Property of
Flood Control District of MC Library
Please Return to
2801 W. Durango
Phoenix, AZ 85009

FLOOD CONTROL DISTRICT of MARICOPA COUNTY 1959

Paradise Shores – New River Bank Protection Project

CANDIDATE ASSESSMENT REPORT

PREPARED FOR
FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY

PREPARED BY
STANTEC CONSULTING, INC.

7776 Pointe Parkway West Suite 290
Phoenix, Arizona 85044
(602) 438-2200

FEBRUARY 2000

Table of Contents

		Page1.0
	BACKGROUND	**1**
1.1	General Description	1
1.2	Location Project	1
1.3	Existing Conditions	1
1.4	Proposed Improvement Summary	3
2.0	**HYDROLOGIC/HYDRAULIC ANALYSIS**	**4**
2.1	General	4
2.2	Design Discharges	4
2.3	Hydraulic Models	5
	2.3.1 General	5
	2.3.2 Proposed Conditions Hydraulic Models	5
3.0	**LAND USE**	**6**
3.1	General	6
4.0	**UTILITIES**	**8**
4.1	General	8
5.0	**DESIGN ALTERNATIVES**	**9**
5.1	Alternative Development	9
5.2	Results of Alternative Analyses	10
5.3	Engineering Cost Estimates	12
5.4	Preferred Alternative	13
6.0	**RIGHT-OF-WAY**	**15**
6.1	Existing	15
6.2	Proposed	15
7.0	**ENVIRONMENTAL**	**16**
7.1	General	16
8.0	**DESIGN EFFORT**	**17**

Stantec

8.1 Design Labor Hours, Cost and Direct Cost 17

8.2 Design Schedule 17

8.3 Full Project Cost 17

LIST OF TABLES

Table 1 Proposed Condition Hydraulic Results FEMA Q_{100}
Table 2 Proposed Condition Hydraulic Results COE Q_{100}
Table 3 Summary of Unit Cost
Table 4 Alternative 2 Construction Cost Estimates
Table 5 Labor Hour and Cost Estimate for Alternative 2
Table 6 Alternative 2 Scheduled Project Man-Hours
Table 7 Full Project Cost for Each Alternative

LIST OF FIGURES

Figure 1 Project Location Map
Figure 2 Land Use Map City of Glendale
Figure 3 Alternative 2

APPENDICES

Appendix A HEC-RAS Computer Output Files Proposed Condition
Appendix B HEC-RAS Input Files on Disk

1.0 Background

1.1 GENERAL DESCRIPTION

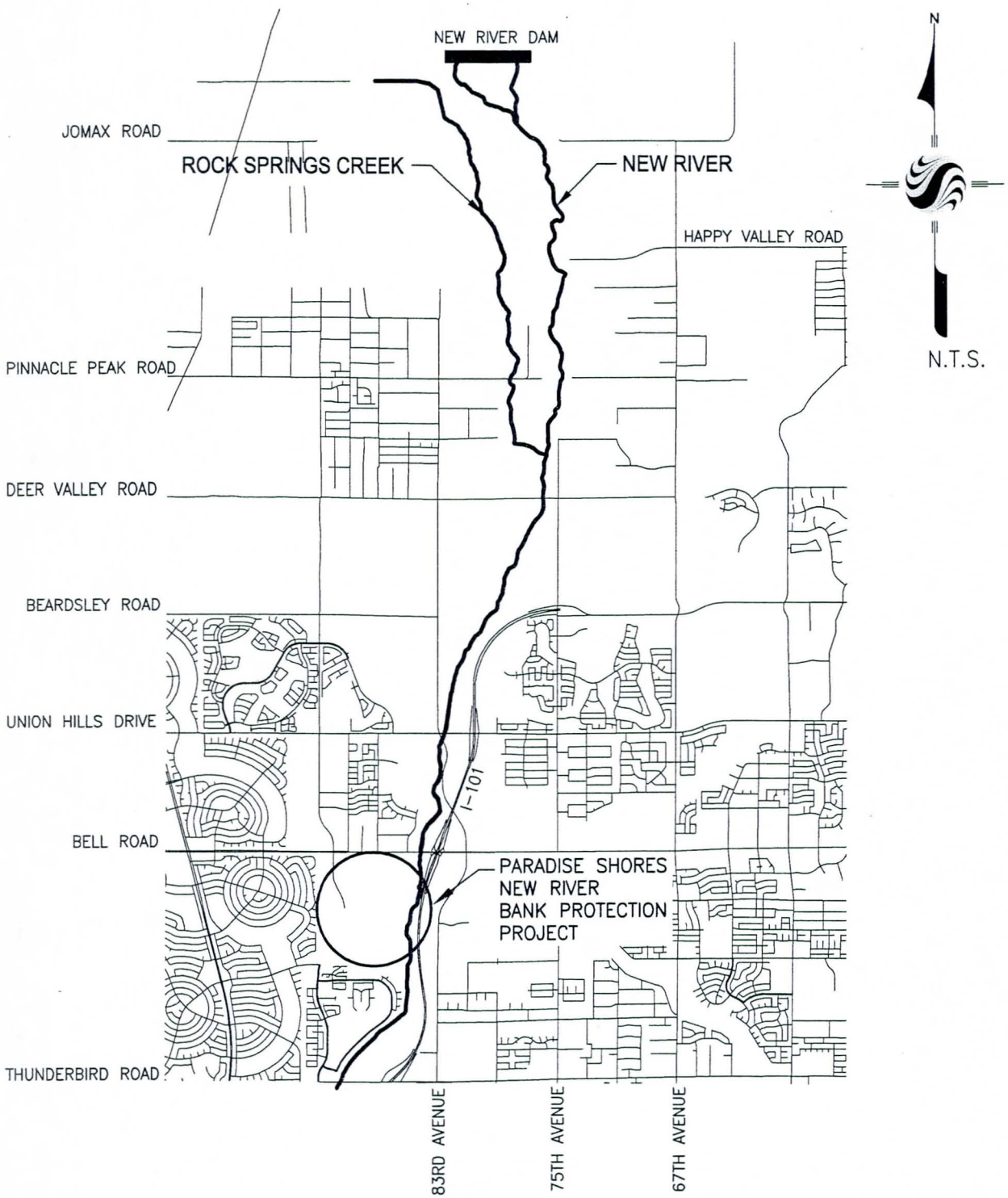
The goal of the Paradise Shores – New River Bank Protection Project is to provide conceptual engineering plans and cost estimates for bank armoring along the west bank of New River immediately adjacent to the Paradise Shores Subdivision. Under existing conditions, the segment of the west bank adjacent to the subdivision is the only west bank segment unprotected between Bell Road and the New River confluence with Skunk Creek

1.2 LOCATION PROJECT

The location of the project is within the New River channel corridor. Specifically, the project is located approximately 2000 feet south Bell Road within the City of Peoria. Project location is displayed on Figure 1. The project is also located within the Middle New River Watercourse Master Plan Study (FCD 97-04) project area.

1.3 EXISTING CONDITIONS

The project reach extends from approximately River Mile (RM) 9.492 to RM 9.592 The existing channel is characterized by a trapezoidal shaped channel section with the majority of the west channel side slope being armored with wire-tied, rock filled mattresses. The east channel side slope is typically not armored. However, where the east bank is armored, it is armored with a soil cement type armoring. The trapezoidal type section is a result of encroachment of the natural channel/floodplain by development. The channel bed material consists of cobbles and sand.



Stantec

P:\28900058\Acadr13\Car\deervalley_rev.dwg

Client/Project
Flood Control District of Maricopa County
Paradise Shores – New River
Bank Protection Project

Figure No.
1.0

Title
LOCATION MAP

Date: 01/04/00
Project Number 28900058

1.4 PROPOSED IMPROVEMENT SUMMARY

Proposed improvements consists of minor channel excavation and armoring of west channel side slopes with wire-tied, rock filled mattresses.

The proposed project is an element of the Middle New River Watercourse Master Plan (Contract FCD 97-04). This particular element is currently ranked as a medium priority within the Master Plan. Finial review of the Master Plan is being conducted.

2.0 Hydrologic/Hydraulic Analysis

2.1 GENERAL

The project area lies below New River Dam and within the New River channel corridor. Upstream of the dam, the New River watershed is comprised of 164 square miles of primarily undeveloped desert and desert mountains, whereas below the dam, the New River watersheds are highly urbanized. In urbanized portions of the watershed, land use is predominately residential with some commercial areas. Watersheds are characterized by both mountainous areas and flat valley areas, thus slopes can range from 0.1 percent to greater than 10 percent. Downstream of the dam, stormwater is conveyed as concentrated flow within defined and/or braided channels and as overland flow within overbank areas. The subject reach of New River is in a FEMA delineated floodway.

2.2 DESIGN DISCHARGES

Peak discharges developed for previous hydrologic studies conducted by the Federal Emergency Management Agency (FEMA) and the Army Corp's of Engineers (COE) are used in the hydraulic evaluations and design for this project. Design peak discharges for proposed improvements are based on both FEMA's and the COE's 100-year peak discharges for New River.

One hundred year peak discharges cited in the FEMA's "Flood Insurance Study (FIS), Maricopa County, Arizona and Incorporated Areas" (1995), and the FEMA, HEC-2 hydraulic computer model for the effective New River Floodplain/Floodway delineation's are utilized in this study. The FEMA 100-year peak discharge of 11,450 cfs is used as the design peak discharges for the subject reach.

The COE, in their design process for the New River Dam, developed a hydrologic model to determine future condition 100-Year peak discharges at two specific concentration points downstream of the dam. The concentration points are located at the confluence of New River with Rocks Springs Creek and at the confluence of New River with Skunk Creek. Interpolations of the future condition 100-year peak discharges, cited in the Army Corps of Engineers (COE) document entitled, "Gila River Basin, Phoenix, Arizona and Vicinity (Including New River), New River Dam (Including New River to Skunk Creek) Design Memorandum No. 3", dated November 1982, are made to determine potential peak discharges at locations other than the locations cited in the COE's report. The methodology used for COE 100-year peak discharge interpolation is described in the Middle New River Watercourse Master

Plan Technical Documentation Notebook. The COE 100-year peak discharge (future condition) of 19,000 is used for the subject reach when evaluating potential future flow capacity. The COE peak discharge is to be contained within the freeboard of the designed channel.

2.3 HYDRAULIC MODELS

2.3.1 General

The basis for this project are hydraulic models developed for the Middle New River Watercourse Master Plan. Hydraulic computations performed for the Middle New River Watercourse Master Plan were completed following procedures and guidelines listed in the "Drainage Design Manual for Maricopa County, Volume II Hydraulics"; the "ProHEC2, Program Documentation Manual" (Dodson and Associates, Inc.); and U.S. the Army Corps of Engineers, "HEC-RAS River Analysis System User Manual".

2.3.2 Proposed Conditions Hydraulic Models

Stantec developed a HEC-RAS proposed condition hydraulic model to reflect proposed improvements cited in the Middle New River Watercourse Master Plan. Proposed improvements that were modeled vary from grading and armoring of existing channel banks along with minor grading of the channel bottom, to realignment and redefinition of channel banks with major grading within the channel bottom and channel grade control structures. Major grading in the channel bottom consists of providing a new channel invert slope and a uniform geometric bottom. Channel improvements are typically within Effective FEMA Floodway limits. Improvements proposed for the Paradise Shores-New River Bank Protection Project are included in the proposed condition hydraulic model.

Proposed condition HEC-RAS models computer output files are located in Appendix A whereas a diskette with computer input files is located in Appendix B. Results of the proposed condition hydraulic analysis are discussed in the Design Alternatives section of this report.

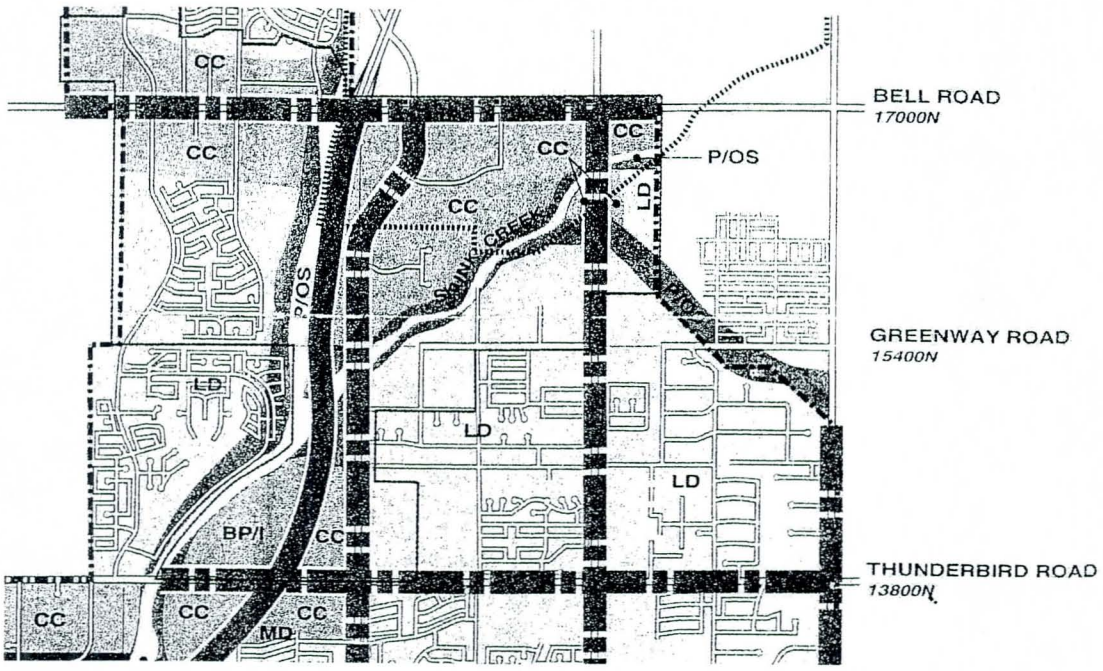
3.0 Land Use

3.1 GENERAL

The project limits lie within the City of Peoria. Peoria's Comprehensive Master Plan list the land use within the City of Peoria adjacent to the project as low density residential (1.5-4.0), Community Commercial and Open Space (Figure 2)

FIGURE 2

Portion of City of Peoria's Comprehensive Master Plan



LD = Low Density (1.5 – 4.0 du/ac)

CC = Community Commercial

P/OS= Park/Open Space

4.0 Utilities

4.1 GENERAL

No utilities have been identified to date, within the project area.

5.0 Design Alternatives

5.1 ALTERNATIVE DEVELOPMENT

Design alternatives are developed to evaluate the relationship between existing conditions and proposed improvements and to help determine the most practical cost effective design that will mitigate the potential damage from a flooding event. Hydraulic evaluations of project alternatives are conducted to evaluate the flow capacity of each alternative. Proposed channel alternatives are developed utilizing criteria developed for the Middle New River Watercourse Master Plan. The design criteria are:

1. Structural alternatives will consist of an alluvial channel bottom and armored channel side slopes. Top widths of proposed channel improvement will be restricted to approximate floodway widths for a given reach to allow for full development in floodplain fringes.

2. Proposed channel improvements shall convey FEMA's 100-year peak discharge. The COE future condition 100-year peak discharge shall be conveyed within the limits defined by the calculated channel freeboard.

3. The selected type of bank armoring for the Middle New River Watercourse Master Plan is rock filled wire tied mattress.

The project alternatives formulated for the Paradise Shore – New River Bank Protection Project are:

Alternative 1: No Action ("do nothing") Alternative

Alternative 2: Alternative 2 provides a channel section with a natural channel bottom and rock filled wire tied mattress armoring to be placed along the west bank. Minor grading will occur in the existing channel bottom and along the west channel side slope. Proposed armoring will tie into existing rock filled wire tied mattress armoring both upstream and downstream of the project.

Alternative 2 will accommodate an access ramp for a multi-use trail. The access ramp is an element of the Middle New River Watercourse Master Plan.

5.2 RESULTS OF ALTERNATIVE ANALYSES

Alternative 1: The no action alternative does provide a solution to mitigate the potential for erosion along the subject west bank segment of New River. An erosion analysis was conducted for the subject reach as part of the analyses that were conducted for the Middle New River Watercourse Master Plan. The erosion analysis conducted utilized a State Standard 5-96, Level 1 Analysis. The results of the Level 1 Analysis indicate that there is a potential for the west bank to migrate to the west approximately 110 feet during a 100-year New River runoff event. Should this happen subdivision roadways would be damaged. Therefore Alternative 1 is not considered a viable alternative.

Alternative 2: The results of the hydraulic analysis conducted to model the proposed improvements listed for Alternative 2 indicate that the alternative is viable. Results of hydraulic analysis are listed in Tables 1 and 2. Results listed in Table 2 show that the proposed condition water surface elevations for the FEMA 100-year peak discharge are below bank elevations and thus the flow is contained within the channel. Calculated freeboard indicate that adequate freeboard has been provided for the proposed channel improvements. A review of the hydraulic analysis results listed in Table 2 show that the proposed condition water surface elevation for the COE future condition 100-year peak discharge are within the freeboard limits.

TABLE 1
PROPOSED CONDITION HYDRAULIC RESULTS ALTERNATIVE 2
FEMA Q_{100}

River Mile	Existing Condition Q_{100}	Channel Invert Elevation	Q_{100} Watersurface Elevation	Channel Depth of Flow	Channel Velocity	Calculated Freeboard Elevation	West Bank Elevation	Difference Between West Bank Elevation and Freeboard Elevation
	(cfs)	(ft)	(ft)	(ft)	(ft/s)	(ft)	(ft)	(ft)
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
9.193	12000	1164.47	1170.95	6.48	5.48	1172.69	1176.19	3.50
9.289	12000	1167.93	1172.63	4.70	9.21	1174.13	1179.19	5.06
9.318	12000	1168.41	1174.37	5.96	6.33	1176.02	1180.81	4.79
9.367	12000	1171.33	1176.29	4.96	7.64	1177.76	1183.44	5.68
9.492	11450	1173.77	1178.70	4.93	6.50	1180.10	1185.88	5.78
9.592	11450	1175.70	1181.73	6.03	9.80	1183.61	1189.79	6.18
9.692	11450	1176.99	1184.75	7.76	5.61	1186.81	1189.82	3.01
9.794	11450	1176.99	1185.65	8.66	4.83	1187.91	1190.11	2.20
9.889	11450	1185.46	1190.32	4.86	13.81	1192.28	1198.14	5.86
9.908	11450	1188.87	1193.24	4.37	11.08	1194.81	1198.82	4.01
9.953	11450	1189.74	1195.40	5.66	10.00	1197.20	1202.25	5.05

TABLE 2
PROPOSED CONDITION HYDRAULIC RESULTS
ALTERNATIVE 2
COE Q_{221}

River Mile	Proposed Condition Q_{100}	Q_{221} Watersurface Elevation	Calculated Freeboard Elevation	Difference Between Freeboard Elev. And Q221 Watersurface Elev.
	(cfs)	(ft)	(ft)	
1	**2**	**3**	**4**	**5**
9.193	19000	1172.73	1172.69	-0.04
9.289	19000	1173.69	1174.13	0.44
9.318	19000	1175.46	1176.02	0.56
9.367	19000	1177.47	1177.76	0.29
9.492	19000	1179.96	1180.10	0.14
9.592	19000	1182.89	1183.61	0.72
9.692	19000	1186.54	1186.81	0.27
9.794	19000	1187.61	1187.91	0.30
9.889	15500	1191.22	1192.28	1.06
9.908	15500	1194.10	1194.81	0.71
9.953	15500	1196.16	1197.20	1.04

5.3 ENGINEERING COST ESTIMATES

Estimates of probable construction cost were prepared for Alternative 2. Quantities are calculated for earthwork (channel excavation and/or fill) and volume of bank armoring material required.

Unit costs were compiled from a Stantec database, including bid tabs for the City of Phoenix, the City of Scottsdale and the Arizona Department of Transportation construction projects for 1998. Table 3 lists a summary of unit cost utilized to determine cost estimates for each alternative.

TABLE 3

SUMMARY OF UNIT COST

Item	Unit	Cost
Earth Work	Cubic Yards (cy)	$3.00/cy
Soil Cement	Cubic Yards (cy)	$35.00/cy
Gabion Mattress	Cubic Yards (cy)	$70.00/cy

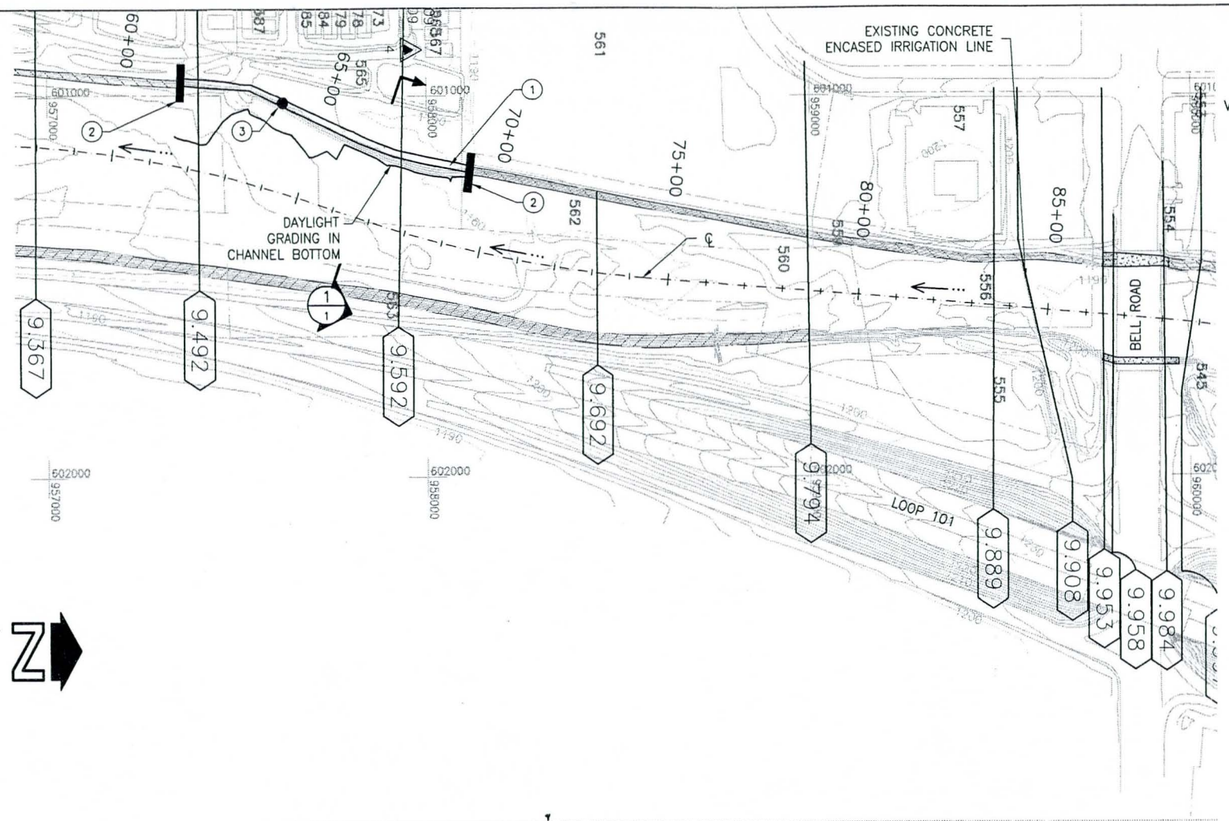
Given the level of design (conceptual) of the proposed alternatives, a contingency cost is applied to account for design detail that is not undertaken at this stage. Contingency cost is estimated at 20 percent of the cost of the proposed channel improvements. Contingency cost also includes relocation of utilities. Cost estimates do not include construction activities associated with development adjacent to proposed improvements. Table 4 lists cost estimates developed for the Alternative 2.

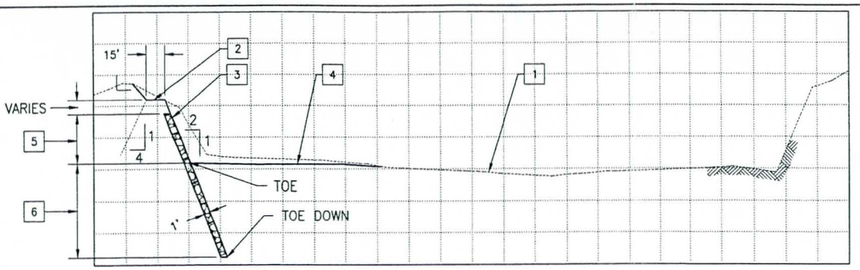
Table 4
Construction Cost Estimate

Pay Item No.	Description	Quantity	Unit	Unit Cost	Estimate Amount
1	Earth Work (Excavation)	5,294.00	CY	$ 3.00	$ 15,882.00
2	Earth Work (Fill)	1	CY	$ 3.00	$ 3.00
3	Rock Filled Wire Tied Mattress	1324	CY	$ 70.00	$ 92,680.00
4	Soil Cement (Access Ramp)	1434	CY	$ 35.00	$ 50,190.00
5	Misc. Work (20%)		LS		$ 31,751.00
			Total of Bid Items		$ 190,506.00

5.4 PREFERRED ALTERNATIVE

Alternative 2 provides a solution to the identified erosion potential. The elements of Alternative 2 are presented on Figure 3.

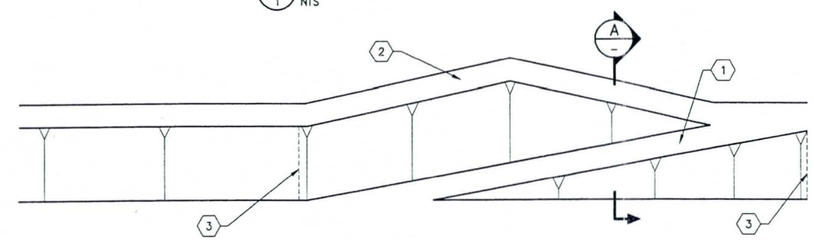




KEYNOTES:

1. EXISTING GROUND
2. 15 FOOT WIDE CORRIDOR TO ACCOMMODATE RECREATIONAL TRAIL SYSTEM AND/OR MAINTENANCE ACCESS
3. 1 FOOT THICK ROCK FILLED WIRE BASKET BANK ARMORING
4. GRADE FROM TOE OF SLOPE TO CHANNEL DAYLIGHT
5. ARMORED CHANNEL HEIGHT, 7'-8" ABOVE CHANNEL INVERT
6. TOE-DOWN DEPTH, 10'-6" BELOW CHANNEL INVERT

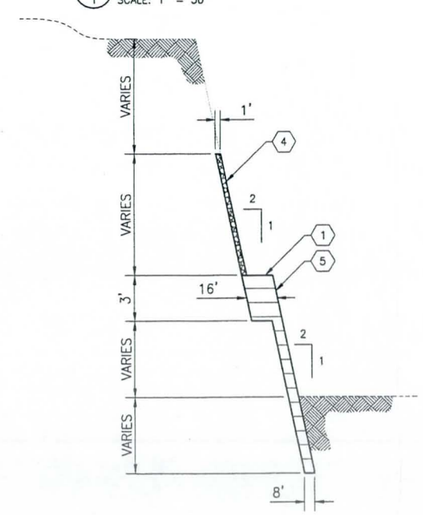
1/1 CHANNEL IMPROVEMENT DETAIL
NTS



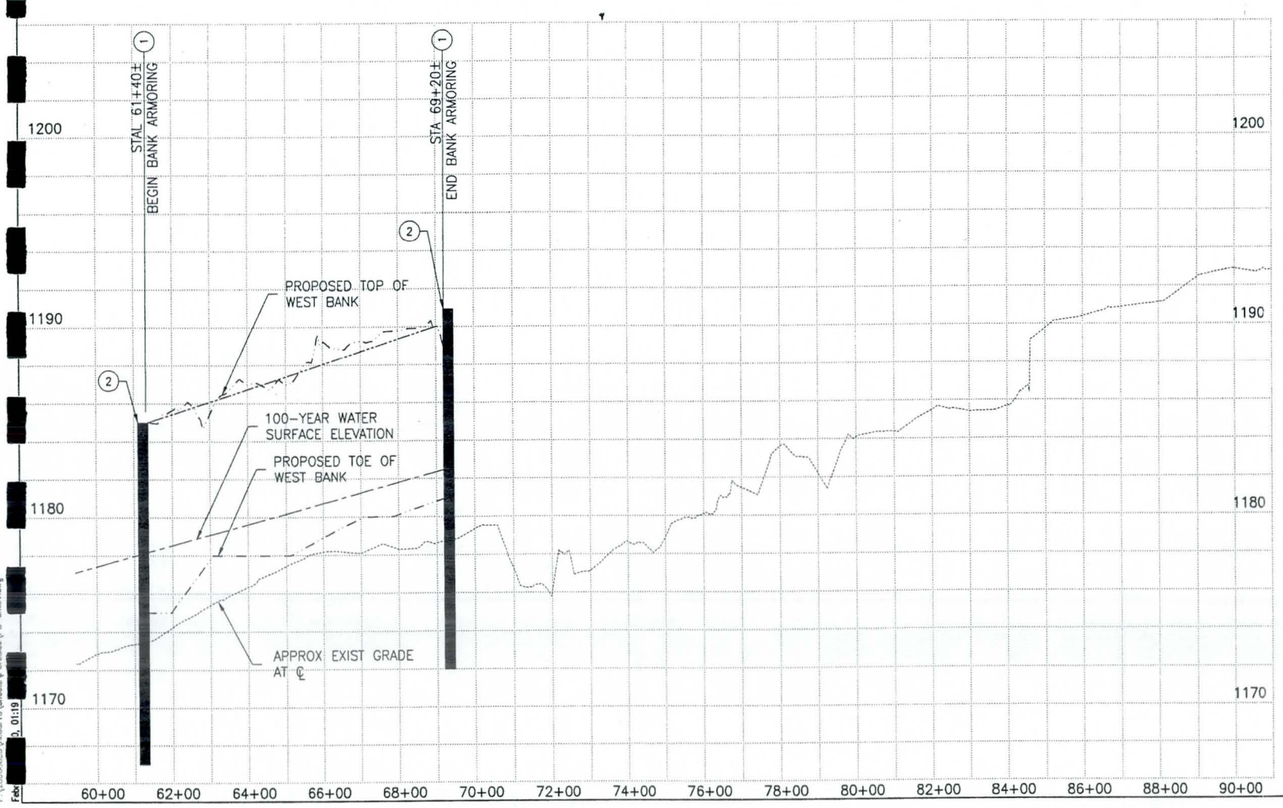
KEYNOTES:

1. TRAIL/ACCESS RAMP. MAXIMUM RAMP GRADE = 5%
2. AREA TO ACCOMMODATE MULTI-USE RECREATIONAL TRAIL
3. TIE SOIL CEMENT ARMORING TO ROCK FILLED WIRE BASKETS
4. ROCK FILLED WIRE BASKETS
5. SOIL CEMENT ARMORING

2/1 ACCESS RAMP DETAIL
SCALE: 1" = 50'



A/1 MULTI-USE TRAIL CROSSING RAMP DETAIL
SOIL CEMENT AND ROCK FILLED WIRE BASKETS



CONSTRUCTION NOTES

1. PROVIDE ROCK FILLED WIRE BASKETS TYPE BANK PROTECTION ON GRADED CHANNEL SLOPES.
2. TIE INTO EXISTING BANK PROTECTION. SIDE SLOPE TRANSITION MAY BE REQUIRED.
3. PROVIDE CHANNEL ACCESS RAMP PER DETAIL (LOCATION APPROXIMATE) 2/1

LEGEND

- EXISTING SOIL CEMENT BANK ARMORING.
- EXISTING ROCK FILLED WIRE TIED MATTRESS TYPE ARMORING.
- EXISTING CONCRETE ARMORING.
- TIE-IN TO EXISTING SLOPE CONDITIONS SEE 2.
- PROPERTY LINE (LOCATION APPROXIMATE)
- FLOW DIRECTION
- 9.984 — HYDRAULIC CROSS SECTION LOCATION RIVER MILE

200' 0' 200' 400'
CONTOUR INTERVAL:2 FEET

NO.	REVISION	BY	DATE
3			
2			
1			

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
ENGINEERING DIVISION

FIGURE 3
ALTERNATIVE 2
PARADISE SHORES – NEW RIVER
BANK PROTECTION PROJECT
PROJECT NO. 28900058

		BY	DATE
PRELIMINARY NOT FOR CONSTRUCTION	DESIGNED	P.J.E./C.A.S.	01/03/00
	DRAWN	H.A.R.	01/03/00
	CHECKED	S.S.S./P.J.E.	01/03/00

Stantec

PLAN AND PROFILE
STA. 60+00 TO 90+00

SHEET 1 OF 1

6.0 Right-of-Way

6.1 EXISTING

There is no existing right-of-way for flood control infrastructure within the project limits.

6.2 PROPOSED

Approximately 0.40 acres of right of way and approximately 1.1 acres of easement will be required for the improvements proposed in Alternative 2. Right-of–Way takes are in the areas where armored banks are proposed. Easements are proposed in areas where only grading is proposed (channel bottom).

7.0 Environmental

7.1 GENERAL

The project is located in an urbanized area characterized by a major arterial roadway, residential development and commercial development. The west bank is characterized by residential land use, whereas the east bank under existing conditions is undeveloped. The proposed improvements will be consistent with existing infrastructure. The east bank will be armored with rock filled wire baskets and the channel will be left unarmored. Existing vegetation and wildlife habitat (no sensitive habitats were identified in the Middle New River Watercourse Master Plan study) will be distributed during construction. Revegetation will be allowed after construction.

Currently, the Flood Control District of Maricopa County is preparing a submittal package for a Section 404 permit. The 404 permit will include proposed construction activities associated with this project.

8.0 Design Effort

8.1 DESIGN LABOR HOURS, COST AND DIRECT COST

Design labor hours, design labors cost and direct costs associated with Alternative 2 are listed on Table 5.

8.2 DESIGN SCHEDULE

A project design schedule is presented as Table 6 for Alternatives 2. Design schedule assumes a starting time of January 1, 2001.

8.3 FULL PROJECT COST

Full project cost for Alternative 2 are presented in Table 7. Full project cost includes construction cost, design cost, construction management costs, Flood Control District administration cost and right-of-way cost.

TABLE 5
Labor Hour and Cost Estimate for Alternative 2

Task No.	Description	Classification Rate	Project Principal $102	Project Manager $90	Project Engineer $90	Engineer $65	Engineer $60	2-man Survey Crew $95	Clerical $40	Total Hours	Total Labor (1)	Geotechnical	Expenses	Total Cost
	Survey													
1.1	Field survey				2			8		10	$943		$100	$1,043
1.2	Prepare base mapping				1		8			9	$570			$570
	Category Totals		0	0	3	0	8	8	0	19	$1,513	$0	$100	$1,613
	Geotechnical Investigation													
2.1	Drilling & sampling									0	$0	$1,000		$1,000
2.2	Laboratory testing									0	$0	$1,000		$1,000
2.3	Report			2	4					5	$540	$1,000		$1,540
	Category Totals		0	2	4	0	0	0	0	5	$540	$3,000	$0	$3,540
	Design Concept Report													
3.1	Design Concept Report		0	2	8	4	8	0	8	8	$1,960		$200	$2,160
	Category Totals		0	2	8	4	8	0	8	8	$1,960	$0	$200	$2,160

	Determination of Final Design Condition													
4.1	Data collection			2	4					6	$540			$540
4.2	Site visit			4	4					8	$720		$25	$745
4.3	Data synthesis			2	4		4			10	$780			$780
4.4	Channel stability analysis			2	4					6	$540			$540
4.5	Material sources/use/reuse				4	8				12	$880			$880
4.6	Preliminary design modifications			2	4		4		4	14	$940			$940
4.7	One meeting			4	4				1	9	$760		$25	$785
	Category Totals		0	16	28	8	8	0	5	65	$5,160	$0	$50	$5,210
	Right-of Way Delineation Package													
5.1	Right-of Way Delineation Package			4	4		8		2	18	$1,280			$1,280
	Category Totals			4	4	0	8	0	2	18	$1,280	$0	$0	$1,280
	Prepare Plans and Specifications													
6.1	40% plans and analysis		1	2	8	16	24		8	59	$3,700		$50	$3,750
6.2	70% plans, specs and estimate		1	2	16	24	32		24	99	$6,060		$50	$6,110
6.3	90% plans, specs and estimate		1	2	8	16	24		24	75	$4,340		$50	$4,390
6.4	100% plans, specs and estimate		1	2	8	16	24		16	67	$4,020		$50	$4,070
6.5	Hydraulics Report		0	2	2	0	4		8	38	$920			$2,680
6.6	QA/QC review		2	8	8	4	4		2	28	$2,020			$2,020
6.7.1	Three meetings			6	6				3	15	$1,200		$25	$1,225
6.7.2	Public meeting		2	4	4				2	12	$800		$25	$825
	Category Totals		8	28	60	76	112	0	87	393	$23,060	$0	$250	$23,310
	404 Permits													
7.1	Assume Obtained by Others													

	Bidding Assistance													
8.1	Prepare final bid ready documents				8		8		2	18	$1,280		$50	$1,330
8.2	Attend pre-bid conference (1)									0	$0			$0
8.3	Respond to contractors questions				16				1	17	$1,480			$1,480
8.4	Prepare addendum's (2)									0	$0			$0
	Category Totals		0	0	24	0	8	0	3	35	$2,760	$0	$50	$2,810
	Grand Totals		**8**	**52**	**131**	**88**	**152**	**8**	**105**	**543**	**$33,033**	**$3,000**	**$450**	**$39,923**

Notes:

1 Labor rates include overhead and profit.
2 Attendance at pre-bid conference is not required.
3 Preparation of addenda is not required.

Table 6
Alternative 2
CONSULTANT/SUBCONSULTANT SCHEDULED PROJECT MANHOURS

CONSULTANT/SUBCONSULTANT NAME: Work Order No.
PROJECT NAME: 83RD Avenue Grade Control Structure and Channel Improvements
DATE: 1 January

Consultant Manhours													
Project Personnel	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Totals
Project Principal	1	1	1	1	1	2							7
Project Manager	5	6	5	10	10	16							52
Project Engineer	10	10	40	20	40	11							131
Engineer	0	10	30	16	24	8							88
CADD Designer		20	60	16	40	16							152
Survey Crew	8												8
Clerical	1	8	40	8	40	8							105
													0
													0
Totals			176	71	155	61	0	0	0	0	0	0	543

Table 7
Full Project Cost for Each Alternative 2

Item	Categories		Assumptions		Full Cost Alternative 2
1	Design				$ 39,922.74
2	Construction				$ 190,506.00
3	Right of Way		$35,000/acre		$ 14,000.00
4	Construction Management		15% of Item 2		$ 28,575.90
5	Administration		13% of Item 2		$ 24,765.78
			Total		$ 297,770.42

APPENDIX A

HEC-RAS COMPUTER OUTPUT FILES PROPOSED CONDITION

HEC-RAS Plan: Plan 01 River: RIVER-1 Reach: Reach-1 (Continued)

Reach	River Sta	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	13.076	7900.00	1263.14	1270.49		1270.96	0.001351	5.54	1424.94	209.28	0.37
Reach-1	13.151	7900.00	1264.13	1271.02		1271.56	0.001666	5.93	1333.06	207.52	0.41
Reach-1	13.161	7900.00	1264.28	1271.09		1271.65	0.001722	5.99	1319.15	207.25	0.42
Reach-1	13.166	7900.00	1264.36	1271.14	1268.20	1271.70	0.001749	6.02	1313.35	207.42	0.42
Reach-1	13.175	7900.00	1264.50	1266.12	1268.38	1277.63	0.227455	27.23	290.13	185.13	3.83
Reach-1	13.179	7900.00	1273.50	1277.34	1277.34	1279.21	0.011838	10.96	720.73	195.36	1.01
Reach-1	13.183	7900.00	1273.58	1278.13		1279.44	0.006656	9.16	862.64	198.54	0.77
Reach-1	13.227	7900.00	1274.58	1279.75		1280.75	0.004375	8.04	983.14	200.66	0.64
Reach-1	13.325	7900.00	1276.80	1282.05		1283.02	0.004136	7.89	1000.64	201.01	0.62
Reach-1	13.42	7900.00	1278.89	1284.15		1285.11	0.004127	7.89	1001.15	200.93	0.62
Reach-1	13.524	7900.00	1280.98	1286.22		1287.19	0.004178	7.92	997.46	200.95	0.63
Reach-1	13.619	7900.00	1283.02	1288.30		1289.26	0.004068	7.85	1005.86	201.11	0.62
Reach-1	13.68	7900.00	1284.34	1289.62		1290.57	0.004075	7.86	1005.32	201.10	0.62
Reach-1	13.742	7900.00	1285.81	1291.09		1292.05	0.004069	7.86	1005.71	201.09	0.62
Reach-1	13.818	7900.00	1287.37	1292.65		1293.61	0.004072	7.86	1005.46	201.09	0.62
Reach-1	13.918	7900.00	1289.67	1295.04		1295.96	0.003837	7.71	1024.48	201.50	0.60
Reach-1	14.013	6100.00	1291.61	1296.93		1297.49	0.002358	6.01	1014.76	201.29	0.47
Reach-1	14.103	6100.00	1293.77	1298.34		1299.11	0.003933	7.06	864.60	198.29	0.60
Reach-1	14.150	6100.00	1294.78	1299.31	1298.03	1300.10	0.004096	7.16	852.52	197.23	0.61
Reach-1	14.159	6100.00	1295.00	1296.36	1298.25	1305.72	0.227682	24.56	248.38	185.44	3.74
Reach-1	14.162	6100.00	1302.32	1305.64	1305.64	1307.22	0.012432	10.09	604.86	192.97	1.00
Reach-1	14.166	6100.00	1302.39	1306.38		1307.45	0.006577	8.28	737.06	195.95	0.75
Reach-1	14.197	6100.00	1303.30	1308.80	1306.89	1308.98	0.001731	3.55	1863.03	790.76	0.34
Reach-1	14.284	6100.00	1305.40	1310.70	1310.70	1311.49	0.010618	8.75	990.03	643.85	0.86
Reach-1	14.379	6100.00	1309.18	1314.42		1314.65	0.003990	4.46	1758.05	1317.64	0.50
Reach-1	14.495	6100.00	1312.16	1317.11		1317.73	0.008009	7.53	1151.45	800.20	0.74
Reach-1	14.599	6100.00	1315.07	1320.01		1320.31	0.003548	4.39	1388.44	583.90	0.48
Reach-1	14.653	6100.00	1317.90	1322.63		1323.35	0.010572	7.48	992.59	676.93	0.83
Reach-1	14.752	6100.00	1319.77	1325.52	1324.08	1325.77	0.002351	4.04	1642.79	766.14	0.40
Reach-1	14.85	6100.00	1323.06	1327.33		1327.75	0.006116	5.64	1190.67	556.63	0.63
Reach-1	14.945	4200.00	1323.89	1330.11	1329.31	1330.66	0.004303	6.51	826.25	701.19	0.57
Reach-1	14.983	4200.00	1323.95	1330.97		1331.79	0.005437	7.29	585.41	160.42	0.64
Reach-1	15.049	4200.00	1327.09	1333.63		1333.84	0.003166	3.92	1302.77	622.93	0.33
Reach-1	15.144	4200.00	1329.20	1335.27		1335.62	0.003976	5.01	938.79	401.92	0.52
Reach-1	15.248	4200.00	1331.18	1337.05		1337.61	0.003891	6.08	740.95	263.92	0.54
Reach-1	15.333	4200.00	1333.64	1338.93	1337.69	1339.27	0.003400	4.68	897.88	326.98	0.48
Reach-1	15.416	4200.00	1333.40	1339.85		1340.00	0.000899	3.10	1355.50	314.01	0.26
Reach-1	15.475	4200.00	1335.06	1340.23		1340.51	0.002928	4.29	978.43	337.67	0.44
Reach-1	15.596	4200.00	1338.38	1343.76		1344.67	0.017129	7.68	546.66	164.81	0.74
Reach-1	15.623	4200.00	1340.00	1347.81		1348.08	0.003720	4.40	1169.47	579.01	0.36
Reach-1	15.699	4200.00	1344.71	1349.40		1349.64	0.005118	4.49	1097.57	642.48	0.41
Reach-1	15.792	4200.00	1345.20	1351.76	1350.93	1352.37	0.005386	6.73	732.31	295.30	0.62
Reach-1	15.885	4200.00	1348.40	1354.74		1355.37	0.006608	6.74	685.03	276.88	0.67
Reach-1	15.966	2350.00	1351.84	1356.95		1357.10	0.001966	3.43	921.23	562.01	0.36
Reach-1	16.066	2350.00	1354.42	1358.60		1358.83	0.005387	4.11	605.21	438.00	0.55
Reach-1	16.167	2350.00	1358.98	1361.47		1361.77	0.005275	3.36	551.38	341.11	0.52
Reach-1	16.248	2350.00	1360.22	1364.29		1364.77	0.007648	6.21	447.97	294.17	0.70
Reach-1	16.348	2350.00	1362.60	1366.70		1366.92	0.003569	4.33	642.47	382.85	0.48
Reach-1	16.411	2350.00	1364.41	1368.80		1369.38	0.006643	6.17	405.16	179.22	0.66
Reach-1	16.504	2350.00	1366.82	1371.22	1370.08	1371.52	0.003112	4.38	539.26	235.47	0.47
Reach-1	16.608	2350.00	1368.69	1373.09		1373.45	0.004820	4.84	485.33	201.79	0.55
Reach-1	16.637	2350.00	1370.17	1374.64		1375.27	0.013268	6.36	369.56	218.54	0.86
Reach-1	16.732	2350.00	1372.93	1377.81		1378.15	0.003404	4.71	498.84	166.60	0.48
Reach-1	16.829	2350.00	1374.90	1379.46	1377.97	1379.81	0.002958	4.77	507.92	187.88	0.46

Plan: Plan 01 River: RIVER-1 Reach:Reach-1 Riv Sta: 9.984 Profile: PF#1

		Element	Left OB	Channel	Right OB
E.G. Elev (ft)	1198.28				
Vel Head (ft)	0.81	Wt. n-Val.		0.035	
W.S. Elev (ft)	1197.47	Reach Len. (ft)	7.00	7.00	7.00
Crit W.S. (ft)	1195.38	Flow Area (sq ft)		1585.48	
E.G. Slope (ft/ft)	0.002814	Area (sq ft)		1585.48	
Q Total (cfs)	11450.00	Flow (cfs)		11450.00	
Top Width (ft)	273.68	Top Width (ft)		273.68	
Vel Total (ft/s)	7.22	Avg. Vel. (ft/s)		7.22	
Max Chl Dpth (ft)	6.47	Hydr. Depth (ft)		5.79	
Conv. Total (cfs)	215856.6	Conv. (cfs)		215856.6	
Length Wtd. (ft)	7.00	Wetted Per. (ft)		276.09	
Min Ch El (ft)	1191.00	Shear (lb/sq ft)		1.01	
Alpha	1.00	Stream Power (lb/ft s)		7.29	
Frctn Loss (ft)		Cum Volume (acre-ft)		820.23	
C & E Loss (ft)		Cum SA (acres)		101.95	

Plan: Plan 01 River: RIVER-1 Reach:Reach-1 Riv Sta: 9.971001BR U Profile: PF#1

		Element	Left OB	Channel	Right OB
E.G. Elev (ft)	1198.25				
Vel Head (ft)	0.87	Wt. n-Val.		0.035	
W.S. Elev (ft)	1197.38	Reach Len. (ft)	115.00	115.00	115.00
Crit W.S. (ft)	1195.42	Flow Area (sq ft)		1530.48	
E.G. Slope (ft/ft)	0.003852	Area (sq ft)		1530.48	
Q Total (cfs)	11450.00	Flow (cfs)		11450.00	
Top Width (ft)	268.57	Top Width (ft)		268.57	
Vel Total (ft/s)	7.48	Avg. Vel. (ft/s)		7.48	
Max Chl Dpth (ft)	6.38	Hydr. Depth (ft)		5.70	
Conv. Total (cfs)	184476.6	Conv. (cfs)		184476.6	
Length Wtd. (ft)	115.00	Wetted Per. (ft)		319.93	
Min Ch El (ft)	1191.00	Shear (lb/sq ft)		1.15	
Alpha	1.00	Stream Power (lb/ft s)		8.61	
Frctn Loss (ft)		Cum Volume (acre-ft)		819.98	
C & E Loss (ft)		Cum SA (acres)		101.91	

Plan: Plan 01 River: RIVER-1 Reach:Reach-1 Riv Sta: 9.971001BR D Profile: PF#1

		Element	Left OB	Channel	Right OB
E.G. Elev (ft)	1197.29				
Vel Head (ft)	1.30	Wt. n-Val.		0.035	
W.S. Elev (ft)	1196.00	Reach Len. (ft)	11.96	11.96	11.96
Crit W.S. (ft)	1195.06	Flow Area (sq ft)		1253.42	
E.G. Slope (ft/ft)	0.007002	Area (sq ft)		1253.42	
Q Total (cfs)	11450.00	Flow (cfs)		11450.00	
Top Width (ft)	260.88	Top Width (ft)		260.88	
Vel Total (ft/s)	9.14	Avg. Vel. (ft/s)		9.14	
Max Chl Dpth (ft)	5.53	Hydr. Depth (ft)		4.80	
Conv. Total (cfs)	136835.4	Conv. (cfs)		136835.4	
Length Wtd. (ft)	11.96	Wetted Per. (ft)		303.97	
Min Ch El (ft)	1190.47	Shear (lb/sq ft)		1.80	
Alpha	1.00	Stream Power (lb/ft s)		16.47	
Frctn Loss (ft)		Cum Volume (acre-ft)		816.31	
C & E Loss (ft)		Cum SA (acres)		101.21	

Plan: Plan 01 River: RIVER-1 Reach:Reach-1 Riv Sta: 9.958 Profile: PF#1

E.G. Elev (ft)	1197.22	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.27	Wt. n-Val.		0.035	
W.S. Elev (ft)	1195.95	Reach Len. (ft)	22.00	27.43	28.00
Crit W.S. (ft)		Flow Area (sq ft)		1265.11	
E.G. Slope (ft/ft)	0.005715	Area (sq ft)		1265.11	
Q Total (cfs)	11450.00	Flow (cfs)		11450.00	
Top Width (ft)	265.30	Top Width (ft)		265.30	
Vel Total (ft/s)	9.05	Avg. Vel. (ft/s)		9.05	
Max Chl Dpth (ft)	5.48	Hydr. Depth (ft)		4.77	
Conv. Total (cfs)	151461.7	Conv. (cfs)		151461.7	
Length Wtd. (ft)	27.43	Wetted Per. (ft)		267.15	
Min Ch El (ft)	1190.47	Shear (lb/sq ft)		1.69	
Alpha	1.00	Stream Power (lb/ft s)		15.29	
Frctn Loss (ft)	0.18	Cum Volume (acre-ft)		815.96	
C & E Loss (ft)	0.09	Cum SA (acres)		101.14	

Plan: Plan 01 River: RIVER-1 Reach:Reach-1 Riv Sta: 9.953 Profile: PF#1

E.G. Elev (ft)	1196.96	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.55	Wt. n-Val.		0.035	
W.S. Elev (ft)	1195.40	Reach Len. (ft)	183.24	183.24	183.24
Crit W.S. (ft)		Flow Area (sq ft)		1144.61	
E.G. Slope (ft/ft)	0.007645	Area (sq ft)		1144.61	
Q Total (cfs)	11450.00	Flow (cfs)		11450.00	
Top Width (ft)	256.83	Top Width (ft)		256.83	
Vel Total (ft/s)	10.00	Avg. Vel. (ft/s)		10.00	
Max Chl Dpth (ft)	5.66	Hydr. Depth (ft)		4.46	
Conv. Total (cfs)	130956.9	Conv. (cfs)		130956.9	
Length Wtd. (ft)	183.24	Wetted Per. (ft)		258.73	
Min Ch El (ft)	1189.74	Shear (lb/sq ft)		2.11	
Alpha	1.00	Stream Power (lb/ft s)		21.12	
Frctn Loss (ft)	1.70	Cum Volume (acre-ft)		815.20	
C & E Loss (ft)	0.11	Cum SA (acres)		100.98	

Errors Warnings and Notes

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

Plan: Plan 01 River: RIVER-1 Reach:Reach-1 Riv Sta: 9.908 Profile: PF#1

E.G. Elev (ft)	1195.14	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.91	Wt. n-Val.		0.035	
W.S. Elev (ft)	1193.24	Reach Len. (ft)	104.44	104.44	104.44
Crit W.S. (ft)	1193.24	Flow Area (sq ft)		1033.52	
E.G. Slope (ft/ft)	0.011558	Area (sq ft)		1033.52	
Q Total (cfs)	11450.00	Flow (cfs)		11450.00	
Top Width (ft)	271.24	Top Width (ft)		271.24	
Vel Total (ft/s)	11.08	Avg. Vel. (ft/s)		11.08	
Max Chl Dpth (ft)	4.37	Hydr. Depth (ft)		3.81	
Conv. Total (cfs)	106502.5	Conv. (cfs)		106502.5	
Length Wtd. (ft)	104.44	Wetted Per. (ft)		273.30	
Min Ch El (ft)	1188.87	Shear (lb/sq ft)		2.73	
Alpha	1.00	Stream Power (lb/ft s)		30.23	
Frctn Loss (ft)		Cum Volume (acre-ft)		810.62	
C & E Loss (ft)		Cum SA (acres)		99.86	

Errors Warnings and Notes

Warning:	The energy equation could not be balanced within the specified number of iterations. The

Errors Warnings and Notes (Continued)

	program used critical depth for the water surface and continued on with the calculations.
Warning:	The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
	section. This may indicate the need for additional cross sections.

Plan: Plan 01 River: RIVER-1 Reach:Reach-1 Riv Sta: 9.889 Profile: PF#1

E.G. Elev (ft)	1193.28	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.96	Wt. n-Val.		0.035	
W.S. Elev (ft)	1190.32	Reach Len. (ft)	489.29	489.29	489.29
Crit W.S. (ft)	1190.99	Flow Area (sq ft)		829.15	
E.G. Slope (ft/ft)	0.019851	Area (sq ft)		829.15	
Q Total (cfs)	11450.00	Flow (cfs)		11450.00	
Top Width (ft)	234.19	Top Width (ft)		234.19	
Vel Total (ft/s)	13.81	Avg. Vel. (ft/s)		13.81	
Max Chl Dpth (ft)	4.86	Hydr. Depth (ft)		3.54	
Conv. Total (cfs)	81267.8	Conv. (cfs)		81267.8	
Length Wtd. (ft)	489.29	Wetted Per. (ft)		236.37	
Min Ch El (ft)	1185.46	Shear (lb/sq ft)		4.35	
Alpha	1.00	Stream Power (lb/ft s)		60.03	
Frctn Loss (ft)	1.55	Cum Volume (acre-ft)		808.39	
C & E Loss (ft)	0.31	Cum SA (acres)		99.26	

Errors Warnings and Notes

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.

Plan: Plan 01 River: RIVER-1 Reach:Reach-1 Riv Sta: 9.794 Profile: PF#1

E.G. Elev (ft)	1186.02	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.36	Wt. n-Val.		0.035	
W.S. Elev (ft)	1185.65	Reach Len. (ft)	554.00	554.00	554.00
Crit W.S. (ft)	1182.22	Flow Area (sq ft)		2371.97	
E.G. Slope (ft/ft)	0.001094	Area (sq ft)		2371.97	
Q Total (cfs)	11450.00	Flow (cfs)		11450.00	
Top Width (ft)	368.98	Top Width (ft)		368.98	
Vel Total (ft/s)	4.83	Avg. Vel. (ft/s)		4.83	
Max Chl Dpth (ft)	8.66	Hydr. Depth (ft)		6.43	
Conv. Total (cfs)	346190.7	Conv. (cfs)		346190.7	
Length Wtd. (ft)	554.00	Wetted Per. (ft)		372.13	
Min Ch El (ft)	1176.99	Shear (lb/sq ft)		0.44	
Alpha	1.00	Stream Power (lb/ft s)		2.10	
Frctn Loss (ft)	0.76	Cum Volume (acre-ft)		790.41	
C & E Loss (ft)	0.01	Cum SA (acres)		95.87	

Errors Warnings and Notes

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

Plan: Plan 01 River: RIVER-1 Reach:Reach-1 Riv Sta: 9.692 Profile: PF#1

E.G. Elev (ft)	1185.24	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.49	Wt. n-Val.		0.035	
W.S. Elev (ft)	1184.75	Reach Len. (ft)	526.34	526.34	526.34
Crit W.S. (ft)		Flow Area (sq ft)		2041.39	
E.G. Slope (ft/ft)	0.001777	Area (sq ft)		2041.39	

Plan: Plan 01 River: RIVER-1 Reach:Reach-1 Riv Sta: 9.692 Profile: PF#1 (Continued)

Q Total (cfs)	11450.00	Flow (cfs)		11450.00	
Top Width (ft)	365.22	Top Width (ft)		365.22	
Vel Total (ft/s)	5.61	Avg. Vel. (ft/s)		5.61	
Max Chl Dpth (ft)	7.76	Hydr. Depth (ft)		5.59	
Conv. Total (cfs)	271605.3	Conv. (cfs)		271605.3	
Length Wtd. (ft)	526.34	Wetted Per. (ft)		367.96	
Min Ch El (ft)	1176.99	Shear (lb/sq ft)		0.62	
Alpha	1.00	Stream Power (lb/ft s)		3.45	
Frctn Loss (ft)	1.92	Cum Volume (acre-ft)		762.35	
C & E Loss (ft)	0.10	Cum SA (acres)		91.20	

Errors Warnings and Notes

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.

Plan: Plan 01 River: RIVER-1 Reach:Reach-1 Riv Sta: 9.592 Profile: PF#1

		Element	Left OB	Channel	Right OB
E.G. Elev (ft)	1183.22				
Vel Head (ft)	1.49	Wt. n-Val.		0.035	
W.S. Elev (ft)	1181.73	Reach Len. (ft)	557.60	557.60	557.60
Crit W.S. (ft)	1181.62	Flow Area (sq ft)		1168.20	
E.G. Slope (ft/ft)	0.011380	Area (sq ft)		1168.20	
Q Total (cfs)	11450.00	Flow (cfs)		11450.00	
Top Width (ft)	365.27	Top Width (ft)		365.27	
Vel Total (ft/s)	9.80	Avg. Vel. (ft/s)		9.80	
Max Chl Dpth (ft)	6.03	Hydr. Depth (ft)		3.20	
Conv. Total (cfs)	107331.5	Conv. (cfs)		107331.5	
Length Wtd. (ft)	557.60	Wetted Per. (ft)		366.94	
Min Ch El (ft)	1175.70	Shear (lb/sq ft)		2.26	
Alpha	1.00	Stream Power (lb/ft s)		22.17	
Frctn Loss (ft)	3.61	Cum Volume (acre-ft)		742.95	
C & E Loss (ft)	0.25	Cum SA (acres)		86.79	

Errors Warnings and Notes

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.

Plan: Plan 01 River: RIVER-1 Reach:Reach-1 Riv Sta: 9.492 Profile: PF#1

		Element	Left OB	Channel	Right OB
E.G. Elev (ft)	1179.36				
Vel Head (ft)	0.66	Wt. n-Val.		0.035	
W.S. Elev (ft)	1178.70	Reach Len. (ft)	433.72	433.72	433.72
Crit W.S. (ft)		Flow Area (sq ft)		1760.85	
E.G. Slope (ft/ft)	0.004175	Area (sq ft)		1760.85	
Q Total (cfs)	11450.00	Flow (cfs)		11450.00	
Top Width (ft)	480.92	Top Width (ft)		480.92	
Vel Total (ft/s)	6.50	Avg. Vel. (ft/s)		6.50	

Plan: Plan 01 River: RIVER-1 Reach:Reach-1 Riv Sta: 9.492 Profile: PF#1 (Continued)

Max Chl Dpth (ft)	4.93	Hydr. Depth (ft)		3.66	
Conv. Total (cfs)	177197.4	Conv. (cfs)		177197.4	
Length Wtd. (ft)	433.72	Wetted Per. (ft)		482.51	
Min Ch El (ft)	1173.77	Shear (lb/sq ft)		0.95	
Alpha	1.00	Stream Power (lb/ft s)		6.19	
Frctn Loss (ft)	2.14	Cum Volume (acre-ft)		724.21	
C & E Loss (ft)	0.02	Cum SA (acres)		81.37	

Errors Warnings and Notes

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

Plan: Plan 01 River: RIVER-1 Reach:Reach-1 Riv Sta: 9.367 Profile: PF#1

E.G. Elev (ft)	1177.19	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.91	Wt. n-Val.		0.035	
W.S. Elev (ft)	1176.29	Reach Len. (ft)	459.27	459.27	459.27
Crit W.S. (ft)		Flow Area (sq ft)		1570.46	
E.G. Slope (ft/ft)	0.005846	Area (sq ft)		1570.46	
Q Total (cfs)	12000.00	Flow (cfs)		12000.00	
Top Width (ft)	433.89	Top Width (ft)		433.89	
Vel Total (ft/s)	7.64	Avg. Vel. (ft/s)		7.64	
Max Chl Dpth (ft)	4.96	Hydr. Depth (ft)		3.62	
Conv. Total (cfs)	156944.3	Conv. (cfs)		156944.3	
Length Wtd. (ft)	459.27	Wetted Per. (ft)		434.85	
Min Ch El (ft)	1171.33	Shear (lb/sq ft)		1.32	
Alpha	1.00	Stream Power (lb/ft s)		10.07	
Frctn Loss (ft)	2.12	Cum Volume (acre-ft)		707.62	
C & E Loss (ft)	0.09	Cum SA (acres)		76.82	

Errors Warnings and Notes

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

Plan: Plan 01 River: RIVER-1 Reach:Reach-1 Riv Sta: 9.318 Profile: PF#1

E.G. Elev (ft)	1174.99	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.62	Wt. n-Val.		0.035	
W.S. Elev (ft)	1174.37	Reach Len. (ft)	154.63	154.63	154.63
Crit W.S. (ft)		Flow Area (sq ft)		1895.15	
E.G. Slope (ft/ft)	0.003719	Area (sq ft)		1895.15	
Q Total (cfs)	12000.00	Flow (cfs)		12000.00	
Top Width (ft)	494.35	Top Width (ft)		494.35	
Vel Total (ft/s)	6.33	Avg. Vel. (ft/s)		6.33	
Max Chl Dpth (ft)	5.96	Hydr. Depth (ft)		3.83	
Conv. Total (cfs)	196769.7	Conv. (cfs)		196769.7	
Length Wtd. (ft)	154.63	Wetted Per. (ft)		495.52	
Min Ch El (ft)	1168.41	Shear (lb/sq ft)		0.89	
Alpha	1.00	Stream Power (lb/ft s)		5.62	
Frctn Loss (ft)	0.97	Cum Volume (acre-ft)		689.35	
C & E Loss (ft)	0.07	Cum SA (acres)		71.93	

Errors Warnings and Notes

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

Errors Warnings and Notes (Continued)

Warning:	The conveyance ratio (upstream 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.

Plan: Plan 01 River: RIVER-1 Reach:Reach-1 Riv Sta: 9.289 Profile: PF#1

E.G. Elev (ft)	1173.95	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.32	Wt. n-Val.		0.035	
W.S. Elev (ft)	1172.63	Reach Len. (ft)	457.57	457.57	457.57
Crit W.S. (ft)	1172.63	Flow Area (sq ft)		1303.44	
E.G. Slope (ft/ft)	0.012871	Area (sq ft)		1303.44	
Q Total (cfs)	12000.00	Flow (cfs)		12000.00	
Top Width (ft)	492.38	Top Width (ft)		492.38	
Vel Total (ft/s)	9.21	Avg. Vel. (ft/s)		9.21	
Max Chl Dpth (ft)	4.70	Hydr. Depth (ft)		2.65	
Conv. Total (cfs)	105773.1	Conv. (cfs)		105773.1	
Length Wtd. (ft)	457.57	Wetted Per. (ft)		493.24	
Min Ch El (ft)	1167.93	Shear (lb/sq ft)		2.12	
Alpha	1.00	Stream Power (lb/ft s)		19.55	
Frctn Loss (ft)	2.08	Cum Volume (acre-ft)		683.68	
C & E Loss (ft)	0.25	Cum SA (acres)		70.17	

Errors Warnings and Notes

Warning:	The energy equation could not be balanced within the specified number of iterations. The
	program selected the water surface that had the least amount of error between computed
	and assumed values.
Warning:	The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for
	additional cross sections.
Warning:	The conveyance ratio (upstream conveyance divided by downstream conveyance) is less
	than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning:	The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
	section. This may indicate the need for additional cross sections.
Warning:	During the standard step iterations, when the assumed water surface was set equal to
	critical depth, the calculated water surface came back below critical depth. This indicates
	that there is not a valid subcritical answer. The program defaulted to critical depth.

Plan: Plan 01 River: RIVER-1 Reach:Reach-1 Riv Sta: 9.193 Profile: PF#1

E.G. Elev (ft)	1171.42	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.47	Wt. n-Val.		0.035	
W.S. Elev (ft)	1170.95	Reach Len. (ft)	391.34	391.34	391.34
Crit W.S. (ft)	1169.13	Flow Area (sq ft)		2190.00	
E.G. Slope (ft/ft)	0.002303	Area (sq ft)		2190.00	
Q Total (cfs)	12000.00	Flow (cfs)		12000.00	
Top Width (ft)	494.59	Top Width (ft)		494.59	
Vel Total (ft/s)	5.48	Avg. Vel. (ft/s)		5.48	
Max Chl Dpth (ft)	6.48	Hydr. Depth (ft)		4.43	
Conv. Total (cfs)	250076.8	Conv. (cfs)		250076.8	
Length Wtd. (ft)	391.34	Wetted Per. (ft)		496.47	
Min Ch El (ft)	1164.47	Shear (lb/sq ft)		0.63	
Alpha	1.00	Stream Power (lb/ft s)		3.47	
Frctn Loss (ft)	0.67	Cum Volume (acre-ft)		665.33	
C & E Loss (ft)	0.03	Cum SA (acres)		64.99	

Errors Warnings and Notes

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

Plan: Plan 01 River: RIVER-1 Reach:Reach-1 Riv Sta: 9.129 Profile: PF#1

		Element	Left OB	Channel	Right OB
E.G. Elev (ft)	1170.72				
Vel Head (ft)	0.35	Wt. n-Val.		0.035	
W.S. Elev (ft)	1170.37	Reach Len. (ft)	402.94	402.94	402.94
Crit W.S. (ft)		Flow Area (sq ft)		2516.42	
E.G. Slope (ft/ft)	0.001306	Area (sq ft)		2516.42	
Q Total (cfs)	12000.00	Flow (cfs)		12000.00	
Top Width (ft)	457.17	Top Width (ft)		457.17	
Vel Total (ft/s)	4.77	Avg. Vel. (ft/s)		4.77	
Max Chl Dpth (ft)	7.21	Hydr. Depth (ft)		5.50	
Conv. Total (cfs)	332086.2	Conv. (cfs)		332086.2	
Length Wtd. (ft)	402.94	Wetted Per. (ft)		459.17	
Min Ch El (ft)	1163.16	Shear (lb/sq ft)		0.45	
Alpha	1.00	Stream Power (lb/ft s)		2.13	
Frctn Loss (ft)	0.58	Cum Volume (acre-ft)		644.19	
C & E Loss (ft)	0.01	Cum SA (acres)		60.72	

Plan: Plan 01 River: RIVER-1 Reach:Reach-1 Riv Sta: 9.047 Profile: PF#1

		Element	Left OB	Channel	Right OB
E.G. Elev (ft)	1170.13				
Vel Head (ft)	0.46	Wt. n-Val.		0.035	
W.S. Elev (ft)	1169.67	Reach Len. (ft)	290.48	290.48	290.48
Crit W.S. (ft)		Flow Area (sq ft)		2210.07	
E.G. Slope (ft/ft)	0.001612	Area (sq ft)		2210.07	
Q Total (cfs)	12000.00	Flow (cfs)		12000.00	
Top Width (ft)	386.37	Top Width (ft)		386.37	
Vel Total (ft/s)	5.43	Avg. Vel. (ft/s)		5.43	
Max Chl Dpth (ft)	8.02	Hydr. Depth (ft)		5.72	
Conv. Total (cfs)	298861.3	Conv. (cfs)		298861.3	
Length Wtd. (ft)	290.48	Wetted Per. (ft)		388.78	
Min Ch El (ft)	1161.65	Shear (lb/sq ft)		0.57	
Alpha	1.00	Stream Power (lb/ft s)		3.11	
Frctn Loss (ft)	0.50	Cum Volume (acre-ft)		622.33	
C & E Loss (ft)	0.01	Cum SA (acres)		56.81	

Plan: Plan 01 River: RIVER-1 Reach:Reach-1 Riv Sta: 8.994 Profile: PF#1

		Element	Left OB	Channel	Right OB
E.G. Elev (ft)	1169.61				
Vel Head (ft)	0.55	Wt. n-Val.		0.035	
W.S. Elev (ft)	1169.06	Reach Len. (ft)	90.73	90.73	90.73
Crit W.S. (ft)		Flow Area (sq ft)		2009.89	
E.G. Slope (ft/ft)	0.001867	Area (sq ft)		2009.89	
Q Total (cfs)	12000.00	Flow (cfs)		12000.00	
Top Width (ft)	338.56	Top Width (ft)		338.56	
Vel Total (ft/s)	5.97	Avg. Vel. (ft/s)		5.97	
Max Chl Dpth (ft)	7.40	Hydr. Depth (ft)		5.94	
Conv. Total (cfs)	277750.3	Conv. (cfs)		277750.3	
Length Wtd. (ft)	90.73	Wetted Per. (ft)		342.25	
Min Ch El (ft)	1161.66	Shear (lb/sq ft)		0.68	
Alpha	1.00	Stream Power (lb/ft s)		4.09	
Frctn Loss (ft)	0.20	Cum Volume (acre-ft)		608.26	
C & E Loss (ft)	0.02	Cum SA (acres)		54.40	

Plan: Plan 01 River: RIVER-1 Reach:Reach-1 Riv Sta: 8.977 Profile: PF#1

E.G. Elev (ft)	1169.40	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.72	Wt. n-Val.		0.035	
W.S. Elev (ft)	1168.68	Reach Len. (ft)	210.76	210.76	210.76
Crit W.S. (ft)		Flow Area (sq ft)		1766.33	
E.G. Slope (ft/ft)	0.002684	Area (sq ft)		1766.33	
Q Total (cfs)	12000.00	Flow (cfs)		12000.00	
Top Width (ft)	321.97	Top Width (ft)		321.97	
Vel Total (ft/s)	6.79	Avg. Vel. (ft/s)		6.79	
Max Chl Dpth (ft)	7.37	Hydr. Depth (ft)		5.49	
Conv. Total (cfs)	231626.7	Conv. (cfs)		231626.7	
Length Wtd. (ft)	210.76	Wetted Per. (ft)		325.38	
Min Ch El (ft)	1161.31	Shear (lb/sq ft)		0.91	
Alpha	1.00	Stream Power (lb/ft s)		6.18	
Frctn Loss (ft)	0.56	Cum Volume (acre-ft)		604.32	
C & E Loss (ft)	0.00	Cum SA (acres)		53.71	

Plan: Plan 01 River: RIVER-1 Reach:Reach-1 Riv Sta: 8.936 Profile: PF#1

E.G. Elev (ft)	1168.84	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.71	Wt. n-Val.		0.035	
W.S. Elev (ft)	1168.12	Reach Len. (ft)	289.44	289.44	289.44
Crit W.S. (ft)		Flow Area (sq ft)		1770.10	
E.G. Slope (ft/ft)	0.002600	Area (sq ft)		1770.10	
Q Total (cfs)	12000.00	Flow (cfs)		12000.00	
Top Width (ft)	316.55	Top Width (ft)		316.55	
Vel Total (ft/s)	6.78	Avg. Vel. (ft/s)		6.78	
Max Chl Dpth (ft)	8.17	Hydr. Depth (ft)		5.59	
Conv. Total (cfs)	235344.1	Conv. (cfs)		235344.1	
Length Wtd. (ft)	289.44	Wetted Per. (ft)		319.40	
Min Ch El (ft)	1159.95	Shear (lb/sq ft)		0.90	
Alpha	1.00	Stream Power (lb/ft s)		6.10	
Frctn Loss (ft)	0.71	Cum Volume (acre-ft)		595.77	
C & E Loss (ft)	0.01	Cum SA (acres)		52.16	

Plan: Plan 01 River: RIVER-1 Reach:Reach-1 Riv Sta: 8.883 Profile: PF#1

E.G. Elev (ft)	1168.12	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.68	Wt. n-Val.		0.035	
W.S. Elev (ft)	1167.44	Reach Len. (ft)	400.91	400.91	400.91
Crit W.S. (ft)		Flow Area (sq ft)		1810.57	
E.G. Slope (ft/ft)	0.002325	Area (sq ft)		1810.57	
Q Total (cfs)	12000.00	Flow (cfs)		12000.00	
Top Width (ft)	307.98	Top Width (ft)		307.98	
Vel Total (ft/s)	6.63	Avg. Vel. (ft/s)		6.63	
Max Chl Dpth (ft)	8.00	Hydr. Depth (ft)		5.88	
Conv. Total (cfs)	248864.3	Conv. (cfs)		248864.3	
Length Wtd. (ft)	400.91	Wetted Per. (ft)		310.80	
Min Ch El (ft)	1159.44	Shear (lb/sq ft)		0.85	
Alpha	1.00	Stream Power (lb/ft s)		5.60	
Frctn Loss (ft)	0.52	Cum Volume (acre-ft)		583.87	
C & E Loss (ft)	0.09	Cum SA (acres)		50.09	

Errors Warnings and Notes

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

Plan: Plan 01 River: RIVER-1 Reach:Reach-1 Riv Sta: 8.807 Profile: PF#1

E.G. Elev (ft)	1167.50	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.37	Wt. n-Val.		0.035	
W.S. Elev (ft)	1167.14	Reach Len. (ft)	397.26	397.26	397.26
Crit W.S. (ft)		Flow Area (sq ft)		2475.03	
E.G. Slope (ft/ft)	0.000828	Area (sq ft)		2475.03	
Q Total (cfs)	12000.00	Flow (cfs)		12000.00	
Top Width (ft)	309.23	Top Width (ft)		309.23	
Vel Total (ft/s)	4.85	Avg. Vel. (ft/s)		4.85	
Max Chl Dpth (ft)	9.17	Hydr. Depth (ft)		8.00	
Conv. Total (cfs)	417013.8	Conv. (cfs)		417013.8	
Length Wtd. (ft)	397.26	Wetted Per. (ft)		313.05	
Min Ch El (ft)	1157.97	Shear (lb/sq ft)		0.41	
Alpha	1.00	Stream Power (lb/ft s)		1.98	
Frctn Loss (ft)	0.20	Cum Volume (acre-ft)		564.15	
C & E Loss (ft)	0.01	Cum SA (acres)		47.25	

Errors Warnings and Notes

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

Plan: Plan 01 River: RIVER-1 Reach:Reach-1 Riv Sta: 8.731 Profile: PF#1

E.G. Elev (ft)	1167.29	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.32	Wt. n-Val.		0.035	
W.S. Elev (ft)	1166.96	Reach Len. (ft)	399.90	399.90	399.90
Crit W.S. (ft)		Flow Area (sq ft)		8985.40	
E.G. Slope (ft/ft)	0.000452	Area (sq ft)		8985.40	
Q Total (cfs)	41000.00	Flow (cfs)		41000.00	
Top Width (ft)	785.22	Top Width (ft)		785.22	
Vel Total (ft/s)	4.56	Avg. Vel. (ft/s)		4.56	
Max Chl Dpth (ft)	13.36	Hydr. Depth (ft)		11.44	
Conv. Total (cfs)	1928056.8	Conv. (cfs)		1928056.8	
Length Wtd. (ft)	399.90	Wetted Per. (ft)		790.78	
Min Ch El (ft)	1153.60	Shear (lb/sq ft)		0.32	
Alpha	1.00	Stream Power (lb/ft s)		1.46	
Frctn Loss (ft)	0.25	Cum Volume (acre-ft)		511.89	
C & E Loss (ft)	0.03	Cum SA (acres)		42.26	

Errors Warnings and Notes

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

Plan: Plan 01 River: RIVER-1 Reach:Reach-1 Riv Sta: 8.655 Profile: PF#1

E.G. Elev (ft)	1167.01	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.64	Wt. n-Val.		0.035	
W.S. Elev (ft)	1166.37	Reach Len. (ft)	449.60	449.60	449.60
Crit W.S. (ft)		Flow Area (sq ft)		6386.12	
E.G. Slope (ft/ft)	0.000887	Area (sq ft)		6386.12	
Q Total (cfs)	41000.00	Flow (cfs)		41000.00	
Top Width (ft)	553.62	Top Width (ft)		553.62	
Vel Total (ft/s)	6.42	Avg. Vel. (ft/s)		6.42	
Max Chl Dpth (ft)	13.82	Hydr. Depth (ft)		11.54	
Conv. Total (cfs)	1376356.9	Conv. (cfs)		1376356.9	
Length Wtd. (ft)	449.60	Wetted Per. (ft)		558.32	

Plan: Plan 01 River: RIVER-1 Reach:Reach-1 Riv Sta: 8.655 Profile: PF#1 (Continued)

Min Ch El (ft)	1152.55	Shear (lb/sq ft)		0.63	
Alpha	1.00	Stream Power (lb/ft s)		4.07	
Frctn Loss (ft)	0.93	Cum Volume (acre-ft)		441.33	
C & E Loss (ft)	0.71	Cum SA (acres)		36.11	

Errors Warnings and Notes

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.

Plan: Plan 01 River: RIVER-1 Reach:Reach-1 Riv Sta: 8.548 Profile: PF#1

		Element	Left OB	Channel	Right OB
E.G. Elev (ft)	1165.37				
Vel Head (ft)	4.21	Wt. n-Val.		0.035	
W.S. Elev (ft)	1161.16	Reach Len. (ft)	51.18	51.18	51.18
Crit W.S. (ft)	1161.16	Flow Area (sq ft)		2490.92	
E.G. Slope (ft/ft)	0.009135	Area (sq ft)		2490.92	
Q Total (cfs)	41000.00	Flow (cfs)		41000.00	
Top Width (ft)	297.80	Top Width (ft)		297.80	
Vel Total (ft/s)	16.46	Avg. Vel. (ft/s)		16.46	
Max Chl Dpth (ft)	11.12	Hydr. Depth (ft)		8.36	
Conv. Total (cfs)	428978.2	Conv. (cfs)		428978.2	
Length Wtd. (ft)	51.18	Wetted Per. (ft)		304.89	
Min Ch El (ft)	1150.04	Shear (lb/sq ft)		4.66	
Alpha	1.00	Stream Power (lb/ft s)		76.69	
Frctn Loss (ft)	0.10	Cum Volume (acre-ft)		395.52	
C & E Loss (ft)	0.97	Cum SA (acres)		31.72	

Errors Warnings and Notes

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.

Plan: Plan 01 River: RIVER-1 Reach:Reach-1 Riv Sta: 8.538 Profile: PF#1

		Element	Left OB	Channel	Right OB
E.G. Elev (ft)	1162.28				
Vel Head (ft)	0.99	Wt. n-Val.		0.035	
W.S. Elev (ft)	1161.29	Reach Len. (ft)	114.85	114.85	114.85
Crit W.S. (ft)	1151.60	Flow Area (sq ft)		5137.21	
E.G. Slope (ft/ft)	0.000823	Area (sq ft)		5137.21	
Q Total (cfs)	41000.00	Flow (cfs)		41000.00	
Top Width (ft)	292.15	Top Width (ft)		292.15	
Vel Total (ft/s)	7.98	Avg. Vel. (ft/s)		7.98	
Max Chl Dpth (ft)	19.17	Hydr. Depth (ft)		17.58	

Plan: Plan 01 River: RIVER-1 Reach:Reach-1 Riv Sta: 8.538 Profile: PF#1 (Continued)

Conv. Total (cfs)	1429004.0	Conv. (cfs)		1429004.0	
Length Wtd. (ft)	114.85	Wetted Per. (ft)		306.31	
Min Ch El (ft)	1142.12	Shear (lb/sq ft)		0.86	
Alpha	1.00	Stream Power (lb/ft s)		6.88	
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)		391.04	
C & E Loss (ft)	0.02	Cum SA (acres)		31.37	

Errors Warnings and Notes

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

Plan: Plan 01 River: RIVER-1 Reach:Reach-1 Riv Sta: 8.516 Profile: PF#1

E.G. Elev (ft)	1162.18	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.94	Wt. n-Val.		0.035	
W.S. Elev (ft)	1161.24	Reach Len. (ft)	280.00	287.90	305.00
Crit W.S. (ft)		Flow Area (sq ft)		5272.39	
E.G. Slope (ft/ft)	0.000766	Area (sq ft)		5272.39	
Q Total (cfs)	41000.00	Flow (cfs)		41000.00	
Top Width (ft)	296.32	Top Width (ft)		296.32	
Vel Total (ft/s)	7.78	Avg. Vel. (ft/s)		7.78	
Max Chl Dpth (ft)	19.67	Hydr. Depth (ft)		17.79	
Conv. Total (cfs)	1481428.9	Conv. (cfs)		1481428.9	
Length Wtd. (ft)	287.90	Wetted Per. (ft)		309.66	
Min Ch El (ft)	1141.57	Shear (lb/sq ft)		0.81	
Alpha	1.00	Stream Power (lb/ft s)		6.33	
Frctn Loss (ft)	0.33	Cum Volume (acre-ft)		377.32	
C & E Loss (ft)	0.06	Cum SA (acres)		30.60	

Errors Warnings and Notes

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.

Plan: Plan 01 River: RIVER-1 Reach:Reach-1 Riv Sta: 8.457 Profile: PF#1

E.G. Elev (ft)	1161.78	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.58	Wt. n-Val.		0.035	
W.S. Elev (ft)	1160.20	Reach Len. (ft)	365.00	361.88	355.00
Crit W.S. (ft)		Flow Area (sq ft)		4059.89	
E.G. Slope (ft/ft)	0.001889	Area (sq ft)		4059.89	
Q Total (cfs)	41000.00	Flow (cfs)		41000.00	
Top Width (ft)	313.65	Top Width (ft)		313.65	
Vel Total (ft/s)	10.10	Avg. Vel. (ft/s)		10.10	
Max Chl Dpth (ft)	19.10	Hydr. Depth (ft)		12.94	
Conv. Total (cfs)	943344.8	Conv. (cfs)		943344.8	
Length Wtd. (ft)	361.88	Wetted Per. (ft)		317.08	
Min Ch El (ft)	1141.10	Shear (lb/sq ft)		1.51	
Alpha	1.00	Stream Power (lb/ft s)		15.25	
Frctn Loss (ft)	0.72	Cum Volume (acre-ft)		346.48	
C & E Loss (ft)	0.01	Cum SA (acres)		28.58	

Plan: Plan 01 River: RIVER-1 Reach:Reach-1 Riv Sta: 8.39 Profile: PF#1

E.G. Elev (ft)	1161.05	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.70	Wt. n-Val.		0.035	
W.S. Elev (ft)	1159.35	Reach Len. (ft)	310.00	308.23	305.00
Crit W.S. (ft)		Flow Area (sq ft)		3917.83	
E.G. Slope (ft/ft)	0.002116	Area (sq ft)		3917.83	
Q Total (cfs)	41000.00	Flow (cfs)		41000.00	
Top Width (ft)	312.54	Top Width (ft)		312.54	
Vel Total (ft/s)	10.46	Avg. Vel. (ft/s)		10.46	
Max Chl Dpth (ft)	18.43	Hydr. Depth (ft)		12.54	
Conv. Total (cfs)	891384.4	Conv. (cfs)		891384.4	
Length Wtd. (ft)	308.23	Wetted Per. (ft)		315.80	
Min Ch El (ft)	1140.92	Shear (lb/sq ft)		1.64	
Alpha	1.00	Stream Power (lb/ft s)		17.15	
Frctn Loss (ft)	0.67	Cum Volume (acre-ft)		313.34	
C & E Loss (ft)	0.00	Cum SA (acres)		25.98	

Plan: Plan 01 River: RIVER-1 Reach:Reach-1 Riv Sta: 8.33 Profile: PF#1

E.G. Elev (ft)	1160.38	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.72	Wt. n-Val.		0.035	
W.S. Elev (ft)	1158.66	Reach Len. (ft)	555.00	565.26	545.00
Crit W.S. (ft)		Flow Area (sq ft)		3897.48	
E.G. Slope (ft/ft)	0.002210	Area (sq ft)		3897.48	
Q Total (cfs)	41000.00	Flow (cfs)		41000.00	
Top Width (ft)	318.94	Top Width (ft)		318.94	
Vel Total (ft/s)	10.52	Avg. Vel. (ft/s)		10.52	
Max Chl Dpth (ft)	18.07	Hydr. Depth (ft)		12.22	
Conv. Total (cfs)	872181.1	Conv. (cfs)		872181.1	
Length Wtd. (ft)	565.26	Wetted Per. (ft)		322.06	
Min Ch El (ft)	1140.59	Shear (lb/sq ft)		1.67	
Alpha	1.00	Stream Power (lb/ft s)		17.56	
Frctn Loss (ft)	1.22	Cum Volume (acre-ft)		285.69	
C & E Loss (ft)	0.03	Cum SA (acres)		23.75	

Errors Warnings and Notes

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

Plan: Plan 01 River: RIVER-1 Reach:Reach-1 Riv Sta: 8.22 Profile: PF#1

E.G. Elev (ft)	1159.13	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.63	Wt. n-Val.		0.035	
W.S. Elev (ft)	1157.50	Reach Len. (ft)	485.00	512.82	565.00
Crit W.S. (ft)		Flow Area (sq ft)		4004.47	
E.G. Slope (ft/ft)	0.002125	Area (sq ft)		4004.47	
Q Total (cfs)	41000.00	Flow (cfs)		41000.00	
Top Width (ft)	331.29	Top Width (ft)		331.29	
Vel Total (ft/s)	10.24	Avg. Vel. (ft/s)		10.24	
Max Chl Dpth (ft)	18.72	Hydr. Depth (ft)		12.09	
Conv. Total (cfs)	889481.4	Conv. (cfs)		889481.4	
Length Wtd. (ft)	512.82	Wetted Per. (ft)		334.62	
Min Ch El (ft)	1138.78	Shear (lb/sq ft)		1.59	
Alpha	1.00	Stream Power (lb/ft s)		16.25	
Frctn Loss (ft)	1.13	Cum Volume (acre-ft)		234.42	
C & E Loss (ft)	0.01	Cum SA (acres)		19.53	

Errors Warnings and Notes

Warning:	The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross

Errors Warnings and Notes (Continued)

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

Plan: Plan 01 River: RIVER-1 Reach:Reach-1 Riv Sta: 8.12 Profile: PF#1

E.G. Elev (ft)	1157.99	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.71	Wt. n-Val.		0.035	
W.S. Elev (ft)	1156.28	Reach Len. (ft)	365.00	370.41	370.00
Crit W.S. (ft)		Flow Area (sq ft)		3904.58	
E.G. Slope (ft/ft)	0.002275	Area (sq ft)		3904.58	
Q Total (cfs)	41000.00	Flow (cfs)		41000.00	
Top Width (ft)	326.23	Top Width (ft)		326.23	
Vel Total (ft/s)	10.50	Avg. Vel. (ft/s)		10.50	
Max Chl Dpth (ft)	18.31	Hydr. Depth (ft)		11.97	
Conv. Total (cfs)	859614.4	Conv. (cfs)		859614.4	
Length Wtd. (ft)	370.41	Wetted Per. (ft)		330.65	
Min Ch El (ft)	1137.97	Shear (lb/sq ft)		1.68	
Alpha	1.00	Stream Power (lb/ft s)		17.61	
Frctn Loss (ft)	0.80	Cum Volume (acre-ft)		187.86	
C & E Loss (ft)	0.04	Cum SA (acres)		15.66	

Plan: Plan 01 River: RIVER-1 Reach:Reach-1 Riv Sta: 8.052 Profile: PF#1

E.G. Elev (ft)	1157.15	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.58	Wt. n-Val.		0.035	
W.S. Elev (ft)	1155.57	Reach Len. (ft)	225.00	236.58	255.00
Crit W.S. (ft)		Flow Area (sq ft)		4068.21	
E.G. Slope (ft/ft)	0.002069	Area (sq ft)		4068.21	
Q Total (cfs)	41000.00	Flow (cfs)		41000.00	
Top Width (ft)	337.28	Top Width (ft)		337.28	
Vel Total (ft/s)	10.08	Avg. Vel. (ft/s)		10.08	
Max Chl Dpth (ft)	19.15	Hydr. Depth (ft)		12.06	
Conv. Total (cfs)	901399.6	Conv. (cfs)		901399.6	
Length Wtd. (ft)	236.58	Wetted Per. (ft)		341.21	
Min Ch El (ft)	1136.42	Shear (lb/sq ft)		1.54	
Alpha	1.00	Stream Power (lb/ft s)		15.52	
Frctn Loss (ft)	0.50	Cum Volume (acre-ft)		153.97	
C & E Loss (ft)	0.00	Cum SA (acres)		12.84	

Plan: Plan 01 River: RIVER-1 Reach:Reach-1 Riv Sta: 8.006 Profile: PF#1

E.G. Elev (ft)	1156.65	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.61	Wt. n-Val.		0.035	
W.S. Elev (ft)	1155.05	Reach Len. (ft)	445.00	463.28	505.00
Crit W.S. (ft)		Flow Area (sq ft)		4032.16	
E.G. Slope (ft/ft)	0.002122	Area (sq ft)		4032.16	
Q Total (cfs)	41000.00	Flow (cfs)		41000.00	
Top Width (ft)	336.50	Top Width (ft)		336.50	
Vel Total (ft/s)	10.17	Avg. Vel. (ft/s)		10.17	
Max Chl Dpth (ft)	18.94	Hydr. Depth (ft)		11.98	
Conv. Total (cfs)	890094.9	Conv. (cfs)		890094.9	
Length Wtd. (ft)	463.28	Wetted Per. (ft)		340.08	
Min Ch El (ft)	1136.11	Shear (lb/sq ft)		1.57	
Alpha	1.00	Stream Power (lb/ft s)		15.97	
Frctn Loss (ft)	1.00	Cum Volume (acre-ft)		131.97	
C & E Loss (ft)	0.00	Cum SA (acres)		11.01	

Plan: Plan 01 River: RIVER-1 Reach:Reach-1 Riv Sta: 7.92 Profile: PF#1

E.G. Elev (ft)	1155.66	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.63	Wt. n-Val.		0.035	
W.S. Elev (ft)	1154.03	Reach Len. (ft)	615.00	631.37	655.00
Crit W.S. (ft)		Flow Area (sq ft)		4006.66	
E.G. Slope (ft/ft)	0.002179	Area (sq ft)		4006.66	
Q Total (cfs)	41000.00	Flow (cfs)		41000.00	
Top Width (ft)	337.85	Top Width (ft)		337.85	
Vel Total (ft/s)	10.23	Avg. Vel. (ft/s)		10.23	
Max Chl Dpth (ft)	18.29	Hydr. Depth (ft)		11.86	
Conv. Total (cfs)	878286.5	Conv. (cfs)		878286.5	
Length Wtd. (ft)	631.37	Wetted Per. (ft)		341.50	
Min Ch El (ft)	1135.74	Shear (lb/sq ft)		1.60	
Alpha	1.00	Stream Power (lb/ft s)		16.33	
Frctn Loss (ft)	1.43	Cum Volume (acre-ft)		89.22	
C & E Loss (ft)	0.01	Cum SA (acres)		7.42	

Errors Warnings and Notes

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

Plan: Plan 01 River: RIVER-1 Reach:Reach-1 Riv Sta: 7.8 Profile: PF#1

E.G. Elev (ft)	1154.22	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.73	Wt. n-Val.		0.035	
W.S. Elev (ft)	1152.49	Reach Len. (ft)	230.00	259.16	355.00
Crit W.S. (ft)		Flow Area (sq ft)		3886.59	
E.G. Slope (ft/ft)	0.002352	Area (sq ft)		3886.59	
Q Total (cfs)	41000.00	Flow (cfs)		41000.00	
Top Width (ft)	332.21	Top Width (ft)		332.21	
Vel Total (ft/s)	10.55	Avg. Vel. (ft/s)		10.55	
Max Chl Dpth (ft)	16.84	Hydr. Depth (ft)		11.70	
Conv. Total (cfs)	845419.9	Conv. (cfs)		845419.9	
Length Wtd. (ft)	259.16	Wetted Per. (ft)		335.12	
Min Ch El (ft)	1135.65	Shear (lb/sq ft)		1.70	
Alpha	1.00	Stream Power (lb/ft s)		17.96	
Frctn Loss (ft)	0.60	Cum Volume (acre-ft)		32.02	
C & E Loss (ft)	0.07	Cum SA (acres)		2.56	

Plan: Plan 01 River: RIVER-1 Reach:Reach-1 Riv Sta: 7.751 Profile: PF#1

E.G. Elev (ft)	1153.55	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.96	Wt. n-Val.		0.035	
W.S. Elev (ft)	1151.60	Reach Len. (ft)	10.00	10.00	10.00
Crit W.S. (ft)	1146.57	Flow Area (sq ft)		3652.64	
E.G. Slope (ft/ft)	0.002248	Area (sq ft)		3652.64	
Q Total (cfs)	41000.00	Flow (cfs)		41000.00	
Top Width (ft)	270.42	Top Width (ft)		270.42	
Vel Total (ft/s)	11.22	Avg. Vel. (ft/s)		11.22	
Max Chl Dpth (ft)	16.30	Hydr. Depth (ft)		13.51	
Conv. Total (cfs)	864733.9	Conv. (cfs)		864733.9	
Length Wtd. (ft)	10.00	Wetted Per. (ft)		277.39	
Min Ch El (ft)	1135.30	Shear (lb/sq ft)		1.85	
Alpha	1.00	Stream Power (lb/ft s)		20.74	
Frctn Loss (ft)		Cum Volume (acre-ft)		9.59	
C & E Loss (ft)		Cum SA (acres)		0.77	

Plan: Plan 01 River: RIVER-1 Reach:Reach-1 Riv Sta: 7.7395 BR U Profile: PF#1

		Element	Left OB	Channel	Right OB
E.G. Elev (ft)	1153.38				
Vel Head (ft)	2.28	Wt. n-Val.		0.035	
W.S. Elev (ft)	1151.10	Reach Len. (ft)	89.00	89.00	89.00
Crit W.S. (ft)	1146.86	Flow Area (sq ft)		3383.19	
E.G. Slope (ft/ft)	0.004053	Area (sq ft)		3383.19	
Q Total (cfs)	41000.00	Flow (cfs)		41000.00	
Top Width (ft)	259.55	Top Width (ft)		259.55	
Vel Total (ft/s)	12.12	Avg. Vel. (ft/s)		12.12	
Max Chl Dpth (ft)	15.80	Hydr. Depth (ft)		13.03	
Conv. Total (cfs)	644010.8	Conv. (cfs)		644010.8	
Length Wtd. (ft)	89.00	Wetted Per. (ft)		356.34	
Min Ch El (ft)	1135.30	Shear (lb/sq ft)		2.40	
Alpha	1.00	Stream Power (lb/ft s)		29.11	
Frctn Loss (ft)		Cum Volume (acre-ft)		8.78	
C & E Loss (ft)		Cum SA (acres)		0.71	

Plan: Plan 01 River: RIVER-1 Reach:Reach-1 Riv Sta: 7.7395 BR D Profile: PF#1

		Element	Left OB	Channel	Right OB
E.G. Elev (ft)	1152.59				
Vel Head (ft)	2.23	Wt. n-Val.		0.035	
W.S. Elev (ft)	1150.36	Reach Len. (ft)	22.70	22.70	22.70
Crit W.S. (ft)	1146.53	Flow Area (sq ft)		3423.42	
E.G. Slope (ft/ft)	0.004207	Area (sq ft)		3423.42	
Q Total (cfs)	41000.00	Flow (cfs)		41000.00	
Top Width (ft)	286.67	Top Width (ft)		286.67	
Vel Total (ft/s)	11.98	Avg. Vel. (ft/s)		11.98	
Max Chl Dpth (ft)	14.96	Hydr. Depth (ft)		11.94	
Conv. Total (cfs)	632082.4	Conv. (cfs)		632082.4	
Length Wtd. (ft)	22.70	Wetted Per. (ft)		377.47	
Min Ch El (ft)	1135.40	Shear (lb/sq ft)		2.38	
Alpha	1.00	Stream Power (lb/ft s)		28.53	
Frctn Loss (ft)		Cum Volume (acre-ft)		1.83	
C & E Loss (ft)		Cum SA (acres)		0.15	

Plan: Plan 01 River: RIVER-1 Reach:Reach-1 Riv Sta: 7.728 Profile: PF#1

		Element	Left OB	Channel	Right OB
E.G. Elev (ft)	1152.52				
Vel Head (ft)	2.02	Wt. n-Val.		0.035	
W.S. Elev (ft)	1150.50	Reach Len. (ft)			
Crit W.S. (ft)	1146.26	Flow Area (sq ft)		3593.64	
E.G. Slope (ft/ft)	0.002645	Area (sq ft)		3593.64	
Q Total (cfs)	41000.00	Flow (cfs)		41000.00	
Top Width (ft)	296.66	Top Width (ft)		296.66	
Vel Total (ft/s)	11.41	Avg. Vel. (ft/s)		11.41	
Max Chl Dpth (ft)	15.10	Hydr. Depth (ft)		12.11	
Conv. Total (cfs)	797187.3	Conv. (cfs)		797187.3	
Length Wtd. (ft)		Wetted Per. (ft)		300.88	
Min Ch El (ft)	1135.40	Shear (lb/sq ft)		1.97	
Alpha	1.00	Stream Power (lb/ft s)		22.50	
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

COE Q100 PROFILE

HEC-RAS Plan: Plan 01 River: RIVER-1 Reach: Reach-1

Reach	River Sta	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	7.728	41000.00	1135.40	1150.50	1146.26	1152.52	0.002645	11.41	3593.64	296.66	0.58
Reach-1	7.7395	Bridge									
Reach-1	7.751	41000.00	1135.30	1151.60	1146.57	1153.55	0.002248	11.22	3652.64	270.42	0.54
Reach-1	7.8	41000.00	1135.65	1152.49		1154.22	0.002352	10.55	3886.59	332.21	0.54
Reach-1	7.92	41000.00	1135.74	1154.03		1155.66	0.002179	10.23	4006.66	337.85	0.52
Reach-1	8.006	41000.00	1136.11	1155.05		1156.65	0.002122	10.17	4032.16	336.50	0.52
Reach-1	8.052	41000.00	1136.42	1155.57		1157.15	0.002069	10.08	4068.21	337.28	0.51
Reach-1	8.12	41000.00	1137.97	1156.28		1157.99	0.002275	10.50	3904.58	326.23	0.53
Reach-1	8.22	41000.00	1138.78	1157.50		1159.13	0.002125	10.24	4004.47	331.29	0.52
Reach-1	8.33	41000.00	1140.59	1158.66		1160.38	0.002210	10.52	3897.48	318.94	0.53
Reach-1	8.39	41000.00	1140.92	1159.35		1161.05	0.002116	10.46	3917.83	312.54	0.52
Reach-1	8.457	41000.00	1141.10	1160.20		1161.78	0.001889	10.10	4059.89	313.65	0.49
Reach-1	8.516	41000.00	1141.57	1161.24		1162.18	0.000766	7.78	5272.39	296.32	0.32
Reach-1	8.538	41000.00	1142.12	1161.29	1151.60	1162.28	0.000823	7.98	5137.21	292.15	0.34
Reach-1	8.548	41000.00	1150.04	1161.16	1161.16	1165.37	0.009135	16.46	2490.92	297.80	1.00
Reach-1	8.655	41000.00	1152.55	1166.37		1167.01	0.000887	6.42	6386.12	553.62	0.33
Reach-1	8.731	41000.00	1153.60	1166.96		1167.29	0.000452	4.56	8985.40	785.22	0.24
Reach-1	8.807	12000.00	1157.97	1167.14		1167.50	0.000828	4.85	2475.03	309.23	0.30
Reach-1	8.883	12000.00	1159.44	1167.44		1168.12	0.002325	6.63	1810.57	307.98	0.48
Reach-1	8.938	12000.00	1159.95	1168.12		1168.84	0.002600	6.78	1770.10	316.55	0.51
Reach-1	8.977	12000.00	1161.31	1168.68		1169.40	0.002684	6.79	1766.33	321.97	0.51
Reach-1	8.994	12000.00	1161.66	1169.06		1169.61	0.001867	5.97	2009.89	338.56	0.43
Reach-1	9.047	12000.00	1161.65	1169.67		1170.13	0.001612	5.43	2210.07	386.37	0.40
Reach-1	9.129	12000.00	1163.16	1170.37		1170.72	0.001306	4.77	2516.42	457.17	0.36
Reach-1	9.193	12000.00	1164.47	1170.95	1169.13	1171.42	0.002303	5.48	2190.00	494.59	0.46
Reach-1	9.289	12000.00	1167.93	1172.63	1172.63	1173.95	0.012871	9.21	1303.44	492.38	1.00
Reach-1	9.318	12000.00	1168.41	1174.37		1174.99	0.003719	6.33	1895.15	494.35	0.57
Reach-1	9.367	12000.00	1171.33	1176.29		1177.19	0.005846	7.64	1570.46	433.89	0.71
Reach-1	9.492	11450.00	1173.77	1178.70		1179.36	0.004175	6.50	1760.85	480.92	0.60
Reach-1	9.592	11450.00	1175.70	1181.73	1181.62	1183.22	0.011380	9.80	1168.20	365.27	0.97
Reach-1	9.692	11450.00	1176.99	1184.75		1185.24	0.001777	5.61	2041.39	365.22	0.42
Reach-1	9.794	11450.00	1176.99	1185.65	1182.22	1186.02	0.001094	4.83	2371.97	368.98	0.34
Reach-1	9.889	11450.00	1185.46	1190.32	1190.99	1193.28	0.019851	13.81	829.15	234.19	1.29
Reach-1	9.908	11450.00	1188.87	1193.24	1193.24	1195.14	0.011558	11.08	1033.52	271.24	1.00
Reach-1	9.953	11450.00	1189.74	1195.40		1196.96	0.007645	10.00	1144.61	256.83	0.84
Reach-1	9.958	11450.00	1190.47	1195.95		1197.22	0.005715	9.05	1265.11	265.30	0.73
Reach-1	9.971001	Bridge									
Reach-1	9.984	11450.00	1191.00	1197.47	1195.38	1198.28	0.002814	7.22	1585.48	273.68	0.53
Reach-1	9.997	11450.00	1191.76	1197.59		1198.69	0.004454	8.42	1359.83	263.35	0.65
Reach-1	10.096	11450.00	1193.83	1200.12		1200.80	0.003314	6.62	1729.18	385.57	0.55
Reach-1	10.176	11450.00	1195.55	1201.90		1202.53	0.003184	6.38	1793.98	410.59	0.54
Reach-1	10.271	10900.00	1198.24	1203.64		1204.56	0.006219	7.72	1411.26	400.79	0.73
Reach-1	10.348	10900.00	1201.00	1205.80		1206.39	0.002879	6.12	1781.25	403.01	0.51
Reach-1	10.443	10900.00	1203.95	1207.49		1208.27	0.005742	7.08	1539.65	470.28	0.69
Reach-1	10.517	10900.00	1204.88	1209.46		1210.07	0.003049	6.30	1729.24	390.48	0.53
Reach-1	10.612	10900.00	1205.80	1210.85		1211.86	0.004460	8.05	1354.05	281.05	0.65
Reach-1	10.699	10900.00	1206.71	1212.71		1213.75	0.003786	8.18	1332.04	237.91	0.61
Reach-1	10.794	10900.00	1207.72	1214.51	1211.80	1215.18	0.002072	6.57	1658.84	261.84	0.46
Reach-1	10.803	10900.00	1207.82	1209.69	1211.89	1219.50	0.157819	25.13	433.76	237.79	3.28
Reach-1	10.806	10900.00	1215.00	1218.70	1218.70	1220.52	0.011610	10.82	1010.98	281.61	1.00
Reach-1	10.810	10900.00	1215.03	1219.54		1220.74	0.006099	8.79	1239.78	285.25	0.74
Reach-1	10.862	10900.00	1215.43	1221.18		1222.72	0.007086	9.96	1094.74	233.26	0.81
Reach-1	10.917	10900.00	1216.30	1223.08		1223.86	0.002433	7.12	1569.05	289.82	0.50
Reach-1	10.98	10900.00	1217.72	1223.87		1225.24	0.005006	9.36	1164.35	209.81	0.70
Reach-1	10.988	Bridge									
Reach-1	10.996	10900.00	1218.50	1225.75	1223.29	1226.62	0.002667	7.48	1457.54	229.54	0.52
Reach-1	11.03	10900.00	1219.39	1225.99		1227.36	0.004636	9.40	1159.69	195.41	0.68
Reach-1	11.129	10900.00	1220.06	1228.06		1228.52	0.001174	5.46	1995.26	271.11	0.35
Reach-1	11.188	10350.00	1220.47	1228.35		1229.04	0.001856	6.69	1547.18	218.19	0.44
Reach-1	11.243	10350.00	1220.89	1228.80		1229.88	0.002962	8.34	1241.38	178.07	0.56
Reach-1	11.301	10350.00	1221.27	1229.71		1230.69	0.002499	7.92	1306.66	178.01	0.52
Reach-1	11.386	10350.00	1223.71	1230.92		1231.79	0.002543	7.48	1383.72	208.50	0.51
Reach-1	11.481	10350.00	1226.89	1232.43		1233.92	0.005970	9.80	1056.56	202.13	0.76
Reach-1	11.566	10350.00	1229.40	1235.11		1236.43	0.005090	9.24	1120.40	207.72	0.70
Reach-1	11.664	10350.00	1232.17	1237.75		1238.85	0.004297	8.41	1230.52	231.67	0.64
Reach-1	11.759	10350.00	1234.74	1239.90		1240.86	0.004069	7.83	1321.45	266.33	0.62
Reach-1	11.864	10350.00	1237.96	1242.60		1243.76	0.005667	8.64	1197.93	267.37	0.72
Reach-1	11.949	10350.00	1240.27	1245.00		1246.09	0.005244	8.41	1230.90	269.98	0.69
Reach-1	12.034	10350.00	1243.20	1248.00		1249.44	0.006860	9.63	1074.71	235.16	0.79
Reach-1	12.125	10350.00	1245.31	1250.58		1252.20	0.006951	10.21	1013.48	204.68	0.81
Reach-1	12.194	10350.00	1247.10	1252.90		1253.99	0.004122	8.39	1233.17	225.86	0.63
Reach-1	12.313	9800.00	1250.65	1255.84		1257.16	0.005676	9.21	1064.40	215.56	0.73
Reach-1	12.42	9800.00	1253.85	1259.14		1260.52	0.005858	9.44	1037.62	206.82	0.74
Reach-1	12.511	9800.00	1256.28	1261.71		1263.10	0.005699	9.46	1035.94	201.71	0.74
Reach-1	12.606	9800.00	1257.52	1264.31		1265.20	0.002798	7.56	1296.62	206.81	0.53
Reach-1	12.701	9800.00	1258.67	1265.70		1266.52	0.002491	7.29	1345.19	207.75	0.50
Reach-1	12.801	9800.00	1259.88	1267.00		1267.80	0.002384	7.18	1364.11	208.10	0.49
Reach-1	12.896	9800.00	1260.95	1268.19		1268.97	0.002306	7.11	1378.59	208.39	0.49
Reach-1	12.991	9800.00	1261.98	1269.45		1270.18	0.002060	6.86	1429.11	209.37	0.46

HEC-RAS Plan: Plan 01 River: RIVER-1 Reach: Reach-1

Reach	River Sta	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	7.728	41000.00	1135.40	1150.50	1146.25	1152.52	0.002645	11.41	3593.64	296.66	0.58
Reach-1	7.7395	Bridge									
Reach-1	7.751	41000.00	1135.30	1151.60	1146.57	1153.55	0.002248	11.22	3652.64	270.42	0.54
Reach-1	7.8	41000.00	1135.65	1152.49		1154.22	0.002352	10.55	3886.59	332.21	0.54
Reach-1	7.92	41000.00	1135.74	1154.03		1155.66	0.002179	10.23	4006.66	337.85	0.52
Reach-1	8.006	41000.00	1136.11	1155.05		1156.65	0.002122	10.17	4032.16	336.50	0.52
Reach-1	8.052	41000.00	1136.42	1155.57		1157.15	0.002069	10.08	4068.21	337.28	0.51
Reach-1	8.12	41000.00	1137.97	1156.28		1157.99	0.002275	10.50	3904.58	326.23	0.53
Reach-1	8.22	41000.00	1138.78	1157.50		1159.13	0.002125	10.24	4004.47	331.29	0.52
Reach-1	8.33	41000.00	1140.59	1158.66		1160.38	0.002210	10.52	3897.48	318.94	0.53
Reach-1	8.39	41000.00	1140.92	1159.35		1161.05	0.002116	10.46	3917.83	312.54	0.52
Reach-1	8.457	41000.00	1141.10	1160.20		1161.78	0.001889	10.10	4059.89	313.65	0.49
Reach-1	8.516	41000.00	1141.57	1161.24		1162.18	0.000766	7.78	5272.39	296.32	0.32
Reach-1	8.538	41000.00	1142.12	1161.29	1151.60	1162.28	0.000823	7.98	5137.21	292.15	0.34
Reach-1	8.548	41000.00	1150.04	1161.16	1161.16	1165.37	0.009136	16.46	2490.85	297.80	1.00
Reach-1	8.655	41000.00	1152.55	1166.37		1167.01	0.000887	6.42	6386.12	553.62	0.33
Reach-1	8.731	41000.00	1153.60	1166.96		1167.29	0.000452	4.56	8985.40	785.22	0.24
Reach-1	8.807	19000.00	1157.97	1166.75		1167.76	0.002430	8.07	2355.84	307.76	0.51
Reach-1	8.883	19000.00	1159.44	1167.72		1169.28	0.005001	10.01	1898.94	309.17	0.71
Reach-1	8.936	19000.00	1159.95	1169.30		1170.52	0.003521	8.86	2143.51	321.39	0.60
Reach-1	8.977	19000.00	1161.31	1170.10		1171.23	0.003180	8.53	2227.77	327.14	0.58
Reach-1	8.994	19000.00	1161.66	1170.63		1171.49	0.002182	7.47	2544.74	343.80	0.48
Reach-1	9.047	19000.00	1161.65	1171.40		1172.07	0.001709	6.59	2884.60	393.61	0.43
Reach-1	9.129	19000.00	1163.16	1172.19		1172.68	0.001285	5.66	3354.74	464.57	0.37
Reach-1	9.193	19000.00	1164.47	1172.73		1173.32	0.001906	6.18	3073.01	501.58	0.44
Reach-1	9.289	19000.00	1167.93	1173.69	1173.58	1175.37	0.010650	10.41	1825.33	497.13	0.96
Reach-1	9.318	19000.00	1168.41	1175.46		1176.41	0.004076	7.79	2438.68	498.67	0.62
Reach-1	9.367	19000.00	1171.33	1177.47		1178.75	0.005936	9.07	2094.87	452.44	0.74
Reach-1	9.492	19000.00	1173.77	1179.96	1178.68	1180.96	0.004328	8.01	2371.96	486.20	0.64
Reach-1	9.592	19000.00	1175.70	1182.89	1182.89	1185.09	0.011331	11.91	1594.68	370.33	1.01
Reach-1	9.692	19000.00	1176.99	1186.54		1187.31	0.001982	7.03	2701.19	372.62	0.46
Reach-1	9.794	19000.00	1176.99	1187.61	1183.51	1188.20	0.001269	6.12	3103.11	376.95	0.38
Reach-1	9.889	15500.00	1185.46	1191.22	1191.94	1194.66	0.017418	14.89	1041.02	237.70	1.25
Reach-1	9.908	15500.00	1188.87	1194.10	1194.10	1196.42	0.010859	12.21	1269.68	274.51	1.00
Reach-1	9.953	15500.00	1189.74	1196.16		1198.24	0.008417	11.55	1341.83	260.51	0.90
Reach-1	9.958	15500.00	1190.47	1197.05		1198.58	0.005384	9.94	1558.73	271.06	0.73
Reach-1	9.971001	Bridge									
Reach-1	9.984	15500.00	1191.00	1198.63	1196.26	1199.66	0.002880	8.14	1904.10	279.03	0.55
Reach-1	9.997	15500.00	1191.76	1198.74		1200.07	0.004408	9.27	1671.99	277.85	0.67
Reach-1	10.096	15500.00	1193.83	1201.25		1202.04	0.002909	7.15	2167.83	390.22	0.53
Reach-1	10.176	15500.00	1195.55	1202.85		1203.63	0.003061	7.09	2185.68	414.30	0.54
Reach-1	10.271	15500.00	1198.24	1204.46		1205.69	0.006310	8.89	1743.17	404.82	0.76
Reach-1	10.348	15500.00	1201.00	1206.80		1207.58	0.003010	7.10	2183.24	408.30	0.54
Reach-1	10.443	15500.00	1203.95	1208.45		1209.39	0.004990	7.78	1991.84	474.83	0.67
Reach-1	10.517	15500.00	1204.88	1210.32		1211.20	0.003439	7.49	2070.41	395.01	0.58
Reach-1	10.612	15500.00	1205.80	1211.82		1213.23	0.004981	9.51	1629.26	285.58	0.70
Reach-1	10.699	15500.00	1206.71	1213.89		1215.32	0.004161	9.59	1616.63	243.94	0.66
Reach-1	10.794	15500.00	1207.72	1215.96	1212.86	1216.85	0.002165	7.58	2045.90	269.10	0.48
Reach-1	10.803	15500.00	1207.82	1210.44	1212.94	1220.41	0.103743	25.34	611.71	241.49	2.81
Reach-1	10.806	13900.00	1215.00	1219.33	1219.33	1221.47	0.011079	11.75	1189.46	284.35	1.00
Reach-1	10.810	13900.00	1215.03	1220.29		1221.70	0.005870	9.54	1467.05	340.44	0.75
Reach-1	10.862	13900.00	1215.43	1221.86		1223.76	0.007637	11.07	1255.68	241.32	0.86
Reach-1	10.917	13900.00	1216.30	1224.02		1224.97	0.002483	7.84	1854.22	326.16	0.51
Reach-1	10.98	13900.00	1217.72	1224.77		1226.40	0.005121	10.27	1353.83	215.86	0.72
Reach-1	10.988	Bridge									
Reach-1	10.996	13900.00	1218.50	1226.80	1224.11	1227.84	0.002715	8.17	1702.22	237.88	0.54
Reach-1	11.03	13900.00	1219.39	1226.98		1228.61	0.004661	10.25	1355.92	201.11	0.70
Reach-1	11.129	13900.00	1220.06	1229.25		1229.80	0.001192	5.99	2320.24	277.36	0.37
Reach-1	11.188	13900.00	1220.47	1229.47		1230.40	0.002122	7.74	1794.81	224.32	0.48
Reach-1	11.243	13900.00	1220.89	1229.94		1231.37	0.003355	9.60	1447.47	184.10	0.60
Reach-1	11.301	13900.00	1221.27	1231.01		1232.27	0.002737	9.01	1542.83	185.17	0.55
Reach-1	11.386	13900.00	1223.71	1232.37		1233.42	0.002455	8.23	1689.13	214.27	0.52
Reach-1	11.481	13900.00	1226.89	1233.71		1235.43	0.005326	10.53	1319.58	207.27	0.74
Reach-1	11.566	13900.00	1229.40	1236.16		1237.83	0.005191	10.36	1341.18	211.93	0.73
Reach-1	11.664	13900.00	1232.17	1238.90		1240.23	0.004144	9.28	1497.69	236.24	0.65
Reach-1	11.759	13900.00	1234.74	1241.00		1242.15	0.003842	8.60	1616.23	270.73	0.62
Reach-1	11.864	13900.00	1237.96	1243.53		1244.96	0.005538	9.60	1448.56	271.09	0.73
Reach-1	11.949	13900.00	1240.27	1245.89		1247.27	0.005278	9.42	1474.91	273.58	0.72
Reach-1	12.034	13400.00	1243.20	1248.85		1250.56	0.006613	10.49	1277.93	239.13	0.80
Reach-1	12.125	13400.00	1245.31	1251.36		1253.38	0.007323	11.42	1173.79	208.29	0.85
Reach-1	12.194	13400.00	1247.10	1253.90		1255.21	0.004025	9.16	1462.71	230.38	0.64
Reach-1	12.313	12000.00	1250.65	1256.71		1258.13	0.005048	9.57	1253.82	219.04	0.70
Reach-1	12.42	12000.00	1253.85	1259.76		1261.40	0.006045	10.28	1166.82	209.32	0.77
Reach-1	12.511	12000.00	1256.28	1262.40		1264.02	0.005694	10.19	1177.19	204.49	0.75
Reach-1	12.606	12000.00	1257.52	1265.11		1266.15	0.002869	8.20	1462.89	210.00	0.55
Reach-1	12.701	12000.00	1258.67	1266.54		1267.51	0.002534	7.88	1522.01	211.13	0.52
Reach-1	12.801	12000.00	1259.88	1267.87		1268.80	0.002409	7.76	1546.80	211.59	0.51
Reach-1	12.896	12000.00	1260.95	1269.07		1269.99	0.002323	7.67	1564.84	211.94	0.50
Reach-1	12.991	12000.00	1261.98	1270.35		1271.20	0.002084	7.41	1620.30	212.99	0.47

HEC-RAS Plan: Plan 01 River: RIVER-1 Reach: Reach-1 (Continued)

Reach	River Sta	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	13.076	12000.00	1263.14	1271.30		1272.17	0.002185	7.52	1595.76	212.52	0.48
Reach-1	13.151	12000.00	1264.13	1272.14		1273.05	0.002304	7.65	1569.05	212.02	0.50
Reach-1	13.161	8800.00	1264.28	1272.74		1273.18	0.001026	5.28	1666.54	213.85	0.33
Reach-1	13.166	8800.00	1264.36	1272.77		1273.20	0.001046	5.31	1657.07	213.95	0.34
Reach-1	13.175	8800.00	1264.50	1272.80	1268.67	1273.27	0.001125	5.46	1612.84	210.91	0.35
Reach-1	13.179	8800.00	1273.50	1277.62	1277.62	1279.62	0.011559	11.33	776.46	196.50	1.00
Reach-1	13.183	8800.00	1273.58	1278.44		1279.85	0.006631	9.52	923.91	199.77	0.78
Reach-1	13.227	8800.00	1274.58	1280.08		1281.17	0.004407	8.38	1049.64	201.98	0.65
Reach-1	13.325	8800.00	1276.80	1282.40		1283.45	0.004143	8.22	1070.25	202.39	0.63
Reach-1	13.42	8800.00	1278.89	1284.50		1285.54	0.004126	8.21	1071.42	202.32	0.63
Reach-1	13.524	8800.00	1280.98	1286.56		1287.62	0.004177	8.24	1067.48	202.34	0.63
Reach-1	13.619	8800.00	1283.02	1288.65		1289.69	0.004070	8.18	1076.22	202.51	0.63
Reach-1	13.68	8800.00	1284.34	1289.97		1291.00	0.004075	8.18	1075.82	202.50	0.63
Reach-1	13.742	8800.00	1285.81	1291.44		1292.48	0.004070	8.18	1076.19	202.49	0.63
Reach-1	13.818	8800.00	1287.37	1293.00		1294.04	0.004072	8.18	1075.99	202.49	0.63
Reach-1	13.918	8800.00	1289.67	1295.39		1296.39	0.003846	8.03	1095.59	202.91	0.61
Reach-1	14.013	8800.00	1291.61	1297.29		1298.30	0.003955	8.10	1085.97	202.70	0.62
Reach-1	14.103	8800.00	1293.77	1299.37		1300.42	0.004148	8.23	1069.78	202.38	0.63
Reach-1	14.150	6600.00	1294.78	1300.65	1298.21	1301.19	0.002006	5.89	1120.44	202.59	0.44
Reach-1	14.159	6600.00	1295.00	1296.45	1298.41	1306.06	0.214520	24.87	265.33	185.80	3.67
Reach-1	14.162	6600.00	1302.32	1305.81	1305.81	1307.47	0.012268	10.35	637.66	193.65	1.01
Reach-1	14.166	6600.00	1302.39	1306.56		1307.70	0.006639	8.55	771.81	196.66	0.76
Reach-1	14.197	6600.00	1303.30	1309.00	1307.06	1309.19	0.001629	3.58	2027.94	836.39	0.34
Reach-1	14.284	6600.00	1305.40	1310.83	1310.83	1311.62	0.010350	8.79	1072.12	697.06	0.85
Reach-1	14.379	6600.00	1309.18	1314.51		1314.75	0.004007	4.57	1880.38	1356.15	0.51
Reach-1	14.495	6600.00	1312.16	1317.22		1317.85	0.008092	7.72	1237.74	894.08	0.75
Reach-1	14.599	6600.00	1315.07	1320.13		1320.44	0.003590	4.54	1460.32	622.81	0.48
Reach-1	14.653	6600.00	1317.90	1322.76		1323.50	0.010568	7.62	1085.69	735.69	0.83
Reach-1	14.752	6600.00	1319.77	1325.66	1324.18	1325.92	0.002355	4.16	1751.88	798.93	0.41
Reach-1	14.85	6600.00	1323.06	1327.45		1327.89	0.006004	5.73	1258.79	559.31	0.63
Reach-1	14.945	6600.00	1323.89	1330.57	1330.14	1331.51	0.006799	8.71	1043.66	825.31	0.73
Reach-1	14.983	6600.00	1323.95	1331.82	1330.99	1333.14	0.007232	9.31	764.66	300.92	0.75
Reach-1	15.049	6600.00	1327.09	1334.83		1335.01	0.002232	3.84	2227.92	816.50	0.29
Reach-1	15.144	6600.00	1329.20	1336.08		1336.56	0.004053	5.89	1285.16	468.22	0.54
Reach-1	15.248	6600.00	1331.18	1337.94		1338.78	0.004632	7.53	1005.68	319.31	0.61
Reach-1	15.333	6600.00	1333.64	1340.04	1338.40	1340.48	0.003001	5.32	1241.37	359.77	0.47
Reach-1	15.416	6600.00	1333.40	1341.01		1341.24	0.001035	3.82	1727.75	324.63	0.29
Reach-1	15.475	6600.00	1335.06	1341.40		1341.76	0.002390	4.77	1384.87	373.25	0.42
Reach-1	15.596	4200.00	1338.38	1343.83		1344.71	0.015999	7.52	558.59	165.24	0.72
Reach-1	15.623	4200.00	1340.00	1347.80		1348.06	0.003778	4.42	1160.53	574.42	0.37
Reach-1	15.699	4200.00	1344.71	1349.40		1349.64	0.005109	4.49	1098.36	642.71	0.41
Reach-1	15.792	4200.00	1345.20	1351.76	1350.93	1352.37	0.005388	6.73	732.17	295.27	0.62
Reach-1	15.885	4200.00	1348.40	1354.75		1355.37	0.006608	6.74	685.06	276.90	0.67
Reach-1	15.966	2350.00	1351.84	1356.95		1357.10	0.001967	3.43	921.16	562.00	0.36
Reach-1	16.066	2350.00	1354.42	1358.60		1358.83	0.005387	4.11	605.21	438.00	0.55
Reach-1	16.167	2350.00	1358.98	1361.47		1361.77	0.005275	3.36	551.38	341.11	0.52
Reach-1	16.248	2350.00	1360.22	1364.29		1364.77	0.007648	6.21	447.97	294.17	0.70
Reach-1	16.348	2350.00	1362.60	1366.70		1366.92	0.003569	4.33	642.47	382.85	0.48
Reach-1	16.411	2350.00	1364.41	1368.80		1369.38	0.006643	6.17	405.16	179.22	0.66
Reach-1	16.504	2350.00	1366.82	1371.22	1370.08	1371.52	0.003112	4.38	539.26	235.47	0.47
Reach-1	16.608	2350.00	1368.69	1373.09		1373.45	0.004820	4.84	485.33	201.79	0.55
Reach-1	16.637	2350.00	1370.17	1374.64		1375.27	0.013268	6.36	369.56	218.54	0.86
Reach-1	16.732	2350.00	1372.93	1377.81		1378.15	0.003404	4.71	498.84	166.60	0.48
Reach-1	16.829	2350.00	1374.90	1379.46	1377.97	1379.81	0.002958	4.77	507.92	187.88	0.46

Plan: Plan 01 River: RIVER-1 Reach:Reach-1 Riv Sta: 9.984 Profile: PF#2

E.G. Elev (ft)	1199.66	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.03	Wt. n-Val.		0.035	
W.S. Elev (ft)	1198.63	Reach Len. (ft)	7.00	7.00	7.00
Crit W.S. (ft)	1196.26	Flow Area (sq ft)		1904.10	
E.G. Slope (ft/ft)	0.002880	Area (sq ft)		1904.10	
Q Total (cfs)	15500.00	Flow (cfs)		15500.00	
Top Width (ft)	279.03	Top Width (ft)		279.03	
Vel Total (ft/s)	8.14	Avg. Vel. (ft/s)		8.14	
Max Chl Dpth (ft)	7.63	Hydr. Depth (ft)		6.82	
Conv. Total (cfs)	288847.3	Conv. (cfs)		288847.3	
Length Wtd. (ft)	7.00	Wetted Per. (ft)		281.91	
Min Ch El (ft)	1191.00	Shear (lb/sq ft)		1.21	
Alpha	1.00	Stream Power (lb/ft s)		9.88	
Frctn Loss (ft)		Cum Volume (acre-ft)		893.31	
C & E Loss (ft)		Cum SA (acres)		102.84	

Plan: Plan 01 River: RIVER-1 Reach:Reach-1 Riv Sta: 9.971001BR U Profile: PF#2

E.G. Elev (ft)	1199.61	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.11	Wt. n-Val.		0.035	
W.S. Elev (ft)	1198.51	Reach Len. (ft)	115.00	115.00	115.00
Crit W.S. (ft)	1196.32	Flow Area (sq ft)		1837.06	
E.G. Slope (ft/ft)	0.004079	Area (sq ft)		1837.06	
Q Total (cfs)	15500.00	Flow (cfs)		15500.00	
Top Width (ft)	273.82	Top Width (ft)		273.82	
Vel Total (ft/s)	8.44	Avg. Vel. (ft/s)		8.44	
Max Chl Dpth (ft)	7.51	Hydr. Depth (ft)		6.71	
Conv. Total (cfs)	242686.3	Conv. (cfs)		242686.3	
Length Wtd. (ft)	115.00	Wetted Per. (ft)		334.68	
Min Ch El (ft)	1191.00	Shear (lb/sq ft)		1.40	
Alpha	1.00	Stream Power (lb/ft s)		11.79	
Frctn Loss (ft)		Cum Volume (acre-ft)		893.01	
C & E Loss (ft)		Cum SA (acres)		102.79	

Plan: Plan 01 River: RIVER-1 Reach:Reach-1 Riv Sta: 9.971001BR D Profile: PF#2

E.G. Elev (ft)	1198.65	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.58	Wt. n-Val.		0.035	
W.S. Elev (ft)	1197.07	Reach Len. (ft)	11.96	11.96	11.96
Crit W.S. (ft)	1195.98	Flow Area (sq ft)		1535.73	
E.G. Slope (ft/ft)	0.006940	Area (sq ft)		1535.73	
Q Total (cfs)	15500.00	Flow (cfs)		15500.00	
Top Width (ft)	266.52	Top Width (ft)		266.52	
Vel Total (ft/s)	10.09	Avg. Vel. (ft/s)		10.09	
Max Chl Dpth (ft)	6.60	Hydr. Depth (ft)		5.76	
Conv. Total (cfs)	186057.0	Conv. (cfs)		186057.0	
Length Wtd. (ft)	11.96	Wetted Per. (ft)		318.57	
Min Ch El (ft)	1190.47	Shear (lb/sq ft)		2.09	
Alpha	1.00	Stream Power (lb/ft s)		21.08	
Frctn Loss (ft)		Cum Volume (acre-ft)		888.56	
C & E Loss (ft)		Cum SA (acres)		102.08	

Plan: Plan 01 River: RIVER-1 Reach:Reach-1 Riv Sta: 9.958 Profile: PF#2

E.G. Elev (ft)	1198.58	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.54	Wt. n-Val.		0.035	
W.S. Elev (ft)	1197.05	Reach Len. (ft)	22.00	27.43	28.00
Crit W.S. (ft)		Flow Area (sq ft)		1558.73	
E.G. Slope (ft/ft)	0.005384	Area (sq ft)		1558.73	
Q Total (cfs)	15500.00	Flow (cfs)		15500.00	
Top Width (ft)	271.06	Top Width (ft)		271.06	
Vel Total (ft/s)	9.94	Avg. Vel. (ft/s)		9.94	
Max Chl Dpth (ft)	6.58	Hydr. Depth (ft)		5.75	
Conv. Total (cfs)	211232.6	Conv. (cfs)		211232.6	
Length Wtd. (ft)	27.43	Wetted Per. (ft)		273.32	
Min Ch El (ft)	1190.47	Shear (lb/sq ft)		1.92	
Alpha	1.00	Stream Power (lb/ft s)		19.06	
Frctn Loss (ft)	0.18	Cum Volume (acre-ft)		888.13	
C & E Loss (ft)	0.16	Cum SA (acres)		102.01	

Errors Warnings and Notes

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

Plan: Plan 01 River: RIVER-1 Reach:Reach-1 Riv Sta: 9.953 Profile: PF#2

E.G. Elev (ft)	1198.24	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.07	Wt. n-Val.		0.035	
W.S. Elev (ft)	1196.16	Reach Len. (ft)	183.24	183.24	183.24
Crit W.S. (ft)		Flow Area (sq ft)		1341.83	
E.G. Slope (ft/ft)	0.008417	Area (sq ft)		1341.83	
Q Total (cfs)	15500.00	Flow (cfs)		15500.00	
Top Width (ft)	260.51	Top Width (ft)		260.51	
Vel Total (ft/s)	11.55	Avg. Vel. (ft/s)		11.55	
Max Chl Dpth (ft)	6.42	Hydr. Depth (ft)		5.15	
Conv. Total (cfs)	168950.8	Conv. (cfs)		168950.8	
Length Wtd. (ft)	183.24	Wetted Per. (ft)		262.72	
Min Ch El (ft)	1189.74	Shear (lb/sq ft)		2.68	
Alpha	1.00	Stream Power (lb/ft s)		31.00	
Frctn Loss (ft)	1.74	Cum Volume (acre-ft)		887.22	
C & E Loss (ft)	0.07	Cum SA (acres)		101.84	

Errors Warnings and Notes

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

Plan: Plan 01 River: RIVER-1 Reach:Reach-1 Riv Sta: 9.908 Profile: PF#2

E.G. Elev (ft)	1196.42	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.31	Wt. n-Val.		0.035	
W.S. Elev (ft)	1194.10	Reach Len. (ft)	104.44	104.44	104.44
Crit W.S. (ft)	1194.10	Flow Area (sq ft)		1269.68	
E.G. Slope (ft/ft)	0.010859	Area (sq ft)		1269.68	
Q Total (cfs)	15500.00	Flow (cfs)		15500.00	
Top Width (ft)	274.51	Top Width (ft)		274.51	
Vel Total (ft/s)	12.21	Avg. Vel. (ft/s)		12.21	
Max Chl Dpth (ft)	5.23	Hydr. Depth (ft)		4.63	
Conv. Total (cfs)	148741.5	Conv. (cfs)		148741.5	
Length Wtd. (ft)	104.44	Wetted Per. (ft)		277.00	

Plan: Plan 01 River: RIVER-1 Reach:Reach-1 Riv Sta: 9.908 Profile: PF#2 (Continued)

Min Ch El (ft)	1188.87	Shear (lb/sq ft)		3.11	
Alpha	1.00	Stream Power (lb/ft s)		37.94	
Frctn Loss (ft)	1.12	Cum Volume (acre-ft)		881.72	
C & E Loss (ft)	0.07	Cum SA (acres)		100.71	

Errors Warnings and Notes

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

Plan: Plan 01 River: RIVER-1 Reach:Reach-1 Riv Sta: 9.889 Profile: PF#2

E.G. Elev (ft)	1194.66	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.44	Wt. n-Val.		0.035	
W.S. Elev (ft)	1191.22	Reach Len. (ft)	489.29	489.29	489.29
Crit W.S. (ft)	1191.94	Flow Area (sq ft)		1041.02	
E.G. Slope (ft/ft)	0.017418	Area (sq ft)		1041.02	
Q Total (cfs)	15500.00	Flow (cfs)		15500.00	
Top Width (ft)	237.70	Top Width (ft)		237.70	
Vel Total (ft/s)	14.89	Avg. Vel. (ft/s)		14.89	
Max Chl Dpth (ft)	5.76	Hydr. Depth (ft)		4.38	
Conv. Total (cfs)	117444.3	Conv. (cfs)		117444.3	
Length Wtd. (ft)	489.29	Wetted Per. (ft)		240.32	
Min Ch El (ft)	1185.46	Shear (lb/sq ft)		4.71	
Alpha	1.00	Stream Power (lb/ft s)		70.14	
Frctn Loss (ft)	1.43	Cum Volume (acre-ft)		878.95	
C & E Loss (ft)	0.33	Cum SA (acres)		100.10	

Errors Warnings and Notes

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.

Plan: Plan 01 River: RIVER-1 Reach:Reach-1 Riv Sta: 9.794 Profile: PF#2

E.G. Elev (ft)	1188.20	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.58	Wt. n-Val.		0.035	
W.S. Elev (ft)	1187.61	Reach Len. (ft)	554.00	554.00	554.00
Crit W.S. (ft)	1183.51	Flow Area (sq ft)		3103.11	
E.G. Slope (ft/ft)	0.001269	Area (sq ft)		3103.11	
Q Total (cfs)	19000.00	Flow (cfs)		19000.00	
Top Width (ft)	376.95	Top Width (ft)		376.95	
Vel Total (ft/s)	6.12	Avg. Vel. (ft/s)		6.12	
Max Chl Dpth (ft)	10.62	Hydr. Depth (ft)		8.23	
Conv. Total (cfs)	533292.3	Conv. (cfs)		533292.3	
Length Wtd. (ft)	554.00	Wetted Per. (ft)		381.01	
Min Ch El (ft)	1176.99	Shear (lb/sq ft)		0.65	
Alpha	1.00	Stream Power (lb/ft s)		3.95	
Frctn Loss (ft)	0.87	Cum Volume (acre-ft)		855.68	

Plan: Plan 01 River: RIVER-1 Reach:Reach-1 Riv Sta: 9.794 Profile: PF#2 (Continued)

C & E Loss (ft)	0.02	Cum SA (acres)		96.65	

Errors Warnings and Notes

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

Plan: Plan 01 River: RIVER-1 Reach:Reach-1 Riv Sta: 9.692 Profile: PF#2

		Element	Left OB	Channel	Right OB
E.G. Elev (ft)	1187.31				
Vel Head (ft)	0.77	Wt. n-Val.		0.035	
W.S. Elev (ft)	1186.54	Reach Len. (ft)	526.34	526.34	526.34
Crit W.S. (ft)		Flow Area (sq ft)		2701.19	
E.G. Slope (ft/ft)	0.001982	Area (sq ft)		2701.19	
Q Total (cfs)	19000.00	Flow (cfs)		19000.00	
Top Width (ft)	372.62	Top Width (ft)		372.62	
Vel Total (ft/s)	7.03	Avg. Vel. (ft/s)		7.03	
Max Chl Dpth (ft)	9.55	Hydr. Depth (ft)		7.25	
Conv. Total (cfs)	426829.8	Conv. (cfs)		426829.8	
Length Wtd. (ft)	526.34	Wetted Per. (ft)		376.18	
Min Ch El (ft)	1176.99	Shear (lb/sq ft)		0.89	
Alpha	1.00	Stream Power (lb/ft s)		6.25	
Frctn Loss (ft)	2.08	Cum Volume (acre-ft)		818.77	
C & E Loss (ft)	0.14	Cum SA (acres)		91.88	

Errors Warnings and Notes

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.

Plan: Plan 01 River: RIVER-1 Reach:Reach-1 Riv Sta: 9.592 Profile: PF#2

		Element	Left OB	Channel	Right OB
E.G. Elev (ft)	1185.09				
Vel Head (ft)	2.20	Wt. n-Val.		0.035	
W.S. Elev (ft)	1182.89	Reach Len. (ft)	557.60	557.60	557.60
Crit W.S. (ft)	1182.89	Flow Area (sq ft)		1594.68	
E.G. Slope (ft/ft)	0.011331	Area (sq ft)		1594.68	
Q Total (cfs)	19000.00	Flow (cfs)		19000.00	
Top Width (ft)	370.33	Top Width (ft)		370.33	
Vel Total (ft/s)	11.91	Avg. Vel. (ft/s)		11.91	
Max Chl Dpth (ft)	7.19	Hydr. Depth (ft)		4.31	
Conv. Total (cfs)	178495.8	Conv. (cfs)		178495.8	
Length Wtd. (ft)	557.60	Wetted Per. (ft)		372.50	
Min Ch El (ft)	1175.70	Shear (lb/sq ft)		3.03	
Alpha	1.00	Stream Power (lb/ft s)		36.08	
Frctn Loss (ft)	3.69	Cum Volume (acre-ft)		792.82	
C & E Loss (ft)	0.36	Cum SA (acres)		87.39	

Errors Warnings and Notes

Warning:	The energy equation could not be balanced within the specified number of iterations. The
	program selected the water surface that had the least amount of error between computed
	and assumed values.
Warning:	The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for
	additional cross sections.

Errors Warnings and Notes (Continued)

Warning:	The conveyance ratio (upstream 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.

Plan: Plan 01 River: RIVER-1 Reach:Reach-1 Riv Sta: 9.492 Profile: PF#2

		Element	Left OB	Channel	Right OB
E.G. Elev (ft)	1180.96				
Vel Head (ft)	1.00	Wt. n-Val.		0.035	
W.S. Elev (ft)	1179.96	Reach Len. (ft)	433.72	433.72	433.72
Crit W.S. (ft)	1178.68	Flow Area (sq ft)		2371.96	
E.G. Slope (ft/ft)	0.004328	Area (sq ft)		2371.96	
Q Total (cfs)	19000.00	Flow (cfs)		19000.00	
Top Width (ft)	486.20	Top Width (ft)		486.20	
Vel Total (ft/s)	8.01	Avg. Vel. (ft/s)		8.01	
Max Chl Dpth (ft)	6.19	Hydr. Depth (ft)		4.88	
Conv. Total (cfs)	288806.3	Conv. (cfs)		288806.3	
Length Wtd. (ft)	433.72	Wetted Per. (ft)		488.37	
Min Ch El (ft)	1173.77	Shear (lb/sq ft)		1.31	
Alpha	1.00	Stream Power (lb/ft s)		10.51	
Frctn Loss (ft)	2.19	Cum Volume (acre-ft)		767.43	
C & E Loss (ft)	0.03	Cum SA (acres)		81.91	

Errors Warnings and Notes

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

Plan: Plan 01 River: RIVER-1 Reach:Reach-1 Riv Sta: 9.367 Profile: PF#2

		Element	Left OB	Channel	Right OB
E.G. Elev (ft)	1178.75				
Vel Head (ft)	1.28	Wt. n-Val.		0.035	
W.S. Elev (ft)	1177.47	Reach Len. (ft)	459.27	459.27	459.27
Crit W.S. (ft)		Flow Area (sq ft)		2094.87	
E.G. Slope (ft/ft)	0.005936	Area (sq ft)		2094.87	
Q Total (cfs)	19000.00	Flow (cfs)		19000.00	
Top Width (ft)	452.44	Top Width (ft)		452.44	
Vel Total (ft/s)	9.07	Avg. Vel. (ft/s)		9.07	
Max Chl Dpth (ft)	6.14	Hydr. Depth (ft)		4.63	
Conv. Total (cfs)	246615.6	Conv. (cfs)		246615.6	
Length Wtd. (ft)	459.27	Wetted Per. (ft)		453.69	
Min Ch El (ft)	1171.33	Shear (lb/sq ft)		1.71	
Alpha	1.00	Stream Power (lb/ft s)		15.52	
Frctn Loss (ft)	2.24	Cum Volume (acre-ft)		745.19	
C & E Loss (ft)	0.10	Cum SA (acres)		77.24	

Errors Warnings and Notes

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

Plan: Plan 01 River: RIVER-1 Reach:Reach-1 Riv Sta: 9.318 Profile: PF#2

E.G. Elev (ft)	1176.41	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.94	Wt. n-Val.		0.035	
W.S. Elev (ft)	1175.46	Reach Len. (ft)	154.63	154.63	154.63
Crit W.S. (ft)		Flow Area (sq ft)		2438.68	
E.G. Slope (ft/ft)	0.004076	Area (sq ft)		2438.68	
Q Total (cfs)	19000.00	Flow (cfs)		19000.00	
Top Width (ft)	498.67	Top Width (ft)		498.67	
Vel Total (ft/s)	7.79	Avg. Vel. (ft/s)		7.79	
Max Chl Dpth (ft)	7.05	Hydr. Depth (ft)		4.89	
Conv. Total (cfs)	297617.8	Conv. (cfs)		297617.8	
Length Wtd. (ft)	154.63	Wetted Per. (ft)		500.37	
Min Ch El (ft)	1168.41	Shear (lb/sq ft)		1.24	
Alpha	1.00	Stream Power (lb/ft s)		9.66	
Frctn Loss (ft)	0.96	Cum Volume (acre-ft)		721.29	
C & E Loss (ft)	0.07	Cum SA (acres)		72.22	

Errors Warnings and Notes

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.

Plan: Plan 01 River: RIVER-1 Reach:Reach-1 Riv Sta: 9.289 Profile: PF#2

E.G. Elev (ft)	1175.37	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.68	Wt. n-Val.		0.035	
W.S. Elev (ft)	1173.69	Reach Len. (ft)	457.57	457.57	457.57
Crit W.S. (ft)	1173.58	Flow Area (sq ft)		1825.33	
E.G. Slope (ft/ft)	0.010650	Area (sq ft)		1825.33	
Q Total (cfs)	19000.00	Flow (cfs)		19000.00	
Top Width (ft)	497.13	Top Width (ft)		497.13	
Vel Total (ft/s)	10.41	Avg. Vel. (ft/s)		10.41	
Max Chl Dpth (ft)	5.76	Hydr. Depth (ft)		3.67	
Conv. Total (cfs)	184113.4	Conv. (cfs)		184113.4	
Length Wtd. (ft)	457.57	Wetted Per. (ft)		498.45	
Min Ch El (ft)	1167.93	Shear (lb/sq ft)		2.43	
Alpha	1.00	Stream Power (lb/ft s)		25.34	
Frctn Loss (ft)	1.72	Cum Volume (acre-ft)		713.72	
C & E Loss (ft)	0.32	Cum SA (acres)		70.46	

Errors Warnings and Notes

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.

Plan: Plan 01 River: RIVER-1 Reach:Reach-1 Riv Sta: 9.193 Profile: PF#2

E.G. Elev (ft)	1173.32	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.59	Wt. n-Val.		0.035	
W.S. Elev (ft)	1172.73	Reach Len. (ft)	391.34	391.34	391.34
Crit W.S. (ft)		Flow Area (sq ft)		3073.01	
E.G. Slope (ft/ft)	0.001906	Area (sq ft)		3073.01	
Q Total (cfs)	19000.00	Flow (cfs)		19000.00	
Top Width (ft)	501.58	Top Width (ft)		501.58	
Vel Total (ft/s)	6.18	Avg. Vel. (ft/s)		6.18	
Max Chl Dpth (ft)	8.26	Hydr. Depth (ft)		6.13	
Conv. Total (cfs)	435251.1	Conv. (cfs)		435251.1	
Length Wtd. (ft)	391.34	Wetted Per. (ft)		504.30	
Min Ch El (ft)	1164.47	Shear (lb/sq ft)		0.72	
Alpha	1.00	Stream Power (lb/ft s)		4.48	
Frctn Loss (ft)	0.61	Cum Volume (acre-ft)		688.00	
C & E Loss (ft)	0.03	Cum SA (acres)		65.21	

Plan: Plan 01 River: RIVER-1 Reach:Reach-1 Riv Sta: 9.129 Profile: PF#2

E.G. Elev (ft)	1172.68	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.50	Wt. n-Val.		0.035	
W.S. Elev (ft)	1172.19	Reach Len. (ft)	402.94	402.94	402.94
Crit W.S. (ft)		Flow Area (sq ft)		3354.74	
E.G. Slope (ft/ft)	0.001285	Area (sq ft)		3354.74	
Q Total (cfs)	19000.00	Flow (cfs)		19000.00	
Top Width (ft)	464.57	Top Width (ft)		464.57	
Vel Total (ft/s)	5.66	Avg. Vel. (ft/s)		5.66	
Max Chl Dpth (ft)	9.03	Hydr. Depth (ft)		7.22	
Conv. Total (cfs)	529933.9	Conv. (cfs)		529933.9	
Length Wtd. (ft)	402.94	Wetted Per. (ft)		467.42	
Min Ch El (ft)	1163.16	Shear (lb/sq ft)		0.58	
Alpha	1.00	Stream Power (lb/ft s)		3.26	
Frctn Loss (ft)	0.59	Cum Volume (acre-ft)		659.12	
C & E Loss (ft)	0.02	Cum SA (acres)		60.87	

Plan: Plan 01 River: RIVER-1 Reach:Reach-1 Riv Sta: 9.047 Profile: PF#2

E.G. Elev (ft)	1172.07	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.67	Wt. n-Val.		0.035	
W.S. Elev (ft)	1171.40	Reach Len. (ft)	290.48	290.48	290.48
Crit W.S. (ft)		Flow Area (sq ft)		2884.60	
E.G. Slope (ft/ft)	0.001709	Area (sq ft)		2884.60	
Q Total (cfs)	19000.00	Flow (cfs)		19000.00	
Top Width (ft)	393.61	Top Width (ft)		393.61	
Vel Total (ft/s)	6.59	Avg. Vel. (ft/s)		6.59	
Max Chl Dpth (ft)	9.75	Hydr. Depth (ft)		7.33	
Conv. Total (cfs)	459571.7	Conv. (cfs)		459571.7	
Length Wtd. (ft)	290.48	Wetted Per. (ft)		396.80	
Min Ch El (ft)	1161.65	Shear (lb/sq ft)		0.78	
Alpha	1.00	Stream Power (lb/ft s)		5.11	
Frctn Loss (ft)	0.56	Cum Volume (acre-ft)		630.26	
C & E Loss (ft)	0.02	Cum SA (acres)		56.90	

Plan: Plan 01 River: RIVER-1 Reach:Reach-1 Riv Sta: 8.994 Profile: PF#2

		Element	Left OB	Channel	Right OB
E.G. Elev (ft)	1171.49				
Vel Head (ft)	0.87	Wt. n-Val.		0.035	
W.S. Elev (ft)	1170.63	Reach Len. (ft)	90.73	90.73	90.73
Crit W.S. (ft)		Flow Area (sq ft)		2544.74	
E.G. Slope (ft/ft)	0.002182	Area (sq ft)		2544.74	
Q Total (cfs)	19000.00	Flow (cfs)		19000.00	
Top Width (ft)	343.80	Top Width (ft)		343.80	
Vel Total (ft/s)	7.47	Avg. Vel. (ft/s)		7.47	
Max Chl Dpth (ft)	8.97	Hydr. Depth (ft)		7.40	
Conv. Total (cfs)	406715.3	Conv. (cfs)		406715.3	
Length Wtd. (ft)	90.73	Wetted Per. (ft)		348.39	
Min Ch El (ft)	1161.66	Shear (lb/sq ft)		1.00	
Alpha	1.00	Stream Power (lb/ft s)		7.43	
Frctn Loss (ft)	0.24	Cum Volume (acre-ft)		612.16	
C & E Loss (ft)	0.03	Cum SA (acres)		54.44	

Plan: Plan 01 River: RIVER-1 Reach:Reach-1 Riv Sta: 8.977 Profile: PF#2

		Element	Left OB	Channel	Right OB
E.G. Elev (ft)	1171.23				
Vel Head (ft)	1.13	Wt. n-Val.		0.035	
W.S. Elev (ft)	1170.10	Reach Len. (ft)	210.76	210.76	210.76
Crit W.S. (ft)		Flow Area (sq ft)		2227.77	
E.G. Slope (ft/ft)	0.003180	Area (sq ft)		2227.77	
Q Total (cfs)	19000.00	Flow (cfs)		19000.00	
Top Width (ft)	327.14	Top Width (ft)		327.14	
Vel Total (ft/s)	8.53	Avg. Vel. (ft/s)		8.53	
Max Chl Dpth (ft)	8.79	Hydr. Depth (ft)		6.81	
Conv. Total (cfs)	336955.8	Conv. (cfs)		336955.8	
Length Wtd. (ft)	210.76	Wetted Per. (ft)		331.29	
Min Ch El (ft)	1161.31	Shear (lb/sq ft)		1.33	
Alpha	1.00	Stream Power (lb/ft s)		11.38	
Frctn Loss (ft)	0.70	Cum Volume (acre-ft)		607.19	
C & E Loss (ft)	0.01	Cum SA (acres)		53.75	

Plan: Plan 01 River: RIVER-1 Reach:Reach-1 Riv Sta: 8.936 Profile: PF#2

		Element	Left OB	Channel	Right OB
E.G. Elev (ft)	1170.52				
Vel Head (ft)	1.22	Wt. n-Val.		0.035	
W.S. Elev (ft)	1169.30	Reach Len. (ft)	289.44	289.44	289.44
Crit W.S. (ft)		Flow Area (sq ft)		2143.51	
E.G. Slope (ft/ft)	0.003521	Area (sq ft)		2143.51	
Q Total (cfs)	19000.00	Flow (cfs)		19000.00	
Top Width (ft)	321.39	Top Width (ft)		321.39	
Vel Total (ft/s)	8.86	Avg. Vel. (ft/s)		8.86	
Max Chl Dpth (ft)	9.35	Hydr. Depth (ft)		6.67	
Conv. Total (cfs)	320199.8	Conv. (cfs)		320199.8	
Length Wtd. (ft)	289.44	Wetted Per. (ft)		324.77	
Min Ch El (ft)	1159.95	Shear (lb/sq ft)		1.45	
Alpha	1.00	Stream Power (lb/ft s)		12.86	
Frctn Loss (ft)	1.21	Cum Volume (acre-ft)		596.62	
C & E Loss (ft)	0.03	Cum SA (acres)		52.18	

Errors Warnings and Notes

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

Plan: Plan 01 River: RIVER-1 Reach:Reach-1 Riv Sta: 8.883 Profile: PF#2

E.G. Elev (ft)	1169.28	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.55	Wt. n-Val.		0.035	
W.S. Elev (ft)	1167.72	Reach Len. (ft)	400.91	400.91	400.91
Crit W.S. (ft)		Flow Area (sq ft)		1898.94	
E.G. Slope (ft/ft)	0.005001	Area (sq ft)		1898.94	
Q Total (cfs)	19000.00	Flow (cfs)		19000.00	
Top Width (ft)	309.17	Top Width (ft)		309.17	
Vel Total (ft/s)	10.01	Avg. Vel. (ft/s)		10.01	
Max Chl Dpth (ft)	8.28	Hydr. Depth (ft)		6.14	
Conv. Total (cfs)	268673.1	Conv. (cfs)		268673.1	
Length Wtd. (ft)	400.91	Wetted Per. (ft)		312.13	
Min Ch El (ft)	1159.44	Shear (lb/sq ft)		1.90	
Alpha	1.00	Stream Power (lb/ft s)		19.01	
Frctn Loss (ft)	1.35	Cum Volume (acre-ft)		583.19	
C & E Loss (ft)	0.16	Cum SA (acres)		50.08	

Errors Warnings and Notes

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.

Plan: Plan 01 River: RIVER-1 Reach:Reach-1 Riv Sta: 8.807 Profile: PF#2

E.G. Elev (ft)	1167.76	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.01	Wt. n-Val.		0.035	
W.S. Elev (ft)	1166.75	Reach Len. (ft)	397.26	397.26	397.26
Crit W.S. (ft)		Flow Area (sq ft)		2355.84	
E.G. Slope (ft/ft)	0.002430	Area (sq ft)		2355.84	
Q Total (cfs)	19000.00	Flow (cfs)		19000.00	
Top Width (ft)	307.76	Top Width (ft)		307.76	
Vel Total (ft/s)	8.07	Avg. Vel. (ft/s)		8.07	
Max Chl Dpth (ft)	8.78	Hydr. Depth (ft)		7.65	
Conv. Total (cfs)	385451.5	Conv. (cfs)		385451.5	
Length Wtd. (ft)	397.26	Wetted Per. (ft)		311.39	
Min Ch El (ft)	1157.97	Shear (lb/sq ft)		1.15	
Alpha	1.00	Stream Power (lb/ft s)		9.26	
Frctn Loss (ft)	0.27	Cum Volume (acre-ft)		563.61	
C & E Loss (ft)	0.21	Cum SA (acres)		47.24	

Errors Warnings and Notes

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.

Plan: Plan 01 River: RIVER-1 Reach:Reach-1 Riv Sta: 8.731 Profile: PF#2

E.G. Elev (ft)	1167.29	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.32	Wt. n-Val.		0.035	
W.S. Elev (ft)	1166.96	Reach Len. (ft)	399.90	399.90	399.90
Crit W.S. (ft)		Flow Area (sq ft)		8985.40	
E.G. Slope (ft/ft)	0.000452	Area (sq ft)		8985.40	

Plan: Plan 01 River: RIVER-1 Reach:Reach-1 Riv Sta: 8.731 Profile: PF#2 (Continued)

Q Total (cfs)	41000.00	Flow (cfs)		41000.00	
Top Width (ft)	785.22	Top Width (ft)		785.22	
Vel Total (ft/s)	4.56	Avg. Vel. (ft/s)		4.56	
Max Chl Dpth (ft)	13.36	Hydr. Depth (ft)		11.44	
Conv. Total (cfs)	1928056.8	Conv. (cfs)		1928056.8	
Length Wtd. (ft)	399.90	Wetted Per. (ft)		790.78	
Min Ch El (ft)	1153.60	Shear (lb/sq ft)		0.32	
Alpha	1.00	Stream Power (lb/ft s)		1.46	
Frctn Loss (ft)	0.25	Cum Volume (acre-ft)		511.89	
C & E Loss (ft)	0.03	Cum SA (acres)		42.26	

Errors Warnings and Notes

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

Plan: Plan 01 River: RIVER-1 Reach:Reach-1 Riv Sta: 8.655 Profile: PF#2

E.G. Elev (ft)	1167.01	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.64	Wt. n-Val.		0.035	
W.S. Elev (ft)	1166.37	Reach Len. (ft)	449.60	449.60	449.60
Crit W.S. (ft)		Flow Area (sq ft)		6386.12	
E.G. Slope (ft/ft)	0.000887	Area (sq ft)		6386.12	
Q Total (cfs)	41000.00	Flow (cfs)		41000.00	
Top Width (ft)	553.62	Top Width (ft)		553.62	
Vel Total (ft/s)	6.42	Avg. Vel. (ft/s)		6.42	
Max Chl Dpth (ft)	13.82	Hydr. Depth (ft)		11.54	
Conv. Total (cfs)	1376356.9	Conv. (cfs)		1376356.9	
Length Wtd. (ft)	449.60	Wetted Per. (ft)		558.32	
Min Ch El (ft)	1152.55	Shear (lb/sq ft)		0.63	
Alpha	1.00	Stream Power (lb/ft s)		4.07	
Frctn Loss (ft)	0.93	Cum Volume (acre-ft)		441.33	
C & E Loss (ft)	0.71	Cum SA (acres)		36.11	

Errors Warnings and Notes

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.

Plan: Plan 01 River: RIVER-1 Reach:Reach-1 Riv Sta: 8.548 Profile: PF#2

E.G. Elev (ft)	1165.37	Element	Left OB	Channel	Right OB
Vel Head (ft)	4.21	Wt. n-Val.		0.035	
W.S. Elev (ft)	1161.16	Reach Len. (ft)	51.18	51.18	51.18
Crit W.S. (ft)	1161.16	Flow Area (sq ft)		2490.85	
E.G. Slope (ft/ft)	0.009136	Area (sq ft)		2490.85	
Q Total (cfs)	41000.00	Flow (cfs)		41000.00	
Top Width (ft)	297.80	Top Width (ft)		297.80	
Vel Total (ft/s)	16.46	Avg. Vel. (ft/s)		16.46	
Max Chl Dpth (ft)	11.12	Hydr. Depth (ft)		8.36	
Conv. Total (cfs)	428957.8	Conv. (cfs)		428957.8	
Length Wtd. (ft)	51.18	Wetted Per. (ft)		304.89	
Min Ch El (ft)	1150.04	Shear (lb/sq ft)		4.66	

Plan: Plan 01 River: RIVER-1 Reach:Reach-1 Riv Sta: 8.548 Profile: PF#2 (Continued)

Alpha	1.00	Stream Power (lb/ft s)		76.70	
Frctn Loss (ft)	0.10	Cum Volume (acre-ft)		395.52	
C & E Loss (ft)	0.97	Cum SA (acres)		31.72	

Errors Warnings and Notes

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.

Plan: Plan 01 River: RIVER-1 Reach:Reach-1 Riv Sta: 8.538 Profile: PF#2

E.G. Elev (ft)	1162.28	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.99	Wt. n-Val.		0.035	
W.S. Elev (ft)	1161.29	Reach Len. (ft)	114.85	114.85	114.85
Crit W.S. (ft)	1151.60	Flow Area (sq ft)		5137.21	
E.G. Slope (ft/ft)	0.000823	Area (sq ft)		5137.21	
Q Total (cfs)	41000.00	Flow (cfs)		41000.00	
Top Width (ft)	292.15	Top Width (ft)		292.15	
Vel Total (ft/s)	7.98	Avg. Vel. (ft/s)		7.98	
Max Chl Dpth (ft)	19.17	Hydr. Depth (ft)		17.58	
Conv. Total (cfs)	1429004.0	Conv. (cfs)		1429004.0	
Length Wtd. (ft)	114.85	Wetted Per. (ft)		306.31	
Min Ch El (ft)	1142.12	Shear (lb/sq ft)		0.86	
Alpha	1.00	Stream Power (lb/ft s)		6.88	
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)		391.04	
C & E Loss (ft)	0.02	Cum SA (acres)		31.37	

Errors Warnings and Notes

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

Plan: Plan 01 River: RIVER-1 Reach:Reach-1 Riv Sta: 8.516 Profile: PF#2

E.G. Elev (ft)	1162.18	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.94	Wt. n-Val.		0.035	
W.S. Elev (ft)	1161.24	Reach Len. (ft)	280.00	287.90	305.00
Crit W.S. (ft)		Flow Area (sq ft)		5272.39	
E.G. Slope (ft/ft)	0.000766	Area (sq ft)		5272.39	
Q Total (cfs)	41000.00	Flow (cfs)		41000.00	
Top Width (ft)	296.32	Top Width (ft)		296.32	
Vel Total (ft/s)	7.78	Avg. Vel. (ft/s)		7.78	
Max Chl Dpth (ft)	19.67	Hydr. Depth (ft)		17.79	
Conv. Total (cfs)	1481428.9	Conv. (cfs)		1481428.9	
Length Wtd. (ft)	287.90	Wetted Per. (ft)		309.66	
Min Ch El (ft)	1141.57	Shear (lb/sq ft)		0.81	
Alpha	1.00	Stream Power (lb/ft s)		6.33	
Frctn Loss (ft)	0.33	Cum Volume (acre-ft)		377.32	
C & E Loss (ft)	0.06	Cum SA (acres)		30.60	

Errors Warnings and Notes

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

Errors Warnings and Notes (Continued)

	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.

Plan: Plan 01 River: RIVER-1 Reach:Reach-1 Riv Sta: 8.457 Profile: PF#2

E.G. Elev (ft)	1161.78	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.58	Wt. n-Val.		0.035	
W.S. Elev (ft)	1160.20	Reach Len. (ft)	365.00	361.88	355.00
Crit W.S. (ft)		Flow Area (sq ft)		4059.89	
E.G. Slope (ft/ft)	0.001889	Area (sq ft)		4059.89	
Q Total (cfs)	41000.00	Flow (cfs)		41000.00	
Top Width (ft)	313.65	Top Width (ft)		313.65	
Vel Total (ft/s)	10.10	Avg. Vel. (ft/s)		10.10	
Max Chl Dpth (ft)	19.10	Hydr. Depth (ft)		12.94	
Conv. Total (cfs)	943344.8	Conv. (cfs)		943344.8	
Length Wtd. (ft)	361.88	Wetted Per. (ft)		317.08	
Min Ch El (ft)	1141.10	Shear (lb/sq ft)		1.51	
Alpha	1.00	Stream Power (lb/ft s)		15.25	
Frctn Loss (ft)	0.72	Cum Volume (acre-ft)		346.48	
C & E Loss (ft)	0.01	Cum SA (acres)		28.58	

Plan: Plan 01 River: RIVER-1 Reach:Reach-1 Riv Sta: 8.39 Profile: PF#2

E.G. Elev (ft)	1161.05	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.70	Wt. n-Val.		0.035	
W.S. Elev (ft)	1159.35	Reach Len. (ft)	310.00	308.23	305.00
Crit W.S. (ft)		Flow Area (sq ft)		3917.83	
E.G. Slope (ft/ft)	0.002116	Area (sq ft)		3917.83	
Q Total (cfs)	41000.00	Flow (cfs)		41000.00	
Top Width (ft)	312.54	Top Width (ft)		312.54	
Vel Total (ft/s)	10.46	Avg. Vel. (ft/s)		10.46	
Max Chl Dpth (ft)	18.43	Hydr. Depth (ft)		12.54	
Conv. Total (cfs)	891384.4	Conv. (cfs)		891384.4	
Length Wtd. (ft)	308.23	Wetted Per. (ft)		315.80	
Min Ch El (ft)	1140.92	Shear (lb/sq ft)		1.64	
Alpha	1.00	Stream Power (lb/ft s)		17.15	
Frctn Loss (ft)	0.67	Cum Volume (acre-ft)		313.34	
C & E Loss (ft)	0.00	Cum SA (acres)		25.98	

Plan: Plan 01 River: RIVER-1 Reach:Reach-1 Riv Sta: 8.33 Profile: PF#2

E.G. Elev (ft)	1160.38	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.72	Wt. n-Val.		0.035	
W.S. Elev (ft)	1158.66	Reach Len. (ft)	555.00	565.26	545.00
Crit W.S. (ft)		Flow Area (sq ft)		3897.48	
E.G. Slope (ft/ft)	0.002210	Area (sq ft)		3897.48	
Q Total (cfs)	41000.00	Flow (cfs)		41000.00	
Top Width (ft)	318.94	Top Width (ft)		318.94	
Vel Total (ft/s)	10.52	Avg. Vel. (ft/s)		10.52	
Max Chl Dpth (ft)	18.07	Hydr. Depth (ft)		12.22	
Conv. Total (cfs)	872181.1	Conv. (cfs)		872181.1	
Length Wtd. (ft)	565.26	Wetted Per. (ft)		322.06	
Min Ch El (ft)	1140.59	Shear (lb/sq ft)		1.67	
Alpha	1.00	Stream Power (lb/ft s)		17.56	
Frctn Loss (ft)	1.22	Cum Volume (acre-ft)		285.69	

Plan: Plan 01 River: RIVER-1 Reach:Reach-1 Riv Sta: 8.33 Profile: PF#2 (Continued)

C & E Loss (ft)	0.03	Cum SA (acres)		23.75	

Errors Warnings and Notes

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

Plan: Plan 01 River: RIVER-1 Reach:Reach-1 Riv Sta: 8.22 Profile: PF#2

E.G. Elev (ft)	1159.13	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.63	Wt. n-Val.		0.035	
W.S. Elev (ft)	1157.50	Reach Len. (ft)	485.00	512.82	565.00
Crit W.S. (ft)		Flow Area (sq ft)		4004.47	
E.G. Slope (ft/ft)	0.002125	Area (sq ft)		4004.47	
Q Total (cfs)	41000.00	Flow (cfs)		41000.00	
Top Width (ft)	331.29	Top Width (ft)		331.29	
Vel Total (ft/s)	10.24	Avg. Vel. (ft/s)		10.24	
Max Chl Dpth (ft)	18.72	Hydr. Depth (ft)		12.09	
Conv. Total (cfs)	889481.4	Conv. (cfs)		889481.4	
Length Wtd. (ft)	512.82	Wetted Per. (ft)		334.62	
Min Ch El (ft)	1138.78	Shear (lb/sq ft)		1.59	
Alpha	1.00	Stream Power (lb/ft s)		16.25	
Frctn Loss (ft)	1.13	Cum Volume (acre-ft)		234.42	
C & E Loss (ft)	0.01	Cum SA (acres)		19.53	

Errors Warnings and Notes

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

Plan: Plan 01 River: RIVER-1 Reach:Reach-1 Riv Sta: 8.12 Profile: PF#2

E.G. Elev (ft)	1157.99	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.71	Wt. n-Val.		0.035	
W.S. Elev (ft)	1156.28	Reach Len. (ft)	365.00	370.41	370.00
Crit W.S. (ft)		Flow Area (sq ft)		3904.58	
E.G. Slope (ft/ft)	0.002275	Area (sq ft)		3904.58	
Q Total (cfs)	41000.00	Flow (cfs)		41000.00	
Top Width (ft)	326.23	Top Width (ft)		326.23	
Vel Total (ft/s)	10.50	Avg. Vel. (ft/s)		10.50	
Max Chl Dpth (ft)	18.31	Hydr. Depth (ft)		11.97	
Conv. Total (cfs)	859614.4	Conv. (cfs)		859614.4	
Length Wtd. (ft)	370.41	Wetted Per. (ft)		330.65	
Min Ch El (ft)	1137.97	Shear (lb/sq ft)		1.68	
Alpha	1.00	Stream Power (lb/ft s)		17.61	
Frctn Loss (ft)	0.80	Cum Volume (acre-ft)		187.86	
C & E Loss (ft)	0.04	Cum SA (acres)		15.66	

Plan: Plan 01 River: RIVER-1 Reach:Reach-1 Riv Sta: 8.052 Profile: PF#2

E.G. Elev (ft)	1157.15	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.58	Wt. n-Val.		0.035	
W.S. Elev (ft)	1155.57	Reach Len. (ft)	225.00	236.58	255.00
Crit W.S. (ft)		Flow Area (sq ft)		4068.21	
E.G. Slope (ft/ft)	0.002069	Area (sq ft)		4068.21	
Q Total (cfs)	41000.00	Flow (cfs)		41000.00	
Top Width (ft)	337.28	Top Width (ft)		337.28	
Vel Total (ft/s)	10.08	Avg. Vel. (ft/s)		10.08	

Plan: Plan 01 River: RIVER-1 Reach:Reach-1 Riv Sta: 8.052 Profile: PF#2 (Continued)

Max Chl Dpth (ft)	19.15	Hydr. Depth (ft)		12.06	
Conv. Total (cfs)	901399.6	Conv. (cfs)		901399.6	
Length Wtd. (ft)	236.58	Wetted Per. (ft)		341.21	
Min Ch El (ft)	1136.42	Shear (lb/sq ft)		1.54	
Alpha	1.00	Stream Power (lb/ft s)		15.52	
Frctn Loss (ft)	0.50	Cum Volume (acre-ft)		153.97	
C & E Loss (ft)	0.00	Cum SA (acres)		12.84	

Plan: Plan 01 River: RIVER-1 Reach:Reach-1 Riv Sta: 8.006 Profile: PF#2

E.G. Elev (ft)	1156.65	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.61	Wt. n-Val.		0.035	
W.S. Elev (ft)	1155.05	Reach Len. (ft)	445.00	463.28	505.00
Crit W.S. (ft)		Flow Area (sq ft)		4032.16	
E.G. Slope (ft/ft)	0.002122	Area (sq ft)		4032.16	
Q Total (cfs)	41000.00	Flow (cfs)		41000.00	
Top Width (ft)	336.50	Top Width (ft)		336.50	
Vel Total (ft/s)	10.17	Avg. Vel. (ft/s)		10.17	
Max Chl Dpth (ft)	18.94	Hydr. Depth (ft)		11.98	
Conv. Total (cfs)	890094.9	Conv. (cfs)		890094.9	
Length Wtd. (ft)	463.28	Wetted Per. (ft)		340.08	
Min Ch El (ft)	1136.11	Shear (lb/sq ft)		1.57	
Alpha	1.00	Stream Power (lb/ft s)		15.97	
Frctn Loss (ft)	1.00	Cum Volume (acre-ft)		131.97	
C & E Loss (ft)	0.00	Cum SA (acres)		11.01	

Plan: Plan 01 River: RIVER-1 Reach:Reach-1 Riv Sta: 7.92 Profile: PF#2

E.G. Elev (ft)	1155.66	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.63	Wt. n-Val.		0.035	
W.S. Elev (ft)	1154.03	Reach Len. (ft)	615.00	631.37	655.00
Crit W.S. (ft)		Flow Area (sq ft)		4006.66	
E.G. Slope (ft/ft)	0.002179	Area (sq ft)		4006.66	
Q Total (cfs)	41000.00	Flow (cfs)		41000.00	
Top Width (ft)	337.85	Top Width (ft)		337.85	
Vel Total (ft/s)	10.23	Avg. Vel. (ft/s)		10.23	
Max Chl Dpth (ft)	18.29	Hydr. Depth (ft)		11.86	
Conv. Total (cfs)	878286.5	Conv. (cfs)		878286.5	
Length Wtd. (ft)	631.37	Wetted Per. (ft)		341.50	
Min Ch El (ft)	1135.74	Shear (lb/sq ft)		1.60	
Alpha	1.00	Stream Power (lb/ft s)		16.33	
Frctn Loss (ft)	1.43	Cum Volume (acre-ft)		89.22	
C & E Loss (ft)	0.01	Cum SA (acres)		7.42	

Errors Warnings and Notes

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

Plan: Plan 01 River: RIVER-1 Reach:Reach-1 Riv Sta: 7.8 Profile: PF#2

E.G. Elev (ft)	1154.22	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.73	Wt. n-Val.		0.035	
W.S. Elev (ft)	1152.49	Reach Len. (ft)	230.00	259.16	355.00
Crit W.S. (ft)		Flow Area (sq ft)		3886.59	
E.G. Slope (ft/ft)	0.002352	Area (sq ft)		3886.59	
Q Total (cfs)	41000.00	Flow (cfs)		41000.00	

Plan: Plan 01 River: RIVER-1 Reach:Reach-1 Riv Sta: 7.8 Profile: PF#2 (Continued)

Top Width (ft)	332.21	Top Width (ft)		332.21	
Vel Total (ft/s)	10.55	Avg. Vel. (ft/s)		10.55	
Max Chl Dpth (ft)	16.84	Hydr. Depth (ft)		11.70	
Conv. Total (cfs)	845419.9	Conv. (cfs)		845419.9	
Length Wtd. (ft)	259.16	Wetted Per. (ft)		335.12	
Min Ch El (ft)	1135.65	Shear (lb/sq ft)		1.70	
Alpha	1.00	Stream Power (lb/ft s)		17.96	
Frctn Loss (ft)	0.60	Cum Volume (acre-ft)		32.02	
C & E Loss (ft)	0.07	Cum SA (acres)		2.56	

Plan: Plan 01 River: RIVER-1 Reach:Reach-1 Riv Sta: 7.751 Profile: PF#2

		Element	Left OB	Channel	Right OB
E.G. Elev (ft)	1153.55				
Vel Head (ft)	1.96	Wt. n-Val.		0.035	
W.S. Elev (ft)	1151.60	Reach Len. (ft)	10.00	10.00	10.00
Crit W.S. (ft)	1146.57	Flow Area (sq ft)		3652.64	
E.G. Slope (ft/ft)	0.002248	Area (sq ft)		3652.64	
Q Total (cfs)	41000.00	Flow (cfs)		41000.00	
Top Width (ft)	270.42	Top Width (ft)		270.42	
Vel Total (ft/s)	11.22	Avg. Vel. (ft/s)		11.22	
Max Chl Dpth (ft)	16.30	Hydr. Depth (ft)		13.51	
Conv. Total (cfs)	864733.9	Conv. (cfs)		864733.9	
Length Wtd. (ft)	10.00	Wetted Per. (ft)		277.39	
Min Ch El (ft)	1135.30	Shear (lb/sq ft)		1.85	
Alpha	1.00	Stream Power (lb/ft s)		20.74	
Frctn Loss (ft)		Cum Volume (acre-ft)		9.59	
C & E Loss (ft)		Cum SA (acres)		0.77	

Plan: Plan 01 River: RIVER-1 Reach:Reach-1 Riv Sta: 7.7395 BR U Profile: PF#2

		Element	Left OB	Channel	Right OB
E.G. Elev (ft)	1153.38				
Vel Head (ft)	2.28	Wt. n-Val.		0.035	
W.S. Elev (ft)	1151.10	Reach Len. (ft)	89.00	89.00	89.00
Crit W.S. (ft)	1146.86	Flow Area (sq ft)		3383.19	
E.G. Slope (ft/ft)	0.004053	Area (sq ft)		3383.19	
Q Total (cfs)	41000.00	Flow (cfs)		41000.00	
Top Width (ft)	259.55	Top Width (ft)		259.55	
Vel Total (ft/s)	12.12	Avg. Vel. (ft/s)		12.12	
Max Chl Dpth (ft)	15.80	Hydr. Depth (ft)		13.03	
Conv. Total (cfs)	644010.8	Conv. (cfs)		644010.8	
Length Wtd. (ft)	89.00	Wetted Per. (ft)		356.34	
Min Ch El (ft)	1135.30	Shear (lb/sq ft)		2.40	
Alpha	1.00	Stream Power (lb/ft s)		29.11	
Frctn Loss (ft)		Cum Volume (acre-ft)		8.78	
C & E Loss (ft)		Cum SA (acres)		0.71	

Plan: Plan 01 River: RIVER-1 Reach:Reach-1 Riv Sta: 7.7395 BR D Profile: PF#2

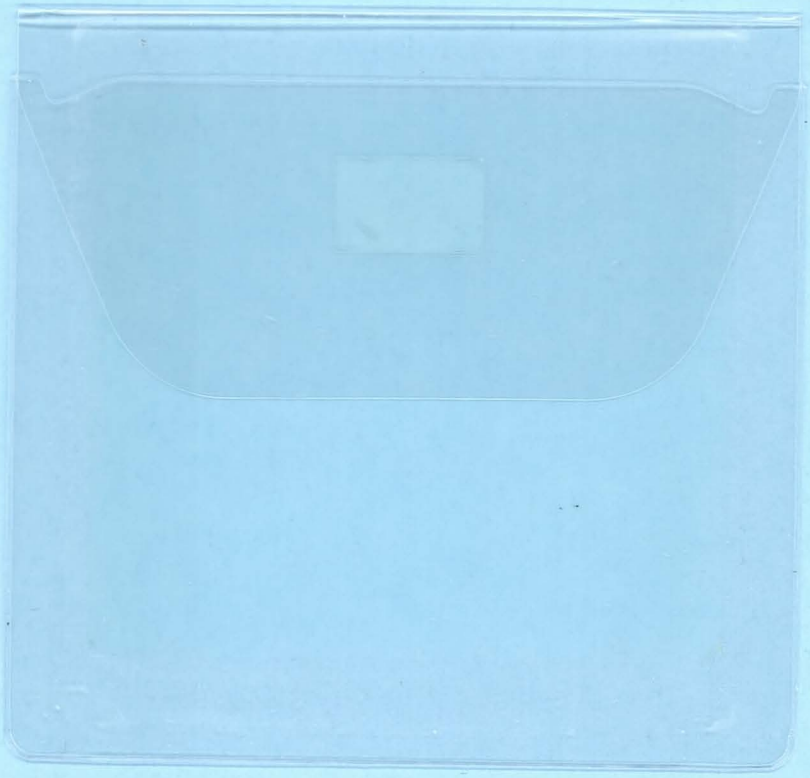
		Element	Left OB	Channel	Right OB
E.G. Elev (ft)	1152.59				
Vel Head (ft)	2.23	Wt. n-Val.		0.035	
W.S. Elev (ft)	1150.36	Reach Len. (ft)	22.70	22.70	22.70
Crit W.S. (ft)	1146.53	Flow Area (sq ft)		3423.42	
E.G. Slope (ft/ft)	0.004207	Area (sq ft)		3423.42	
Q Total (cfs)	41000.00	Flow (cfs)		41000.00	
Top Width (ft)	286.67	Top Width (ft)		286.67	
Vel Total (ft/s)	11.98	Avg. Vel. (ft/s)		11.98	

Plan: Plan 01 River: RIVER-1 Reach:Reach-1 Riv Sta: 7.7395 BR D Profile: PF#2 (Continued)

Max Chl Dpth (ft)	14.96	Hydr. Depth (ft)		11.94	
Conv. Total (cfs)	632082.4	Conv. (cfs)		632082.4	
Length Wtd. (ft)	22.70	Wetted Per. (ft)		377.47	
Min Ch El (ft)	1135.40	Shear (lb/sq ft)		2.38	
Alpha	1.00	Stream Power (lb/ft s)		28.53	
Frctn Loss (ft)		Cum Volume (acre-ft)		1.83	
C & E Loss (ft)		Cum SA (acres)		0.15	

Plan: Plan 01 River: RIVER-1 Reach:Reach-1 Riv Sta: 7.728 Profile: PF#2

E.G. Elev (ft)	1152.52	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.02	Wt. n-Val.		0.035	
W.S. Elev (ft)	1150.50	Reach Len. (ft)			
Crit W.S. (ft)	1146.25	Flow Area (sq ft)		3593.64	
E.G. Slope (ft/ft)	0.002645	Area (sq ft)		3593.64	
Q Total (cfs)	41000.00	Flow (cfs)		41000.00	
Top Width (ft)	296.66	Top Width (ft)		296.66	
Vel Total (ft/s)	11.41	Avg. Vel. (ft/s)		11.41	
Max Chl Dpth (ft)	15.10	Hydr. Depth (ft)		12.11	
Conv. Total (cfs)	797187.3	Conv. (cfs)		797187.3	
Length Wtd. (ft)		Wetted Per. (ft)		300.88	
Min Ch El (ft)	1135.40	Shear (lb/sq ft)		1.97	
Alpha	1.00	Stream Power (lb/ft s)		22.50	
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			



APPENDIX B

HEC-RAS INPUT FILES ON DISK