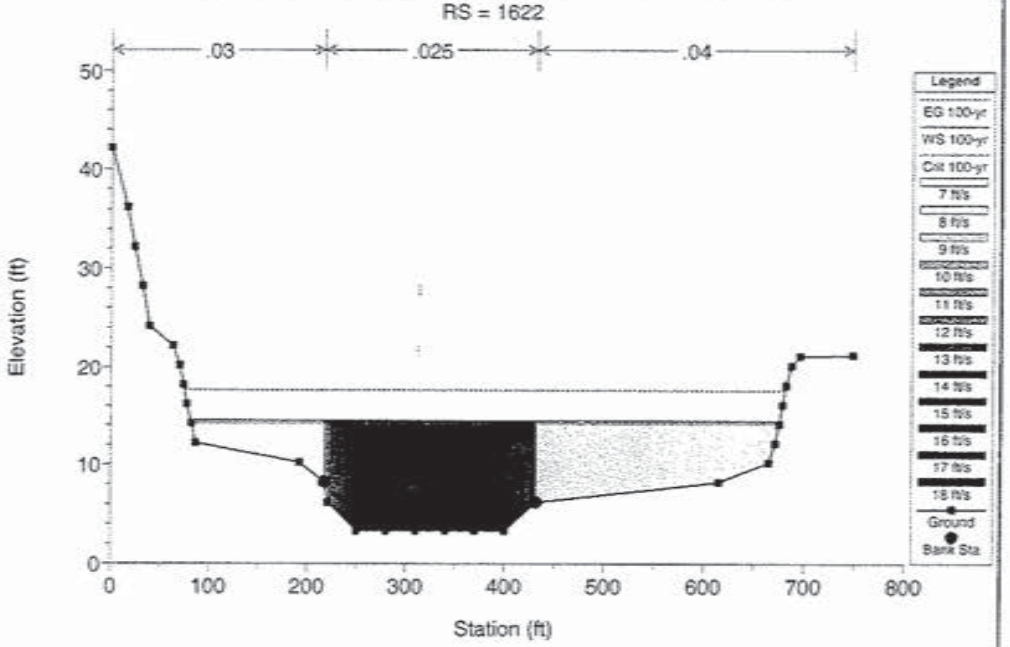

San Luis Rey River Proposed Condition 3/4/2008
RS = 2500 BR San Diego Freeways
.04
.025
.05
Elevation (ft)
Station (ft)
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
Ground
Bank Sta

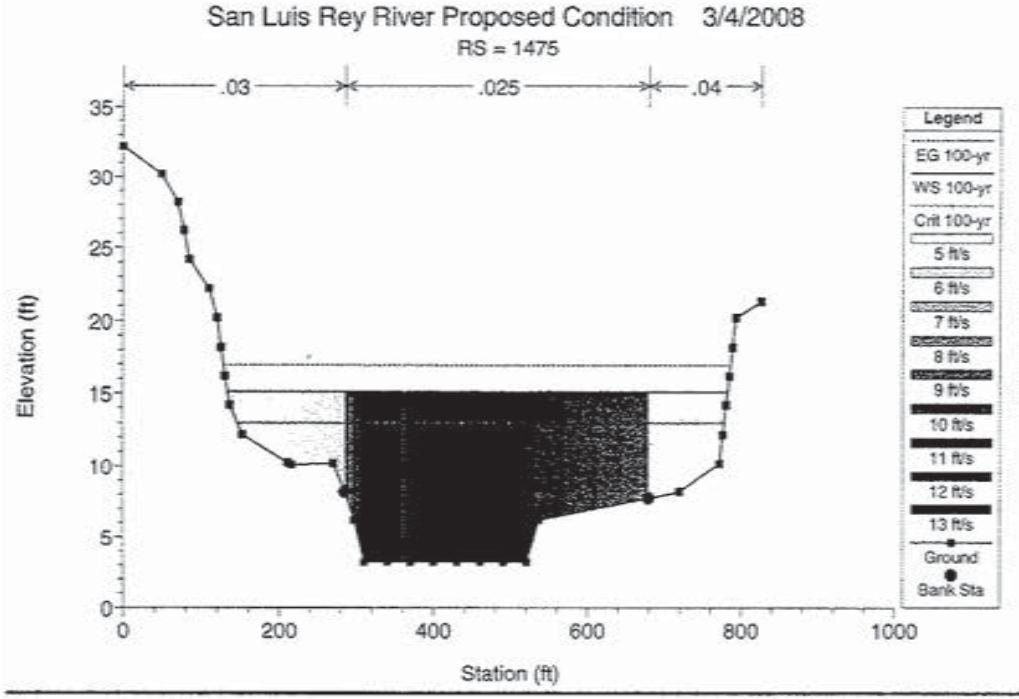

San Luis Rey River Proposed Condition 3/4/2008
RS = 2500 BR San Diego Freeways
.04
.025
.04
Elevation (ft)
Station (ft)
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
Ground
Bank Sta

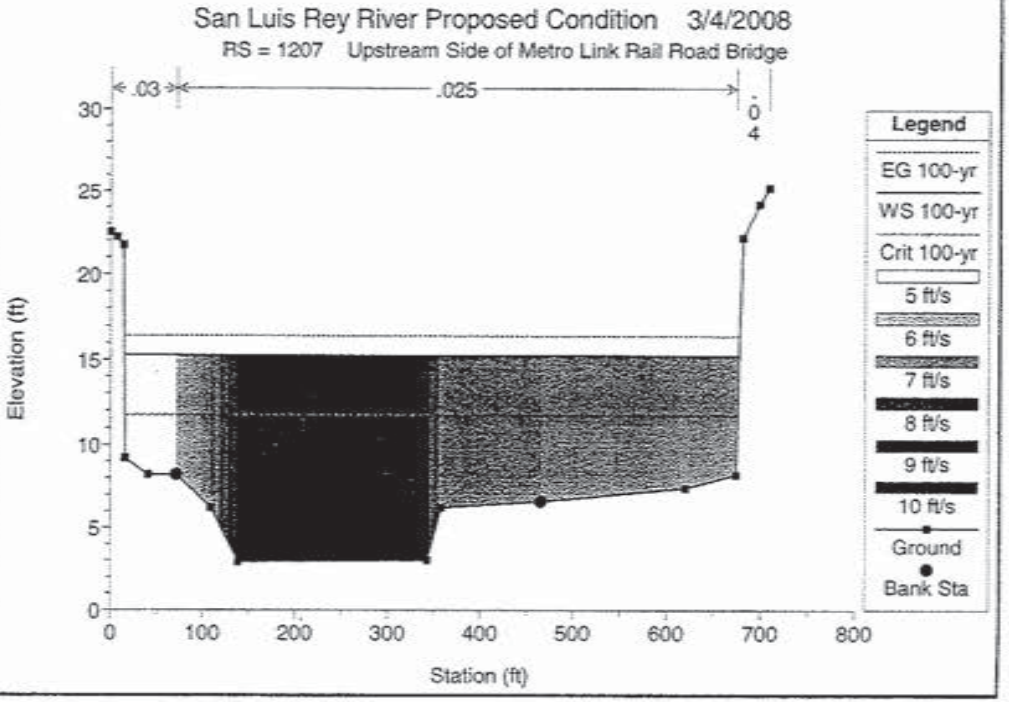

San Luis Rey River Proposed Condition 3/4/2008
RS = 2477 Upstream side of Pacific Coast Highway
.04
.025
.04
Elevation (ft)
Station (ft)
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
Ground
Bank Sta

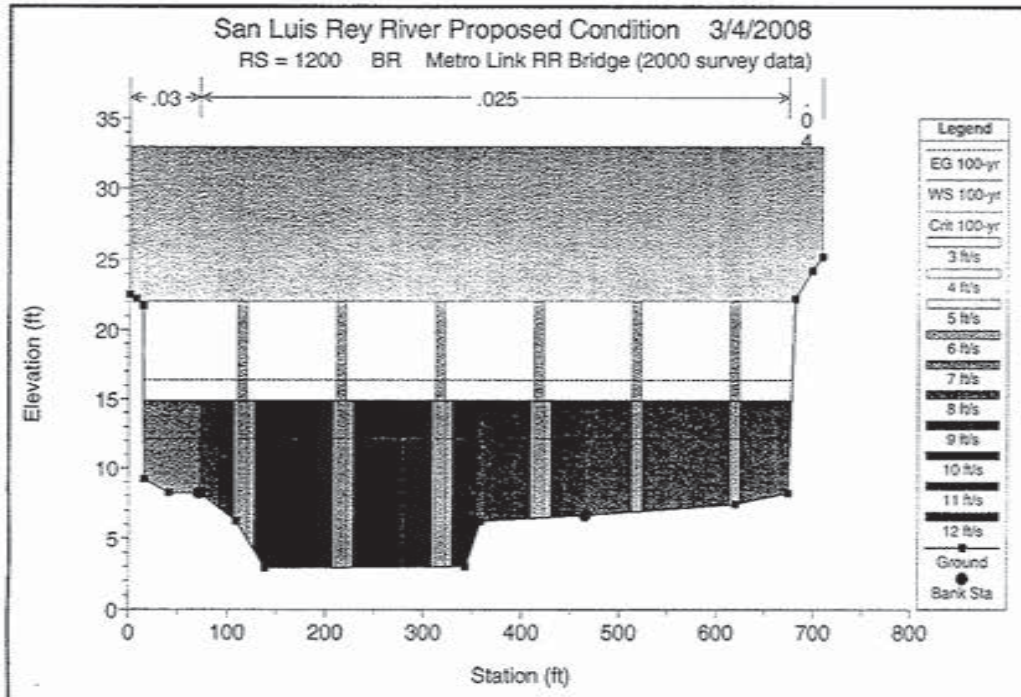

San Luis Rey River Proposed Condition 3/4/2008
RS = 2430 BR Pacific Coast Highway
.04
.025
.04
Elevation (ft)
Station (ft)
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
2 ft/s
3 ft/s
4 ft/s
5 ft/s
6 ft/s
7 ft/s
8 ft/s
9 ft/s
10 ft/s
11 ft/s
12 ft/s
13 ft/s
14 ft/s
Ground
Bank Sta
San Luis Rey River Proposed Condition 3/4/2008
RS = 2430 BR Pacific Coast Highway
.03
.025
.04
Elevation (ft)
Station (ft)
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
2 ft/s
3 ft/s
4 ft/s
5 ft/s
6 ft/s
7 ft/s
8 ft/s
9 ft/s
10 ft/s
11 ft/s
Ground
Bank Sta
San Luis Rey River Proposed Condition 3/4/2008
RS = 2424 Downstream Side of Pacific Coast Highway
.03
.025
.04
Elevation (ft)
Station (ft)
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
3 ft/s
4 ft/s
5 ft/s
6 ft/s
7 ft/s
8 ft/s
9 ft/s
10 ft/s
11 ft/s
Ground
Bank Sta
San Luis Rey River Proposed Condition 3/4/2008
RS = 2220
.03
.025
Elevation (ft)
Station (ft)
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
4 ft/s
5 ft/s
6 ft/s
7 ft/s
8 ft/s
9 ft/s
10 ft/s
11 ft/s
12 ft/s
13 ft/s
14 ft/s
15 ft/s
Ground
Bank Sta

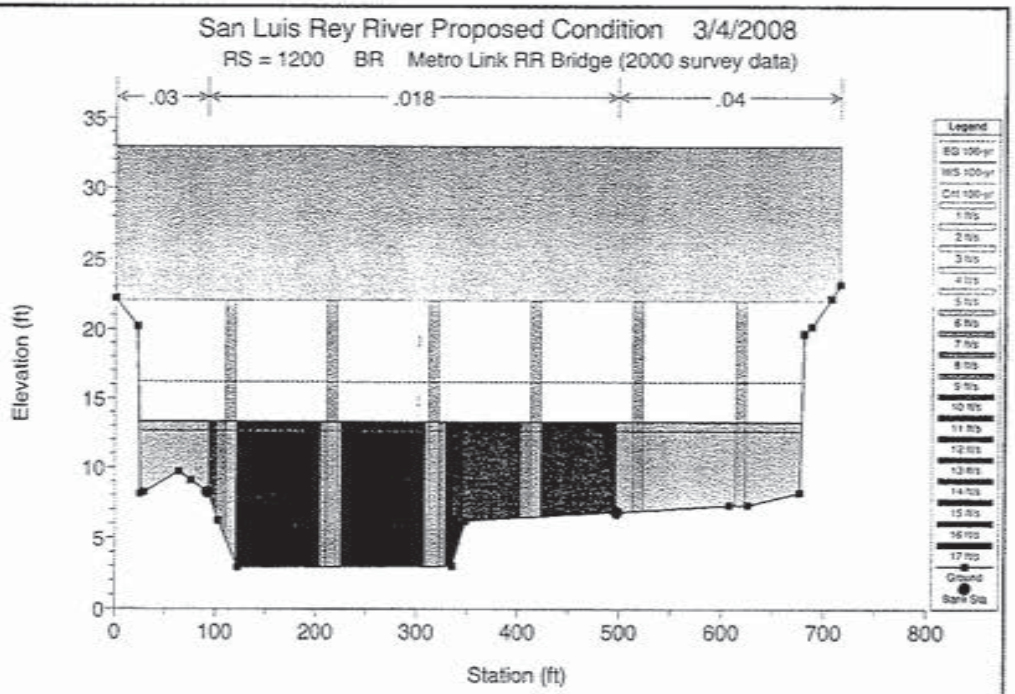

San Luis Rey River Proposed Condition 3/4/2008
RS = 1829
.03
.025
.04
Elevation (ft)
Station (ft)
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
7 ft/s
8 ft/s
9 ft/s
10 ft/s
11 ft/s
12 ft/s
13 ft/s
14 ft/s
15 ft/s
16 ft/s
17 ft/s
18 ft/s
19 ft/s
Ground
Bank Sta

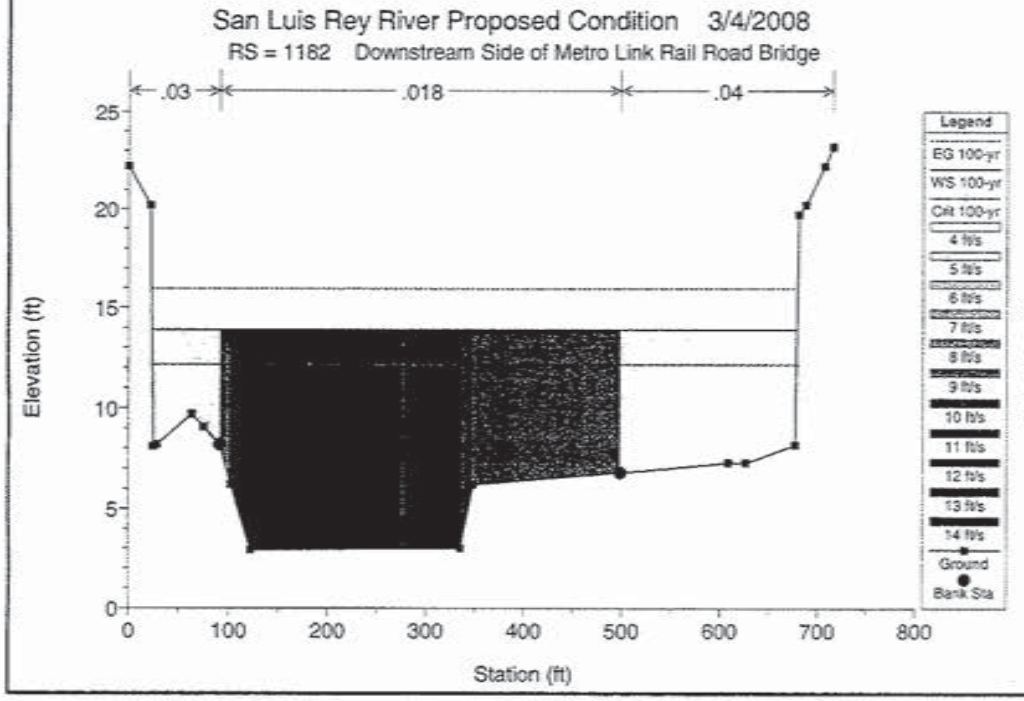

San Luis Rey River Proposed Condition 3/4/2008
RS = 1622
.03
.025
.04
Elevation (ft)
Station (ft)
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
7 ft/s
8 ft/s
9 ft/s
10 ft/s
11 ft/s
12 ft/s
13 ft/s
14 ft/s
15 ft/s
16 ft/s
17 ft/s
18 ft/s
Ground
Bank Sta

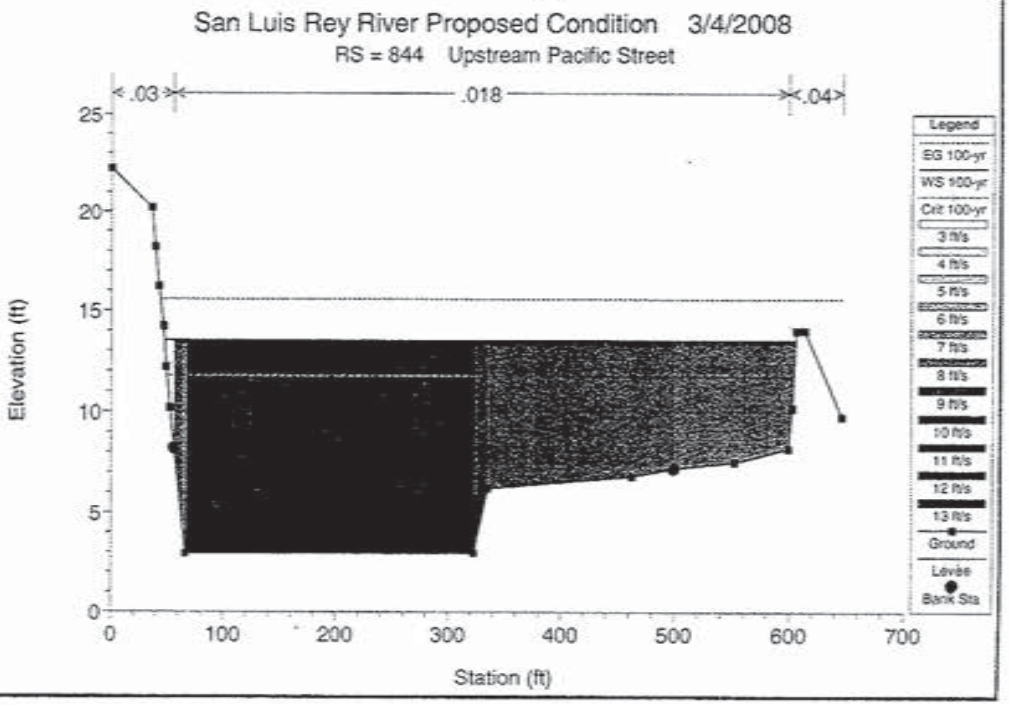

San Luis Rey River Proposed Condition 3/4/2008
RS = 1475
.03
.025
.04
Elevation (ft)
Station (ft)
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
5 ft/s
6 ft/s
7 ft/s
8 ft/s
9 ft/s
10 ft/s
11 ft/s
12 ft/s
13 ft/s
Ground
Bank Sta

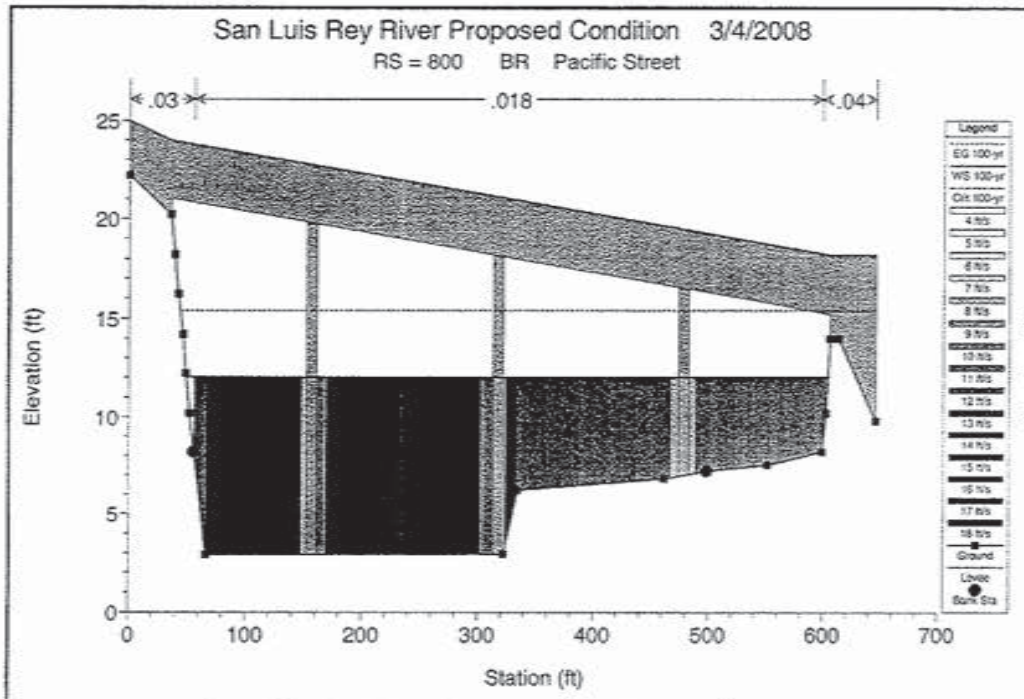

San Luis Rey River Proposed Condition 3/4/2008
RS = 1207 Upstream Side of Metro Link Rail Road Bridge
.03
.025
.04
Elevation (ft)
Station (ft)
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
5 ft/s
6 ft/s
7 ft/s
8 ft/s
9 ft/s
10 ft/s
Ground
Bank Sta

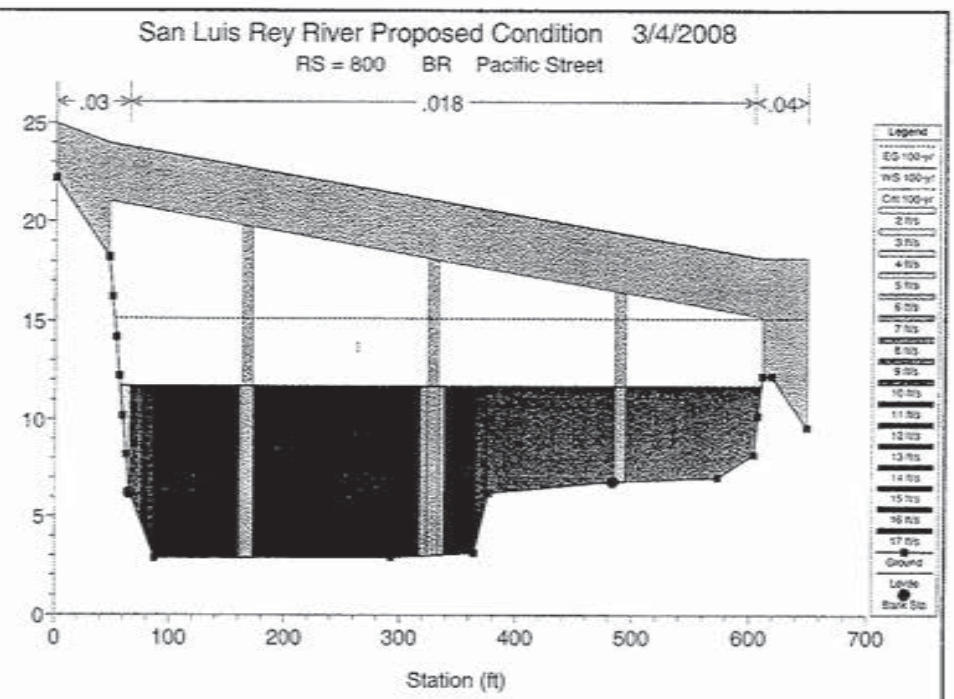

San Luis Rey River Proposed Condition 3/4/2008
RS = 1200 BR Metro Link RR Bridge (2000 survey data)
.03
.025
Elevation (ft)
Station (ft)
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
Ground
Bank Sta

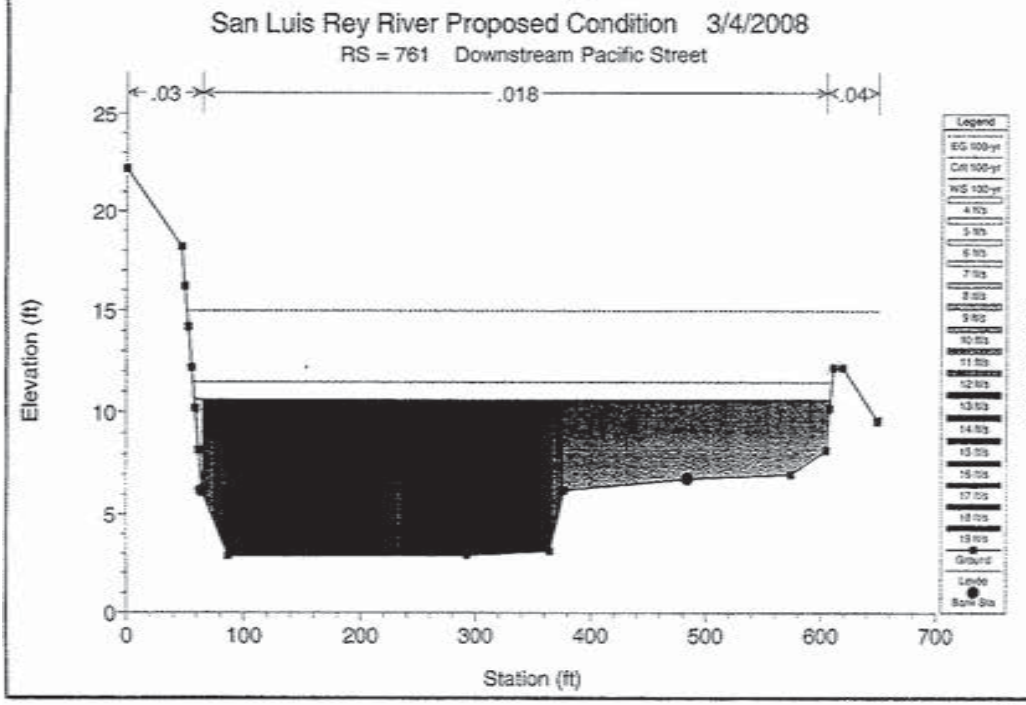

San Luis Rey River Proposed Condition 3/4/2008
RS = 1200 BR Metro Link RR Bridge (2000 survey data)
.03
.018
.04
Elevation (ft)
Station (ft)
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
Ground
Bank Sta

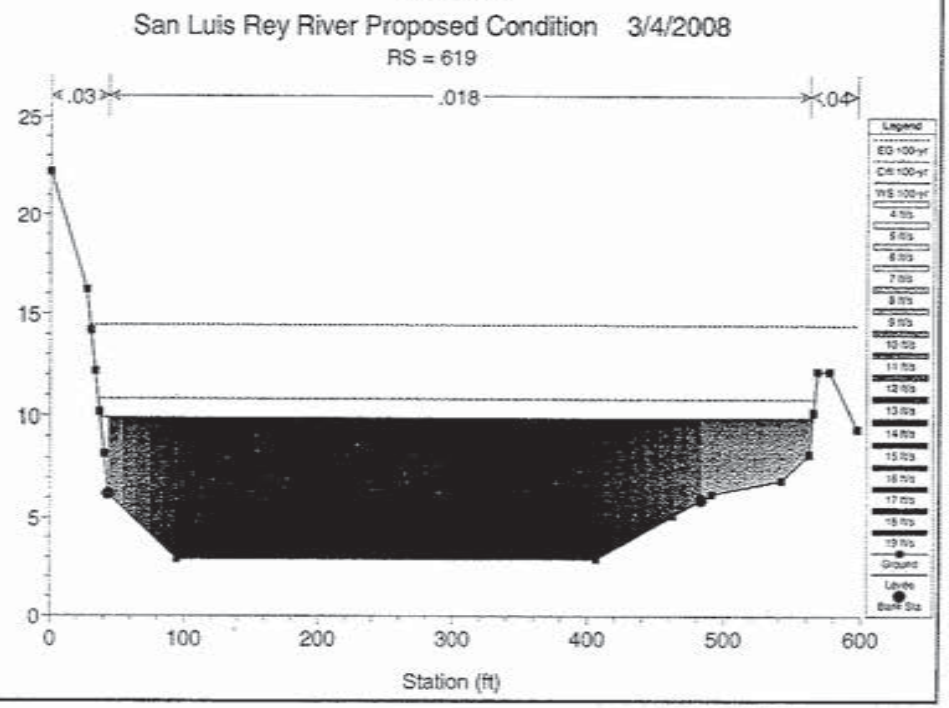

San Luis Rey River Proposed Condition 3/4/2008
RS = 1182 Downstream Side of Metro Link Rail Road Bridge
.03
.018
.04
Elevation (ft)
Station (ft)
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
Ground
Bank Sta

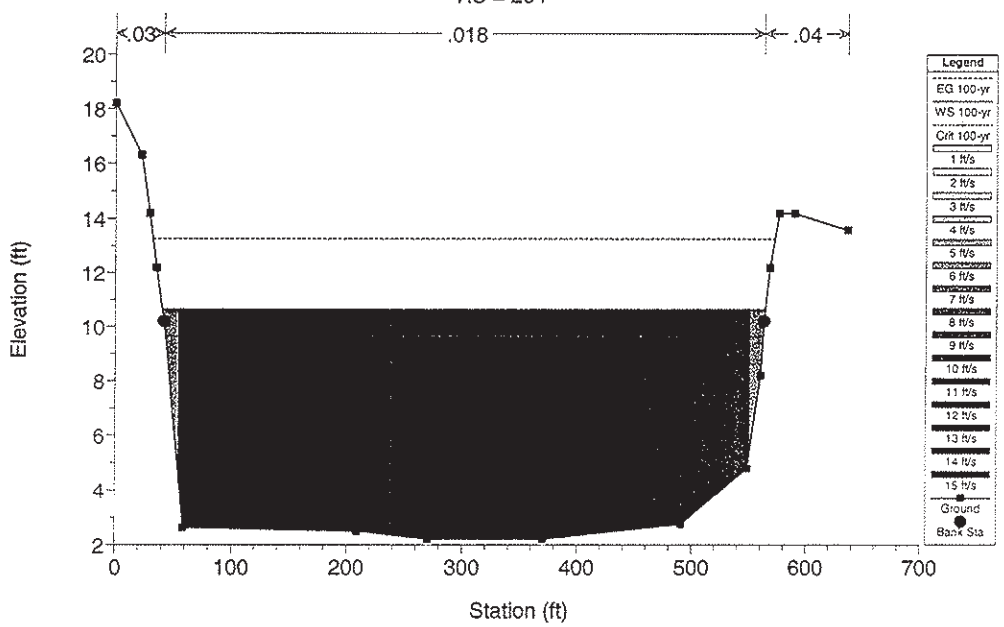

San Luis Rey River Proposed Condition 3/4/2008
RS = 844 Upstream Pacific Street
.03
.018
.04
Elevation (ft)
Station (ft)
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
Ground
Levee
Bank Sta

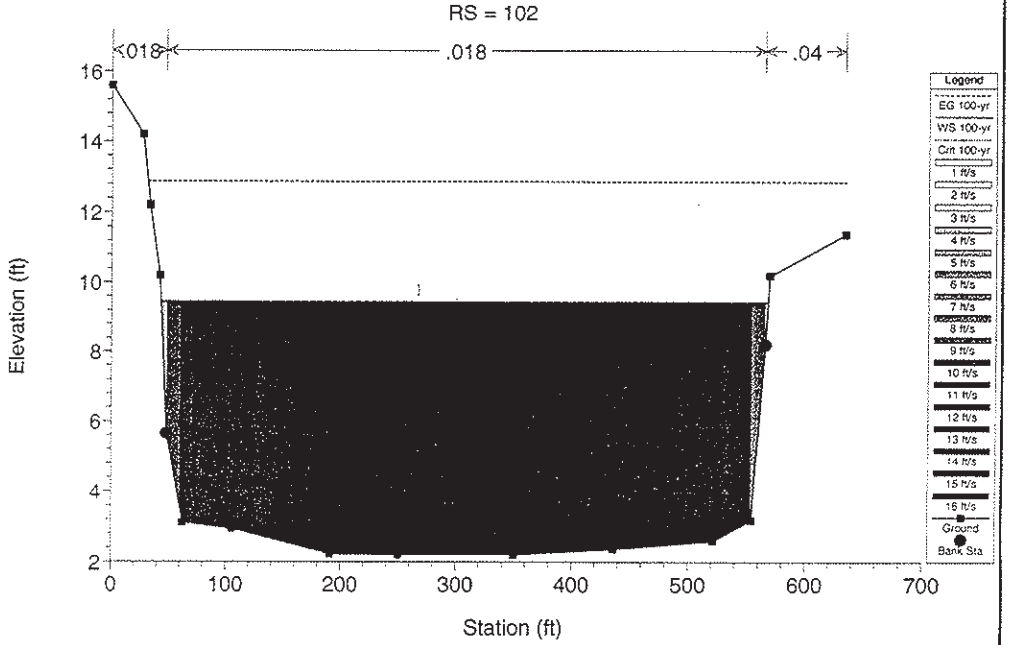

San Luis Rey River Proposed Condition 3/4/2008
RS = 800 BR Pacific Street
.03
.018
.04
Elevation (ft)
Station (ft)
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
Ground
Levee
Bank Sta

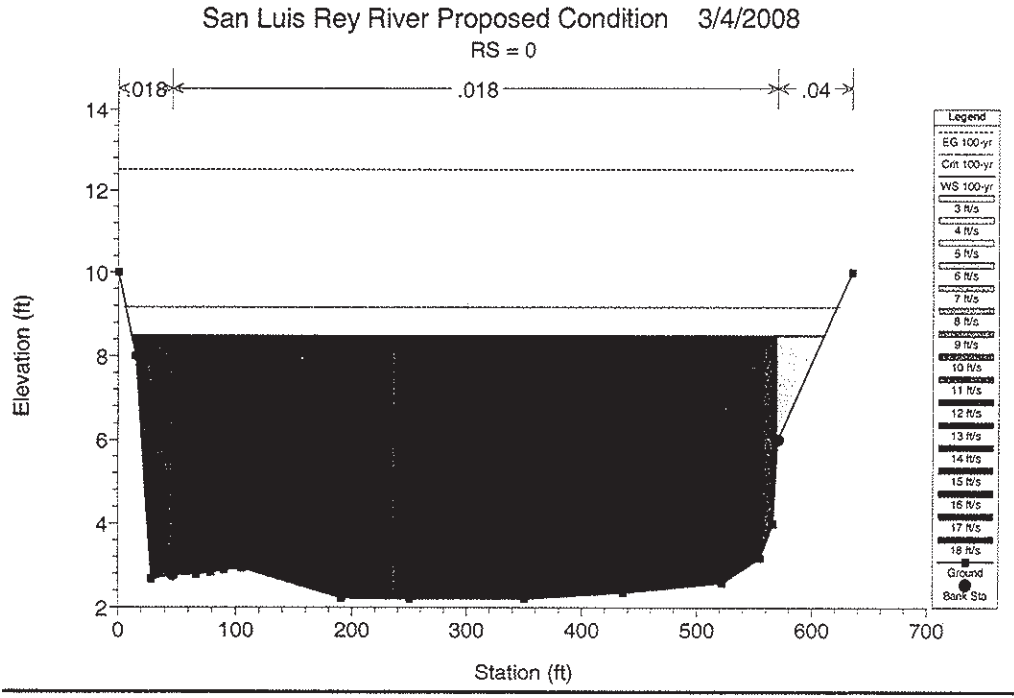

San Luis Rey River Proposed Condition 3/4/2008
RS = 800 BR Pacific Street
.03
.018
.04
Elevation (ft)
Station (ft)
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
Ground
Levee
Bank Sta


San Luis Rey River Proposed Condition 3/4/2008
RS = 761 Downstream Pacific Street
.03
.018
.04
Elevation (ft)
Station (ft)
Legend
EG 100-yr
Crit 100-yr
WS 100-yr
Ground
Levee
Bank Sta


San Luis Rey River Proposed Condition 3/4/2008
RS = 619
.03
.018
.04
Elevation (ft)
Station (ft)
Legend
EG 100-yr
Crit 100-yr
WS 100-yr
Ground
Levee
Bank Sta


San Luis Rey River Proposed Condition 3/4/2008
RS = 264
<.03
.018
.04
Elevation (ft)
Station (ft)
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
Ground
Bank Sta


San Luis Rey River Proposed Condition 3/4/2008
RS = 102
<.018
.018
.04
Elevation (ft)
Station (ft)
Legend
EG 100-yr
WS 100-yr
Crit 100-yr
Ground
Bank Sta


San Luis Rey River Proposed Condition 3/4/2008
RS = 0
<.018
.018
.04
Elevation (ft)
Station (ft)
Legend
EG 100-yr
Crit 100-yr
WS 100-yr
Ground
Bank Sta

SLR_Prop.rep

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
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PROJECT DATA
Project Title: San Luis Rey Proposed
Project File : SLR_Prop.prj
Run Date and Time: 3/4/2008 5:14:22 PM

Project in English units

Project Description:
San Luis Rey River Location Hydraulic Study - Proposed Condition

PLAN DATA

Plan Title: San Luis Rey River Proposed Condition
Plan File : p:\1683_TO64_I5_Floodplain\420_Env_ Stud\San Luis Rey\HEC-RAS\Final\Proposed\SLR_Prop.p01

Geometry Title: San Luis Rey Proposed Condition
Geometry File : p:\1683_TO64_I5_Floodplain\420_Env_ Stud\San Luis Rey\HEC-RAS\Final\Proposed\SLR_Prop.g11

Flow Title : 100-year Discharge
Flow File : p:\1683_TO64_I5_Floodplain\420_Env_ Stud\San Luis Rey\HEC-RAS\Final\Proposed\SLR_Prop.f08

Plan Summary Information:

Number of:	Cross Sections	= 23	Multiple Openings	=	0
	Culverts	= 0	Inline Structures	=	0
	Bridges	= 4	Lateral Structures	=	0

Computational Information

Water surface calculation tolerance	= 0.01
Critical depth calculation tolerance	= 0.01
Maximum number of iterations	= 40
Maximum difference tolerance	= 0.3
Flow tolerance factor	= 0.001

Computation Options

Critical depth computed at all	cross sections
Conveyance Calculation Method:	At breaks in n values only
Friction Slope Method:	Average Conveyance
Computational Flow Regime:	Mixed Flow

FLOW DATA

Flow Title: 100-year Discharge
Flow File : p:\1683_TO64_I5_Floodplain\420_Env_ Stud\San Luis Rey\HEC-RAS\Final\Proposed\SLR_Prop.f08

Flow Data (cfs)

River	Reach	RS	100-yr
San Luis Rey Riv	Reach 1	6042	53000

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
San Luis Rey Riv	Reach 1	100-yr	Normal S = 0.001	Known WS = 8.2

GEOMETRY DATA

Geometry Title: San Luis Rey Proposed Condition
Geometry File : p:\1683_TO64_I5_Floodplain\420_Env_ Stud\San Luis Rey\HEC-RAS\Final\Proposed\SLR_Prop.g11

CROSS SECTION

RIVER: San Luis Rey Riv
REACH: Reach 1 RS: 6042

INPUT
Description: Upstream X-Section
Station Elevation Data num= 36

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	52.2	6	50.2	81	48.2	126	46.2	139	47.2
151	46.2	159	42.2	171	36.2	179	32.2	189	26.2
206	22.2	207.62	21.27	213	18.2	221	14.2	236	12.2
256	14.2	336.15	14.2	343	14.2	389	13.9	431.8	12.2
434.6	10.2	437.3	8.2	497.4	6.7	529.2	6.7	598	8.2
653	10.2	661	12.2	667.4	16.2	674	20.2	678	22.2
693	32.2	701.58	42.18	701.6	42.2	710	52.2	722	62.2
742.577	72.2								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	431.8	.025	667.4	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
431.8	667.4	531.5	566.5	629.4	.1	.3

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	26.12	Element	Left OB	Channel
Right OB				
Vel Head (ft)	1.44	Wt. n-Val.	0.040	0.025
0.050				
W.S. Elev (ft)	24.68	Reach Len. (ft)	531.50	566.50
629.40				
Crit W.S. (ft)	19.14	Flow Area (sq ft)	2412.85	3898.83
61.32				
E.G. Slope (ft/ft)	0.000765	Area (sq ft)	2412.85	3898.83
61.32				
Q Total (cfs)	53000.00	Flow (cfs)	11582.62	41297.25
120.13				
Top Width (ft)	486.27	Top Width (ft)	236.34	235.60
14.32				
Vel Total (ft/s)	8.32	Avg. Vel. (ft/s)	4.80	10.59
1.96				
Max Chl Dpth (ft)	17.98	Hydr. Depth (ft)	10.21	16.55
4.28				
Conv. Total (cfs)	1916332.0	Conv. (cfs)	418795.2	1493193.0
4343.4				
Length Wtd. (ft)	560.43	Wetted Per. (ft)	238.91	238.37
16.66				
Min Ch El (ft)	6.70	Shear (lb/sq ft)	0.48	0.78
0.18				
Alpha	1.34	Stream Power (lb/ft s)	2.32	8.27
0.34				
Frctn Loss (ft)	0.45	Cum Volume (acre-ft)	107.15	519.70
86.41				
C & E Loss (ft)	0.01	Cum SA (acres)	15.70	45.10
11.87				

Profile #100-yr

Percent Conv	Pos Hydr Depth(ft)	Left Sta Velocity (ft/s)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)
1	LOB	0.00	431.80	11582.62	2412.85	238.91
21.85	10.21	4.80				
2	Chan	431.80	437.28	665.09	79.20	6.77
1.25	14.46	8.40				
3	Chan	437.28	442.76	959.17	90.67	5.49
1.81	16.55	10.58				
4	Chan	442.76	448.24	973.03	91.42	5.48
1.84	16.69	10.64				
5	Chan	448.24	453.72	986.35	92.17	5.48
1.86	16.82	10.70				
6	Chan	453.72	459.20	999.75	92.92	5.48
1.89	16.96	10.76				
7	Chan	459.20	464.67	1013.22	93.67	5.48
1.91	17.10	10.82				
8	Chan	464.67	470.15	1026.76	94.42	5.48
1.94	17.23	10.87				
9	Chan	470.15	475.63	1040.38	95.17	5.48
1.96	17.37	10.93				
10	Chan	475.63	481.11	1054.07	95.92	5.48
1.99	17.51	10.99				
11	Chan	481.11	486.59	1067.83	96.67	5.48

2.01	17.64	11.05					
12	Chan	486.59	492.07	1081.66	97.42	5.48	
2.04	17.78	11.10					
13	Chan	492.07	497.55	1095.56	98.17	5.48	
2.07	17.92	11.16					
14	Chan	497.55	503.03	1102.38	98.52	5.48	
2.08	17.98	11.19					
15	Chan	503.03	508.51	1102.39	98.52	5.48	
2.08	17.98	11.19					
16	Chan	508.51	513.99	1102.38	98.52	5.48	
2.08	17.98	11.19					
17	Chan	513.99	519.47	1102.38	98.52	5.48	
2.08	17.98	11.19					
18	Chan	519.47	524.94	1102.40	98.52	5.48	
2.08	17.98	11.19					
19	Chan	524.94	530.42	1102.04	98.50	5.48	
2.08	17.98	11.19					
20	Chan	530.42	535.90	1093.40	98.05	5.48	
2.06	17.89	11.15					
21	Chan	535.90	541.38	1081.26	97.39	5.48	
2.04	17.78	11.10					
22	Chan	541.38	546.86	1069.17	96.74	5.48	
2.02	17.66	11.05					
23	Chan	546.86	552.34	1057.15	96.08	5.48	
1.99	17.54	11.00					
24	Chan	552.34	557.82	1045.17	95.43	5.48	
1.97	17.42	10.95					
25	Chan	557.82	563.30	1033.25	94.77	5.48	
1.95	17.30	10.90					
26	Chan	563.30	568.78	1021.39	94.12	5.48	
1.93	17.18	10.85					
27	Chan	568.78	574.26	1009.57	93.46	5.48	
1.90	17.06	10.80					
28	Chan	574.26	579.73	997.83	92.81	5.48	
1.88	16.94	10.75					
29	Chan	579.73	585.21	986.12	92.16	5.48	
1.86	16.82	10.70					
30	Chan	585.21	590.69	974.47	91.50	5.48	
1.84	16.70	10.65					
31	Chan	590.69	596.17	962.88	90.85	5.48	
1.82	16.58	10.60					
32	Chan	596.17	601.65	949.47	90.10	5.48	
1.79	16.44	10.54					
33	Chan	601.65	607.13	930.71	89.03	5.48	
1.76	16.25	10.45					
34	Chan	607.13	612.61	911.76	87.94	5.48	
1.72	16.05	10.37					
35	Chan	612.61	618.09	892.98	86.84	5.48	
1.68	15.85	10.28					
36	Chan	618.09	623.57	874.35	85.75	5.48	
1.65	15.65	10.20					
37	Chan	623.57	629.05	855.88	84.66	5.48	
1.61	15.45	10.11					
38	Chan	629.05	634.53	837.56	83.57	5.48	
1.58	15.25	10.02					
39	Chan	634.53	640.00	819.42	82.48	5.48	
1.55	15.05	9.93					
40	Chan	640.00	645.48	801.41	81.39	5.48	
1.51	14.85	9.85					
41	Chan	645.48	650.96	783.58	80.29	5.48	
1.48	14.65	9.76					
42	Chan	650.96	656.44	736.36	77.94	5.59	
1.39	14.22	9.45					

43	Chan	656.44	661.92	611.83	70.72	5.78
1.15	12.91	8.65				
44	Chan	661.92	667.40	383.50	55.85	6.46
0.72	10.19	6.87				
45	ROB	667.40	742.58	120.13	61.32	16.66
0.23	4.28	1.96				

CROSS SECTION

RIVER: San Luis Rey Riv
REACH: Reach 1 RS: 5475

INPUT
Description:
Station Elevation Data num= 39

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	32.2	21	36.2	36.8	40.2	107	45.6	146.75	40.2
151	39.2	159	38.2	171	32.2	182	26.2	195	24.2
195.467	23.97	199	22.2	207	18.2	221	16.3	247	16.7
268	16.2	320.1	14.91	345	14.3	407.09	15.7	427	14.2
437	12.2	440	10.2	444	7.2	464	7.2	479	6.7
528	6.2	601	8.2	636	10.2	668	12.2	679	14.2
690	16.2	702	18.2	713	20.2	723	22.2	731	24.2
755	26.2	767	28.2	788	30.2	804	32.2		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	407.09	.025	690	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
407.09	690	579	515.3 478.7	.1	.3

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	25.65	Element	Left OB	Channel
Right OB				
Vel Head (ft)	1.51	Wt. n-Val.	0.040	0.025
0.050				
W.S. Elev (ft)	24.14	Reach Len. (ft)	579.00	515.30
478.70				
Crit W.S. (ft)	19.50	Flow Area (sq ft)	1744.60	4249.41
174.65				
E.G. Slope (ft/ft)	0.000862	Area (sq ft)	1744.60	4249.41
174.65				
Q Total (cfs)	53000.00	Flow (cfs)	7717.16	44886.01
396.83				
Top Width (ft)	535.65	Top Width (ft)	211.97	282.91
40.77				
Vel Total (ft/s)	8.59	Avg. Vel. (ft/s)	4.42	10.56
2.27				
Max Chl Dpth (ft)	17.94	Hydr. Depth (ft)	8.23	15.02
4.28				
Conv. Total (cfs)	1805417.0	Conv. (cfs)	262881.1	1529019.0
13517.7				
Length Wtd. (ft)	524.65	Wetted Per. (ft)	213.55	285.29
41.55				
Min Ch El (ft)	6.20	Shear (lb/sq ft)	0.44	0.80
0.23				
Alpha	1.32	Stream Power (lb/ft s)	1.94	8.46

0.51					
Frctn Loss (ft)		0.65	Cum Volume (acre-ft)	81.79	466.71
84.71					
C & E Loss (ft)		0.11	Cum SA (acres)	12.96	41.73
11.47					

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.

Profile #100-yr

Percent Conv	Pos Hydr Depth(ft)	Left Sta Velocity (ft/s)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)
1	LOB	0.00	407.09	7717.16	1744.60	213.55
14.56	8.23	4.42				
2	Chan	407.09	413.67	411.56	57.18	6.60
0.78	8.69	7.20				
3	Chan	413.67	420.25	451.42	60.44	6.60
0.85	9.19	7.47				
4	Chan	420.25	426.83	492.75	63.70	6.60
0.93	9.68	7.74				
5	Chan	426.83	433.41	563.86	69.52	6.71
1.06	10.57	8.11				
6	Chan	433.41	439.99	679.90	80.26	7.25
1.28	12.20	8.47				
7	Chan	439.99	446.57	1040.13	105.43	7.58
1.96	16.02	9.87				
8	Chan	446.57	453.15	1254.54	111.47	6.58
2.37	16.94	11.25				
9	Chan	453.15	459.72	1254.54	111.47	6.58
2.37	16.94	11.25				
10	Chan	459.72	466.30	1256.03	111.56	6.58
2.37	16.96	11.26				
11	Chan	466.30	472.88	1277.16	112.70	6.58
2.41	17.13	11.33				
12	Chan	472.88	479.46	1304.51	114.14	6.58
2.46	17.35	11.43				
13	Chan	479.46	486.04	1321.63	115.01	6.58
2.49	17.48	11.49				
14	Chan	486.04	492.62	1330.10	115.45	6.58
2.51	17.55	11.52				
15	Chan	492.62	499.20	1338.58	115.89	6.58
2.53	17.62	11.55				
16	Chan	499.20	505.78	1347.10	116.34	6.58
2.54	17.68	11.58				
17	Chan	505.78	512.36	1355.63	116.78	6.58
2.56	17.75	11.61				
18	Chan	512.36	518.94	1364.19	117.22	6.58
2.57	17.82	11.64				
19	Chan	518.94	525.52	1372.78	117.66	6.58
2.59	17.88	11.67				
20	Chan	525.52	532.10	1375.04	117.79	6.58
2.59	17.90	11.67				

21	Chan	532.10	538.68	1354.17	116.72	6.58
2.56	17.74	11.60				
22	Chan	538.68	545.26	1331.33	115.53	6.58
2.51	17.56	11.52				
23	Chan	545.26	551.83	1308.62	114.35	6.58
2.47	17.38	11.44				
24	Chan	551.83	558.41	1286.08	113.16	6.58
2.43	17.20	11.37				
25	Chan	558.41	564.99	1263.69	111.97	6.58
2.38	17.02	11.29				
26	Chan	564.99	571.57	1241.47	110.79	6.58
2.34	16.84	11.21				
27	Chan	571.57	578.15	1219.39	109.60	6.58
2.30	16.66	11.13				
28	Chan	578.15	584.73	1197.48	108.42	6.58
2.26	16.48	11.05				
29	Chan	584.73	591.31	1175.74	107.23	6.58
2.22	16.30	10.96				
30	Chan	591.31	597.89	1154.14	106.04	6.58
2.18	16.12	10.88				
31	Chan	597.89	604.47	1128.99	104.68	6.59
2.13	15.91	10.79				
32	Chan	604.47	611.05	1087.00	102.35	6.59
2.05	15.56	10.62				
33	Chan	611.05	617.63	1043.56	99.88	6.59
1.97	15.18	10.45				
34	Chan	617.63	624.21	1000.84	97.40	6.59
1.89	14.80	10.28				
35	Chan	624.21	630.79	958.84	94.93	6.59
1.81	14.43	10.10				
36	Chan	630.79	637.37	917.45	92.45	6.59
1.73	14.05	9.92				
37	Chan	637.37	643.94	874.16	89.82	6.59
1.65	13.65	9.73				
38	Chan	643.94	650.52	830.72	87.11	6.59
1.57	13.24	9.54				
39	Chan	650.52	657.10	788.18	84.41	6.59
1.49	12.83	9.34				
40	Chan	657.10	663.68	746.52	81.70	6.59
1.41	12.42	9.14				
41	Chan	663.68	670.26	698.92	78.69	6.62
1.32	11.96	8.88				
42	Chan	670.26	676.84	598.02	71.93	6.69
1.13	10.93	8.31				
43	Chan	676.84	683.42	493.00	64.06	6.69
0.93	9.74	7.70				
44	Chan	683.42	690.00	396.24	56.19	6.69
0.75	8.54	7.05				
45	ROB	690.00	804.00	396.83	174.65	41.55
0.75	4.28	2.27				

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

CROSS SECTION

RIVER: San Luis Rey Riv
REACH: Reach 1 RS: 4960

INPUT
Description:
Station Elevation Data num= 32

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	32.2	84	33.1	121	32.2	136	28.2	182	26.2
200	22.2	214	18.2	227	16.2	312.8	16.06	350	16
445	15.1	476	14.2	486	12.2	489	10.2	500	8.9
510	8.2	535	6.7	570	6.7	617	8.2	631	9.5
668	10.2	687.9	12.2	703	18.2	712	22.2	725	28.2
731	32.2	737	38.2	742	42.2	756	43.2	777	43.7
784	44.2	796	45.2						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	445	.025	703	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
445	703	382.1	548.1 630.3	.1	.3

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	24.90	Element	Left OB	Channel
Right OB				
Vel Head (ft)	2.61	Wt. n-Val.	0.040	0.025
0.050				
W.S. Elev (ft)	22.29	Reach Len. (ft)	382.10	548.10
630.30				
Crit W.S. (ft)	20.53	Flow Area (sq ft)	1497.04	3228.76
18.81				
E.G. Slope (ft/ft)	0.001904	Area (sq ft)	1497.04	3228.76
18.81				
Q Total (cfs)	53000.00	Flow (cfs)	8086.65	44876.31
37.03				
Top Width (ft)	512.60	Top Width (ft)	245.40	258.00
9.19				
Vel Total (ft/s)	11.17	Avg. Vel. (ft/s)	5.40	13.90
1.97				
Max Chl Dpth (ft)	15.59	Hydr. Depth (ft)	6.10	12.51
2.05				
Conv. Total (cfs)	1214472.0	Conv. (cfs)	185302.1	1028321.0
848.6				
Length Wtd. (ft)	526.12	Wetted Per. (ft)	246.13	260.30
10.06				
Min Ch El (ft)	6.70	Shear (lb/sq ft)	0.72	1.47
0.22				
Alpha	1.35	Stream Power (lb/ft s)	3.91	20.50
0.44				
Frctn Loss (ft)	0.65	Cum Volume (acre-ft)	60.24	422.48
83.64				
C & E Loss (ft)	0.38	Cum SA (acres)	9.92	38.53
11.20				

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.

Profile #100-yr

Percent Conv	Pos Hydr Depth(ft)	Left Sta Velocity (ft/s)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)
1	LOB	0.00	445.00	8086.65	1497.04	246.13
15.26	6.10	5.40				
2	Chan	445.00	451.00	411.57	43.66	6.00
0.78	7.28	9.43				
3	Chan	451.00	457.00	428.12	44.71	6.00
0.81	7.45	9.58				
4	Chan	457.00	463.00	444.93	45.75	6.00
0.84	7.63	9.73				
5	Chan	463.00	469.00	462.00	46.80	6.00
0.87	7.80	9.87				
6	Chan	469.00	475.00	479.32	47.84	6.00
0.90	7.97	10.02				
7	Chan	475.00	481.00	527.96	51.02	6.10
1.00	8.50	10.35				
8	Chan	481.00	487.00	646.52	58.37	6.30
1.22	9.73	11.08				
9	Chan	487.00	493.00	907.89	72.15	6.43
1.71	12.02	12.58				
10	Chan	493.00	499.00	1066.42	77.50	6.04
2.01	12.92	13.76				
11	Chan	499.00	505.00	1154.36	81.15	6.02
2.18	13.53	14.22				
12	Chan	505.00	511.00	1215.88	83.69	6.01
2.29	13.95	14.53				
13	Chan	511.00	517.00	1272.16	85.98	6.01
2.40	14.33	14.80				
14	Chan	517.00	523.00	1325.88	88.14	6.01
2.50	14.69	15.04				
15	Chan	523.00	529.00	1380.47	90.30	6.01
2.60	15.05	15.29				
16	Chan	529.00	535.00	1435.95	92.46	6.01
2.71	15.41	15.53				
17	Chan	535.00	541.00	1465.77	93.54	6.00
2.77	15.59	15.67				
18	Chan	541.00	547.00	1465.77	93.54	6.00
2.77	15.59	15.67				
19	Chan	547.00	553.00	1465.77	93.54	6.00
2.77	15.59	15.67				
20	Chan	553.00	559.00	1465.77	93.54	6.00
2.77	15.59	15.67				
21	Chan	559.00	565.00	1465.77	93.54	6.00
2.77	15.59	15.67				
22	Chan	565.00	571.00	1465.27	93.52	6.00
2.76	15.59	15.67				
23	Chan	571.00	577.00	1445.33	92.77	6.00
2.73	15.46	15.58				
24	Chan	577.00	583.00	1415.62	91.62	6.00
2.67	15.27	15.45				
25	Chan	583.00	589.00	1386.15	90.47	6.00

2.62	15.08	15.32					
26	Chan	589.00	595.00	1356.94	89.32	6.00	
2.56	14.89	15.19					
27	Chan	595.00	601.00	1327.98	88.18	6.00	
2.51	14.70	15.06					
28	Chan	601.00	607.00	1299.26	87.03	6.00	
2.45	14.50	14.93					
29	Chan	607.00	613.00	1270.80	85.88	6.00	
2.40	14.31	14.80					
30	Chan	613.00	619.00	1238.57	84.61	6.01	
2.34	14.10	14.64					
31	Chan	619.00	625.00	1167.73	81.75	6.03	
2.20	13.63	14.28					
32	Chan	625.00	631.00	1089.23	78.41	6.03	
2.06	13.07	13.89					
33	Chan	631.00	637.00	1045.92	76.40	6.00	
1.97	12.73	13.69					
34	Chan	637.00	643.00	1030.42	75.72	6.00	
1.94	12.62	13.61					
35	Chan	643.00	649.00	1015.02	75.03	6.00	
1.92	12.51	13.53					
36	Chan	649.00	655.00	999.71	74.35	6.00	
1.89	12.39	13.45					
37	Chan	655.00	661.00	984.49	73.67	6.00	
1.86	12.28	13.36					
38	Chan	661.00	667.00	969.37	72.99	6.00	
1.83	12.17	13.28					
39	Chan	667.00	673.00	929.51	71.29	6.03	
1.75	11.88	13.04					
40	Chan	673.00	679.00	852.62	67.71	6.03	
1.61	11.29	12.59					
41	Chan	679.00	685.00	778.05	64.10	6.03	
1.47	10.68	12.14					
42	Chan	685.00	691.00	662.67	59.05	6.25	
1.25	9.84	11.22					
43	Chan	691.00	697.00	427.60	45.99	6.46	
0.81	7.67	9.30					
44	Chan	697.00	703.00	229.82	31.69	6.46	
0.43	5.28	7.25					
45	ROB	703.00	796.00	37.03	18.81	10.06	
0.07	2.05	1.97					

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 Riv
REACH: Reach 1 RS: 4412

INPUT
Description:

Station Elevation Data num= 37

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	30.2	28.8	30.7	52.4	30.2	80	30.7	109	30.2
140	29	149	28.2	157.7	26.2	164.5	24.2	167.7	22.2
173.9	18.2	177.1	16.2	180.2	12.2	203.7	14.2	269	13
276.5	12.88	319.5	12.2	392.9	9.1	503.7	6.6	554.2	8.2
579	9.4	669.5	12.2	680.4	14.2	690.3	16.2	698	17.74
700.3	18.2	711.4	20.2	724.1	22.2	740.4	24.2	744.6	26.2
748.15	28.2	750.8	30.2	754.2	32.2	760.9	36.2	764.3	38.2
788	50.2	838.4	62.2						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	319.5	.025	669.5	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
319.5	669.5	617.2	624.6	463	.1	.3

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	23.87	Element	Left OB	Channel
Right OB				
Vel Head (ft)	1.35	Wt. n-Val.	0.040	0.025
0.050				
W.S. Elev (ft)	22.51	Reach Len. (ft)	617.20	624.60
463.00				
Crit W.S. (ft)	17.82	Flow Area (sq ft)	1358.98	4659.36
280.99				
E.G. Slope (ft/ft)	0.000874	Area (sq ft)	1358.98	4659.36
280.99				
Q Total (cfs)	53000.00	Flow (cfs)	6314.27	45979.57
706.16				
Top Width (ft)	559.47	Top Width (ft)	152.30	350.00
57.17				
Vel Total (ft/s)	8.41	Avg. Vel. (ft/s)	4.65	9.87
2.51				
Max Chl Dpth (ft)	15.91	Hydr. Depth (ft)	8.92	13.31
4.92				
Conv. Total (cfs)	1792421.0	Conv. (cfs)	213543.8	1554995.0
23881.8				
Length Wtd. (ft)	610.86	Wetted Per. (ft)	156.21	350.19
58.10				
Min Ch El (ft)	6.60	Shear (lb/sq ft)	0.47	0.73
0.26				
Alpha	1.23	Stream Power (lb/ft s)	2.21	7.17
0.66				
Frctn Loss (ft)	0.59	Cum Volume (acre-ft)	47.72	372.85
81.48				
C & E Loss (ft)	0.04	Cum SA (acres)	8.18	34.70
10.72				

Profile #100-yr

Percent Conv	Depth(ft)	Pos Hydr	Left Sta Velocity (ft/s)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)
1		LOB	0.00	319.50	6314.27	1358.98	156.21
11.91	8.92		4.65				

2	Chan	319.50	327.64	712.24	85.36	8.15
1.34	10.49	8.34				
3	Chan	327.64	335.78	751.58	88.16	8.15
1.42	10.83	8.53				
4	Chan	335.78	343.92	791.76	90.95	8.15
1.49	11.17	8.71				
5	Chan	343.92	352.06	832.77	93.75	8.15
1.57	11.52	8.88				
6	Chan	352.06	360.20	874.60	96.55	8.15
1.65	11.86	9.06				
7	Chan	360.20	368.34	917.26	99.35	8.15
1.73	12.21	9.23				
8	Chan	368.34	376.48	960.72	102.15	8.15
1.81	12.55	9.41				
9	Chan	376.48	384.62	1004.98	104.94	8.15
1.90	12.89	9.58				
10	Chan	384.62	392.76	1050.04	107.74	8.15
1.98	13.24	9.75				
11	Chan	392.76	400.90	1085.96	109.91	8.14
2.05	13.50	9.88				
12	Chan	400.90	409.03	1110.70	111.41	8.14
2.10	13.69	9.97				
13	Chan	409.03	417.17	1135.65	112.90	8.14
2.14	13.87	10.06				
14	Chan	417.17	425.31	1160.82	114.40	8.14
2.19	14.05	10.15				
15	Chan	425.31	433.45	1186.21	115.89	8.14
2.24	14.24	10.24				
16	Chan	433.45	441.59	1211.82	117.39	8.14
2.29	14.42	10.32				
17	Chan	441.59	449.73	1237.65	118.88	8.14
2.34	14.61	10.41				
18	Chan	449.73	457.87	1263.70	120.38	8.14
2.38	14.79	10.50				
19	Chan	457.87	466.01	1289.96	121.87	8.14
2.43	14.97	10.58				
20	Chan	466.01	474.15	1316.44	123.37	8.14
2.48	15.16	10.67				
21	Chan	474.15	482.29	1343.14	124.86	8.14
2.53	15.34	10.76				
22	Chan	482.29	490.43	1370.04	126.35	8.14
2.58	15.52	10.84				
23	Chan	490.43	498.57	1397.16	127.85	8.14
2.64	15.71	10.93				
24	Chan	498.57	506.71	1419.90	129.10	8.14
2.68	15.86	11.00				
25	Chan	506.71	514.85	1394.45	127.71	8.14
2.63	15.69	10.92				
26	Chan	514.85	522.99	1356.47	125.61	8.14
2.56	15.43	10.80				
27	Chan	522.99	531.13	1318.91	123.52	8.14
2.49	15.17	10.68				
28	Chan	531.13	539.27	1281.75	121.42	8.14
2.42	14.92	10.56				
29	Chan	539.27	547.41	1245.03	119.32	8.14
2.35	14.66	10.43				
30	Chan	547.41	555.55	1208.39	117.20	8.14
2.28	14.40	10.31				
31	Chan	555.55	563.69	1159.89	114.38	8.15
2.19	14.05	10.14				
32	Chan	563.69	571.83	1106.22	111.18	8.15
2.09	13.66	9.95				
33	Chan	571.83	579.97	1053.76	107.98	8.15

1.99	13.27	9.76				
34	Chan	579.97	588.10	1013.85	105.48	8.14
1.91	12.96	9.61				
35	Chan	588.10	596.24	981.22	103.43	8.14
1.85	12.71	9.49				
36	Chan	596.24	604.38	949.02	101.38	8.14
1.79	12.46	9.36				
37	Chan	604.38	612.52	917.26	99.33	8.14
1.73	12.20	9.23				
38	Chan	612.52	620.66	885.93	97.28	8.14
1.67	11.95	9.11				
39	Chan	620.66	628.80	855.04	95.23	8.14
1.61	11.70	8.98				
40	Chan	628.80	636.94	824.58	93.18	8.14
1.56	11.45	8.85				
41	Chan	636.94	645.08	794.58	91.13	8.14
1.50	11.20	8.72				
42	Chan	645.08	653.22	765.01	89.08	8.14
1.44	10.94	8.59				
43	Chan	653.22	661.36	735.90	87.03	8.14
1.39	10.69	8.46				
44	Chan	661.36	669.50	707.24	84.98	8.14
1.33	10.44	8.32				
45	ROB	669.50	838.40	706.16	280.99	58.10
1.33	4.92	2.51				

CROSS SECTION

RIVER: San Luis Rey Riv
REACH: Reach 1 RS: 3787

INPUT
Description:
Station Elevation Data num= 39

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	26.2	8.8	26.5	15	26.2	24	26.2	35	25.6
48	26.2	59	26.8	76.25	26.38	92	23.5	102.2	22.2
105	20.2	107.57	18.79	112.3	16.2	118.7	12.2	125.4	8.2
150	4.9	175	4.9	200	4.9	225	4.9	258	8.2
294	8.5	398	9.4	455.7	9.7	512	10	530	10.2
538.5	12.2	545.5	14.2	551.5	16.2	557.8	18.2	566	20.2
585	22.2	588	32.2	598.4	42.2	609.6	52.2	621.2	62.2
635	72.2	658.5	78.38	660	82.2	680	92.7		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	125.4	.025	398	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
125.4	398	478	483.1	500.6	.1	.3

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	23.23	Element	Left OB	Channel
Right OB				
Vel Head (ft)	1.76	Wt. n-Val.	0.040	0.025
0.050				
W.S. Elev (ft)	21.48	Reach Len. (ft)	478.00	483.10
500.60				

Crit W.S. (ft)	16.78	Flow Area (sq ft)	147.17	3878.15 1783.69
E.G. Slope (ft/ft)	0.001080	Area (sq ft)	147.17	3878.15 1783.69
Q Total (cfs)	53000.00	Flow (cfs)	572.63	44436.53 7990.84
Top Width (ft)	474.91	Top Width (ft)	22.19	272.60 180.12
Vel Total (ft/s)	9.12	Avg. Vel. (ft/s)	3.89	11.46 4.48
Max Chl Dpth (ft)	16.58	Hydr. Depth (ft)	6.63	14.23 9.90
Conv. Total (cfs)	1612626.0	Conv. (cfs)	17423.2	1352066.0 243136.6
Length Wtd. (ft)	486.78	Wetted Per. (ft)	25.87	272.99 181.58
Min Ch El (ft)	4.90	Shear (lb/sq ft)	0.38	0.96 0.66
Alpha	1.36	Stream Power (lb/ft s)	1.49	10.98 2.97
Frctn Loss (ft)	0.59	Cum Volume (acre-ft)	37.04	311.65 70.50
C & E Loss (ft)	0.02	Cum SA (acres)	6.94	30.24 9.46

Profile #100-yr

Percent Conv	Pos Hydr Depth(ft)	Left Sta Velocity (ft/s)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)
1	LOB	0.00	125.40	572.63	147.17	25.87
1.08	6.63	3.89				
2	Chan	125.40	131.74	957.71	86.86	6.40
1.81	13.70	11.03				
3	Chan	131.74	138.08	1058.83	92.25	6.40
2.00	14.55	11.48				
4	Chan	138.08	144.42	1163.96	97.64	6.40
2.20	15.40	11.92				
5	Chan	144.42	150.76	1273.14	102.99	6.39
2.40	16.25	12.36				
6	Chan	150.76	157.10	1323.38	105.08	6.34
2.50	16.58	12.59				
7	Chan	157.10	163.44	1323.39	105.08	6.34
2.50	16.58	12.59				
8	Chan	163.44	169.78	1323.39	105.08	6.34
2.50	16.58	12.59				
9	Chan	169.78	176.12	1323.39	105.08	6.34
2.50	16.58	12.59				
10	Chan	176.12	182.46	1323.38	105.08	6.34
2.50	16.58	12.59				
11	Chan	182.46	188.80	1323.39	105.08	6.34
2.50	16.58	12.59				
12	Chan	188.80	195.13	1323.39	105.08	6.34
2.50	16.58	12.59				
13	Chan	195.13	201.47	1323.39	105.08	6.34
2.50	16.58	12.59				
14	Chan	201.47	207.81	1323.38	105.08	6.34
2.50	16.58	12.59				
15	Chan	207.81	214.15	1323.39	105.08	6.34

2.50	16.58	12.59					
16	Chan		214.15	220.49	1323.39	105.08	6.34
2.50	16.58	12.59					
17	Chan		220.49	226.83	1318.60	104.92	6.35
2.49	16.55	12.57					
18	Chan		226.83	233.17	1253.33	101.91	6.37
2.36	16.08	12.30					
19	Chan		233.17	239.51	1172.04	97.89	6.37
2.21	15.44	11.97					
20	Chan		239.51	245.85	1092.95	93.87	6.37
2.06	14.81	11.64					
21	Chan		245.85	252.19	1016.08	89.86	6.37
1.92	14.17	11.31					
22	Chan		252.19	258.53	941.97	85.85	6.37
1.78	13.54	10.97					
23	Chan		258.53	264.87	910.55	83.97	6.34
1.72	13.25	10.84					
24	Chan		264.87	271.21	904.50	83.63	6.34
1.71	13.19	10.82					
25	Chan		271.21	277.55	898.48	83.30	6.34
1.70	13.14	10.79					
26	Chan		277.55	283.89	892.47	82.96	6.34
1.68	13.09	10.76					
27	Chan		283.89	290.23	886.47	82.63	6.34
1.67	13.03	10.73					
28	Chan		290.23	296.57	880.47	82.29	6.34
1.66	12.98	10.70					
29	Chan		296.57	302.91	874.31	81.95	6.34
1.65	12.93	10.67					
30	Chan		302.91	309.25	868.14	81.60	6.34
1.64	12.87	10.64					
31	Chan		309.25	315.59	861.98	81.25	6.34
1.63	12.82	10.61					
32	Chan		315.59	321.93	855.84	80.90	6.34
1.61	12.76	10.58					
33	Chan		321.93	328.27	849.72	80.56	6.34
1.60	12.71	10.55					
34	Chan		328.27	334.60	843.61	80.21	6.34
1.59	12.65	10.52					
35	Chan		334.60	340.94	837.52	79.86	6.34
1.58	12.60	10.49					
36	Chan		340.94	347.28	831.45	79.51	6.34
1.57	12.54	10.46					
37	Chan		347.28	353.62	825.40	79.16	6.34
1.56	12.49	10.43					
38	Chan		353.62	359.96	819.37	78.82	6.34
1.55	12.43	10.40					
39	Chan		359.96	366.30	813.35	78.47	6.34
1.53	12.38	10.37					
40	Chan		366.30	372.64	807.34	78.12	6.34
1.52	12.32	10.33					
41	Chan		372.64	378.98	801.37	77.77	6.34
1.51	12.27	10.30					
42	Chan		378.98	385.32	795.40	77.43	6.34
1.50	12.21	10.27					
43	Chan		385.32	391.66	789.46	77.08	6.34
1.49	12.16	10.24					
44	Chan		391.66	398.00	783.53	76.73	6.34
1.48	12.10	10.21					
45	ROB		398.00	680.00	7990.84	1783.69	181.58
15.08	9.90	4.48					

CROSS SECTION

RIVER: San Luis Rey Riv
REACH: Reach 1 RS: 3305

INPUT
Description:
Station Elevation Data num= 38

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	23.2	37	24.8	66	24.2	84	22.6	90.9	18.2
94	16.2	96.4	14.7	99	16.2	103	14.2	114	10.2
120	8.2	150	4.9	180	4.9	210	4.9	211.2	4.9
240	4.9	253	8.2	323	8.75	367	8.7	383	8.2
440	7.75	491	8.2	511	10.2	515.5	10.76	527	12.2
546	14.2	552	16.2	554	18.2	557	20.2	558	22.2
570	32.2	581	42.2	591	52.2	601	62.2	617	72.2
620.7	78.2	669	82.2	691	84.2				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	114	.025	323	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
114	323	210.5	214.6 221.9	.1	.3

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	22.63	Element	Left OB	Channel
Right OB				
Vel Head (ft)	1.93	Wt. n-Val.	0.040	0.025
0.050				
W.S. Elev (ft)	20.70	Reach Len. (ft)	210.50	214.60
221.90				
Crit W.S. (ft)	16.68	Flow Area (sq ft)	157.51	2955.29
2666.38				
E.G. Slope (ft/ft)	0.001355	Area (sq ft)	157.51	2955.29
2666.38				
Q Total (cfs)	53000.00	Flow (cfs)	645.62	37695.91
14658.48				
Top Width (ft)	470.27	Top Width (ft)	27.02	209.00
234.25				
Vel Total (ft/s)	9.17	Avg. Vel. (ft/s)	4.10	12.76
5.50				
Max Chl Dpth (ft)	15.80	Hydr. Depth (ft)	5.83	14.14
11.38				
Conv. Total (cfs)	1439907.0	Conv. (cfs)	17540.2	1024124.0
398242.2				
Length Wtd. (ft)	215.50	Wetted Per. (ft)	30.35	209.92
236.66				
Min Ch El (ft)	4.90	Shear (lb/sq ft)	0.44	1.19
0.95				
Alpha	1.48	Stream Power (lb/ft s)	1.80	15.19
5.24				
Frctn Loss (ft)	0.20	Cum Volume (acre-ft)	35.37	273.75
44.93				
C & E Loss (ft)	0.20	Cum SA (acres)	6.67	27.57
7.08				

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.

Profile #100-yr

Conv	Pos Hydr	Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	Percent Depth(ft)	Velocity (ft/s)
1	LOB	0.00	114.00	645.62	157.51	30.35	5.83	4.10
2	Chan	114.00	118.86	580.34	54.97	5.12	11.31	10.56
3	Chan	118.86	123.72	712.59	61.30	4.94	12.61	11.62
4	Chan	123.72	128.58	772.25	64.05	4.89	13.18	12.06
5	Chan	128.58	133.44	825.18	66.65	4.89	13.71	12.38
6	Chan	133.44	138.30	879.49	69.24	4.89	14.25	12.70
7	Chan	138.30	143.16	935.19	71.84	4.89	14.78	13.02
8	Chan	143.16	148.02	992.24	74.44	4.89	15.32	13.33
9	Chan	148.02	152.88	1042.75	76.58	4.87	15.76	13.62
10	Chan	152.88	157.74	1049.34	76.80	4.86	15.80	13.66
11	Chan	157.74	162.60	1049.34	76.80	4.86	15.80	13.66
12	Chan	162.60	167.47	1049.34	76.80	4.86	15.80	13.66
13	Chan	167.47	172.33	1049.34	76.80	4.86	15.80	13.66
14	Chan	172.33	177.19	1049.34	76.80	4.86	15.80	13.66
15	Chan	177.19	182.05	1049.34	76.80	4.86	15.80	13.66
16	Chan	182.05	186.91	1049.34	76.80	4.86	15.80	13.66
17	Chan	186.91	191.77	1049.34	76.80	4.86	15.80	13.66
18	Chan	191.77	196.63	1049.34	76.80	4.86	15.80	13.66
19	Chan	196.63	201.49	1049.34	76.80	4.86	15.80	13.66
20	Chan	201.49	206.35	1049.34	76.80	4.86	15.80	13.66
21	Chan	206.35	211.21	1049.34	76.80	4.86	15.80	13.66
22	Chan	211.21	216.07	1049.34	76.80	4.86	15.80	13.66
23	Chan	216.07	220.93	1049.34	76.80	4.86	15.80	13.66
24	Chan	220.93	225.79	1049.34	76.80	4.86	15.80	13.66

25	Chan	225.79	230.65	1049.34	76.80	4.86	
1.98	15.80	13.66					
26	Chan	230.65	235.51	1049.34	76.80	4.86	
1.98	15.80	13.66					
27	Chan	235.51	240.37	1047.24	76.78	4.87	
1.98	15.80	13.64					
28	Chan	240.37	245.23	951.77	73.34	5.01	
1.80	15.09	12.98					
29	Chan	245.23	250.09	825.63	67.34	5.01	
1.56	13.86	12.26					
30	Chan	250.09	254.95	721.76	61.82	4.95	
1.36	12.72	11.68					
31	Chan	254.95	259.81	706.87	60.59	4.86	
1.33	12.47	11.67					
32	Chan	259.81	264.67	703.26	60.40	4.86	
1.33	12.43	11.64					
33	Chan	264.67	269.53	699.66	60.22	4.86	
1.32	12.39	11.62					
34	Chan	269.53	274.40	696.07	60.03	4.86	
1.31	12.35	11.59					
35	Chan	274.40	279.26	692.49	59.85	4.86	
1.31	12.31	11.57					
36	Chan	279.26	284.12	688.91	59.66	4.86	
1.30	12.28	11.55					
37	Chan	284.12	288.98	685.34	59.48	4.86	
1.29	12.24	11.52					
38	Chan	288.98	293.84	681.78	59.29	4.86	
1.29	12.20	11.50					
39	Chan	293.84	298.70	678.23	59.11	4.86	
1.28	12.16	11.47					
40	Chan	298.70	303.56	674.68	58.92	4.86	
1.27	12.12	11.45					
41	Chan	303.56	308.42	671.14	58.73	4.86	
1.27	12.08	11.43					
42	Chan	308.42	313.28	667.61	58.55	4.86	
1.26	12.05	11.40					
43	Chan	313.28	318.14	664.09	58.36	4.86	
1.25	12.01	11.38					
44	Chan	318.14	323.00	660.57	58.18	4.86	
1.25	11.97	11.35					
45	ROB	323.00	691.00	14658.48	2666.38	236.66	
27.66	11.38	5.50					

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

CROSS SECTION

RIVER: San Luis Rey Riv
REACH: Reach 1 RS: 3089

INPUT
Description:
Station Elevation Data num= 48

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev

0	26.2	18.5	27.1	27.2	26.81	45	26.2	66	24.2
80	22.2	84	20.2	89	18.2	94	16.2	98	14.2
102	12.2	114	12.6	139	12.2	158	11.3	164.8	10.99
182.3	10.2	191	8.2	220	6.5	250	4.9	280	4.9
310	4.9	340	4.9	370	4.7	430	4.9	470	6.6
500	7.5	520	8.2	535	10.2	549	12.2	565	14.2
567	16.2	569	18.2	571	20.2	573	22.2	583.86	32.07
584	32.2	594	42.2	609	52.2	616	56.2	620	62.2
623	64.2	628	66.2	635	68.2	641	70.2	648	72.2
661	74.2	676	76.2	699	78.2				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	191	.025	535	.05

Bank Sta: Left	Right	Lengths: Left Channel		Right	Coeff Contr.	Expan.
191	535	285.7	250.5	194.1	.1	.3

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	22.23	Element	Left OB	Channel
Right OB				
Vel Head (ft)	1.25	Wt. n-Val.	0.040	0.025
0.050				
W.S. Elev (ft)	20.98	Reach Len. (ft)	285.70	250.50
194.10				
Crit W.S. (ft)	14.93	Flow Area (sq ft)	926.66	5223.71
284.41				
E.G. Slope (ft/ft)	0.000652	Area (sq ft)	926.66	5223.71
284.41				
Q Total (cfs)	53000.00	Flow (cfs)	3622.07	48578.15
799.78				
Top Width (ft)	489.34	Top Width (ft)	108.56	344.00
36.78				
Vel Total (ft/s)	8.24	Avg. Vel. (ft/s)	3.91	9.30
2.81				
Max Chl Dpth (ft)	16.28	Hydr. Depth (ft)	8.54	15.19
7.73				
Conv. Total (cfs)	2076065.0	Conv. (cfs)	141880.1	1902857.0
31328.4				
Length Wtd. (ft)	251.65	Wetted Per. (ft)	110.74	344.29
39.86				
Min Ch El (ft)	4.70	Shear (lb/sq ft)	0.34	0.62
0.29				
Alpha	1.19	Stream Power (lb/ft s)	1.33	5.74
0.82				
Frctn Loss (ft)	0.26	Cum Volume (acre-ft)	32.75	253.61
37.42				
C & E Loss (ft)	0.15	Cum SA (acres)	6.34	26.21
6.39				

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.

Profile #100-yr

Percent Conv	Pos Hydr Depth(ft)	Left Sta Velocity (ft/s)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)
1	LOB	0.00	191.00	3622.07	926.66	110.74
6.83	8.54	3.91				
2	Chan	191.00	199.00	869.59	104.12	8.01
1.64	13.02	8.35				
3	Chan	199.00	207.00	922.44	107.87	8.01
1.74	13.48	8.55				
4	Chan	207.00	215.00	976.52	111.63	8.01
1.84	13.95	8.75				
5	Chan	215.00	223.00	1031.56	115.35	8.01
1.95	14.42	8.94				
6	Chan	223.00	231.00	1084.07	118.83	8.01
2.05	14.85	9.12				
7	Chan	231.00	239.00	1136.46	122.25	8.01
2.14	15.28	9.30				
8	Chan	239.00	247.00	1189.84	125.66	8.01
2.24	15.71	9.47				
9	Chan	247.00	255.00	1234.23	128.41	8.00
2.33	16.05	9.61				
10	Chan	255.00	263.00	1238.52	128.65	8.00
2.34	16.08	9.63				
11	Chan	263.00	271.00	1238.52	128.65	8.00
2.34	16.08	9.63				
12	Chan	271.00	279.00	1238.52	128.65	8.00
2.34	16.08	9.63				
13	Chan	279.00	287.00	1238.52	128.65	8.00
2.34	16.08	9.63				
14	Chan	287.00	295.00	1238.52	128.65	8.00
2.34	16.08	9.63				
15	Chan	295.00	303.00	1238.52	128.65	8.00
2.34	16.08	9.63				
16	Chan	303.00	311.00	1238.52	128.65	8.00
2.34	16.08	9.63				
17	Chan	311.00	319.00	1238.52	128.65	8.00
2.34	16.08	9.63				
18	Chan	319.00	327.00	1238.52	128.65	8.00
2.34	16.08	9.63				
19	Chan	327.00	335.00	1238.52	128.65	8.00
2.34	16.08	9.63				
20	Chan	335.00	343.00	1238.99	128.68	8.00
2.34	16.08	9.63				
21	Chan	343.00	351.00	1244.50	129.02	8.00
2.35	16.13	9.65				
22	Chan	351.00	359.00	1251.36	129.45	8.00
2.36	16.18	9.67				
23	Chan	359.00	367.00	1258.25	129.87	8.00
2.37	16.23	9.69				
24	Chan	367.00	375.00	1263.13	130.17	8.00
2.38	16.27	9.70				
25	Chan	375.00	383.00	1260.41	130.01	8.00
2.38	16.25	9.70				
26	Chan	383.00	391.00	1256.97	129.79	8.00
2.37	16.22	9.68				
27	Chan	391.00	399.00	1253.53	129.58	8.00
2.37	16.20	9.67				
28	Chan	399.00	407.00	1250.09	129.37	8.00
2.36	16.17	9.66				
29	Chan	407.00	415.00	1246.65	129.15	8.00

2.35	16.14	9.65					
30	Chan	415.00	423.00	1243.22	128.94	8.00	
2.35	16.12	9.64					
31	Chan	423.00	431.00	1239.39	128.71	8.00	
2.34	16.09	9.63					
32	Chan	431.00	439.00	1210.63	126.95	8.01	
2.28	15.87	9.54					
33	Chan	439.00	447.00	1167.71	124.23	8.01	
2.20	15.53	9.40					
34	Chan	447.00	455.00	1125.41	121.51	8.01	
2.12	15.19	9.26					
35	Chan	455.00	463.00	1083.73	118.79	8.01	
2.04	14.85	9.12					
36	Chan	463.00	471.00	1042.82	116.07	8.01	
1.97	14.51	8.98					
37	Chan	471.00	479.00	1009.97	113.85	8.00	
1.91	14.23	8.87					
38	Chan	479.00	487.00	981.74	111.93	8.00	
1.85	13.99	8.77					
39	Chan	487.00	495.00	953.83	110.01	8.00	
1.80	13.75	8.67					
40	Chan	495.00	503.00	925.89	108.06	8.00	
1.75	13.51	8.57					
41	Chan	503.00	511.00	894.94	105.89	8.00	
1.69	13.24	8.45					
42	Chan	511.00	519.00	863.61	103.65	8.00	
1.63	12.96	8.33					
43	Chan	519.00	527.00	796.20	99.00	8.06	
1.50	12.37	8.04					
44	Chan	527.00	535.00	685.29	90.51	8.07	
1.29	11.31	7.57					
45	ROB	535.00	699.00	799.78	284.41	39.86	
1.51	7.73	2.81					

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

CROSS SECTION

RIVER: San Luis Rey Riv
REACH: Reach 1 RS: 2839

INPUT
Description:
Station Elevation Data num= 56

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	38.2	81.8	37.6	105.3	36.2	139.9	35.5	153.6	34.2
181.7	32.2	217.8	30.2	242.8	29.3	256	28.2	289.7	26.2
316.8	25.6	329.6	24.2	353.8	22.2	362.3	20.2	369.8	18.2
377.8	16.2	385.55	14.2	420.95	12.2	439.7	11.57	480.7	10.2
483.8	8.2	502.2	4.5	598.5	4.5	610.8	7.5	647.6	7.5
654.96	6.6	674.6	6.6	689.95	7.4	727.25	8.2	739.4	10.2
749.5	12.2	762.1	14.2	777.55	16.2	783.5	17.5	786.7	18.2
789.1	20.2	791.6	22.2	794.7	24.2	799.8	28.2	804.8	32.2
807.7	34.2	811.6	36.2	813.8	38.2	817.7	40.2	821	42.2

825.9	46.2	833.7	50.2	837.7	52.2	841.6	54.2	845.3	56.2
850	58.2	862.4	62.2	868.6	64.2	882.9	66.2	897.3	68.2
955.33	72.2								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	439.7	.025	749.5	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
439.7	749.5	145.6	90.9	65.5	.1	.3

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	21.82	Element	Left OB	Channel
Right OB				
Vel Head (ft)	2.74	Wt. n-Val.	0.040	0.025
0.050				
W.S. Elev (ft)	19.07	Reach Len. (ft)	145.60	90.90
65.50				
Crit W.S. (ft)	16.76	Flow Area (sq ft)	389.24	3729.80
151.51				
E.G. Slope (ft/ft)	0.001903	Area (sq ft)	389.24	3729.80
151.51				
Q Total (cfs)	53000.00	Flow (cfs)	1910.17	50605.03
484.81				
Top Width (ft)	421.23	Top Width (ft)	73.18	309.80
38.25				
Vel Total (ft/s)	12.41	Avg. Vel. (ft/s)	4.91	13.57
3.20				
Max Chl Dpth (ft)	14.57	Hydr. Depth (ft)	5.32	12.04
3.96				
Conv. Total (cfs)	1214959.0	Conv. (cfs)	43788.2	1160057.0
11113.6				
Length Wtd. (ft)	91.87	Wetted Per. (ft)	73.86	311.58
39.07				
Min Ch El (ft)	4.50	Shear (lb/sq ft)	0.63	1.42
0.46				
Alpha	1.15	Stream Power (lb/ft s)	3.07	19.29
1.47				
Frctn Loss (ft)	0.15	Cum Volume (acre-ft)	28.44	227.86
36.45				
C & E Loss (ft)	0.21	Cum SA (acres)	5.75	24.33
6.22				

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

Profile #100-yr

Percent Conv	Pos Hydr Depth(ft)	Left Sta Velocity (ft/s)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)
1	LOB	0.00	439.70	1910.17	389.24	73.86
3.60	5.32	4.91				
2	Chan	439.70	446.90	540.66	54.94	7.21
1.02	7.63	9.84				
3	Chan	446.90	454.11	569.41	56.67	7.21

1.07	7.87	10.05					
4	Chan	454.11	461.31	598.75	58.41	7.21	
1.13	8.11	10.25					
5	Chan	461.31	468.52	628.68	60.14	7.21	
1.19	8.35	10.45					
6	Chan	468.52	475.72	659.18	61.87	7.21	
1.24	8.59	10.65					
7	Chan	475.72	482.93	691.21	65.13	7.63	
1.30	9.04	10.61					
8	Chan	482.93	490.13	1029.62	82.14	7.50	
1.94	11.40	12.54					
9	Chan	490.13	497.34	1277.53	92.74	7.35	
2.41	12.87	13.77					
10	Chan	497.34	504.54	1518.95	102.63	7.30	
2.87	14.24	14.80					
11	Chan	504.54	511.75	1592.23	105.01	7.20	
3.00	14.57	15.16					
12	Chan	511.75	518.95	1592.23	105.01	7.20	
3.00	14.57	15.16					
13	Chan	518.95	526.16	1592.23	105.01	7.20	
3.00	14.57	15.16					
14	Chan	526.16	533.36	1592.23	105.01	7.20	
3.00	14.57	15.16					
15	Chan	533.36	540.57	1592.23	105.01	7.20	
3.00	14.57	15.16					
16	Chan	540.57	547.77	1592.23	105.01	7.20	
3.00	14.57	15.16					
17	Chan	547.77	554.97	1592.23	105.01	7.20	
3.00	14.57	15.16					
18	Chan	554.97	562.18	1592.23	105.01	7.20	
3.00	14.57	15.16					
19	Chan	562.18	569.38	1592.23	105.01	7.20	
3.00	14.57	15.16					
20	Chan	569.38	576.59	1592.23	105.01	7.20	
3.00	14.57	15.16					
21	Chan	576.59	583.79	1592.23	105.01	7.20	
3.00	14.57	15.16					
22	Chan	583.79	591.00	1592.23	105.01	7.20	
3.00	14.57	15.16					
23	Chan	591.00	598.20	1592.23	105.01	7.20	
3.00	14.57	15.16					
24	Chan	598.20	605.41	1421.42	99.19	7.41	
2.68	13.77	14.33					
25	Chan	605.41	612.61	1145.66	86.94	7.36	
2.16	12.07	13.18					
26	Chan	612.61	619.82	1084.40	83.39	7.20	
2.05	11.57	13.00					
27	Chan	619.82	627.02	1084.40	83.39	7.20	
2.05	11.57	13.00					
28	Chan	627.02	634.23	1084.40	83.39	7.20	
2.05	11.57	13.00					
29	Chan	634.23	641.43	1084.40	83.39	7.20	
2.05	11.57	13.00					
30	Chan	641.43	648.63	1085.05	83.46	7.21	
2.05	11.58	13.00					
31	Chan	648.63	655.84	1168.24	87.43	7.25	
2.20	12.14	13.36					
32	Chan	655.84	663.04	1228.54	89.88	7.20	
2.32	12.47	13.67					
33	Chan	663.04	670.25	1228.54	89.88	7.20	
2.32	12.47	13.67					
34	Chan	670.25	677.45	1223.28	89.66	7.21	
2.31	12.45	13.64					

35	Chan	677.45	684.66	1172.76	87.45	7.21
2.21	12.14	13.41				
36	Chan	684.66	691.86	1114.37	84.80	7.21
2.10	11.77	13.14				
37	Chan	691.86	699.07	1081.38	83.26	7.21
2.04	11.56	12.99				
38	Chan	699.07	706.27	1057.39	82.15	7.21
2.00	11.40	12.87				
39	Chan	706.27	713.48	1033.62	81.03	7.21
1.95	11.25	12.76				
40	Chan	713.48	720.68	1010.06	79.92	7.21
1.91	11.09	12.64				
41	Chan	720.68	727.89	985.35	78.78	7.21
1.86	10.93	12.51				
42	Chan	727.89	735.09	867.31	73.32	7.30
1.64	10.18	11.83				
43	Chan	735.09	742.30	701.85	64.64	7.32
1.32	8.97	10.86				
44	Chan	742.30	749.50	529.66	54.67	7.34
1.00	7.59	9.69				
45	ROB	749.50	955.33	484.81	151.51	39.07
0.91	3.96	3.20				

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

CROSS SECTION

RIVER: San Luis Rey Riv
REACH: Reach 1 RS: 2748

INPUT
Description: I-5 Upstream Existing
Station Elevation Data num= 42

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	52.2	20.2	50.2	26.1	48.2	54.5	46.2	66.2	44.2
72.25	42.2	77.4	40.2	81.7	38.2	87.3	36.2	90.75	34.2
95.1	32.2	100.4	30.2	105.6	28.2	109.5	26.2	119.7	24.2
127.1	22.2	133	20.2	137.66	18.2	143	16.2	149.7	14.2
156.7	13.51	169.9	12.2	228.9	10.2	286.55	8.2	313.7	4.5
438.9	4.5	488.7	8.2	510.3	10.2	537.6	12.2	553.9	14.2
563.2	15.96	564.5	16.2	576.35	22.2	580.9	24.2	592	26.2
598.4	32.2	607.9	42.2	610.3	44.2	617.2	48.2	630.4	52.2
651	62.2	706.8	66.2						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	156.7	.025	553.9	.05

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
156.7	553.9	271.2	271 268.4	.1	.3

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	21.45	Element	Left OB	Channel
Right OB				
Vel Head (ft)	2.03	Wt. n-Val.	0.040	0.025
0.050				

W.S. Elev (ft)	19.42	Reach Len. (ft)	15.50	15.50
15.50				
Crit W.S. (ft)	16.11	Flow Area (sq ft)	80.80	4580.79
54.93				
E.G. Slope (ft/ft)	0.001437	Area (sq ft)	80.80	4580.79
54.93				
Q Total (cfs)	53000.00	Flow (cfs)	264.30	52605.11
130.59				
Top Width (ft)	436.04	Top Width (ft)	21.88	397.20
16.96				
Vel Total (ft/s)	11.24	Avg. Vel. (ft/s)	3.27	11.48
2.38				
Max Chl Dpth (ft)	14.92	Hydr. Depth (ft)	3.69	11.53
3.24				
Conv. Total (cfs)	1398326.0	Conv. (cfs)	6973.1	1387908.0
3445.5				
Length Wtd. (ft)	15.50	Wetted Per. (ft)	22.82	398.01
17.91				
Min Ch El (ft)	4.50	Shear (lb/sq ft)	0.32	1.03
0.28				
Alpha	1.04	Stream Power (lb/ft s)	1.04	11.85
0.65				
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	27.65	219.19
36.29				
C & E Loss (ft)	0.05	Cum SA (acres)	5.59	23.59
6.18				

Profile #100-yr

Percent Conv	Pos Hydr Depth(ft)	Left Sta Velocity (ft/s)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)
1	LOB	0.00	156.70	264.30	80.80	22.82
0.50	3.69	3.27				
2	Chan	156.70	165.94	436.81	58.82	9.28
0.82	6.37	7.43				
3	Chan	165.94	175.17	535.20	66.38	9.26
1.01	7.19	8.06				
4	Chan	175.17	184.41	582.46	69.78	9.24
1.10	7.55	8.35				
5	Chan	184.41	193.65	623.25	72.68	9.24
1.18	7.87	8.58				
6	Chan	193.65	202.89	665.14	75.57	9.24
1.25	8.18	8.80				
7	Chan	202.89	212.12	708.11	78.46	9.24
1.34	8.49	9.03				
8	Chan	212.12	221.36	752.15	81.35	9.24
1.42	8.81	9.25				
9	Chan	221.36	230.60	797.26	84.25	9.24
1.50	9.12	9.46				
10	Chan	230.60	239.83	844.12	87.18	9.24
1.59	9.44	9.68				
11	Chan	239.83	249.07	892.42	90.14	9.24
1.68	9.76	9.90				
12	Chan	249.07	258.31	941.80	93.10	9.24
1.78	10.08	10.12				
13	Chan	258.31	267.55	992.23	96.06	9.24
1.87	10.40	10.33				
14	Chan	267.55	276.78	1043.71	99.02	9.24

1.97	10.72	10.54					
15	Chan	276.78	286.02	1096.23	101.99	9.24	
2.07	11.04	10.75					
16	Chan	286.02	295.26	1214.38	108.80	9.32	
2.29	11.78	11.16					
17	Chan	295.26	304.50	1437.56	120.41	9.32	
2.71	13.04	11.94					
18	Chan	304.50	313.73	1676.35	132.04	9.32	
3.16	14.29	12.70					
19	Chan	313.73	322.97	1811.31	137.81	9.24	
3.42	14.92	13.14					
20	Chan	322.97	332.21	1811.31	137.81	9.24	
3.42	14.92	13.14					
21	Chan	332.21	341.44	1811.31	137.81	9.24	
3.42	14.92	13.14					
22	Chan	341.44	350.68	1811.31	137.81	9.24	
3.42	14.92	13.14					
23	Chan	350.68	359.92	1811.31	137.81	9.24	
3.42	14.92	13.14					
24	Chan	359.92	369.16	1811.31	137.81	9.24	
3.42	14.92	13.14					
25	Chan	369.16	378.39	1811.31	137.81	9.24	
3.42	14.92	13.14					
26	Chan	378.39	387.63	1811.31	137.81	9.24	
3.42	14.92	13.14					
27	Chan	387.63	396.87	1811.31	137.81	9.24	
3.42	14.92	13.14					
28	Chan	396.87	406.10	1811.31	137.81	9.24	
3.42	14.92	13.14					
29	Chan	406.10	415.34	1811.31	137.81	9.24	
3.42	14.92	13.14					
30	Chan	415.34	424.58	1811.31	137.81	9.24	
3.42	14.92	13.14					
31	Chan	424.58	433.82	1811.31	137.81	9.24	
3.42	14.92	13.14					
32	Chan	433.82	443.05	1795.81	137.17	9.25	
3.39	14.85	13.09					
33	Chan	443.05	452.29	1678.28	131.79	9.26	
3.17	14.27	12.73					
34	Chan	452.29	461.53	1545.90	125.45	9.26	
2.92	13.58	12.32					
35	Chan	461.53	470.77	1417.91	119.11	9.26	
2.68	12.89	11.90					
36	Chan	470.77	480.00	1294.38	112.77	9.26	
2.44	12.21	11.48					
37	Chan	480.00	489.24	1175.28	106.43	9.26	
2.22	11.52	11.04					
38	Chan	489.24	498.48	1044.63	99.22	9.28	
1.97	10.74	10.53					
39	Chan	498.48	507.71	909.72	91.32	9.28	
1.72	9.89	9.96					
40	Chan	507.71	516.95	789.66	83.85	9.27	
1.49	9.08	9.42					
41	Chan	516.95	526.19	693.25	77.53	9.26	
1.31	8.39	8.94					
42	Chan	526.19	535.43	602.62	71.28	9.26	
1.14	7.72	8.45					
43	Chan	535.43	544.66	499.69	63.80	9.30	
0.94	6.91	7.83					
44	Chan	544.66	553.90	371.71	53.45	9.31	
0.70	5.79	6.95					
45	ROB	553.90	706.80	130.59	54.93	17.91	
0.25	3.24	2.38					

BRIDGE

RIVER: San Luis Rey Riv
REACH: Reach 1 RS: 2500

INPUT
Description: San Diego Freeways
Distance from Upstream XS = 15.5
Deck/Roadway Width = 248.36
Weir Coefficient = 2.6
Upstream Deck/Roadway Coordinates
num= 4

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
0	63.615	0	72.7	63.615	0	72.7	63.615	56.299
712.8	66.634	59.318						

Upstream Bridge Cross Section Data
Station Elevation Data num= 42

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	52.2	20.2	50.2	26.1	48.2	54.5	46.2	66.2	44.2
72.25	42.2	77.4	40.2	81.7	38.2	87.3	36.2	90.75	34.2
95.1	32.2	100.4	30.2	105.6	28.2	109.5	26.2	119.7	24.2
127.1	22.2	133	20.2	137.66	18.2	143	16.2	149.7	14.2
156.7	13.51	169.9	12.2	228.9	10.2	286.55	8.2	313.7	4.5
438.9	4.5	488.7	8.2	510.3	10.2	537.6	12.2	553.9	14.2
563.2	15.96	564.5	16.2	576.35	22.2	580.9	24.2	592	26.2
598.4	32.2	607.9	42.2	610.3	44.2	617.2	48.2	630.4	52.2
651	62.2	706.8	66.2						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	156.7	.025	553.9	.05

Bank Sta: Left	Right	Coeff Contr.	Expan.
156.7	553.9	.1	.3

Downstream Deck/Roadway Coordinates
num= 6

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
0	63.615	0	137	63.615	0	137	63.615	56.299
815	66.634	59.318	815	66.634	0	894	66.634	0

Downstream Bridge Cross Section Data
Station Elevation Data num= 46

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	62.2	8	58.2	13	54.2	20	50.2	26	46.2
31	42.2	37	38.2	43	34.2	45	32.2	51	28.2
57	24.2	60	22.2	75	20.2	93	18.2	111	16.2
128	14.2	160	12.2	241.3	11.4	362	10.2	431	8.2
460	4.4	490	4.4	520	4.4	550	4.4	580	4.4
610	4.4	622	8.2	645	10.2	682.1	12.2	712	14.2
717	16.2	720	18.2	725	20.2	729	22.2	737	26.2
743	28.2	753	30.2	768.45	31.41	778.6	32.2	780	32.49
792.6	34.2	806	36.2	818	40.2	829	42.2	845	46.2
893.04	69.8								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	362	.025	645	.04

```
Bank Sta: Left   Right    Coeff Contr.   Expan.
           362     645            .1       .3

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

Number of Piers =  5

Pier Data
Pier Station     Upstream=   156.7    Downstream=     221
Upstream     num=        2
    Width   Elev    Width   Elev
     7.5       0     7.5      60
Downstream     num=        2
    Width   Elev    Width   Elev
     7.5       0     7.5      60

Pier Data
Pier Station     Upstream=   289.7    Downstream=     354
Upstream     num=        2
    Width   Elev    Width   Elev
     7.5       0     7.5      60
Downstream     num=        2
    Width   Elev    Width   Elev
     7.5       0     7.5      60

Pier Data
Pier Station     Upstream=   422.7    Downstream=     487
Upstream     num=        2
    Width   Elev    Width   Elev
     7.5       0     7.5      60
Downstream     num=        2
    Width   Elev    Width   Elev
     7.5       0     7.5      60

Pier Data
Pier Station     Upstream=   555.7    Downstream=     620
Upstream     num=        2
    Width   Elev    Width   Elev
     7.5       0     7.5      60
Downstream     num=        2
    Width   Elev    Width   Elev
     7.5       0     7.5      60

Pier Data
Pier Station     Upstream=   688.7    Downstream=     753
Upstream     num=        2
    Width   Elev    Width   Elev
     7.5       0     7.5      60
Downstream     num=        2
    Width   Elev    Width   Elev
     7.5       0     7.5      60

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
       Energy
```

Selected Low Flow Methods = Highest Energy Answer

High Flow Method
Energy Only

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

BRIDGE OUTPUT Profile #100-yr

E.G. US. (ft)	21.45	Element	Inside BR US
Inside BR DS			
W.S. US. (ft)	19.42	E.G. Elev (ft)	21.38
20.70			
Q Total (cfs)	53000.00	W.S. Elev (ft)	18.85
18.66			
Q Bridge (cfs)	53000.00	Crit W.S. (ft)	16.40
16.35			
Q Weir (cfs)		Max Chl Dpth (ft)	14.35
14.26			
Weir Sta Lft (ft)		Vel Total (ft/s)	12.60
9.98			
Weir Sta Rgt (ft)		Flow Area (sq ft)	4206.73
5310.95			
Weir Submerg		Froude # Chl	0.68
0.63			
Weir Max Depth (ft)		Specif Force (cu ft)	45470.20
46700.45			
Min El Weir Flow (ft)	63.63	Hydr Depth (ft)	10.42
9.58			
Min El Prs (ft)	59.00	W.P. Total (ft)	475.94
638.07			
Delta EG (ft)	0.84	Conv. Total (cfs)	1100397.0
1194316.0			
Delta WS (ft)	0.60	Top Width (ft)	403.60
554.15			
BR Open Area (sq ft)	23026.90	Frctn Loss (ft)	0.53
0.01			
BR Open Vel (ft/s)	12.60	C & E Loss (ft)	0.15
0.07			
Coef of Q		Shear Total (lb/sq ft)	1.28
1.02			
Br Sel Method	Energy only	Power Total (lb/ft s)	16.13
10.21			

CROSS SECTION

RIVER: San Luis Rey Riv
REACH: Reach 1 RS: 2477

INPUT
Description: Upstream side of Pacific Coast Highway
Station Elevation Data num= 46

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	62.2	8	58.2	13	54.2	20	50.2	26	46.2

31	42.2	37	38.2	43	34.2	45	32.2	51	28.2
57	24.2	60	22.2	75	20.2	93	18.2	111	16.2
128	14.2	160	12.2	241.3	11.4	362	10.2	431	8.2
460	4.4	490	4.4	520	4.4	550	4.4	580	4.4
610	4.4	622	8.2	645	10.2	682.1	12.2	712	14.2
717	16.2	720	18.2	725	20.2	729	22.2	737	26.2
743	28.2	753	30.2	768.45	31.41	778.6	32.2	780	32.49
792.6	34.2	806	36.2	818	40.2	829	42.2	845	46.2
893.04	69.8								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	362	.025	645	.04

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
362	645	115	53.3	94.9	.1	.3

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	20.62	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.80	Wt. n-Val.	0.040	0.025	0.040
W.S. Elev (ft)	18.82	Reach Len. (ft)	7.00	7.00	7.00
Crit W.S. (ft)	16.09	Flow Area (sq ft)	1810.24	3560.56	473.96
E.G. Slope (ft/ft)	0.001360	Area (sq ft)	1810.24	3560.56	473.96
Q Total (cfs)	53000.00	Flow (cfs)	8712.34	42121.43	2166.23
Top Width (ft)	634.10	Top Width (ft)	274.55	283.00	76.54
Vel Total (ft/s)	9.07	Avg. Vel. (ft/s)	4.81	11.83	4.57
Max Chl Dpth (ft)	14.42	Hydr. Depth (ft)	6.59	12.58	6.19
Conv. Total (cfs)	1437243.0	Conv. (cfs)	236259.3	1142240.0	58743.3
Length Wtd. (ft)	7.00	Wetted Per. (ft)	274.89	283.95	77.77
Min Ch El (ft)	4.40	Shear (lb/sq ft)	0.56	1.06	0.52
Alpha	1.41	Stream Power (lb/ft s)	2.69	12.59	2.36
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	22.87	195.81	34.82
C & E Loss (ft)	0.01	Cum SA (acres)	4.90	21.57	5.91

Profile #100-yr

Percent Conv	Pos Hydr Depth(ft)	Left Sta Velocity (ft/s)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)
1	LOB	0.00	362.00	8712.34	1810.24	274.89
16.44	6.59	4.81				
2	Chan	362.00	368.58	522.78	57.34	6.58

0.99	8.71	9.12					
3	Chan		368.58	375.16	541.99	58.60	6.58
1.02	8.90	9.25					
4	Chan		375.16	381.74	561.49	59.85	6.58
1.06	9.09	9.38					
5	Chan		381.74	388.33	581.26	61.11	6.58
1.10	9.28	9.51					
6	Chan		388.33	394.91	601.29	62.36	6.58
1.13	9.48	9.64					
7	Chan		394.91	401.49	621.61	63.62	6.58
1.17	9.67	9.77					
8	Chan		401.49	408.07	642.19	64.87	6.58
1.21	9.86	9.90					
9	Chan		408.07	414.65	663.03	66.13	6.58
1.25	10.05	10.03					
10	Chan		414.65	421.23	684.14	67.38	6.58
1.29	10.24	10.15					
11	Chan		421.23	427.81	705.52	68.64	6.58
1.33	10.43	10.28					
12	Chan		427.81	434.40	735.33	70.48	6.61
1.39	10.71	10.43					
13	Chan		434.40	440.98	825.03	75.64	6.64
1.56	11.49	10.91					
14	Chan		440.98	447.56	930.77	81.32	6.64
1.76	12.36	11.45					
15	Chan		447.56	454.14	1041.55	86.99	6.64
1.97	13.22	11.97					
16	Chan		454.14	460.72	1157.25	92.63	6.63
2.18	14.08	12.49					
17	Chan		460.72	467.30	1210.59	94.89	6.58
2.28	14.42	12.76					
18	Chan		467.30	473.88	1210.59	94.89	6.58
2.28	14.42	12.76					
19	Chan		473.88	480.47	1210.59	94.89	6.58
2.28	14.42	12.76					
20	Chan		480.47	487.05	1210.59	94.89	6.58
2.28	14.42	12.76					
21	Chan		487.05	493.63	1210.59	94.89	6.58
2.28	14.42	12.76					
22	Chan		493.63	500.21	1210.59	94.89	6.58
2.28	14.42	12.76					
23	Chan		500.21	506.79	1210.59	94.89	6.58
2.28	14.42	12.76					
24	Chan		506.79	513.37	1210.58	94.88	6.58
2.28	14.42	12.76					
25	Chan		513.37	519.95	1210.59	94.89	6.58
2.28	14.42	12.76					
26	Chan		519.95	526.53	1210.59	94.89	6.58
2.28	14.42	12.76					
27	Chan		526.53	533.12	1210.58	94.88	6.58
2.28	14.42	12.76					
28	Chan		533.12	539.70	1210.59	94.89	6.58
2.28	14.42	12.76					
29	Chan		539.70	546.28	1210.58	94.88	6.58
2.28	14.42	12.76					
30	Chan		546.28	552.86	1210.59	94.89	6.58
2.28	14.42	12.76					
31	Chan		552.86	559.44	1210.58	94.88	6.58
2.28	14.42	12.76					
32	Chan		559.44	566.02	1210.59	94.89	6.58
2.28	14.42	12.76					
33	Chan		566.02	572.60	1210.59	94.89	6.58
2.28	14.42	12.76					

34	Chan	572.60	579.19	1210.58	94.88	6.58
2.28	14.42	12.76				
35	Chan	579.19	585.77	1210.59	94.89	6.58
2.28	14.42	12.76				
36	Chan	585.77	592.35	1210.58	94.88	6.58
2.28	14.42	12.76				
37	Chan	592.35	598.93	1210.59	94.89	6.58
2.28	14.42	12.76				
38	Chan	598.93	605.51	1210.59	94.89	6.58
2.28	14.42	12.76				
39	Chan	605.51	612.09	1183.62	94.19	6.68
2.23	14.31	12.57				
40	Chan	612.09	618.67	950.76	83.67	6.90
1.79	12.71	11.36				
41	Chan	618.67	625.26	736.52	71.17	6.76
1.39	10.81	10.35				
42	Chan	625.26	631.84	661.56	66.13	6.61
1.25	10.05	10.00				
43	Chan	631.84	638.42	599.95	62.36	6.61
1.13	9.48	9.62				
44	Chan	638.42	645.00	540.79	58.60	6.61
1.02	8.90	9.23				
45	ROB	645.00	893.04	2166.23	473.96	77.77
4.09	6.19	4.57				

BRIDGE

RIVER: San Luis Rey Riv
REACH: Reach 1 RS: 2430

INPUT
Description: Pacific Coast Highway
Distance from Upstream XS = 7
Deck/Roadway Width = 45
Weir Coefficient = 2.6
Upstream Deck/Roadway Coordinates
num= 2

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
0	61.6	54.6	893	64	57

Upstream Bridge Cross Section Data
Station Elevation Data num= 46

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	62.2	8	58.2	13	54.2	20	50.2	26	46.2
31	42.2	37	38.2	43	34.2	45	32.2	51	28.2
57	24.2	60	22.2	75	20.2	93	18.2	111	16.2
128	14.2	160	12.2	241.3	11.4	362	10.2	431	8.2
460	4.4	490	4.4	520	4.4	550	4.4	580	4.4
610	4.4	622	8.2	645	10.2	682.1	12.2	712	14.2
717	16.2	720	18.2	725	20.2	729	22.2	737	26.2
743	28.2	753	30.2	768.45	31.41	778.6	32.2	780	32.49
792.6	34.2	806	36.2	818	40.2	829	42.2	845	46.2
893.04	69.8								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.04	362	.025	645	.04

Bank Sta: Left Right Coeff Contr. Expan.
362 645 .1 .3

```
Downstream  Deck/Roadway Coordinates
    num=        4
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
       0     61.6    54.6  834.41      64       57  834.41      64       0
  857.61      64       0

Downstream Bridge Cross Section Data
Station Elevation Data    num=      34
     Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev
       0     48.2        6     44.2        9     42.2       17     37.2       25     32.2
      30     28.2       38     24.2       41     22.2       43     18.2       50     16.2
      53     14.2       62     12.2       74     12.2      102     12.2      180    11.52
     331     10.2      341      8.2   406.05      4.4      450      4.4      480      4.4
     510      4.4      540      4.5      570      4.5      586      8.2      620     10.2
     661     12.2      692     14.2   693.43    14.38      708     16.2      718     18.2
     737     20.2      833     22.2    834.8     28.2   848.27     32.2

Manning's n Values        num=       3
     Sta   n Val      Sta   n Val      Sta   n Val
       0     .03      331    .025      620     .04

Bank Sta: Left   Right    Coeff Contr.    Expan.
           331     620             .1        .3

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

Number of Piers =  2

Pier Data
Pier Station     Upstream=     400    Downstream=     400
Upstream     num=        2
    Width   Elev    Width   Elev
      7.5       0     7.5      60
Downstream     num=        2
    Width   Elev    Width   Elev
      7.5       0     7.5      60

Pier Data
Pier Station     Upstream=     610    Downstream=     590
Upstream     num=        2
    Width   Elev    Width   Elev
      7.5       0     7.5      58
Downstream     num=        2
    Width   Elev    Width   Elev
      7.5       0     7.5      58

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
       Energy
Selected Low Flow Methods = Highest Energy Answer

High Flow Method
       Energy Only

Additional Bridge Parameters
```

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

BRIDGE OUTPUT Profile #100-yr

E.G. US. (ft)	20.62	Element	Inside BR US
Inside BR DS			
W.S. US. (ft)	18.82	E.G. Elev (ft)	20.60
20.35			
Q Total (cfs)	53000.00	W.S. Elev (ft)	18.73
19.09			
Q Bridge (cfs)	53000.00	Crit W.S. (ft)	16.32
15.67			
Q Weir (cfs)		Max Chl Dpth (ft)	14.33
14.69			
Weir Sta Lft (ft)		Vel Total (ft/s)	9.44
8.23			
Weir Sta Rgt (ft)		Flow Area (sq ft)	5612.39
6437.67			
Weir Submerg		Froude # Chl	0.60
0.48			
Weir Max Depth (ft)		Specif Force (cu ft)	47084.77
50042.44			
Min El Weir Flow (ft)	61.61	Hydr Depth (ft)	9.08
9.62			
Min El Prs (ft)	56.93	W.P. Total (ft)	667.15
721.77			
Delta EG (ft)	0.27	Conv. Total (cfs)	1255049.0
1583507.0			
Delta WS (ft)	-0.28	Top Width (ft)	618.10
668.88			
BR Open Area (sq ft)	33155.16	Frctn Loss (ft)	0.06
0.00			
BR Open Vel (ft/s)	9.44	C & E Loss (ft)	0.18
0.00			
Coef of Q		Shear Total (lb/sq ft)	0.94
0.62			
Br Sel Method	Energy only	Power Total (lb/ft s)	8.84
5.14			

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

CROSS SECTION

RIVER: San Luis Rey Riv
REACH: Reach 1 RS: 2424

INPUT
Description: Downstream Side of Pacific Coast Highway
Station Elevation Data num= 34

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	48.2	6	44.2	9	42.2	17	37.2	25	32.2
30	28.2	38	24.2	41	22.2	43	18.2	50	16.2
53	14.2	62	12.2	74	12.2	102	12.2	180	11.52

331	10.2	341	8.2	406.05	4.4	450	4.4	480	4.4
510	4.4	540	4.5	570	4.5	586	8.2	620	10.2
661	12.2	692	14.2	693.43	14.38	708	16.2	718	18.2
737	20.2	833	22.2	834.8	28.2	848.27	32.2		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.03	331	.025	620	.04

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
331	620	132.5	204	231.1	.1	.3

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	20.35	Element	Left OB	Channel
Right OB				
Vel Head (ft)	1.26	Wt. n-Val.	0.030	0.025
0.040				
W.S. Elev (ft)	19.09	Reach Len. (ft)	132.50	204.00
231.10				
Crit W.S. (ft)	15.46	Flow Area (sq ft)	2161.38	3875.92
591.34				
E.G. Slope (ft/ft)	0.000891	Area (sq ft)	2161.38	3875.92
591.34				
Q Total (cfs)	53000.00	Flow (cfs)	12192.78	38756.63
2050.59				
Top Width (ft)	683.93	Top Width (ft)	288.45	289.00
106.49				
Vel Total (ft/s)	8.00	Avg. Vel. (ft/s)	5.64	10.00
3.47				
Max Chl Dpth (ft)	14.69	Hydr. Depth (ft)	7.49	13.41
5.55				
Conv. Total (cfs)	1775088.0	Conv. (cfs)	408363.2	1298046.0
68678.8				
Length Wtd. (ft)	192.50	Wetted Per. (ft)	290.11	289.79
106.97				
Min Ch El (ft)	4.40	Shear (lb/sq ft)	0.41	0.74
0.31				
Alpha	1.27	Stream Power (lb/ft s)	2.34	7.44
1.07				
Frctn Loss (ft)	0.24	Cum Volume (acre-ft)	20.48	191.50
34.18				
C & E Loss (ft)	0.12	Cum SA (acres)	4.55	21.24
5.80				

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.

Profile #100-yr

Pos		Left Sta	Right Sta	Flow	Area	W.P.	Percent
Hydr	Velocity (ft)	(ft)	(ft)	(cfs)	(sq ft)	(ft)	
Conv	Depth(ft)	(ft/s)					

1	LOB	0.00	331.00	12192.78	2161.38	290.11
23.01	7.49	5.64				
2	Chan	331.00	337.72	502.11	64.29	6.85
0.95	9.57	7.81				
3	Chan	337.72	344.44	617.01	72.49	6.79
1.16	10.78	8.51				
4	Chan	344.44	351.16	669.90	75.88	6.73
1.26	11.29	8.83				
5	Chan	351.16	357.88	709.17	78.52	6.73
1.34	11.68	9.03				
6	Chan	357.88	364.60	749.33	81.16	6.73
1.41	12.08	9.23				
7	Chan	364.60	371.33	790.38	83.80	6.73
1.49	12.47	9.43				
8	Chan	371.33	378.05	832.29	86.44	6.73
1.57	12.86	9.63				
9	Chan	378.05	384.77	875.07	89.08	6.73
1.65	13.25	9.82				
10	Chan	384.77	391.49	918.69	91.72	6.73
1.73	13.65	10.02				
11	Chan	391.49	398.21	963.16	94.36	6.73
1.82	14.04	10.21				
12	Chan	398.21	404.93	1008.48	96.99	6.73
1.90	14.43	10.40				
13	Chan	404.93	411.65	1039.48	98.72	6.72
1.96	14.69	10.53				
14	Chan	411.65	418.37	1040.32	98.75	6.72
1.96	14.69	10.53				
15	Chan	418.37	425.09	1040.32	98.75	6.72
1.96	14.69	10.53				
16	Chan	425.09	431.81	1040.32	98.75	6.72
1.96	14.69	10.53				
17	Chan	431.81	438.53	1040.32	98.75	6.72
1.96	14.69	10.53				
18	Chan	438.53	445.26	1040.32	98.75	6.72
1.96	14.69	10.53				
19	Chan	445.26	451.98	1040.32	98.75	6.72
1.96	14.69	10.53				
20	Chan	451.98	458.70	1040.32	98.75	6.72
1.96	14.69	10.53				
21	Chan	458.70	465.42	1040.32	98.75	6.72
1.96	14.69	10.53				
22	Chan	465.42	472.14	1040.32	98.75	6.72
1.96	14.69	10.53				
23	Chan	472.14	478.86	1040.32	98.75	6.72
1.96	14.69	10.53				
24	Chan	478.86	485.58	1040.32	98.75	6.72
1.96	14.69	10.53				
25	Chan	485.58	492.30	1040.32	98.75	6.72
1.96	14.69	10.53				
26	Chan	492.30	499.02	1040.32	98.75	6.72
1.96	14.69	10.53				
27	Chan	499.02	505.74	1040.32	98.75	6.72
1.96	14.69	10.53				
28	Chan	505.74	512.47	1040.14	98.74	6.72
1.96	14.69	10.53				
29	Chan	512.47	519.19	1038.03	98.62	6.72
1.96	14.67	10.53				
30	Chan	519.19	525.91	1035.39	98.47	6.72
1.95	14.65	10.51				
31	Chan	525.91	532.63	1032.75	98.32	6.72
1.95	14.63	10.50				
32	Chan	532.63	539.35	1030.11	98.17	6.72

1.94	14.61	10.49				
33	Chan	539.35	546.07	1028.56	98.08	6.72
1.94	14.59	10.49				
34	Chan	546.07	552.79	1028.55	98.08	6.72
1.94	14.59	10.49				
35	Chan	552.79	559.51	1028.55	98.08	6.72
1.94	14.59	10.49				
36	Chan	559.51	566.23	1028.54	98.08	6.72
1.94	14.59	10.49				
37	Chan	566.23	572.95	1003.24	97.07	6.80
1.89	14.44	10.33				
38	Chan	572.95	579.67	847.97	88.27	6.90
1.60	13.13	9.61				
39	Chan	579.67	586.40	688.25	77.84	6.89
1.30	11.58	8.84				
40	Chan	586.40	593.12	609.87	71.73	6.73
1.15	10.67	8.50				
41	Chan	593.12	599.84	572.69	69.07	6.73
1.08	10.28	8.29				
42	Chan	599.84	606.56	536.44	66.42	6.73
1.01	9.88	8.08				
43	Chan	606.56	613.28	501.15	63.76	6.73
0.95	9.49	7.86				
44	Chan	613.28	620.00	466.83	61.10	6.73
0.88	9.09	7.64				
45	ROB	620.00	848.27	2050.59	591.34	106.97
3.87	5.55	3.47				

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

CROSS SECTION

RIVER: San Luis Rey Riv
REACH: Reach 1 RS: 2220

INPUT
Description:
Station Elevation Data num= 27

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	34.2	3.5	32.2	6	30.2	9	28.2	11.3	26.2
14.7	24.2	19	22.2	51.8	20.2	65	18.2	73.8	16.2
145	14.2	180.72	13.35	229	12.2	259.1	10.2	290.6	8.2
327	4.4	445	4.4	482.8	6.7	575.9	7.7	593.1	8.2
597.5	10.2	602.2	12.2	606.4	14.2	610.2	16.2	618	20.2
622	22.2	626.4	22.3						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.03	290.6	.025	597.5	.04

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
290.6	597.5	343.8	389.9	420.4	.1	.3

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	19.99	Element	Left OB	Channel
Right OB				
Vel Head (ft)	2.44	Wt. n-Val.	0.030	0.025
0.040				
W.S. Elev (ft)	17.55	Reach Len. (ft)	343.80	389.90
420.40				
Crit W.S. (ft)	15.62	Flow Area (sq ft)	991.91	3581.67
58.89				
E.G. Slope (ft/ft)	0.001852	Area (sq ft)	991.91	3581.67
58.89				
Q Total (cfs)	53000.00	Flow (cfs)	5717.30	47067.31
215.39				
Top Width (ft)	545.00	Top Width (ft)	222.76	306.90
15.34				
Vel Total (ft/s)	11.44	Avg. Vel. (ft/s)	5.76	13.14
3.66				
Max Chl Dpth (ft)	13.15	Hydr. Depth (ft)	4.45	11.67
3.84				
Conv. Total (cfs)	1231454.0	Conv. (cfs)	132841.3	1093608.0
5004.5				
Length Wtd. (ft)	388.15	Wetted Per. (ft)	223.09	307.61
17.02				
Min Ch El (ft)	4.40	Shear (lb/sq ft)	0.51	1.35
0.40				
Alpha	1.20	Stream Power (lb/ft s)	2.96	17.69
1.46				
Frctn Loss (ft)	0.98	Cum Volume (acre-ft)	15.69	174.04
32.45				
C & E Loss (ft)	0.13	Cum SA (acres)	3.78	19.84
5.48				

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

Profile #100-yr

Percent Conv	Pos Hydr Depth(ft)	Left Sta Velocity (ft/s)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)
1	LOB	0.00	290.60	5717.30	991.91	223.09
10.79	4.45	5.76				
2	Chan	290.60	297.74	799.41	69.43	7.18
1.51	9.73	11.51				
3	Chan	297.74	304.87	904.06	74.74	7.18
1.71	10.47	12.10				
4	Chan	304.87	312.01	1013.78	80.06	7.18
1.91	11.22	12.66				
5	Chan	312.01	319.15	1128.48	85.38	7.18
2.13	11.96	13.22				
6	Chan	319.15	326.29	1248.04	90.70	7.18
2.35	12.71	13.76				
7	Chan	326.29	333.42	1325.76	93.86	7.14
2.50	13.15	14.12				

8	Chan	333.42	340.56	1326.87	93.89	7.14
2.50	13.15	14.13				
9	Chan	340.56	347.70	1326.87	93.89	7.14
2.50	13.15	14.13				
10	Chan	347.70	354.83	1326.87	93.89	7.14
2.50	13.15	14.13				
11	Chan	354.83	361.97	1326.87	93.89	7.14
2.50	13.15	14.13				
12	Chan	361.97	369.11	1326.87	93.89	7.14
2.50	13.15	14.13				
13	Chan	369.11	376.25	1326.87	93.89	7.14
2.50	13.15	14.13				
14	Chan	376.25	383.38	1326.87	93.89	7.14
2.50	13.15	14.13				
15	Chan	383.38	390.52	1326.87	93.89	7.14
2.50	13.15	14.13				
16	Chan	390.52	397.66	1326.87	93.89	7.14
2.50	13.15	14.13				
17	Chan	397.66	404.80	1326.87	93.89	7.14
2.50	13.15	14.13				
18	Chan	404.80	411.93	1326.87	93.89	7.14
2.50	13.15	14.13				
19	Chan	411.93	419.07	1326.87	93.89	7.14
2.50	13.15	14.13				
20	Chan	419.07	426.21	1326.87	93.89	7.14
2.50	13.15	14.13				
21	Chan	426.21	433.34	1326.87	93.89	7.14
2.50	13.15	14.13				
22	Chan	433.34	440.48	1326.87	93.89	7.14
2.50	13.15	14.13				
23	Chan	440.48	447.62	1321.36	93.68	7.14
2.49	13.13	14.11				
24	Chan	447.62	454.76	1262.63	91.20	7.15
2.38	12.78	13.84				
25	Chan	454.76	461.89	1191.92	88.10	7.15
2.25	12.34	13.53				
26	Chan	461.89	469.03	1122.86	85.00	7.15
2.12	11.91	13.21				
27	Chan	469.03	476.17	1055.45	81.90	7.15
1.99	11.48	12.89				
28	Chan	476.17	483.30	989.94	78.81	7.15
1.87	11.04	12.56				
29	Chan	483.30	490.44	956.71	77.16	7.14
1.81	10.81	12.40				
30	Chan	490.44	497.58	945.43	76.61	7.14
1.78	10.73	12.34				
31	Chan	497.58	504.72	934.21	76.07	7.14
1.76	10.66	12.28				
32	Chan	504.72	511.85	923.03	75.52	7.14
1.74	10.58	12.22				
33	Chan	511.85	518.99	911.92	74.97	7.14
1.72	10.50	12.16				
34	Chan	518.99	526.13	900.85	74.42	7.14
1.70	10.43	12.10				
35	Chan	526.13	533.27	889.84	73.88	7.14
1.68	10.35	12.04				
36	Chan	533.27	540.40	878.88	73.33	7.14
1.66	10.27	11.99				
37	Chan	540.40	547.54	867.98	72.78	7.14
1.64	10.20	11.93				
38	Chan	547.54	554.68	857.13	72.24	7.14
1.62	10.12	11.87				
39	Chan	554.68	561.81	846.34	71.69	7.14

1.60	10.04	11.81				
40	Chan	561.81	568.95	835.60	71.14	7.14
1.58	9.97	11.75				
41	Chan	568.95	576.09	824.90	70.59	7.14
1.56	9.89	11.69				
42	Chan	576.09	583.23	804.59	69.56	7.14
1.52	9.75	11.57				
43	Chan	583.23	590.36	776.24	68.07	7.14
1.46	9.54	11.40				
44	Chan	590.36	597.50	646.97	62.48	7.57
1.22	8.75	10.36				
45	ROB	597.50	626.40	215.39	58.89	17.02
0.41	3.84	3.66				

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

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

CROSS SECTION

RIVER: San Luis Rey Riv
REACH: Reach 1 RS: 1829

INPUT
Description:
Station Elevation Data num= 27

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	22.2	3.5	20.2	26	18.2	52	16.2	69	14.2
93.3	13.02	110	12.2	160	10.2	178	8.2	183	6.2
210	3.9	240	3.9	270	3.9	300	3.9	330	3.9
360	3.9	366	6.2	438.1	7.66	470	8.2	569.8	10.2
574.5	12.2	578.8	14.2	583.3	16.2	587.4	18.2	592.4	20.2
601	21.7	681.7	22.2						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.03	178	.025	438.1	.04

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
178	438.1	209.9	206.9 213.2	.1	.3

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	18.88	Element	Left OB	Channel
Right OB				
Vel Head (ft)	3.76	Wt. n-Val.	0.030	0.025
0.040				
W.S. Elev (ft)	15.13	Reach Len. (ft)	209.90	206.90
213.20				
Crit W.S. (ft)	15.13	Flow Area (sq ft)	385.47	2646.98
848.67				
E.G. Slope (ft/ft)	0.003609	Area (sq ft)	385.47	2646.98
848.67				
Q Total (cfs)	53000.00	Flow (cfs)	2537.70	44278.89
6183.41				
Top Width (ft)	519.75	Top Width (ft)	116.87	260.10

142.78				
Vel Total (ft/s)	13.66	Avg. Vel. (ft/s)	6.58	16.73
7.29				
Max Chl Dpth (ft)	11.23	Hydr. Depth (ft)	3.30	10.18
5.94				
Conv. Total (cfs)	882264.8	Conv. (cfs)	42243.8	737088.7
102932.2				
Length Wtd. (ft)	208.15	Wetted Per. (ft)	117.13	261.02
143.85				
Min Ch El (ft)	3.90	Shear (lb/sq ft)	0.74	2.28
1.33				
Alpha	1.30	Stream Power (lb/ft s)	4.88	38.22
9.68				
Frctn Loss (ft)	0.71	Cum Volume (acre-ft)	10.25	146.16
28.07				
C & E Loss (ft)	0.18	Cum SA (acres)	2.43	17.30
4.72				

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

Profile #100-yr

Percent Conv	Pos Hydr Depth(ft)	Left Sta Velocity (ft/s)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)
1	LOB	0.00	178.00	2537.70	385.47	117.13
4.79	3.30	6.58				
2	Chan	178.00	184.05	670.61	49.04	6.44
1.27	8.11	13.68				
3	Chan	184.05	190.10	872.41	56.09	6.07
1.65	9.27	15.55				
4	Chan	190.10	196.15	954.69	59.21	6.07
1.80	9.79	16.12				
5	Chan	196.15	202.20	1039.91	62.32	6.07
1.96	10.30	16.69				
6	Chan	202.20	208.24	1128.03	65.44	6.07
2.13	10.82	17.24				
7	Chan	208.24	214.29	1197.86	67.77	6.06
2.26	11.20	17.67				
8	Chan	214.29	220.34	1202.57	67.90	6.05
2.27	11.23	17.71				
9	Chan	220.34	226.39	1202.57	67.90	6.05
2.27	11.23	17.71				
10	Chan	226.39	232.44	1202.57	67.90	6.05

2.27	11.23	17.71					
11	Chan	232.44	238.49	1202.57	67.90	6.05	
2.27	11.23	17.71					
12	Chan	238.49	244.54	1202.57	67.90	6.05	
2.27	11.23	17.71					
13	Chan	244.54	250.59	1202.57	67.90	6.05	
2.27	11.23	17.71					
14	Chan	250.59	256.63	1202.57	67.90	6.05	
2.27	11.23	17.71					
15	Chan	256.63	262.68	1202.57	67.90	6.05	
2.27	11.23	17.71					
16	Chan	262.68	268.73	1202.57	67.90	6.05	
2.27	11.23	17.71					
17	Chan	268.73	274.78	1202.57	67.90	6.05	
2.27	11.23	17.71					
18	Chan	274.78	280.83	1202.57	67.90	6.05	
2.27	11.23	17.71					
19	Chan	280.83	286.88	1202.57	67.90	6.05	
2.27	11.23	17.71					
20	Chan	286.88	292.93	1202.57	67.90	6.05	
2.27	11.23	17.71					
21	Chan	292.93	298.98	1202.57	67.90	6.05	
2.27	11.23	17.71					
22	Chan	298.98	305.03	1202.57	67.90	6.05	
2.27	11.23	17.71					
23	Chan	305.03	311.07	1202.57	67.90	6.05	
2.27	11.23	17.71					
24	Chan	311.07	317.12	1202.57	67.90	6.05	
2.27	11.23	17.71					
25	Chan	317.12	323.17	1202.57	67.90	6.05	
2.27	11.23	17.71					
26	Chan	323.17	329.22	1202.57	67.90	6.05	
2.27	11.23	17.71					
27	Chan	329.22	335.27	1202.57	67.90	6.05	
2.27	11.23	17.71					
28	Chan	335.27	341.32	1202.57	67.90	6.05	
2.27	11.23	17.71					
29	Chan	341.32	347.37	1202.57	67.90	6.05	
2.27	11.23	17.71					
30	Chan	347.37	353.42	1202.57	67.90	6.05	
2.27	11.23	17.71					
31	Chan	353.42	359.47	1202.57	67.90	6.05	
2.27	11.23	17.71					
32	Chan	359.47	365.51	993.16	62.08	6.44	
1.87	10.26	16.00					
33	Chan	365.51	371.56	810.70	53.72	6.08	
1.53	8.88	15.09					
34	Chan	371.56	377.61	794.08	52.94	6.05	
1.50	8.75	15.00					
35	Chan	377.61	383.66	775.64	52.20	6.05	
1.46	8.63	14.86					
36	Chan	383.66	389.71	757.39	51.46	6.05	
1.43	8.51	14.72					
37	Chan	389.71	395.76	739.29	50.72	6.05	
1.39	8.38	14.58					
38	Chan	395.76	401.81	721.38	49.98	6.05	
1.36	8.26	14.43					
39	Chan	401.81	407.86	703.65	49.24	6.05	
1.33	8.14	14.29					
40	Chan	407.86	413.90	686.09	48.50	6.05	
1.29	8.02	14.15					
41	Chan	413.90	419.95	668.71	47.75	6.05	
1.26	7.89	14.00					

42	Chan	419.95	426.00	651.50	47.01	6.05
1.23	7.77	13.86				
43	Chan	426.00	432.05	634.49	46.27	6.05
1.20	7.65	13.71				
44	Chan	432.05	438.10	617.64	45.53	6.05
1.17	7.53	13.57				
45	ROB	438.10	681.70	6183.41	848.67	143.85
11.67	5.94	7.29				

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

CROSS SECTION

RIVER: San Luis Rey Riv
REACH: Reach 1 RS: 1622

INPUT
Description:
Station Elevation Data num= 30

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	42.2	16	36.2	23.4	32.2	32	28.2	39	24.2
63	22.2	70	20.2	74	18.2	77	16.2	82	14.2
86	12.2	192	10.2	217	8.2	221	6.2	250	3.3
280	3.3	310	3.3	340	3.3	370	3.3	400	3.3
432	6.2	615	8.2	665	10.2	671	12.2	675	14.2
678	16.2	682	18.2	687	20.2	696	21.2	748.3	21.3

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.03	217	.025	432	.04

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
217	432	171.5	147.6 151.2	.1	.3

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	17.69	Element	Left OB	Channel
Right OB				
Vel Head (ft)	3.17	Wt. n-Val.	0.030	0.025
0.040				
W.S. Elev (ft)	14.52	Reach Len. (ft)	171.50	147.60
151.20				
Crit W.S. (ft)	14.25	Flow Area (sq ft)	490.24	2308.11
1630.68				

E.G. Slope (ft/ft)	0.003195	Area (sq ft)	490.24	2308.11 1630.68
Q Total (cfs)	53000.00	Flow (cfs)	3219.73	37646.54 12133.72
Top Width (ft)	594.28	Top Width (ft)	135.80	215.00 243.48
Vel Total (ft/s)	11.97	Avg. Vel. (ft/s)	6.57	16.31 7.44
Max Chl Dpth (ft)	11.22	Hydr. Depth (ft)	3.61	10.74 6.70
Conv. Total (cfs)	937711.5	Conv. (cfs)	56965.7	666067.8 214678.0
Length Wtd. (ft)	149.60	Wetted Per. (ft)	136.43	215.75 244.42
Min Ch El (ft)	3.30	Shear (lb/sq ft)	0.72	2.13 1.33
Alpha	1.43	Stream Power (lb/ft s)	4.71	34.80 9.90
Frctn Loss (ft)	0.34	Cum Volume (acre-ft)	8.14	134.39 22.01
C & E Loss (ft)	0.40	Cum SA (acres)	1.83	16.18 3.77

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

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

Profile #100-yr

Percent Conv	Pos Hydr Depth(ft)	Left Sta Velocity (ft/s)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)
1	LOB	0.00	217.00	3219.73	490.24	136.43
6.07	3.61	6.57				
2	Chan	217.00	222.00	454.95	37.65	5.48
0.86	7.53	12.08				
3	Chan	222.00	227.00	609.48	43.35	5.02
1.15	8.67	14.06				
4	Chan	227.00	232.00	669.18	45.85	5.02
1.26	9.17	14.60				
5	Chan	232.00	237.00	731.10	48.35	5.02
1.38	9.67	15.12				
6	Chan	237.00	242.00	795.19	50.85	5.02
1.50	10.17	15.64				
7	Chan	242.00	247.00	861.41	53.35	5.02
1.63	10.67	16.15				
8	Chan	247.00	252.00	925.42	55.65	5.01
1.75	11.13	16.63				
9	Chan	252.00	257.00	939.80	56.10	5.00
1.77	11.22	16.75				
10	Chan	257.00	262.00	939.80	56.10	5.00
1.77	11.22	16.75				
11	Chan	262.00	267.00	939.80	56.10	5.00
1.77	11.22	16.75				
12	Chan	267.00	272.00	939.80	56.10	5.00
1.77	11.22	16.75				
13	Chan	272.00	277.00	939.80	56.10	5.00

1.77	11.22	16.75					
14	Chan	277.00	282.00	939.80	56.10	5.00	
1.77	11.22	16.75					
15	Chan	282.00	287.00	939.80	56.10	5.00	
1.77	11.22	16.75					
16	Chan	287.00	292.00	939.80	56.10	5.00	
1.77	11.22	16.75					
17	Chan	292.00	297.00	939.80	56.10	5.00	
1.77	11.22	16.75					
18	Chan	297.00	302.00	939.80	56.10	5.00	
1.77	11.22	16.75					
19	Chan	302.00	307.00	939.80	56.10	5.00	
1.77	11.22	16.75					
20	Chan	307.00	312.00	939.80	56.10	5.00	
1.77	11.22	16.75					
21	Chan	312.00	317.00	939.80	56.10	5.00	
1.77	11.22	16.75					
22	Chan	317.00	322.00	939.80	56.10	5.00	
1.77	11.22	16.75					
23	Chan	322.00	327.00	939.80	56.10	5.00	
1.77	11.22	16.75					
24	Chan	327.00	332.00	939.80	56.10	5.00	
1.77	11.22	16.75					
25	Chan	332.00	337.00	939.80	56.10	5.00	
1.77	11.22	16.75					
26	Chan	337.00	342.00	939.80	56.10	5.00	
1.77	11.22	16.75					
27	Chan	342.00	347.00	939.80	56.10	5.00	
1.77	11.22	16.75					
28	Chan	347.00	352.00	939.80	56.10	5.00	
1.77	11.22	16.75					
29	Chan	352.00	357.00	939.80	56.10	5.00	
1.77	11.22	16.75					
30	Chan	357.00	362.00	939.80	56.10	5.00	
1.77	11.22	16.75					
31	Chan	362.00	367.00	939.80	56.10	5.00	
1.77	11.22	16.75					
32	Chan	367.00	372.00	939.80	56.10	5.00	
1.77	11.22	16.75					
33	Chan	372.00	377.00	939.80	56.10	5.00	
1.77	11.22	16.75					
34	Chan	377.00	382.00	939.80	56.10	5.00	
1.77	11.22	16.75					
35	Chan	382.00	387.00	939.80	56.10	5.00	
1.77	11.22	16.75					
36	Chan	387.00	392.00	939.80	56.10	5.00	
1.77	11.22	16.75					
37	Chan	392.00	397.00	939.80	56.10	5.00	
1.77	11.22	16.75					
38	Chan	397.00	402.00	933.72	55.92	5.01	
1.76	11.18	16.70					
39	Chan	402.00	407.00	881.15	54.06	5.02	
1.66	10.81	16.30					
40	Chan	407.00	412.00	820.46	51.79	5.02	
1.55	10.36	15.84					
41	Chan	412.00	417.00	761.52	49.53	5.02	
1.44	9.91	15.38					
42	Chan	417.00	422.00	704.35	47.26	5.02	
1.33	9.45	14.90					
43	Chan	422.00	427.00	648.98	45.00	5.02	
1.22	9.00	14.42					
44	Chan	427.00	432.00	595.44	42.73	5.02	
1.12	8.55	13.94					

45	ROB	432.00	748.30	12133.72	1630.68	244.42
22.89	6.70	7.44				

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION

RIVER: San Luis Rey Riv
REACH: Reach 1 RS: 1475

INPUT
Description:
Station Elevation Data num= 34

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	32.2	49	30.2	70	28.2	78	26.2	85	24.2
110	22.2	121	20.2	126	18.2	131	16.2	137	14.2
153	12.2	211	10.27	216	10.1	270	10.2	285	8.2
297	6.2	310	3.2	340	3.2	370	3.2	400	3.2
430	3.2	460	3.2	490	3.2	520	3.2	536	6.2
678.9	7.76	719	8.2	771	10.2	775.4	12.2	780	14.2
784.2	16.2	788.2	18.2	792.7	20.2	825.6	21.3		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.03	285	.025	678.9	.04

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
285	678.9	400.7	263.3	141.7	.1	.3

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	16.95	Element	Left OB	Channel
Right OB				
Vel Head (ft)	1.84	Wt. n-Val.	0.030	0.025
0.040				
W.S. Elev (ft)	15.11	Reach Len. (ft)	400.70	263.30
141.70				
Crit W.S. (ft)	13.02	Flow Area (sq ft)	638.08	4060.77
620.38				
E.G. Slope (ft/ft)	0.001662	Area (sq ft)	638.08	4060.77
620.38				
Q Total (cfs)	53000.00	Flow (cfs)	3365.14	46546.81
3088.05				
Top Width (ft)	647.66	Top Width (ft)	150.74	393.90
103.02				
Vel Total (ft/s)	9.96	Avg. Vel. (ft/s)	5.27	11.46
4.98				
Max Chl Dpth (ft)	11.91	Hydr. Depth (ft)	4.23	10.31
6.02				
Conv. Total (cfs)	1300014.0	Conv. (cfs)	82541.9	1141726.0
75745.5				
Length Wtd. (ft)	252.32	Wetted Per. (ft)	151.18	394.69
104.11				
Min Ch El (ft)	3.20	Shear (lb/sq ft)	0.44	1.07
0.62				

Alpha	1.19	Stream Power (lb/ft s)	2.31	12.24
3.08				
Frctn Loss (ft)	0.31	Cum Volume (acre-ft)	5.92	123.60
18.10				
C & E Loss (ft)	0.21	Cum SA (acres)	1.26	15.14
3.17				

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

Profile #100-yr

Percent Conv	Pos Hydr	Left Sta Velocity (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)
	Depth(ft)	(ft/s)				
1	LOB	0.00	285.00	3365.14	638.08	151.18
6.35	4.23	5.27				
2	Chan	285.00	294.16	645.43	70.32	9.29
1.22	7.68	9.18				
3	Chan	294.16	303.32	890.45	85.58	9.37
1.68	9.34	10.40				
4	Chan	303.32	312.48	1234.42	103.98	9.34
2.33	11.35	11.87				
5	Chan	312.48	321.64	1354.98	109.13	9.16
2.56	11.91	12.42				
6	Chan	321.64	330.80	1354.97	109.13	9.16
2.56	11.91	12.42				
7	Chan	330.80	339.96	1354.97	109.13	9.16
2.56	11.91	12.42				
8	Chan	339.96	349.12	1354.97	109.13	9.16
2.56	11.91	12.42				
9	Chan	349.12	358.28	1354.97	109.13	9.16
2.56	11.91	12.42				
10	Chan	358.28	367.44	1354.97	109.13	9.16
2.56	11.91	12.42				
11	Chan	367.44	376.60	1354.97	109.13	9.16
2.56	11.91	12.42				
12	Chan	376.60	385.77	1354.98	109.13	9.16
2.56	11.91	12.42				
13	Chan	385.77	394.93	1354.97	109.13	9.16
2.56	11.91	12.42				
14	Chan	394.93	404.09	1354.97	109.13	9.16
2.56	11.91	12.42				
15	Chan	404.09	413.25	1354.97	109.13	9.16
2.56	11.91	12.42				
16	Chan	413.25	422.41	1354.97	109.13	9.16
2.56	11.91	12.42				
17	Chan	422.41	431.57	1354.97	109.13	9.16
2.56	11.91	12.42				
18	Chan	431.57	440.73	1354.97	109.13	9.16
2.56	11.91	12.42				
19	Chan	440.73	449.89	1354.98	109.13	9.16
2.56	11.91	12.42				
20	Chan	449.89	459.05	1354.97	109.13	9.16
2.56	11.91	12.42				
21	Chan	459.05	468.21	1354.97	109.13	9.16
2.56	11.91	12.42				
22	Chan	468.21	477.37	1354.97	109.13	9.16

2.56	11.91	12.42					
23	Chan		477.37	486.53	1354.97	109.13	9.16
2.56	11.91	12.42					
24	Chan		486.53	495.69	1354.97	109.13	9.16
2.56	11.91	12.42					
25	Chan		495.69	504.85	1354.97	109.13	9.16
2.56	11.91	12.42					
26	Chan		504.85	514.01	1354.98	109.13	9.16
2.56	11.91	12.42					
27	Chan		514.01	523.17	1330.16	108.18	9.22
2.51	11.81	12.30					
28	Chan		523.17	532.33	1078.30	95.81	9.32
2.03	10.46	11.25					
29	Chan		532.33	541.49	850.28	82.74	9.22
1.60	9.03	10.28					
30	Chan		541.49	550.65	818.33	80.64	9.16
1.54	8.80	10.15					
31	Chan		550.65	559.81	802.89	79.72	9.16
1.51	8.70	10.07					
32	Chan		559.81	568.97	787.57	78.81	9.16
1.49	8.60	9.99					
33	Chan		568.97	578.13	772.37	77.89	9.16
1.46	8.50	9.92					
34	Chan		578.13	587.30	757.29	76.97	9.16
1.43	8.40	9.84					
35	Chan		587.30	596.46	742.33	76.06	9.16
1.40	8.30	9.76					
36	Chan		596.46	605.62	727.49	75.14	9.16
1.37	8.20	9.68					
37	Chan		605.62	614.78	712.77	74.23	9.16
1.34	8.10	9.60					
38	Chan		614.78	623.94	698.17	73.31	9.16
1.32	8.00	9.52					
39	Chan		623.94	633.10	683.69	72.39	9.16
1.29	7.90	9.44					
40	Chan		633.10	642.26	669.33	71.48	9.16
1.26	7.80	9.36					
41	Chan		642.26	651.42	655.09	70.56	9.16
1.24	7.70	9.28					
42	Chan		651.42	660.58	640.98	69.64	9.16
1.21	7.60	9.20					
43	Chan		660.58	669.74	626.99	68.73	9.16
1.18	7.50	9.12					
44	Chan		669.74	678.90	613.12	67.81	9.16
1.16	7.40	9.04					
45	ROB		678.90	825.60	3088.05	620.38	104.11
5.83	6.02	4.98					

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

CROSS SECTION

RIVER: San Luis Rey Riv
REACH: Reach 1 RS: 1207

INPUT
Description: Upstream Side of Metro Link Rail Road Bridge
All negative station

ground points taken from topographic data, not surveyed.
All

other ground points from survey data, June 2000.
Copied from

2267.5
Station Elevation Data num= 17

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	22.5	7	22.2	14	21.7	15.5	9.2	40.6	8.2
68.75	8.2	71.3	8.2	109	6.2	138.5	2.9	342.7	3
358.2	6.2	465.2	6.6	619.3	7.4	673.5	8.2	680.7	22.2
698	24.2	708.36	25.2						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.03	71.3	.025	673.5	.04

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
71.3	465.2	30.4	30.2	32.6	.1	.3

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	16.43	Element	Left OB	Channel
Right OB				
Vel Head (ft)	1.13	Wt. n-Val.	0.030	0.025
0.025				
W.S. Elev (ft)	15.29	Reach Len. (ft)	10.10	10.10
10.10				
Crit W.S. (ft)	11.75	Flow Area (sq ft)	385.43	4259.51
1696.88				
E.G. Slope (ft/ft)	0.000966	Area (sq ft)	385.43	4259.51
1696.88				
Q Total (cfs)	53000.00	Flow (cfs)	2007.04	38442.23
12550.74				
Top Width (ft)	662.38	Top Width (ft)	56.53	393.90
211.95				
Vel Total (ft/s)	8.36	Avg. Vel. (ft/s)	5.21	9.03
7.40				
Max Chl Dpth (ft)	12.39	Hydr. Depth (ft)	6.82	10.81
8.01				
Conv. Total (cfs)	1705231.0	Conv. (cfs)	64574.9	1236847.0
403809.4				
Length Wtd. (ft)	10.10	Wetted Per. (ft)	61.96	394.46
216.28				
Min Ch El (ft)	2.90	Shear (lb/sq ft)	0.38	0.65
0.47				
Alpha	1.05	Stream Power (lb/ft s)	1.95	5.88
3.50				
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	1.21	98.46
14.33				
C & E Loss (ft)	0.04	Cum SA (acres)	0.31	12.76
2.66				

Profile #100-yr

Percent Conv	Pos Hydr	Left Sta Velocity (ft) Depth(ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)
		(ft/s)				
1	LOB	0.00	71.30	2007.04	385.43	61.96

3.79	6.82	5.21					
2	Chan	71.30	80.46	461.43	67.20	9.17	
0.87	7.34	6.87					
3	Chan	80.46	89.62	513.50	71.65	9.17	
0.97	7.82	7.17					
4	Chan	89.62	98.78	567.77	76.10	9.17	
1.07	8.31	7.46					
5	Chan	98.78	107.94	624.19	80.55	9.17	
1.18	8.79	7.75					
6	Chan	107.94	117.10	706.77	86.93	9.21	
1.33	9.49	8.13					
7	Chan	117.10	126.26	837.70	96.29	9.22	
1.58	10.51	8.70					
8	Chan	126.26	135.42	978.19	105.67	9.22	
1.85	11.54	9.26					
9	Chan	135.42	144.58	1096.53	112.98	9.18	
2.07	12.33	9.71					
10	Chan	144.58	153.74	1106.02	113.47	9.16	
2.09	12.39	9.75					
11	Chan	153.74	162.90	1105.35	113.43	9.16	
2.09	12.38	9.74					
12	Chan	162.90	172.07	1104.68	113.39	9.16	
2.08	12.38	9.74					
13	Chan	172.07	181.23	1104.02	113.35	9.16	
2.08	12.37	9.74					
14	Chan	181.23	190.39	1103.35	113.31	9.16	
2.08	12.37	9.74					
15	Chan	190.39	199.55	1102.68	113.27	9.16	
2.08	12.36	9.74					
16	Chan	199.55	208.71	1102.02	113.23	9.16	
2.08	12.36	9.73					
17	Chan	208.71	217.87	1101.35	113.18	9.16	
2.08	12.36	9.73					
18	Chan	217.87	227.03	1100.68	113.14	9.16	
2.08	12.35	9.73					
19	Chan	227.03	236.19	1100.02	113.10	9.16	
2.08	12.35	9.73					
20	Chan	236.19	245.35	1099.35	113.06	9.16	
2.07	12.34	9.72					
21	Chan	245.35	254.51	1098.68	113.02	9.16	
2.07	12.34	9.72					
22	Chan	254.51	263.67	1098.02	112.98	9.16	
2.07	12.33	9.72					
23	Chan	263.67	272.83	1097.35	112.94	9.16	
2.07	12.33	9.72					
24	Chan	272.83	281.99	1096.69	112.90	9.16	
2.07	12.32	9.71					
25	Chan	281.99	291.15	1096.03	112.86	9.16	
2.07	12.32	9.71					
26	Chan	291.15	300.31	1095.36	112.81	9.16	
2.07	12.32	9.71					
27	Chan	300.31	309.47	1094.69	112.77	9.16	
2.07	12.31	9.71					
28	Chan	309.47	318.63	1094.03	112.73	9.16	
2.06	12.31	9.70					
29	Chan	318.63	327.79	1093.36	112.69	9.16	
2.06	12.30	9.70					
30	Chan	327.79	336.95	1092.70	112.65	9.16	
2.06	12.30	9.70					
31	Chan	336.95	346.11	1067.12	111.41	9.23	
2.01	12.16	9.58					
32	Chan	346.11	355.27	846.84	97.49	9.35	
1.60	10.64	8.69					

33	Chan	355.27	364.43	668.36	84.10	9.22
1.26	9.18	7.95				
34	Chan	364.43	373.60	655.71	82.92	9.16
1.24	9.05	7.91				
35	Chan	373.60	382.76	651.58	82.61	9.16
1.23	9.02	7.89				
36	Chan	382.76	391.92	647.46	82.29	9.16
1.22	8.98	7.87				
37	Chan	391.92	401.08	643.35	81.98	9.16
1.21	8.95	7.85				
38	Chan	401.08	410.24	639.25	81.67	9.16
1.21	8.91	7.83				
39	Chan	410.24	419.40	635.17	81.35	9.16
1.20	8.88	7.81				
40	Chan	419.40	428.56	631.09	81.04	9.16
1.19	8.85	7.79				
41	Chan	428.56	437.72	627.03	80.72	9.16
1.18	8.81	7.77				
42	Chan	437.72	446.88	622.97	80.41	9.16
1.18	8.78	7.75				
43	Chan	446.88	456.04	618.92	80.10	9.16
1.17	8.74	7.73				
44	Chan	456.04	465.20	614.89	79.78	9.16
1.16	8.71	7.71				
45	ROB	465.20	708.36	12550.74	1696.88	216.28
23.68	8.01	7.40				

BRIDGE

RIVER: San Luis Rey Riv
REACH: Reach 1 RS: 1200

INPUT
Description: Metro Link RR Bridge (2000 survey data)
Distance from Upstream XS = 10.1
Deck/Roadway Width = 20
Weir Coefficient = 2.8
Upstream Deck/Roadway Coordinates
num= 4

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
0	33	22	892.92	33	22
892.92	33	0	900	33	0

Upstream Bridge Cross Section Data
Station Elevation Data num= 17

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	22.5	7	22.2	14	21.7	15.5	9.2	40.6	8.2
68.75	8.2	71.3	8.2	109	6.2	138.5	2.9	342.7	3
358.2	6.2	465.2	6.6	619.3	7.4	673.5	8.2	680.7	22.2
698	24.2	708.36	25.2						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.03	71.3	.025	673.5	.04

Bank Sta: Left	Right	Coeff Contr.	Expan.
71.3	465.2	.1	.3

Downstream Deck/Roadway Coordinates
num= 4

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
0	33	22	892.92	33	22
892.92	33	0	900	33	0

Downstream Bridge Cross Section Data
Station Elevation Data num= 19

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	22.2	22	20.2	25	8.1	29	8.2	63.5	9.7
75.5	9.07	92	8.2	102.8	6.2	122.3	2.9	335.1	3
348.2	6.2	497.6	6.8	608	7.3	626	7.3	676.5	8.2
679.8	19.7	687.4	20.2	706.5	22.2	715.1	23.2		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.03	92	.018	497.6	.04

Bank Sta: Left	Right	Coeff Contr.	Expan.
92	497.6	.1	.3

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

Number of Piers = 6

Pier Data
Pier Station Upstream= 114.75 Downstream= 114.75
Upstream num= 2

Width	Elev	Width	Elev
10	-5	10	22

Downstream num= 2

Width	Elev	Width	Elev
10	-5	10	22

Pier Data
Pier Station Upstream= 215.5 Downstream= 215.5
Upstream num= 2

Width	Elev	Width	Elev
10	-5	10	22

Downstream num= 2

Width	Elev	Width	Elev
10	-5	10	22

Pier Data
Pier Station Upstream= 316.25 Downstream= 316.25
Upstream num= 2

Width	Elev	Width	Elev
10	-5	10	22

Downstream num= 2

Width	Elev	Width	Elev
10	-5	10	22

Pier Data
Pier Station Upstream= 417 Downstream= 417
Upstream num= 2

Width	Elev	Width	Elev
10	-5	10	22

Downstream num= 2

Width	Elev	Width	Elev

```
      10       -5       10       22

Pier Data
Pier Station     Upstream=  517.75    Downstream=  517.75
Upstream     num=        2
    Width   Elev    Width   Elev
      10       -5       10       22
Downstream     num=        2
    Width   Elev    Width   Elev
      10       -5       10       22

Pier Data
Pier Station     Upstream=   618.5    Downstream=   618.5
Upstream     num=        2
    Width   Elev    Width   Elev
      10       -5       10       22
Downstream     num=        2
    Width   Elev    Width   Elev
      10       -5       10       22

Number of Bridge Coefficient Sets =  1

Low Flow Methods and Data
       Energy
Selected Low Flow Methods = Highest Energy Answer

High Flow Method
       Energy Only

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

BRIDGE OUTPUT  Profile #100-yr


  E.G. US. (ft)                 16.43    Element                 Inside BR US
Inside BR DS
  W.S. US. (ft)                 15.29    E.G. Elev (ft)             16.38
16.20
  Q Total (cfs)              53000.00    W.S. Elev (ft)             14.89
13.32
  Q Bridge (cfs)             53000.00    Crit W.S. (ft)             12.15
12.67
  Q Weir (cfs)                           Max Chl Dpth (ft)          11.99
10.42
  Weir Sta Lft (ft)                      Vel Total (ft/s)            9.63
11.85
  Weir Sta Rgt (ft)                      Flow Area (sq ft)        5504.67
4472.79
  Weir Submerg                           Froude # Chl               0.56
 0.86
  Weir Max Depth (ft)                    Specif Force (cu ft)    42532.73
40088.56
  Min El Weir Flow (ft)         33.01    Hydr Depth (ft)            9.14
 7.53
  Min El Prs (ft)               22.00    W.P. Total (ft)          726.10
701.32
  Delta EG (ft)                  0.48    Conv. Total (cfs)       1267931.0
1142202.0
```

Delta WS (ft)	1.39	Top Width (ft)	602.12
594.27			
BR Open Area (sq ft)	9696.62	Frctn Loss (ft)	0.04
0.00			
BR Open Vel (ft/s)	11.85	C & E Loss (ft)	0.14
0.25			
Coef of Q		Shear Total (lb/sq ft)	0.83
0.86			
Br Sel Method	Energy only	Power Total (lb/ft s)	7.96
10.16			

Warning: For the final momentum answer at the bridge, the upstream energy was computed lower than
the downstream energy. This is not physically possible, the momentum answer has been
disregarded.
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 velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for
additional cross sections.

CROSS SECTION

RIVER: San Luis Rey Riv
REACH: Reach 1 RS: 1182

INPUT
Description: Downstream Side of Metro Link Rail Road Bridge
All negative
station ground points taken from topographic data, not surveyed.
All other ground points from survey data, June
2000.
Copied from 2267.5
Station Elevation Data num= 19

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	22.2	22	20.2	25	8.1	29	8.2	63.5	9.7
75.5	9.07	92	8.2	102.8	6.2	122.3	2.9	335.1	3
348.2	6.2	497.6	6.8	608	7.3	626	7.3	676.5	8.2
679.8	19.7	687.4	20.2	706.5	22.2	715.1	23.2		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.03	92	.018	497.6	.04

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
92	497.6	153	337.7	510.2	.1 .3

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	15.95	Element	Left OB	Channel
Right OB				
Vel Head (ft)	2.05	Wt. n-Val.	0.030	0.018
0.040				
W.S. Elev (ft)	13.90	Reach Len. (ft)	153.00	337.70
510.20				
Crit W.S. (ft)	12.16	Flow Area (sq ft)	339.34	3814.24

1191.17				
E.G. Slope (ft/ft)	0.001096	Area (sq ft)	339.34	3814.24
1191.17				
Q Total (cfs)	53000.00	Flow (cfs)	1549.08	46377.93
5073.00				
Top Width (ft)	654.58	Top Width (ft)	68.44	405.60
180.54				
Vel Total (ft/s)	9.92	Avg. Vel. (ft/s)	4.57	12.16
4.26				
Max Chl Dpth (ft)	11.00	Hydr. Depth (ft)	4.96	9.40
6.60				
Conv. Total (cfs)	1600902.0	Conv. (cfs)	46791.0	1400878.0
153233.5				
Length Wtd. (ft)	351.78	Wetted Per. (ft)	73.05	406.45
184.84				
Min Ch El (ft)	2.90	Shear (lb/sq ft)	0.32	0.64
0.44				
Alpha	1.34	Stream Power (lb/ft s)	1.45	7.81
1.88				
Frctn Loss (ft)	0.38	Cum Volume (acre-ft)	0.97	95.94
13.41				
C & E Loss (ft)	0.00	Cum SA (acres)	0.27	12.51
2.53				

Profile #100-yr

Percent Conv	Pos Hydr Depth(ft)	Left Sta Velocity (ft/s)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)
1	LOB	0.00	92.00	1549.08	339.34	73.05
2.92	4.96	4.57				
2	Chan	92.00	101.43	577.67	62.05	9.59
1.09	6.58	9.31				
3	Chan	101.43	110.87	847.26	78.01	9.57
1.60	8.27	10.86				
4	Chan	110.87	120.30	1137.60	93.08	9.57
2.15	9.87	12.22				
5	Chan	120.30	129.73	1366.72	103.45	9.46
2.58	10.97	13.21				
6	Chan	129.73	139.16	1376.06	103.75	9.43
2.60	11.00	13.26				
7	Chan	139.16	148.60	1375.14	103.71	9.43
2.59	10.99	13.26				
8	Chan	148.60	158.03	1374.21	103.67	9.43
2.59	10.99	13.26				
9	Chan	158.03	167.46	1373.29	103.63	9.43
2.59	10.99	13.25				
10	Chan	167.46	176.89	1372.37	103.58	9.43
2.59	10.98	13.25				
11	Chan	176.89	186.33	1371.44	103.54	9.43
2.59	10.98	13.25				
12	Chan	186.33	195.76	1370.52	103.50	9.43
2.59	10.97	13.24				
13	Chan	195.76	205.19	1369.60	103.46	9.43
2.58	10.97	13.24				
14	Chan	205.19	214.62	1368.67	103.42	9.43
2.58	10.96	13.23				
15	Chan	214.62	224.06	1367.75	103.37	9.43
2.58	10.96	13.23				

16	Chan	224.06	233.49	1366.83	103.33	9.43
2.58	10.95	13.23				
17	Chan	233.49	242.92	1365.91	103.29	9.43
2.58	10.95	13.22				
18	Chan	242.92	252.35	1364.99	103.25	9.43
2.58	10.95	13.22				
19	Chan	252.35	261.79	1364.07	103.21	9.43
2.57	10.94	13.22				
20	Chan	261.79	271.22	1363.15	103.17	9.43
2.57	10.94	13.21				
21	Chan	271.22	280.65	1362.22	103.12	9.43
2.57	10.93	13.21				
22	Chan	280.65	290.08	1361.30	103.08	9.43
2.57	10.93	13.21				
23	Chan	290.08	299.52	1360.39	103.04	9.43
2.57	10.92	13.20				
24	Chan	299.52	308.95	1359.46	103.00	9.43
2.57	10.92	13.20				
25	Chan	308.95	318.38	1358.54	102.96	9.43
2.56	10.92	13.20				
26	Chan	318.38	327.81	1357.63	102.91	9.43
2.56	10.91	13.19				
27	Chan	327.81	337.25	1338.42	102.31	9.50
2.53	10.85	13.08				
28	Chan	337.25	346.68	1007.39	87.05	9.71
1.90	9.23	11.57				
29	Chan	346.68	356.11	760.63	72.83	9.48
1.44	7.72	10.44				
30	Chan	356.11	365.54	751.97	72.20	9.43
1.42	7.65	10.42				
31	Chan	365.54	374.98	745.78	71.84	9.43
1.41	7.62	10.38				
32	Chan	374.98	384.41	739.60	71.48	9.43
1.40	7.58	10.35				
33	Chan	384.41	393.84	733.45	71.13	9.43
1.38	7.54	10.31				
34	Chan	393.84	403.27	727.32	70.77	9.43
1.37	7.50	10.28				
35	Chan	403.27	412.71	721.21	70.41	9.43
1.36	7.46	10.24				
36	Chan	412.71	422.14	715.12	70.06	9.43
1.35	7.43	10.21				
37	Chan	422.14	431.57	709.06	69.70	9.43
1.34	7.39	10.17				
38	Chan	431.57	441.00	703.01	69.34	9.43
1.33	7.35	10.14				
39	Chan	441.00	450.44	696.98	68.98	9.43
1.32	7.31	10.10				
40	Chan	450.44	459.87	690.97	68.63	9.43
1.30	7.28	10.07				
41	Chan	459.87	469.30	684.99	68.27	9.43
1.29	7.24	10.03				
42	Chan	469.30	478.73	679.02	67.91	9.43
1.28	7.20	10.00				
43	Chan	478.73	488.17	673.08	67.55	9.43
1.27	7.16	9.96				
44	Chan	488.17	497.60	667.15	67.20	9.43
1.26	7.12	9.93				
45	ROB	497.60	715.10	5073.00	1191.17	184.84
9.57	6.60	4.26				

CROSS SECTION

RIVER: San Luis Rey Riv
REACH: Reach 1 RS: 844

INPUT
Description: Upstream Pacific Street
Station Elevation Data num= 19

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	22.2	35.8	20.2	38.9	18.2	42.1	16.2	46.2	14.2
48.6	12.2	51.8	10.2	55.6	8.2	66.1	2.9	322.36	2.93
334.5	6.2	461.5	6.8	498.4	7.2	551.4	7.5	598.8	8.2
602.3	10.2	605.8	14	613.2	14	645.8	9.8		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.03	55.6	.018	598.8	.04

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
55.6	498.4	81.3	83	80.5	.1	.3

Right Levee Station= 605.8 Elevation= 14

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	15.57	Element	Left OB	Channel
Right OB				
Vel Head (ft)	2.06	Wt. n-Val.	0.030	0.018
0.018				
W.S. Elev (ft)	13.51	Reach Len. (ft)	12.50	12.50
12.50				
Crit W.S. (ft)	11.76	Flow Area (sq ft)	24.82	4038.58
615.10				
E.G. Slope (ft/ft)	0.001076	Area (sq ft)	24.82	4038.58
615.10				
Q Total (cfs)	53000.00	Flow (cfs)	73.32	47608.63
5318.05				
Top Width (ft)	558.32	Top Width (ft)	8.57	442.80
106.95				
Vel Total (ft/s)	11.33	Avg. Vel. (ft/s)	2.95	11.79
8.65				
Max Chl Dpth (ft)	10.61	Hydr. Depth (ft)	2.89	9.12
5.75				
Conv. Total (cfs)	1616021.0	Conv. (cfs)	2235.6	1451632.0
162152.5				
Length Wtd. (ft)	12.50	Wetted Per. (ft)	10.12	444.50
108.94				
Min Ch El (ft)	2.90	Shear (lb/sq ft)	0.16	0.61
0.38				
Alpha	1.03	Stream Power (lb/ft s)	0.49	7.19
3.28				
Frctn Loss (ft)		Cum Volume (acre-ft)	0.33	65.50
2.83				
C & E Loss (ft)		Cum SA (acres)	0.13	9.22
0.85				

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

is less than
0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid,
energy was used.

Profile #100-yr

Percent Conv	Pos Hydr Depth(ft)	Left Sta Velocity (ft/s)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)
1	LOB	0.00	55.60	73.32	24.82	10.12
0.14	2.89	2.95				
2	Chan	55.60	65.90	794.42	81.46	11.54
1.50	7.91	9.75				
3	Chan	65.90	76.20	1395.51	109.26	10.32
2.63	10.61	12.77				
4	Chan	76.20	86.49	1397.66	109.26	10.30
2.64	10.61	12.79				
5	Chan	86.49	96.79	1397.40	109.25	10.30
2.64	10.61	12.79				
6	Chan	96.79	107.09	1397.13	109.23	10.30
2.64	10.61	12.79				
7	Chan	107.09	117.39	1396.87	109.22	10.30
2.64	10.61	12.79				
8	Chan	117.39	127.68	1396.60	109.21	10.30
2.64	10.61	12.79				
9	Chan	127.68	137.98	1396.34	109.20	10.30
2.63	10.60	12.79				
10	Chan	137.98	148.28	1396.07	109.19	10.30
2.63	10.60	12.79				
11	Chan	148.28	158.58	1395.81	109.17	10.30
2.63	10.60	12.79				
12	Chan	158.58	168.87	1395.55	109.16	10.30
2.63	10.60	12.78				
13	Chan	168.87	179.17	1395.28	109.15	10.30
2.63	10.60	12.78				
14	Chan	179.17	189.47	1395.02	109.14	10.30
2.63	10.60	12.78				
15	Chan	189.47	199.77	1394.75	109.12	10.30
2.63	10.60	12.78				
16	Chan	199.77	210.07	1394.49	109.11	10.30
2.63	10.60	12.78				
17	Chan	210.07	220.36	1394.22	109.10	10.30
2.63	10.59	12.78				
18	Chan	220.36	230.66	1393.96	109.09	10.30
2.63	10.59	12.78				
19	Chan	230.66	240.96	1393.69	109.07	10.30
2.63	10.59	12.78				
20	Chan	240.96	251.26	1393.43	109.06	10.30
2.63	10.59	12.78				
21	Chan	251.26	261.55	1393.17	109.05	10.30
2.63	10.59	12.78				
22	Chan	261.55	271.85	1392.90	109.04	10.30
2.63	10.59	12.77				
23	Chan	271.85	282.15	1392.64	109.02	10.30
2.63	10.59	12.77				
24	Chan	282.15	292.45	1392.37	109.01	10.30
2.63	10.59	12.77				
25	Chan	292.45	302.74	1392.11	109.00	10.30

2.63	10.58	12.77					
26	Chan		302.74	313.04	1391.85	108.99	10.30
2.63	10.58	12.77					
27	Chan		313.04	323.34	1385.70	108.84	10.33
2.61	10.57	12.73					
28	Chan		323.34	333.64	1024.65	91.97	10.66
1.93	8.93	11.14					
29	Chan		333.64	343.93	748.16	75.19	10.33
1.41	7.30	9.95					
30	Chan		343.93	354.23	739.71	74.59	10.30
1.40	7.24	9.92					
31	Chan		354.23	364.53	731.45	74.09	10.30
1.38	7.19	9.87					
32	Chan		364.53	374.83	723.22	73.58	10.30
1.36	7.15	9.83					
33	Chan		374.83	385.13	715.04	73.08	10.30
1.35	7.10	9.78					
34	Chan		385.13	395.42	706.89	72.58	10.30
1.33	7.05	9.74					
35	Chan		395.42	405.72	698.77	72.08	10.30
1.32	7.00	9.69					
36	Chan		405.72	416.02	690.70	71.58	10.30
1.30	6.95	9.65					
37	Chan		416.02	426.32	682.66	71.08	10.30
1.29	6.90	9.60					
38	Chan		426.32	436.61	674.66	70.58	10.30
1.27	6.85	9.56					
39	Chan		436.61	446.91	666.70	70.08	10.30
1.26	6.81	9.51					
40	Chan		446.91	457.21	658.77	69.58	10.30
1.24	6.76	9.47					
41	Chan		457.21	467.51	649.14	68.96	10.30
1.22	6.70	9.41					
42	Chan		467.51	477.80	632.07	67.87	10.30
1.19	6.59	9.31					
43	Chan		477.80	488.10	614.33	66.72	10.30
1.16	6.48	9.21					
44	Chan		488.10	498.40	596.79	65.57	10.30
1.13	6.37	9.10					
45	ROB		498.40	605.80	5318.05	615.10	108.94
10.03	5.75	8.65					

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

BRIDGE

RIVER: San Luis Rey Riv
REACH: Reach 1 RS: 800

INPUT
Description: Pacific Street

Distance from Upstream XS = 12.5
Deck/Roadway Width = 55.5
Weir Coefficient = 2.6
Upstream Deck/Roadway Coordinates
num= 6

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
0	25	0	35.8	24	0	35.8	24	21
605.8	18.2	15.2	605.8	18.2	0	650	18.2	0

Upstream Bridge Cross Section Data
Station Elevation Data num= 19

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	22.2	35.8	20.2	38.9	18.2	42.1	16.2	46.2	14.2
48.6	12.2	51.8	10.2	55.6	8.2	66.1	2.9	322.36	2.93
334.5	6.2	461.5	6.8	498.4	7.2	551.4	7.5	598.8	8.2
602.3	10.2	605.8	14	613.2	14	645.8	9.8		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.03	55.6	.018	598.8	.04

Bank Sta: Left	Right	Coeff Contr.	Expan.
55.6	498.4	.1	.3

Right Levee Station= 605.8 Elevation= 14

Downstream Deck/Roadway Coordinates
num= 6

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
0	25	0	46.6	24	0	46.6	24	21
610.6	18.2	15.2	610.6	18.2	0	650	18.2	0

Downstream Bridge Cross Section Data
Station Elevation Data num= 19

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	22.2	46.6	18.2	49.7	16.2	53	14.2	55.8	12.2
58.8	10.2	61.9	8.2	64.7	6.2	86.96	2.86	292.4	2.9
363.98	3.12	376.5	6.2	483.4	6.8	573.3	7	604	8.2
607.1	10.2	610.6	12.2	618.6	12.2	648.8	9.6		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.03	64.7	.018	604	.04

Bank Sta: Left	Right	Coeff Contr.	Expan.
64.7	483.4	.1	.3

Right Levee Station= 610.6 Elevation= 12.2

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

Number of Piers = 3

Pier Data
Pier Station Upstream= 156.5 Downstream= 167.3
Upstream num= 2

Width	Elev	Width	Elev
8.75	0	8.75	25

Downstream num= 2

Width	Elev	Width	Elev
8.75	0	8.75	25

Pier Data
Pier Station Upstream= 317.4 Downstream= 328.2
Upstream num= 2

Width	Elev	Width	Elev
8.75	0	8.75	25

Downstream num= 2

Width	Elev	Width	Elev
8.75	0	8.75	25

Pier Data
Pier Station Upstream= 478.3 Downstream= 489.1
Upstream num= 2

Width	Elev	Width	Elev
8.75	0	8.75	25

Downstream num= 2

Width	Elev	Width	Elev
8.75	0	8.75	25

Number of Bridge Coefficient Sets = 1

Low Flow Methods and Data
Energy
Selected Low Flow Methods = Highest Energy Answer

High Flow Method
Energy Only

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

BRIDGE OUTPUT Profile #100-yr

E.G. US. (ft)	15.57	Element	Inside BR US
Inside BR DS			
W.S. US. (ft)	13.51	E.G. Elev (ft)	15.40
15.13			
Q Total (cfs)	53000.00	W.S. Elev (ft)	12.01
11.73			
Q Bridge (cfs)	53000.00	Crit W.S. (ft)	12.01
11.73			
Q Weir (cfs)		Max Chl Dpth (ft)	9.11
8.87			
Weir Sta Lft (ft)		Vel Total (ft/s)	14.56
14.54			
Weir Sta Rgt (ft)		Flow Area (sq ft)	3639.49
3644.21			
Weir Submerg		Froude # Chl	0.96
0.97			
Weir Max Depth (ft)		Specif Force (cu ft)	37969.51
37978.78			
Min El Weir Flow (ft)	18.21	Hydr Depth (ft)	6.88
6.91			
Min El Prs (ft)	21.00	W.P. Total (ft)	579.27
575.30			
Delta EG (ft)	0.38	Conv. Total (cfs)	1041996.0

1058745.0			
Delta WS (ft)	2.90	Top Width (ft)	528.81
527.01			
BR Open Area (sq ft)	6893.12	Frctn Loss (ft)	
BR Open Vel (ft/s)	14.56	C & E Loss (ft)	
Coef of Q		Shear Total (lb/sq ft)	1.01
0.99			
Br Sel Method	Momentum	Power Total (lb/ft s)	14.78
14.41			

Warning: Pier drag coefficient of 2.0 assumed for Class B flow.
Warning: The momentum, Class B, supercritical, water surface downstream of the bridge had a higher
energy than the upstream cross section. This is not physically possible. The downstream water
surface has been computed by taking the momentum result inside of the bridge and performing
an energy balance.
Note: The momentum method has computed a class B profile.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid,
energy was used.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for
additional cross sections.
Note: The energy method has computed a class B profile.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid,
energy was used.

CROSS SECTION

RIVER: San Luis Rey Riv
REACH: Reach 1 RS: 761

INPUT
Description: Downstream Pacific Street
Station Elevation Data num= 19

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	22.2	46.6	18.2	49.7	16.2	53	14.2	55.8	12.2
58.8	10.2	61.9	8.2	64.7	6.2	86.96	2.86	292.4	2.9
363.98	3.12	376.5	6.2	483.4	6.8	573.3	7	604	8.2
607.1	10.2	610.6	12.2	618.6	12.2	648.8	9.6		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.03	64.7	.018	604	.04

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
64.7	483.4	188.3	141.9 103.8	.1	.3

Right Levee Station= 610.6 Elevation= 12.2

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	15.00	Element	Left OB	Channel
Right OB				
Vel Head (ft)	4.39	Wt. n-Val.	0.030	0.018

0.018				
W.S. Elev (ft)	10.61	Reach Len. (ft)	188.30	141.90
103.80				
Crit W.S. (ft)	11.49	Flow Area (sq ft)	14.07	2782.87
430.93				
E.G. Slope (ft/ft)	0.003513	Area (sq ft)	14.07	2782.87
430.93				
Q Total (cfs)	53000.00	Flow (cfs)	60.82	48087.60
4851.58				
Top Width (ft)	549.65	Top Width (ft)	6.52	418.70
124.42				
Vel Total (ft/s)	16.42	Avg. Vel. (ft/s)	4.32	17.28
11.26				
Max Chl Dpth (ft)	7.75	Hydr. Depth (ft)	2.16	6.65
3.46				
Conv. Total (cfs)	894168.6	Conv. (cfs)	1026.0	811291.1
81851.5				
Length Wtd. (ft)	139.24	Wetted Per. (ft)	7.88	419.32
125.15				
Min Ch El (ft)	2.86	Shear (lb/sq ft)	0.39	1.46
0.76				
Alpha	1.05	Stream Power (lb/ft s)	1.69	25.15
8.50				
Frctn Loss (ft)		Cum Volume (acre-ft)	0.30	59.47
1.88				
C & E Loss (ft)		Cum SA (acres)	0.12	8.44
0.63				

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for
additional cross sections.
Note: The energy method has computed a class B profile.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid,
energy was used.

Profile #100-yr

Percent Conv	Pos Hydr Depth(ft)	Left Sta Velocity (ft/s)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)
1	LOB	0.00	64.70	60.82	14.07	7.88
0.11	2.16	4.32				
2	Chan	64.70	74.44	702.46	50.09	9.85
1.33	5.14	14.02				
3	Chan	74.44	84.17	1065.54	64.32	9.85
2.01	6.61	16.57				
4	Chan	84.17	93.91	1381.18	74.91	9.77
2.61	7.69	18.44				
5	Chan	93.91	103.65	1401.55	75.48	9.74
2.64	7.75	18.57				
6	Chan	103.65	113.39	1400.98	75.46	9.74
2.64	7.75	18.57				
7	Chan	113.39	123.12	1400.41	75.44	9.74
2.64	7.75	18.56				
8	Chan	123.12	132.86	1399.84	75.42	9.74
2.64	7.75	18.56				
9	Chan	132.86	142.60	1399.27	75.40	9.74
2.64	7.74	18.56				

10	Chan	142.60	152.33	1398.70	75.39	9.74
2.64	7.74	18.55				
11	Chan	152.33	162.07	1398.12	75.37	9.74
2.64	7.74	18.55				
12	Chan	162.07	171.81	1397.56	75.35	9.74
2.64	7.74	18.55				
13	Chan	171.81	181.55	1396.98	75.33	9.74
2.64	7.74	18.54				
14	Chan	181.55	191.28	1396.41	75.31	9.74
2.63	7.73	18.54				
15	Chan	191.28	201.02	1395.84	75.29	9.74
2.63	7.73	18.54				
16	Chan	201.02	210.76	1395.27	75.28	9.74
2.63	7.73	18.54				
17	Chan	210.76	220.50	1394.70	75.26	9.74
2.63	7.73	18.53				
18	Chan	220.50	230.23	1394.13	75.24	9.74
2.63	7.73	18.53				
19	Chan	230.23	239.97	1393.56	75.22	9.74
2.63	7.73	18.53				
20	Chan	239.97	249.71	1392.99	75.20	9.74
2.63	7.72	18.52				
21	Chan	249.71	259.44	1392.42	75.18	9.74
2.63	7.72	18.52				
22	Chan	259.44	269.18	1391.85	75.16	9.74
2.63	7.72	18.52				
23	Chan	269.18	278.92	1391.28	75.15	9.74
2.63	7.72	18.51				
24	Chan	278.92	288.66	1390.71	75.13	9.74
2.62	7.72	18.51				
25	Chan	288.66	298.39	1388.54	75.06	9.74
2.62	7.71	18.50				
26	Chan	298.39	308.13	1380.19	74.79	9.74
2.60	7.68	18.46				
27	Chan	308.13	317.87	1371.24	74.49	9.74
2.59	7.65	18.41				
28	Chan	317.87	327.60	1362.31	74.20	9.74
2.57	7.62	18.36				
29	Chan	327.60	337.34	1353.41	73.91	9.74
2.55	7.59	18.31				
30	Chan	337.34	347.08	1344.53	73.62	9.74
2.54	7.56	18.26				
31	Chan	347.08	356.82	1335.67	73.33	9.74
2.52	7.53	18.21				
32	Chan	356.82	366.55	1295.77	72.23	9.81
2.44	7.42	17.94				
33	Chan	366.55	376.29	814.46	55.14	10.03
1.54	5.66	14.77				
34	Chan	376.29	386.03	542.74	42.73	9.74
1.02	4.39	12.70				
35	Chan	386.03	395.77	531.63	42.19	9.74
1.00	4.33	12.60				
36	Chan	395.77	405.50	520.51	41.66	9.74
0.98	4.28	12.49				
37	Chan	405.50	415.24	509.47	41.13	9.74
0.96	4.22	12.39				
38	Chan	415.24	424.98	498.53	40.60	9.74
0.94	4.17	12.28				
39	Chan	424.98	434.71	487.69	40.06	9.74
0.92	4.11	12.17				
40	Chan	434.71	444.45	476.94	39.53	9.74
0.90	4.06	12.06				
41	Chan	444.45	454.19	466.28	39.00	9.74

0.88	4.01	11.96				
42	Chan	454.19	463.93	455.73	38.47	9.74
0.86	3.95	11.85				
43	Chan	463.93	473.66	445.27	37.93	9.74
0.84	3.90	11.74				
44	Chan	473.66	483.40	434.91	37.40	9.74
0.82	3.84	11.63				
45	ROB	483.40	610.60	4851.58	430.93	125.15
9.15	3.46	11.26				

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for
additional cross sections.
Note: The energy method has computed a class B profile.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid,
energy was used.

CROSS SECTION

RIVER: San Luis Rey Riv
REACH: Reach 1 RS: 619

INPUT
Description:
Station Elevation Data num= 18

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	22.2	27.1	16.2	30.3	14.2	33.5	12.2	36.7	10.2
40.4	8.2	43.4	6.2	94.76	2.89	406	2.9	461.9	5.1
482.7	5.91	490.12	6.2	541.5	6.9	562	8.2	565	10.2
568.1	12.2	576.7	12.2	596.9	9.4				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.03	43.4	.018	562	.04

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
43.4	482.7	368.9	355.9 348	.1	.3

Right Levee Station= 568.1 Elevation= 12.2

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	14.49	Element	Left OB	Channel
Right OB				
Vel Head (ft)	4.57	Wt. n-Val.	0.030	0.018
0.018				
W.S. Elev (ft)	9.91	Reach Len. (ft)	368.90	355.90
348.00				
Crit W.S. (ft)	10.85	Flow Area (sq ft)	10.85	2882.02
252.03				
E.G. Slope (ft/ft)	0.003639	Area (sq ft)	10.85	2882.02
252.03				
Q Total (cfs)	53000.00	Flow (cfs)	42.59	50281.19
2676.23				
Top Width (ft)	527.34	Top Width (ft)	6.17	439.30
81.87				
Vel Total (ft/s)	16.85	Avg. Vel. (ft/s)	3.92	17.45
10.62				
Max Chl Dpth (ft)	7.02	Hydr. Depth (ft)	1.76	6.56

3.08				
Conv. Total (cfs)	878628.6	Conv. (cfs)	706.0	833556.4
44366.2				
Length Wtd. (ft)	355.66	Wetted Per. (ft)	7.21	439.47
82.44				
Min Ch El (ft)	2.89	Shear (lb/sq ft)	0.34	1.49
0.69				
Alpha	1.04	Stream Power (lb/ft s)	1.34	25.99
7.37				
Frctn Loss (ft)	0.50	Cum Volume (acre-ft)	0.24	50.24
1.07				
C & E Loss (ft)	0.02	Cum SA (acres)	0.09	7.04
0.39				

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

Profile #100-yr

Percent Conv	Pos Hydr Depth(ft)	Left Sta Velocity (ft/s)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)
1	LOB	0.00	43.40	42.59	10.85	7.21
0.08	1.76	3.92				
2	Chan	43.40	53.62	515.89	41.29	10.24
0.97	4.04	12.49				
3	Chan	53.62	63.83	663.43	48.02	10.24
1.25	4.70	13.82				
4	Chan	63.83	74.05	825.44	54.74	10.24
1.56	5.36	15.08				
5	Chan	74.05	84.27	1001.31	61.47	10.24
1.89	6.02	16.29				
6	Chan	84.27	94.48	1190.51	68.20	10.24
2.25	6.68	17.46				
7	Chan	94.48	104.70	1297.09	71.74	10.22
2.45	7.02	18.08				
8	Chan	104.70	114.91	1297.12	71.74	10.22
2.45	7.02	18.08				
9	Chan	114.91	125.13	1297.02	71.74	10.22
2.45	7.02	18.08				
10	Chan	125.13	135.35	1296.91	71.73	10.22
2.45	7.02	18.08				
11	Chan	135.35	145.56	1296.81	71.73	10.22
2.45	7.02	18.08				
12	Chan	145.56	155.78	1296.71	71.73	10.22
2.45	7.02	18.08				
13	Chan	155.78	166.00	1296.61	71.72	10.22
2.45	7.02	18.08				
14	Chan	166.00	176.21	1296.51	71.72	10.22
2.45	7.02	18.08				
15	Chan	176.21	186.43	1296.41	71.72	10.22
2.45	7.02	18.08				
16	Chan	186.43	196.64	1296.31	71.71	10.22
2.45	7.02	18.08				
17	Chan	196.64	206.86	1296.21	71.71	10.22
2.45	7.02	18.08				
18	Chan	206.86	217.08	1296.11	71.71	10.22
2.45	7.02	18.08				

19	Chan	217.08	227.29	1296.01	71.70	10.22
2.45	7.02	18.07				
20	Chan	227.29	237.51	1295.90	71.70	10.22
2.45	7.02	18.07				
21	Chan	237.51	247.73	1295.80	71.70	10.22
2.44	7.02	18.07				
22	Chan	247.73	257.94	1295.70	71.69	10.22
2.44	7.02	18.07				
23	Chan	257.94	268.16	1295.60	71.69	10.22
2.44	7.02	18.07				
24	Chan	268.16	278.37	1295.50	71.69	10.22
2.44	7.02	18.07				
25	Chan	278.37	288.59	1295.40	71.68	10.22
2.44	7.02	18.07				
26	Chan	288.59	298.81	1295.30	71.68	10.22
2.44	7.02	18.07				
27	Chan	298.81	309.02	1295.20	71.68	10.22
2.44	7.02	18.07				
28	Chan	309.02	319.24	1295.10	71.67	10.22
2.44	7.02	18.07				
29	Chan	319.24	329.46	1295.00	71.67	10.22
2.44	7.02	18.07				
30	Chan	329.46	339.67	1294.89	71.67	10.22
2.44	7.01	18.07				
31	Chan	339.67	349.89	1294.79	71.66	10.22
2.44	7.01	18.07				
32	Chan	349.89	360.10	1294.70	71.66	10.22
2.44	7.01	18.07				
33	Chan	360.10	370.32	1294.59	71.66	10.22
2.44	7.01	18.07				
34	Chan	370.32	380.54	1294.49	71.65	10.22
2.44	7.01	18.07				
35	Chan	380.54	390.75	1294.39	71.65	10.22
2.44	7.01	18.07				
36	Chan	390.75	400.97	1294.29	71.65	10.22
2.44	7.01	18.07				
37	Chan	400.97	411.19	1277.97	71.11	10.22
2.41	6.96	17.97				
38	Chan	411.19	421.40	1171.38	67.50	10.22
2.21	6.61	17.35				
39	Chan	421.40	431.62	1055.01	63.40	10.22
1.99	6.21	16.64				
40	Chan	431.62	441.83	943.56	59.29	10.22
1.78	5.80	15.91				
41	Chan	441.83	452.05	837.14	55.18	10.22
1.58	5.40	15.17				
42	Chan	452.05	462.27	735.88	51.07	10.22
1.39	5.00	14.41				
43	Chan	462.27	472.48	640.44	46.99	10.22
1.21	4.60	13.63				
44	Chan	472.48	482.70	550.79	42.92	10.22
1.04	4.20	12.83				
45	ROB	482.70	568.10	2676.23	252.03	82.44
5.05	3.08	10.62				

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

CROSS SECTION

RIVER: San Luis Rey Riv
REACH: Reach 1 RS: 264

INPUT
Description:
Station Elevation Data num= 17

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	18.2	22.2	16.3	29.1	14.2	35.2	12.2	42.1	10.2
58.39	2.62	208.7	2.48	270	2.2	370	2.2	490.68	2.74
548.45	4.78	560	8.2	562.9	10.2	568	12.2	575.9	14.2
589.4	14.2	636.14	13.6						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.03	42.1	.018	562.9	.04

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
42.1	562.9	160.2	161.3	162.2	.1	.3

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	13.27	Element	Left OB	Channel
Right OB				
Vel Head (ft)	2.63	Wt. n-Val.	0.030	0.018
0.040				
W.S. Elev (ft)	10.64	Reach Len. (ft)	160.20	161.30
162.20				
Crit W.S. (ft)	9.66	Flow Area (sq ft)	0.33	4071.49
0.24				
E.G. Slope (ft/ft)	0.001614	Area (sq ft)	0.33	4071.49
0.24				
Q Total (cfs)	53000.00	Flow (cfs)	0.23	52999.64
0.13				
Top Width (ft)	523.42	Top Width (ft)	1.51	520.80
1.11				
Vel Total (ft/s)	13.02	Avg. Vel. (ft/s)	0.70	13.02
0.52				
Max Chl Dpth (ft)	8.44	Hydr. Depth (ft)	0.22	7.82
0.22				
Conv. Total (cfs)	1319157.0	Conv. (cfs)	5.8	1319148.0
3.1				
Length Wtd. (ft)	161.30	Wetted Per. (ft)	1.57	523.63
1.20				
Min Ch El (ft)	2.20	Shear (lb/sq ft)	0.02	0.78
0.02				
Alpha	1.00	Stream Power (lb/ft s)	0.01	10.20
0.01				
Frctn Loss (ft)	0.32	Cum Volume (acre-ft)	0.20	21.83
0.06				
C & E Loss (ft)	0.08	Cum SA (acres)	0.06	3.12
0.06				

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for
additional cross sections.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

Profile #100-yr

Percent Conv	Pos Hydr	Left Sta Velocity (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)
	Depth(ft)	(ft/s)				
1	LOB	0.00	42.10	0.23	0.33	1.57
0.00	0.22	0.70				
2	Chan	42.10	54.21	265.02	39.42	13.36
0.50	3.25	6.72				
3	Chan	54.21	66.32	1157.03	93.06	12.54
2.18	7.68	12.43				
4	Chan	66.32	78.43	1274.47	97.25	12.11
2.40	8.03	13.10				
5	Chan	78.43	90.55	1277.46	97.39	12.11
2.41	8.04	13.12				
6	Chan	90.55	102.66	1280.45	97.53	12.11
2.42	8.05	13.13				
7	Chan	102.66	114.77	1283.44	97.66	12.11
2.42	8.06	13.14				
8	Chan	114.77	126.88	1286.43	97.80	12.11
2.43	8.07	13.15				
9	Chan	126.88	138.99	1289.43	97.94	12.11
2.43	8.09	13.17				
10	Chan	138.99	151.10	1292.43	98.07	12.11
2.44	8.10	13.18				
11	Chan	151.10	163.22	1295.43	98.21	12.11
2.44	8.11	13.19				
12	Chan	163.22	175.33	1298.44	98.35	12.11
2.45	8.12	13.20				
13	Chan	175.33	187.44	1301.44	98.48	12.11
2.46	8.13	13.21				
14	Chan	187.44	199.55	1304.45	98.62	12.11
2.46	8.14	13.23				
15	Chan	199.55	211.66	1307.82	98.77	12.11
2.47	8.16	13.24				
16	Chan	211.66	223.77	1319.26	99.29	12.11
2.49	8.20	13.29				
17	Chan	223.77	235.89	1334.13	99.96	12.11
2.52	8.25	13.35				
18	Chan	235.89	248.00	1349.07	100.63	12.11
2.55	8.31	13.41				
19	Chan	248.00	260.11	1364.07	101.30	12.11
2.57	8.36	13.47				
20	Chan	260.11	272.22	1378.89	101.96	12.11
2.60	8.42	13.52				
21	Chan	272.22	284.33	1383.94	102.18	12.11
2.61	8.44	13.54				
22	Chan	284.33	296.44	1383.94	102.18	12.11
2.61	8.44	13.54				
23	Chan	296.44	308.56	1383.94	102.18	12.11
2.61	8.44	13.54				
24	Chan	308.56	320.67	1383.94	102.18	12.11
2.61	8.44	13.54				
25	Chan	320.67	332.78	1383.94	102.18	12.11
2.61	8.44	13.54				
26	Chan	332.78	344.89	1383.94	102.18	12.11
2.61	8.44	13.54				
27	Chan	344.89	357.00	1383.94	102.18	12.11
2.61	8.44	13.54				
28	Chan	357.00	369.11	1383.94	102.18	12.11
2.61	8.44	13.54				
29	Chan	369.11	381.23	1377.57	101.90	12.11

2.60	8.41	13.52				
30	Chan	381.23	393.34	1362.85	101.25	12.11
2.57	8.36	13.46				
31	Chan	393.34	405.45	1348.16	100.59	12.11
2.54	8.31	13.40				
32	Chan	405.45	417.56	1333.53	99.93	12.11
2.52	8.25	13.34				
33	Chan	417.56	429.67	1318.96	99.28	12.11
2.49	8.20	13.29				
34	Chan	429.67	441.78	1304.46	98.62	12.11
2.46	8.14	13.23				
35	Chan	441.78	453.90	1290.02	97.96	12.11
2.43	8.09	13.17				
36	Chan	453.90	466.01	1275.65	97.31	12.11
2.41	8.03	13.11				
37	Chan	466.01	478.12	1261.34	96.65	12.11
2.38	7.98	13.05				
38	Chan	478.12	490.23	1247.09	95.99	12.11
2.35	7.93	12.99				
39	Chan	490.23	502.34	1187.58	93.24	12.12
2.24	7.70	12.74				
40	Chan	502.34	514.45	1079.72	88.06	12.12
2.04	7.27	12.26				
41	Chan	514.45	526.57	975.96	82.88	12.12
1.84	6.84	11.77				
42	Chan	526.57	538.68	876.43	77.70	12.12
1.65	6.42	11.28				
43	Chan	538.68	550.79	764.32	71.81	12.22
1.44	5.93	10.64				
44	Chan	550.79	562.90	265.34	39.17	13.13
0.50	3.23	6.77				
45	ROB	562.90	636.14	0.13	0.24	1.20
0.00	0.22	0.52				

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for
additional cross sections.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION

RIVER: San Luis Rey Riv
REACH: Reach 1 RS: 102

INPUT
Description:
Station Elevation Data num= 16

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	15.6	27.3	14.2	33.4	12.2	42.1	10.2	47.83	5.65
62.11	3.1	104.97	2.93	190.68	2.22	250	2.2	350	2.2
436.02	2.35	521.74	2.58	554.66	3.17	565.7	8.2	569.3	10.2
634.1	11.4								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.018	47.83	.018	565.7	.04

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
47.83	565.7	100	100	100	.1	.3

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	12.87	Element	Left OB	Channel
Right OB				
Vel Head (ft)	3.43	Wt. n-Val.	0.018	0.018
0.040				
W.S. Elev (ft)	9.44	Reach Len. (ft)	100.00	100.00
100.00				
Crit W.S. (ft)	9.44	Flow Area (sq ft)	9.07	3563.24
1.39				
E.G. Slope (ft/ft)	0.002485	Area (sq ft)	9.07	3563.24
1.39				
Q Total (cfs)	53000.00	Flow (cfs)	48.58	52949.70
1.72				
Top Width (ft)	524.89	Top Width (ft)	4.78	517.87
2.24				
Vel Total (ft/s)	14.83	Avg. Vel. (ft/s)	5.36	14.86
1.23				
Max Chl Dpth (ft)	7.24	Hydr. Depth (ft)	1.90	6.88
0.62				
Conv. Total (cfs)	1063297.0	Conv. (cfs)	974.7	1062288.0
34.5				
Length Wtd. (ft)	100.00	Wetted Per. (ft)	6.10	519.20
2.56				
Min Ch El (ft)	2.20	Shear (lb/sq ft)	0.23	1.06
0.08				
Alpha	1.00	Stream Power (lb/ft s)	1.23	15.82
0.10				
Frctn Loss (ft)	0.25	Cum Volume (acre-ft)	0.18	7.70
0.06				
C & E Loss (ft)	0.06	Cum SA (acres)	0.05	1.19
0.05				

Warning: The energy equation could not be balanced within the specified number of iterations. The
program selected the water surface that had the least amount of error between computed and
assumed values.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical
depth, the calculated water surface came back below critical depth. This indicates that there
is not a valid subcritical answer. The program defaulted to critical depth.

Profile #100-yr

	Pos	Left Sta	Right Sta	Flow	Area	W.P.	Percent
	Hydr	Velocity (ft)	(ft)	(cfs)	(sq ft)	(ft)	
Conv	Depth(ft)	(ft/s)					
1	LOB	0.00	47.83	48.58	9.07	6.10	0.09
	1.90	5.36					
2	Chan	47.83	59.87	682.33	58.65	12.23	1.29
	4.87	11.63					
3	Chan	59.87	71.92	1063.48	76.16	12.08	2.01
	6.32	13.96					
4	Chan	71.92	83.96	1089.27	77.17	12.04	

2.06	6.41	14.12					
5	Chan	83.96	96.00	1102.83	77.74	12.04	
2.08	6.46	14.19					
6	Chan	96.00	108.05	1116.95	78.34	12.04	
2.11	6.50	14.26					
7	Chan	108.05	120.09	1141.47	79.37	12.04	
2.15	6.59	14.38					
8	Chan	120.09	132.13	1170.41	80.57	12.04	
2.21	6.69	14.53					
9	Chan	132.13	144.18	1199.65	81.77	12.04	
2.26	6.79	14.67					
10	Chan	144.18	156.22	1229.17	82.97	12.04	
2.32	6.89	14.81					
11	Chan	156.22	168.26	1258.98	84.17	12.04	
2.38	6.99	14.96					
12	Chan	168.26	180.31	1289.08	85.38	12.04	
2.43	7.09	15.10					
13	Chan	180.31	192.35	1319.18	86.57	12.04	
2.49	7.19	15.24					
14	Chan	192.35	204.40	1331.32	87.04	12.04	
2.51	7.23	15.30					
15	Chan	204.40	216.44	1332.57	87.09	12.04	
2.51	7.23	15.30					
16	Chan	216.44	228.48	1333.82	87.14	12.04	
2.52	7.24	15.31					
17	Chan	228.48	240.53	1335.06	87.19	12.04	
2.52	7.24	15.31					
18	Chan	240.53	252.57	1336.28	87.24	12.04	
2.52	7.24	15.32					
19	Chan	252.57	264.61	1336.67	87.25	12.04	
2.52	7.24	15.32					
20	Chan	264.61	276.66	1336.67	87.25	12.04	
2.52	7.24	15.32					
21	Chan	276.66	288.70	1336.67	87.25	12.04	
2.52	7.24	15.32					
22	Chan	288.70	300.74	1336.67	87.25	12.04	
2.52	7.24	15.32					
23	Chan	300.74	312.79	1336.67	87.25	12.04	
2.52	7.24	15.32					
24	Chan	312.79	324.83	1336.67	87.25	12.04	
2.52	7.24	15.32					
25	Chan	324.83	336.87	1336.67	87.25	12.04	
2.52	7.24	15.32					
26	Chan	336.87	348.92	1336.67	87.25	12.04	
2.52	7.24	15.32					
27	Chan	348.92	360.96	1333.99	87.15	12.04	
2.52	7.24	15.31					
28	Chan	360.96	373.00	1327.57	86.90	12.04	
2.50	7.22	15.28					
29	Chan	373.00	385.05	1321.14	86.64	12.04	
2.49	7.19	15.25					
30	Chan	385.05	397.09	1314.72	86.39	12.04	
2.48	7.17	15.22					
31	Chan	397.09	409.13	1308.31	86.14	12.04	
2.47	7.15	15.19					
32	Chan	409.13	421.18	1301.91	85.88	12.04	
2.46	7.13	15.16					
33	Chan	421.18	433.22	1295.53	85.63	12.04	
2.44	7.11	15.13					
34	Chan	433.22	445.27	1288.15	85.34	12.04	
2.43	7.09	15.09					
35	Chan	445.27	457.31	1278.46	84.95	12.04	
2.41	7.05	15.05					

36	Chan	457.31	469.35	1268.72	84.56	12.04
2.39	7.02	15.00				
37	Chan	469.35	481.40	1259.00	84.17	12.04
2.38	6.99	14.96				
38	Chan	481.40	493.44	1249.31	83.78	12.04
2.36	6.96	14.91				
39	Chan	493.44	505.48	1239.66	83.40	12.04
2.34	6.92	14.86				
40	Chan	505.48	517.53	1230.03	83.01	12.04
2.32	6.89	14.82				
41	Chan	517.53	529.57	1208.87	82.15	12.04
2.28	6.82	14.72				
42	Chan	529.57	541.61	1149.00	79.69	12.05
2.17	6.62	14.42				
43	Chan	541.61	553.66	1087.20	77.09	12.05
2.05	6.40	14.10				
44	Chan	553.66	565.70	462.93	47.81	13.14
0.87	3.97	9.68				
45	ROB	565.70	634.10	1.72	1.39	2.56
0.00	0.62	1.23				

Warning: The energy equation could not be balanced within the specified number of iterations. The
program selected the water surface that had the least amount of error between computed and
assumed values.
Warning: 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 Riv
REACH: Reach 1 RS: 0

INPUT
Description:
Station Elevation Data num= 17

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	10	15	8	28.57	2.67	46.58	2.77	66.46	2.78
78.88	2.83	90.06	2.88	104.97	2.93	190.68	2.22	250	2.2
350	2.2	436.02	2.35	521.74	2.58	554.66	3.17	565.7	4
569.3	6	634.1	10						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.018	46.58	.018	569.3	.04

Bank Sta: Left Right Coeff Contr. Expan.
46.58 569.3 .1 .3

CROSS SECTION OUTPUT Profile #100-yr

E.G. Elev (ft)	12.52	Element	Left OB	Channel
Right OB				
Vel Head (ft)	4.03	Wt. n-Val.	0.018	0.018

0.040				
W.S. Elev (ft)	8.49	Reach Len. (ft)		
Crit W.S. (ft)	9.17	Flow Area (sq ft)	147.69	3142.49
50.29				
E.G. Slope (ft/ft)	0.003544	Area (sq ft)	147.69	3142.49
50.29				
Q Total (cfs)	53000.00	Flow (cfs)	1849.37	51022.04
128.59				
Top Width (ft)	598.35	Top Width (ft)	35.27	522.72
40.36				
Vel Total (ft/s)	15.87	Avg. Vel. (ft/s)	12.52	16.24
2.56				
Max Chl Dpth (ft)	6.29	Hydr. Depth (ft)	4.19	6.01
1.25				
Conv. Total (cfs)	890312.8	Conv. (cfs)	31066.4	857086.3
2160.1				
Length Wtd. (ft)		Wetted Per. (ft)	36.31	523.28
40.44				
Min Ch El (ft)	2.20	Shear (lb/sq ft)	0.90	1.33
0.28				
Alpha	1.03	Stream Power (lb/ft s)	11.27	21.57
0.70				
Frctn Loss (ft)	0.29	Cum Volume (acre-ft)		
C & E Loss (ft)	0.06	Cum SA (acres)		

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

Profile #100-yr

Percent Conv	Pos Hydr	Left Sta Velocity (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)
	Depth(ft)	(ft/s)				
1	LOB	0.00	46.58	1849.37	147.69	36.31
3.49	4.19	12.52				
2	Chan	46.58	58.74	1089.98	69.52	12.16
2.06	5.72	15.68				
3	Chan	58.74	70.89	1087.13	69.41	12.16
2.05	5.71	15.66				
4	Chan	70.89	83.05	1074.27	68.91	12.16
2.03	5.67	15.59				
5	Chan	83.05	95.21	1057.91	68.28	12.16
2.00	5.62	15.49				
6	Chan	95.21	107.36	1045.29	67.79	12.16
1.97	5.58	15.42				
7	Chan	107.36	119.52	1062.53	68.46	12.16
2.00	5.63	15.52				
8	Chan	119.52	131.67	1094.38	69.69	12.16
2.06	5.73	15.70				
9	Chan	131.67	143.83	1126.61	70.91	12.16
2.13	5.83	15.89				
10	Chan	143.83	155.99	1159.21	72.13	12.16
2.19	5.93	16.07				
11	Chan	155.99	168.14	1192.18	73.36	12.16
2.25	6.03	16.25				

12	Chan	168.14	180.30	1225.52	74.58	12.16
2.31	6.14	16.43				
13	Chan	180.30	192.46	1258.89	75.79	12.16
2.38	6.23	16.61				
14	Chan	192.46	204.61	1272.17	76.27	12.16
2.40	6.27	16.68				
15	Chan	204.61	216.77	1273.56	76.32	12.16
2.40	6.28	16.69				
16	Chan	216.77	228.92	1274.94	76.37	12.16
2.41	6.28	16.69				
17	Chan	228.92	241.08	1276.33	76.42	12.16
2.41	6.29	16.70				
18	Chan	241.08	253.24	1277.67	76.47	12.16
2.41	6.29	16.71				
19	Chan	253.24	265.39	1278.04	76.48	12.16
2.41	6.29	16.71				
20	Chan	265.39	277.55	1278.04	76.48	12.16
2.41	6.29	16.71				
21	Chan	277.55	289.71	1278.04	76.48	12.16
2.41	6.29	16.71				
22	Chan	289.71	301.86	1278.04	76.48	12.16
2.41	6.29	16.71				
23	Chan	301.86	314.02	1278.04	76.48	12.16
2.41	6.29	16.71				
24	Chan	314.02	326.17	1278.04	76.48	12.16
2.41	6.29	16.71				
25	Chan	326.17	338.33	1278.04	76.48	12.16
2.41	6.29	16.71				
26	Chan	338.33	350.49	1278.04	76.48	12.16
2.41	6.29	16.71				
27	Chan	350.49	362.64	1274.17	76.34	12.16
2.40	6.28	16.69				
28	Chan	362.64	374.80	1267.01	76.09	12.16
2.39	6.26	16.65				
29	Chan	374.80	386.96	1259.86	75.83	12.16
2.38	6.24	16.61				
30	Chan	386.96	399.11	1252.73	75.57	12.16
2.36	6.22	16.58				
31	Chan	399.11	411.27	1245.62	75.31	12.16
2.35	6.20	16.54				
32	Chan	411.27	423.42	1238.53	75.06	12.16
2.34	6.17	16.50				
33	Chan	423.42	435.58	1231.45	74.80	12.16
2.32	6.15	16.46				
34	Chan	435.58	447.74	1222.62	74.48	12.16
2.31	6.13	16.42				
35	Chan	447.74	459.89	1211.79	74.08	12.16
2.29	6.09	16.36				
36	Chan	459.89	472.05	1201.00	73.68	12.16
2.27	6.06	16.30				
37	Chan	472.05	484.21	1190.25	73.29	12.16
2.25	6.03	16.24				
38	Chan	484.21	496.36	1179.54	72.89	12.16
2.23	6.00	16.18				
39	Chan	496.36	508.52	1168.86	72.49	12.16
2.21	5.96	16.12				
40	Chan	508.52	520.67	1158.23	72.10	12.16
2.19	5.93	16.06				
41	Chan	520.67	532.83	1122.63	70.76	12.16
2.12	5.82	15.86				
42	Chan	532.83	544.99	1053.69	68.12	12.16
1.99	5.60	15.47				
43	Chan	544.99	557.14	981.52	65.30	12.16

1.85	5.37	15.03				
44	Chan	557.14	569.30	689.67	53.75	12.70
1.30	4.42	12.83				
45	ROB	569.30	634.10	128.59	50.29	40.44
0.24	1.25	2.56				

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

SUMMARY OF MANNING'S N VALUES

River:San Luis Rey Riv

Reach	River Sta.	n1	n2	n3
Reach 1	6042	.04	.025	.05
Reach 1	5475	.04	.025	.05
Reach 1	4960	.04	.025	.05
Reach 1	4412	.04	.025	.05
Reach 1	3787	.04	.025	.05
Reach 1	3305	.04	.025	.05
Reach 1	3089	.04	.025	.05
Reach 1	2839	.04	.025	.05
Reach 1	2748	.04	.025	.05
Reach 1	2500	Bridge		
Reach 1	2477	.04	.025	.04
Reach 1	2430	Bridge		
Reach 1	2424	.03	.025	.04
Reach 1	2220	.03	.025	.04
Reach 1	1829	.03	.025	.04
Reach 1	1622	.03	.025	.04
Reach 1	1475	.03	.025	.04
Reach 1	1207	.03	.025	.04
Reach 1	1200	Bridge		
Reach 1	1182	.03	.018	.04
Reach 1	844	.03	.018	.04
Reach 1	800	Bridge		
Reach 1	761	.03	.018	.04
Reach 1	619	.03	.018	.04
Reach 1	264	.03	.018	.04
Reach 1	102	.018	.018	.04
Reach 1	0	.018	.018	.04

SUMMARY OF REACH LENGTHS

River: San Luis Rey Riv

Reach	River Sta.	Left	Channel	Right
Reach 1	6042	531.5	566.5	629.4
Reach 1	5475	579	515.3	478.7
Reach 1	4960	382.1	548.1	630.3
Reach 1	4412	617.2	624.6	463
Reach 1	3787	478	483.1	500.6
Reach 1	3305	210.5	214.6	221.9

Reach 1	3089	285.7	250.5	194.1
Reach 1	2839	145.6	90.9	65.5
Reach 1	2748	271.2	271	268.4
Reach 1	2500	Bridge		
Reach 1	2477	115	53.3	94.9
Reach 1	2430	Bridge		
Reach 1	2424	132.5	204	231.1
Reach 1	2220	343.8	389.9	420.4
Reach 1	1829	209.9	206.9	213.2
Reach 1	1622	171.5	147.6	151.2
Reach 1	1475	400.7	263.3	141.7
Reach 1	1207	30.4	30.2	32.6
Reach 1	1200	Bridge		
Reach 1	1182	153	337.7	510.2
Reach 1	844	81.3	83	80.5
Reach 1	800	Bridge		
Reach 1	761	188.3	141.9	103.8
Reach 1	619	368.9	355.9	348
Reach 1	264	160.2	161.3	162.2
Reach 1	102	100	100	100
Reach 1	0			

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: San Luis Rey Riv

Reach	River Sta.	Contr.	Expan.
Reach 1	6042	.1	.3
Reach 1	5475	.1	.3
Reach 1	4960	.1	.3
Reach 1	4412	.1	.3
Reach 1	3787	.1	.3
Reach 1	3305	.1	.3
Reach 1	3089	.1	.3
Reach 1	2839	.1	.3
Reach 1	2748	.1	.3
Reach 1	2500	Bridge	
Reach 1	2477	.1	.3
Reach 1	2430	Bridge	
Reach 1	2424	.1	.3
Reach 1	2220	.1	.3
Reach 1	1829	.1	.3
Reach 1	1622	.1	.3
Reach 1	1475	.1	.3
Reach 1	1207	.1	.3
Reach 1	1200	Bridge	
Reach 1	1182	.1	.3
Reach 1	844	.1	.3
Reach 1	800	Bridge	
Reach 1	761	.1	.3
Reach 1	619	.1	.3
Reach 1	264	.1	.3
Reach 1	102	.1	.3
Reach 1	0	.1	.3

Profile Output Table - Standard Table 1

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.
E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl	
(ft)	(ft/ft)	(ft/s)	(cfs) (sq ft)	(ft)	(ft)	(ft)
Reach 1	6042	100-yr	53000.00	6.70	24.68	19.14
26.12	0.000765	10.59	6373.00	486.27	0.46	
Reach 1	5475	100-yr	53000.00	6.20	24.14	19.50
25.65	0.000862	10.56	6168.66	535.65	0.48	
Reach 1	4960	100-yr	53000.00	6.70	22.29	20.53
24.90	0.001904	13.90	4744.61	512.60	0.69	
Reach 1	4412	100-yr	53000.00	6.60	22.51	17.82
23.87	0.000874	9.87	6299.34	559.47	0.48	
Reach 1	3787	100-yr	53000.00	4.90	21.48	16.78
23.23	0.001080	11.46	5809.02	474.91	0.54	
Reach 1	3305	100-yr	53000.00	4.90	20.70	16.68
22.63	0.001355	12.76	5779.18	470.27	0.60	
Reach 1	3089	100-yr	53000.00	4.70	20.98	14.93
22.23	0.000652	9.30	6434.78	489.34	0.42	
Reach 1	2839	100-yr	53000.00	4.50	19.07	16.76
21.82	0.001903	13.57	4270.55	421.23	0.69	
Reach 1	2748	100-yr	53000.00	4.50	19.42	16.11
21.45	0.001437	11.48	4716.52	436.04	0.60	
Reach 1	2500		Bridge			
Reach 1	2477	100-yr	53000.00	4.40	18.82	16.09
20.62	0.001360	11.83	5844.76	634.10	0.59	
Reach 1	2430		Bridge			
Reach 1	2424	100-yr	53000.00	4.40	19.09	15.46
20.35	0.000891	10.00	6628.63	683.93	0.48	
Reach 1	2220	100-yr	53000.00	4.40	17.55	15.62
19.99	0.001852	13.14	4632.48	545.00	0.68	
Reach 1	1829	100-yr	53000.00	3.90	15.13	15.13
18.88	0.003609	16.73	3881.12	519.75	0.92	
Reach 1	1622	100-yr	53000.00	3.30	14.52	14.25
17.69	0.003195	16.31	4429.03	594.28	0.88	
Reach 1	1475	100-yr	53000.00	3.20	15.11	13.02
16.95	0.001662	11.46	5319.23	647.66	0.63	
Reach 1	1207	100-yr	53000.00	2.90	15.29	11.75
16.43	0.000966	9.03	6341.82	662.38	0.48	
Reach 1	1200		Bridge			
Reach 1	1182	100-yr	53000.00	2.90	13.90	12.16
15.95	0.001096	12.16	5344.75	654.58	0.70	
Reach 1	844	100-yr	53000.00	2.90	13.51	11.76
15.57	0.001076	11.79	4678.49	558.32	0.69	
Reach 1	800		Bridge			
Reach 1	761	100-yr	53000.00	2.86	10.61	11.49
15.00	0.003513	17.28	3227.87	549.65	1.18	
Reach 1	619	100-yr	53000.00	2.89	9.91	10.85
14.49	0.003639	17.45	3144.90	527.34	1.20	
Reach 1	264	100-yr	53000.00	2.20	10.64	9.66
13.27	0.001614	13.02	4072.06	523.42	0.82	
Reach 1	102	100-yr	53000.00	2.20	9.44	9.44
12.87	0.002485	14.86	3573.70	524.89	1.00	
Reach 1	0	100-yr	53000.00	2.20	8.49	9.17
12.52	0.003544	16.24	3340.47	598.35	1.17	

ERRORS WARNINGS AND NOTES
Errors Warnings and Notes for Plan : SLR_Prop

River: San Luis Rey Riv Reach: Reach 1 RS: 5475 Profile: 100-yr
  Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
  Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
  This may indicate the need for additional cross sections.
River: San Luis Rey Riv Reach: Reach 1 RS: 4960 Profile: 100-yr
  Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
  Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
  This may indicate the need for additional cross sections.
  Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate
  the need for additional cross sections.
River: San Luis Rey Riv Reach: Reach 1 RS: 3305 Profile: 100-yr
  Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
  Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
  This may indicate the need for additional cross sections.
River: San Luis Rey Riv Reach: Reach 1 RS: 3089 Profile: 100-yr
  Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
  Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
  This may indicate the need for additional cross sections.
River: San Luis Rey Riv Reach: Reach 1 RS: 2839 Profile: 100-yr
  Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
River: San Luis Rey Riv Reach: Reach 1 RS: 2430 Profile: 100-yr Upstream
  Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
River: San Luis Rey Riv Reach: Reach 1 RS: 2424 Profile: 100-yr
  Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
  Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
  This may indicate the need for additional cross sections.
River: San Luis Rey Riv Reach: Reach 1 RS: 2220 Profile: 100-yr
  Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
  Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate
  the need for additional cross sections.
River: San Luis Rey Riv Reach: Reach 1 RS: 1829 Profile: 100-yr
  Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth
  for the water surface and continued on with the calculations.
  Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
  Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate
  the need for additional cross sections.
  Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
  water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The

program defaulted to critical depth.
River: San Luis Rey Riv Reach: Reach 1 RS: 1622 Profile: 100-yr
Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
River: San Luis Rey Riv Reach: Reach 1 RS: 1475 Profile: 100-yr
Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
River: San Luis Rey Riv Reach: Reach 1 RS: 1200 Profile: 100-yr
Warning:For the final momentum answer at the bridge, the upstream energy was computed lower than the downstream energy. This
is not physically possible, the momentum answer has been disregarded.
River: San Luis Rey Riv Reach: Reach 1 RS: 1200 Profile: 100-yr Upstream
Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
River: San Luis Rey Riv Reach: Reach 1 RS: 1200 Profile: 100-yr Downstream
Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
River: San Luis Rey Riv Reach: Reach 1 RS: 844 Profile: 100-yr
Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
River: San Luis Rey Riv Reach: Reach 1 RS: 800 Profile: 100-yr
Warning:Pier drag coefficient of 2.0 assumed for Class B flow.
Warning:The momentum, Class B, supercritical, water surface downstream of the bridge had a higher energy than the upstream
cross section. This is not physically possible. The downstream water surface has been computed by taking the
momentum result inside of the bridge and performing an energy balance.
Note: The momentum method has computed a class B profile.
River: San Luis Rey Riv Reach: Reach 1 RS: 800 Profile: 100-yr Upstream
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
River: San Luis Rey Riv Reach: Reach 1 RS: 800 Profile: 100-yr Downstream
Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Note: The energy method has computed a class B profile.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
River: San Luis Rey Riv Reach: Reach 1 RS: 761 Profile: 100-yr
Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Note: The energy method has computed a class B profile.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
River: San Luis Rey Riv Reach: Reach 1 RS: 619 Profile: 100-yr
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was
used.
River: San Luis Rey Riv Reach: Reach 1 RS: 264 Profile: 100-yr
Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
River: San Luis Rey Riv Reach: Reach 1 RS: 102 Profile: 100-yr
Warning:The energy equation could not be balanced within the specified number of iterations. The program selected the water
surface that had the least amount of error between computed and assumed

values.

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

River: San Luis Rey Riv Reach: Reach 1 RS: 0 Profile: 100-yr

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