TOPOGRAPHIC MAPPING AND FLOODPLAIN DELINEATION STUDY FOR TRIBUTARIES TO SKUNK CREEK

FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY
Contract 98-22

TECHNICAL DATA NOTEBOOK

April 2001

Tetra Tech, Inc./Simons, Li & Associates, Inc.

TOPOGRAPHIC MAPPING AND FLOODPLAIN DELINEATION STUDY FOR TRIBUTARIES TO SKUNK CREEK

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
FCD CONTRACT NO. 98-22
SLA Project No. PAZ-MC-18

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TECHNICAL DATA NOTEBOOK

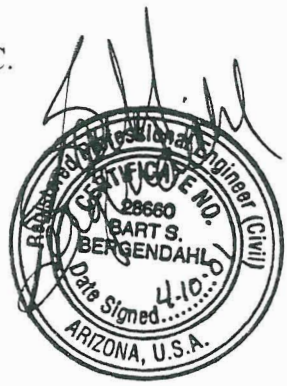
Prepared for:

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
2801 West Durango Street
Phoenix, AZ 85009

Prepared by:

TETRA TECH/SIMONS, LI & ASSOCIATES, INC.
501 North 44th Street, Suite 125
Phoenix, Arizona 85008
(602) 629-1100

APRIL 2001



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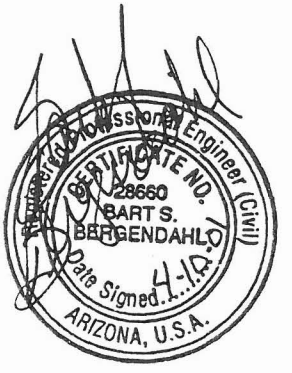

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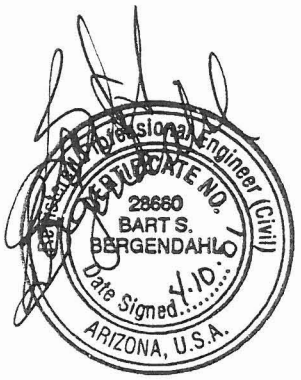


TOPOGRAPHIC MAPPING AND FLOODPLAIN DELINEATION STUDY FOR TRIBUTARIES TO SKUNK CREEK FCD CONTRACT NO. 98-22

TECHNICAL DATA NOTEBOOK

SECTION 1: INTRODUCTION

This Technical Data Notebook (TDN) documents the hydraulic analysis conducted for the initial floodplain and floodway delineation study of five tributaries (6B, 6C, 10A, 10B, & 12) for the upper reaches of Skunk Creek in Maricopa County, Arizona. No previous floodplain delineation studies have been completed on these tributaries. Floodplain delineation studies on the main stem of Skunk Creek near the project location have been completed by Montgomery Watson in 1997 and Harris-Toup Associates in 1978. This TDN has been prepared in the initial floodplain delineation study format as prescribed by the Arizona Department of Water Resources (ADWR) and the Federal Emergency Management Agency (FEMA).

The study was completed under the authority of the Flood Control District of Maricopa County (FCD) under Contract No. 98-22 in May 2000. Michael Duncan was the FCD Project Manager.

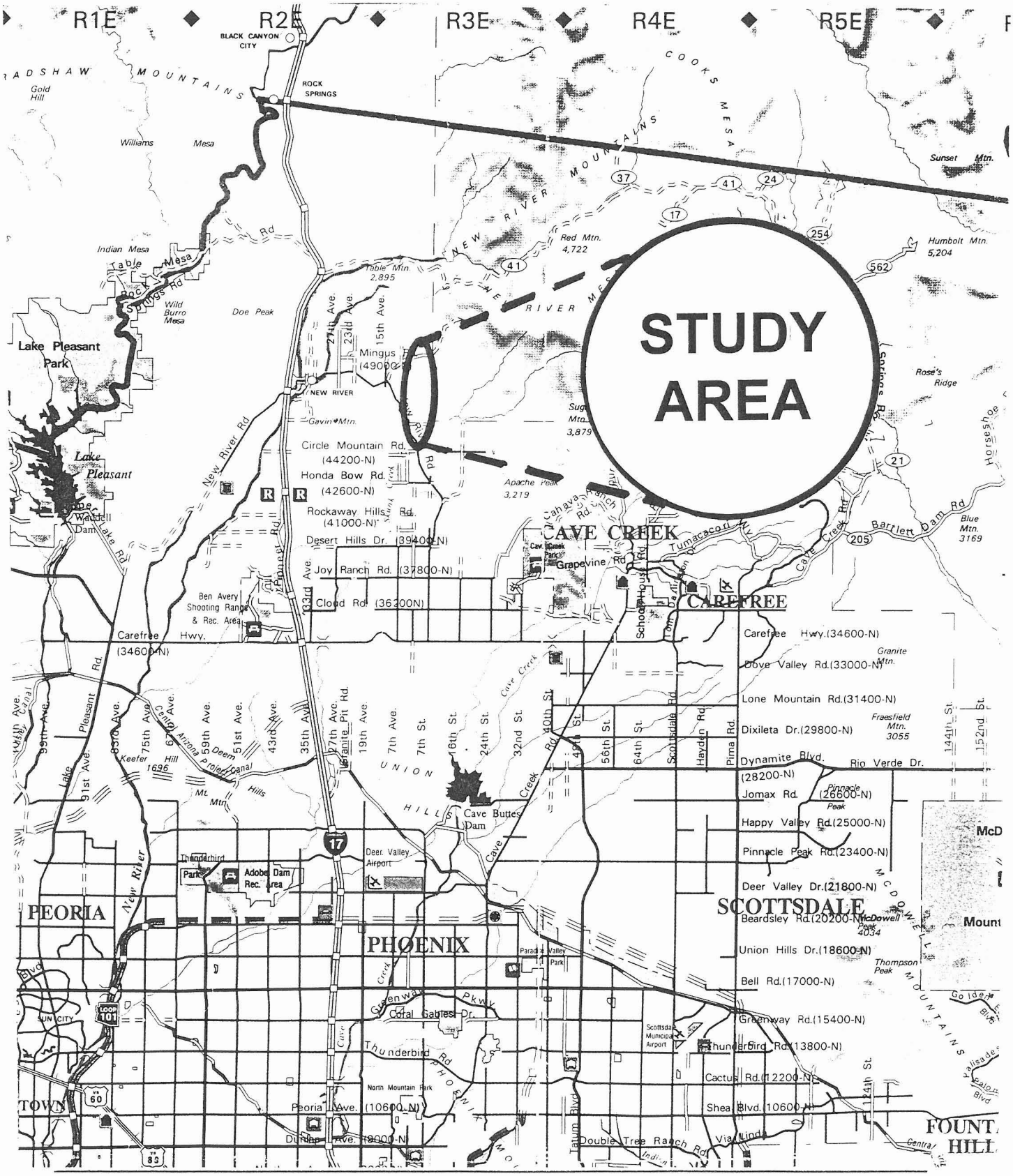
Skunk Creek originates in north central Maricopa County, Arizona, and flows southwesterly until its eventual confluence with the New River near Thunderbird Road and 83rd Avenue in Peoria, Arizona. The study includes five tributaries, 6B, 6C, 10A, 10B, and 12, along the main stem of Skunk Creek between Fig Springs Road to the north and Circle Mountain Road to the south. The tributaries are located in Townships 6N and 7N, Range 3E, G&SRBM, in Maricopa County, Arizona (Figure 1). The study limit for each tributary is from the tributaries' confluence with the main stem of Skunk Creek to approximately the Tonto National Forest boundary.

The study area is characterized by Sonoran desert shrubs, trees, and cacti of medium, uniform density. A relatively higher density vegetation is found along the limits of the alluvial washes and consists of palo verde, creosote bush, bush muhly, and mesquite. The constituents of the soils in the study area consist of alluvial deposits of shallow sands, gravel, and cobble, with some boulders and rock outcrops on moderately steep to steep slopes.

The hydrology for this report was provided by the FCD. An n-value report was completed and approved according to FCD standards to determine the roughness coefficients in the study area. The USACE program HEC-RAS was used to delineate the floodplain and floodway boundaries for the tributaries.

Floodplain/floodway work maps were prepared from the HEC-RAS model results. In most reaches, the floodway is coincident with the narrow floodplain. All culvert structures are overtopped significantly during the 100-year event. Near the confluence of Tributary 6B and Skunk Creek, flow breaks out of the tributary and escapes to the Skunk Creek main stem floodplain.

Figure 1: Study Area Location Map



SECTION 2: ADWR AND FEMA FORMS

2.1 Study Documentation Abstract

STUDY DOCUMENTATION ABSTRACT		INITIAL STUDY	RESTUDY	LOMR	OTHER
Tributaries to Skunk Creek		X			
SECTION 1: GENERAL INFORMATION					
1A	COMMUNITY	Unincorporated Maricopa County			
1B	COMMUNITY NUMBER	040037			
1C	COUNTY	Maricopa			
1D	STATE	Arizona			
1E	DATE STUDY ACCEPTED				
1F	STUDY CONTRACTOR CONTACT(S) ADDRESS PHONE	Tetra Tech/Simons, Li & Associates, Inc. Bart S. Bergendahl, P.E. 501 North 44th Street, Suite 125 Phoenix, AZ 85008 (602) 629-1100			
1G	TECH REVIEWER (FEMA) PHONE				
1H	FEMA REGIONAL REVIEWER PHONE				
1I	STATE REVIEWER PHONE	Arizona Department of Water Resources (602) 417-2400			
1J	LOCAL REVIEWER PHONE	Flood Control District of Maricopa County Michael Duncan 602-506-4732			
1K	RIVER OR STREAM NAME	Skunk Creek Tributaries 6B, 6C, 10A, 10B, 12			
1L	REACH DESCRIPTION	Skunk Creek Tributaries 6B, 6C, 10A, 10B, 12 along Skunk Creek between Fig Springs Road and Circle Mountain Road			
1K	STUDY TYPE	Riverine			

SECTION 2: MAPPING INFORMATION		
2A	USGS QUAD SHEET(S)	Daisy Mountain, Arizona, 7.5 Minute USGS QUAD Map
2B	MAPPING FOR HYDROLOGIC STUDY: TYPE/SOURCE SCALE DATE	 Daisy Mountain, Arizona, 7.5 Minute USGS QUAD Map
2C	MAPPING FOR HYDRAULIC STUDY: TYPE/SOURCE SCALE DATE	 2 ft Contour Kennedy Aerial Mapping, Inc., Phoenix, AZ 1" = 400' May 31, 1999

SECTION 3: HYDROLOGY		
3A	MODEL OR METHOD USED (including vendor and version description)	Flood Hydrograph Package (HEC-1) Version 4.1, July 1997 USACE Hydraulic Engineering Center 609 Second Street Davis, CA 85616
3B	STORM DURATION	6 & 24 Hour
3C	HYETOGRAPH	
3D	FREQUENCIES DETERMINED	100-Year
3E	LIST OF GAGES USED IN FREQUENCY ANALYSIS OR CALIBRATION (Location, Years of Record, Gage Ownership)	
3F	RAINFALL AND REFERENCE	
3G	UNIQUE CONDITIONS AND PROBLEMS	
3H	COORDINATION OF Q'S (Agency, Date, Comments)	Hydrology provided by Flood Control District of Maricopa County

SECTION 4: HYDRAULICS		
4A	MODEL OR METHOD USED (Including Vendor and Version Description)	HEC-RAS River Analysis System, Version 2.2, September 1998 USACE Hydraulic Engineering Center 609 Second Street Davis, CA 85616
4B	REGIME	Subcritical
4C	FREQUENCIES FOR WHICH PROFILES WERE COMPUTED	100-Year
4D	METHOD OF FLOODWAY CALCULATION	See Attached Report
4E	UNIQUE CONDITIONS AND PROBLEMS	See Attached Report
ADDITIONAL STUDY INFORMATION		
ITEM		DESCRIPTION/DISCUSSION
Backup Report		Report provides technical appendices including HEC-RAS input and output, and floodplain/floodway maps

2.2 APPLICATION/CERTIFICATION FORMS

The required FEMA application and certification forms (MT-2 Forms 1,4,5 & 7) are included as Appendix F.

SECTION 3: SURVEY AND MAPPING INFORMATION

3.1 Field Survey Information

A field survey of the project area for mapping control was completed between November 12 and 20, 1998 by Project Engineering Consultants, LTD. Additional detailed surveying for culvert information was conducted on December 8, 1998 and on March 22, 2000. Project Engineering Consultants provided Tetra Tech/Simons, Li and Associates with a copy of the survey field notes, a list of all elevation reference marks (ERM's), and a list of points surveyed. The FCD project manager also provided a copy of his notes from the March 22, 2000 field survey of Tributary 10A. All of the survey data is located in Appendix C.

3.2 Mapping Description

The vertical mapping datum is NGVD29. The average vertical conversion from NGVD29 to NAVD88 is +2.06 feet. A figure with the actual conversion contours is found in Appendix C. The horizontal datum is based upon the State Plane Coordinate System of 1983. Aerial photography was completed on December 1, 1998 by Kenney Aerial Mapping, Inc. of Phoenix, Arizona. The topographic mapping has a two-foot contour interval.

SECTION 4: HYDROLOGIC ANALYSIS

All hydrologic data was provided by the Flood Control District of Maricopa County. The hydrologic data was provided to Tetra Tech/Simons Li and Associates in the report "Skunk Creek 3 Tributaries Floodplain Delineation Study (Addendum to the Skunk Creek Floodplain Delineation Study)." This study was completed in August 1998 by the Hydrology Branch, Engineering Division of the FCD. Table 1 provides a summary of the 100-year peak discharges from the FCD study. The full hydrology report is included in the TDN as Appendix D.

Table 1: FCD Hydrology Summary

Tributary	Concentration Point	Q (cfs)	Governing Storm (100 Year)
12	S12C	2255	6-Hr
10B	C-S10B	1820	6-Hr
10A	S-10A	1778	6-Hr
6C	S6C	758	6-Hr
6B	S4	1477	6-Hr
6B	S5	2007	24-Hr
6B	S5C	3169	24-Hr
6B	CPS6B	3110	24-Hr

SECTION 5: HYDRAULIC ANALYSIS

5.1 Method Description

The tributaries are located in a semi-developed area of north-central Maricopa County. In most locations, conveyance structures at roadways do not exist. The roads follow the stream bed topography and flow passes over the road during high runoff events. Of the structures that do exist at roadways, all appear to function hydraulically but show signs of aging. The tributaries have not been channelized or diverted from their natural stream bed except for minor adjustments at the culverts crossings.

The study area is characterized by Sonoran desert shrubs, trees, and cacti of medium, uniform density. A relatively higher density vegetation is found along the limits of the alluvial washes and consists of palo verde, creosote bush, bush muhly, and mesquite. The constituents of the soils in the study area consist of alluvial deposits of shallow sands, gravel, and cobble, with some boulders and rock outcrops on moderately steep to steep slopes.

The water-surface profile model used in this study, HEC-RAS (River Analysis System), was developed by the U.S. Army Corps of Engineers. All modeling data for the five tributaries such as roughness, expansion, and contraction coefficients, overbank stations, and channel lengths, were extracted from the topographic mapping prepared for the study, the *n*-value report, and recommendations from the HEC-RAS User's Manual. Flow rates were taken from the FCD hydrology study and a subcritical flow regime was utilized. The slope-area method was used to determine the starting water-surface elevations for all tributaries, as directed by the FEMA Technical Evaluation Consultant, Michael Baker, Jr., Inc. (Sheila Nolan).

5.2 Work Study Maps

The work-study maps were prepared using the results of the HEC-RAS models. The location of the hydraulic baseline and the placement of cross sections were reviewed and approved by the FCD.

The cross sections are numbered and identified in river miles upstream from each tributary's confluence with the main stem of Skunk Creek. The study used the same tributary designations: 12, 10A, 10B, 6B, and 6C as found in FCD hydrology report. All map nomenclature follows FCD standards.

All of the tributaries are relatively short in length so they were each modeled with only one reach, with the exception of Tributary 6B. Tributary 6B conveys flow from two separate subbasins whose confluence is near the Tonto National Forest boundary. The stream from each subbasin was modeled as a separate reach. As flow is conveyed down Tributary 6B, break-out occurs to the west near the confluence with the main-stem, Skunk Creek floodplain. Flow is contained within the other tributaries throughout their entire length. Along the length of each tributary, roughness coefficients do not vary enough to warrant additional reaches. Figure 2 shows a topographic map of the entire study area. Figure 3 shows the photo-reduced work-study maps.

FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY

TOPOGRAPHIC MAPPING AND
FLOODPLAIN DELINEATION STUDY
FOR TRIBUTARIES TO SKUNK CREEK

MARICOPA COUNTY, ARIZONA

F.C.D. CONTRACT NO. 98-22

N

SHEET 1

SHEET 2

SHEET 3

SHEET 4

SHEET 5

SHEET 6

SHEET 7

SHEET 8

SKUNK CREEK

NEW RIVER ROAD

CLINE CREEK

TRIBUTARY 10A

TRIBUTARY 10B

TRIBUTARY 12

TRIBUTARY 6C

TRIBUTARY 6B

APPROXIMATE LOCATION

TONTO NATIONAL FOREST BOUNDARY

SHEET INDEX

0 600' 1200'

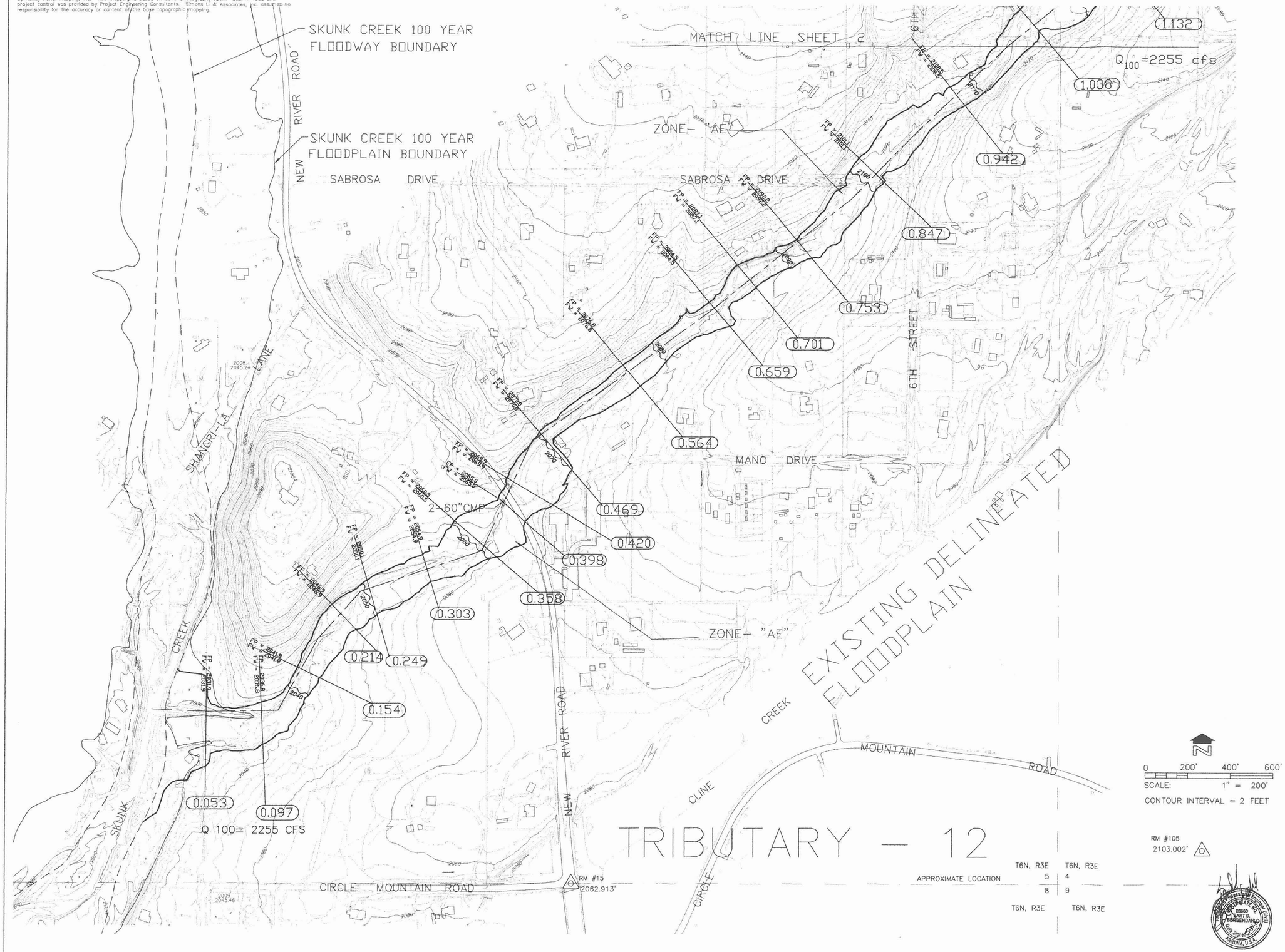
SCALE: 1" = 600'

CONTOUR INTERVAL = 2 FEET

SIMONS, LI & ASSOCIATES, INC.

	BY	DATE	
DESIGN	DEJ	1/2000	FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
DESIGN CHK.	BSB	1/2000	
PLANS	ML	1/2000	RECOMMENDED BY: DATE
PLANS CHK.	BSB	1/2000	APPROVED BY: DATE
SUBMITTED BY: DATE:			SHEET 1 OF 1

The base topographic mapping used to conduct this floodplain delineation study was prepared and certified by Kenny Aerial Mapping, Inc. This mapping is based on aerial photography taken Dec. 1, 1998 and project control was provided by Project Engineering Consultants. Simons Li & Associates, Inc. assumes no responsibility for the accuracy or content of the base topographic mapping.



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MARICOPA COUNTY, ARIZONA

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LEGEND

- SECTION LINE
- 100-YEAR FLOODPLAIN/FLOODWAY BOUNDARY
- FLOODWAY BOUNDARY
- HYDRAULIC BASE LINE
- CROSS-SECTION (FP=FLOODPLAIN WSE, FW=FLOODWAY WSE) 1.432
- BASE FLOOD ELEVATION 1160
- ELEVATION REFERENCE MARK RM
- BUILDING

NOTES

1. CROSS-SECTION STATION 10,000 IS THE HYDRAULIC BASELINE .

ELEVATION REFERENCE MARKS

RM#	ELEVATION	DESCRIPTION
15	2062.913	MCHD Brass Cap @inters. New River Rd. and Circle Mtn. Rd.
33	2087.907	Gen.Land Office Brass Cap N.E. Cor. Sect.6, T6N,R3E
34	2176.988	Gen.Land Office Brass Cap N.E. Cor. Sect.5, T6N,R3E
35	2256.490	Gen.Land Office Brass Cap N.1/4 Cor. Sect.29, T7N, R3E
36	2222.419	Gen.Land Office Brass Cap N.E. Cor. Sect.30, T7N, R3E
37	2434.413	Gen.Land Office Brass Cap E.1/4 Cor. Sect.20, T7N, R3E
100	2111.509	MCHD Brass Cap @top W. barrier wall, New River Rd. over Skunk Creek
105	2103.002	Brass Cap @top Headwall S. side Circle Mtn. Rd. 1/2 Mi. E. New River Rd.
204	2132.631	Fd. iron Bar, H.H. 1/4 Mi. N. of New River Rd. Bridge over Skunk Creek, W. Side
2010	2038.517	Gen.Land Office Brass Cap N.E. Cor. Sect.7, T6N, R3E

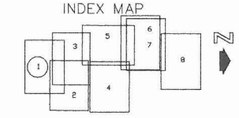
N

0 200' 400' 600'

SCALE: 1" = 200'

CONTOUR INTERVAL = 2 FEET

INDEX MAP



NOTE: ALL ELEVATIONS ARE BASED ON NATIONAL GEODETIC VERTICAL DATUM OF 1929

SIMONS, LI & ASSOCIATES, INC.

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PLANS	ML	1/2000	RECOMMENDED BY: DATE
PLANS CHK.	BSB	1/2000	APPROVED BY: DATE
SUBMITTED BY: DATE:			SHEET 1 OF 8

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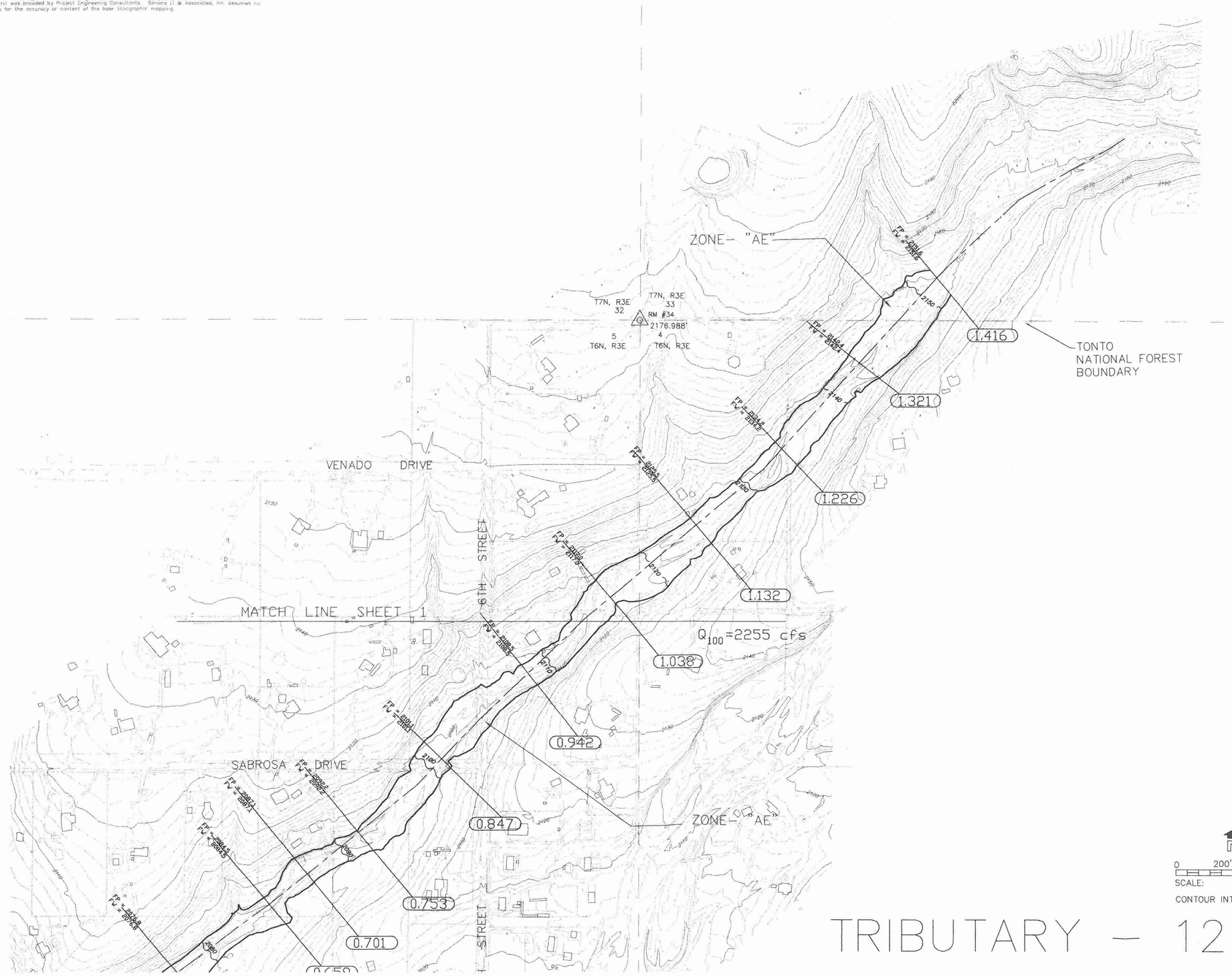

TRIBUTARY - 12

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SCALE: 1" = 200'
CONTOUR INTERVAL = 2 FEET

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

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- FLOODWAY BOUNDARY
- HYDRAULIC BASE LINE
- CROSS-SECTION (FP=FLOODPLAIN WSE / FW=FLOODWAY WSE, 1.432)
- BASE FLOOD ELEVATION 1160
- ELEVATION REFERENCE MARK △ RM
- BUILDING

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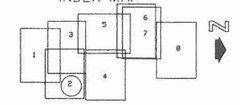
INDEX MAP



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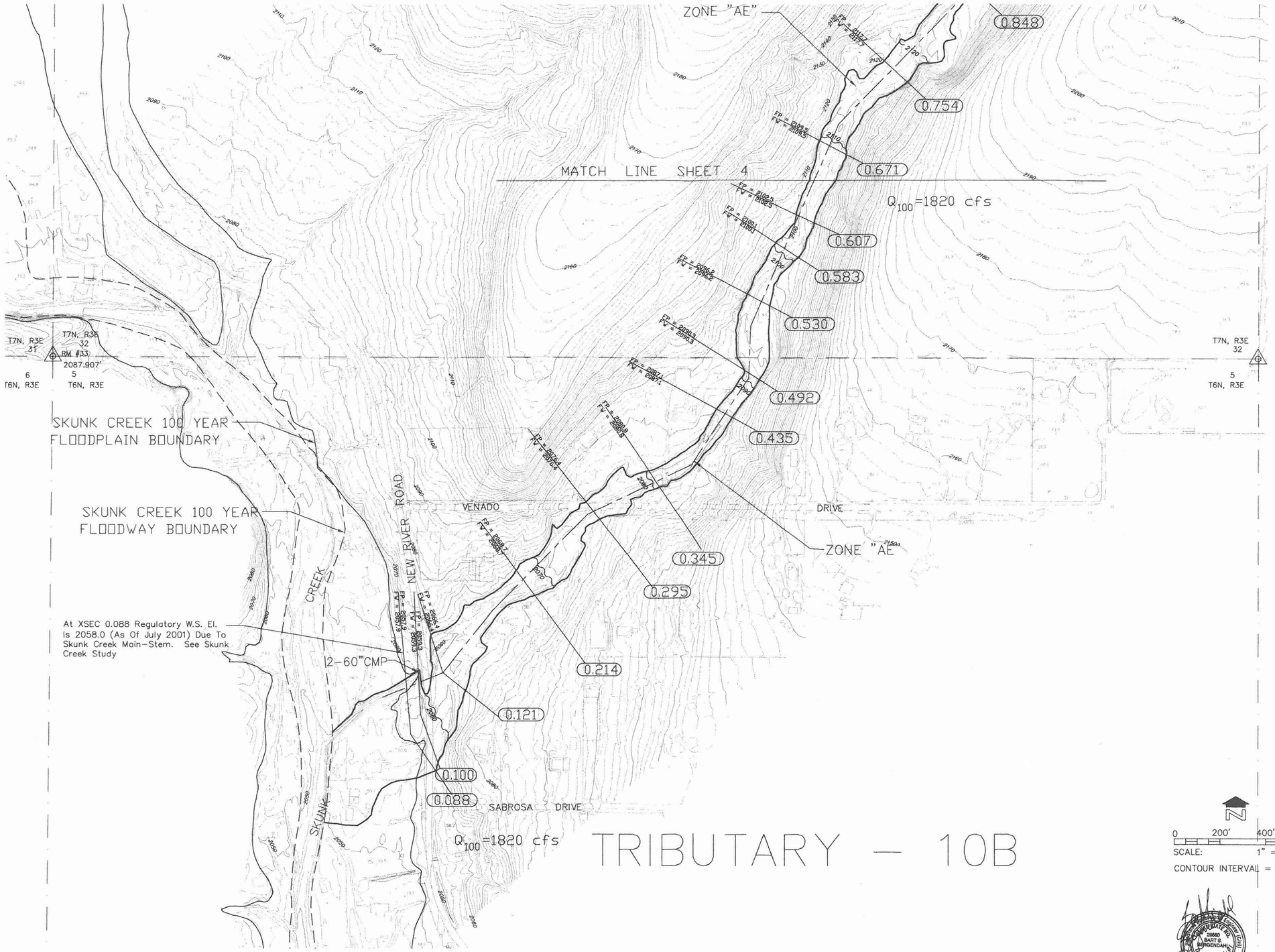

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0 200' 400' 600'

SCALE: 1" = 200'

CONTOUR INTERVAL = 2 FEET

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- HYDRAULIC BASE LINE
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- BASE FLOOD ELEVATION
- ELEVATION REFERENCE MARK (RM)
- BUILDING

NOTES

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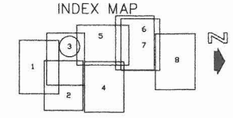
INDEX MAP



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sla SIMONS, LI & ASSOCIATES, INC.

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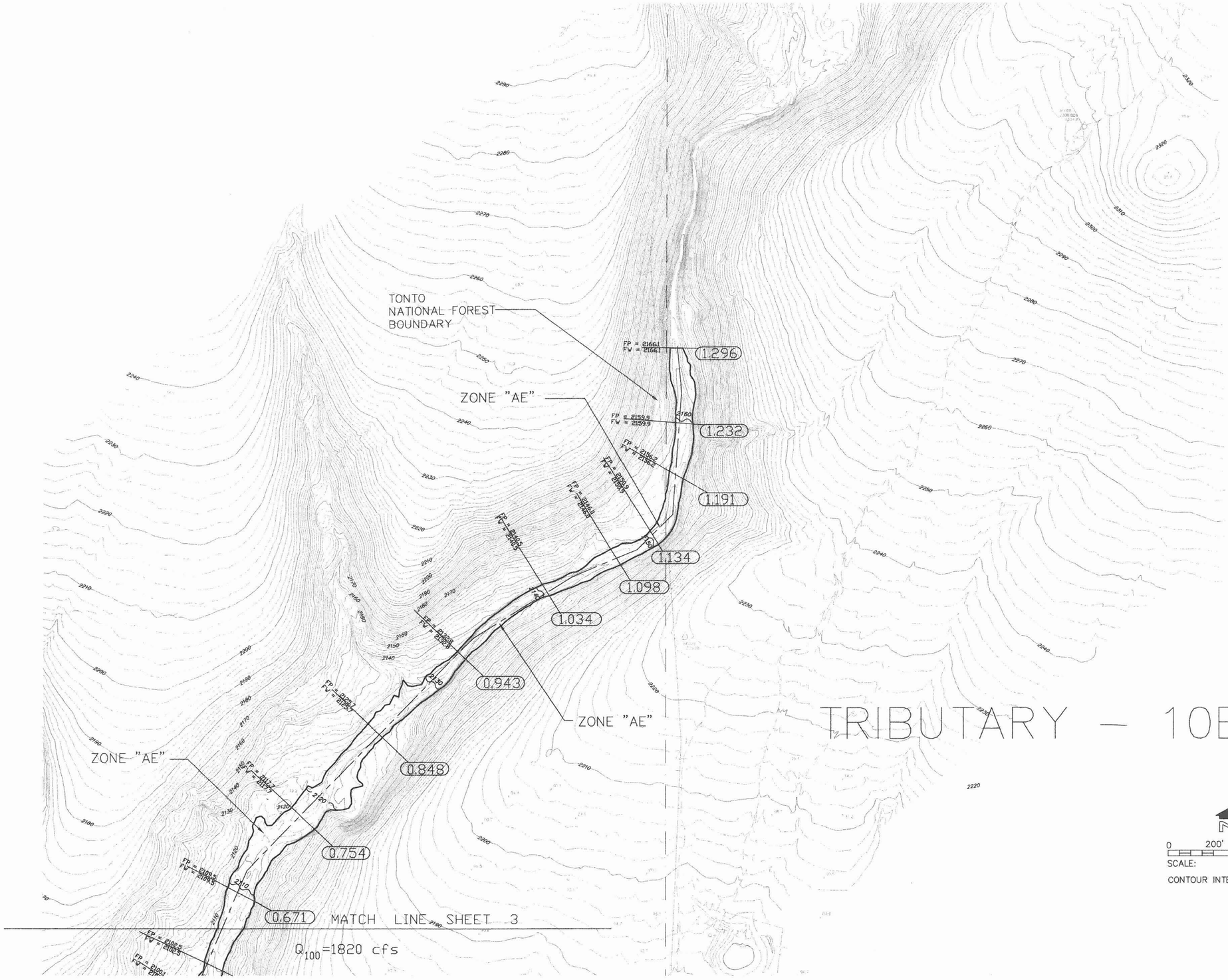

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- FLOODWAY BOUNDARY
- HYDRAULIC BASE LINE
- CROSS-SECTION (FP=FLOODPLAIN WSE / FW=FLOODWAY WSE) 1.432
- BASE FLOOD ELEVATION 1160
- ELEVATION REFERENCE MARK RM
- BUILDING

NOTES

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ELEVATION REFERENCE MARKS

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15	2062.913	MCHD Brass Cap @inters. New River Rd. and Circle Mtn. Rd.
33	2087.907	Gen.Land Office Brass Cap N.E. Cor. Sect.6, T6N,R3E
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35	2256.499	Gen.Land Office Brass Cap N.1/4 Cor. Sect.29, T7N, R3E
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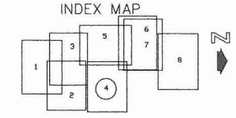
2010	2038.517	Gen.Land Office Brass Cap N.E. Cor. Sect.7, T6N, R3E

INDEX MAP



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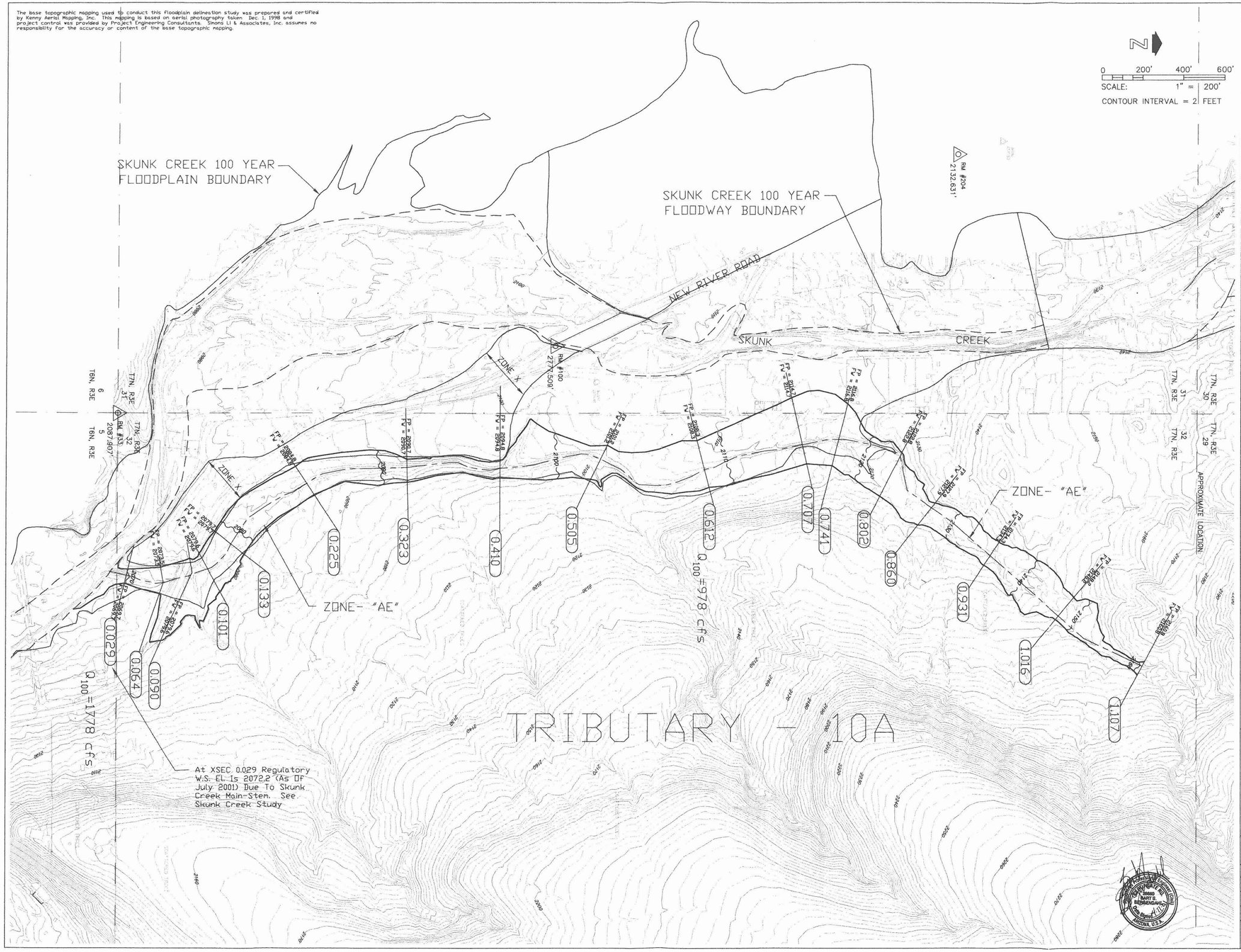

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

TOPOGRAPHIC MAPPING AND FLOODPLAIN DELINEATION STUDY FOR TRIBUTARIES TO SKUNK CREEK

MARICOPA COUNTY, ARIZONA

F.C.D. CONTRACT NO. 98-22

LEGEND

- SECTION LINE
- 100-YEAR FLOODPLAIN/FLOODWAY BOUNDARY
- FLOODWAY BOUNDARY
- HYDRAULIC BASE LINE
- CROSS-SECTION (FP=FLOODPLAIN WSE, FW=FLOODWAY WSE)
- BASE FLOOD ELEVATION 1160
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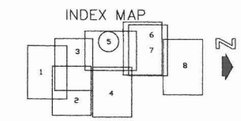
INDEX MAP



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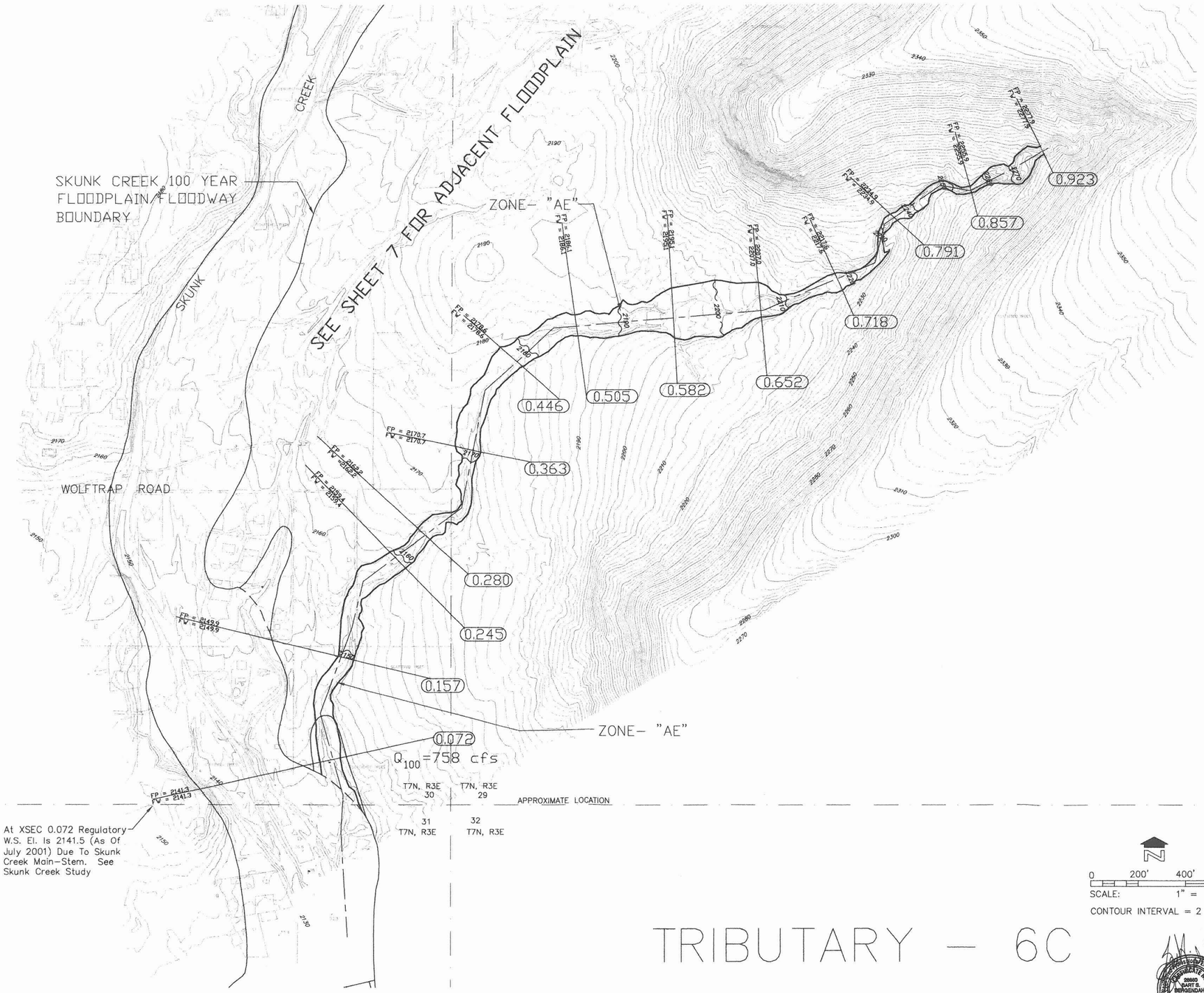

TRIBUTARY - 6C

0 200' 400' 600'
SCALE: 1" = 200'
CONTOUR INTERVAL = 2 FEET

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

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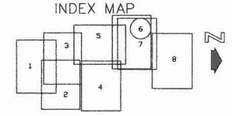
INDEX MAP



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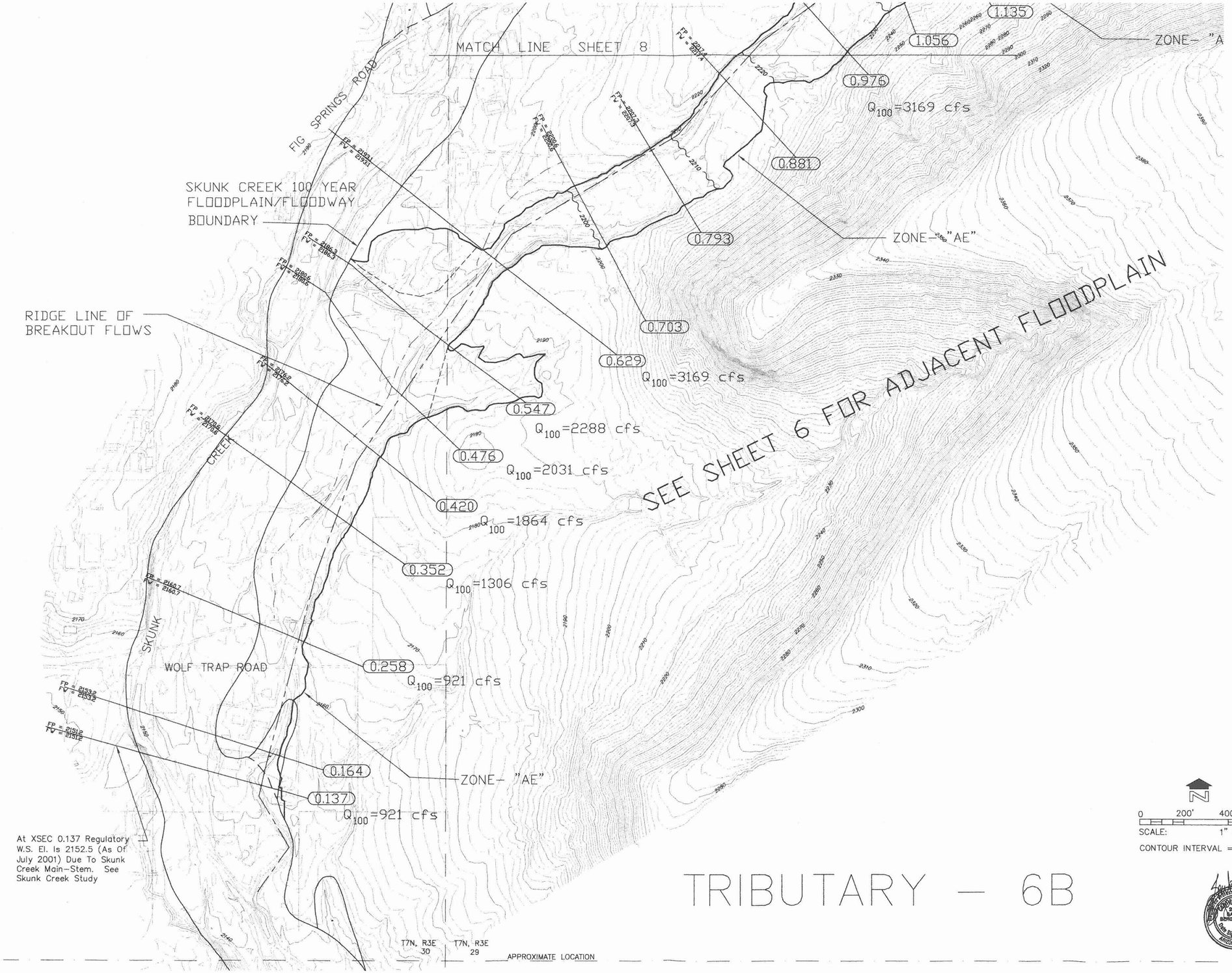

TRIBUTARY – 6B

0 200' 400' 600'
SCALE: 1" = 200'
CONTOUR INTERVAL = 2 FEET

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

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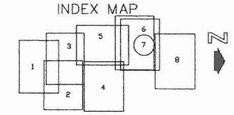

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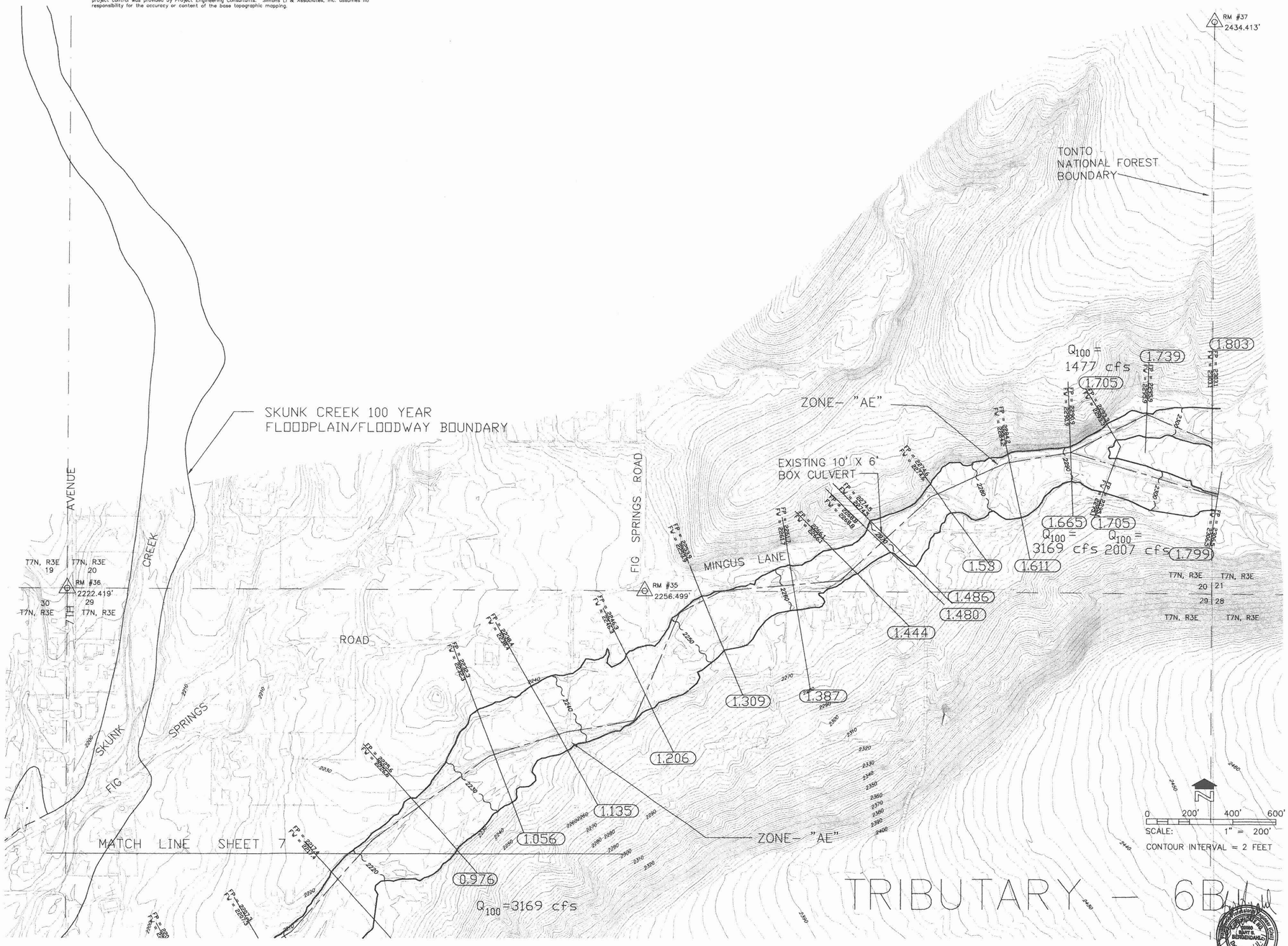

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

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- ELEVATION REFERENCE MARK (RM)
- BUILDING

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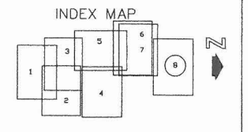

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5.3 Parameter Estimation

5.3.1 Roughness Coefficients

The roughness coefficients were determined through an n-value field reconnaissance study that was completed pursuant to the scope of work. An n-value study report that describes the results of the field reconnaissance conducted for each of the five tributaries was prepared. Main channel n-values range from 0.035-0.045, while overbank values range from 0.06-0.065. The complete n-value report is included in Appendix E.

5.3.2 Expansion and Contraction Coefficients

Expansion and contraction coefficients of 0.3 and 0.1, respectively, were used to compute losses from one cross-section to the next. Expansion and contraction coefficients of 1.0 and 0.5, respectively, were used to compute losses through each culvert. All coefficients are the values recommended by the HEC-RAS User's Manual for normal modeling cases.

5.4 Cross-Section Description

Cross-sections were spaced along the length of each tributary approximately every 500 feet and oriented perpendicular to the anticipated flow paths. In areas of sudden geometry change, additional cross-sections were placed as necessary. Additional cross-sections were not placed immediately above and below culverts. Since the majority of the flow exceeds the capacity of the culverts and overtops the roads, transition losses due to the structures are negligible. Additional cross-sections were placed in areas of significant geometry variation or thalweg departure in relation to the previous cross-section.

The cross-sections are numbered in river miles from downstream to upstream as measured along the channel baseline beginning at the each tributary's confluence with Skunk Creek. The cross-sections are defined by data points oriented left to right, looking downstream. Each data point consists of an elevation and corresponding cross-section station number. The intersection of each cross-section and the channel baseline is assigned Station 10,000. Cross-section plots are included in Appendix E.

5.5 Modeling Considerations

All HEC-RAS models were coded for subcritical flow profile computations.

5.5.1 Hydraulic Jump/Drop Analysis

Significant hydraulic jumps or drops do not occur in any of the five tributaries.

5.5.2 Bridges and Culverts

As was previously stated, structures that convey flow under the local roadways typically do not exist. Local roads usually cross the washes at grade and are closed during runoff events. Four culvert crossings do exist on the primary roadways. All culverts were modeled in accordance with the standard HEC-RAS culvert modeling procedures. At Cross-section 0.409 of Tributary 12, a double-barrel corrugated metal pipe (CMP) exists to convey flow under New River Road. Each CMP is approximately 75 feet in length and five feet in diameter. The culvert has a concrete headwall with wingwalls. The 100-year flow event in Tributary 12 exceeds the capacity of the culvert and the majority of flow overtops the headwall and passes over the road.

At Cross-section 0.11 in Tributary 10B, a double-barrel corrugated metal pipe culvert also exists to convey flow under New River Road. Each CMP is approximately 80 feet in length and five feet in diameter. The culvert has a concrete headwall with wingwalls. As with Tributary 12, flow in Tributary 10B exceeds the capacity of the culvert and the majority of flow overtops the headwall and flows over the road.

Another double-barrel corrugated metal pipe culvert conveys flow under New River Road at Cross-section 0.082 on Tributary 10A. Each barrel has a diameter of six feet and is 73 feet long. The culvert inlet has a headwall with no wingwalls and the outlet has both a headwall and wingwalls. During the 100-year flow event, the capacity of the culvert is also exceeded as 65% of the flow overtops New River Road.

A concrete box culvert conveys flow under Mingus Lane at Cross-section 1.483 on Tributary 6B. The single-barrel box culvert has a rise of six (6) feet and a span of ten (10) feet. It is approximately 30 feet in length and has flared wingwall 30° to 75°. The 100-year flow in tributary 6B also significantly exceeds the capacity of this culvert and overtops the road.

5.5.3 Levees and Dikes

No levees and dikes are located within the reaches of this study.

5.5.4 Islands and Flow Splits

Other than the lower reach of Tributary 6B, no hydraulically significant islands or flow splits occur within study area. The method used to analyze the flow split (break-out) in the lower reach of Tributary 6B is described in Section 5.7.

5.5.5 Ineffective Flow Areas

No ineffective flow areas exist on Tributaries 12 and 10B.

Tributary 6C contains ineffective flow areas at Cross-sections 0.072, 0.157, and 0.363. The ineffective areas at Cross-sections 0.072 and 0.157 represent the area within the 100-year Skunk Creek floodplain. At Cross-section 0.363, beyond the right overbank, a natural grade down to Tributary 6B begins. A ridge separates the tributaries and since the flow from Tributary 6C does not top this ridge, the area is ineffective.

Tributary 6B contains ineffective flow areas in Cross-sections 0.137 - 0.629. Like Tributary 6C, these areas represent the Skunk Creek 100-year floodplain. During the 100-year flood event, a portion of the flow breaks-out over the subtle ridge and flows west into the Skunk Creek floodplain. The decreasing flow rates in the lower sections of Tributary 6B reflect the amount of break-out. The amount of break-out was determined through a HEC-2 split flow option. The analysis is discussed in Section 5.7. The ineffective area opposite the Skunk Creek 100-year floodplain at Cross-sections 0.137 and 0.164 reflects the Tributary 6C floodplain. Cross-section 0.547 also has an ineffective flow area on the side opposite the 100-year Skunk Creek floodplain, which represents an area of pooling backwater.

Due to overtopping, no ineffective flow areas were used near any of the four culverts. At each culvert in Tributaries 12, 10B, 10A, and 6B, at least 65% of the 100-year flow overtops the road. Therefore, the usual ineffective flow areas used to simulate effective conveyance reduction immediately before and after culverts, do not exist.

5.5.6 Supercritical Flow

All of the tributaries were modeled using a subcritical flow regime. The HEC-RAS results indicate that, in general, the flow regimes are in the subcritical range. However, critical flow occurs in a number of sub-reaches.

5.6 Floodway Modeling

The floodway concept is used to define the amount of floodplain encroachment that is considered acceptable for development. The principle is that limited encroachment is likely to have an insignificant effect on all but the severest flood events. A floodway consists of the main channel of a stream plus sufficient overbank area to convey the 100-year flood without increasing flood heights by more than a specified amount. Federal standards limit the increase to one foot (1') above the base flood elevation. FCD has adopted the same standard.

Flow in the tributaries is typically confined to the area within the specified bank stations. Therefore, floodway analyses were inappropriate. Fringe flow or backwater areas were identified at two isolated backwater pooling locations on Tributary 6B, as shown on the work-study maps. In all other areas, the floodway boundaries are coincident with the floodplain boundaries.

5.7 Problems Encountered

Upstream of the confluence with Skunk Creek, flow breaks-out from Tributary 6B into the Skunk Creek 100-year floodplain. A simulation of the break-out was modeled with the HEC-2 split flow option. The encroached HEC-RAS files were used to build a HEC-2 model and, after calibration, a split flow weir routine was added to the model. The high points along the ridge between the tributary and Skunk Creek floodplain were used as the weir elevations. The rate of break-out was determined through an iterative process using the HEC-2 and HEC-RAS models. Initially, the slope-area routine was used as the HEC-2 initial starting condition. The resulting HEC-2 break-out flow rates were then input into the HEC-RAS model and a new HEC-RAS profile was generated. If the HEC-2 and HEC-RAS profiles did not match, another HEC-2 iteration was completed using a new starting water surface elevation from the HEC-RAS profile. Again, the resulting HEC-2 flow rates were input into the HEC-RAS model and a new HEC-RAS profile was generated. After three iterations, the HEC-2 and HEC-RAS profiles matched. The ridge line used for the weir elevations is noted on the work-study maps. The HEC-2 results are found in Appendix E and an electronic copy of the input and output code is on the attached floppy disk.

5.8 Calibration

As directed by Michael Baker, Jr., Inc., the slope-area method was used to determine the starting water surface elevation (WSEL) for all tributaries. To calculate the initial WSEL by the slope-area method, the energy slope was approximated using the slope of the channel bottom. This slope was varied to determine the sensitivity of the models to this variable. As the energy slope was decreased significantly, the WSEL at the first cross-section increased by less than one foot (1'), while the WSEL did not change at any other cross-sections. As the energy slope was increased significantly, the WSEL at several of the upstream cross-sections changed by less than 0.2 feet. Therefore, beyond the first cross-section, the models were not overly sensitive to change in the initial starting condition.

5.9 Final Results

The results of the hydraulic modeling effort are summarized in Table 2. The floodplain results are summarized in the first row for a given cross-section, while the floodway results are reported in the second row. Note that the results are the same for this study, since the floodplain and floodway boundaries are coincident.

Table 2a: Tributary 12 Summary

Cross Section Identifier	Peak Discharge (cfs)	WSEL (ft)	Critical WSEL (ft)	Average Velocity (ft/s)	Top Width of Flow (ft)	Hydraulic Depth of Flow (ft)	Maximum Channel Depth (ft)	Froude Number	Left Station where WSEL Meets Ground	Right Station where WSEL Meets Ground
1.416	2255	2151.6	2151.6	8.0	142.1	2.0	3.6	1.00	9905.9	10048.0
	2255	2151.6	2151.6	8.0	142.1	2.0	3.6	1.00	9905.9	10048.0
1.321	2255	2142.4		5.8	166.6	2.3	4.4	0.68	9887.4	10054.1
	2255	2142.4		5.8	166.6	2.3	4.4	0.68	9887.4	10054.1
1.226	2255	2134.2	2134.2	8.1	137.4	2.0	4.2	1.00	9896.8	10034.3
	2255	2134.2	2134.2	8.1	137.4	2.0	4.2	1.00	9896.8	10034.3
1.132	2255	2125.5	2125.4	7.5	146.7	2.0	3.5	0.93	9895.9	10042.6
	2255	2125.5	2125.4	7.5	146.7	2.0	3.5	0.93	9895.9	10042.6
1.038	2255	2117.0	2117.0	8.2	134.1	2.1	5.0	1.01	9965.6	10099.7
	2255	2117.0	2117.0	8.2	134.1	2.1	5.0	1.01	9965.6	10099.7
0.942	2255	2108.5	2108.5	8.8	108.2	2.4	4.5	1.00	9928.8	10037.0
	2255	2108.5	2108.5	8.8	108.2	2.4	4.5	1.00	9928.8	10037.0
0.847	2255	2101.1	2101.1	7.7	165.5	1.8	3.1	1.01	9944.7	10110.2
	2255	2101.1	2101.1	7.7	165.5	1.8	3.1	1.01	9944.7	10110.2
0.753	2255	2092.2	2092.2	8.7	111.4	2.3	6.2	1.01	9898.2	10009.6
	2255	2092.2	2092.2	8.7	111.4	2.3	6.2	1.01	9898.2	10009.6
0.701	2255	2087.1	2087.0	8.0	125.5	2.2	5.1	0.94	9959.8	10085.4
	2255	2087.1	2087.0	8.0	125.5	2.2	5.1	0.94	9959.8	10085.4
0.659	2255	2084.5	2084.5	8.0	148.5	1.9	4.5	1.02	9889.1	10037.6
	2255	2084.5	2084.5	8.0	148.5	1.9	4.5	1.02	9889.1	10037.6
0.564	2255	2076.8	2076.8	8.3	127.4	2.1	6.8	1.01	9913.6	10041.0
	2255	2076.8	2076.8	8.3	127.4	2.1	6.8	1.01	9913.6	10041.0
0.469	2255	2070.0		5.1	236.5	1.9	6.0	0.66	9780.8	10017.3
	2255	2070.0		5.1	236.5	1.9	6.0	0.66	9780.8	10017.3

Table 2a: Tributary 12 Summary (cont.)

Cross Section Identifier	Peak Discharge (cfs)	WSEL (ft)	Critical WSEL (ft)	Average Velocity (ft/s)	Top Width of Flow (ft)	Hydraulic Depth of Flow (ft)	Maximum Channel Depth (ft)	Froude Number	Left Station where WSEL Meets Ground	Right Station where WSEL Meets Ground
0.42	2255	2069.9	2066.1	2.0	249.6	4.6	7.9	0.16	9774.5	10024.1
	2255	2069.9	2066.1	2.0	249.6	4.6	7.9	0.16	9774.5	10024.1
0.409	Culvert									
0.398	2255	2065.0		6.7	182.3	1.9	5.0	0.86	9886.1	10068.4
	2255	2065.0		6.7	182.3	1.9	5.0	0.86	9886.1	10068.4
0.358	2255	2060.5	2060.5	6.5	252.2	1.4	4.5	0.97	9933.5	10185.7
	2255	2060.5	2060.5	6.5	252.2	1.4	4.5	0.97	9933.5	10185.7
0.303	2255	2054.9	2054.9	8.2	136.7	2.0	4.9	1.01	9938.8	10075.5
	2255	2054.9	2054.9	8.2	136.7	2.0	4.9	1.01	9938.8	10075.5
0.249	2255	2050.1	2050.0	7.3	170.4	1.8	2.1	0.96	9878.9	10049.3
	2255	2050.1	2050.0	7.3	170.4	1.8	2.1	0.96	9878.9	10049.3
0.214	2255	2046.9		6.4	164.6	2.1	4.9	0.77	9894.0	10058.6
	2255	2046.9		6.4	164.6	2.1	4.9	0.77	9894.0	10058.6
0.154	2255	2041.8	2041.6	8.3	114.1	2.4	5.8	0.94	9903.9	10018.0
	2255	2041.8	2041.6	8.3	114.1	2.4	5.8	0.94	9903.9	10018.0
0.097	2255	2036.8	2036.8	7.3	195.9	1.6	4.8	1.03	9853.7	10049.7
	2255	2036.8	2036.8	7.3	195.9	1.6	4.8	1.03	9853.7	10049.7
0.053	2255	2031.9	2031.6	5.1	355.0	1.3	3.9	0.80	9745.3	10158.8
	2255	2031.9	2031.6	5.1	355.0	1.3	3.9	0.80	9745.3	10158.8

Table 2b: Tributary 10B Summary (cont.)

Cross Section Identifier	Peak Discharge (cfs)	WSEL (ft)	Critical WSEL (ft)	Average Velocity (ft/s)	Top Width of Flow (ft)	Hydraulic Depth of Flow (ft)	Maximum Channel Depth (ft)	Froude Number	Left Station where WSEL Meets Ground	Right Station where WSEL Meets Ground
0.435	1820	2087.1	2087.1	9.4	72.6	2.7	3.1	1.01	9971.4	10044.0
	1820	2087.1	2087.1	9.4	72.6	2.7	3.1	1.01	9971.4	10044.0
0.345	1820	2080.8		8.3	86.0	2.5	4.8	0.92	9984.8	10070.8
	1820	2080.8		8.3	86.0	2.5	4.8	0.92	9984.8	10070.8
0.295	1820	2076.4	2076.3	8.1	100.9	2.2	4.4	0.96	9948.7	10049.6
	1820	2076.4	2076.3	8.1	100.9	2.2	4.4	0.96	9948.7	10049.6
0.214	1820	2068.7	2068.7	7.6	133.9	1.8	2.7	1.01	9914.4	10048.3
	1820	2068.7	2068.7	7.6	133.9	1.8	2.7	1.01	9914.4	10048.3
0.121	1820	2066.4	2061.5	1.4	283.6	4.7	8.4	0.11	9882.6	10166.2
	1820	2066.4	2061.5	1.4	283.6	4.7	8.4	0.11	9882.6	10166.2
Culvert										
0.1	1820	2059.3		5.6	250.4	1.3	3.3	0.87	9652.3	10056.7
	1820	2059.3		5.6	250.4	1.3	3.3	0.87	9652.3	10056.7
0.088	1820	2057.9	2057.6	5.0	259.4	1.4	3.9	0.73	9599.8	10041.3
	1820	2057.9	2057.6	5.0	259.4	1.4	3.9	0.73	9599.8	10041.3

Table 2b: Tributary 10B Summary

Cross Section Identifier	Peak Discharge (cfs)	WSEL (ft)	Critical WSEL (ft)	Average Velocity (ft/s)	Top Width of Flow (ft)	Hydraulic Depth of Flow (ft)	Maximum Channel Depth (ft)	Froude Number	Left Station where WSEL Meets Ground	Right Station where WSEL Meets Ground
1.296	1820	2166.1	2166.1	10.1	57.3	3.1	4.1	1.01	9972.9	10030.2
	1820	2166.1	2166.1	10.1	57.3	3.1	4.1	1.01	9972.9	10030.2
1.232	1820	2159.9	2159.6	8.3	79.3	2.8	5.9	0.89	9935.1	10014.4
	1820	2159.9	2159.6	8.3	79.3	2.8	5.9	0.89	9935.1	10014.4
1.191	1820	2156.2	2156.1	9.5	66.9	2.9	4.2	0.99	9964.2	10031.1
	1820	2156.2	2156.1	9.5	66.9	2.9	4.2	0.99	9964.2	10031.1
1.134	1820	2150.9	2150.9	9.4	72.8	2.7	4.9	1.01	9942.7	10015.5
	1820	2150.9	2150.9	9.4	72.8	2.7	4.9	1.01	9942.7	10015.5
1.098	1820	2146.0		8.5	82.3	2.6	4.0	0.92	9967.3	10049.6
	1820	2146.0		8.5	82.3	2.6	4.0	0.92	9967.3	10049.6
1.034	1820	2140.5	2140.5	10.0	57.2	3.2	4.5	0.99	9981.8	10039.0
	1820	2140.5	2140.5	10.0	57.2	3.2	4.5	0.99	9981.8	10039.0
0.943	1820	2132.8	2132.8	10.8	46.8	3.6	4.8	1.01	9958.3	10005.1
	1820	2132.8	2132.8	10.8	46.8	3.6	4.8	1.01	9958.3	10005.1
0.848	1820	2125.7	2125.7	8.8	87.9	2.4	3.7	1.01	9982.6	10070.4
	1820	2125.7	2125.7	8.8	87.9	2.4	3.7	1.01	9982.6	10070.4
0.754	1820	2117.7		6.1	136.2	2.2	3.7	0.72	9925.3	10061.5
	1820	2117.7		6.1	136.2	2.2	3.7	0.72	9925.3	10061.5
0.671	1820	2109.5	2109.3	6.9	134.7	2.0	3.5	0.87	9917.8	10052.4
	1820	2109.5	2109.3	6.9	134.7	2.0	3.5	0.87	9917.8	10052.4
0.607	1820	2102.5	2102.5	8.9	85.0	2.4	4.5	1.00	9923.8	10008.8
	1820	2102.5	2102.5	8.9	85.0	2.4	4.5	1.00	9923.8	10008.8
0.583	1820	2100.1		6.0	119.7	2.5	4.1	0.66	9920.8	10040.4
	1820	2100.1		6.0	119.7	2.5	4.1	0.66	9920.8	10040.4
0.53	1820	2096.2	2096.2	8.1	110.8	2.0	4.2	1.00	9958.9	10069.7
	1820	2096.2	2096.2	8.1	110.8	2.0	4.2	1.00	9958.9	10069.7
0.492	1820	2090.3	2089.9	8.3	72.9	3.0	4.3	0.84	9946.6	10019.6
	1820	2090.3	2089.9	8.3	72.9	3.0	4.3	0.84	9946.6	10019.6

Table 2c: Tributary 10A Summary

Cross Section Identifier	Peak Discharge (cfs)	WSEL (ft)	Critical WSEL (ft)	Average Velocity (ft/s)	Top Width of Flow (ft)	Hydraulic Depth of Flow (ft)	Maximum Channel Depth (ft)	Froude Number	Left Station where WSEL Meets Ground	Right Station where WSEL Meets Ground
1.107	978	2160.8	2160.8	7.6	74.1	1.7	2.8	1.01	9950.9	10025.0
	978	2160.8	2160.8	7.6	74.1	1.7	2.8	1.01	9950.9	10025.0
1.016	978	2148.2	2148.2	6.0	150.4	1.1	2.2	1.01	9975.9	10126.4
	978	2148.2	2148.2	6.0	150.4	1.1	2.2	1.01	9975.9	10126.4
0.931	978	2134.3	2134.3	6.2	133.7	1.2	4.3	1.01	9947.0	10080.7
	978	2134.3	2134.3	6.2	133.7	1.2	4.3	1.01	9947.0	10080.7
0.860	978	2127.9	2127.6	5.3	131.1	1.4	1.9	0.79	9894.1	10025.2
	978	2127.9	2127.6	5.3	131.1	1.4	1.9	0.79	9894.1	10025.2
0.802	978	2122.8		4.2	233.4	1.0	2.8	0.73	9784.5	10017.9
	978	2122.8		4.2	233.4	1.0	2.8	0.73	9784.5	10017.9
0.741	978	2116.8		4.9	241.9	0.9	2.8	0.84	9874.9	10174.9
	978	2116.8		4.9	241.9	0.9	2.8	0.84	9874.9	10174.9
0.707	978	2114.7		5.0	329.2	0.9	2.7	0.61	9906.1	10235.4
	978	2114.7		5.0	329.2	0.9	2.7	0.61	9906.1	10235.4
0.612	978	2108.3	2108.3	5.8	231.3	0.8	2.3	0.88	9912.8	10144.1
	978	2108.3	2108.3	5.8	231.3	0.8	2.3	0.88	9912.8	10144.1
0.505	1778	2101.2		5.3	182.8	2.0	5.2	0.56	9890.7	10073.5
	1778	2101.2		5.3	182.8	2.0	5.2	0.56	9890.7	10073.5
0.410	1778	2094.8	2094.8	8.8	82.7	2.4	4.8	1.00	9957.1	10039.8
	1778	2094.8	2094.8	8.8	82.7	2.4	4.8	1.00	9957.1	10039.8
0.323	1778	2090.7		5.3	111.5	3.0	4.7	0.53	9927.9	10039.5
	1778	2090.7		5.3	111.5	3.0	4.7	0.53	9927.9	10039.5
0.225	1778	2084.8	2084.8	7.1	165.7	1.5	2.8	1.01	9933.6	10099.3
	1778	2084.8	2084.8	7.1	165.7	1.5	2.8	1.01	9933.6	10099.3
0.133	1778	2079.7		3.3	183.3	3.0	3.7	0.34	9918.2	10101.5
	1778	2079.7		3.3	183.3	3.0	3.7	0.34	9918.2	10101.5
0.101	1778	2079.6		2.9	204.0	3.6	7.6	0.21	9882.5	10086.5
	1778	2079.6		2.9	204.0	3.6	7.6	0.21	9882.5	10086.5

Table 2c: Tributary 10A Summary (cont.)

Cross Section Identifier	Peak Discharge (cfs)	WSEL (ft)	Critical WSEL (ft)	Average Velocity (ft/s)	Top Width of Flow (ft)	Hydraulic Depth of Flow (ft)	Maximum Channel Depth (ft)	Froude Number	Left Station where WSEL Meets Ground	Right Station where WSEL Meets Ground
0.090	1778	2079.6	2075.2	1.9	261.4	3.7	7.6	0.16	9813.5	10074.9
	1778	2079.6	2075.2	1.9	261.4	3.7	7.6	0.16	9813.5	10074.9
	Culvert									
0.064	1778	2073.5		6.2	137.0	2.1	3.5	0.75	9938.5	10075.5
	1778	2073.5		6.2	137.0	2.1	3.5	0.75	9938.5	10075.5
0.029	1778	2069.7	2069.6	9.1	70.7	2.8	5.7	0.96	9959.9	10030.5
	1778	2069.7	2069.6	9.1	70.7	2.8	5.7	0.96	9959.9	10030.5

Table 2d: Tributary 6C Summary

Cross Section Identifier	Peak Discharge (cfs)	WSEL (ft)	Critical WSEL (ft)	Average Velocity (ft/s)	Top Width of Flow (ft)	Hydraulic Depth of Flow (ft)	Maximum Channel Depth (ft)	Froude Number	Left Station where WSEL Meets Ground	Right Station where WSEL Meets Ground
0.923	758	2277.9	2277.9	8.8	36.5	2.4	3.9	1.01	9983.5	10020.0
	758	2277.9	2277.9	8.8	36.5	2.4	3.9	1.01	9983.5	10020.0
0.857	758	2255.9	2255.9	8.8	35.8	2.4	3.9	1.01	9979.5	10015.3
	758	2255.9	2255.9	8.8	35.8	2.4	3.9	1.01	9979.5	10015.3
0.791	758	2234.9	2234.9	7.6	56.5	1.8	2.9	1.01	9971.8	10028.3
	758	2234.9	2234.9	7.6	56.5	1.8	2.9	1.01	9971.8	10028.3
0.718	758	2217.6	2217.6	6.8	79.5	1.4	1.6	1.01	9952.1	10031.6
	758	2217.6	2217.6	6.8	79.5	1.4	1.6	1.01	9952.1	10031.6
0.652	758	2207.0	2207.0	5.5	149.0	0.9	3.0	1.00	9971.0	10119.9
	758	2207.0	2207.0	5.5	149.0	0.9	3.0	1.00	9971.0	10119.9
0.582	758	2195.1	2194.9	4.2	204.0	0.9	1.1	0.79	9920.9	10124.9
	758	2195.1	2194.9	4.2	204.0	0.9	1.1	0.79	9920.9	10124.9
0.505	758	2186.1	2186.1	6.6	85.3	1.4	2.1	1.00	9961.6	10046.8
	758	2186.1	2186.1	6.6	85.3	1.4	2.1	1.00	9961.6	10046.8
0.446	758	2178.6		5.3	127.9	1.1	2.6	0.89	9964.6	10092.5
	758	2178.6		5.3	127.9	1.1	2.6	0.89	9964.6	10092.5
0.363	758	2170.7	2170.7	6.2	102.8	1.2	2.7	1.00	9966.2	10068.9
	758	2170.7	2170.7	6.2	102.8	1.2	2.7	1.00	9966.2	10068.9
0.28	758	2162.2		6.3	71.9	1.7	2.2	0.86	9969.1	10041.1
	758	2162.2		6.3	71.9	1.7	2.2	0.86	9969.1	10041.1
0.245	758	2159.4	2159.3	5.9	97.4	1.3	3.4	0.91	9934.2	10031.6
	758	2159.4	2159.3	5.9	97.4	1.3	3.4	0.91	9934.2	10031.6
0.157	758	2149.9	2149.8	6.8	67.8	1.6	3.9	0.94	9946.1	10013.9
	758	2149.9	2149.8	6.8	67.8	1.6	3.9	0.94	9946.1	10013.9
0.072	758	2141.3	2141.1	6.1	77.1	1.6	3.3	0.84	9972.5	10049.5
	758	2141.3	2141.1	6.1	77.1	1.6	3.3	0.84	9972.5	10049.5

Table 2e: Tributary 6B Summary

Cross Section Identifier	Peak Discharge (cfs)	WSEL (ft)	Critical WSEL (ft)	Average Velocity (ft/s)	Top Width of Flow (ft)	Hydraulic Depth of Flow (ft)	Maximum Channel Depth (ft)	Froude Number	Left Station where WSEL Meets Ground	Right Station where WSEL Meets Ground
1.803	1477	2303.1	2303.0	6.0	181.1	1.4	3.1	0.91	9974.2	10155.3
	1477	2303.1	2303.0	6.0	181.1	1.4	3.1	0.91	9974.2	10155.3
1.739	1477	2295.9	2295.9	7.7	107.1	1.8	3.9	1.01	9902.4	10009.5
	1477	2295.9	2295.9	7.7	107.1	1.8	3.9	1.01	9902.4	10009.5
1.705	1477	2293.3		7.2	74.2	2.8	5.3	0.76	9952.3	10026.5
	1477	2293.3		7.2	74.2	2.8	5.3	0.76	9952.3	10026.5
1.799	2007	2306.5	2306.5	9.3	82.5	2.6	6.5	1.01	9943.3	10025.8
	2007	2306.5	2306.5	9.3	82.5	2.6	6.5	1.01	9943.3	10025.8
1.705	2007	2295.1	2295.1	7.3	171.2	1.6	5.1	1.01	9868.3	10039.5
	2007	2295.1	2295.1	7.3	171.2	1.6	5.1	1.01	9868.3	10039.5
1.665	3169	2290.9	2290.9	8.6	162.7	2.3	4.9	1.00	9862.8	10025.5
	3169	2290.9	2290.9	8.6	162.7	2.3	4.9	1.00	9862.8	10025.5
1.611	3169	2284.2	2284.2	7.0	302.2	1.5	4.2	1.01	9739.5	10041.8
	3169	2284.2	2284.2	7.0	302.2	1.5	4.2	1.01	9739.5	10041.8
1.53	3169	2274.6		7.7	165.3	2.5	4.6	0.86	9886.5	10051.8
	3169	2274.6		7.7	165.3	2.5	4.6	0.86	9886.5	10051.8
1.486	3169	2274.5	2270.4	2.4	286.7	4.6	8.5	0.19	9818.1	10104.8
	3169	2274.5	2270.4	2.4	286.7	4.6	8.5	0.19	9818.1	10104.8
Culvert										
1.48	3169	2268.8		8.5	142.7	2.6	4.8	0.92	9949.3	10092.0
	3169	2268.8		8.5	142.7	2.6	4.8	0.92	9949.3	10092.0
1.444	3169	2266.1	2266.1	8.5	167.1	2.2	6.1	1.00	9967.3	10134.4
	3169	2266.1	2266.1	8.5	167.1	2.2	6.1	1.00	9967.3	10134.4
1.387	3169	2261.7	2261.7	7.6	237.2	1.8	5.7	1.01	9853.6	10090.8
	3169	2261.7	2261.7	7.6	237.2	1.8	5.7	1.01	9853.6	10090.8
1.309	3169	2253.9	2253.6	6.4	262.9	1.9	3.9	0.83	9751.8	10014.7
	3169	2253.9	2253.6	6.4	262.9	1.9	3.9	0.83	9751.8	10014.7

Table 2e: Tributary 6B Summary (cont.)

Cross Section Identifier	Peak Discharge (cfs)	WSEL (ft)	Critical WSEL (ft)	Average Velocity (ft/s)	Top Width of Flow (ft)	Hydraulic Depth of Flow (ft)	Maximum Channel Depth (ft)	Froude Number	Left Station where WSEL Meets Ground	Right Station where WSEL Meets Ground
1.206	3169	2246.3	2246.3	7.2	275.3	1.6	2.3	1.01	9926.3	10201.5
	3169	2246.3	2246.3	7.2	275.3	1.6	2.3	1.01	9926.3	10201.5
1.135	3169	2238.4	2238.4	6.8	334.6	1.4	6.4	1.01	9917.5	10252.0
	3169	2238.4	2238.4	6.8	334.6	1.4	6.4	1.01	9917.5	10252.0
1.056	3169	2232.3	2232.3	6.3	448.0	1.1	6.3	1.06	9768.1	10216.1
	3169	2232.3	2232.3	6.3	448.0	1.1	6.3	1.06	9768.1	10216.1
0.976	3169	2225.6		4.5	318.5	2.2	5.6	0.54	9734.3	10052.8
	3169	2225.6		4.5	318.5	2.2	5.6	0.54	9734.3	10052.8
0.881	3169	2217.4	2216.8	5.7	292.7	1.9	5.4	0.73	9754.1	10046.8
	3169	2217.4	2216.8	5.7	292.7	1.9	5.4	0.73	9754.1	10046.8
0.793	3169	2207.3	2207.3	8.2	187.0	2.1	3.3	1.01	9708.1	10011.3
	3169	2207.3	2207.3	8.2	187.0	2.1	3.3	1.01	9708.1	10011.3
0.703	3169	2200.6		6.4	320.8	1.6	4.6	0.90	9730.3	10051.1
	3169	2200.6		6.4	320.8	1.6	4.6	0.90	9730.3	10051.1
0.629	3169	2193.1	2193.1	9.5	149.1	2.4	5.1	0.94	9930.9	10080.0
	3169	2193.1	2193.1	9.5	149.1	2.4	5.1	0.94	9930.9	10080.0
0.547	2288	2186.3	2186.3	8.7	512.1	1.8	4.3	0.89	9554.9	10067.0
	2288	2186.3	2186.3	8.7	512.1	1.8	4.3	0.89	9554.9	10067.0
0.476	2031	2180.6	2180.2	6.9	175.3	2.5	2.6	0.76	9853.7	10029.0
	2031	2180.6	2180.2	6.9	175.3	2.5	2.6	0.76	9853.7	10029.0
0.42	1864	2176.2	2176.1	8.7	84.7	2.5	4.2	0.96	9925.3	10010.0
	1864	2176.2	2176.1	8.7	84.7	2.5	4.2	0.96	9925.3	10010.0
0.352	1306	2170.6		5.3	236.4	1.1	2.6	0.91	9926.6	10163.0
	1306	2170.6		5.3	236.4	1.1	2.6	0.91	9926.6	10163.0
0.258	921	2160.7		6.4	91.9	1.6	2.7	0.90	9975.8	10067.7
	921	2160.7		6.4	91.9	1.6	2.7	0.90	9975.8	10067.7
0.164	921	2153.2	2153.2	6.1	123.8	1.2	3.2	0.96	9956.3	10080.1
	921	2153.2	2153.2	6.1	123.8	1.2	3.2	0.96	9956.3	10080.1
0.137	921	2151.2	2151.0	4.8	164.0	1.2	3.2	0.78	9900.0	10064.0
	921	2151.2	2151.0	4.8	164.0	1.2	3.2	0.78	9900.0	10064.0

Culvert hydraulic results are summarized in Table 3. The culvert located in Tributary 12 is a double barrel CMP with a diameter of five feet and a length of approximately 75 feet at each barrel. The culvert in Tributary 10B is also a double barrel CMP with a diameter of five feet and a length of approximately 80 feet at each barrel. Another double barrel CMP culvert six feet in diameter on Tributary 10A is approximately 73 feet in length. The culvert in Tributary 6B is a concrete box culvert that has a span of ten feet, a rise of six feet, and a length of approximately 30 feet.

Table 3a: Tributary 12 Culvert Hydraulics

Cross Section	WSEL (ft)	EGL Elevation (ft)	Peak Discharge (cfs)	Discharge Through Structure (cfs)	Discharge Over Road (cfs)	Velocity Head (ft)	Friction Loss	Contraction Coefficient	Expansion Coefficient
0.409	2069.9	2070.0	2255	491	1764	2.4	1.4	0.5	1.0
	2069.9	2070.0	2255	491	1764	2.4	1.4	0.5	1.0

Table 3b: Tributary 10B Culvert Hydraulics

Cross Section	WSEL (ft)	EGL Elevation (ft)	Peak Discharge (cfs)	Discharge Through Structure (cfs)	Discharge Over Road (cfs)	Velocity Head (ft)	Friction Loss	Contraction Coefficient	Expansion Coefficient
0.11	2066.4	2066.5	1820	517	1303	2.7	1.7	0.5	1.0
	2066.4	2066.5	1820	517	1303	2.7	1.7	0.5	1.0

Table 3c: Tributary 10A Culvert Hydraulics

Cross Section	WSEL (ft)	EGL Elevation (ft)	Peak Discharge (cfs)	Discharge Through Structure (cfs)	Discharge Over Road (cfs)	Velocity Head (ft)	Friction Loss	Contraction Coefficient	Expansion Coefficient
0.082	2079.6	2079.6	1778	619	1159	2.5	1.1	0.5	1.0
	2079.6	2079.6	1778	619	1159	2.5	1.1	0.5	1.0

Table 3d: Tributary 6B Culvert Hydraulics

Cross Section	WSEL (ft)	EGL Elevation (ft)	Peak Discharge (cfs)	Discharge Through Structure (cfs)	Discharge Over Road (cfs)	Velocity Head (ft)	Friction Loss	Contraction Coefficient	Expansion Coefficient
1.483	2274.5	2274.5	3169	663	2506	1.9	0.23	0.5	1.0
	2274.5	2274.5	3169	663	2506	1.9	0.23	0.5	1.0

Table 4 summarizes the surface area innundated by the floodplains and the floodways. Surface area is reported in both square miles and acres.

Table 4: Floodplain/Floodway Surface Areas

Tributary	Floodplain Surface Area (mi2)	Floodplain Surface Area (acres)	Floodway Surface Area (mi2)	Floodway Surface Area (acre)
12	0.04	25.2	0.04	25.2
10B	0.03	16.0	0.03	16.0
10A	0.04	24.2	0.04	24.2
6C	0.01	9.2	0.01	9.2
6B	0.09	58.9	0.08	54.1

5.9.2 Verification of Results

The results from the HEC-RAS model study are reasonable. Floodplain boundaries follow topographic variations on the work-study maps.

SECTION 6: DRAFT FIS REPORT DATA

6.1 Summary of Discharges

A summary of the peak discharges used in this study is presented in Table 5.

Table 5: Summary of Discharges

Tributary	Cross Section	Discharge (cfs)
12	0.053	2255
10B	0.088	1820
10A	0.029	1778
	0.612	978
6C	0.072	758
6B	0.137	921
	0.352	1306
	0.420	1864
	0.476	2031
	0.547	2288
	0.629	3169
North Reach	1.705	1477
South Reach	1.705	2007

6.2 Floodway Data

The floodway data tables in FEMA format are provided for each tributary in Table 6.

FLOODING SOURCE		FLOODWAY			WATER SURFACE ELEVATION		
Cross Section	Distance [1]	Width (ft)	Section Area (ft^2)	Velocity (ft^2/s)	With Floodway (ft)	Without Floodway (ft)	Difference (ft)
A	0.053	355.0	445.6	5.1	2031.9	2031.9	0.0
B	0.249	170.4	307.9	7.3	2050.1	2050.1	0.0
C	0.398	182.0	339.2	6.7	2065.0	2065.0	0.0
D	0.409	251.9	497.5	3.5	2070.0	2070.0	0.0
E	0.469	236.5	441.2	5.1	2070.0	2070.0	0.0
F	0.659	148.5	283.0	8.0	2084.5	2084.5	0.0
G	0.847	165.5	294.4	7.7	2101.1	2101.1	0.0
H	1.416	142.1	281.2	8.0	2151.6	2151.6	0.0

[1] Miles above confluence with Skunk Creek

Table 6a

FEDERAL EMERGENCY MANAGEMENT AGENCY

MARICOPA COUNTY, ARIZONA

FLOODWAY DATA

SKUNK CREEK TRIBUTARY 12

FLOODING SOURCE		FLOODWAY			WATER SURFACE ELEVATION		
Cross Section	Distance [1]	Width (ft)	Section Area (ft^2)	Velocity (ft^2/s)	With Floodway (ft)	Without Floodway (ft)	Difference (ft)
A	0.088	259.4	367.2	5.0	2057.9	2057.9	0.0
B	0.100	250.4	324.1	5.6	2059.3	2059.3	0.0
C	0.121	283.6	1327.6	1.4	2066.4	2066.4	0.0
D	0.214	133.9	238.3	7.6	2068.7	2068.7	0.0
E	0.435	72.6	194.6	9.4	2087.1	2087.1	0.0
F	0.492	72.9	219.3	8.3	2090.3	2090.3	0.0
G	0.530	110.8	224.7	8.1	2096.2	2096.2	0.0
H	0.607	85.0	205.7	8.9	2102.5	2102.5	0.0
I	1.098	82.3	215.5	8.5	2146.0	2146.0	0.0
J	1.134	72.8	194.4	9.4	2150.9	2150.9	0.0
K	1.232	79.3	218.3	8.3	2159.9	2159.9	0.0
L	1.296	57.3	180.0	10.1	2166.1	2166.1	0.0

[1] Miles above confluence with Skunk Creek

Table 6b

FEDERAL EMERGENCY MANAGEMENT AGENCY

MARICOPA COUNTY, ARIZONA

FLOODWAY DATA

SKUNK CREEK TRIBUTARY 10B

FLOODING SOURCE		FLOODWAY			WATER SURFACE ELEVATION		
CROSS SECTION	DISTANCE [1]	WIDTH (ft)	SECTION AREA (ft^2)	VELOCITY (ft^2/s)	WITH FLOODWAY (ft)	WITHOUT FLOODWAY (ft)	DIFFERENCE (ft)
A	0.029	70.7	195.6	9.1	2069.7	2069.7	0.0
B	0.064	137.0	287.0	6.2	2073.5	2073.5	0.0
C	0.090	261.4	961.3	1.9	2079.6	2079.6	0.0
D	0.133	183.3	541.0	3.3	2079.7	2079.7	0.0
E	0.225	165.7	252.0	7.1	2084.8	2084.8	0.0
F	0.741	173.8	180.6	5.4	2116.8	2116.8	0.0
G	0.931	140.4	176.9	5.5	2134.4	2134.4	0.0
H	1.107	74.1	129.3	7.6	2160.8	2160.8	0.0

[1] Miles above confluence with Skunk Creek

Table 6c

FEDERAL EMERGENCY MANAGEMENT AGENCY

MARICOPA COUNTY, ARIZONA

FLOODWAY DATA

SKUNK CREEK TRIBUTARY 10A

FLOODING SOURCE		FLOODWAY			WATER SURFACE ELEVATION		
Cross Section	Distance [1]	Width (ft)	Section Area (ft^2)	Velocity (ft^2/s)	With Floodway (ft)	Without Floodway (ft)	Difference (ft)
A	0.072	77.1	124.6	6.1	2141.3	2141.3	0.0
B	0.245	97.4	127.8	5.9	2159.4	2159.4	0.0
C	0.280	71.9	120.3	6.3	2162.2	2162.2	0.0
D	0.446	127.9	142.2	5.3	2178.6	2178.6	0.0
E	0.582	204.0	180.5	4.2	2195.1	2195.1	0.0
F	0.718	79.5	111.9	6.8	2217.6	2217.6	0.0
G	0.791	56.5	99.6	7.6	2234.9	2234.9	0.0
H	0.923	36.5	86.3	8.8	2277.9	2277.9	0.0

[1] Miles above confluence with Skunk Creek

Table 6d

FEDERAL EMERGENCY MANAGEMENT AGENCY

MARICOPA COUNTY, ARIZONA

FLOODWAY DATA

SKUNK CREEK TRIBUTARY 6C

FLOODING SOURCE		FLOODWAY			WATER SURFACE ELEVATION		
Cross Section	Distance [1]	Width (ft)	Section Area (ft^2)	Velocity (ft^2/s)	With Floodway (ft)	Without Floodway (ft)	Difference (ft)
A	0.137	164.0	191.9	4.8	2151.2	2151.2	0.0
B	0.164	123.8	152.2	6.1	2153.2	2153.2	0.0
C	0.420	84.7	214.4	8.7	2176.2	2176.2	0.0
D	0.703	320.8	497.3	6.4	2200.6	2200.6	0.0
E	0.793	187.0	385.5	8.2	2207.3	2207.3	0.0
F	0.881	292.7	557.4	5.7	2217.4	2217.4	0.0
G	1.135	334.6	469.2	6.8	2238.4	2238.4	0.0
H	1.206	275.3	437.7	7.2	2246.3	2246.3	0.0
I	1.309	262.9	493.7	6.4	2253.9	2253.9	0.0
J	1.387	237.2	418.1	7.6	2261.7	2261.7	0.0
K	1.480	142.7	373.5	8.5	2268.8	2268.8	0.0
L	1.486	286.7	1310.7	2.4	2274.5	2274.5	0.0
M	1.530	165.3	410.1	7.7	2274.6	2274.6	0.0
N	1.665	162.7	369.8	8.6	2290.9	2290.9	0.0
O	1.799	82.5	217.0	9.3	2306.5	2306.5	0.0

[1] Miles above confluence with Skunk Creek

Table 6e

FEDERAL EMERGENCY MANAGEMENT AGENCY

MARICOPA COUNTY, ARIZONA

FLOODWAY DATA

SKUNK CREEK TRIBUTARY 6B

FLOODING SOURCE		FLOODWAY			WATER SURFACE ELEVATION		
Cross Section	Distance [1]	Width (ft)	Section Area (ft^2)	Velocity (ft^2/s)	With Floodway (ft)	Without Floodway (ft)	Difference (ft)
N	1.665	162.7	369.8	8.6	2290.9	2290.9	0.0
P	1.705	74.2	205.5	7.2	2293.3	2293.3	0.0
Q	1.739	107.1	192.2	7.7	2295.9	2295.9	0.0
R	1.803	181.1	245.1	6.0	2303.1	2303.1	0.0

[1] Miles above confluence with Skunk Creek

Table 6f

FEDERAL EMERGENCY MANAGEMENT AGENCY

MARICOPA COUNTY, ARIZONA

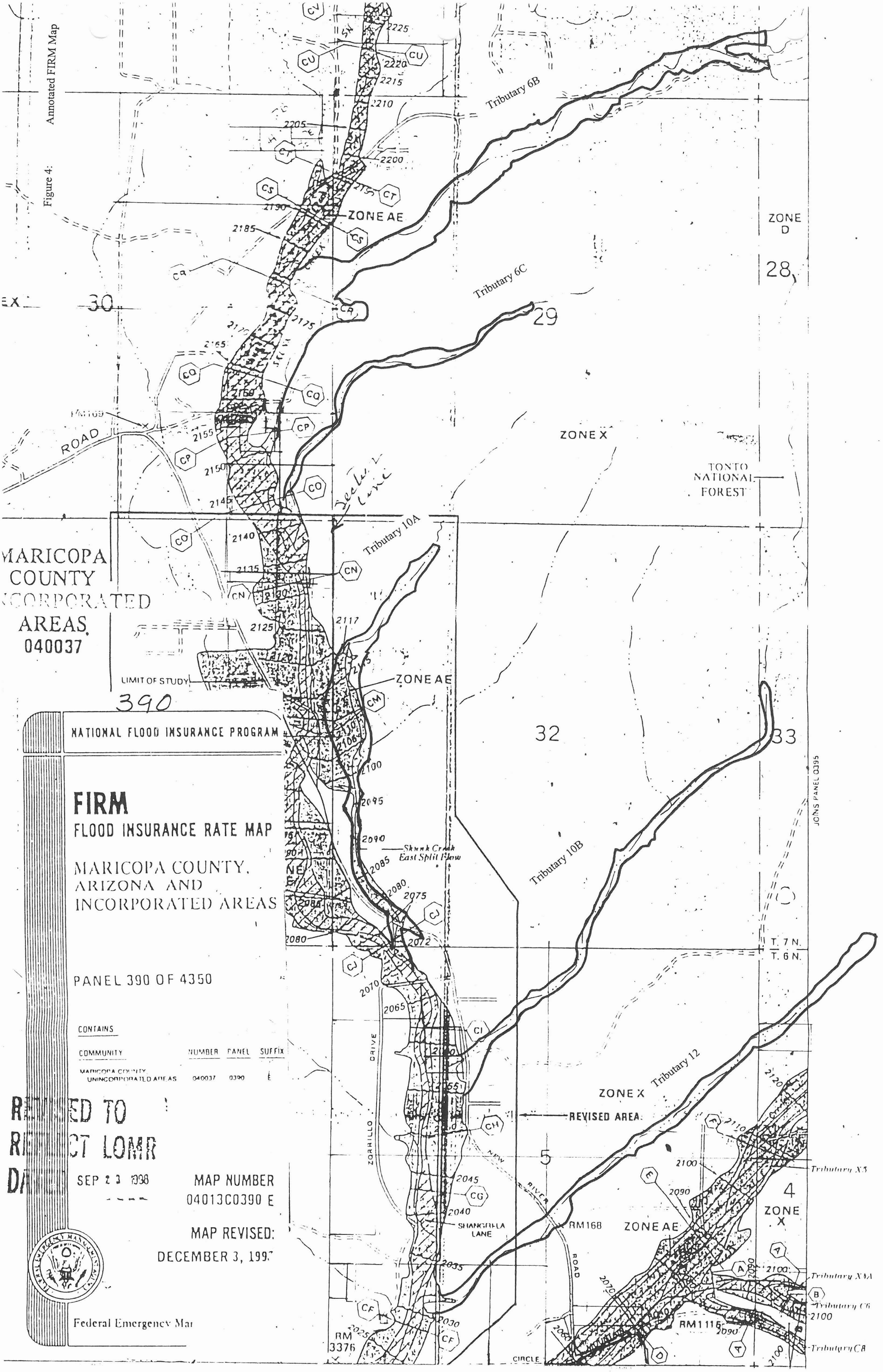
FLOODWAY DATA

SKUNK CREEK TRIB. 6B NORTH REACH

6.3 Annotated FIRM Map

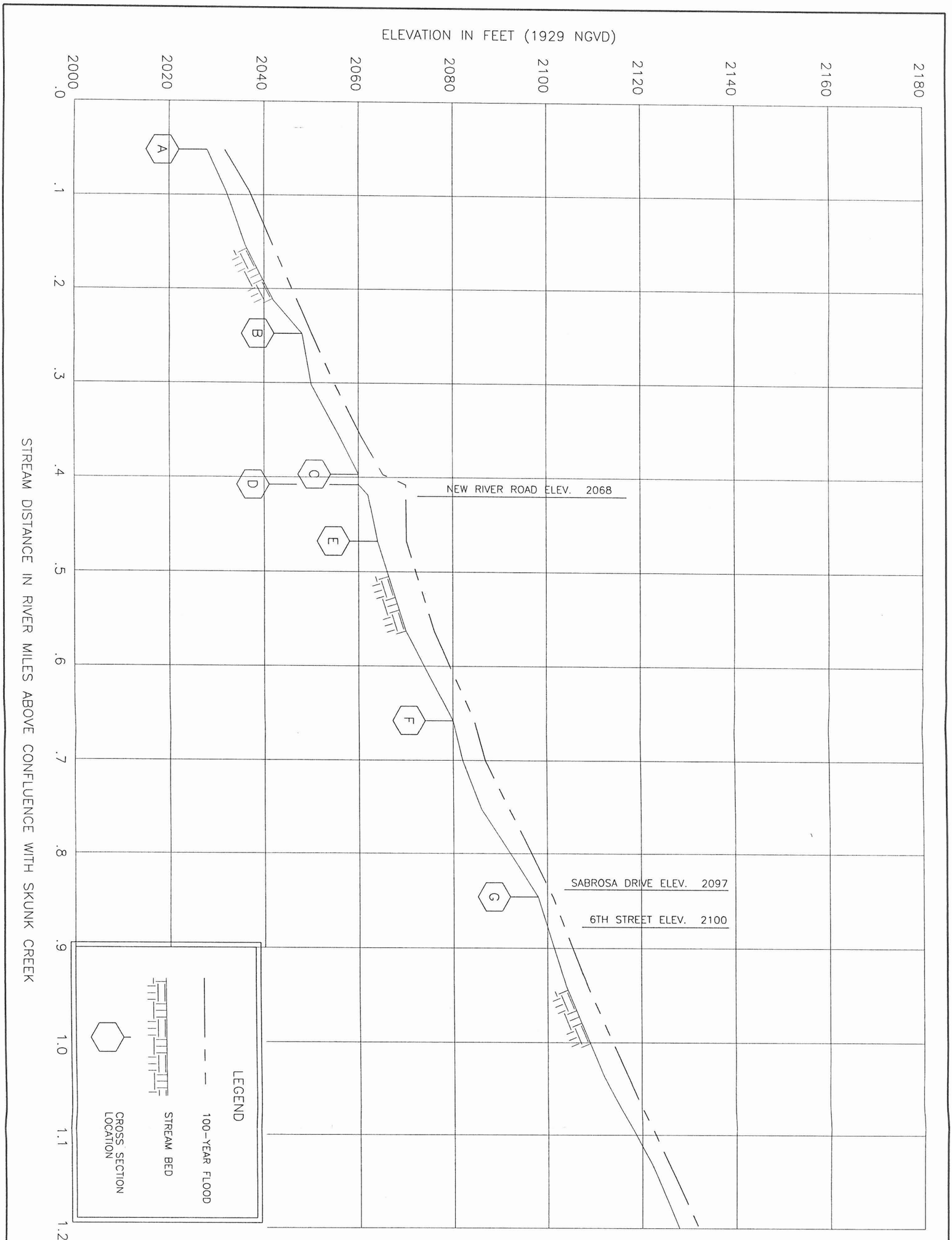
An annotated FIRM Map in FEMA format is in Figure 4.

Figure 4: Annotated FIRM Map



6.4 Flood Profiles

Flood profiles for each tributary in FEMA format are provided in Figure 5.



SHEET 1

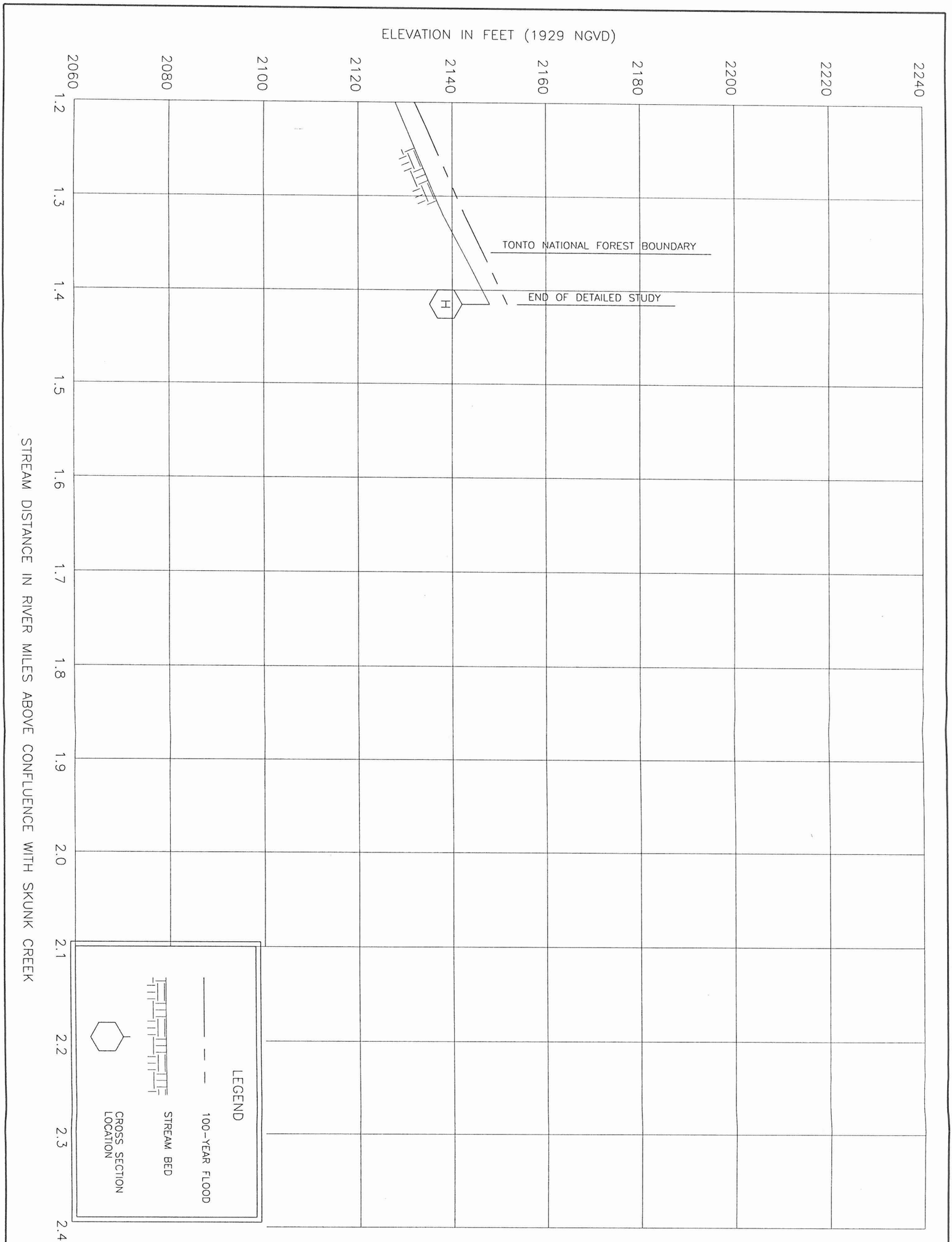
FEDERAL EMERGENCY MANAGEMENT AGENCY

FLOOD CONTROL DISTRICT MARICOPA COUNTY

FLOOD PROFILES

UNINCORPORATED MARICOPA COUNTY, AZ

SKUNK CREEK TRIBUTARY 12



FEDERAL EMERGENCY MANAGEMENT AGENCY

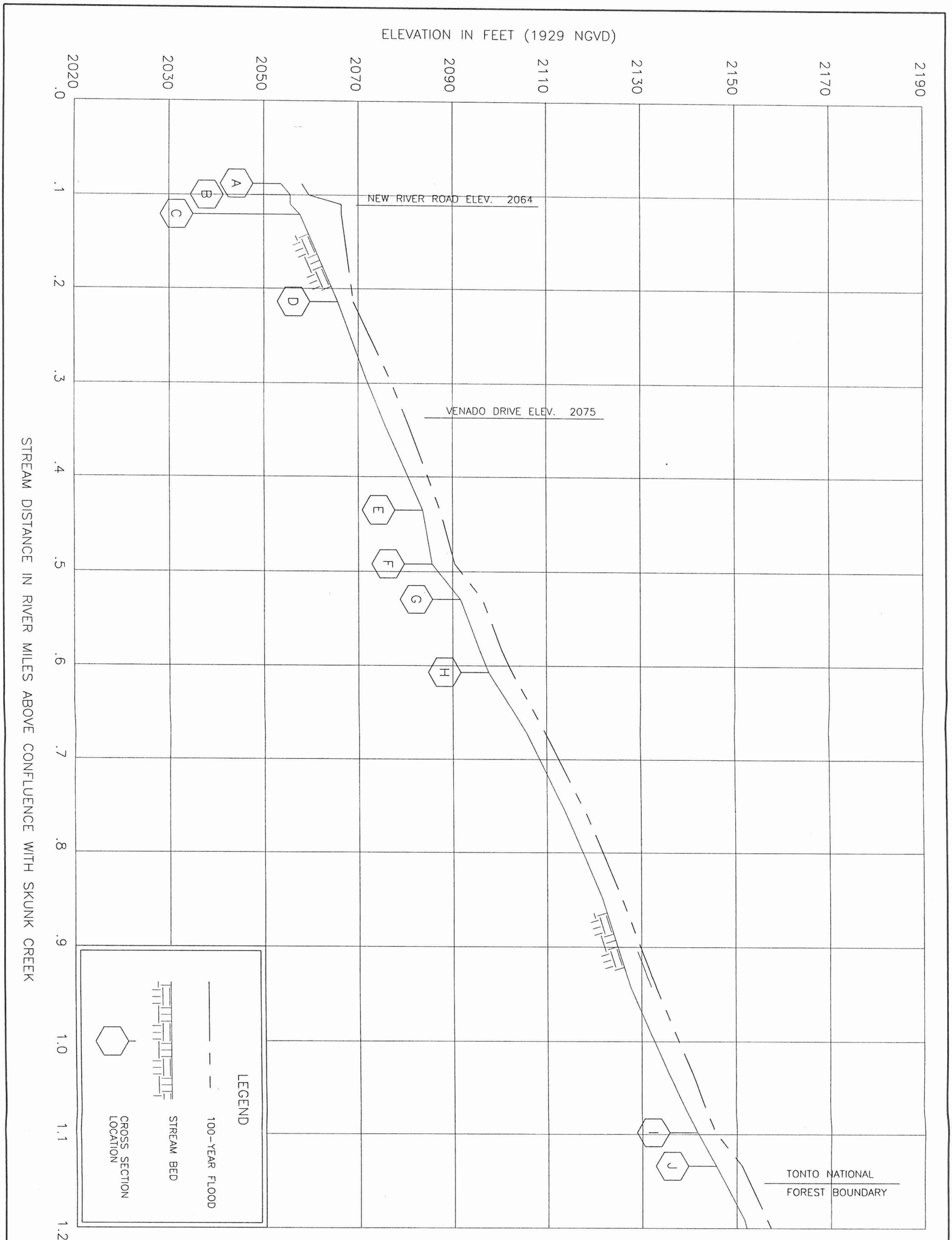
FLOOD CONTROL DISTRICT MARICOPA COUNTY

FLOOD PROFILES

UNINCORPORATED MARICOPA COUNTY, AZ

SKUNK CREEK TRIBUTARY 12

SHEET 2



SHEET 1

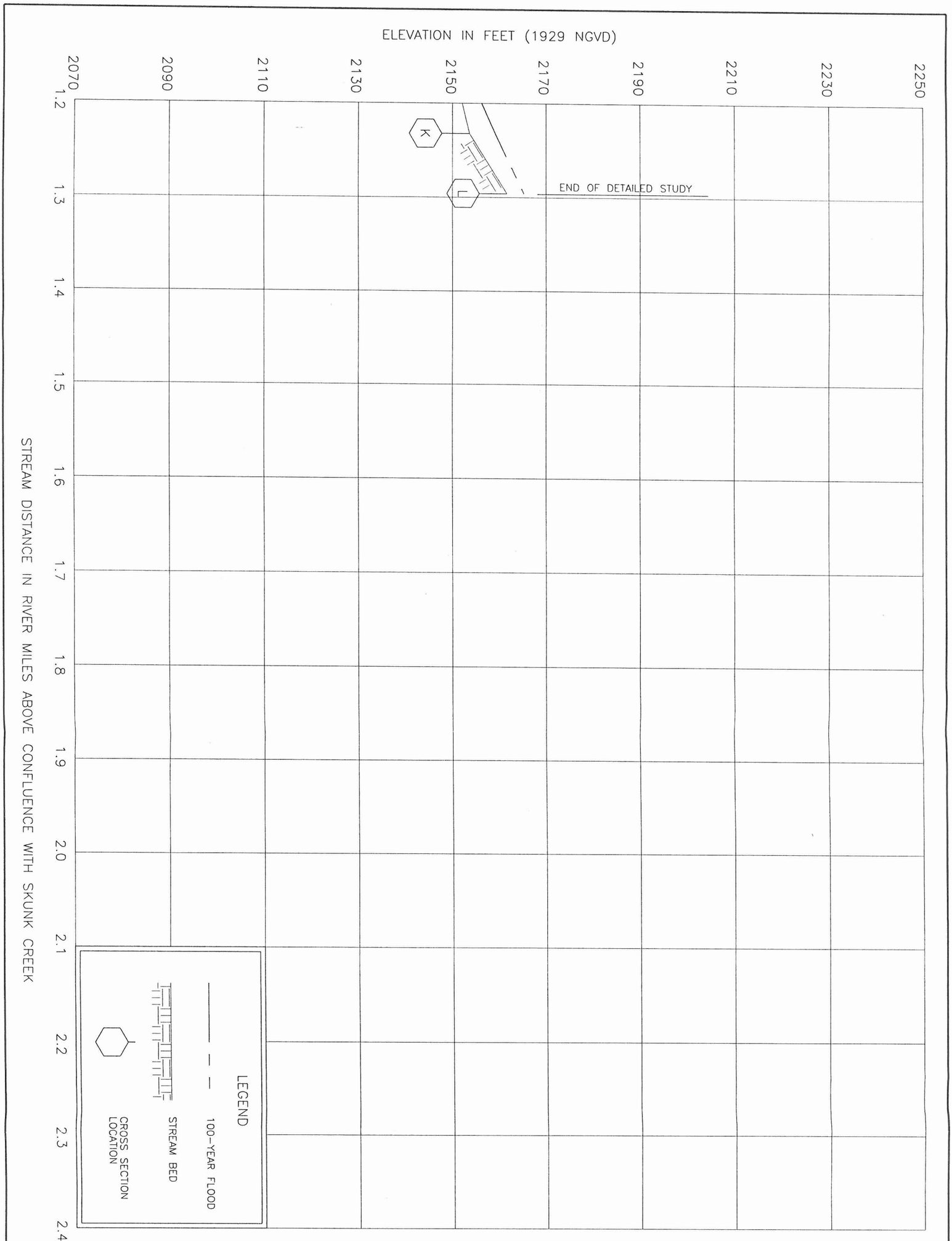
FEDERAL EMERGENCY MANAGEMENT AGENCY

FLOOD CONTROL DISTRICT MARICOPA COUNTY

FLOOD PROFILES

UNINCORPORATED MARICOPA COUNTY, AZ

SKUNK CREEK TRIBUTARY 10B



FEDERAL EMERGENCY MANAGEMENT AGENCY

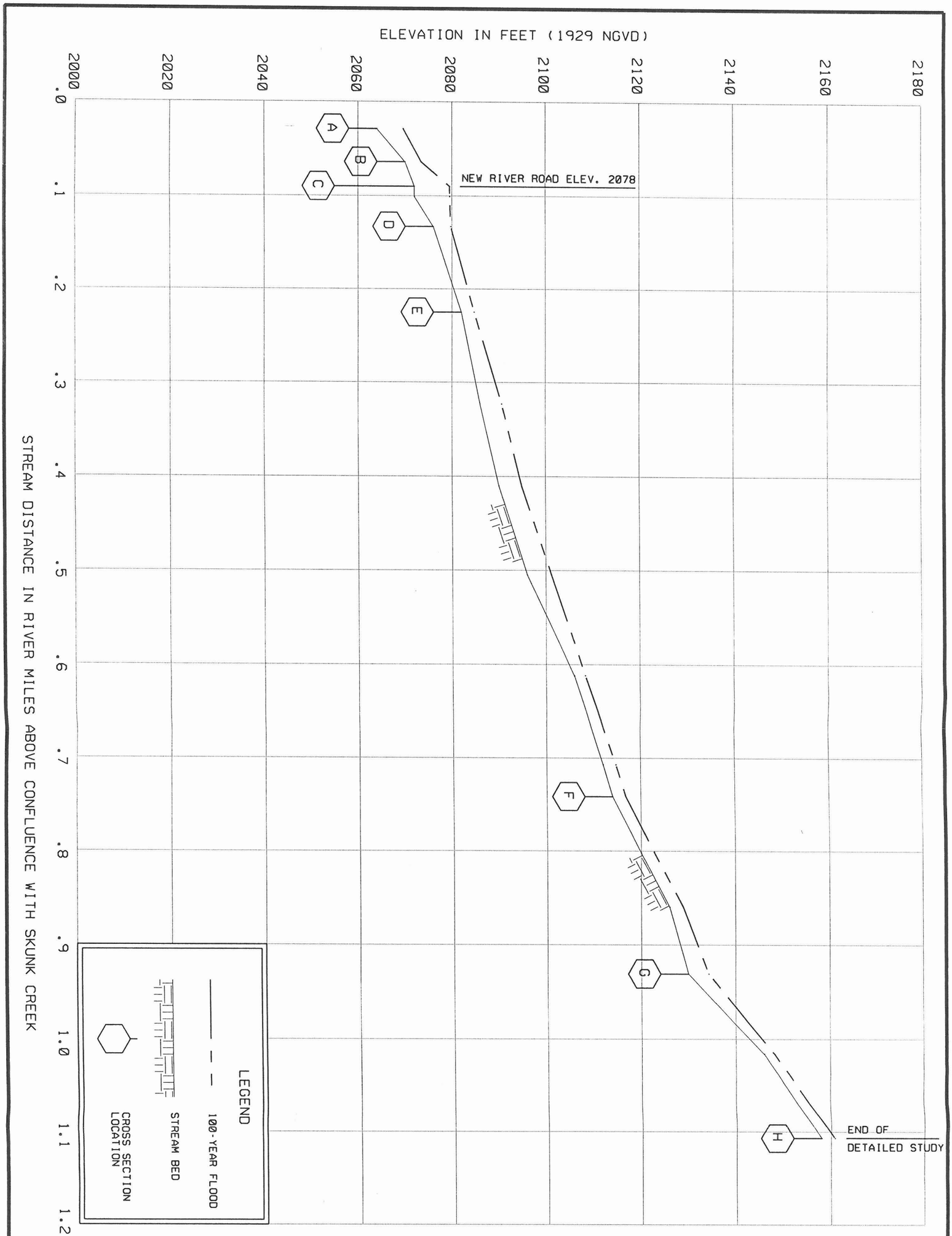
FLOOD CONTROL DISTRICT MARICOPA COUNTY

FLOOD PROFILES

UNINCORPORATED MARICOPA COUNTY, AZ

SKUNK CREEK TRIBUTARY 10B

SHEET 2



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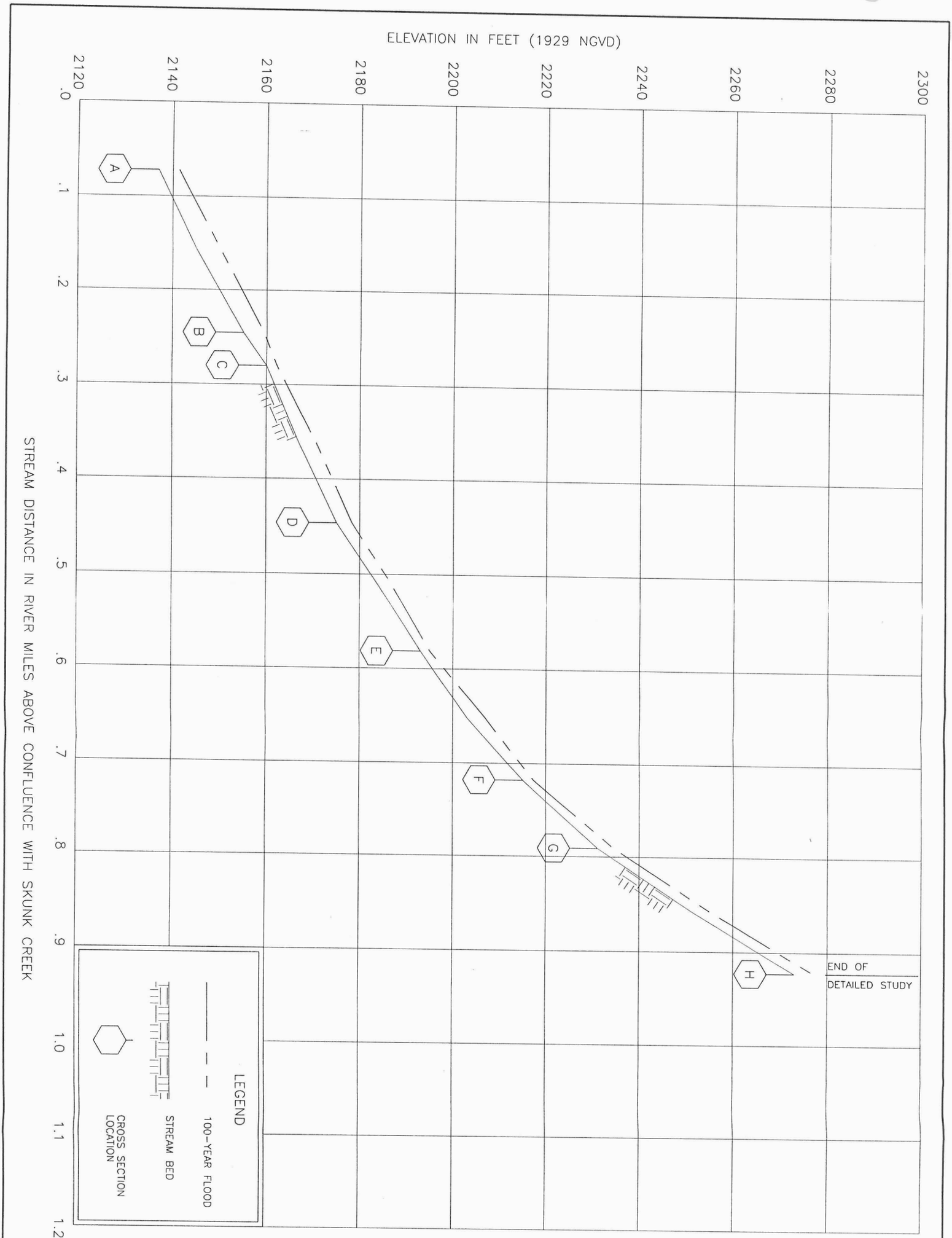
FEDERAL EMERGENCY MANAGEMENT AGENCY

FLOOD CONTROL DISTRICT MARICOPA COUNTY

FLOOD PROFILES

UNINCORPORATED MARICOPA COUNTY, AZ

SKUNK CREEK TRIBUTARY 10A



FEDERAL EMERGENCY MANAGEMENT AGENCY

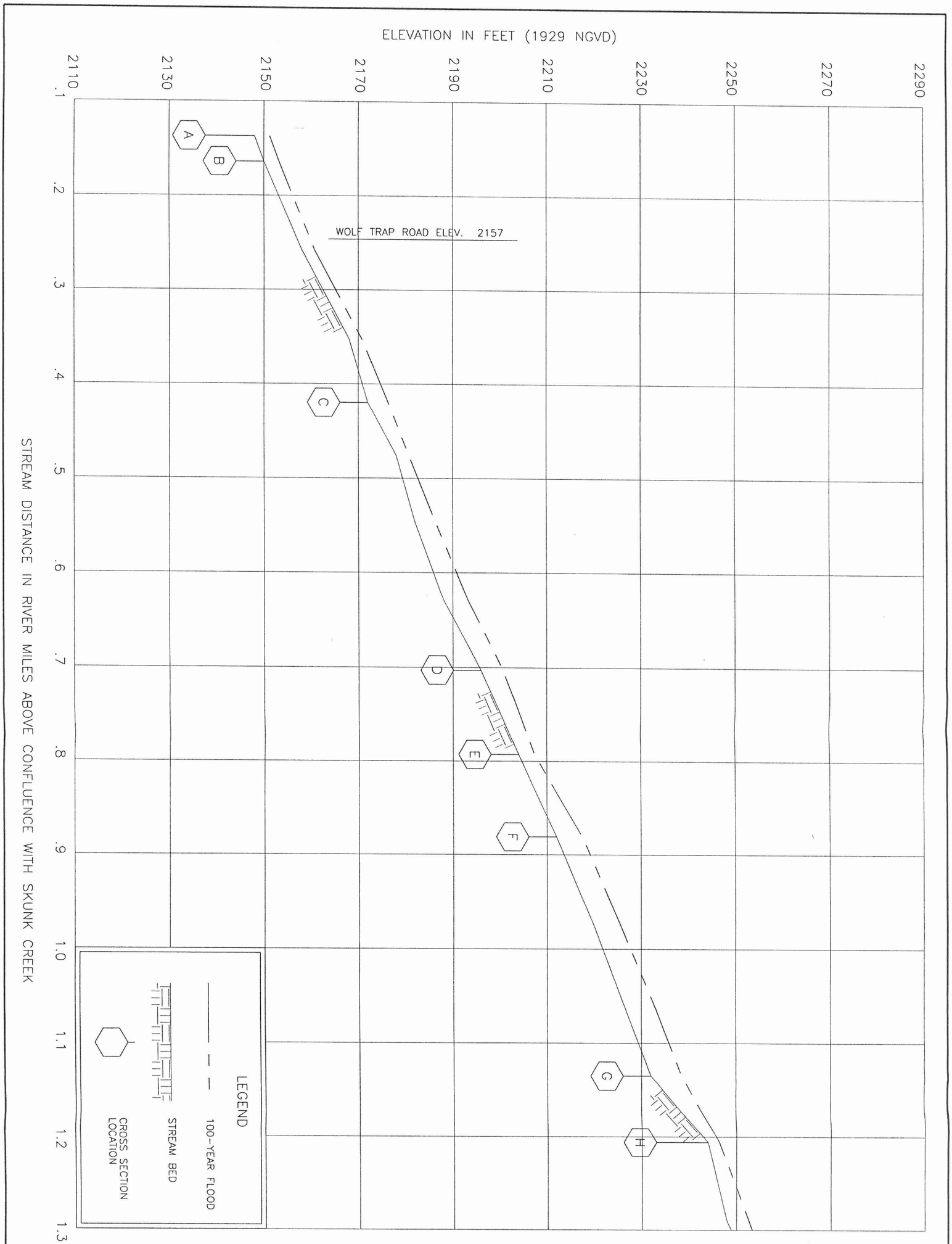
FLOOD CONTROL DISTRICT MARICOPA COUNTY

FLOOD PROFILES

UNINCORPORATED MARICOPA COUNTY, AZ

SKUNK CREEK TRIBUTARY 6C

SHEET 1



FEDERAL EMERGENCY MANAGEMENT AGENCY

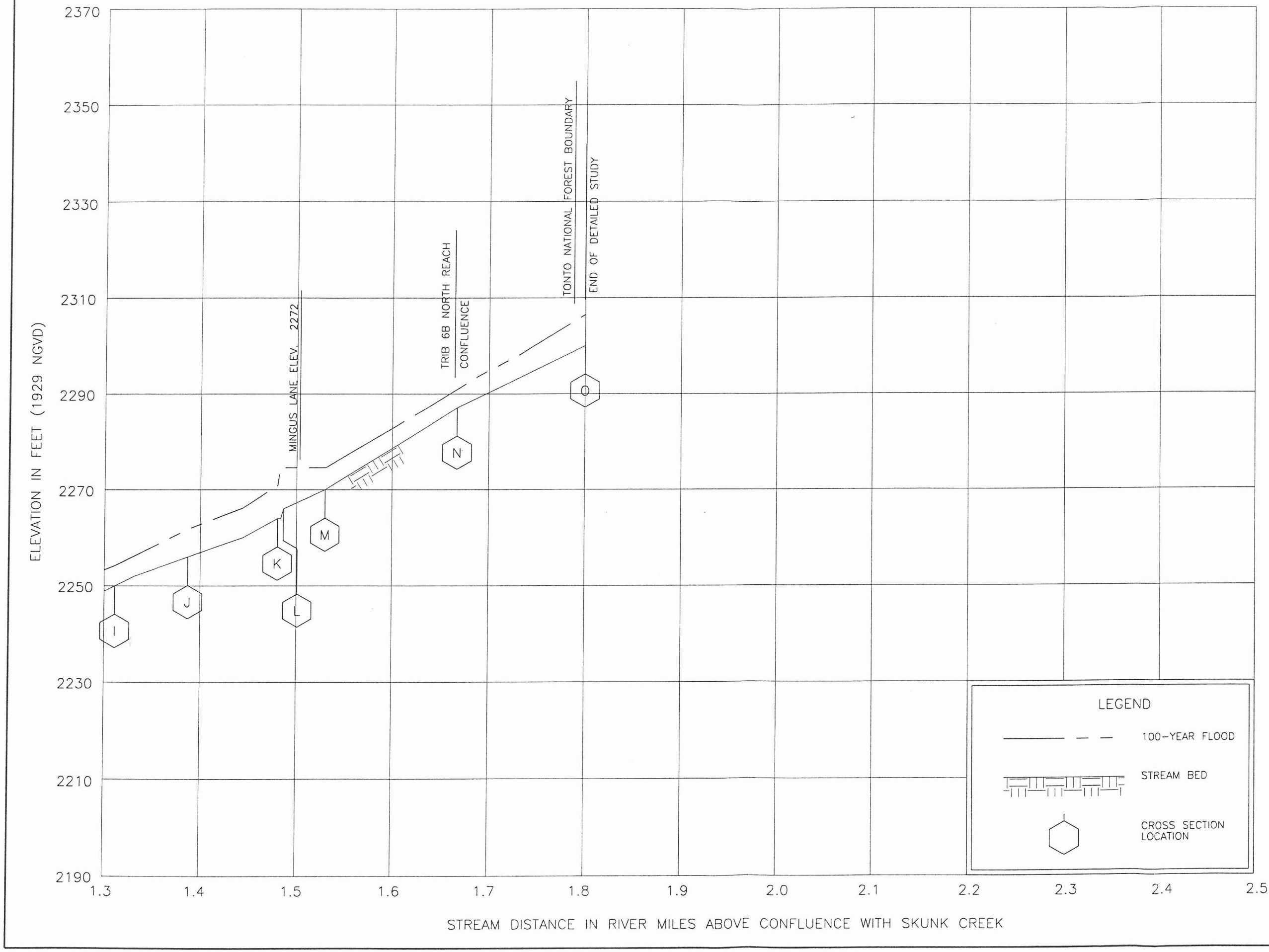
FLOOD CONTROL DISTRICT MARICOPA COUNTY

FLOOD PROFILES

UNINCORPORATED MARICOPA COUNTY, AZ

SKUNK CREEK TRIBUTARY 6B

SHEET 1



FLOOD PROFILES

UNINCORPORATED
MARICOPA COUNTY, AZ

SKUNK CREEK TRIBUTARY 6B

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MARICOPA COUNTY

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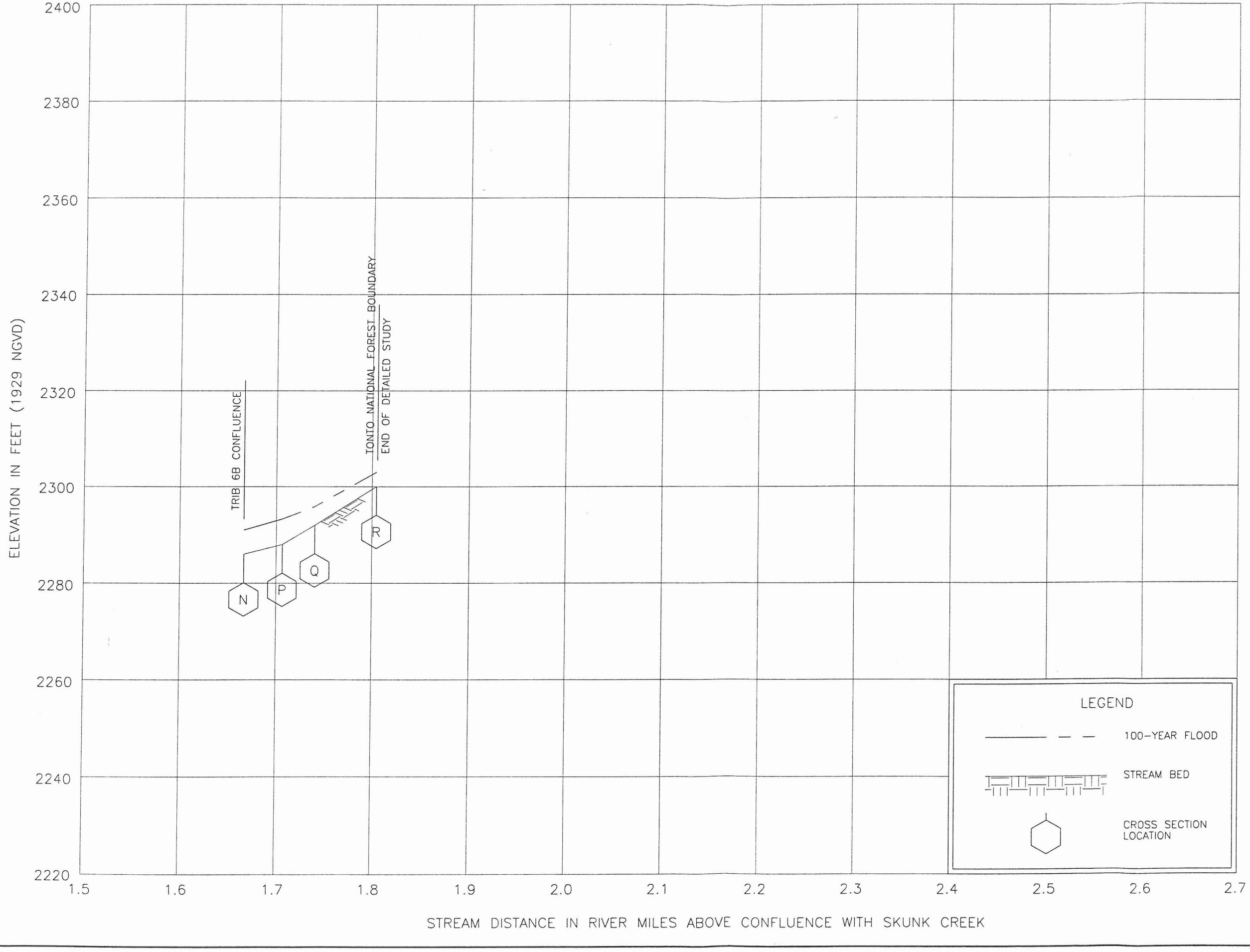

FLOOD PROFILES

UNINCORPORATED
MARICOPA COUNTY, AZ

SKUNK CREEK TRIBUTARY 6B NORTH REACH

FEDERAL EMERGENCY
MANAGEMENT AGENCY

FLOOD CONTROL DISTRICT
MARICOPA COUNTY

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APPENDIX A: REFERENCES

A.1 Data Collection Summary

A HEC-1 hydrologic analysis was completed for the study area by the Hydrology Branch, Engineering Division of the FCD in August 1998. The results of the study are contained in the report "Skunk Creek 3 Tributaries Floodplain Delineation Study (Addendum to the Skunk Creek Floodplain Delineation Study)". A copy of the report is included as Appendix D.

No previous floodplain delineation studies have been completed on any of the study tributaries. Data was collected on floodplain delineation studies completed by Montgomery Watson and Harris-Toup Associates on the main stem of Skunk Creek adjacent to the study area. Montgomery Watson conducted a detailed floodplain delineation study on a portion of the main stem of Skunk Creek in July 1997. The Montgomery Watson study begins at the intersection of Skunk Creek and the Central Arizona Project aqueduct near Highway I-17 and ends just downstream of confluence of Tributary 6C and the main stem of Skunk Creek, south of Wolftrap Road. Harris-Toup Associates conducted a detailed floodplain delineation study on a portion of the main stem of Skunk Creek in 1978. The Harris-Toup study begins at the intersection of the Carefree Highway and Skunk Creek and extends upstream of the confluence with Tributary 6B to Fig Springs Road.

A.2 Referenced Documents

1. Flood Insurance Study for Skunk Creek - Maricopa County, Arizona, Harris-Toup Associates, United States Department of Housing and Urban Development, FIA, 1978.

2. Flood Insurance Study for Skunk Creek - Maricopa County, Arizona, Montgomery-Watson, Flood Control District of Maricopa County, FCD 95-16, July 1997.

3. U.S. Army Corps of Engineers, HEC-RAS River Analysis System User's Manual, (CPD-68), U.S. Army Corps of Engineers, Version 2.2, September, 1998.

4. U.S. Army Corps of Engineers, HEC-RAS River Analysis System Hydraulic Reference Manual, (CPD-69), U.S. Army Corps of Engineers, Version 2.2, August 1998.

5. Chow, V.T., Various Portions, 'Open Channel Hydraulics,' McGraw-Hill Book Company, Inc., New York, 1959. Reissued 1988.

6. Federal Emergency and Management Agency, Flood Insurance Study Guidelines and Specifications for Study Contractors, FEMA 37, January 1995.

7. Arizona Department of Water Resources Flood Mitigation Section, Instructions for Organizing and Submitting Technical Documentation for Flood Studies, State Standard Attachment SSA1-97, November, 1997.

8. Federal Emergency and Management Agency, Appeals, Revisions, and Amendments to Nation Flood Insurance Program Maps, A guide for Community Officials, FIA-12, December, 1993.

9. U.S. Geological Survey, Daisy Mountain, Arizona Topographic Quadrangle, 7.5 Minute Topographic Series, USGS N 3352.5-W11200/7.5, 1964.

10. Flood Control District of Maricopa County, Engineering Division, Hydrology Branch, Skunk Creek 3 Tributaries Floodplain Delineation Study (Addendum to the Skunk Creek Floodplain Delineation Study), Technical Data Notebook, August, 1998.

11. Estimated Manning's Roughness Coefficients for Stream Channels and Floodplains in Maricopa County, Arizona, U.S. Geological Survey, April 1991.

TETRA TECH, INC.
INFRASTRUCTURE SOUTHWEST GROUP
501 North 44th Street, Suite 125, Phoenix, AZ 85008-6596
(602) 629-1100 ■ FAX (602) 629-1186

Formerly:
Simons, Li & Associates, Inc.
IWA Engineers, Inc.
FLO Engineering, Inc.
CDC Engineering, Inc.

April 20, 2000

Mr. Michael Duncan, P.E.
Flood Control District of Maricopa County
2801 West Durango Street
Phoenix, AZ 85009

RE: TOPOGRAPHIC MAPPING AND FLOODPLAIN DELINEATION STUDY FOR TRIBUTARIES TO SKUNK CREEK, Contract FCD 98-22

Dear Michael:

Enclosed for your approval is Change Order Request No. 2 to the above referenced contract, revised as we discussed.

If you have any questions or need additional information regarding the request, please do not hesitate to contact me.

Sincerely,

Tetra Tech, Inc.
Infrastructure Southwest Group

Bart S. Bergendahl, P.E.
Project Manager

BSB/bsb

Enclosure

PAZ-MC-18
ChangeOrderLtr2A.wpd

TOPOGRAPHIC MAPPING AND FLOODPLAIN DELINEATION STUDY FOR TRIBUTARIES TO SKUNK CREEK

Change Order Request No. 2
FCD Contract No. 98-22

I. Introduction

The District has requested that Tetra Tech/Simons, Li & Associates, Inc. perform additional work under the subject contract that is beyond the original scope. The additional work entails extending the floodplain delineation of Tributary 10A and terminating all delineations at the eastern floodway boundary of the Skunk Creek main stem, rather than the floodplain boundary. The floodplain/floodway delineation for Tributary 10A is to be extended downstream, within the floodplain of the Skunk Creek main stem, to the point where the low-flow channel of Tributary 10A confluences with the low-flow channel of the main stem. The tasks and associated effort required to accomplish the additional work are described in detail below.

II. Scope of Work

Task 1 - Coordination

A minimum amount of additional coordination will be required to accomplish the work. This effort is estimated to be approximately 2 hours.

Task 2 - Data Collection

Additional data collection will be required to accomplish the work. The additional data includes the type, size, number of barrels, length, and inlet/outlet geometry of the culvert on Tributary 10A, which passes under New River Road, just above the confluence of the low-flow channels. This data along with photographs of the sub-reach will be provided by the District to assist in identifying bank locations and verifying Manning's roughness coefficients for the additional delineation. The District will also provide the drawing file of the floodway boundary for Skunk Creek prepared by Montgomery-Watson.

Additional discharge information at the confluence of the tributary to Tributary 10A (opposite the New River Road Bridge) will also be required. The additional discharge information will be determined by prorating the drainage sub-area of the tributary to the total drainage area of Tributary 10A.

Task 6 - Floodplain Delineation

The HEC-RAS modeling done for Tributary 10A must be extended in order to delineate the additional floodplain/floodway boundaries, as requested. The modeling completed for Tributary 10A will be extended downstream approximately 4000 feet, along that portion of the channel that

is within the Skunk Creek main-stem floodplain, to the confluence of the low-flow channels just downstream of New River Road. Additional cross-sections will be located at approximately 500-foot intervals to accomplish this task.

One additional work map must be prepared to accommodate the 4000 feet of additional floodplain/floodway delineation requested for Tributary 10A. This will also require modifying the work map index sheet (Sheet 1 of 1). The floodplain/floodway delineations for each of the study tributaries will be modified, as necessary, at their confluence with the main-stem of Skunk Creek in order to tie the delineations to the eastern floodway boundary of Skunk Creek. All drawing files and work maps will be modified accordingly.

Task 7 - Digital Data

As a consequence of extending the floodplain/floodway delineation for Tributary 10A and modifying the delineations at the tributary confluences with the main stem of Skunk Creek, the HIS submittal must be revised. All HIS themes will be generated in accordance with the HIS Data Delivery Specifications, Revision 3.1, dated June 1, 1998, for the additional and modified delineations. This work will be coordinated with the District's GIS database manager.

Task 8- Deliverables

Additional text, tables, mapping, and support data required for the Technical Data Notebook (TDN) will be provided and existing information will be modified, as necessary, to reflect the extended and modified floodplain/floodway delineations described above.

The fee proposal for the requested additional work is attached. It is estimated that the additional work will take approximately four weeks from the approval date of this change order request to complete.

TETRA TECH, INC.
INFRASTRUCTURE SOUTHWEST GROUP
4600 S. Mill Avenue, Suite 200, Tempe, Arizona 85282-6759
(602) 491-1393 ▪ FAX (602) 491-1396

Formerly:
Simons, Li & Associates, Inc.
IWA Engineers, Inc.
FLO Engineering, Inc.
CDC Engineering, Inc.

April 8, 1999

Mr. Pedro Calza
Flood Control District of Maricopa County
2801 West Durango Street
Phoenix, AZ 85009

RE: TOPOGRAPHIC MAPPING AND FLOODPLAIN DELINEATION STUDY FOR TRIBUTARIES TO SKUNK CREEK, Contract FCD 98-22

Dear Pedro:

In accordance with the scope of work for the above referenced project, we are submitting the enclosed draft n-Value/Field Reconnaissance Report for your review and approval. The report also provides the proposed locations and alignments of the channel cross-sections and hydraulic baselines for the five tributaries involved in the study.

Per your direction, entry onto privately fenced property was avoided during field reconnaissance. Access to Tributary 6C and portions of other tributaries was not possible due to such fencing. As a consequence, no ground-level photography was obtained to establish Manning's n-values for Tributary 6C. However, based on the aerial photography, available soils mapping, and the field reconnaissance conducted on the adjacent tributary watersheds, it is evident that the soils and groundcover in the study area are quite homogeneous. Therefore, the n-values established for Tributary 10A, which is similar in size and orientation to Tributary 6C, were used for Tributary 6C.

In addition to the draft n-Value/Field Reconnaissance Report, we are submitting the following documents for your information and use:

- Data Collection Report
- Affidavits of Publication (2)
- Survey Report (2 copies)
- Topographic Mapping DTM/Survey Data (CD)
- Aerial Contact Prints.

• Orthophoto files (CD)

With the submittal of the draft n-Value/Field Reconnaissance Report, we will begin working on the HEC-RAS modeling. Your review and comment on the draft report will be most helpful to the modeling effort.

If you have any questions or need additional information on the enclosed documents, please do not hesitate to contact me.

Sincerely,

Tetra Tech, Inc.
Infrastructure Southwest Group

Bart S. Bergendahl, P.E.
Project Manager

Enclosures

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TETRA TECH, INC.
INFRASTRUCTURE SOUTHWEST GROUP
4600 S. Mill Avenue, Suite 200, Tempe, Arizona 85282-6759
(480) 491-1393 ■ FAX (480) 491-1396

Formerly:
Simons, Li & Associates, Inc.
IWA Engineers, Inc.
FLO Engineering, Inc.
CDC Engineering, Inc.

September 8, 1999

Mr. David Boggs
Flood Control District of Maricopa County
2801 West Durango Street
Phoenix, AZ 85009

RE: TOPOGRAPHIC MAPPING AND FLOODPLAIN DELINEATION STUDY FOR TRIBUTARIES TO SKUNK CREEK, Contract FCD 98-22

Dear David:

In accordance with the scope of work for the above referenced contract, we are submitting the enclosed floodplain/floodway delineation work maps (full-size plots and CD) for your review and approval. Also enclosed are cross-section plots and the HEC-RAS input files (on disk) for each of the five tributaries. Upon receiving your approval of the mapping and models, we will finalize and incorporate them into the draft Technical Data Notebook.

If you have any questions or need additional information regarding this submittal, please do not hesitate to contact me.

Sincerely,

Tetra Tech, Inc.
Infrastructure Southwest Group

Bart S. Bergendahl, P.E.
Project Manager

Enclosure

BSB/ad

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TETRA TECH, INC.
INFRASTRUCTURE SOUTHWEST GROUP
4600 S. Mill Avenue, Suite 200, Tempe, Arizona 85282-6759
(480) 491-1393 ■ FAX (480) 491-1396

Formerly:
Simons, Li & Associates, Inc.
IWA Engineers, Inc.
FLO Engineering, Inc.
CDC Engineering, Inc.

August 25, 1999

Mr. Michael Duncan, P.E.
Flood Control District of Maricopa County
2801 West Durango Street
Phoenix, AZ 85009

RE: TOPOGRAPHIC MAPPING AND FLOODPLAIN DELINEATION STUDY FOR TRIBUTARIES TO SKUNK CREEK, Contract FCD 98-22

Dear Michael:

Enclosed for your review and approval is the revised HIS submittal (CD) for the base topographic mapping from Kenney Aerial Mapping, Inc. With the Kenney submittal is a memorandum from Matt Heineman describing the steps that were taken to correct the errors in their August 11, 1999 submittal. Also enclosed is the HIS submittal (CD) for the CAD deliverables which depict the floodplains, floodways, cross-sections, and baselines of the five tributaries. This submittal consists of a single dxf file for AutoCAD along with the required text files.

If you have any questions or need additional information regarding this submittal, please do not hesitate to contact me.

Sincerely,

Tetra Tech, Inc.
Infrastructure Southwest Group

Bart S. Bergendahl, P.E.
Project Manager

BSB/ad

Enclosures

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PAZ-MC-18

TETRA TECH, INC.
INFRASTRUCTURE SOUTHWEST GROUP
501 North 44th Street, Suite 125
(602) 629-1100 • FAX (602) 629-0725

Formerly: Simons, Li & Associates, Inc.
IWA Engineers, Inc.
FLO Engineering, Inc.
CDC Engineering, Inc.

December 8, 1999

Mr. Michael Duncan, P.E.
Flood Control District of Maricopa County
2801 West Durango Street
Phoenix, AZ 85009

RE: TOPOGRAPHIC MAPPING AND FLOODPLAIN DELINEATION STUDY FOR TRIBUTARIES TO SKUNK CREEK, Contract FCD 98-22

Dear Michael:

In accordance with the scope of work for the above referenced contract, we are submitting our proposed final floodplain/floodway delineation work maps (full-size plots) for the five tributaries, the HEC-RAS model for each, and the HEC-2 weir flow model for Tributary 6B (on disk) for your review and approval. Also enclosed is a copy of our November 10, 1999, meeting minutes and attachments which describe the resolutions to your review comments on our initial submittal. Upon receiving your approval of the mapping and models, we will finalize and incorporate them into the draft Technical Data Notebook.

If you have any questions or need additional information regarding this submittal, please do not hesitate to contact me.

Sincerely,

Tetra Tech, Inc.
Infrastructure Southwest Group

Bart S. Bergendahl, P.E.
Project Manager

BSB/bsb

Enclosures

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SCOPE OF WORK
TOPOGRAPHIC MAPPING AND FLOODPLAIN DELINEATION STUDY
FOR
TRIBUTAIRIES TO SKUNK CREEK
FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
FCD CONTRACT NO. 98-22

GENERAL

The project consists of approximately **5.5 river miles** of floodplain delineation, approximately **3 square miles** of new topographic mapping for the upper Skunk Creek area. These approximate boundaries are shown in Exhibit 1.

The District will provide the hydrology for the study.

The consultant will develop the floodplain and floodway delineations using the HEC-RAS computer model, if appropriate. The consultant must use sound engineering judgement in the development of the hydraulic model. The results of the model must be analyzed carefully and refinements made to the input parameters in order to obtain the most realistic results. All work must meet Arizona Department of Water Resources (ADWR) and Federal Emergency Management Agency (FEMA) requirements for floodplain delineations. The results of this study must be reviewed and accepted by FEMA prior to the finalization of this contract. All work under this scope will be completed within 400 calendar days from the date of Notice to Proceed, including 60 days for District reviews and 180 days for FEMA reviews.

TASK 1 - COORDINATION

1.1 The consultant shall submit a project schedule showing coordination meetings and completion dates for each of the tasks in the scope within 14 days of Notice To Proceed. The consultant shall update this project schedule when appropriate.

1.2 The consultant shall participate in regular coordination meetings (at least once every four weeks) with the District's Project Manager and in milestone coordination meetings in the development of the hydrologic and hydraulic analyses. The consultant is responsible for the minutes of any meetings. Whenever possible, coordination and milestone meetings should be combined.

1.3 The consultant shall submit a quarterly estimation of the projected billing within 14 days of Notice to Proceed. Thereafter, this estimation will be updated and submitted to the District's project manager at least 10 days prior to the end of each quarter.

1.4 The consultant shall submit monthly progress reports at least 5 days before submittal of monthly invoices. The report shall be brief and should be no longer than two typed pages. At a minimum, the monthly report shall contain the following:

a. A description of the work accomplished by task during the reporting month.

b. Percent (%) completed for the month and percent (%) cumulative completed for each task.

c. A brief description of the work to be accomplished the following month.

d. A description of any problems encountered.

1.5 The consultant is responsible for placing the legal advertising at the beginning of the study, notifying the public of the study. The ad will be run in a widely circulated newspaper two times, with approximately one week between runs. The ad must also be run two times in a local newspaper that serves the area being studied. After the ad is run the consultant will supply the District with the original affidavit of publication from each of the newspapers for each day that the ad ran.

1.6 The consultant shall notify all property owners and obtain any necessary Rights of Entry for the study area. The consultant shall furnish the District with a list of all the property owners notified and a sample Right of Entry letter.

1.7 The consultant shall meet with officials from the local public works department. The purpose of this meeting is to identify local flooding problems and obtain information on current and planned public works projects, channel modifications, storm-drainage systems, development, and corporate limits.

1.8 The District shall plan and conduct two public meetings in conjunction with this study. The first meeting will be to inform the public of the purpose and scope of the study. The second meeting will be to inform the public and obtain public comments on the study results, and shall take place prior to the submittal of the final report to FEMA. The consultant/District shall be responsible for the preparation of the graphic displays for these meetings. One representative from the consultant shall attend both the meetings. The consultant shall respond to the public's comments and make revisions to the study if necessary.

1.9 Consultant/District Performance Evaluations will be performed. An informal evaluation will be performed at the completion of the hydrologic analysis. A formal evaluation will be performed at the completion of the project upon receipt of all deliverables.

TASK 2 - DATA COLLECTION

2.1 The consultant shall collect and review pertinent data from the District and other outside sources. Data to be collected will include previous flood hazard reports and hydrology for the study area; existing topographic mapping; historical flooding information; as-built plans for existing structures; FEMA Flood Hazard Boundary Maps and any Letters of Map Amendment and/or Revisions, and other pertinent information.

2.2 A written report summarizing the data collected shall be submitted to the District for information purposes. A preliminary draft of this report is due within 90 days of Notice to Proceed.

TASK 3 - TOPOGRAPHIC MAPPING

3.1 An aerial survey subcontractor shall be retained by the consultant as part of this contract. The new topographic mapping would be one mile and half mile wide, as necessary to cover the entire approximate 100-yr. floodplain width of the identified washes.

3.2 The consultant shall coordinate all the aerial surveying work with the aerial surveying subcontractor to ensure that the specifications of the aerial surveying work are met. The consultant is responsible for ensuring that the topographic mapping covers the area of delineation. Quality control on surveys will be per FEMA document 37, Flood Insurance Study Guidelines and Specifications for Study Contractors, January 1995.

3.3 Digital contour and planimetric data developed for this study shall be delivered prior to finalizing Task 6.

3.4 Digital Terrain Models shall be delivered following the guidelines stated in district's HIS data Delivery Specifications, Rev 3.1, June 1, 1998.

3.5 Prepare topographic mapping to a 4-foot contour interval, with a scale of 1 inch = 200 feet, with spot elevations on all section line and mid-section line roads.

3.6 Ground Control:

a. The consultant shall provide all survey control using NAD 1983.

b. The consultant shall systematically set panel points and establish horizontal and vertical control throughout the areas to be mapped for use in compilation by the aerial survey contractor. Where readily available, surveys will tie into the State Plane Coordinate System. Field control shall be sufficient to readily allow for compilation of maps by the aerial survey contractor at the desired map scale and contour interval, and will be based on the National Geodetic Vertical Data of 1929 (NGVD). A conversion factor, including documentation of how it was derived, will be provided by the consultant to allow comparison of NGVD 29 elevations to NAVD 88 elevations and will be included in the Technical Data Notebook.

c. The horizontal and vertical control points shall be located and marked by the consultant. The controls for the aerial mapping shall be in sufficient numbers and shall be in locations, which will be compatible with the accuracy of the mapping requirements. The controls shall be of at least third order accuracy. Section corners, quarter corners, and mid-section points shall be used for control points wherever possible.

3.7 The consultant shall provide permanent non-erasable topographic mylars of the work study drawings. The drawings shall be 24" X 36" in size, with a scale of 1 inch = 200 feet and a contour interval of 2 foot for all mapping with the exception of section line roads which will have a contour interval of 1 foot. A cover sheet will be provided with the project title, date of topographic mapping, and a location map showing geographic range covered by each specific mapping sheet. Each drawing shall include the floodplain and floodway delineations and a minimum of a north arrow, scale, section corners and quarter corners, current and proposed streets and highway names, State Plane Coordinate System,

major drainage features, corporate boundaries, cross section lines, channel station center line, index map, and description and elevation of elevation reference marks (ERMs). A note explaining the proper means to convert the NGVD 29 elevations to NAVD 88 elevations shall be included in "NOTES" in the map border. The mapping will have an accuracy such that ninety percent (90%) of all contours shall be within one-half contour of the true elevations and the remaining ten- percent (10%) of the contours shall not be in error by more than one contour interval.

TASK 4 - FIELD SURVEY

4.1 Prepare topographic mapping to a 4 foot contour interval with a scale of 1 inch = 200 feet, with spot elevations or 1 foot contours on all section line and mid-section line roads, for floodplain/floodway delineation areas as identified in Task 6 or FEMA criteria, whichever is more stringent.

4.2 Ground Control for Floodplain Delineations:

4.2.1 All topographic mapping and survey work shall meet or exceed Federal Emergency Management Agency (FEMA) minimum criteria as defined in FEMA Document 37, Flood Insurance Study Guidelines and Specifications for Study Contractors, January 1995. This would include, but is not limited to: the establishment of "permanent" elevation reference marks (ERMs); field control; and verification of profiles by the ground survey profile procedure.

4.2.2 Horizontal and Vertical Control: Systematically set panel points and establish horizontal and vertical control throughout the area to be mapped for use in compilation by the aerial survey contractor. Where readily available, surveys will tie into State Plane Coordinate System NAD 1983. Field control shall be sufficient, at least one "permanent" point per mile, such point(s) being used as Elevation Reference Marks (ERMs). Surveys will be based on National Geodetic Vertical Datum 1929 (NGVD), per FEMA guidelines. A conversion factor, including documentation of how it was derived, will be provided by the consultant to allow comparison of NGVD 29 elevations to NAVD 88 elevations and will be included in the Technical Data Notebook. "Permanent" survey points shall consist of existing monument, such as brass caps or similar survey monuments. Where additional monument is needed, survey markers conforming to Maricopa Association of Governments (MAG) Uniform Standard Detail for Public Works Construction, detail 120-1, Type C, shall be placed 2" +/- above grade, and topped with a brass cap. Elevation Reference Marks will be labeled on available maps and described in a manner which allow them to be readily located in the field.

4.2.3 All aerial targets are to be removed following completion of the topographic mapping.

4.3 The consultant shall verify the accuracy of the mapping by the procedures called for in FEMA Document 37 or other methods approved by FEMA. This shall include the verification of cross sections used in the floodplain delineation.

4.4 Field surveys of bridges, culverts, and hydraulic structures are to be obtained by the consultant when as-built plans are not available or when changes significant to the HEC-RAS modeling, such as sedimentation, have occurred since the date of as-built. This information should be reduced and compiled into an 11"x 17" (maximum size) drawing for inclusion in the final report. The information

presented in the drawing should be in a format appropriate for use in the HEC-RAS model. Field surveys of bridges, culverts, hydraulic structures, and routing reaches must also be obtained where necessary for proper hydrologic modeling. It may be necessary to field survey some structures since the as-built plans may not be on NGVD 1929.

HIS submittals pertinent to Tasks 3 and 4, must be reviewed and approved prior to finalizing the Floodplain Delineation Task (Task 6).

TASK 5 - HYDROLOGY

5.1 The hydrology will be provided by the District.

TASK 6 - FLOODPLAIN DELINEATION

6.1 Floodplain delineations must be obtained using the U.S. Army Corps of Engineers HEC-RAS River Analysis System , version 2.1 October, 1997, and methodology acceptable to FEMA. This model will simulate the effects of floodplain geomorphology, flow changes, bridges, culverts, hydraulic roughness factors, effective flow limitations, split-flows, and other considerations. The consultant shall prepare the study using the guidelines established in FEMA Document 37, Flood Insurance Study Guidelines and Specification for Study Contractors, January, 1995, and FIA Document 12, Appeals, Revisions, and Amendments to Flood Insurance Maps, January 1990.

6.2 The delineation work shall meet requirements for floodplain and floodway delineations as prescribed by FEMA and the Arizona Department of Water Resources.

6.3 The delineation study shall be based on the final results of the hydrologic study as directed by the District.

6.4 The consultant is to make refinements to the HEC-RAS model based on review of the model results by the District, ADWR, FEMA, and the Technical Evaluation Contractor. The consultant shall review the HEC-RAS model results for reasonableness. Adjustments to the input parameters for obtaining the most realistic results is normal to the scope.

6.5 Floodways are to be determined using equal conveyance encroachment method 4 to start with, but only encroachment method 1 will be used in the final analysis. The floodway encroachment is to be as near the one-foot maximum rise in elevation as possible.

6.6 The consultant must obtain District approval at each of the following steps:

a. Field reconnaissance report and estimation of Manning's "n" values.

b. Proposed location and alignment of the cross sections and channel centerline.

c. Floodplain (natural) delineation.

d. Floodway delineation using equal conveyance encroachment.

e. Floodway delineation using encroachment method 1.

f. Final Hydraulics Report.

6.7 Field Reconnaissance

6.7.1 The consultant shall conduct a field reconnaissance of the full study reach. This will include observation of channel and floodplain conditions for estimation of Manning's "n" values; photographic documentation of floodplain characteristics; determination of channel bank stations; observation of possible overflow areas; inspection of levees or other flood control structures; and measurement of bridge dimensions.

6.7.2 Mannings "n" values are to be determined using the methodology in the USGS report, Estimated Manning's Roughness Coefficients for Stream Channels and Flood Plains in Maricopa County, Arizona, April 1991. Copies of the report are available through the District.

6.7.3 A draft report on the field reconnaissance shall be submitted to the District for review and approval prior to beginning the HEC-RAS modeling. The report shall present the determination of channel and overbank "n" values using captioned color photographs or color photocopies. The report shall also discuss floodplain conditions affecting the delineation, describe structures and obstructions, and provide color photos or photocopies of major hydraulic structures. Photo locations, structures, and "n" values shall be displayed on reduced scale mapping and included in the Final Report.

6.8 Cross Sections

6.8.1 The location and alignment of cross sections and channel centerline shall be submitted for the District's review and approval prior to digitizing the cross section data. Cross section stationing shall be from left to right looking downstream with the thalweg as station 10,000. Cross sections will be spaced approximately every 500 feet, unless geographic or structural constraints dictate otherwise, and shall extend the full width of the area inundated by 100-year floodwaters. Identification of cross sections shall be in river miles, increasing upstream. The stationing shall tie into the specified river mile of the existing FEMA studies. Cross section orientation may need to be altered after running of HEC-RAS model to ensure that sections are perpendicular to flow per FEMA criteria.

6.8.2 All cross sections shall be plotted using a pen, laser, or electrostatic plotter. The cross section plots shall show water surface profiles, ineffective flow areas, "n" values, encroachments, channel stationing and other pertinent information. All plots are to be accompanied by a legend. These plots are to be available at all reviews.

6.8.3 Cross section plots are limited to one plot at the following three stages of work: (a.) a plot of digitized "GR", STCHL, STCHR, centerline (station 10,000) to be used as a check of input data and for working sections during compilation of the floodplain model; (b.) a plot of the cross section for the completed floodplain run which shows the floodplain water surface elevation,

ineffective flow areas, "n" factor, and encroachments to be used as working sections for development of the floodway model; (c.) a plot of the final floodway model cross sections which will show Type 1 encroachments and encroached water surface, in addition to data covered in items (a.) and (b.). These cross sections, generated under (c.), will be submitted as part of the Final Report.

6.9 Bridges and culverts must be modeled in compliance with HEC-RAS modeling requirements for the selected routine. Where multiple bridges occur, each bridge shall be modeled separately. The HEC-RAS modeling results for bridges, culverts, and other hydraulic structures must be checked by using an independent method approved by the District to analyze these structures.

6.10 For floodplains identified as ponding areas, it is preferable to analyze the area by using the HEC-1 model, which shall provide the District with water surface elevations. If appropriate, the consultant shall identify in the ponded floodplains a floodway. The purpose of this floodway is to allow the pond to seek a constant stage throughout the aerial extent of the ponds, versus the creation of two independent ponds.

6.11 Flood zones must be determined according to FEMA criteria and clearly labeled on the final drawings.

6.12 The total area of the floodplain and floodway must be determined for each reach in square miles and acres.

6.13 The floodplain/floodway delineation analysis shall be presented in Technical Data Notebook as described in Task 8. HIS submittals pertinent to Task 6, must be reviewed and approved prior to submittal of the FEMA review package.

TASK 7 - DIGITAL DATA

Digital data shall be delivered in a CADD standard binary DXF format from either AutoCAD or MicroStations outlined in the District's "HIS Data Delivery Specifications," Rev 3.1, June 1, 1998

The following themes shall be delivered:

Name	Page No.	Description
NDXPRJ	LP-40	Shows the map sheet boundaries of the project
PRJ	LP-60	Defines the boundary of the project
CARTO	LP-110	Planimetric features captured but not used by HIS (Fences, tree lines, etc)(if any)
CORNERS	LP-210	Section corners as defined by the PLSS (Public Land Survey System)
CTRL	LP-215	Other control points that are not corners
STRCT	LP-360	Structures like building footprints (if any)

DQ.TBL	LP-410	Data Quality of Data: Scale, date, Vertical Datum, Projection
PRJ.REL	LP-430	Contractor name, Project Name, Project ID
FPBLN	LP-520	Floodway center line
FPCTLFCD	LP-523	Elevation Reference Marks
FPSRFFCD	LP-535	Surface Water Elevation
FPXFCD	LP-540	Cross sections used in HEC-RAS
FPZNFCD	LP-550	Floodplain Zones
FPZNHZ	LP-560	Floodplain Hazard Zones
STRTDTL	LP-660	Edge of Pavement (if any)
ELV	LP-710	Contours and spot elevations
BRIDGE	LP-608	Bridges, including any headwalls or wing walls
CULVERT	LP-612	Culverts, including any headwalls or wing walls
DRNBSN	LP-920	Drainage basins
DRNPTH	LP-930	Drainage Path
RIVER	LP-960	Washes or streams in the area (if any)

This is a comprehensive listing of possible features. If there are no features collected under one of the categories mentioned, then the item does not need to be delivered.

The data submittal under Task 7 will be subject to a quality control (QC) check by the District staff. The District makes use of a checklist in the QC process. A hardcopy of the checklist is enclosed with this scope of work. The consultant shall use the checklist to review each HIS data submittal for compliance and deliver a completed copy of the checklist to the district along with the data submittal.

All required HIS submittals must be reviewed and accepted prior to finalizing the Technical Data Notebook for submittal to FEMA (Task 8.1).

TASK 8 – DELIVERABLES

8.1 **Data Submittal** – Prior to the FEMA submittal, the Consultant shall deliver the final study data in CADD format per the "HIS Data Delivery Specifications," Rev 3.1, June 1, 1998.

8.2 **FEMA Submittal** - The Consultant will submit the following items to the District for review by FEMA and any other appropriate governmental agency. All of the following products are considered deliverables for the FEMA submittal:

8.2.1 Original Affidavits of Publication.

8.2.2 Two (2) complete sets of blueline topographic base maps with the floodplain/floodway delineations shown. All drawings shall be signed and sealed by persons of appropriate professional registration(s). Each registrant shall provide a specific statement as to what service they performed.

8.2.3 Two (2) complete copies of the Technical Data Notebook, including HEC-RAS digital input/output files on diskettes. The Technical Data Notebook shall be prepared in accordance with ADWR State Standards Attachment 1-97 (SSA1-97) using the *ADWR/FEMA Submittals* outline. The notebook shall be organized as specified by the District, following SSA1-97 format.

8.2.4 Two (2) sets of complete survey notes shall be submitted in a notebook separate from the Technical Data Notebook.

8.2.5 One (1) copy of the Digital Terrain Model (DTM) shall be submitted following the guidelines stated in the District's HIS data Delivery Specifications, Rev 3.1.

8.2.6 Two (2) copies of the current FIRM panels showing the proposed delineation.

8.3 **Final Submittal** - The following products are considered deliverables for the final submittal to the District after FEMA approval is issued.

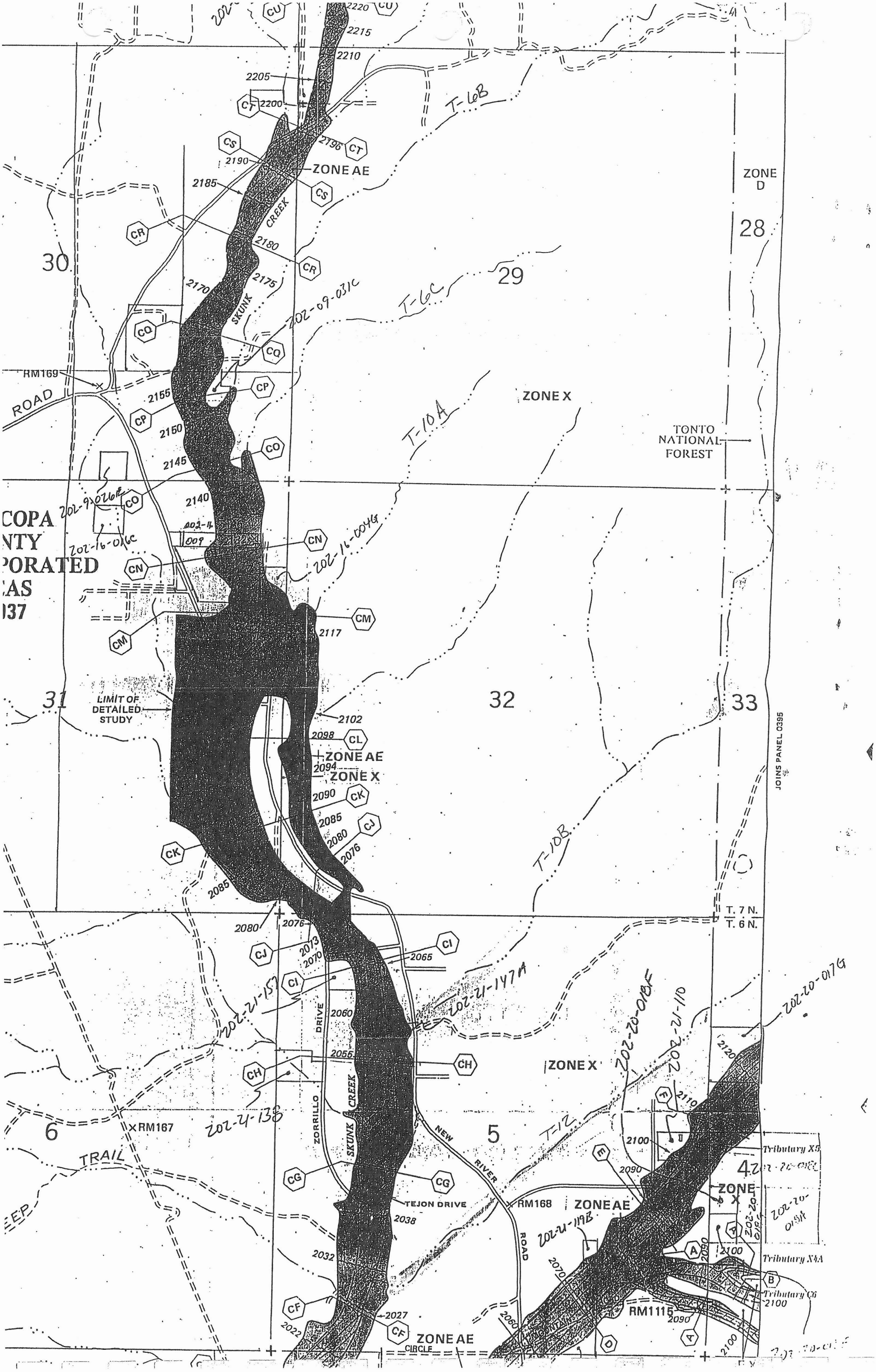
8.3.1 One (1) complete sets of mylars and four (4) complete sets of sealed blueline topographic base maps with the floodplain/floodway delineations shown. All drawings shall be signed and sealed by persons of appropriate professional registration(s). Each registrant will provide a specific statement as to what service they performed.

8.3.2 One (1) complete set of transparent overlays of photo-mylars. Sheet size, numbering, and layout shall correspond to the delineation work maps.

8.3.3 One (1) complete set of 9" X 9" contact prints of the aerial stereo photographs sequentially numbered and catalogued.

8.3.3 Four (4) complete copies of the Technical Data Notebook including HEC-RAS input/output files on diskettes. The Technical Data Notebook shall be prepared in accordance with ADWR State Standards Attachment 1-97 (SSA 1-97). The notebook shall be organized as specified by the District, following SSA 1-97 format. This submittal of the Technical Data Notebook shall include any correspondence and/or meeting minutes with the reviewing agencies and shall reflect any revisions required by those reviewing agencies. Revisions may include, but are not limited to, modifications to the delineation maps, the HEC-RAS model, and/or the Final Report.

Specific deviations from this scope of work shall not be undertaken without the specific written concurrence from the Flood Control District.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ZONE AE
ZONE X
ZONE D
ZONE
LIMIT OF DETAILED STUDY
TONTO NATIONAL FOREST
JOINS PANEL 0395
T. 7 N.
T. 6 N.
T-6B
T-6C
T-10A
T-10B
T-12
30
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RM169
RM167
RM168
RM1115
ROAD
TRAIL
DRIVE
CIRCLE
CREEK
SKUNK
ZORRILLO
NEW RIVER
TEJON DRIVE
Tributary X5
Tributary X4A
Tributary C6
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202-20-018F
202-21-110
202-20-017G
202-21-157
202-4-136
202-11-119B
202-4-009

AFFIDAVIT OF PUBLICATION

THE ARIZONA REPUBLIC

STATE OF ARIZONA
COUNTY OF MARICOPA } SS.

TOM BIANCO, being first duly sworn, upon oath deposes and says: That he is the legal advertising manager of the Arizona Business Gazette, a newspaper of general circulation in the county of Maricopa, State of Arizona, published at Phoenix, Arizona, by Phoenix Newspapers Inc., which also publishes The Arizona Republic, and that the copy hereto attached is a true copy of the advertisement published in the said paper on the dates as indicated.

The Arizona Republic

November 13, 20, 1998

ANNOUNCEMENT OF FLOOD HAZARD STUDY

The Flood Control District of Maricopa County, under the authority of the National Flood Insurance Act of 1968 (P.L. 90-448), as amended, and the Flood Disaster Protection Act of 1973 (P.L. 93-234), is funding a detailed study of flood hazard areas in north-central Maricopa County as follows:

Tributaries to Skunk Creek located adjacent to the Tonto National Forest in Township 7 North, Range 3 East. The study area is approximately 3 miles east of the community of New River, off New River Road.

The study is being performed for the Flood Control District by Simons, Li & Associates, Inc. (SLA) of Tempe, Arizona.

The purpose of this study is to examine and evaluate flood hazard areas which are developed or which are likely to be developed and to determine flood elevations for those areas. Flood elevations will be used by Maricopa County to carry out floodplain management objectives of the National Flood Insurance Program. They will also be used as the basis for determining appropriate flood insurance premium rates applicable for buildings and their contents.

This announcement is intended to notify all interested persons of the commencement of this study so they may have an opportunity to bring any relevant facts and technical data concerning local flood hazards to the attention of the Flood Control District for consideration during the course of the study. Such information should be furnished to Mr. Pedro Calza, Flood Control District of Maricopa County, 2801 West Durango Street, Phoenix, AZ 85009, telephone (602) 506-1501.

98559-November 13, 20, 1998.

Sworn to before me this
24 day of
November A.D. 1998

OFFICIAL SEAL
BRENDA WINDAHL
NOTARY PUBLIC-ARIZONA
MARICOPA COUNTY
My Comm. Expires March 31, 2001

Notary Public

THE DESERT ADVOCATE

70 E. Mitchell Rd., Suite Eleven
Phoenix, AZ 85012
602.465.9384
Fax: 602.234.9982. E-Mail desertadvocate@uswest.net

The Announcement of Flood Hazard Study was published in The Desert Advocate Newspaper on November 19, 1998 and December 4, 1998. The announcement has printed in total as provided.

Signature of Publisher [signature]
Date 3/26/99

Subscribed and sworn to before me this 26th day of March, 1999

[signature]
Notary

Maricopa County, Arizona

My Commission expires on the 3rd day of November 2001

JAMIE L. O'NEILL
Notary Public - Arizona
Maricopa County
My Comm. Expires Nov 3, 2001

ANNOUNCEMENT OF FLOOD HAZARD STUDY

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Published: (newspaper name and date).

Project Engineering Consultants, Ltd.

October 30, 2000

RECEIVED
NOV 13 2000
ASL, PHOENIX

Bart Bergendahl
Tetra Tech
501 North 44th Street, Suite 125
Phoenix, Arizona 85008-6596

Re: Tributaries of Skunk Creek

Dear Bart,

As per contract, the horizontal datum that was used by Project Engineering Consultants, Ltd. for the above referenced project was based on NAD83 datum. There was no 1992 or 1996 adjustment applied.

Please call if you have any other questions.

Sincerely,

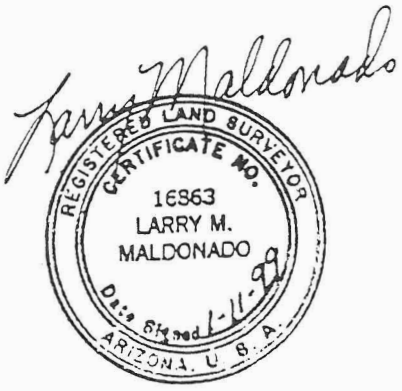
Chuck Gardiner
Survey Manager
Project Engineering Consultants, Ltd.

Engineers • Planners • Surveyors
2310 W. Mission Lane, Suite 4 Phoenix, Arizona 85021 (602) 906-1901 Fax (602) 906-3080
E-Mail: pec@pecaz.com

Tributaries of Skunk Creek

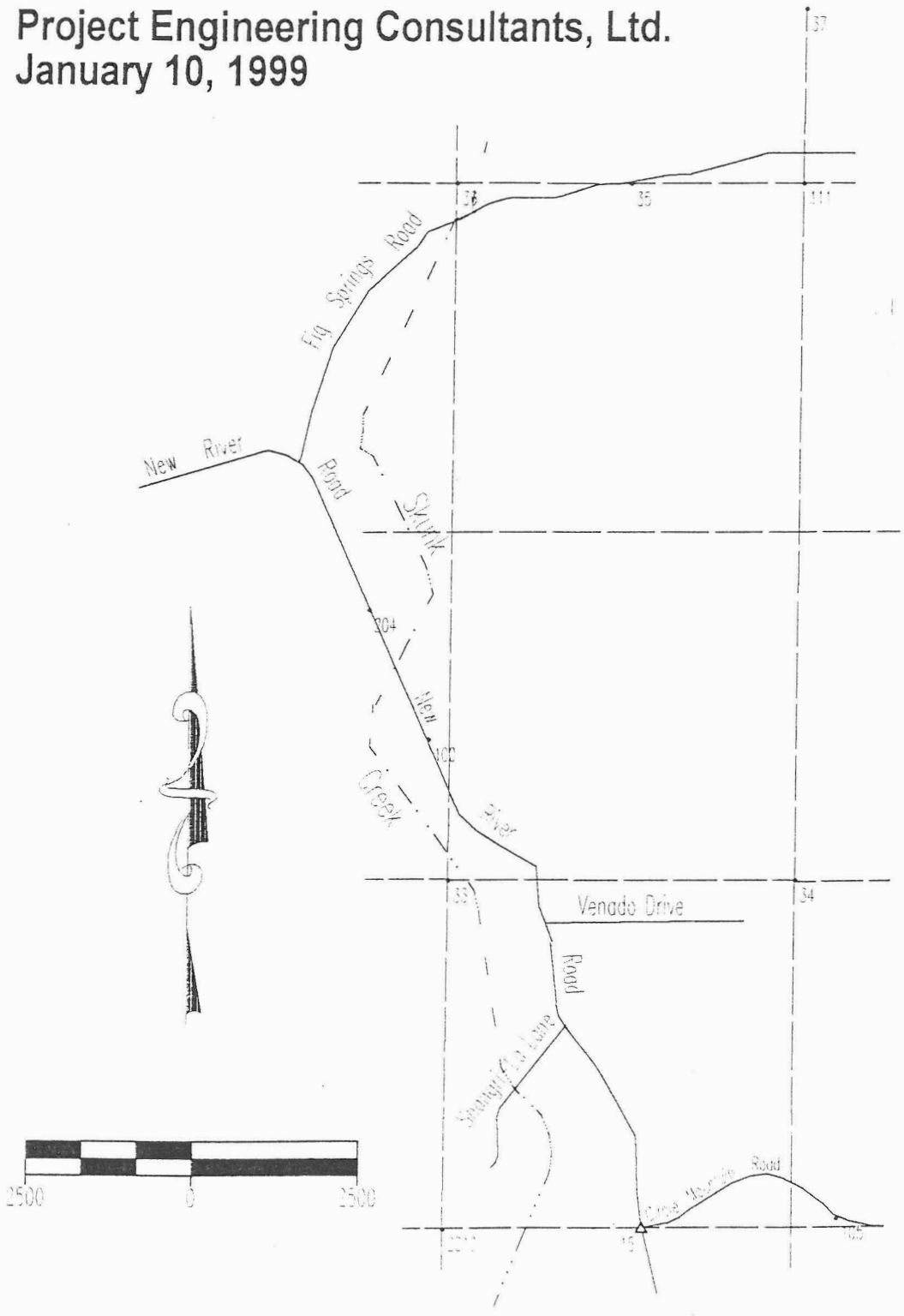
Survey Control

Project Engineering Consultants, Ltd.
January 11, 1999



Skunk Creek Tributaries
Elevation Reference Monument Diagram

Project Engineering Consultants, Ltd.
January 10, 1999



Skunk Creek Tributaries
Survey Control Points

Project Engineering Consultants, Ltd.
1-10-99

NAD83 SPC System
NGVD29 Elevations

Pt #	Northing	Easting	Elevation	Notes
1,	1068441.25500,	654977.50900,	2433.78000,	S001
2,	1066530.16200,	652338.27600,	2271.21997,	S002
3,	1065852.07500,	649633.72100,	2222.57910,	S003
4,	1063849.40400,	648635.51100,	2185.50488,	S004
5,	1063653.87000,	652585.23700,	2363.65796,	S005
6,	1063797.20800,	655337.28800,	2428.26392,	S006
7,	1060390.13100,	657273.04200,	2333.11694,	S007
8,	1059560.41000,	656785.86600,	2308.22510,	S008
9,	1057312.52800,	655025.38600,	2225.88892,	S009
10,	1059588.62400,	648329.53000,	2135.93188,	S010
11,	1054613.29200,	651169.08500,	2082.26390,	S011
12,	1054569.98100,	653598.40800,	2155.10791,	S012
13,	1053906.60200,	656264.17600,	2135.58398,	S013
14,	1050232.57700,	655580.07600,	2103.50708,	S014
15,	1050013.91800,	652654.61300,	2062.91310,	S015
16,	1050002.33500,	650914.25400,	2044.31799,	S016
33,	1055270.57700,	649660.06500,	2087.93994,	S033
34,	1055259.46900,	654936.38000,	2176.98771,	S034
35,	1065817.71400,	652327.43000,	2256.74194,	S035
36,	1065826.66000,	649666.20900,	2222.53589,	S036
37,	1068446.30700,	654952.07200,	2434.41309,	S037
100,	1057404.32900,	649330.98900,	2111.50903,	S100
105,	1050167.89700,	655614.74600,	2103.00195,	S105
204,	1059369.17800,	648396.64200,	2132.63110,	NR13
300,	1054623.04500,	651668.11600,	2097.58203,	S300
301,	1054597.09700,	652795.10100,	2140.36401,	S301
302,	1051862.62000,	652310.55200,	2068.07690,	S302
303,	1051647.76900,	652438.34400,	2064.50488,	S303
304,	1061845.98100,	647978.46200,	2153.71094,	S304
305,	1061859.57000,	648619.84400,	2155.57397,	S305
2010,	1050017.85700,	649623.72700,	2038.51700,	2010

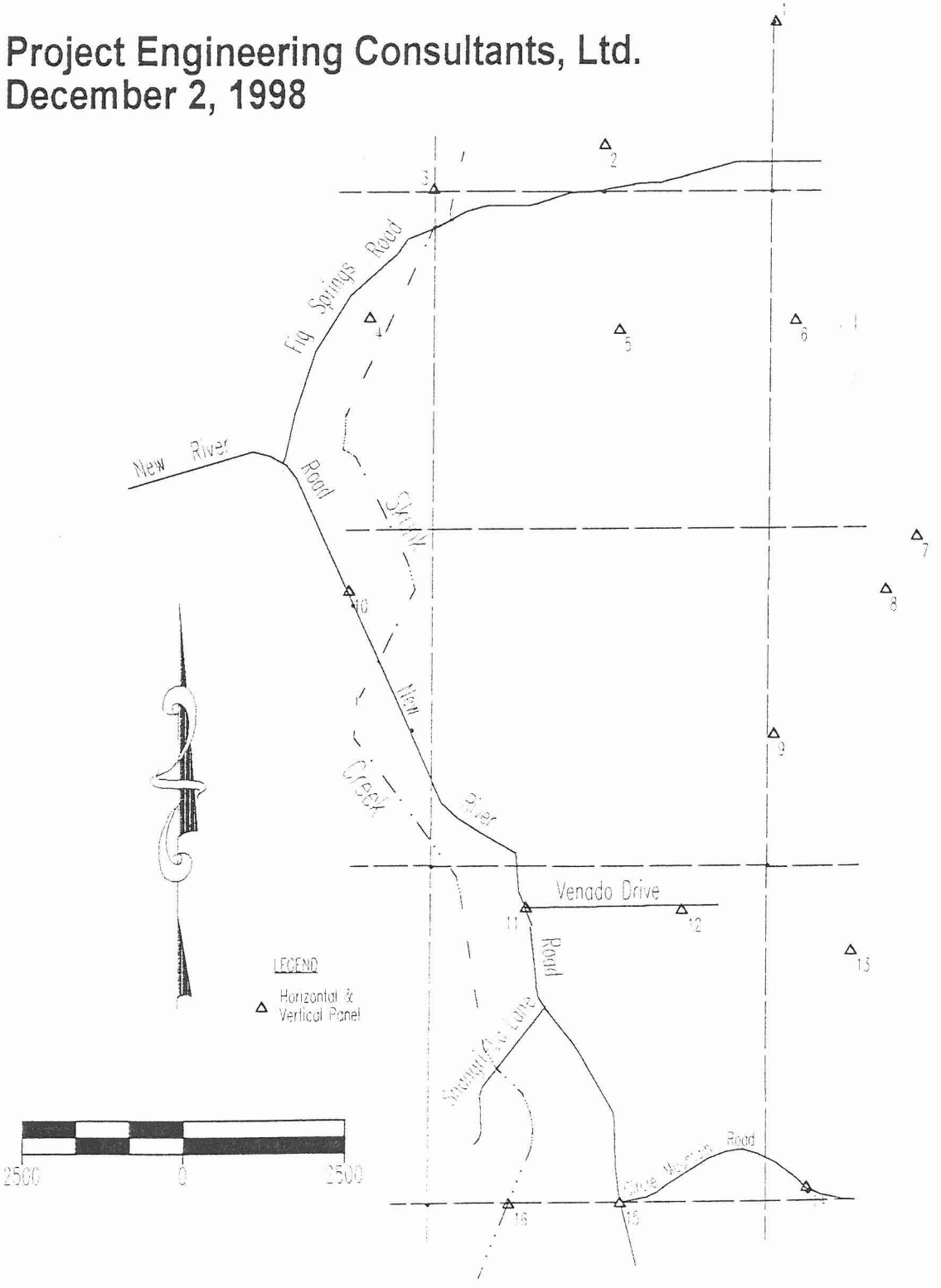
Note: Prime Bench Mark for this project is ERM 100, MCHD Brass Cap on SW Corner of New River Road bridge over Skunk Creek, which is the same as Collins and Pina's ERM 11. This bench mark was based on NGS Point "Skunk."

Point #	Remarks	Northing Easting	Monument Elevation	Section Data	Description
15	ERM	1050013.918 652654.613	2062.913		Maricopa County Highway Department Brass Cap flush w/pavement @ intersection of New River Road and Circle Mountain Road; stamped "INTERSECTION 1996"
33	ERM	1055270.577 649660.065	2087.907	NE Corner, Section 6, T6N, R3E	2½" United States General Land Office Survey Brass Cap, Northeast Corner of Section 6, T6N, R3E
34	ERM	1055259.469 654936.380	2176.988	NE Corner, Section 5, T6N, R3E	2½" United States General Land Office Survey Brass Cap, Northeast Corner of Section 5, T6N, R3E; +/-1.19' above ground
35	ERM	1065817.714 652327.430	2256.499	N¼ Corner, Section 29, T7N, R3E	2½" United States General Land Office Survey Brass Cap, North Quarter Corner of Section 29, T7N, R3E; +/ 2.0' above ground
36	ERM	1065826.660 649666.209	2222.419	NE Corner, Section 30, T7N, R3E	2½" United States General Land Office Survey Brass Cap, Northeast Corner of Section 30, T7N, R3E; +/- 1.90' above ground
37	ERM	1068446.307 654952.072	2434.413	E¼ Corner, Section 20, T7N, R3E	2½" United States General Land Office Survey Brass Cap, East Quarter Corner of Section 20, T7N, R3E
100	ERM	1057404.329 649330.989	2111.509		2½" Maricopa County Highway Department Brass Cap flush w/concrete on top of west barrier wall of New River Road bridge over Skunk Creek, +/-21.9' from south end of of barrier wall; Same as ERM 11 as provided by Collins and Pina
105	ERM	1050167.897 655614.746	2103.002		Brass Cap flush w/concrete on top of headwall, southside of Circle Mountain Road, +/-½ mile east of New River Road
111	ERM		2371.516	NE Corner, Section 29, T7N, R3E	2½" United States General Land Office Survey Brass Cap, Northeast Corner of Section 29, T7N, R3E; +/-1.0' above ground
204	ERM	1059369.178 648396.642	2132.631		Fd Iron Bar in concrete in Handhole +/-¼ mile north of New River Road bridge over Skunk Creek, westside of New River Road

Point #	Remarks	Northing Easting	Monument Elevation	Section Data	Description
2010	ERM	1050017.857 649623.727	2038.517	NE Corner, Section 7, T6N, R3E	2½" United States General Land Office Survey Brass Cap, Northeast Corner of Section 7, T6N, R3E; +/-1.2' above ground; Same As ERM 10 as provided by Collins and Pina

Skunk Creek Tributaries
Aerial Paneling Diagram

Project Engineering Consultants, Ltd.
December 2, 1998



Skunk Creek Tributaries
Aerial Panel Points

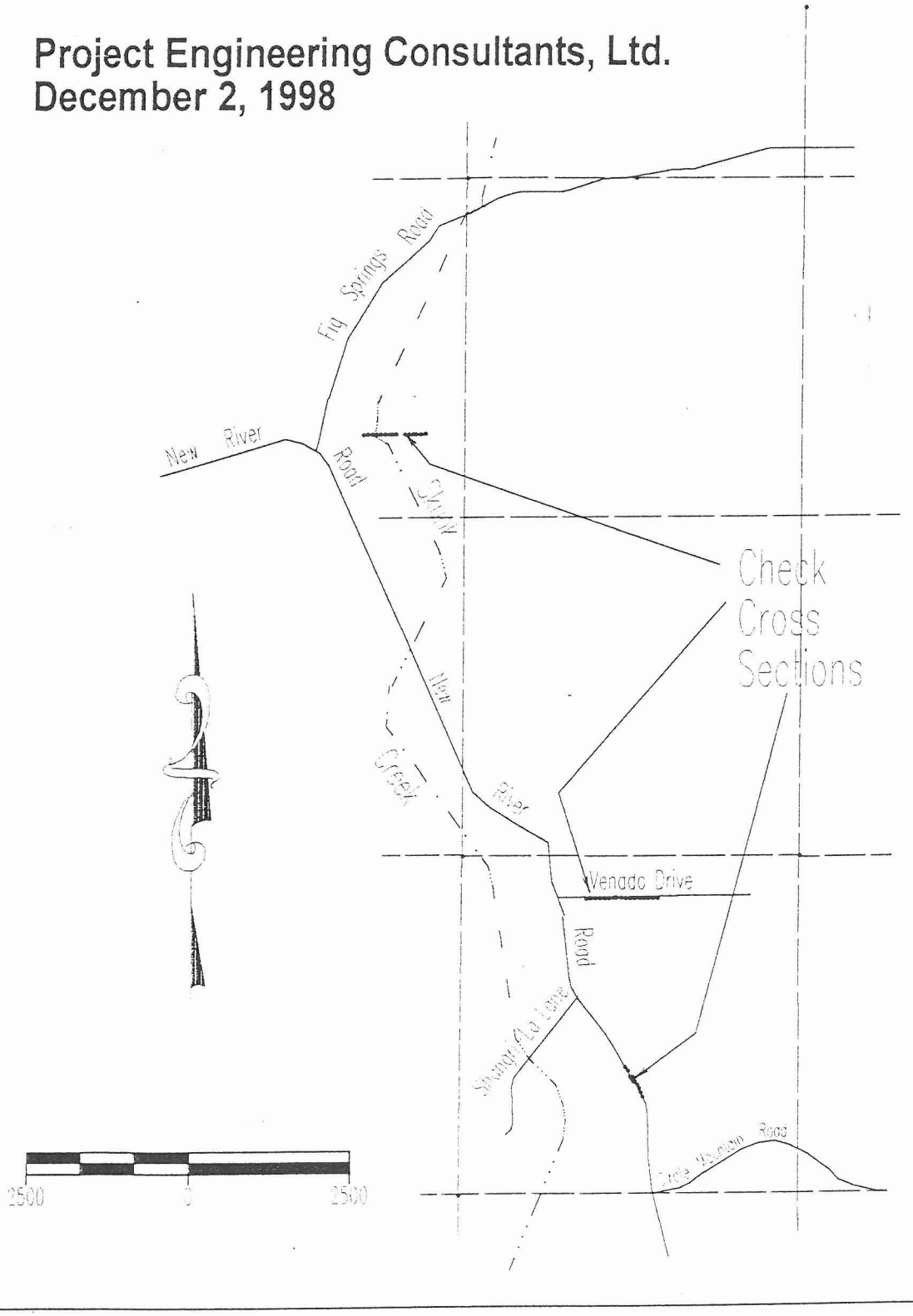
Project Engineering Consultants, Ltd.
1-10-99

NAD83 SPC System
NGVD29 Elevations

Pt #	Northing	Easting	Panel Elev.	Notes
1,	1068441.25500,	654977.50900,	2433.78000,	HV Panel
2,	1066530.16200,	652338.27600,	2271.21997,	HV Panel
3,	1065852.07500,	649633.72100,	2222.57910,	HV Panel
4,	1063849.40400,	648635.51100,	2185.50488,	HV Panel
5,	1063653.87000,	652585.23700,	2363.65796,	HV Panel
6,	1063797.20800,	655337.28800,	2428.26392,	HV Panel
7,	1060390.13100,	657273.04200,	2333.11694,	HV Panel
8,	1059560.41000,	656785.86600,	2308.22510,	HV Panel
9,	1057312.52800,	655025.38600,	2225.88892,	HV Panel
10,	1059588.62400,	648329.53000,	2135.93188,	HV Panel
11,	1054613.29200,	651169.08500,	2082.26390,	HV Panel
12,	1054569.98100,	653598.40800,	2155.10791,	HV Panel
13,	1053906.60200,	656264.17600,	2135.58398,	HV Panel
14,	1050232.57700,	655580.07600,	2103.50708,	HV Panel
15,	1050013.91800,	652654.61300,	2062.91310,	HV Panel
16,	1050002.33500,	650914.25400,	2044.31799,	HV Panel

Skunk Creek Tributaries
Check Cross Sections Diagram

Project Engineering Consultants, Ltd.
December 2, 1998



Skunk Creek Tributaries
Check Cross Sections

Project Engineering Consultants, Ltd.
1-10-99

NAD83 SPC System
NGVD29 Elevations

Pt #	Northing	Easting	Panel Elev.	Notes
310,	1061847.75625,	648047.11378,	2154.03885,	NG
311,	1061854.27255,	648115.44161,	2154.79979,	NG
312,	1061853.93013,	648184.70885,	2155.50086,	NG
313,	1061852.74399,	648249.40378,	2154.31473,	NG
314,	1061853.33779,	648310.09320,	2151.14086,	NG
315,	1061854.77290,	648387.43334,	2155.67049,	NG
316,	1061855.29739,	648457.01885,	2154.35945,	NG
317,	1061854.68549,	648491.90868,	2153.71491,	NG
318,	1061854.20941,	648557.80495,	2154.59183,	NG
319,	1061855.11844,	648686.54104,	2155.88551,	NG
320,	1061854.68373,	648751.34233,	2156.63176,	NG
321,	1061855.46000,	648818.90846,	2157.46791,	NG
322,	1061854.75186,	648872.59657,	2159.50686,	NG
323,	1061853.77029,	648949.72598,	2156.21299,	FL
324,	1061856.40581,	649021.07359,	2158.91547,	NG
325,	1054608.63498,	652721.35696,	2132.82106,	NG
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333,	1054621.83955,	652160.22421,	2077.00025,	NG
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Skunk Creek Tributaries
Topo

Project Engineering Consultants, Ltd.
1-11-99

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454,1053945.15959, 651317.05556, 2056.12524,INV
455,1053967.16398, 651360.53515, 2057.74658,FL
456,1053964.79929, 651363.71931, 2057.91211,TOE
457,1053961.75225, 651366.78755, 2060.77637,TOP
458,1053934.33772, 651371.17360, 2062.15796,NG
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462,1053915.08994, 651328.52167, 2064.90112,TOP
463,1053966.96385, 651314.54015, 2065.86108,TOP
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468,1053984.03962, 651368.50004, 2059.43164,TOP
469,1051788.13250, 652346.58298, 2066.07275,WNG
470,1051794.17820, 652345.85647, 2066.03491,HW
471,1051808.82029, 652336.72542, 2066.27734,HW
472,1051806.60990, 652328.49657, 2065.90283,WNG
473,1051803.61507, 652337.27130, 2059.33350,INV
474,1051794.91108, 652343.48409, 2059.08521,INV
475,1051739.70032, 652314.69415, 2058.61060,FL
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479,1051736.10086, 652301.08344, 2059.89136,TOP
480,1051748.48744, 652347.67206, 2064.14868,NG
481,1051818.04984, 652319.61227, 2066.58472,NG
482,1051887.72571, 652299.85558, 2069.59033,EP
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484,1051905.47540, 652321.92445, 2070.49805,EP
485,1051862.25845, 652351.73116, 2068.72412,EP
486,1051854.70302, 652339.93955, 2068.54150,P
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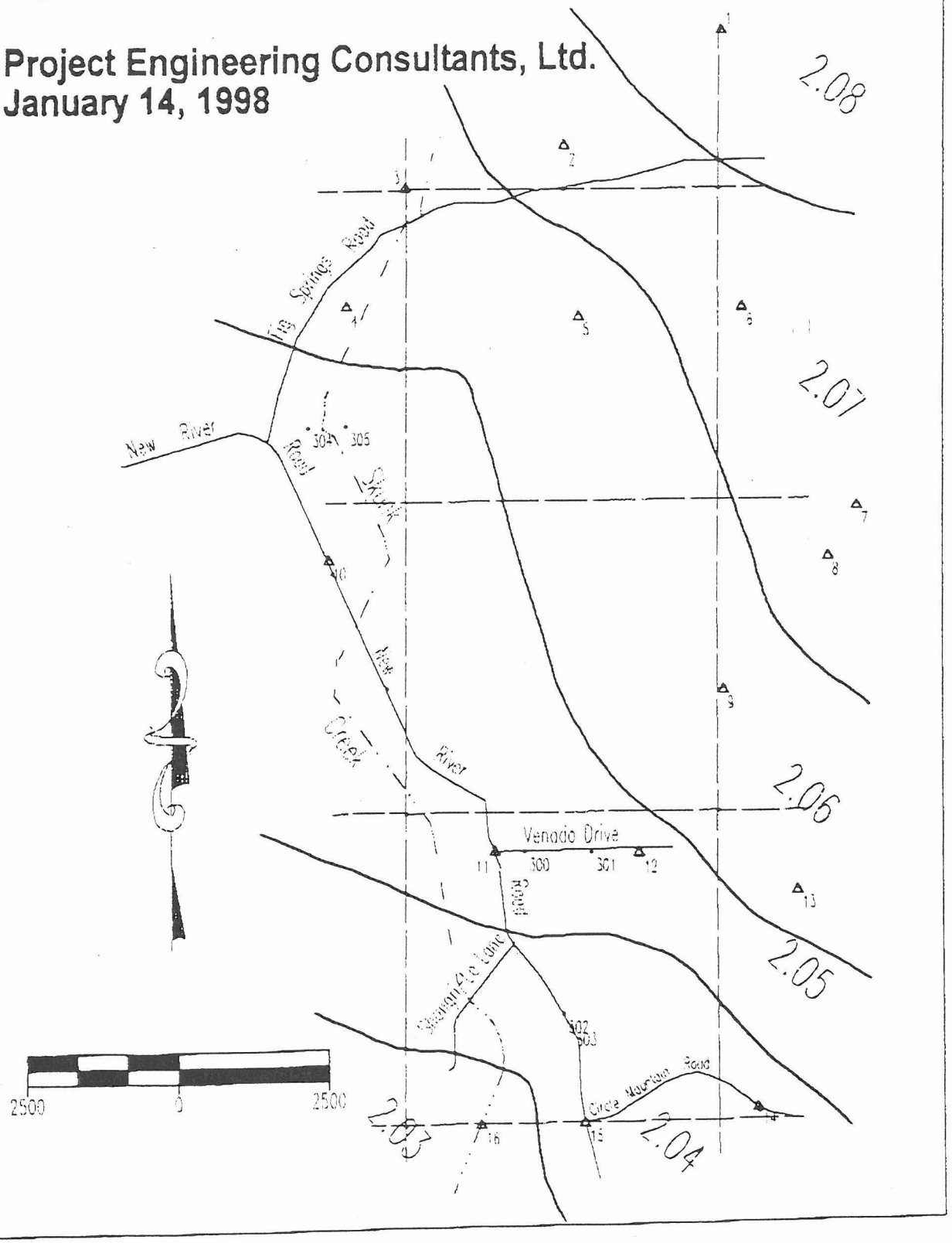
489,1051782.06643, 652386.50764, 2066.75806,P
490,1051789.25001, 652398.42791, 2067.00806,EP
491,1051869.50474, 652375.45029, 2066.88965,WNG
492,1051866.55437, 652368.72016, 2066.86548,HW
493,1051883.51279, 652356.50441, 2066.79248,HW
494,1051889.28909, 652357.40597, 2066.62744,WNG
495,1051880.82135, 652362.13925, 2059.90698,INV
496,1051873.13989, 652367.59297, 2059.34009,INV
497,1051923.31343, 652393.23986, 2060.69678,FL
498,1051920.05819, 652396.88616, 2061.21484,TOE
499,1051916.47595, 652403.09397, 2063.16895,TOP
500,1051933.17361, 652391.86335, 2061.05713,TOE
501,1051945.39660, 652352.75857, 2070.37061,TOP
502,1051916.59563, 652346.84792, 2070.59912,TOP

Skunk Creek Tributaries
NGVD29 To NAVD88 Conversion Chart

Project Engineering Consultants, Ltd.
January 14, 1998



$T = R \tan \frac{1}{2} I$

$T = \frac{50 \tan \frac{1}{2} I}{\text{Sin. } \frac{1}{2} D}$

$\text{Sin. } \frac{1}{2}D = \frac{50}{R}$

$\text{Sin. } \frac{1}{2}D = \frac{50 \tan \frac{1}{2} I}{T}$

$R = T \cot. \frac{1}{2} I$

$R = \frac{50}{\text{Sin. } \frac{1}{2} D}$

$E = R \text{ ex. sec } \frac{1}{2} I$

$E = T \tan \frac{1}{4} I$

$\text{Chord def.} = \frac{\text{chord}^2}{R}$

$\text{No. chords} = \frac{I}{D}$

Tan. def. = ½ chord def.

The square of any distance, divided by twice the radius, will equal the distance from tangent to curve, very nearly.

To find angle for a given distance and deflection.

Rule 1. Multiply the given distance by .01745 (def. for 1° for 1 ft.), and divide given deflection by the product.

Rule 2. Multiply given deflection by 57.3, and divide the product by the given distance.

To find deflection for a given angle and distance. Multiply the angle by .01745, and the product by the distance.

GENERAL DATA

Right Angle Triangles. Square the altitude, divide by twice the base. Add quotient to base for hypotenuse.

Given Base 100, Alt. $10.10^2 \div 200 = .5$. $100 + .5 = 100.5$ hyp.

Given Hyp. 100, Alt. $25.25^2 \div 200 = 3.125$. $100 - 3.125 = 96.875$ = Base.

Error in first example, .002; in last, .045.

To find Tons of Rail in one mile of track: multiply weight per yard by 11, and divide by 7.

Leveling. The correction for curvature and refraction, in feet and decimals of feet is equal to $0.574\ d^2$, where d is the distance in miles. The correction for curvature alone is closely, $\frac{2}{3}d^2$. The combined correction is negative.

Probable Error. If d_1, d_2, d_3, etc. are the discrepancies of various results from the mean, and if Σd^2 = the sum of the squares of these differences and n = the number of observations, then the probable error of the mean = $\pm 0.6745 \sqrt{\frac{\Sigma d^2}{n(n-1)}}$

MINUTES IN DECIMALS OF A DEGREE

1'	.0167	11'	.1833	21'	.3500	31'	.5167	41'	.6833	51'	.8500
2	.0333	12	.2000	22	.3667	32	.5333	42	.7000	52	.8667
3	.0500	13	.2167	23	.3833	33	.5500	43	.7167	53	.8833
4	.0667	14	.2333	24	.4000	34	.5667	44	.7333	54	.9000
5	.0833	15	.2500	25	.4167	35	.5833	45	.7500	55	.9167
6	.1000	16	.2667	26	.4333	36	.6000	46	.7667	56	.9333
7	.1167	17	.2833	27	.4500	37	.6167	47	.7833	57	.9500
8	.1333	18	.3000	28	.4667	38	.6333	48	.8000	58	.9667
9	.1500	19	.3167	29	.4833	39	.6500	49	.8167	59	.9833
10	.1667	20	.3333	30	.5000	40	.6667	50	.8333	60	1.0000

INCHES IN DECIMALS OF A FOOT

1/16	3/32	1/8	5/16	1/4	5/16	3/8	1/2	5/8	3/4	7/8
.0052	.0078	.0104	.0156	.0208	.0260	.0313	.0417	.0521	.0625	.0729

1	2	3	4	5	6	7	8	9	10	11
.0833	.1667	.2500	.3333	.4167	.5000	.5833	.6667	.7500	.8333	.9167

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1

#98054

Skunk Creek Tributaries
Topo

1 SET R/B ALONG RIDGE LINE 50' EAST of GLO BC. # 37

2 SET R/B 500'± NORTH of Point 35 ALONG CENTRAL AVE

3 SET R/B 50'± N/W of GLO BC. #36

4 SET R/B 30' EAST± FIG SPRINGS RD 1000'± N/E of NEW RIVER RIP

5 SET 60d NAIL ON PLATEAU

6 Set ½" Rebar

7 SET R/B ALONG JEEP TRAIL IN TONTO NATIONAL FOREST

8 SET R/B ¾ mi NORTH EAST of Point 34 ALONG JEEP TRAIL IN TONTO FOREST

9 SET RIB EAST SIDE @ 200'± WEST of JEEP TRAIL IN TONTO FOREST BOUNDARY

10 SET PK WEST SIDE NEW RIVER RD OPP ABANDONED PIAZA VIDEO SHOP

11 SET PK WEST SIDE NEW RIVER RD @ INT VENADO DR,

12 SET RIB VANADO DR 1/2 mi EAST of NEW RIVER RD 20'± SOUTH of DIRT RD

13 SET RIB 3/4 mi NORTH of CIRCLE MTN RD ALONG POST

14 ~~SET~~ P.K. CIRCLE MTN Road) .60 mi ± EAST of NEW RIVER RD

15 BCF MARICOPA COUNTY NEW RIVER RD @ CIRCLE MTN RD STAMPED INTERSECTION 1996

16 SET RIB N/W COR CIRCLE MTN RD @ 3 RD AVE

17

18

19

20

21

22

23

24

25

26

27

28

29

30

31

32

33 GLO BC 31 | 32 / 6 | 5

34 GLO BC 1.19 ABOVE GRD 32 | 33 / 5 | 4

35 G.LO B.C 2' ± ABOVE GRD 1917 1 | S20 / 4 | S29
AT DRIVEWAY ENT 15 E MINDORO RD

36 GLO BC. TAVE T7 R3 19 | 20 / 30 | 29
1.90' ± ABOVE GRD

37 G.LO BC 20 | 21 1917

FOLLOWING PAGES 7-9
ARE CK X-SECTIONS
FOR MAPPING COMPARISON

ALL COORDS & ELEVS
ARE ASSUMED

X-SECTIONS

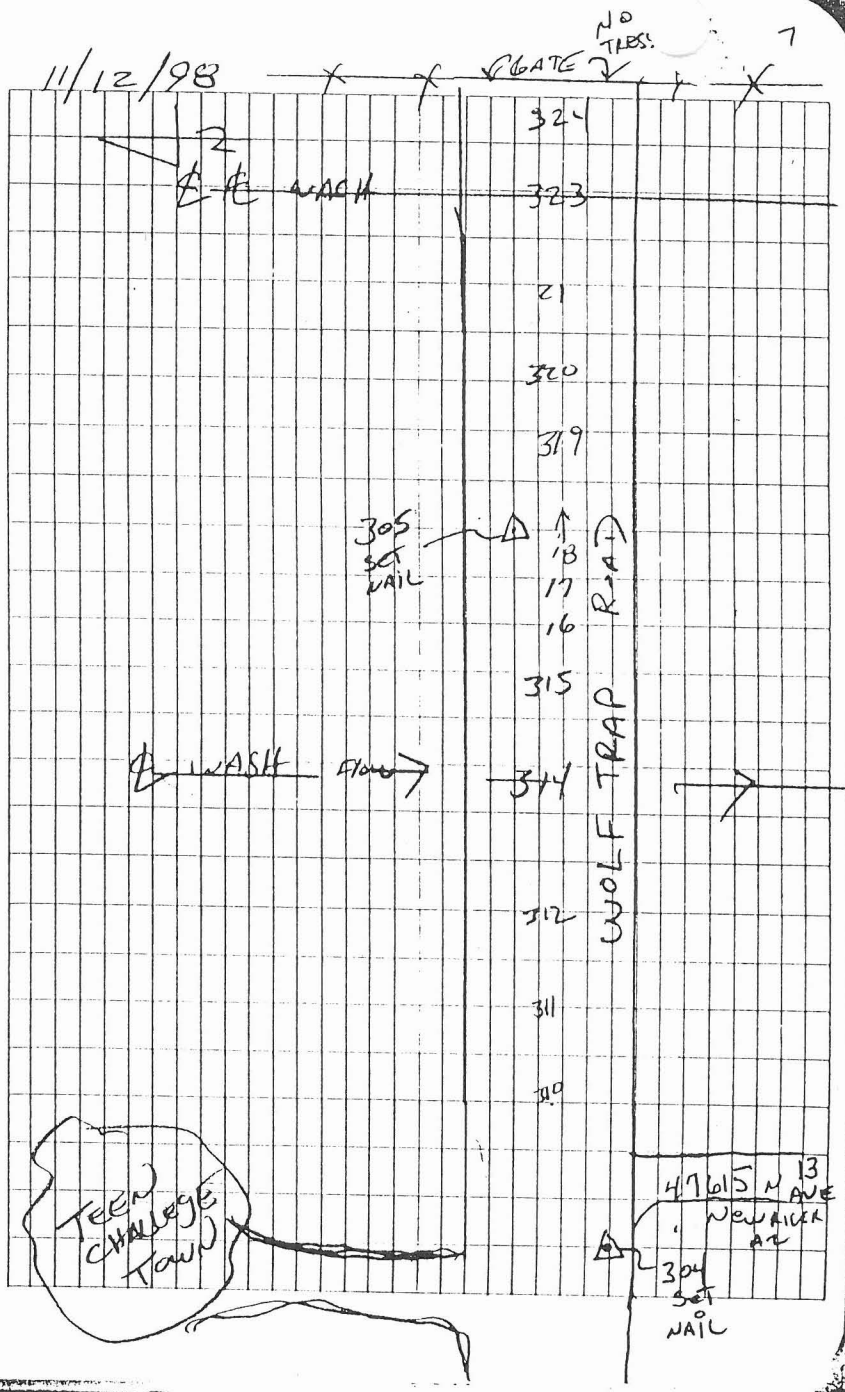
RK. LM. GR.

TP 305 NAIL — B.S. 304 NAIL — w/ 00-00

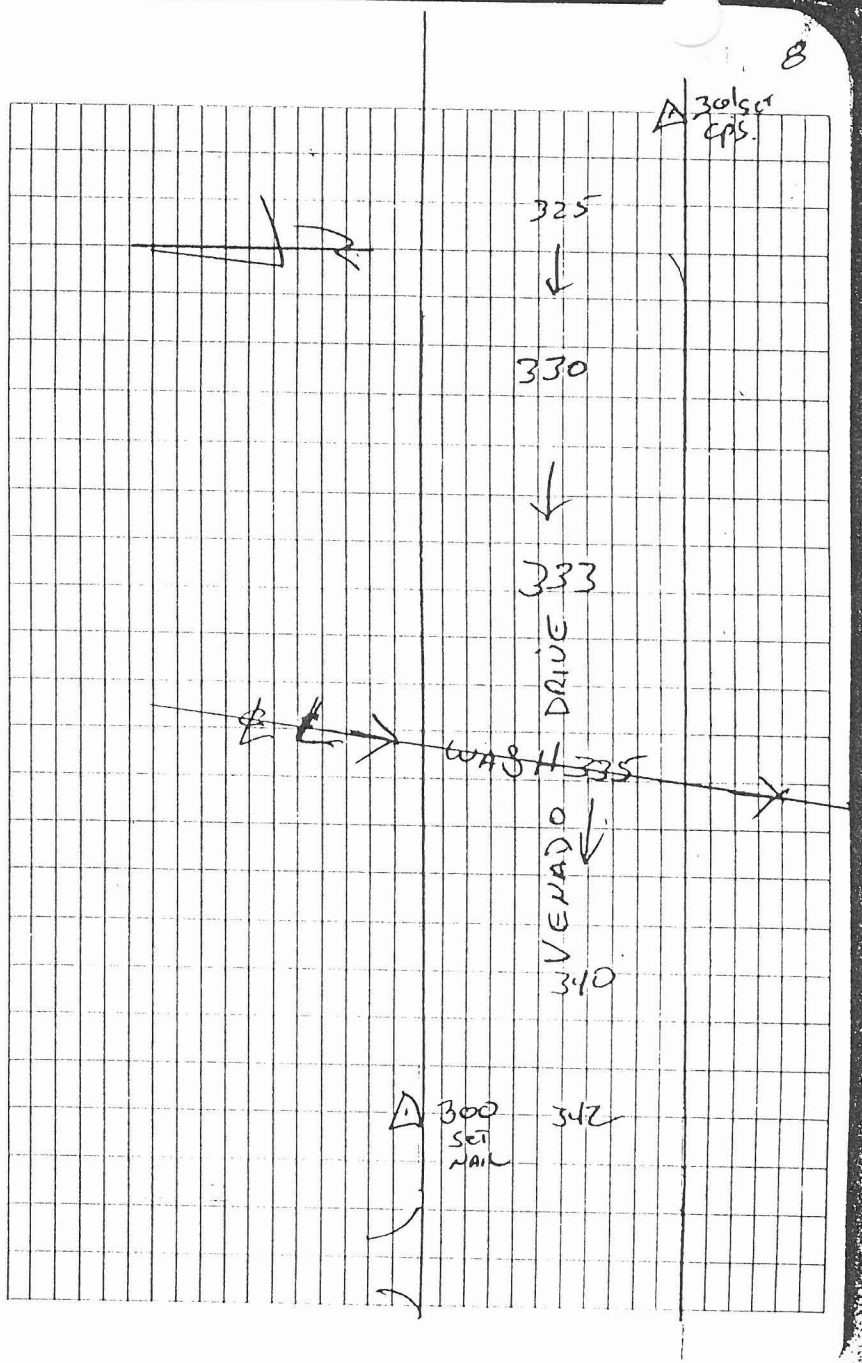
HT 5.25 — NR 5.76

310	N.G.	DIRT R.D
311	"	
312	"	
313	"	
314	℄ WASH	
315	N.G	
316	"	
317	"	
318	"	
319	"	
20	"	
21	"	
22	"	
23	℄ WASH	
24	N.G	

11/12/98



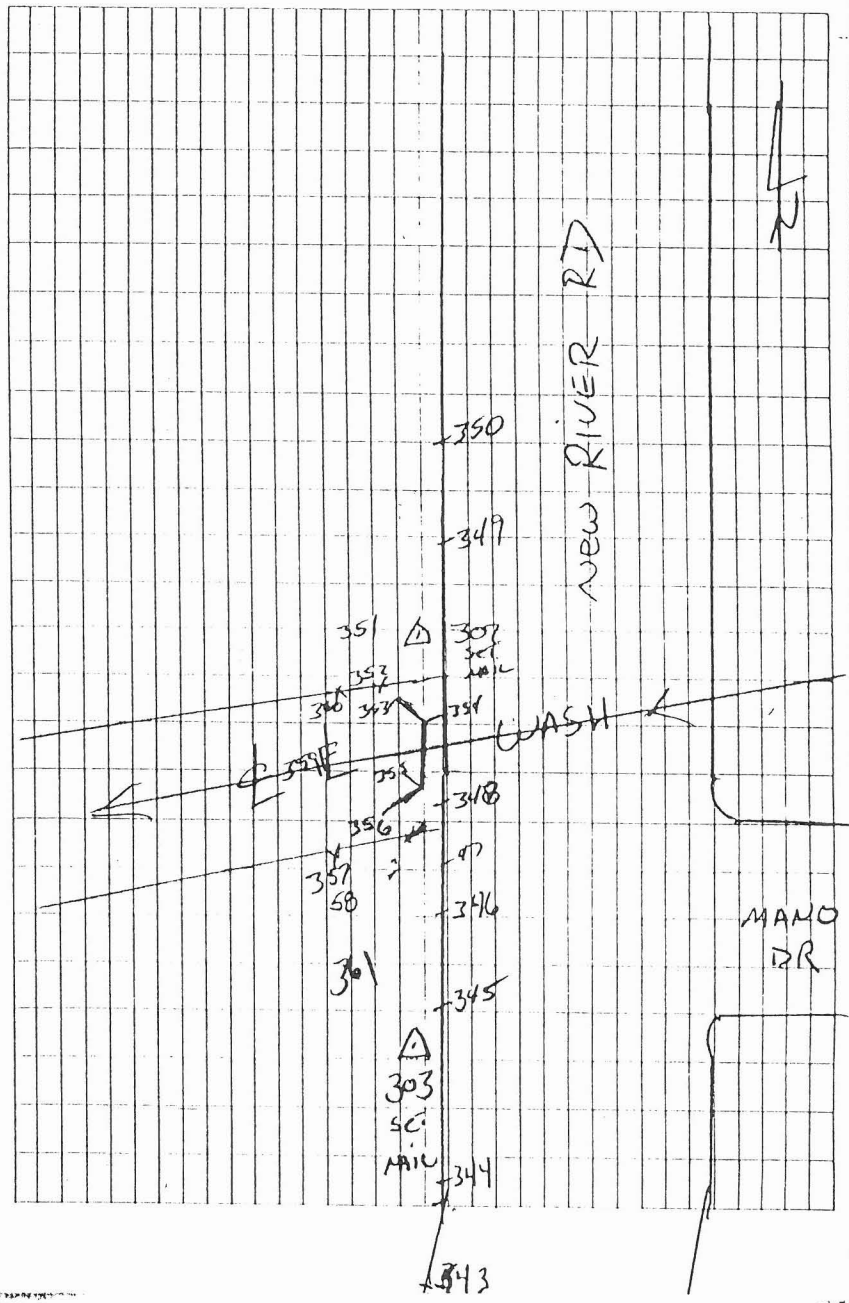
		TC 300		BS 301	w/ 00-00
				HI 5.18	
					HR.
325	NG	DIRT	RD		5.76
26	NG				
27	NG				
28	NG				
29	NG				
30	NG				
31	NG				
32	NG				
33	NG				
34	NG				
35	FL				
36	NG				
37	NG				
38	NG				
39	NG				
340	NG				
41	NG				
42	NG				



TC 302 BS 303 w/00-00

HI 5.18

			HR.
343	EP	EDGE PAV	5.76
44	"		
45	"		
46	"		
47	"		
48	"		
49	"		
350	"		
51	NG		
52	TB		
53	HDWL	WING	
54	HDWL		
55	HDWL		
56	HDWL	WING	
57	TB		
58	BB		
59	TC		
360	BB		8.75
61	NG		5.76



SKUNK CREEK SUPPLEMENTAL TOPO

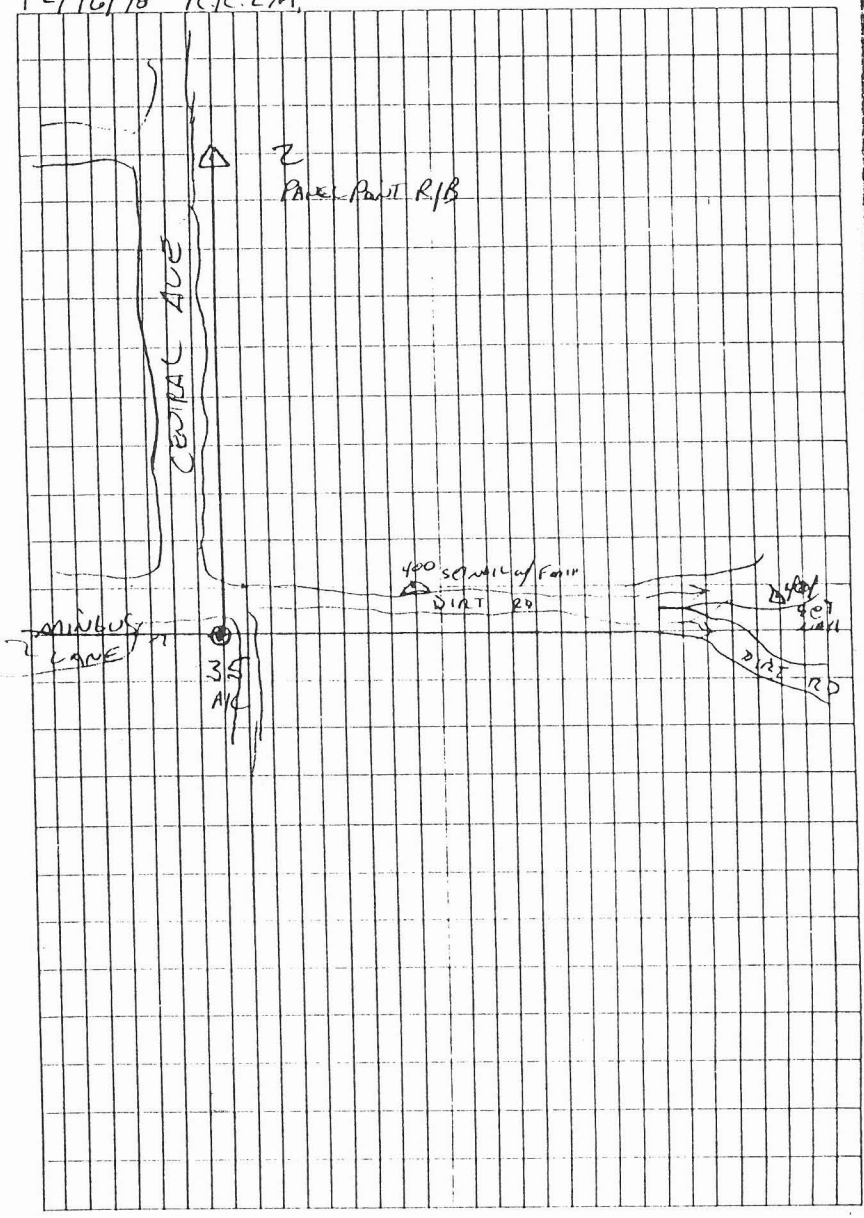
TP 35 BS 2
AIC 4 PP R/B

T/S	N	1065944.5589
400	E	652722.1328
SET	ELEV	2260.637
NAIL		

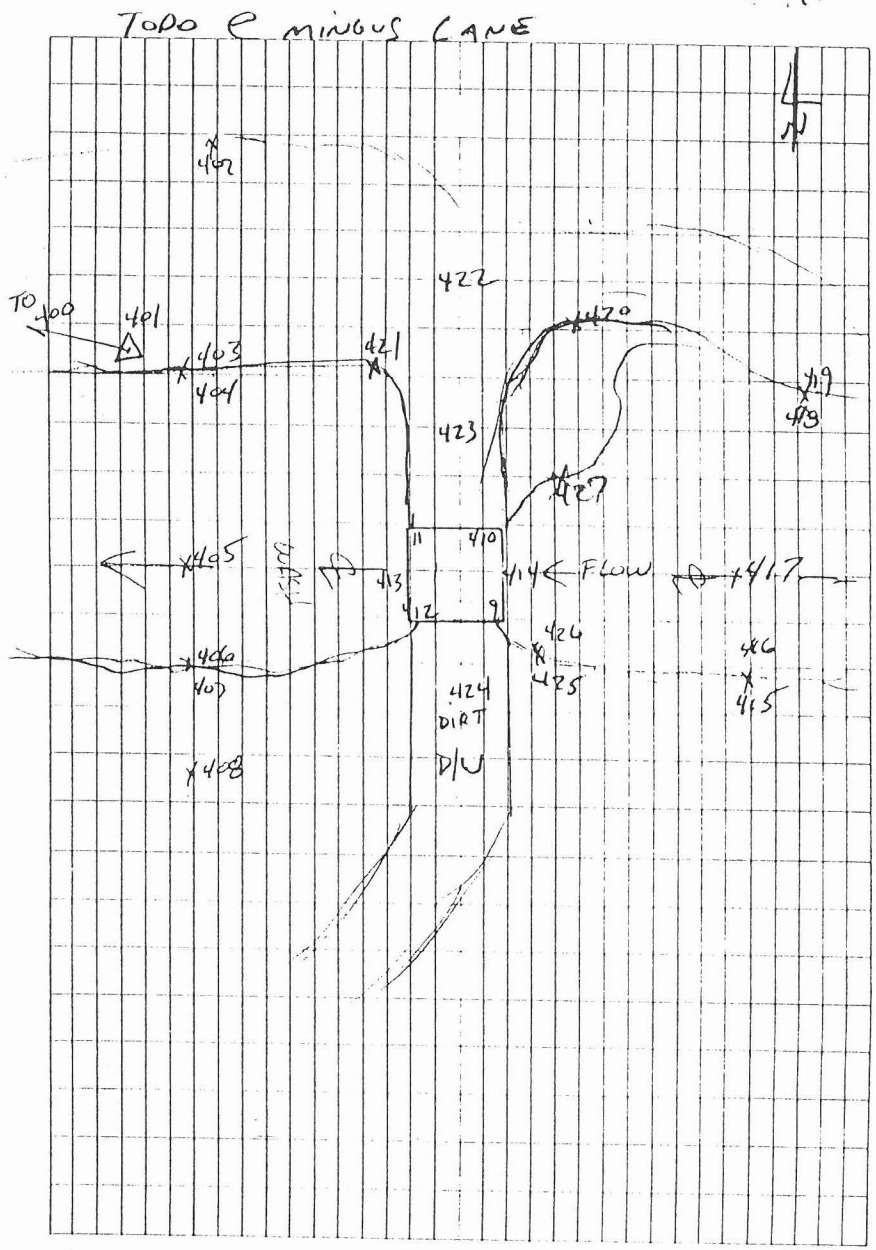
TP 400 BS 35

T/S		
401	N	1066039.5509
SET	E	653315.0286
NAIL	ELEV	2266.72

12/16/98 R.C. L.M.

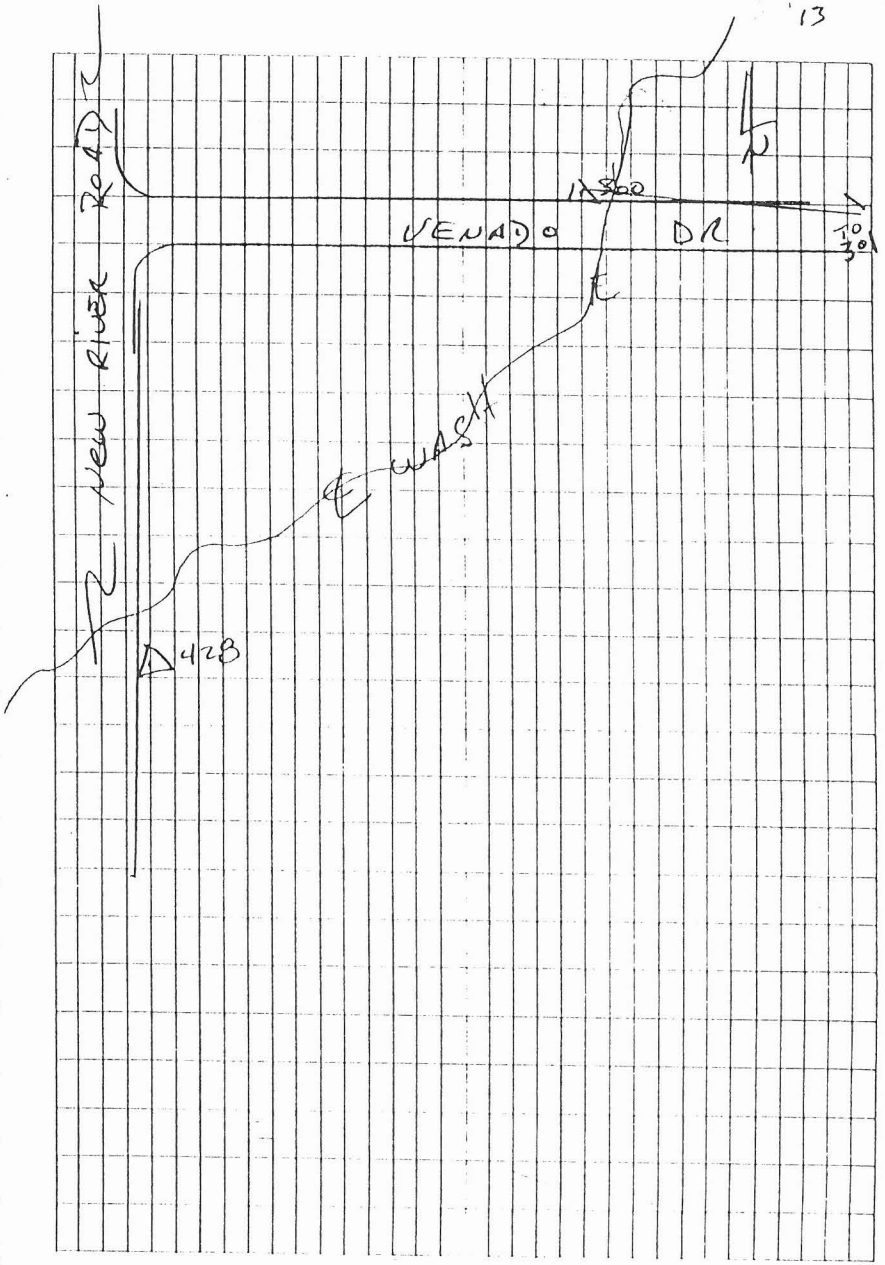


	AC 401		ES 400	
			HI 5.27	
				HR
402	N.B.			5.76
03	TOP	TOP BANK		
04	TOE			
5	PL			
6	TOE			
7	TOP			
8	NB			
9	C	TOP COR BOX CULVERT		17.80
410	C	18'x10'x6'		
11	C			
12	C			
13	PL	℄ R INV BOX		25.32
14	PL	" "		"
15	TOP			
16	TOE			
17	PL			
18	TOE			
19	TOP			
420	TOP			13.85



421	TOP				13.85
22	N6.				↓
23	N.6				
24	11				21.60
25	TOP				↓
26	TOE				
27	TOE				
		END SET UP.			

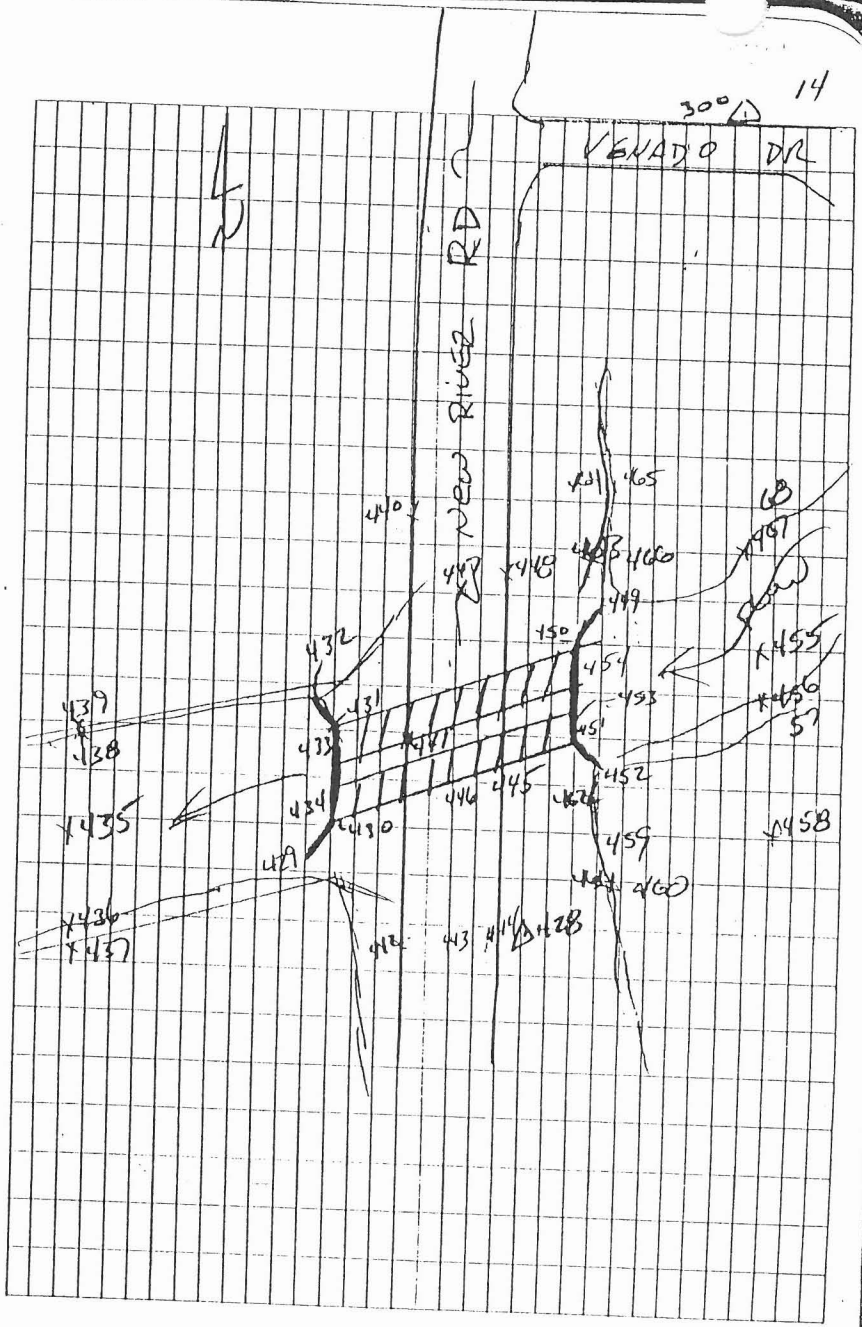
	T @ 300		BS 30/		
	NAIL		NAIL		
			HI 5.11		
428	NAIL	SET	NAIL		9.84



TC 428 BS 300

HI 5.07

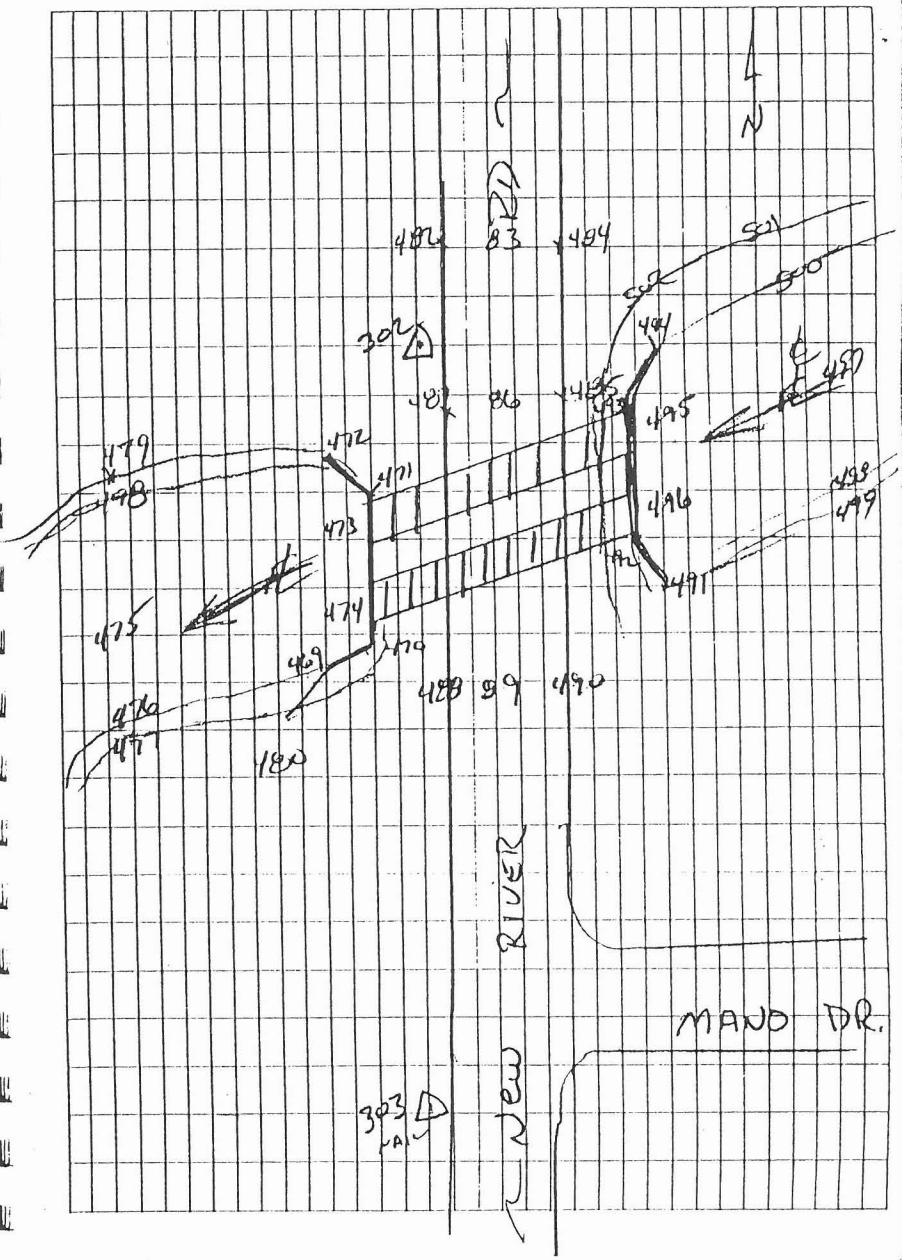
429	WNG	TOP CMP WING WALL	5.76
30	HW	CMP HEADWALL	↓
31	HW	"	
32	WNG		.25
33	INV	INV 60" RCP	9.84
34	INV	" " "	↓
35	FL		
36	TOE		
37	TOP		
38	TOE		
39	TOP		
440	EP.		
41	EP.		
42	"		
43	P		
44	EP.		5.76
45	EP.		
46	P		↓
47	P		
48	EP.		
449	WNG		



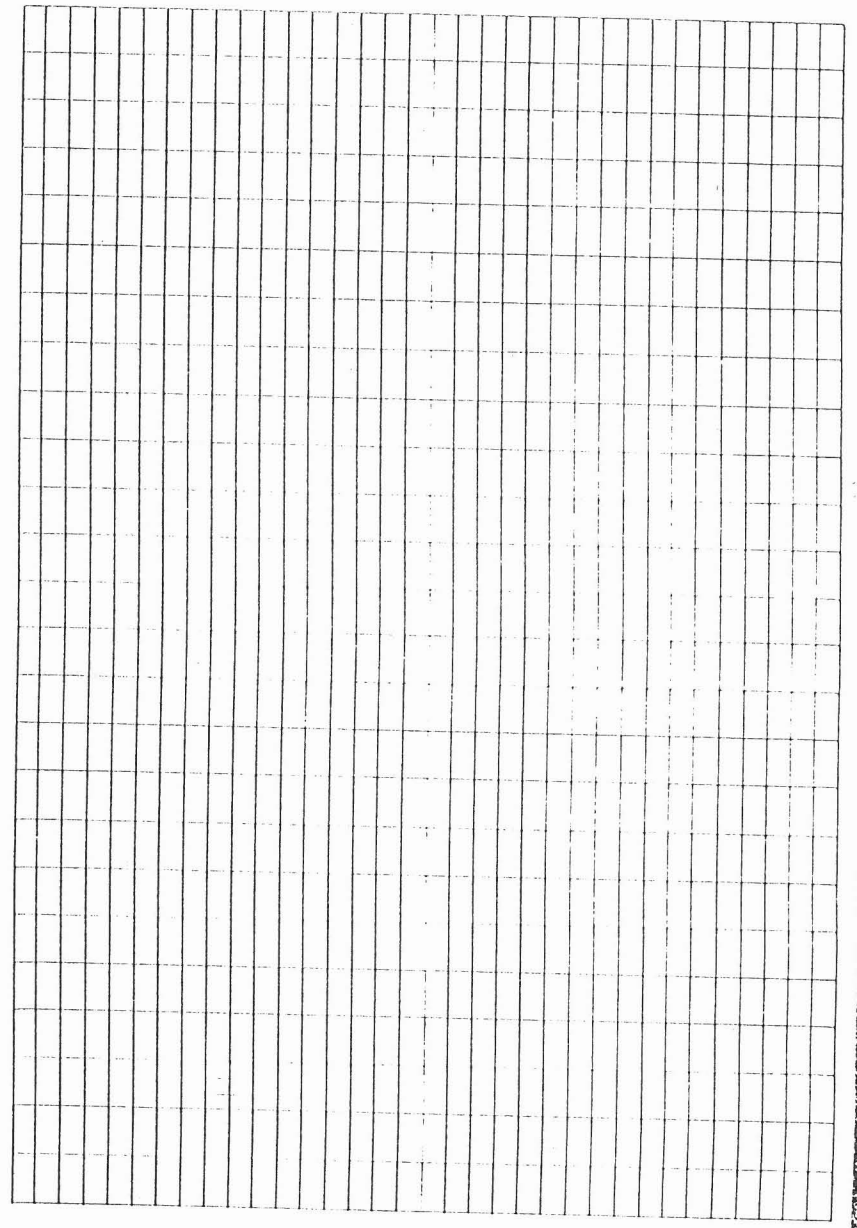
450	HW		5.76
51	HW		
52	WNG		
53	INV	60" R.C.P.	13.85
54	INV	" "	
55	↗		
56	TOE		
57	TOP		
58	N.G		
59	GB		
460	TOB		
61	TOP		
62	TOP		
63	"		
64	"		
65	GB.		
66	GB.		
67	TOE		
68	TOP		

~ END SET UP ~

		℄ 302 NAIL		BS 303 NAIL	
			HI	5.02	
469	WNG				5.76
70	HW				
71	HW				
72	WNG				
73	INV	60" CMP			9.84
74	INV	11 11			
75	℄				17.80
76	TOE				
77	TOP				
78	TOE				
79	TOP				
480	NG				
81	NG				5.76
82	EP				
83	P				
84	EP				
85	EP				
86	P				
87	EP				
88	EP				
489	P				



490	EP				5.76
91	WNG				↓
92	HW				
93	HW				
94	WNG				
95	INV	60" C.MP.			1385
96	INV	" "			↓
97	FL				
98	TOE				
99	TOP				
500	TOE				
01	TOP				
502	TOP				
		~ END SET UP ~			



STA.	PT. NO	B.S.	F.S.	ELEV.
P.O.B.	ERN 11 100			2111.510
		3.241		
TP 1			4.128	2110.623
		5.744		
TP 2			3.805	2112.561
		5.815		
TP 3			3.222	2115.154
		5.265		
TP 4			4.495	2115.924
		5.622		
TP 5			1.610	2119.936
		8.961		
TP 6			1.511	2127.386
		9.331		
TP 7			2.125	2134.592
		6.167		
TP 8			1.754	2139.004
		8.776		
TP 9			1.068	2146.712
		7.400		
TP 10			2.089	2152.022
		6.629		
TP 11			3.456	2155.195
		5.434		

2½ B.C. MARICOPA COUNTY HIGHWAY DEPARTMENT AT NEW SKUNK CREEK BRIDGE ON TOP OF WEST BARRIER WALL 21.5' FROM SOUTH END OF BARRIER WALL ELEV. = 2111.51

STA.	PT. No	B.S.	F.S.	ELEV.
TP 12			4.887	2155.742
		3.825		
TP 13			8.031	2151.535
		2.964		
	101			
TP 14	18		7.490	2147.009

CUT X TOP OF CONC. HEAD WALL BOX CULV. EAST SIDE OF NEW RIVER RD. 200'± SOUTH OF ℄ NEW RIVER RD & FIG SPRINGS RD.

STA	PT. No	B.S.	F.S.	ELEV.
P.O.B	100 H			2111.510
		0.635		
TP 1			6.505	2105.640
		1.969		
TP 2			6.693	2100.917
		1.571		
TP 3			7.344	2095.143
		1.585		
TP 4			6.533	2090.195
		4.435		
TP 5	101 H		5.094	2089.536
		1.950		
TP 6			5.816	2085.670
		6.244		
TP 7			5.384	2086.530
		3.290		
TP 8			7.996	2081.825
		1.947		
TP 9			6.412	2077.359
		4.992		
TP 10			2.294	2080.058
		7.301		
TP 11			1.598	2085.761
		6.567		
TP 12	103 H		3.921	2088.407

X MARK @ NEW CORN @ CONC. HEAD WALL CATTLE GUARD

SET P.K. NAIL OF CONC. HEADWALL 2 N.E. COR. OF CATTLE GUARD

100' NORTH OF ZORRO DR.

STA.	PT. No	B.S.	F.S.	ELEV.
		2.742		
TP 13			6.662	2084.487
		2.073		
TP 14			6.785	2079.774
		1.703		
TP 15			8.090	2073.387
		1.030		
TP 16			8.620	2065.797
		2.063		
TP 17			7.068	2060.792
		1.921		
TP 18			5.639	2057.073
		3.621		
TP 19			5.924	2054.771
		2.799		
TP 20			5.355	2052.214
		6.684		
TP 21			3.060	2055.838
		6.994		
TP 22			2.672	2060.160
		9.701		
TP 23			1.595	2068.267
		9.124		
TP 24			2.942	2074.449

STA.	PT No	B.S.	F.S.	ELEV.
		4.113		
TP 25			10.851	2067.711
		3.440		
TP 26			2.621	2068.530
		6.835		
TP 27			5.097	2070.268
		2.918		
TP 28			6.319	2066.867
		3.358		
TP 29			6.138	2064.087
		2.965		
TP 30			5.725	2061.327
		5.568		
TP 31	15 ~~16~~		3.986	2062.909
		1.636		
TP 32			7.416	2057.130
		3.792		
TP 33			5.704	2055.217
		4.766		
TP 34			4.057	2055.926
		5.096		
TP 35			7.160	2053.861
		2.801		
TP 36			8.118	2048.545

EAST E.C.D. ~~x~~ OF NEW RIVER RD & CIRCLE MTN. RD.
PANEL POINT # 15

STA.	PT. No.	B.S.	F.S.	ELEV.
		3.819		
TP 37	104		4.476	2047.888
		1.057		
TP 38			8.013	2040.932
		1.463		
TP 39			11.624	2030.771
		4.450		
TP 40			4.956	2030.265
		2.072		
TP 41			11.240	2021.096
		2.480		
TP 42			11.447	2012.129
		7.357		
TP 43			10.521	2008.960
		8.204		
TP 44			0.882	2016.282
		8.714		
TP 45			3.042	2021.954
	[illegible]	10.630		
TP 46			1.421	2031.163
		7.897		
TP 47	2010		0.516	2038.543
		0.613		
TP 48			9.577	2029.580

NAIL IN R.R. SOUTH FACE 2 S.E. CORN OF CIRCLE 4TH RD. & 3RD AVE.

GLO B.C. SEC. COR. 6, 5, 7, 8 TGN. R 3 E
ERM 10 PT No. 2010

STA.	PT. No.	B.S.	F.S.	ELEV.
		3.062		
TP 49			10.640	2022.002
		3.426		
TP 50			9.097	2016.330
		1.116		
TP 51			8.439	2009.008
		10.216		
TP 52			7.041	2012.182
		11.037		
TP 53			2.071	2021.149
		10.456		
TP 54			1.287	2030.318
		5.490		
TP 55			4.984	2030.824
		11.035		
TP 56			0.872	2040.987
		7.967		
TP 57	104		1.017	2047.938
		4.713		
TP 58			4.051	2048.599
		8.108		
TP 59			2.794	2053.912
		6.982		
TP 60			4.917	2055.978

NAIL IN P.R. SOUTH EDGE @ S.E. COR. OF X. CIRCLE MTN. RD & 7.RU AVE.

STA.	PT. Nº	B.S.	F.S.	ELEV.
		3.750		
TP 61			4.457	2055.271
		5.293		
TP 62			3.377	2057.187
		7.554		
TP 63	15 ~~20~~		1.773	2062.968
		5.477		
TP 64			4.388	2064.056
		5.977		
TP 65			2.264	2067.769
		6.568		
TP 66			1.828	2072.509
		8.176		
TP 67			3.507	2077.178
		3.973		
TP 68			6.318	2074.834
		3.440		
TP 69			5.086	2073.188
		6.963		
TP 70			1.073	2079.077
		8.954		
TP 71			0.884	2087.147
		7.339		
TP 72			3.241	2091.244

EAST P.C. Q ℄ OF NEW/ RIVER RD. ℄ CIRCLE MTN. RD.
PANEL POINT #15

STN.	PT. No	B.S.	F.S.	ELEV.
		5.319		
TP 73			5.388	2091.175
		4.566		
TP 74			3.758	2091.983
		7.586		
TP 75			2.002	2097.567
		7.344		
TP 76			2.724	2102.187
		5.905		
TP 77	105 24		5.023	2103.070
		4.957		
TP 78			5.840	2102.187
		4.073		
TP 79			8.689	2097.571
		4.423		
TP 80			10.001	2091.993
		5.697		
TP 81			6.506	2091.185
		6.260		
TP 82			6.190	2091.254
		3.293		
TP 83			7.390	2087.157
		3.605		
TP 84			11.674	2079.087

B.C. TOP OF CONC. HEADWALL SOUTH SIDE OF CIRCLE MTN RD & EAST NEW RIVER RD

ST.	PT. No	B.S.	F.S.	ELEV.
		3.724		
TP 85			9.613	2073.198
		7.420		
TP 86			5.774	2074.844
		7.360		
TP 87			5.013	2077.191
		3.427		
TP 88			8.097	2072.522
		2.164		
TP 89			6.903	2067.783
		2.362		
TP 90			6.072	2064.072
		4.324		
TP 91	15		5.410	2062.985
		3.907		
TP 92			5.482	2061.411
		5.244		
TP 93			2.486	2064.169
		6.024		
TP 94			3.245	2066.948
		5.847		
TP 95			2.450	2070.345
		6.489		
TP 96			8.226	2068.609

EAST B.C. @ X OF NEW RIVER RD. & CIRCLE MTN. RD.
PANEL # 15

STA	PT. No	B.S.	F.S.	ELEV.
		3.817		
TP 97			4.636	2067.790
		10.199		
TP 98			3.461	2074.527
		3.123		
TP 99			9.304	2068.346
		2.231		
TP 100			10.342	2060.235
		1.985		
TP 101			6.308	2055.912
		1.868		
TP 102			5.489	2052.291
		3.582		
TP 103			1.029	2054.844
		6.329		
TP 104 = TP 18	23		4.025	2057.148
		4.150		
TP 105			1.429	2059.869
		10.616		
TP 106			0.530	2069.955
		11.621		
TP 107			0.871	2080.704
		12.958		
TP 108			1.094	2092.568

TP 18 WEST SIDE

S	PT. No	B.S.	F.S.	ELEV.
		12.767		
TP 109			0.947	2104.389
		11.901		
TP 110			1.148	2115.141
		11.489		
TP 111			2.124	2124.506
P.B.O	23			2057.148
		7.026		
TP 1			3.309	2060.865
		8.472		
TP 2			3.465	2065.872
		10.234		
TP 3			2.643	2073.463
		9.398		
TP 4			3.011	2079.849
		7.796		
TP 5			3.081	2084.565
		7.384		
END	103 15		3.463	2088.486

SET P.K. NAIL TOP OF CONC. HEAD WALL 2 N.E COR. OF CATTLE GUARD 100' ± NORTH OF ZORRO DR.

STA.	PT. No	B.S.	F.S.	ELEV.
P.O.B.	103			2088.486
		3.465		
TP 1			7.384	2084.566
		2.763		
TP 2			1.751	2085.578
		12.935		
TP 3			0.943	2097.571
		3.422		
TP 4			12.515	2088.477
		0.860		
TP 5			12.606	2076.731
		5.089		
TP 6			1.505	2080.315
		13.269		
TP 7			0.579	2092.005
		12.871		
TP 8			1.086	2104.790
		13.145		
TP 9			0.338	2117.597
		12.983		
TP 10			0.917	2129.663
		13.121		
TP 11			0.311	2142.473
		10.942		

DV2004 UNION RM 1 5.870 METERS 35235
DV2004 ----------
DV2004
DV2004 STATION MARK IS A TRIANGULATION STATION DISK
004 WITH SETTING: SET IN TOP OF CONCRETE MONUMENT (ROUND)
DV2004 THE MARK IS STAMPED: UNION 1947
DV2004 STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO
DV2004 STABILITY: SURFACE MOTION
DV2004 SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR
DV2004 SATELLITE: SATELLITE OBSERVATIONS - April 30, 1994
DV2004

DV2004	HISTORY	- Year Condition	Recov. By
DV2004	HISTORY	- 1947 STATION MONUMENTED	COAST AND GEODETIC SURVEY
DV2004	HISTORY	- 1994 GOOD	NATIONAL GEODETIC SURVEY

DV2004
DV2004 STATION DESCRIPTION
DV2004
DV2004 DESCRIBED BY NATIONAL GEODETIC SURVEY 1994 (JDR)
DV2004 RECOVERED AS DESCRIBED. NOTE- BEAR RIGHT AT CORNER OF WALL AND FOLLOW
DV2004 ROUGH ROAD TO HIGHEST GROUND AND STATION.
DV2004 RECOVERED AS DESCRIBED. NOTE- BEAR RIGHT AT CORNER OF WALL AND FOLLOW
DV2004 ROUGH ROAD TO HIGHEST GROUND AND STATION.
DV2004 RECOVERED AS DESCRIBED.

ST.	PT. NO	B.S.	F.S.	ELEV.
TP 12			1.841	2151.574
		6.441		
TP 13			3.526	2154.489
		5.417		
TP 14	12 16		4.718	2155.188
		6.088		
TP 15			4.084	2157.192
		4.599		
TP 16			1.974	2159.817
		8.824		
TP 17			0.614	2168.028
		7.871		
TP 18			2.680	2173.219
		7.879		
TP 19			4.107	2176.991
		4.754		
TP 20			5.439	2176.306
		3.339		
TP 21	106 17		2.580	2177.064
		4.441		
TP 22			0.524	2180.98
		7.529		
TP 23			2.418	2186.091
		7.845		

½" REBAR PANEL PT. #12 @ 314 E. VENADO SOUTH SIDE ¼ MILE EAST OF NEW RIVER RD. ON VENADO DR.

AL. B.C. SEC. COR. 32,33,5,4. - Same As GPS Pt 34

ST.	PT. No	B.S.	F.S.	ELEV.
TP 24			1.563	2192.374
		7.676		
TP 25			4.259	2195.791
		8.580		
TP 26			0.025	2204.346
		6.773		
TP 27			2.562	2208.557
		7.690		
TP 28.			2.330	2213.917
		9.015		
TP 29			2.419	2220.514
		8.517		
TP 30			1.859	2227.172
		6.295		
TP 31			2.324	2231.142
		6.072		
TP 32			0.763	2236.451
		7.339		
TP 33			0.891	2242.899
		7.413		
TP 34			2.684	2247.628
		8.819		
TP 35			0.328	2256.119
		6.923		

STA.	PT. No	B.S.	F.S.	ELEV.
TP 36			1.711	2261.331
		7.902		
TP 37			1.427	2267.806
		8.802		
TP 38			0.421	2276.187
		8.561		
TP 39			1.010	2283.738
		8.117		
TP 40	107 ~~18~~		3.867	2287.988

STA.	PT. No	B.S.	F.S.	ELEV.
P.O.B.	~~15~~ 101			2147.009
		7.623		
TP 1			5.095	2149.537
		5.678		
TP 2			6.749	2148.466
		8.637		
TP 3			2.140	2154.963
		8.551		
TP 4			2.231	2161.283
		6.046		
TP 5			4.445	2162.884
		7.374		
TP 6			1.535	2168.723
		6.654		
TP 7			0.688	2176.688
		8.255		
TP 8			0.499	2182.444
		7.096		
TP 9			3.050	2186.491
		5.154		
TP 10	4 ~~19~~		6.143	2185.802
		6.043		
TP 11			5.172	2186.373
		6.071		

½ REBAR : PANEL PT. #4

STN.	PT. NO	B.S.	FS.	ELEV.
TP 12			2.895	2189.549
		7.229		
TP 13			5.520	2191.258
		3.981		
TP 14			5.543	2189.696
		4.644		
TP 15			2.304	2192.036
		8.734		
TP 16			4.294	2196.476
		8.809		
TP 17			2.236	2203.050
		8.151		
TP 18			1.898	2209.303
		7.911		
TP 19			0.797	2216.416
		6.572		
TP 20	108 ~~20~~		0.573	2222.415
		1.126		
TP 21	~~2~~ 3		0.966	2222.575
		1.171		
TP 22			7.331	2216.416
		2.505		
TP 23			9.617	2209.303
		2.932		

Fd. B.C. SEC. COR. 1, 29, 24, 30 - Set A. GPS PH36

½ REBAR PANEL PT. #3

STA.	PT No	B.S.	F.S.	ELEV.
TP 24			9.186	2203.050
		2.902		
TP 25			9.475	2196.476
		0.441		
TP 26			1.677	2195.240
		8.543		
TP 27			3.069	2200.714
		6.604		
TP 28			2.515	2204.803
		6.979		
TP. 29			2.496	2209.286
		12.822		
TP 30			1.566	2220.541
		6.663		
TP 31			1.101	2226.103
		10.354		
TP 32			1.512	2234.945
		7.868		
TP 33			2.867	2239.946
		6.277		
TP 34			2.771	2243.452
		8.052		
TP 35			2.086	2249.418
		8.699		

STA.	PT. No	B.S.	F.S.	ELEV.
TP. 36	~~20~~ 1934		1.623	2256.493
		1.925		
TP 37			5.931	2252.486
		7.236		
TP 38			0.956	2258.767
		13.159		
TP 39			0.708	2271.218
		0.708		
TP 40			0.708	2271.218

Fd. B.C. 29, 20 — 20/29

CENTRAL AVE. 2 HOUSE # 4147 BOX

½" REBAR PANEL PT. #2

STA.	PT. No	B.S.	F.S.	ELEV.	ADJ. ELEV.
P.B.O	109 LC			2257.493	
1		2.457			
			2.552	2256.398	
2		6.276			
			3.835	2258.839	
3		9.176			
			3.685	2264.330	
4		7.227			
			5.100	2266.457	
5		5.937			
			3.403	2268.992	
6		3.738			
			1.733	2270.997	
7		11.362			
			1.310	2281.048	
8		9.460			
			1.364	2289.144	
9		10.369			
			1.853	2297.660	
10		3.208			
			4.540	2296.328	
11		8.557			
			2.903	2301.982	
12		9.751			
			2.511	2309.222	

#435

fd. B.C. 29,20 $\frac{20}{29}$ central ave. @ House± 4143

STA.	PT. No	B.S.	F.S.	ELEV.	ADJ. ELEV.
		3.422			
13	110 ~~25~~		3.422	2309.222	
		12.465			
14			0.554	2321.133	
		12.645			
15			0.518	2333.260	
		12.955			
16			0.248	2345.968	
		12.838			
17			0.412	2358.393	
		13.253			
18	111 ~~24~~		0.136	2371.510	

SET PK ⚲ @ S.W. COR. OF LARGE CONC. BLDG. STRUCTURE ±500' N. of SEC. COR. 20, 21, 28, 29

B.C. ON 2" PIPE, ±1' ABOVE SURFACE
SEC COR. 20, 21, 28, 29

CURVE FORMULAS

$T = R \tan \frac{1}{2} I$

$T = \frac{50 \tan \frac{1}{2} I}{\text{Sin. } \frac{1}{2} D}$

$\text{Sin. } \frac{1}{2} D = \frac{50}{R}$

$\text{Sin. } \frac{1}{2} D = \frac{50 \tan \frac{1}{2} I}{T}$

$R = T \cot. \frac{1}{2} I$

$R = \frac{50}{\text{Sin. } \frac{1}{2} D}$

$E = R \text{ ex. sec } \frac{1}{2} I$

$E = T \tan \frac{1}{4} I$

$\text{Chord def.} = \frac{\text{chord}^2}{R}$

$\text{No. chords} = \frac{I}{D}$

Tan. def. = ½ chord def.

The square of any distance, divided by twice the radius, will equal the distance from tangent to curve, very nearly.

To find angle for a given distance and deflection.

Rule 1. Multiply the given distance by .01745 (def. for 1° for 1 ft.) and divide given deflection by the product.

Rule 2. Multiply given deflection by 57.3, and divide the product by the given distance.

To find deflection for a given angle and distance. Multiply the angle by .01745, and the product by the distance.

GENERAL DATA

Right Angle Triangles. Square the altitude, divide by twice the base. Add quotient to base for hypotenuse.

Given Base 100, Alt. $10.10^2 \div 200 = .5$. $100 + .5 = 100.5$ hyp.

Given Hyp. 100, Alt. $25.25^2 \div 200 = 3.125$. $100 - 3.125 = 96.875$=Base.

Error in first example, .002; in last, .045.

To find Tons of Rail in one mile of track: multiply weight per yard by 11, and divide by 7.

Leveling. The correction for curvature and refraction, in feet and decimals of feet is equal to $0.574\ d^2$, where d is the distance in miles. The correction for curvature alone is closely, $\frac{2}{3} d^2$. The combined correction is negative.

Probable Error. If d_1, d_2, d_3, etc. are the discrepancies of various results from the mean, and if Σd^2=the sum of the squares of these differences and n=the number of observations, then the probable error of the mean = $\pm 0.6745 \sqrt{\frac{\Sigma d^2}{n(n-1)}}$

MINUTES IN DECIMALS OF A DEGREE

1′	.0167	11′	.1833	21′	.3500	31′	.5167	41′	.6833	51′	.8500
2	.0333	12	.2000	22	.3667	32	.5333	42	.7000	52	.8667
3	.0500	13	.2167	23	.3833	33	.5500	43	.7167	53	.8833
4	.0667	14	.2333	24	.4000	34	.5667	44	.7333	54	.9000
5	.0833	15	.2500	25	.4167	35	.5833	45	.7500	55	.9167
6	.1000	16	.2667	26	.4333	36	.6000	46	.7667	56	.9333
7	.1167	17	.2833	27	.4500	37	.6167	47	.7833	57	.9500
8	.1333	18	.3000	28	.4667	38	.6333	48	.8000	58	.9667
9	.1500	19	.3167	29	.4833	39	.6500	49	.8167	59	.9833
10	.1667	20	.3333	30	.5000	40	.6667	50	.8333	60	1.0000

INCHES IN DECIMALS OF A FOOT

1/16	3/32	1/8	5/16	1/4	5/16	3/8	1/2	5/8	3/4	7/8
.0052	.0078	.0104	.0156	.0208	.0260	.0313	.0417	.0521	.0625	.0729

1	2	3	4	5	6	7	8	9	10	11
.0833	.1667	.2500	.3333	.4167	.5000	.5833	.6667	.7500	.8333	.9167

Elan Publishing Co., Inc. Meredith, N.H. 03253

SKUNK CREEK
A.P.S.

11/12/98

PT	ROD	OPER	TIME ON	TIME OFF	SPECIES
SKUNK	1.816	JKR	7:27	12:28	UNIT 3
HOUND	1.760	JKR	7:57	12:09	UNIT 2
RIFLE	2.034	JKR	8:25	8:35	120
SØ11	2.034	JKR	9:00	9:01	12
SØ 12	2.034	JKR	9:08	9:09	12
S300	2.034	JKR	9:19	9:20	12
S301	2.034	JKR	9:27	9:28	12
SØ34	2.034	JKR	9:39	9:40	12
SØØ9	2.034	JKR	9:49	9:50	12
SØØ8	2.034	JKR	10:02	10:03	12
SØØ7	2.034	JKR	10:08	10:09	12
S3Ø2	2.034	JKR	10:34	10:35	12
S3Ø3	2.034	JKR	10:38	10:39	12
SØ15	2.034	JKR	10:42	10:43	12
SØ16	2.034	JKR	10:47	10:48	12
2010	2.034	JKR	10:55	10:56	12
SØØ4	2.034	JKR	11:05	11:06	12
SØ13	2.034	JKR	11:15	11:16	12
SØ10	2.034	JKR	11:29	11:30	12
SØ304	2.034	JKR	11:35	11:36	12
S305	2.034	JKR	11:41	11:51	10MIN

	11/13/98		Session B		
PT#	Rod	oper	on	off	#Pucls
SKUNK	1.857	RK	8:00	2:06	UNIT 3
Hound	1.782	RK	8:58	1:50	UNIT 2
PR13	2.034	RKR	9:35	9:45	Rover 120
S33	"	"	10:40	10:41	12
S004	"	"	10:29	10:30	"
S003			10:38	10:39	12
8036			10:42	10:52	120
S035			11:06	11:07	12
S002			11:12	11:13	12
S001			11:37	11:38	12
S037			11:40	11:41	12
S006			12:36	12:37	12
S005			12:59	1:09	120
	RN	1-1656	(19189)		

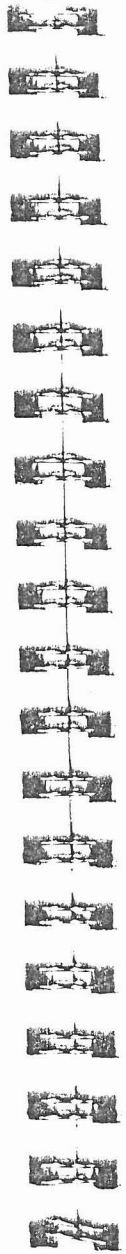
RK C.M. G.R.

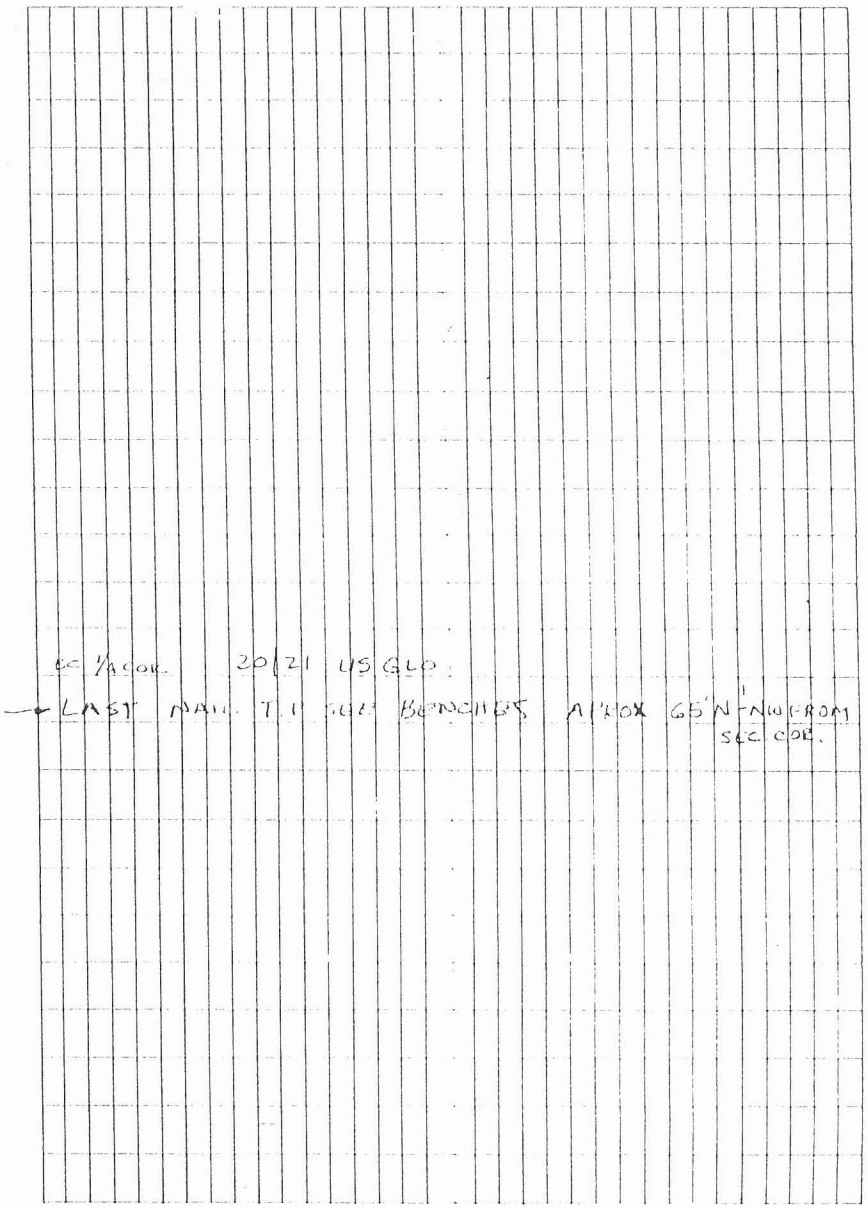
Survey MCDOT IRONBAR in Conc. HH NEW RIVER RD
GLO BC
PANEL POINT
"
GLO BC. N120 39 27
GLO BC N/4 cor 30 27
PANEL POINT CENTRAL AVE
PANEL POINT
GLO BC S20/S21
PANEL POINT
PANEL POINT

Sat 30 1H 1/0
Sat 1

11/19/98 SESSION "C"

PT"	ROD	OPER	TIME ON	TIME OF	EPOCHS
SØ12	1.910	JKR	7:30	1:20	UNIT3
NR13	1.910	JKR	7:43		UNIT2
SØ33	2.034	JKR	8:18	8:27	120
S1Ø5	2.034	JKR	8:43	8:44	12
SØ34(100)	2.034	JKR	8:58	8:59	12
SØ100	2.034	JKR	9:09	9:10	12
SØØ4	2.034	JKR	9:20	9:21	12
SØ36	2.034	JKR	9:36	9:37	12
SØØ3	2.034	JKR	9:39	9:40	12
SØØ2	2.034	JKR	9:49	9:50	12
SØ35	2.034	JKR	9:57	9:58	12
SØØ1	2.034	JKR	10:23	10:32	120
SØ37	2.034	JKR	10:38	10:47	120
* X111	2.034	JKR	11:14	11:15	12
SØØ6	2.034	JKR	11:37	11:56	240
SØØ5	2.034	JKR	12:18	12:38	20MIN





NAD83 SPC To Geo

2010
N 1050016.708
E 649622.893
EL 2038.52

LAT 33-53-10.33392
LONG 112-04-57.60683
EL 621.341 m

2009
N 1049944.611
E 650963.888
EL -

LAT 33-53-01.64178
LONG 112-04-41.69776

11/20/98 "D"

PT	ROD	OPER	TIME ON	TIME OFF	
SØ12	1.922	JKR	10:25	2:09	UNIT3
NR13	1.932	JKR	10:37		UNIT2
SØØ1	2.034	JKR	11:13	11:22	120
SØ37	2.034	JKR	11:27	11:36	120
X111	2.034	JKR	12:03	12:14	12
SØØ6	2.034	JKR	12:25	12:44	240
		SESSION 2"			
SØØ6	2.034	JKR	12:47	12:52	60
SØØ5	2.034	JKR	1:11	1:31	20MIN

National Geodetic Survey, Retrieval Date = MAY 9, 1995

DV0122 **********

DV0122 DESIGNATION - SKUNK
DV0122 PID - DV0122
DV0122 STATE/COUNTY- AZ/MARICOPA
DV0122 USGS QUAD - UNION HILLS (1983)
DV0122
DV0122 HORZ DATUM - NAD 83 (1992)
DV0122 VERT DATUM - NGVD 29
DV0122
DV0122 POSITION - 33 43 32.39095(N) 112 07 08.51535(W) ADJUSTED
DV0122 92 minus 83 - +00.00464 -00.00601 ADJUSTED
DV0122 83 minus 27 - +00.13531 +02.55336 ADJUSTED
DV0122
DV0122 HEIGHT - 447.692 (meters) 1468.80 (feet) ADJ UNCH
DV0122 88 minus 29 - +0.59 VERTCON
DV0122 **********
DV0122 LAPLACE CORR- 3.32 DEFLEC93
DV0122 GEOID HEIGHT- -29.27 GEOID93
DV0122
DV0122 HORZ ORDER - SECOND
DV0122 VERT ORDER - FIRST CLASS 2
DV0122
DV0122 The horizontal position was established by classical geodetic methods
DV0122 and adjusted by the National Geodetic Survey in August 1993.
DV0122
DV0122 The orthometric height was key entered from printed documents
DV0122 and not key verified.
DV0122
DV0122 The Laplace correction was computed from DEFLEC93 derived deflections.
DV0122
DV0122 The geoid height was determined by GEOID93.
DV0122

		North	East	Scale	Converg.	
DV0122 SPC AZ C	-	302,245.973	194,606.493	0.99990433	-0 06 44.5	MT
DV0122 UTM 12	-	3,732,300.995	396,326.248	0.99973250	-0 37 16.9	MT

DV0122

		Primary Azimuth Mark	Grid Az
DV0122 SPC AZ C	-	PYRAMID PK RESET	292 35 09.0
DV0122 UTM 12	-	PYRAMID PK RESET	293 05 41.4

DV0122

Pid	Reference Object	Distance	Geod. AZ
			dddmmss.s
DV0123	SKUNK RM 1	20.092 METERS	09119
DV0121	SKUNK AZ MK		2002300.4
DV2029	PYRAMID PK RESET	APPROX. 6.2 KM	2922824.5
DV0125	Q 56	168.574 METERS	35020
DV0124	SKUNK RM 2	14.533 METERS	35603

DV0122

DV0122 STATION MARK IS A TRIANGULATION STATION DISK
DV0122 WITH SETTING: SET IN TOP OF CONCRETE MONUMENT (ROUND)
DV0122 THE MARK IS STAMPED: SKUNK 1947
DV0122 STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO
DV0122 STABILITY: SURFACE MOTION
DV0122

DV0122 HISTORY	- Year	Condition	Recov. By
DV0122 HISTORY	- 1947	STATION MONUMENTED	COAST AND GEODETIC SURVEY
DV0122 HISTORY	- 1959	GOOD	COAST AND GEODETIC SURVEY

DV0122 HISTORY - 1970 GOOD NATIONAL GEODETIC SURVEY
DV0122 HISTORY - 1972 GOOD AZ HIGHWAY DEPT
DV0122 HISTORY - 1977 GOOD LOCAL ENGINEER
DV0122 HISTORY - 1982 GOOD AZ DEPT OF TRANSP
DV0122 HISTORY - 1986 GOOD AZ DEPT OF TRANSP
DV0122

DV0122 STATION DESCRIPTION
DV0122
DV0122 DESCRIBED BY COAST AND GEODETIC SURVEY 1947 (DHK)
DV0122 LOCATED ON THE EAST SIDE OF STATE HIGHWAY 69. ABOUT 19 MILES
DV0122 NORTH OF PHOENIX AND 14 MILES NORTH-NORTHEAST OF GLENDALE.
DV0122 IT IS 44 FEET WEST OF A FENCE CORNER, 52.5 FEET EAST OF THE
DV0122 CENTER LINE OF THE HIGHWAY, 115.5 FEET SOUTHEAST OF A CATTLE
DV0122 GUARD AND 5.7 FEET SOUTH OF A WITNESS POST. IT IS STAMPED
DV0122 SKUNK 1947 AND PROJECTS 2 INCHES.
DV0122
DV0122 REFERENCE MARK NO. 1 IS 2.5 FEET SOUTH OF AN EAST AND WEST
DV0122 FENCE LINE. IT IS STAMPED SKUNK NO 1 1947 AND PROJECTS 3
DV0122 INCHES.
DV0122
DV0122 REFERENCE MARK NO. 2 IS 75 FEET SOUTHEAST OF A CATTLE GUARD,
DV0122 50 FEET EAST OF THE CENTER LINE OF THE HIGHWAY AND 5.5 FEET WEST
DV0122 OF A NORTH AND SOUTH FENCE LINE. IT IS STAMPED SKUNK NO 2
DV0122 1947 AND PROJECTS 3 INCHES.
DV0122
DV0122 BENCH MARK Q56 IS A STANDARD USC AND GS DISK SET IN A CONCRETE
DV0122 POST PROJECTING 5 INCHES. IT IS 24.5 FEET EAST OF THE CENTER
DV0122 LINE OF THE HIGHWAY AND 45 FEET SOUTH OF A SIDE ROAD. IT IS
DV0122 STAMPED Q 56 1934.
DV0122
DV0122 THE AZIMUTH MARK IS LOCATED 0.45 MILE SOUTH-SOUTHWEST OF THE
DV0122 STATION. 39.5 FEET WEST OF THE CENTER LINE OF THE HIGHWAY.
DV0122 IT IS STAMPED SKUNK 1947 AND PROJECTS 4 INCHES.
DV0122
DV0122 TO REACH THE STATION FROM THE SANTA FE RAILROAD DEPOT IN
DV0122 GLENDALE, GO SOUTHEAST ON U.S. HIGHWAYS 60, 70, AND 89 FOR 2.6
DV0122 MILES TO THEIR JUNCTION WITH STATE HIGHWAY 69. TURN LEFT
DV0122 AND FOLLOW HIGHWAY 69 FOR 4.6 MILES TO THE ARIZONA CANAL.
DV0122 CONTINUE ON HIGHWAY FOR 10.55 MILES TO A CROSSROAD. CONTINUE
DV0122 STRAIGHT AHEAD 0.15 MILE TO THE STATION ON THE RIGHT.
DV0122
DV0122 STATION RECOVERY (1959)
DV0122
DV0122 RECOVERY NOTE BY COAST AND GEODETIC SURVEY 1959 (SLH)
DV0122 ALL MARKS WERE RECOVERED AS DESCRIBED AND IN GOOD CONDITION.
DV0122 A NEW WITNESS POST WAS SET, MEASUREMENTS TO THE MARKS ARE AS
DV0122 FOLLOWS--
DV0122
DV0122 WITNESS POST TO--STATION MARK 29.5 FEET WEST
DV0122
DV0122 R.M. 1 40.0 FEET EAST
DV0122
DV0122 R.M. 2 55.1 FEET NORTHWEST
DV0122
DV0122 THE OLD ROAD HAS BEEN RELOCATED AND THE STATION IS NOW REACHED
DV0122 FROM THE JUNCTION OF CAMELBACK ROAD AND BLACK CANYON HIGHWAY
DV0122 IN PHOENIX BY GOING NORTH ON ARIZONA STATE HIGHWAY 69 FOR 14.3
DV0122 MILES TO A GRADED ROAD ON THE RIGHT. THIS IS 0.1 MILE SOUTH
DV0122 OF THE BRIDGE OVER SKUNK CREEK. TURN RIGHT THROUGH A CATTLE
DV0122 GUARD AND GO EAST FOR 0.1 MILE TO A TRACK ROAD RIGHT, TURN

DV0122 RIGHT AND GO 0.05 MILE SOUTHWEST TO AN EAST-WEST FENCE AND
DV0122 THE STATION.
DV0122
DV0122 TO REACH THE AZIMUTH MARK FROM THE STATION, RETURN TO THE
DV0122 CATTLE-GUARD, TURN LEFT AND GO SOUTH ON ARIZONA STATE HIGHWAY
DV0122 69 FOR 0.35 MILE TO A GRADED ROAD ON THE RIGHT, TURN RIGHT AND
DV0122 FOLLOW THE ROAD SOUTHWESTERLY FOR 0.15 MILE TO THE AZIMUTH
DV0122 MARK ON THE RIGHT, 40 FEET WEST OF THE CENTER OF THE DIRT ROAD.
DV0122
DV0122 STATION RECOVERY (1970)
DV0122
DV0122 RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1970
DV0122 12.6 MI S FROM NEW RIVER.
DV0122 12.6 MILES SOUTH ALONG INTERSTATE HIGHWAY 17 FROM THE BRIDGE OVER NEW
DV0122 RIVER OR 0.2 MILE SOUTH FROM THE HIGHWAY BRIDGE OVER SKUNK RIVER. 52.5
DV0122 FEET EAST OF THE CENTER OF AN OLD GRAVELED ROAD 115 FEET SOUTHEAST OF
DV0122 A CATTLE GUARD 5 1/2 FEET SOUTH OF A WITNESS POST AND ABOUT 200 FEET
DV0122 EAST OF THE EAST FRONTAGE ROAD. THE MARK IS SET IN THE TOP OF A 12
DV0122 INCH CONCRETE MONUMENT WHICH PROJECTS ABOUT 2 INCHES.
DV0122 ALL MARKS WERE RECOVERED AND FOUND IN GOOD CONDITION. THE
DV0122 1959 DESCRIPTION IS ADEQUATE.
DV0122
DV0122 STATION RECOVERY (1972)
DV0122
DV0122 RECOVERY NOTE BY ARIZONA HIGHWAY DEPARTMENT (NOW AZDT) 1972
DV0122 GENERAL LOCATION PHX TO PARKER
DV0122
DV0122 TO REACH AS PER USC AND GS DESCRIPTION AND RECOVERY NOTES
DV0122
DV0122 STATION MARK STD. USC AND GS B.C.
DV0122
DV0122 REFERENCE MARKS GOOD
DV0122
DV0122 STATION RECOVERY (1977)
DV0122
DV0122 RECOVERY NOTE BY LOCAL ENGINEER (INDIVIDUAL OR FIRM) 1977 (FB)
DV0122 SKUNK 1947 RECOVERED GOOD.
DV0122
DV0122 SKUNK NO. 1 1947 RECOVERED GOOD.
DV0122
DV0122 SKUNK NO. 2 1947 RECOVERED GOOD.
DV0122
DV0122 DISTANCE AND DIRECTION FROM NEAREST TOWN--6 MILES NORTH OF PHOENIX,
DV0122 ARIZ.
DV0122
DV0122 STATION RECOVERY (1982)
DV0122
DV0122 RECOVERY NOTE BY ARIZONA DEPARTMENT OF TRANSPORTATION 1982 (GH)
DV0122 THE STATION MARK, REFERENCE MARKS AND THE AZIMUTH MARK WERE RECOVERED
DV0122 AS DESCRIBED IN 1959. A NEW ROUTE TO THE STATION FOLLOWS.
DV0122
DV0122 TO REACH THE STATION FROM INTERSTATE HIGHWAY 17 AND HAPPY VALLEY ROAD
DV0122 TRAFFIC INTERCHANGE IN NORTHERN PHOENIX TRAVEL NORTH ALONG THE EAST
DV0122 FRONTAGE ROAD FOR 0.9 MILE TO THE STATION 220 FEET TO THE RIGHT AND BY
DV0122 A FENCE LINE.
DV0122
DV0122 TO REACH THE AZIMUTH MARK FROM INTERSTATE HIGHWAY 17 AND HAPPY VALLEY
DV0122 ROAD, TRAVEL NORTH ALONG THE WEST FRONTAGE ROAD FOR 0.7 MILE TO A
DV0122 CATTLE GUARD AND A ROAD LEFT. TURN LEFT CROSSING THE CATTLE GUARD AND
DV0122 BEAR LEFT FOR 0.1 MILE TO THE MARK ON THE RIGHT.

DV0122
DV0122 STATION RECOVERY (1986)
DV0122
DV0122 RECOVERY NOTE BY ARIZONA DEPARTMENT OF TRANSPORTATION 1986 (ART)
DV0122 THE STATION MARK, REFERENCE MARKS AND THE AZIMUTH MARK WERE RECOVERED
DV0122 AS DESCRIBED AND FOUND IN GOOD CONDITION. THE AZIMUTH MARK IS
DV0122 OBSTRUCTED FROM THE STATION BY SMALL TREES. A NEW ROUTE TO THE
DV0122 STATION FOLLOWS.
DV0122
DV0122 TO REACH THE STATION FROM THE INTERSECTION OF INTERSTATE HIGHWAY 17
DV0122 AND HAPPY VALLEY ROAD IN NORTHERN PHOENIX, TRAVEL EAST ALONG HAPPY
DV0122 VALLEY ROAD FOR 0.15 MILE TO A DIRT ROAD ON THE LEFT WHICH IS JUST
DV0122 EAST OF THE FRONTAGE ROAD. TURN LEFT AND TRAVEL NORTH ALONG DIRT ROAD
DV0122 WHICH PARALLELS THE FREEWAY FOR ABOUT 1 MILE TO AN EAST WEST FENCE
DV0122 AND THE STATION ON THE LEFT AT THE SOUTH SIDE OF THE FENCE LINE. THE
DV0122 STATION CAN ALSO BE REACHED BY DRIVING NORTH 1 MILE ALONG THE FRONTAGE
DV0122 ROAD TO THE EAST-WEST FENCE LINE AND WALKING EAST ALONG THE SOUTH SIDE
DV0122 OF THE FENCE FOR ABOUT 150 FEET.

National Geodetic Survey, Retrieval Date = MAY 9, 1995

DV1993 **********

DV1993 DESIGNATION - RIFLE
DV1993 PID - DV1993
DV1993 STATE/COUNTY- AZ/MARICOPA
DV1993 USGS QUAD - BISCUIT FLAT (1982)
DV1993
DV1993 HORZ DATUM - NAD 83 (1992)
DV1993 VERT DATUM - NGVD 29
DV1993

DV1993 POSITION	-	33 47 53.85951(N)	112 08 09.19572(W)	ADJUSTED
DV1993 92 minus 83	-	+00.00520	-00.00397	ADJUSTED
DV1993 83 minus 27	-	+00.13397	+02.55629	ADJUSTED

DV1993
DV1993 HEIGHT - 514.6 (meters) 1688. (feet) VERT ANG
DV1993 88 minus 29 - +0.6 VERTCON
DV1993 **********
DV1993 LAPLACE CORR- 3.46 DEFLEC93
DV1993 GEOID HEIGHT- -29.09 GEOID93
DV1993
DV1993 HORZ ORDER - SECOND
DV1993
DV1993 The horizontal position was established by classical geodetic methods
DV1993 and adjusted by the National Geodetic Survey in August 1993.
DV1993
DV1993 The orthometric height was determined by vertical angle observations.
DV1993
DV1993 The Laplace correction was computed from DEFLEC93 derived deflections.
DV1993
DV1993 The geoid height was determined by GEOID93.
DV1993

		North	East	Scale	Converg.	
DV1993 SPC AZ C	-	310,304.379	193,061.579	0.99990508	-0 07 19.0	MT
DV1993 UTM 12	-	3,740,371.445	394,853.303	0.99973629	-0 37 54.9	MT

DV1993

		Primary Azimuth Mark	Grid Az
DV1993 SPC AZ C	-	MUNSON	170 14 31.0
DV1993 UTM 12	-	MUNSON	170 45 06.9

DV1993

Pid	Reference Object	Distance	Geod. AZ dddmmss.s
DV1993	RIFLE RM 2	8.008 METERS	08906
DV1993 DV0132	MUNSON	APPROX. 3.5 KM	1700712.0
DV1993	RIFLE RM 1	8.052 METERS	34556

DV1993
DV1993 STATION MARK IS A TRIANGULATION STATION DISK
DV1993 WITH SETTING: SET IN A MAT FOUNDATION OR CONCRETE SLAB OTHER THAN
DV1993 +WITH SETTING: PAVEMENT
DV1993 STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO
DV1993 STABILITY: SURFACE MOTION
DV1993

		Year	Condition	Recov. By
DV1993 HISTORY	-	1976	STATION MONUMENTED	AZ DEPT OF TRANSP
DV1993 HISTORY	-	1978	GOOD	AZ DEPT OF TRANSP
DV1993 HISTORY	-	1986	GOOD	AZ DEPT OF TRANSP

DV1993
DV1993 STATION DESCRIPTION
DV1993

DV1993 DESCRIBED BY ARIZONA DEPARTMENT OF TRANSPORTATION 1978 (TT)
DV1993 THE STATION IS ABOUT 10.5 MILES SOUTH OF NEW RIVER AND 20 MILES
DV1993 NORTHWEST OF PHOENIX AT THE CAREFREE INTERCHANGE ON I-17.
DV1993
DV1993 THE STATION IS AN ADOT HWY. DIVISION DISK STAMPED RIFLE 1976
DV1993 AND IS EPOXIED TO BRIDGE WHICH IS THE OVERPASS ON I-17. THE
DV1993 DISK IS ON THE SOUTHWEST CORNER OF THE BRIDGE 2 FEET WEST OF THE
DV1993 WESTERN EXPANSION JOINT AND 2 FEET NORTH OF SOUTH WALKWAY ACROSS
DV1993 THE OVERPASS.
DV1993
DV1993 REFERENCE MARK 1 IS AN ADOT HWY. DIVISION DISK STAMPED RIFLE
DV1993 RM 1 1976 AND IS EPOXIED TO THE BRIDGE PAVEMENT ON NORTH SIDE
DV1993 OF OVERPASS.
DV1993
DV1993 REFERENCE MARK 2 IS AN ADOT HWY. DIVISION DISK STAMPED RIFLE RM
DV1993 2 1976 AND IS EPOXIED TO BRIDGE PAVEMENT ON SOUTH SIDE OF OVERPASS.
DV1993
DV1993 TO REACH THE STATION FROM THE INTERSECTION OF BELL RD. AND I-17
DV1993 IN NORTHWEST PHOENIX, GO NORTH ON I-17 FOR 11 MILES TO THE CAREFREE
DV1993 INTERCHANGE. THE STATION IS ON SOUTHWEST END OF BRIDGE THAT
DV1993 CROSSES THE INTERSTATE HWY.
DV1993
DV1993 HEIGHT OF LIGHT ABOVE STATION MARK 1.5 METERS.
DV1993
DV1993 STATION RECOVERY (1986)
DV1993
DV1993 RECOVERY NOTE BY ARIZONA DEPARTMENT OF TRANSPORTATION 1986 (ART)
DV1993 THE STATION WAS RECOVERED AS DESCRIBED IN 1978 EXCEPT THE DISTANCE
DV1993 AND ANGLES TO THE REFERENCE MARKS ARE REVERSED.

National Geodetic Survey, Retrieval Date = MAY 9, 1995

DV0142 **********

DV0142 DESIGNATION - HOUND
DV0142 PID - DV0142
DV0142 STATE/COUNTY- AZ/MARICOPA
DV0142 USGS QUAD - BISCUIT FLAT (1982)
DV0142
DV0142 HORZ DATUM - NAD 83 (1992)
DV0142 VERT DATUM - NGVD 29
DV0142
DV0142 POSITION - 33 51 21.32995(N) 112 08 41.78986(W) ADJUSTED
DV0142 92 minus 83 - +00.00521 -00.00387 ADJUSTED
DV0142 83 minus 27 - +00.13084 +02.55943 ADJUSTED
DV0142
DV0142 HEIGHT - 548.815 (meters) 1800.57 (feet) ADJ UNCH
DV0142 88 minus 29 - +0.60 VERTCON

DV0142 **********

DV0142 LAPLACE CORR- 3.67 DEFLEC93
DV0142 GEOID HEIGHT- -28.90 GEOID93
DV0142
DV0142 HORZ ORDER - SECOND
DV0142 VERT ORDER - SECOND CLASS 0
DV0142
DV0142 The horizontal position was established by classical geodetic methods
DV0142 and adjusted by the National Geodetic Survey in August 1993.
DV0142
DV0142 The orthometric height was key entered from printed documents
DV0142 and not key verified.
DV0142
DV0142 The Laplace correction was computed from DEFLEC93 derived deflections.
DV0142
DV0142 The geoid height was determined by GEOID93.
DV0142

		North	East	Scale	Converg.	
DV0142 SPC AZ C	-	316,697.933	192,237.420	0.99990550	-0 07 37.8	MT
DV0142 UTM 12	-	3,746,771.011	394,086.254	0.99973829	-0 38 16.5	MT

DV0142

		Primary Azimuth Mark	Grid Az
DV0142 SPC AZ C	-	MICRO	168 55 44.6
DV0142 UTM 12	-	MICRO	169 26 23.3

DV0142

DV0142 ---

Pid	Reference Object	Distance	Geod. AZ
			dddmmss.s
DV0137	MICRO	APPROX. 3.8 KM	1684806.8
DV0141	HOUND RM 1	8.066 METERS	17930
DV0143	HOUND RM 2	9.932 METERS	26604

DV0142 ---

DV0142
DV0142 STATION MARK IS A TRIANGULATION STATION DISK
DV0142 WITH SETTING: SET IN A LIGHT STRUCTURE
DV0142 THE MARK IS STAMPED: HOUND 1959
DV0142 STABILITY: D = MARK OF QUESTIONABLE OR UNKNOWN STABILITY
DV0142

		Year	Condition	Recov. By
DV0142	HISTORY -	1959	STATION MONUMENTED	COAST AND GEODETIC SURVEY
DV0142	HISTORY -	1967	GOOD	US ARMY MAP SERVICE (NOW DMA)
DV0142	HISTORY -	1970	GOOD	NATIONAL GEODETIC SURVEY
DV0142	HISTORY -	1971	GOOD	US ENGINEERS

DV0142

DV0142 STATION DESCRIPTION
DV0142
DV0142 DESCRIBED BY COAST AND GEODETIC SURVEY 1959 (SLH)
DV0142 THE STATION IS LOCATED ABOUT 3.8 MILES SOUTH OF NEW RIVER, ON
DV0142 THE WEST SIDE OF ARIZONA STATE HIGHWAY 69.
DV0142
DV0142 TO REACH THE STATION FROM THE INTERSECTION OF CAMELBACK ROAD
DV0142 AND BLACK CANYON HIGHWAY IN PHOENIX, GO NORTH ON ARIZONA STATE
DV0142 HIGHWAY 69 FOR 21.9 MILES TO THE BRIDGE AT DEAD MAN WASH,
DV0142 CONTINUE AHEAD FOR 1.1 MILES TO THE STATION ON THE LEFT.
DV0142
DV0142 THE STATION MARK IS A STANDARD DISK STAMPED HOUND 1959, SET
DV0142 IN A SQUARE CONCRETE MONUMENT THAT PROJECTS 8 INCHES. IT IS
DV0142 85 FEET WEST OF THE CENTER OF ARIZONA STATE HIGHWAY 69, 6.3
DV0142 FEET SOUTHWEST OF A WITNESS POST AND 4.5 FEET EAST OF THE
DV0142 RIGHT-OF-WAY FENCE.
DV0142
DV0142 R.M. 1 IS A STANDARD DISK STAMPED HOUND NO 1 1959, SET IN A
DV0142 SQUARE CONCRETE MONUMENT THAT PROJECTS 3 INCHES. IT IS 20.8
DV0142 FEET SOUTH OF THE WITNESS POST AND 2.0 FEET EAST OF THE
DV0142 FENCE.
DV0142
DV0142 R.M. 2 IS A STANDARD DISK STAMPED HOUND NO 2 1959, SET IN A
DV0142 SQUARE CONCRETE MONUMENT THAT PROJECTS 2 INCHES. IT IS 29.6
DV0142 FEET WEST OF THE WITNESS POST AND 28 FEET WEST OF THE
DV0142 RIGHT-OF-WAY FENCE.
DV0142
DV0142 TRIANGULATION STATION MICRO CAN BE USED AS AN AZIMUTH MARK.
DV0142 (SEE DESCRIPTION THEREOF)
DV0142
DV0142 STATION RECOVERY (1967)
DV0142
DV0142 RECOVERY NOTE BY US ARMY MAP SERVICE (NOW DMA) 1967 (JMH)
DV0142 THE STATION MARK, R.M. NO. 1, R.M. NO 2 RECOVERED AS DESCRIBED
DV0142 AND IN GOOD CONDITION.
DV0142
DV0142 R.M. NO 1, PUB DIST. = 26.46, CHECK DIST = 26.44.
DV0142
DV0142 R.M. NO. 2, PUB DIST = 32.58, CHECK DIST = 32.61.
DV0142
DV0142 STATION RECOVERY (1970)
DV0142
DV0142 RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1970
DV0142 3.4 MI S FROM NEW RIVER.
DV0142 3.4 MILES SOUTH ALONG INTERSTATE HIGHWAY 17 FROM THE BRIDGE OVER NEW
DV0142 RIVER TO THE MARK ON THE RIGHT. 98 FEET WEST OF THE CENTER LINE OF
DV0142 THE SOUTH BOUND LANES, 36 1/2 FEET SOUTHWEST OF A PROMINENT CACTUS, 7
DV0142 FEET NORTHEAST OF THE WITNESS POST AND 5 FEET EAST OF THE RIGHT OF WAY
DV0142 FENCE. THE MARK IS SET IN THE TOP OF A 12 INCH SQUARE CONCRETE
DV0142 MONUMENT WHICH PROJECTS ABOUT 6 INCHES.
DV0142 ALL MARKS WERE RECOVERED AND FOUND IN GOOD CONDITION. THE
DV0142 1959 DESCRIPTION IS ADEQUATE.
DV0142
DV0142 AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN--3.8 MILES
DV0142 SOUTH OF NEW RIVER.
DV0142
DV0142 STATION RECOVERY (1971)
DV0142
DV0142 RECOVERY NOTE BY US ENGINEERS 1971 (EMB)
DV0142 HONDA 1959 - GOOD.

DV0142
DV0142 HONDA NO 1 1959 - GOOD.
DV0142
DV0142 HONDA NO 2 1959 - GOOD.
DV0142
DV0142 DESCRIPTION IS ADEQUATE.

National Geodetic Survey, Retrieval Date = MAY 9, 1995

DESIGNATION - UNION
PID - DV2004
STATE/COUNTY- AZ/MARICOPA
USGS QUAD - UNION HILLS (1983)

HORZ DATUM - NAD 83 (1992)
VERT DATUM - NAVD 88

POSITION -	33 39 10.90540(N)	112 03 03.72536(W)	ADJUSTED
92 minus 83 -	+00.00469	-00.00618	ADJUSTED
83 minus 27 -	+00.14001	+02.54004	ADJUSTED
HEIGHT -	475.2 (meters)	1559. (feet)	GPS OBS
88 minus 29 -	+0.6		VERTCON
LAPLACE CORR-	2.06		DEFLEC93
GEOID HEIGHT-	-29.32		GEOID93
ELLIP HEIGHT-	445.700		
X -	-1,995,442.839		
Y -	-4,926,256.401		
Z -	3,514,722.466		

HORZ ORDER - B
ELLP ORDER - FOURTH CLASS 1

The horizontal coordinates were established by GPS observations
and adjusted by the National Geodetic Survey in September 1992.

The orthometric height was determined by GPS observations.

The Laplace correction was computed from DEFLEC93 derived deflections.

The geoid height was determined by GEOID93.

The ellipsoidal height was determined by GPS observations
and reference to NAD83.

The X, Y, and Z were computed from the position and the ellipsoidal ht.

	North	East	Scale	Converg.
SPC AZ C -	294,180.062	200,897.425	0.99990191	-0 04 28.1 MT
UTM 12 -	3,724,181.017	402,544.237	0.99971709	-0 34 57.0 MT

	Primary Azimuth Mark	Grid Az
SPC AZ C -	SKUNK	322 02 52.1
UTM 12 -	SKUNK	322 33 21.0

Pid	Reference Object	Distance	Geod. AZ dddmmss.s
DV2005	BM	5.008 METERS	10537
DU2209	SCOTTSDALE THUNDERBIRD ACAD TK	APPROX.13.2 KM	1110618.6
	UNION RM 3	16.328 METERS	11718
	UNION AZ MK 2		1643926.8
	UNION AZ MK		1774305.9
DV2014	PHOENIX PUB SER MICROWAVE MAST	APPROX. 7.3 KM	2064629.0
DV2002	ADOBE SPERRY PHOENIX CO TANK	APPROX. 5.1 KM	3034542.8
DV0122	SKUNK	APPROX.10.2 KM	3215824.0

CURVE FORMULAS

$T = R \tan \frac{1}{2} I$

$T = \frac{50 \tan \frac{1}{2} I}{\text{Sin. } \frac{1}{2} D}$

$\text{Sin. } \frac{1}{2} D = \frac{50}{R}$

$\text{Sin. } \frac{1}{2} D = \frac{50 \tan \frac{1}{2} I}{T}$

$R = T \cot. \frac{1}{2} I$

$R = \frac{50}{\text{Sin. } \frac{1}{2} D}$

$E = R \text{ ex. sec } \frac{1}{2} I$

$E = T \tan \frac{1}{4} I$

$\text{Chord def.} = \frac{\text{chord}^2}{R}$

$\text{No. chords} = \frac{I}{D}$

Tan. def. = ½ chord def.

The square of any distance, divided by twice the radius, will equal the distance from tangent to curve, very nearly.

To find angle for a given distance and deflection.

Rule 1. Multiply the given distance by .01745 (def. for 1° for 1 ft.) and divide given deflection by the product.

Rule 2. Multiply given deflection by 57.3, and divide the product by the given distance.

To find deflection for a given angle and distance. Multiply the angle by .01745, and the product by the distance.

GENERAL DATA

Right Angle Triangles. Square the altitude, divide by twice the base. Add quotient to base for hypotenuse.

Given Base 100, Alt. $10.10^2 \div 200 = .5$. $100 + .5 = 100.5$ hyp.

Given Hyp. 100, Alt. $25.25^2 \div 200 = 3.125$. $100 - 3.125 = 96.875$ = Base.

Error in first example, .002; in last, .045.

To find Tons of Rail in one mile of track: multiply weight per yard by 11, and divide by 7.

Leveling. The correction for curvature and refraction, in feet and decimals of feet is equal to 0.574 d^2, where d is the distance in miles. The correction for curvature alone is closely, $\frac{2}{3} d^2$. The combined correction is negative.

Probable Error. If d_1, d_2, d_3, etc. are the discrepancies of various results from the mean, and if Σd^2 = the sum of the squares of these differences and n = the number of observations, then the probable error of the mean =

$$\pm 0.6745 \sqrt{\frac{\Sigma d^2}{n(n-1)}}$$

MINUTES IN DECIMALS OF A DEGREE

1'	.0167	11'	.1833	21'	.3500	31'	.5167	41'	.6833	51'	.8500
2	.0333	12	.2000	22	.3667	32	.5333	42	.7000	52	.8667
3	.0500	13	.2167	23	.3833	33	.5500	43	.7167	53	.8833
4	.0667	14	.2333	24	.4000	34	.5667	44	.7333	54	.9000
5	.0833	15	.2500	25	.4167	35	.5833	45	.7500	55	.9167
6	.1000	16	.2667	26	.4333	36	.6000	46	.7667	56	.9333
7	.1167	17	.2833	27	.4500	37	.6167	47	.7833	57	.9500
8	.1333	18	.3000	28	.4667	38	.6333	48	.8000	58	.9667
9	.1500	19	.3167	29	.4833	39	.6500	49	.8167	59	.9833
10	.1667	20	.3333	30	.5000	40	.6667	50	.8333	60	1.0000

INCHES IN DECIMALS OF A FOOT

1/32	1/16	3/32	1/8	5/32	3/16	7/32	1/4	9/32	5/16	11/32	3/8
.0026	.0052	.0078	.0104	.0130	.0156	.0182	.0208	.0234	.0260	.0286	.0313

13/32	7/16	15/32	1/2	17/32	9/16	19/32	5/8	21/32	11/16	23/32	3/4
.0339	.0365	.0391	.0417	.0443	.0469	.0495	.0521	.0547	.0573	.0599	.0625

25/32	13/16	27/32	7/8	29/32	15/16	31/32	1
.0651	.0677	.0703	.0729	.0755	.0781	.0807	.0833

1	2	3	4	5	6	7	8	9	10	11
.0833	.1667	.2500	.3333	.4167	.5000	.5833	.6667	.7500	.8333	.9167

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#98054

Skunk Creek Tributaries
Vertical Data

FAX TRANSMITTAL

PROJECT ENGINEERING CONSULTANTS, LTD.
ENGINEERS • PLANNERS • SURVEYORS

TO: Tetra Tech (Simons Li & Associates, Inc.)	DATE: 1/15/99
4600 S. Mill Avenue, Suite 200	JOB NO.: 98054
Tempe, AZ 85282	JOB NAME: Tributaries of Skunk Creek
ATTN: Bart Bergendahl	
FAX: ( ) 491-1396	FROM: Chuck Gardiner

NO. OF PAGES INCLUDING COVER: 2

REMARKS:

Bart,

The average vertical conversion for this project (NGVD29 to NAVD88) is +2.06'.

A map of the project shows the breakdown for the conversion for the various points.

If there are any other questions, please call.

Sincerely,

Chuck

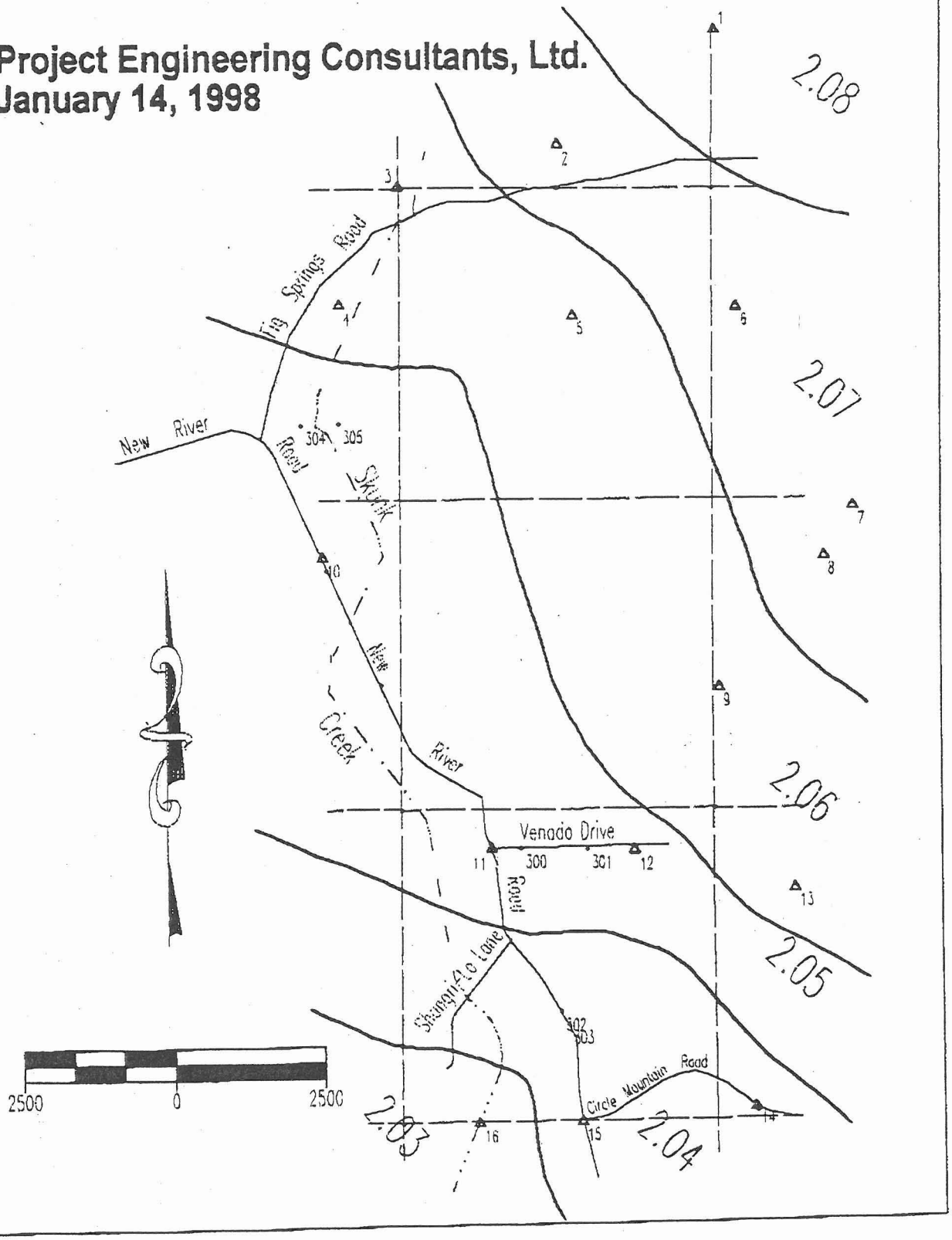
COPY TO:_____

_____

2320 W. Peoria Avenue, Suite C-122, Phoenix, Arizona 85029 (602) 906-1901 FAX (602) 906-3080

Skunk Creek Tributaries
NGVD29 To NAVD88 Conversion Chart

Project Engineering Consultants, Ltd.
January 14, 1998



FAX TRANSMITTAL

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TO: Tetra Tech (Simons Li & Associates, Inc.)	DATE: 1/15/99
4600 S. Mill Avenue, Suite 200	JOB NO.: 98054
Tempe, AZ 85282	JOB NAME: Tributaries of Skunk Creek
ATTN: Bart Bergendahl	
FAX: ( ) 491-1396	FROM: Chuck Gardiner

NO. OF PAGES INCLUDING COVER: 3

REMARKS:

See attached document.

COPY TO:_____

_____

2320 W. Peoria Avenue, Suite C-122, Phoenix, Arizona 85029 (602) 906-1901 FAX (602) 906-3080

Bart,

The program that I used to compute the difference between NGVD29 and NAVD88 is an NGS program called VERTCON. This particular version is a DOS based program that relies on either individual input of latitude and longitude or a batch file containing a list of lats and longs.

It would be possible with a little effort to create some sort of map for the County by simply creating a batch file with latitudes and longitudes for all quarter section corners and section corners. The more points included, the more precise the map will be. The program outputs a text file that could be edited, replacing the elevations for the points with the differences between the 2 datums that was created for the points. From there, you should be able to contour.

Anyways, here is a synopsis of the VERTCON program. If you have any other questions, please call.

Sincerely,
Chuck Gardiner

The VERTCON 2.0 Model

The VERTCON 2.0 model was computed on May 5, 1994 using 381,833 datum difference values. A key part of the computation procedure was the development of the predictable, physical components of the differences between the NAVD 88 and NGVD 29 datums. This included models of refraction effects on geodetic leveling, and gravity and elevation influences on the new NAVD 88 datum. Tests of the predictive capability of the physical model show a 2.0 cm RMS agreement at our 381,833 data points. For this reason, the VERTCON 2.0 model can be considered accurate at the 2 cm (one sigma) level. Since 381,833 data values were used to develop the corrections to the physical model, VERTCON 2.0 will display even better overall accuracy than that displayed by the uncorrected physical model. This higher accuracy will be particularly noticable in the eastern United States.

Using VERTCON 2.0

It should be emphasized that VERTCON 2.0 is a datum transformation model, and can not maintain the full vertical control accuracy of geodetic leveling. Ideally, one should process level data using the latest reduction software and adjust it to established NAVD 88 control. However, VERTCON 2.0 accuracy is suitable for a variety of mapping and charting purposes.

The VERTCON 2.0 model expresses datum differences between NAVD 88 and NGVD 29 due to removal of distortions in the level data, as well as due to the physical differences in the height systems. In some rare cases, these local NGVD 29 distortions could be 20 cm or more. If both ends of your old vertical survey were tied to one of these "problem" lines, then the

datum
difference of the problem line is appropriate to use to transform the survey
data. If both ends of a vertical survey are tied to "undistorted lines",
then it is appropriate to use a slightly distant point to compute the transformation, no matter how close your survey data may approach a given
problem line. The possible presence of a problem NGVD 29 line in the vicinity of your survey will become evident if dramatically different datum
transformation values are computed within a small area.

It must also be emphasized that VERTCON 2.0 is not to be considered reliable beyond the boundaries of the lower 48 United States. The VERTCON
program will interpolate values in Canada, Mexico, or in the ocean, due to the grid structure of the model. Those values do not contain important
model components present in the conterminous U.S. model. Future versions
of VERTCON may be extended into neighboring countries.

The Defense Mapping Agency
The Defense Mapping Agency (DMA) has been of immense help in this endeavor. DMA has provided a major portion of the NGS land gravity data set. DMA has also been instrumental in the creation of the various 30" elevation grids in existence. Although the work of the DMA generally precludes public recognition, their cooperation in this work is gratefully
acknowledged.

For Information on VERTCON 2.0, and Future Research:

Dr. Dennis G. Milbert
NOAA, National Geodetic Survey, N/CG18
1315 East-West Hwy., SSMC3-8113
Silver Spring, MD 20910-3282
phone: 301-713-3202
fax: 301-713-4322
internet: dennis@ngs.noaa.gov

or

David B. Zilkoski
Vertical Network Branch
N/CG13, SSMC3-8752
Telephone: 301-713-3191
Fax: 301-713-4324

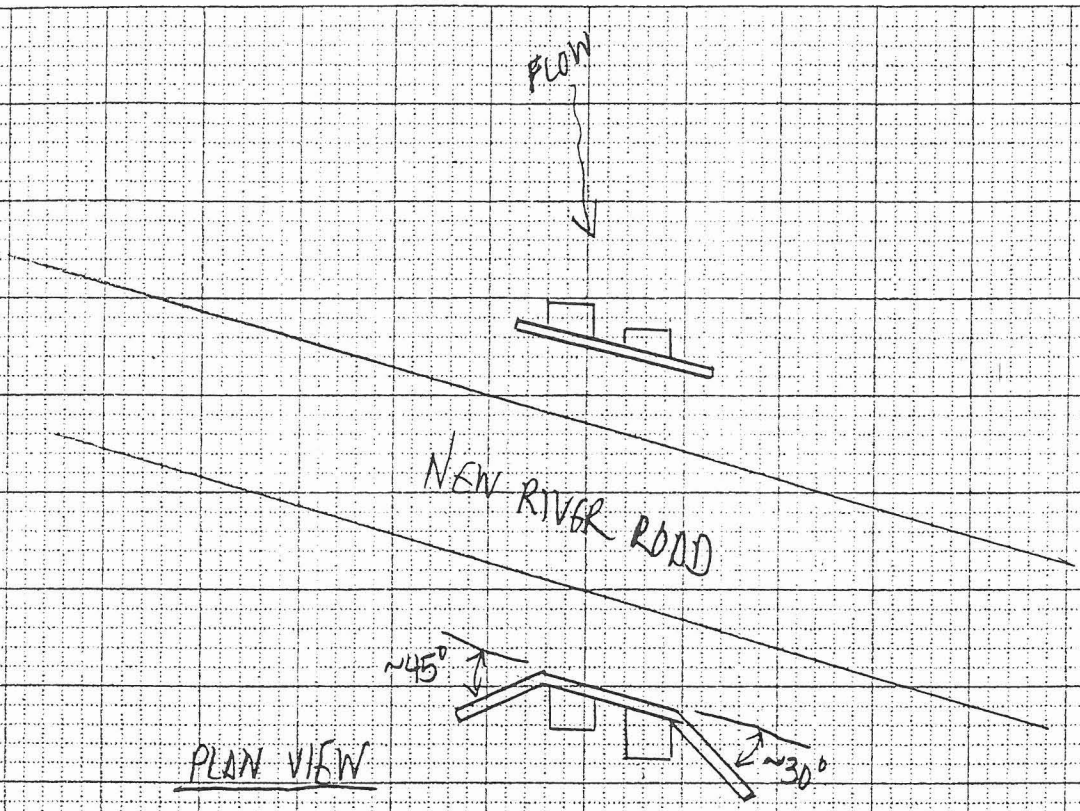
A special word of thanks goes to our colleague, Sandford R. Holdahl, who has
recently retired. Sandy made the first predictions of the vertical datum
differences in 1983, and is a co-author of the VERTCON 2.0 model.

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

PROJECT SKUNK CREEK TRIBUTARIES STUDY PAGE 1 OF 3

DETAIL CULVERT OF TRIB. 10A COMPUTED M. DUNCAN DATE 3-22-00

CHECKED BY DATE



PLAN VIEW

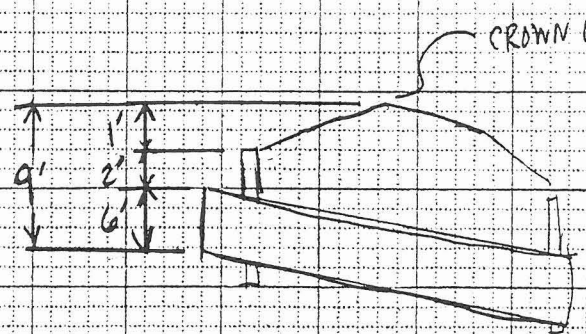
DOUBLE 72" CMP's, SLOPE OF 1.9%, ENDS PROTRUDING

LENGTH = 73.25 FT

$L_{WEST\ PIPE} = 74.3' - 0.1' = 74.2'$

$L_{EAST\ PIPE} = 72.4' - 0.1' = 72.3'$

AVG. = 73.25'



FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

PROJECT SKUNK CREEK TRIBUTARIES STUDY PAGE 2 OF 3

DETAIL CULVERT AT TRIB. 1DA COMPUTED M. DUNCAN DATE 3-22-00

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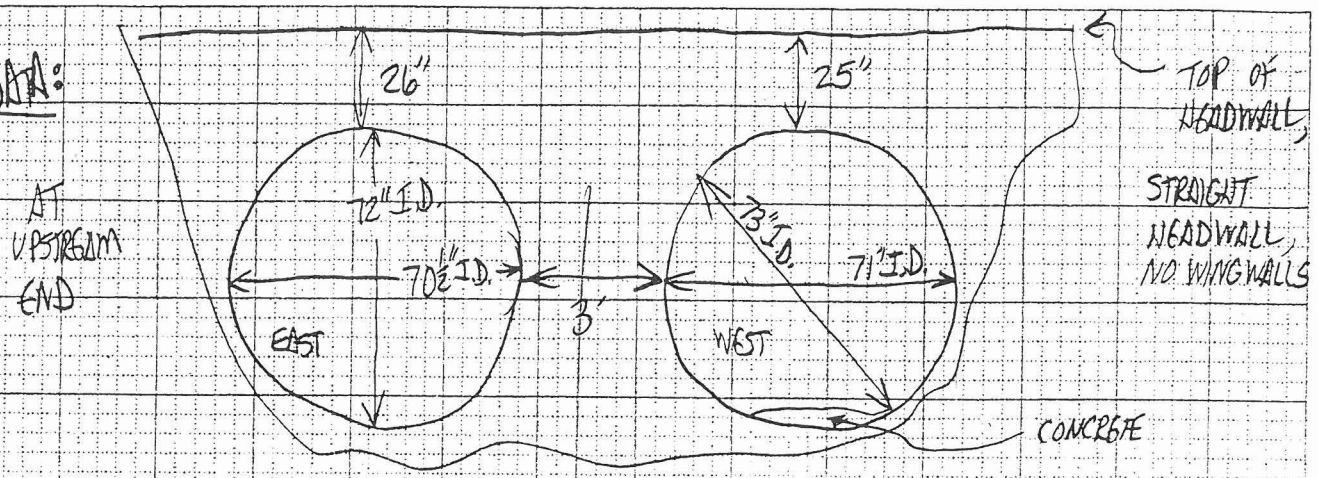
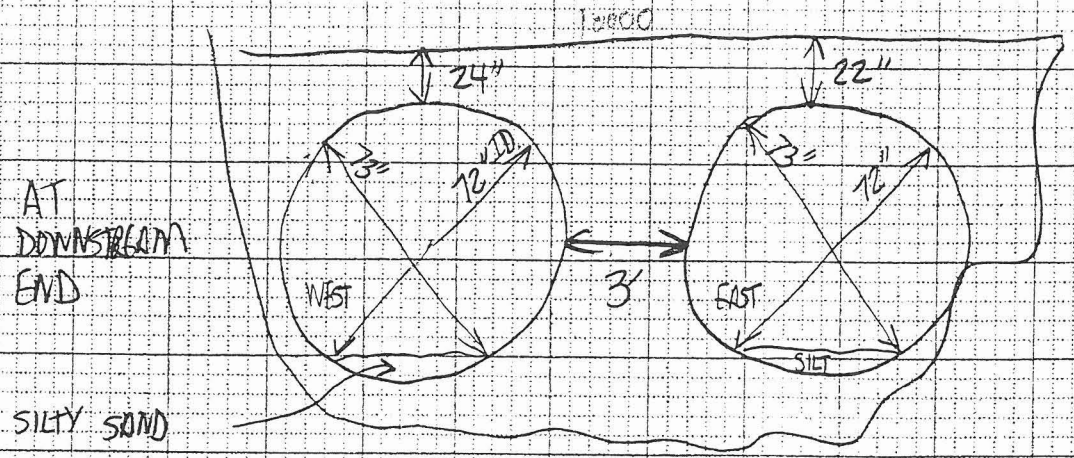
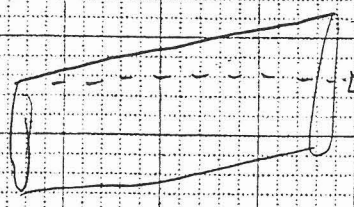
RAW DATA:







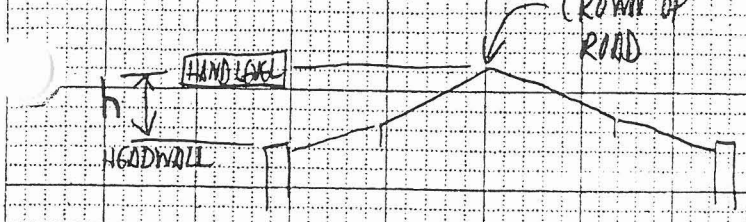
	ΔH
EAST PIPE	18" = 1.5 ft
WEST PIPE	15" = 1.25 ft

SLOPES

$S_{EAST} = \frac{1.5}{72.3} = 2.07\%$

$S_{WEST} = \frac{1.25}{74.2} = 1.68\%$

AVERAGE = 1.88% → 1.9%



	h
UPSTREAM HEADWALL	1'
DOWNSTREAM HEADWALL	2'

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

PROJECT SKUNK CREEK TRIBUTARIES PAGE 3 OF 3

DETAIL TRIB. 10A COMPUTED M. DUNCAN DATE 3-22-00

CHECKED BY _____ DATE _____

DISTANCE UPSTREAM OF CULVERT	PHOTO NO.	APPROX. BOTTOM WIDTH OF WASH		PAGES (1)
800'	13	6 FT.	[BANK HT. LEFT = B.H. RIGHT = 3']	300
1000'	14	12'		400
1300'	HALF WAY BETWEEN 14 & 15	20'		500
2300'	—	5'		900
~2550	18	15'		1000
2600'	17	7'		1000
2900'	19	6'		1,100
3600'	21	6'		1,400
3900	—	3' TO 4'		1,500

(1) COMPARISON WITH GEOGRAPHIC LANDMARKS YIELDED PAGE LENGTH OF 2.6 FEET M. Duncan

FCD-153 4-90

APPENDIX D: HYDROLOGIC ANALYSIS SUPPORTING DOCUMENTATION

All hydrologic data was provided by the Flood Control District of Maricopa County. The hydrologic data is discussed in the report "Skunk Creek 3 Tributaries Floodplain Delineation Study (Addendum to the Skunk Creek Floodplain Delineation Study)." The Hydrology Branch, Engineering Division of the FCD completed the HEC-1 study in August 1998. The full report is attached.

Skunk Creek 3 Tributaries
Floodplain Delineation Study
(Addendum to the Skunk Creek Floodplain Delineation Study)

Technical Data Notebook
Hydrologic Analysis

August 1998

Prepared by
Hydrology Branch, Engineering Division

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Appendix B HEC-1 Output for 100-yr, 24-hr storm(abbreviated model)
Appendix C HEC-1 Output for 100-yr, 6-hr storm(abbreviated model)
Appendix D Figure 2: Flow Paths for Skunk Creek 3 Tributaries Watershed
Appendix E Figure 3: HEC-1 Schematic of Contributing Watershed

1.0 INTRODUCTION

The Hydraulics Branch of the Flood Control District of Maricopa County is redelineating 3 tributaries in three of the sub-basins within the hydrologic model as developed by the Flood Insurance Study (Ref 1). As such they have asked the Hydrology Branch of the Flood Control District of Maricopa County to redelineate two of the sub-basins(S-6 and S-10) into smaller sub-areas and produce a hydrologic model of the resultant area. Figure 1 shows the redelineated sub-basins with the original surrounding sub-basins as a backdrop. This work will lead to a finer floodplain detail for the sub-basins and tributaries in question.

1.0.1 Purpose of Study

This addendum to the original report developed by the FCD has reproduced as much as possible the assumptions and methodology followed by the Flood Insurance Study. The purpose is to redelineate a portion of the study and obtain flows for 3 tributaries within sub-basins S-6 and S-10. Flows from sub-basin S-12 have already been provided in the original Flood Insurance Study but will also be provided within this addendum.

1.1 HYDROLOGIC MODEL DEVELOPMENT AND ASSUMPTIONS

Sub-basins in the addendum were delineated using the 7-1/2 minute quadrangle maps as done in the original work. Sub-basins were drawn out by hand and presented to the FCD's Geographic Information Systems Branch for digitizing. Once digitized the soil and landuse coverages for the area were placed on the sub-basin boundaries and reports summarizing the landuse and soil types for each sub-basin were produced.

The FCD's DDMS was used to compute Green-Ampt parameters for input into the HEC-1 model. Because a portion of the sub-basins lie within the boundaries of the Tonto National Forest, where the soil survey does not cover, the assumptions used to obtain soil areas within the national forest as estimated by the FIS were reproduced in this addendum.. Landuse default conditions were modified to match the assumptions as previously supplied by the FIS. Appendix A contains sub-basin reports for each of the new sub-basins. Figure 2 in Appendix D shows the flow paths in each of the sub-basins.

Hydrograph routing was performed using the Muskingum Method. The assumptions used to obtain the routing parameters in the previous work were used for this work. Table 1 lists the hydrograph routing parameters for this addendum study. Figure 3 in Appendix E shows the HEC-1 schematic for the addendum.

1.2 REFERENCES

Montgomery Watson. Skunk Creek Floodplain Delineation Study, Hydrologic Analysis. June. 1997.

Skunk Creek and 3 Tributaries Delineation
Basin Boundaries

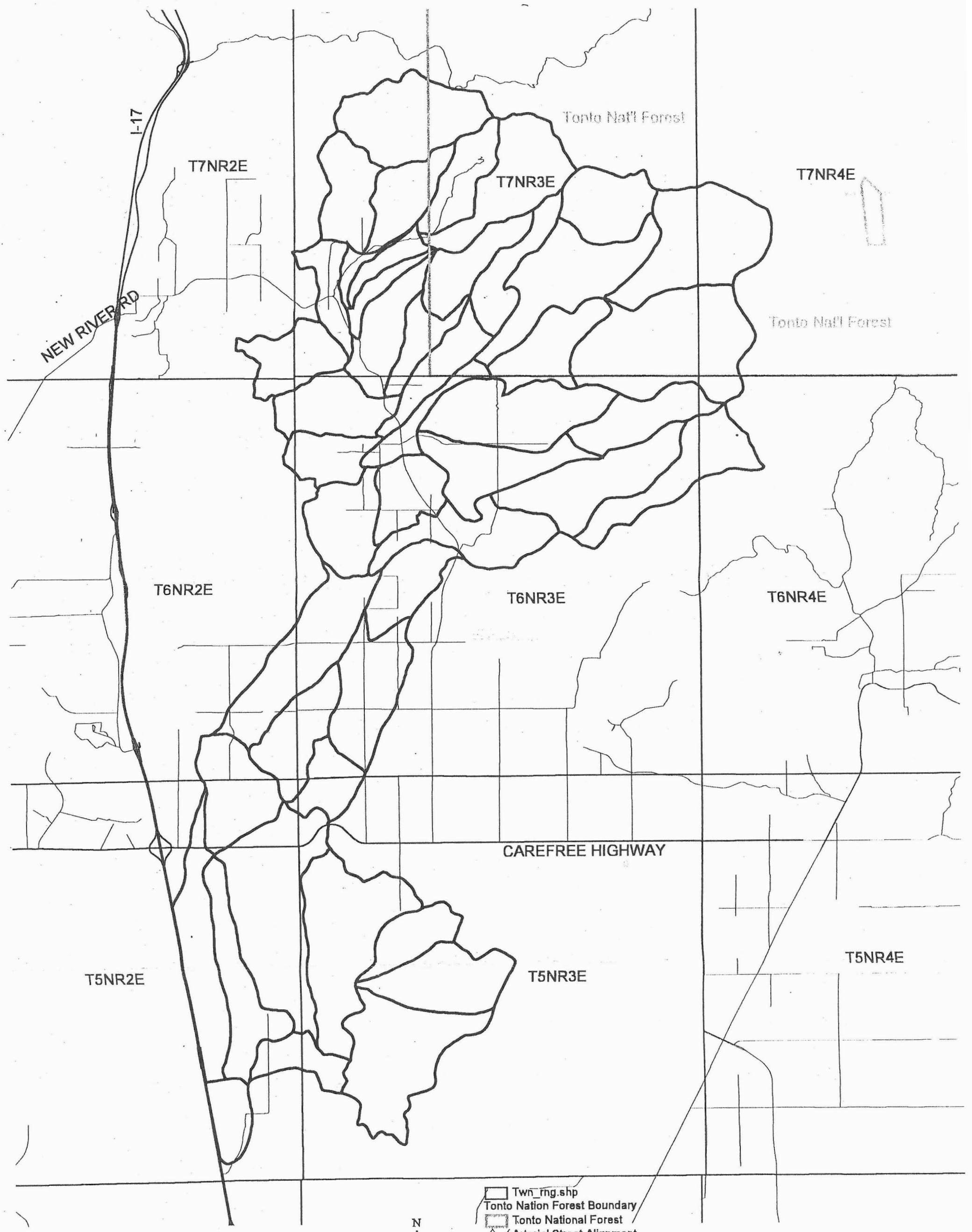

Figure 1

Table 1
Hydrograph Routing Parameters

From	To	Model Length(ft)	Slope	n value	Velocity(ft/s)	Vm/V	Celerity, Vm(ft/s)	Travel Time(min)	K	X	NSTPS
S3	S-6A	5750	0.009	0.045	4.9	1.33	6.5	15	0.25	0.3	3
S5	S-6B	9775	0.013	0.045	5.9	1.33	7.8	20	0.35	0.3	4
S-6B	S-6C	2875	0.01	0.04	5.7	1.67	9.5	5	0.08	0.25	1
S-6C	S-10A	6325	0.01	0.04	5.7	1.67	9.5	11	0.18	0.25	2
S9	S-10B	9200	0.015	0.04	6.2	1.67	10.3	15	0.25	0.3	3
S-10B	S-10A	920	0.015	0.04	6.2	1.67	10.3	2	0.02	0.3	1
S-10B	S-13	3228	0.009	0.04	5.0	1.67	8.45	10	0.09	0.25	1

Appendix A

LOSS PARAMETERS FOR SUBBASIN: S1

Soil Survey Used Aguila/Carefree

XKSAT

Map Unit	AREA Sq.Miles	% Area	XKSAT	% Rock Outcrop
8	0.053	2.5	0.96	0
72	1.031	49.6	0.09	30
96	0.021	1.0	0.07	0
40	0.811	39.0	0.17	0
93	0.002	0.1	0.33	0
104	0.027	1.3	0.14	60
41	0.135	6.5	0.17	0
TOTAL =	2.080 Sq.Miles	XKSAT = 0.13	%Rock = 16	

DTHETA

Dry = 0.38
Normal = 0.21
Wet = 0.00

PSIF = 6.40

LAND USE

AREA Sq.Miles	LAND USE Type	% Area	DTHETA condition	%Veg. cover	RTIMP%	IA in.	Kn	Kb Type	Kb
1.398	VACANT	67.3	DRY	18	0	0.22	0.04	Low	0.04
0.680	FOREST	32.7	DRY	18	0	0.22	0.04	Low	0.04
2.078 = Total Area			Avg. =	18	0%	0.220			

PERCENT OF SUBBASIN DRY = 100. %
NORMAL = 0.0 %
WET = 0.0 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.38

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.14

IMPERVIOUS AREA: URBAN @ 100 % effective = 0
ROCK OUTCROP @ 100 % effective = 16
% EFFECTIVE IMP. = 6

INPUT VALUES FOR MCUHP2 PROGRAM

SUBBASIN	Area sq. mi.	Length mi.	Lca	Kn	Slope ft/mi	IA in.	DTHETA	PSIF	XKSAT adj.	RTIMP %	Lag min.
S1	2.080	2.48	0.93	0.04	535.5	0.22	0.38	6.40	0.14	6	24

LOSS PARAMETERS FOR SUBBASIN: S2

Soil Survey Used Aguila/Carefree

XKSAT

Map Unit	AREA Sq.Miles	% Area	XKSAT	% Rock Outcrop
72	0.265	22.6	0.09	30
96	0.046	3.9	0.07	0
40	0.309	26.3	0.17	0
8	0.055	4.7	0.96	0
93	0.014	1.2	0.33	0
66	0.080	6.8	0.23	0
41	0.121	10.3	0.17	0
95	0.076	6.5	0.04	0
26	0.142	12.1	0.01	0
68	0.018	1.5	0.63	0
110	0.026	2.2	0.13	0
10	0.012	1.0	0.94	0
13	0.009	0.8	0.01	0
12	0.001	0.1	0.01	0
TOTAL =	1.174 Sq.Miles	XKSAT = 0.10	%Rock =	7

DTHETA

Dry = 0.35 PSIF = 7.00
Normal = 0.15
Wet = 0.00

LAND USE

AREA Sq.Miles	LAND USE Type	% Area	DTHETA condition	%Veg. cover	RTIMP%	IA in.	Kn	Kb Type	Kb
0.115	LDR	9.8	DRY	22	5	0.18	0.04	Low	0.05
1.059	VACANT	90.2	DRY	22	0	0.18	0.04	Low	0.04
1.174 = Total Area			Avg. =	22	0%	0.180			

PERCENT OF SUBBASIN DRY = 100. %
NORMAL = 0.0 %
WET = 0.0 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.35

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.11

IMPERVIOUS AREA: URBAN @ 100 % effective = 0
ROCK OUTCROP @ 100 % effective = 7
% EFFECTIVE IMP. = 7

INPUT VALUES FOR MCUHP2 PROGRAM

SUBBASIN	Area sq. mi.	Length mi.	Lca	Kn	Slope ft/mi	IA in.	DTHETA	PSIF	XKSAT adj.	RTIMP %	Lag min.
S2	1.174	2.22	1.09	0.04	384.2	0.18	0.35	7.00	0.11	7	23

LOSS PARAMETERS FOR SUBBASIN: S3

Soil Survey Used Aguila/Carefree

XKSAT

Map Unit	AREA Sq.Miles	% Area	XKSAT	% Rock Outcrop
41	0.224	21.7	0.17	0
95	0.043	4.2	0.04	0
66	0.620	60.2	0.23	0
72	0.107	10.4	0.09	30
96	0.022	2.1	0.07	0
68	0.007	0.7	0.63	0
12	0.007	0.7	0.01	0
TOTAL =	1.030 Sq.Miles	XKSAT = 0.17	%Rock =	3

DTHETA

Dry = 0.39 PSIF = 5.70
Normal = 0.25
Wet = 0.00

LAND USE

AREA Sq.Miles	LAND USE Type	% Area	DTHETA condition	%Veg. cover	RTIMP%	IA in.	Kn	Kb Type	Kb
0.114	LDR	11.1	DRY	23	5	0.17	0.04	Low	0.05
0.722	VACANT	70.1	DRY	23	0	0.17	0.04	Low	0.04
0.194	FOREST	18.8	DRY	23	0	0.17	0.04	Low	0.05
1.030 = Total Area			Avg. =	23	1%	0.170			

PERCENT OF SUBBASIN DRY = 100. %
NORMAL = 0.0 %
WET = 0.0 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.39

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.19

IMPERVIOUS AREA: URBAN @ 100 % effective = 1
ROCK OUTCROP @ 100 % effective = 3
% EFFECTIVE IMP. = 4

INPUT VALUES FOR MCUHP2 PROGRAM

SUBBASIN	Area sq. mi.	Length mi.	Lca	Kn	Slope ft/mi	IA in.	DTHETA	PSIF	XKSAT adj.	RTIMP %	Lag min.
S3	1.030	2.27	1.08	0.04	331.3	0.17	0.39	5.70	0.19	4	24

LOSS PARAMETERS FOR SUBBASIN: S4

Soil Survey Used Aguila/Carefree

XKSAT

Map Unit	AREA Sq.Miles	% Area	XKSAT	% Rock Outcrop
66	0.017	1.8	0.23	0
95	0.020	2.1	0.04	0
40	0.933	96.2	0.17	0
TOTAL =	0.970 Sq.Miles	XKSAT = 0.17	%Rock =	0

DTHETA

Dry = 0.39 PSIF = 5.70
Normal = 0.25
Wet = 0.00

LAND USE

AREA Sq.Miles	LAND USE Type	% Area	DTHETA condition	%Veg. cover	RTIMP%	IA in.	Kn	Kb Type	Kb
0.040	VACANT	4.1	DRY	20	0	0.20	0.04	Low	0.06
0.930	FOREST	95.9	DRY	20	0	0.20	0.04	Low	0.04
0.970 = Total Area			Avg. =	20	0%	0.200			

PERCENT OF SUBBASIN DRY = 100. %
NORMAL = 0.0 %
WET = 0.0 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.39

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.19

IMPERVIOUS AREA: URBAN @ 100 % effective = 0
ROCK OUTCROP @ 100 % effective = 0
% EFFECTIVE IMP. = 0

INPUT VALUES FOR MCUHP2 PROGRAM

SUBBASIN	Area sq. mi.	Length mi.	Lca	Kn	Slope ft/mi	IA in.	DTHETA	PSIF	XKSAT adj.	RTIMP %	Lag min.
S4	0.970	2.31	1.10	0.04	588.7	0.20	0.39	5.70	0.19	0	24

LOSS PARAMETERS FOR SUBBASIN: S5

Soil Survey Used Aguila/Carefree

XKSAT

Map Unit	AREA Sq.Miles	% Area	XKSAT	% Rock Outcrop
95	0.004	0.2	0.04	0
8	0.005	0.3	0.96	0
41	0.005	0.3	0.17	0
40	1.836	99.2	0.17	0
TOTAL =	1.850 Sq.Miles	XKSAT = 0.17	%Rock =	0

DTHETA

Dry = 0.39
Normal = 0.25
Wet = 0.00

PSIF = 5.70

LAND USE

AREA Sq.Miles	LAND USE Type	% Area	DTHETA condition	%Veg. cover	RTIMP%	IA in.	Kn	Kb Type	Kb
0.016	VACANT	0.9	DRY	17	0	0.23	0.04	Low	0.07
1.837	FOREST	99.1	DRY	17	0	0.23	0.04	Low	0.04
1.853 = Total Area			Avg. =	17	0%	0.230			

PERCENT OF SUBBASIN DRY = 100. %
NORMAL = 0.0 %
WET = 0.0 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.39

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.18

IMPERVIOUS AREA: URBAN @ 100 % effective = 0
ROCK OUTCROP @ 100 % effective = 0
% EFFECTIVE IMP. = 0

INPUT VALUES FOR MCUHP2 PROGRAM

SUBBASIN	Area sq. mi.	Length mi.	Lca	Kn	Slope ft/mi	IA in.	DTHETA	PSIF	XKSAT adj.	RTIMP %	Lag min.
S5	1.850	2.91	1.77	0.04	618.6	0.23	0.39	5.70	0.18	0	34

LOSS PARAMETERS FOR SUBBASIN: S-6A

Soil Survey Used Aguila/Carefree

XKSAT

Map Unit	AREA Acres	% Area	XKSAT	% Rock Outcrop
2	9.000	6.7	0.41	0
10	30.000	22.4	0.94	0
12	23.000	17.2	0.01	0
13	23.000	17.2	0.01	0
98	4.000	3.0	0.37	0
110	42.000	31.3	0.13	0
122	3.000	2.2	0.33	0
TOTAL =	134.000 Acres		XKSAT = 0.10	%Rock = 0

DTHETA

Dry = 0.35 PSIF = 7.00
Normal = 0.15
Wet = 0.00

LAND USE

AREA Acres	LAND USE Type	% Area	DTHETA condition	%Veg. cover	RTIMP%	IA in.	Kn	Kb Type	Kb
13.000	Desert	9.7	DRY	31	0	0.23	0.03	Low	0.04
	OPEN		DRY	10	0	0.10	0.02	Min	
	V.L.D.R		NORMAL	30	5	0.30	0.05	Low	
120.000	L.D.R.	89.6	DRY	31	5	0.23	0.03	Low	0.05
1.000	INSTITU	0.7	DRY	31	0	0.23	0.03	Low	0.08
	M.F.R.		NORMAL	50	45	0.25	0.05	Low	
	Ind		NORMAL	60	55	0.15	0.03	Min	
	Comm		NORMAL	75	80	0.10	0.02	Min	
	Park		NORMAL	90	0	0.20	0.10	Hi	
	RowCrop		NORMAL	85	0	0.50	0.10	Hi	
134.00 = Total Area			Avg. =	31	4%	0.230			

PERCENT OF SUBBASIN DRY = 100. %
NORMAL = 0.0 %
WET = 0.0 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.35

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.12

IMPERVIOUS AREA: URBAN @ 100 % effective = 4
ROCK OUTCROP @ 100 % effective = 0
% EFFECTIVE IMP. = 4

INPUT VALUES FOR MCUHP2 PROGRAM

SUBBASIN	Area sq. mi.	Length mi.	Lca	Kn	Slope ft/mi	IA in.	DTHETA	PSIF	XKSAT adj.	RTIMP %	Lag min.
S-6A	0.209	1.70	0.95	0.03	141.2	0.23	0.35	7.00	0.12	4	20

LOSS PARAMETERS FOR SUBBASIN: S-6B

Soil Survey Used Aguila/Carefree

XKSAT

Map Unit	AREA Acres	% Area	XKSAT	% Rock Outcrop
2	5.000	2.0	0.41	0
8	12.000	4.9	0.96	0
10	38.000	15.4	0.94	0
12	54.000	22.0	0.01	0
41	87.000	35.4	0.17	0
66	19.000	7.7	0.23	0
95	31.000	12.6	0.04	0
TOTAL =	246.000 Acres		XKSAT = 0.11	%Rock = 0

DTHETA

Dry = 0.36 PSIF = 6.80
Normal = 0.17
Wet = 0.00

LAND USE

AREA Acres	LAND USE Type	% Area	DTHETA condition	%Veg. cover	RTIMP%	IA in.	Kn	Kb Type	Kb
137.000	Desert	55.7	DRY	31	0	0.23	0.03	Low	0.04
	OPEN		DRY	10	0	0.10	0.02	Min	
	V.L.D.R		NORMAL	30	5	0.30	0.05	Low	
108.000	L.D.R.	43.9	DRY	31	5	0.23	0.03	Low	0.05
	M.D.R.		NORMAL	50	30	0.25	0.05	Low	
1.000	INSTITU	0.4	DRY	31	0	0.23	0.03	Low	0.08
	Ind		NORMAL	60	55	0.15	0.03	Min	
	Comm		NORMAL	75	80	0.10	0.02	Min	
	Park		NORMAL	90	0	0.20	0.10	Hi	
	RowCrop		NORMAL	85	0	0.50	0.10	Hi	
246.00 = Total Area			Avg. =	31	2%	0.230			

PERCENT OF SUBBASIN DRY = 100. %
NORMAL = 0.0 %
WET = 0.0 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.36

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.14

IMPERVIOUS AREA: URBAN @ 100 % effective = 2
ROCK OUTCROP @ 100 % effective = 0
% EFFECTIVE IMP. = 2

INPUT VALUES FOR MCUHP2 PROGRAM

SUBBASIN	Area sq. mi.	Length mi.	Lca	Kn	Slope ft/mi	IA in.	DTHETA	PSIF	XKSAT adj.	RTIMP %	Lag min.
S-6B	0.384	1.60	0.95	0.03	125.0	0.23	0.36	6.80	0.14	2	20

LOSS PARAMETERS FOR SUBBASIN: S-6C

Soil Survey Used Aguila/Carefree

XKSAT

Map Unit	AREA Acres	% Area	XKSAT	% Rock Outcrop
3	9.000	4.1	0.58	0
10	3.000	1.4	0.94	0
12	12.000	5.5	0.01	0
13	47.000	21.5	0.01	0
22	2.000	0.9	0.04	0
41	41.000	18.7	0.17	0
66	72.000	32.9	0.23	0
98	25.000	11.4	0.37	0
110	8.000	3.7	0.13	0
TOTAL =	219.000 Acres		XKSAT = 0.10	%Rock = 0

DTHETA

Dry = 0.35 PSIF = 7.00
Normal = 0.15
Wet = 0.00

LAND USE

AREA Acres	LAND USE Type	% Area	DTHETA condition	%Veg. cover	RTIMP%	IA in.	Kn	Kb Type	Kb
210.000	Desert	95.9	DRY	31	0	0.23	0.03	Low	0.04
	OPEN		DRY	10	0	0.10	0.02	Min	
	V.L.D.R		NORMAL	30	5	0.30	0.05	Low	
9.000	L.D.R.	4.1	DRY	31	5	0.23	0.03	Low	0.07
	M.D.R.		NORMAL	50	30	0.25	0.05	Low	
	M.F.R.		NORMAL	50	45	0.25	0.05	Low	
	Ind		NORMAL	60	55	0.15	0.03	Min	
	Comm		NORMAL	75	80	0.10	0.02	Min	
	Park		NORMAL	90	0	0.20	0.10	Hi	
	RowCrop		NORMAL	85	0	0.50	0.10	Hi	
219.00 = Total Area			Avg. =	31	0%	0.230			

PERCENT OF SUBBASIN DRY = 100. %
NORMAL = 0.0 %
WET = 0.0 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.35

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.12

IMPERVIOUS AREA: URBAN @ 100 % effective = 0
ROCK OUTCROP @ 100 % effective = 0
% EFFECTIVE IMP. = 0

INPUT VALUES FOR MCUHP2 PROGRAM

SUBBASIN	Area sq. mi.	Length mi.	Lca	Kn	Slope ft/mi	IA in.	DTHETA	PSIF	XKSAT adj.	RTIMP %	Lag min.
S-6C	0.342	1.98	1.04	0.03	181.8	0.23	0.35	7.00	0.12	0	21

LOSS PARAMETERS FOR SUBBASIN: S7

Soil Survey Used Aguila/Carefree

XKSAT

Map Unit	AREA Sq.Miles	% Area	XKSAT	% Rock Outcrop
26	0.042	6.1	0.01	0
49	0.023	3.4	0.06	0
110	0.175	25.6	0.13	0
52	0.112	16.4	0.16	20
13	0.088	12.9	0.01	0
98	0.099	14.5	0.37	0
22	0.082	12.0	0.04	0
3	0.020	2.9	0.58	0
45	0.042	6.1	0.03	0
TOTAL =	0.683 Sq.Miles		XKSAT = 0.08	%Rock = 3

DTHETA

Dry = 0.32 PSIF = 7.60
Normal = 0.15
Wet = 0.00

LAND USE

AREA Sq.Miles	LAND USE Type	% Area	DTHETA condition	%Veg. cover	RTIMP%	IA in.	Kn	Kb Type	Kb
0.189	LDR	27.7	DRY	25	5	0.15	0.03	Low	0.05
0.494	VACANT	72.3	DRY	25	0	0.15	0.03	Low	0.05
0.683 = Total Area			Avg. =	25	1%	0.150			

PERCENT OF SUBBASIN DRY = 100. %
NORMAL = 0.0 %
WET = 0.0 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.32

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.09

IMPERVIOUS AREA: URBAN @ 100 % effective = 1
ROCK OUTCROP @ 100 % effective = 3
% EFFECTIVE IMP. = 4

INPUT VALUES FOR MCUHP2 PROGRAM

SUBBASIN	Area sq. mi.	Length mi.	Lca	Kn	Slope ft/mi	IA in.	DTHETA	PSIF	XKSAT adj.	RTIMP %	Lag min.
S7	0.683	2.14	1.25	0.03	136.4	0.15	0.32	7.60	0.09	4	26

LOSS PARAMETERS FOR SUBBASIN: S8

Soil Survey Used Aguila/Carefree

XKSAT

Map Unit	AREA Sq.Miles	% Area	XKSAT	% Rock Outcrop
52	0.014	1.2	0.16	20
45	0.309	27.6	0.03	0
22	0.027	2.4	0.04	0
109	0.705	62.9	0.35	35
98	0.006	0.5	0.37	0
3	0.060	5.4	0.58	0
TOTAL =	1.121 Sq.Miles	XKSAT = 0.17	%Rock = 22	

DTHETA

Dry = 0.39 PSIF = 5.70
Normal = 0.25
Wet = 0.00

LAND USE

AREA Sq.Miles	LAND USE Type	% Area	DTHETA condition	%Veg. cover	RTIMP%	IA in.	Kn	Kb Type	Kb
1.121	VACANT	100.	DRY	23	0	0.17	0.03	Low	0.04
1.121 = Total Area			Avg. =	23	0%	0.170			

PERCENT OF SUBBASIN DRY = 100. %
NORMAL = 0.0 %
WET = 0.0 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.39

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.19

IMPERVIOUS AREA: URBAN @ 100 % effective = 0
ROCK OUTCROP @ 100 % effective = 22
% EFFECTIVE IMP. = 0

INPUT VALUES FOR MCUHP2 PROGRAM

SUBBASIN	Area sq. mi.	Length mi.	Lca	Kn	Slope ft/mi	IA in.	DTHETA	PSIF	XKSAT adj.	RTIMP %	Lag min.
S8	1.121	1.94	1.01	0.03	207.2	0.17	0.39	5.70	0.19	0	23

LOSS PARAMETERS FOR SUBBASIN: S9

Soil Survey Used Aguila/Carefree

XKSAT

Map Unit	AREA Sq.Miles	% Area	XKSAT	% Rock Outcrop
95	0.009	0.9	0.04	0
66	0.027	2.6	0.23	0
40	0.985	96.5	0.17	0
TOTAL =	1.021 Sq.Miles	XKSAT = 0.17	%Rock =	0

DTHETA

Dry = 0.39 PSIF = 5.70
Normal = 0.25
Wet = 0.00

LAND USE

AREA Sq.Miles	LAND USE Type	% Area	DTHETA condition	%Veg. cover	RTIMP%	IA in.	Kn	Kb Type	Kb
0.043	VACANT	4.2	DRY	20	0	0.20	0.04	Low	0.06
0.978	FOREST	95.8	DRY	20	0	0.20	0.04	Low	0.04
1.021 = Total Area			Avg. =	20	0%	0.20			

PERCENT OF SUBBASIN DRY = 100. %
NORMAL = 0.0 %
WET = 0.0 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.39

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.19

IMPERVIOUS AREA: URBAN @ 100 % effective = 0
ROCK OUTCROP @ 100 % effective = 0
% EFFECTIVE IMP. = 0

INPUT VALUES FOR MCUHP2 PROGRAM

SUBBASIN	Area sq. mi.	Length mi.	Lca	Kn	Slope ft/mi	IA in.	DTHETA	PSIF	XKSAT adj.	RTIMP %	Lag min.
S9	1.021	2.31	0.91	0.04	329.0	0.20	0.39	5.70	0.19	0	28

LOSS PARAMETERS FOR SUBBASIN: S-10A

Soil Survey Used Aguila/Carefree

XKSAT

Map Unit	AREA Acres	% Area	XKSAT	% Rock Outcrop
3	100.000	13.7	0.58	0
13	58.000	7.9	0.01	0
41	65.000	8.9	0.17	0
66	233.000	31.9	0.23	0
93	4.000	0.5	0.33	0
95	122.000	16.7	0.04	0
96	2.000	0.3	0.07	0
98	24.000	3.3	0.37	0
109	41.000	5.6	0.35	35
110	32.000	4.4	0.13	0
120	50.000	6.8	0.06	0
TOTAL =	731.000 Acres		XKSAT = 0.14	%Rock = 2

DTHETA

Dry = 0.39 PSIF = 6.20
Normal = 0.23
Wet = 0.00

LAND USE

AREA Acres	LAND USE Type	% Area	DTHETA condition	%Veg. cover	RTIMP%	IA in.	Kn	Kb Type	Kb
700.000	Desert	95.5	DRY	27	0	0.17	0.03	Low	0.04
	OPEN		DRY	10	0	0.10	0.02	Min	
	V.L.D.R		NORMAL	30	5	0.30	0.05	Low	
33.000	L.D.R.	4.5	DRY	27	5	0.17	0.03	Low	0.05
	M.D.R.		NORMAL	50	30	0.25	0.05	Low	
	M.F.R.		NORMAL	50	45	0.25	0.05	Low	
	Ind		NORMAL	60	55	0.15	0.03	Min	
	Comm		NORMAL	75	80	0.10	0.02	Min	
	Park		NORMAL	90	0	0.20	0.10	Hi	
	RowCrop		NORMAL	85	0	0.50	0.10	Hi	
733.00 = Total Area			Avg. =	27	0%	0.170			

PERCENT OF SUBBASIN DRY = 100. %
NORMAL = 0.0 %
WET = 0.0 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.39

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.17

IMPERVIOUS AREA: URBAN @ 100 % effective = 0
ROCK OUTCROP @ 100 % effective = 2
% EFFECTIVE IMP. = 2

INPUT VALUES FOR MCUHP2 PROGRAM

SUBBASIN	Area sq. mi.	Length mi.	Lca	Kn	Slope ft/mi	IA in.	DTHETA	PSIF	XKSAT adj.	RTIMP %	Lag min.
S-10A	1.142	2.65	1.23	0.03	156.6	0.17	0.39	6.20	0.17	2	26

LOSS PARAMETERS FOR SUBBASIN: S-10B

Soil Survey Used Aguila/Carefree

XKSAT

Map Unit	AREA Acres	% Area	XKSAT	% Rock Outcrop
6	21.000	5.0	0.62	0
66	222.000	52.6	0.23	0
93	95.000	22.5	0.33	0
95	45.000	10.7	0.04	0
96	30.000	7.1	0.07	0
120	9.000	2.1	0.06	0

TOTAL = 422.000 Acres XKSAT = 0.19 %Rock = 0

DTHETA

Dry = 0.38 PSIF = 5.40
Normal = 0.25
Wet = 0.00

LAND USE

AREA Acres	LAND USE Type	% Area	DTHETA condition	%Veg. cover	RTIMP%	IA in.	Kn	Kb Type	Kb
370.000	Desert	87.7	DRY	27	0	0.17	0.03	Low	0.04
	OPEN		DRY	10	0	0.10	0.02	Min	
	V.L.D.R		NORMAL	30	5	0.30	0.05	Low	
52.000	L.D.R.	12.3	DRY	27	5	0.17	0.03	Low	0.05
	M.D.R.		NORMAL	50	30	0.25	0.05	Low	
	M.F.R.		NORMAL	50	45	0.25	0.05	Low	
	Ind		NORMAL	60	55	0.15	0.03	Min	
	Comm		NORMAL	75	80	0.10	0.02	Min	
	Park		NORMAL	90	0	0.20	0.10	Hi	
	RowCrop		NORMAL	85	0	0.50	0.10	Hi	
422.00 = Total Area			Avg. =	27	1%	0.170			

PERCENT OF SUBBASIN DRY = 100. %
NORMAL = 0.0 %
WET = 0.0 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.38

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.23

IMPERVIOUS AREA: URBAN @ 100 % effective = 1
ROCK OUTCROP @ 100 % effective = 0
% EFFECTIVE IMP. = 1

INPUT VALUES FOR MCUHP2 PROGRAM

SUBBASIN	Area sq. mi.	Length mi.	Lca	Kn	Slope ft/mi	IA in.	DTHETA	PSIF	XKSAT adj.	RTIMP %	Lag min.
S-10B	0.659	1.98	1.04	0.03	151.5	0.17	0.38	5.40	0.23	1	22

LOSS PARAMETERS FOR SUBBASIN: S11

Soil Survey Used Aguila/Carefree

XKSAT

Map Unit	AREA Sq.Miles	% Area	XKSAT	% Rock Outcrop
40	0.920	100.	0.17	0
TOTAL =	0.920 Sq.Miles	XKSAT = 0.17	%Rock = 0	

DTHETA

Dry = 0.39 PSIF = 5.70
Normal = 0.25
Wet = 0.00

LAND USE

AREA Sq.Miles	LAND USE Type	% Area	DTHETA condition	%Veg. cover	RTIMP%	IA in.	Kn	Kb Type	Kb
0.920	FOREST	100.	DRY	20	0	0.20	0.04	Low	0.04
0.920 = Total Area			Avg. =	20	0%	0.200			

PERCENT OF SUBBASIN DRY = 100. %
NORMAL = 0.0 %
WET = 0.0 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.39

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.19

IMPERVIOUS AREA: URBAN @ 100 % effective = 0
ROCK OUTCROP @ 100 % effective = 0
% EFFECTIVE IMP. = 0

INPUT VALUES FOR MCUHP2 PROGRAM

SUBBASIN	Area sq. mi.	Length mi.	Lca	Kn	Slope ft/mi	IA in.	DTHETA	PSIF	XKSAT adj.	RTIMP %	Lag min.
S11	0.920	2.70	1.28	0.04	438.1	0.20	0.39	5.70	0.19	0	27

LOSS PARAMETERS FOR SUBBASIN: S12

Soil Survey Used Aguila/Carefree

XKSAT

Map Unit	AREA Sq.Miles	% Area	XKSAT	% Rock Outcrop
95	0.425	46.7	0.04	0
66	0.383	42.1	0.23	0
26	0.076	8.4	0.01	0
52	0.002	0.2	0.16	20
68	0.020	2.2	0.63	0
3	0.004	0.4	0.58	0
TOTAL =	0.910 Sq.Miles	XKSAT = 0.08	%Rock =	0

DTHETA

Dry = 0.32 PSIF = 7.60
Normal = 0.15
Wet = 0.00

LAND USE

AREA Sq.Miles	LAND USE Type	% Area	DTHETA condition	%Veg. cover	RTIMP%	IA in.	Kn	Kb Type	Kb
0.506	FOREST	55.4	DRY	25	0	0.15	0.03	Low	0.05
0.214	VACANT	23.4	DRY	25	0	0.15	0.03	Low	0.05
0.193	LDR	21.1	DRY	25	5	0.15	0.03	Low	0.05
0.913 = Total Area		Avg. =		25	1%	0.150			

PERCENT OF SUBBASIN DRY = 100. %
NORMAL = 0.0 %
WET = 0.0 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.32

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.09

IMPERVIOUS AREA: URBAN @ 100 % effective = 1
ROCK OUTCROP @ 100 % effective = 0
% EFFECTIVE IMP. = 1

INPUT VALUES FOR MCUHP2 PROGRAM

SUBBASIN	Area sq. mi.	Length mi.	Lca	Kn	Slope ft/mi	IA in.	DTHETA	PSIF	XKSAT adj.	RTIMP %	Lag min.
S12	0.910	2.76	1.30	0.03	123.2	0.15	0.32	7.60	0.09	1	29

LOSS PARAMETERS FOR SUBBASIN: S13

Soil Survey Used Aguila/Carefree

XKSAT

Map Unit	AREA Sq.Miles	% Area	XKSAT	% Rock Outcrop
109	0.660	51.9	0.35	35
98	0.060	4.7	0.37	0
44	0.234	18.4	0.03	0
110	0.126	9.9	0.13	0
68	0.075	5.9	0.63	0
3	0.054	4.2	0.58	0
13	0.019	1.5	0.01	0
66	0.033	2.6	0.23	0
52	0.009	0.7	0.16	20
96	0.002	0.2	0.07	0
TOTAL =	1.272 Sq.Miles	XKSAT = 0.20	%Rock = 18	

DTHETA

Dry = 0.37 PSIF = 5.30
Normal = 0.25
Wet = 0.00

LAND USE

AREA Sq.Miles	LAND USE Type	% Area	DTHETA condition	%Veg. cover	RTIMP%	IA in.	Kn	Kb Type	Kb
0.203	LDR	16.0	DRY	25	5	0.22	0.04	Low	0.05
0.031	MEDCOM	2.4	DRY	25	60	0.22	0.04	Low	0.06
1.038	VACANT	81.6	DRY	25	0	0.22	0.04	Low	0.04
1.272 = Total Area			Avg. =	25	2%	0.220			

PERCENT OF SUBBASIN DRY = 100. %
NORMAL = 0.0 %
WET = 0.0 %

SUBBASIN DTHETA WEIGHTED BY LAND USE = 0.37

SUBBASIN XKSAT ADJUSTED FOR VEG. = 0.23

IMPERVIOUS AREA: URBAN @ 100 % effective = 2
ROCK OUTCROP @ 100 % effective = 18
% EFFECTIVE IMP. = 20

INPUT VALUES FOR MCUHP2 PROGRAM

SUBBASIN	Area sq. mi.	Length mi.	Lca	Kn	Slope ft/mi	IA in.	DTHETA	PSIF	XKSAT adj.	RTIMP %	Lag min.
S13	1.272	2.67	1.16	0.04	425.1	0.22	0.37	5.30	0.23	20	25

Summary of MCUHP2 Subbasin Input Parameters

SUBBASIN	AREA sq.miles	IA ins.	DTHETA	PSIF	XKSAT adj.	RTIMP %	LAG mins.
S1	2.080	0.220	0.380	6.40	0.140	6	24.0
S2	1.174	0.180	0.350	7.00	0.110	7	23.4
S3	1.030	0.170	0.390	5.70	0.190	4	23.5
S4	0.970	0.200	0.390	5.70	0.190	0	24.4
S5	1.850	0.230	0.390	5.70	0.180	0	34.0
S6	0.936	0.230	0.350	7.00	0.120	2	27.3
S7	0.683	0.150	0.320	7.60	0.090	4	25.5
S8	1.121	0.170	0.390	5.70	0.190	0	22.9
S9	1.021	0.200	0.390	5.70	0.190	0	27.9
S10	1.801	0.170	0.400	6.00	0.180	0	27.9
S11	0.920	0.200	0.390	5.70	0.190	0	26.9
S12	0.910	0.150	0.320	7.60	0.090	1	29.1
S13	1.272	0.220	0.370	5.30	0.230	20	24.5
S14	0.833	0.230	0.390	5.80	0.180	25	18.8
S15	0.987	0.210	0.350	7.00	0.120	15	23.5
S16	1.318	0.290	0.390	5.80	0.200	0	19.1
S17	1.033	0.160	0.330	7.30	0.100	0	30.9
S18	1.713	0.150	0.270	8.80	0.060	0	28.8
S20	1.273	0.170	0.270	8.80	0.060	6	28.9
S19	0.772	0.170	0.290	8.40	0.070	4	19.6
S21	2.221	0.210	0.270	8.80	0.060	0	34.6
S22	1.467	0.250	0.390	5.80	0.190	0	22.7
S23	1.720	0.350	0.250	9.70	0.050	0	42.9
S24	0.640	0.350	0.300	8.00	0.090	0	19.0
X1SUB	0.605	0.200	0.300	8.00	0.070	16	11.0
X2SUB	0.433	0.200	0.320	7.60	0.080	6	12.5
X3SUB	0.556	0.200	0.320	7.60	0.080	1	15.6
X4SUB	0.283	0.200	0.270	8.80	0.050	0	8.8
X5SUB	0.377	0.200	0.370	6.60	0.130	0	11.6
SUBC1	1.259	0.200	0.350	4.80	0.260	0	7.8
SUBC2	2.191	0.200	0.350	4.80	0.260	0	20.5
SUBC3	1.241	0.230	0.350	4.90	0.260	1	14.8
SUBC4	2.539	0.200	0.350	4.80	0.260	0	15.8
SUBC5	3.391	0.240	0.370	5.20	0.230	6	15.0
SUBC7	1.198	0.400	0.270	8.80	0.060	18	12.6
SUBC8	1.422	0.370	0.190	10.10	0.040	13	20.4
SUBC9	0.578	0.350	0.310	6.80	0.140	7	21.8
R1	1.561	0.150	0.250	9.70	0.050	17	23.3
R2	1.984	0.150	0.290	8.40	0.070	14	22.0
R3	1.589	0.100	0.350	7.00	0.130	25	29.9
U1	2.530	0.270	0.250	9.70	0.050	8	33.5
U2	1.596	0.290	0.220	10.10	0.040	6	37.1
U3	0.843	0.240	0.360	6.80	0.130	8	30.4
U4	2.795	0.230	0.350	7.00	0.120	8	28.7
U5	3.251	0.280	0.370	6.60	0.150	3	35.0
U6	0.704	0.210	0.330	7.30	0.100	11	20.7
U7	1.467	0.350	0.250	9.70	0.050	1	34.1

Summary of MCUHP2 Lag Time Calculation Parameters

SUBBASIN	S-Graph Type	Kn	L miles	Lca miles	Slope ft/mile	Lag mins
S1	Mountain	0.0400	2.48	0.93	535.50	24.0
S2	Mountain	0.0360	2.22	1.09	384.20	23.4
S3	Mountain	0.0350	2.27	1.08	331.30	23.5
S4	Mountain	0.0400	2.31	1.10	588.70	24.4
S5	Mountain	0.0430	2.91	1.77	618.60	34.0
S6	Desert/Rangeland	0.0340	2.38	1.12	152.50	27.3
S7	Desert/Rangeland	0.0310	2.14	1.25	136.40	25.5
S8	Desert/Rangeland	0.0340	1.94	1.01	207.20	22.9
S9	Mountain	0.0440	2.31	0.91	329.00	27.9
S10	Desert/Rangeland	0.0320	2.70	1.24	156.70	27.9
S11	Mountain	0.0370	2.70	1.28	438.10	26.9
S12	Desert/Rangeland	0.0310	2.76	1.30	123.20	29.1
S13	Mountain	0.0350	2.67	1.16	425.10	24.5
S14	Mountain	0.0360	1.76	1.02	670.50	18.8
S15	Desert/Rangeland	0.0350	1.97	1.05	238.10	23.5
S16	Mountain	0.0330	1.86	0.89	333.30	19.1
S17	Desert/Rangeland	0.0380	2.47	1.05	136.00	30.9
S18	Desert/Rangeland	0.0300	2.42	1.10	59.50	28.8
S20	Desert/Rangeland	0.0300	2.38	0.96	43.30	28.9
S19	Desert/Rangeland	0.0310	1.49	0.67	76.50	19.6
S21	Desert/Rangeland	0.0260	3.71	1.65	56.60	34.6
S22	Mountain	0.0320	2.27	1.14	277.50	22.7
S23	Desert/Rangeland	0.0260	4.60	2.06	43.90	42.9
S24	Desert/Rangeland	0.0260	1.37	0.75	38.00	19.0
X1SUB	Mountain	0.0200	1.75	0.81	320.00	11.0
X2SUB	Mountain	0.0200	1.99	0.99	311.60	12.5
X3SUB	Desert/Rangeland	0.0200	2.27	1.23	196.00	15.6
X4SUB	Desert/Rangeland	0.0200	1.14	0.62	250.00	8.8
X5SUB	Desert/Rangeland	0.0200	1.51	0.85	198.70	11.6
SUBC1	Mountain	0.0200	1.33	0.81	1143.00	7.8
SUBC2	Mountain	0.0200	3.79	2.08	369.40	20.5
SUBC3	Mountain	0.0200	2.18	1.61	403.70	14.8
SUBC4	Mountain	0.0200	2.94	1.85	688.40	15.8
SUBC5	Mountain	0.0200	2.94	1.42	540.80	15.0
SUBC7	Mountain	0.0200	2.46	1.09	561.00	12.6
SUBC8	Desert/Rangeland	0.0220	2.56	1.23	101.60	20.4
SUBC9	Desert/Rangeland	0.0220	2.46	1.37	81.30	21.8
R1	Desert/Rangeland	0.0250	2.94	1.14	112.20	23.3
R2	Mountain	0.0250	3.36	1.47	327.40	22.0
R3	Mountain	0.0300	3.50	2.08	365.70	29.9
U1	Desert/Rangeland	0.0300	2.62	1.67	72.50	33.5
U2	Desert/Rangeland	0.0310	2.75	1.71	58.20	37.1
U3	Desert/Rangeland	0.0340	2.08	1.31	91.30	30.4
U4	Desert/Rangeland	0.0360	2.07	1.19	135.30	28.7
U5	Desert/Rangeland	0.0320	3.34	1.86	163.20	35.0
U6	Mountain	0.0410	1.41	0.80	315.60	20.7
U7	Desert/Rangeland	0.0250	3.34	1.82	49.40	34.1

Summary of MCUHP2 Lag Time Calculation Parameters

SUBBASIN	S-Graph Type	Kn	L miles	Lca miles	Slope ft/mile	Lag mins
S-10A	Desert/Rangeland	0.0300	2.65	1.23	156.60	25.9
S-10B	Desert/Rangeland	0.0300	1.98	1.04	151.50	21.9
S-6A	Desert/Rangeland	0.0300	1.70	0.95	141.20	20.2
S-6B	Desert/Rangeland	0.0300	1.60	0.95	125.00	20.2
S-6C	Desert/Rangeland	0.0300	1.98	1.04	181.80	21.2

Appendix B

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*                                       *                                       *
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *                                       *   U.S. ARMY CORPS OF
ENGINEERS     *
*              JUL   1997               *                                       *   HYDROLOGIC
  INEERING CENTER    *
*              VERSION 4.1              *                                       *         609 SECOND
STREET          *
*                                       *                                       *       DAVIS, CALIFORNIA
95616       *
*  RUN DATE   08OCT98  TIME  08:10:08   *                                       *           (916) 756-1104
*                                       *                                       *
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X     X  XXXXXXX   XXXXX           X
X     X  X        X     X         XX
X     X  X        X               X
XXXXXXX  XXXX     X        XXXXX  X
X     X  X        X               X
X     X  X        X     X         X
X     X  XXXXXXX   XXXXX          XXX
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THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

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

THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION

NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM


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LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
    1         ID    FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
    2         ID
    3         ID    SKUNK CREEK FOODPLAIN DELINEATION STUDY
    4         ID    CAP AQUEDUCT THROUGH TOWN OF NEW RIVER
    5         ID
    6         ID    100-YEAR 24-HOUR FLOOD HYDROLOGY
    7         ID
    8         ID                METHODS OF STUDY:
    9         ID    - FCD STORM PATTERNS
   10         ID    - FCD PHOENIX AREA S-GRAPHS
   11         ID    - GREEN-AMPT LOSSES
   12         ID    - MUSKINGUM STREAM ROUTING
   13         ID    - FCD DDMS PROGRAM (VER 1.1, AUG 1995) USED TO COMPUTE PARAMETERS
   14         ID
   15         ID    INPUT FILE NAME - SC100Y24.DAT
   16         ID
   17         ID    MONTGOMERY WATSON
   18         ID    MARCH 1996
   19         ID
   20         ID   ********************************************************************************
   21         ID   *MODIFIED BY FLOOD CONTROL DISTRICT BY DOING: SPLIT BASIN S6 UP INTO 3 NEW *
   22         ID   *BASINS, S-6A, S-6B, AND S-6C. ALSO SPLIT BASIN S10 INTO S-10A AND S-10B.  *
   23         ID   *ADDED THE NEW ROUTINGS FOR THESE SPLIT BASINS USING THE ASSUMPTIONS OF    *
   24         ID   *MONTGOMERY WATSON.                                                        *
   25         ID   *BASINS S-11, S-12 AND S-13 ADDED TO MODEL ON 10/8/98 BECAUSE FLOODPLAIN   *
   26         ID   *DELINEATION WILL ALSO INCLUDE WASH IN BASIN S-12
   27         ID   ********************************************************************************
   28         ID
   29         ID   DDM MCUHP2 SKUNK CREEK FOODPLAIN DELINEATION STUDY
              *DIAGRAM
   30         IT       5 05JAN96    0000     300
   31         IN      15
   32         IO       5
              *  THE FOLLOWING JD CARDS DESCRIBE A PRECIP DEPTH/AREA CURVE FOR HEC-1.
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                * THE JD CARD DATA IS DERIVED FROM DARF DATA GIVEN IN THE MARICOPA COUNTY
                * DRAINAGE DESIGN MANUAL (TBL 2.2).  USING THE JD CARDS HEC-1 APPLIES THE
                * CORRECT DARF TO POINT RAINFALL VALUES FOR EACH CONCENTRATION POINT.
     33         JD   4.602    .001
                * THE FOLLOWING PC RECORD USED A 24-HOUR SCS TYPE II RAINFALL
     34         PC    .000    .002    .005    .008    .011    .014    .017    .020    .023    .026
     35         PC    .029    .032    .035    .038    .041    .044    .048    .052    .056    .060
     36         PC    .064    .068    .072    .076    .080    .085    .090    .095    .100    .105
     37         PC    .110    .115    .120    .126    .135    .142    .150    .158    .166    .175
     38         PC    .184    .195    .209    .224    .243    .266    .318    .479    .678    .716
     39         PC    .743    .764    .781    .795    .808    .818    .828    .837    .844    .851
     40         PC    .858    .865    .871    .877    .883    .889    .895    .900    .905    .910
     41         PC    .915    .919    .923    .927    .931    .935    .939    .943    .947    .951
     42         PC    .954    .957    .960    .963    .966    .969    .972    .975    .978    .981
     43         PC    .984    .987    .990    .993    .996    .999   1.000
     44         JD   4.574      1
     45         JD   4.464      5
     46         JD   4.326     10
     47         JD   4.188     20
     48         JD   4.142     30
     49         JD   4.050     40
1                                        HEC-1 INPUT                                        PAGE  2

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

     50         JD   4.004     50
     51         JD   3.949     65
                * DDM   ***** Updated *****

     52         KK      S1
     53         KM   BASIN S1
     54         KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
     55         KM    L=      2.5  Lca=       .9   S=  535.5  Kn= .040  LAG=  24.0
     56         KM    PHOENIX MOUNTAIN S-GRAPH WAS USED FOR THIS BASIN
     57         BA    2.08
     58         LG     .22     .38    6.40     .14    6.00
     59         UI    292.    975.   1892.   2662.   2623.   1696.   1381.   1093.    796.    657.
     60         UI    486.    358.    293.    224.    156.    143.     92.     56.     56.     56.
     61         UI     56.     56.      0.      0.      0.      0.      0.      0.      0.      0.
     62         UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
                * DDM   ***** Preserved *****

     63         KK     S1R
     64         KM    ROUTE S1 THROUGH S2
     65         RM       4    0.31    0.35
                * DDM   ***** Updated *****

     66         KK      S2
     67         KM   BASIN S2
     68         KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
     69         KM    L=      2.2  Lca=      1.1   S=  384.2  Kn= .036  LAG=  23.4
     70         KM    PHOENIX MOUNTAIN S-GRAPH WAS USED FOR THIS BASIN
     71         BA    1.17
     72         LG     .18     .35    7.00     .11    7.00
     73         UI    169.    592.   1118.   1615.   1407.    953.    770.    600.    436.    362.
     74         UI    251.    198.    152.    120.     83.     83.     33.     32.     32.     32.
     75         UI     32.      0.      0.      0.      0.      0.      0.      0.      0.      0.
     76         UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
                * DDM   ***** Preserved *****

     77         KK     S2C
     78         KM    COMBINE S1+S2
     79         HC       2
                * DDM   ***** Updated *****

     80         KK      S3
     81         KM   BASIN S3
     82         KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
     83         KM    L=      2.3  Lca=      1.1   S=  331.3  Kn= .035  LAG=  23.5
     84         KM    PHOENIX MOUNTAIN S-GRAPH WAS USED FOR THIS BASIN
     85         BA    1.03
     86         LG     .17     .39    5.70     .19    4.00
     87         UI    148.    513.    974.   1398.   1248.    837.    677.    529.    385.    320.
     88         UI    222.    174.    135.    108.     72.     72.     32.     28.     28.     28.
     89         UI     28.      0.      0.      0.      0.      0.      0.      0.      0.      0.
     90         UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
                * DDM   ***** Preserved *****
                                         HEC-1 INPUT                                       PAGE  3

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

     91         KK     S3C
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 92          KM    COMBINE S3+S2C (SUBAREAS S1-S3)
 93          HC       2
             * DDM   ***** Preserved *****

 94          KK     S3R
 95          KM    ROUTE S3C THROUGH S6A, APPROXIMATELY 5,000 FEET TO THE SOUTH
 96          KM    (RM RECORDS WILL HAVE TO BE CHANGED STILL)
 97          RM       3    0.25    0.30
             * DDM   ***** Preserved *****

 98          KK    S-6A
 99          KM   BASIN S-6A
100          KM    BASIN ADDED TO MODEL ON 7/30/98. THIS BASIN IN A SUB-WATERSHED OF S-6.
101          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
102          KM    L=       1.7  Lca=        .9   S=  141.2  Kn= .030  LAG=  20.2
103          KM    DESERT/RANGELAND S-GRAPH WAS USED FOR THE BASIN
104          BA     .21
105          LG     .23     .35    7.00     .12    4.00
106          UI     39.    153.    274.    330.    286.    190.    124.     79.     53.     33.
107          UI     24.      9.      8.      8.      0.      0.      0.      0.      0.      0.
108          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.

109          KK   CPS6A
110          KM   COMBINE FLOWS IN SKUNK CREEK APPROXIMATELY 5,000 FEET SOUTH OF COMBINATION
111          KM   POINT S3C.
112          HC       2
             * DDM   ***** Updated *****

113          KK      S4
114          KM   BASIN S4
115          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
116          KM    L=       2.3  Lca=       1.1   S=  588.7  Kn= .040  LAG=  24.4
117          KM    PHOENIX MOUNTAIN S-GRAPH WAS USED FOR THIS BASIN
118          BA     .97
119          LG     .20     .39    5.70     .19     .00
120          UI    134.    437.    853.   1188.   1253.    794.    648.    517.    381.    309.
121          UI    241.    170.    144.    103.     80.     66.     53.     26.     26.     26.
122          UI     26.     26.      0.      0.      0.      0.      0.      0.      0.      0.
123          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
             * DDM   ***** Updated *****

124          KK      S5
125          KM   BASIN S5
126          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
127          KM    L=       2.9  Lca=       1.8   S=  618.6  Kn= .043  LAG=  34.0
128          KM    PHOENIX MOUNTAIN S-GRAPH WAS USED FOR THIS BASIN
129          BA    1.85
130          LG     .23     .39    5.70     .18     .00
131          UI    183.    333.    782.   1176.   1442.   2021.   1475.   1109.    962.    830.
132          UI    702.    564.    461.    409.    335.    259.    220.    201.    142.    140.
133          UI     93.     90.     90.     49.     35.     35.     35.     35.     35.     35.
134          UI     35.      0.      0.      0.      0.      0.      0.      0.      0.      0.
135          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
             * DDM   ***** Preserved *****
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LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

136          KK     S5C
137          KM    COMBINE S4+S5
138          HC       2
             * DDM   ***** Preserved *****

139          KK     S5R
140          KM    ROUTE S5C THROUGH S6B TO A POINT JUST OUTSIDE OF SKUNK CREEK. THIS POINT IS
141          KM   APPROXIMATELY 8,500 FEET SOUTHWEST OF CONCENTRATION POINT S5C.
142          KM    (ROUTING WILL HAVE TO BE CHANGED
143          RM       4    0.35    0.30
             * DDM   ***** Preserved *****

144          KK    S-6B
145          KM   BASIN S-6B
146          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
147          KM    L=       1.6  Lca=        .9   S=  125.0  Kn= .030  LAG=  20.2
148          KM    DESERT/RANGELAND S-GRAPH WAS USED FOR THE BASIN
149          BA     .38
150          LG     .23     .36    6.80     .14    2.00
151          UI     73.    281.    504.    606.    526.    350.    228.    146.     97.     60.
152          UI     44.     17.     16.     16.      0.      0.      0.      0.      0.      0.
153          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
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154          KK   CPS6B
155          KM    COMBINE FLOWS FROM SUBBASINS S-4, S-5 AND S-6B JUST OUTSIDE OF SKUNK CREEK
156          KM    APPROXIMATELY 8,500 FEET SOUTHWEST OF CONCENTRATION POINT S5C.
157          HC       2
             *

158          KK  CS6A-B
159          KM   COMBINE FLOWS FROM CONCENTRATION POINT CPS6B AND CONCENTRATION POINT CPS6A
160          KM   IN SKUNK CREEK. FROM HERE THEY WILL BE ROUTED TO SUBBASIN S-6C
161          HC       2
             *
             * DDM   ***** Preserved *****

162          KK  S6AB-R
163          KM    ROUTE FLOWS IN SKUNK CREEK TO SUBBASIN S-6C. ROUTING DISTANCE IS APPROXIMATE
164          KM    2,500 FEET TO THE SOUTH
165          KM   (RM RECORDS WILL HAVE TO BE CHANGED)
166          RM       1    0.08    0.25
             * DDM   ***** Preserved *****

167          KK    S-6C
168          KM   BASIN S-6C
169          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
170          KM    L=      2.0  Lca=      1.0   S=  181.8  Kn= .030  LAG=  21.2
171          KM    DESERT/RANGELAND S-GRAPH WAS USED FOR THE BASIN
172          BA     .34
173          LG     .23     .35    7.00     .12     .00
174          UI     57.    226.    409.    510.    475.    332.    221.    144.     96.     64.
175          UI     40.     27.     13.     13.     13.      0.      0.      0.      0.      0.
176          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
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LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

177          KK   CS-6C
178          KM   COMBINE FLOWS FROM ALL THE S-6 SUBBASINS IN SKUNK CREEK. THIS IS APPROXIMATEY
179          KM   WHERE NEW RIVER ROAD CROSSES SKUNK CREEK.
180          HC       2
             *

181          KK   RS-6C
182          KM   ROUTE CONCENTRATION POINT CS-6C TO THE SOUTH IN SKUNK, THROUGH SUBBASIN S-10A
183          KM   ROUTING DISTANCE IS APPROXIMATELY 5,500 FEET TO THE SOUTH.
184          KM   (RM RECORDS WILL HAVE TO BE CHANGED)
185          RM       2     .18     .25
             * DDM   ***** Preserved *****

186          KK   S-10A
187          KM   BASIN S-10A
188          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
189          KM    L=      2.7  Lca=      1.2   S=  156.6  Kn= .030  LAG=  25.9
190          KM    DESERT/RANGELAND S-GRAPH WAS USED FOR THE BASIN
191          BA    1.14
192          LG     .17     .39    6.20     .17    2.00
193          UI    148.    445.    903.   1260.   1417.   1306.    970.    696.    497.    351.
194          UI    254.    178.    125.    102.     46.     36.     36.     36.     36.      0.
195          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
196          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
             *

197          KK  C-S10a
198          KM    COMBINE FLOWS FROM ROUTED FLOW RS-6C AND SUBBASIN S-10A. POINT IS IN SKUNK
199          KM   CREEK, 5,500 FEET SOUTH OF WHERE NEW RIVER ROAD CROSSES SKUNK CREEK.
200          HC       2
             * DDM   ***** Updated *****

201          KK      S7
202          KM   BASIN S7
203          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
204          KM    L=      2.1  Lca=      1.3   S=  136.4  Kn= .031  LAG=  25.5
205          KM    DESERT/RANGELAND S-GRAPH WAS USED FOR THE BASIN
206          BA     .68
207          LG     .15     .32    7.60     .09    4.00
208          UI     90.    278.    556.    774.    863.    777.    571.    406.    288.    202.
209          UI    149.    100.     69.     59.     22.     22.     22.     22.    -0.      0.
210          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
             * DDM   ***** Updated *****

211          KK      S8
212          KM   BASIN S8
213          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
```

```
214          KM    L=      1.9  Lca=      1.0   S=  207.2  Kn= .034  LAG=  22.9
215          KM    DESERT/RANGELAND S-GRAPH WAS USED FOR THE BASIN
216          BA    1.12
217          LG     .17     .39    5.70     .19     .00
218          UI    165.    611.   1147.   1509.   1531.   1190.    814.    554.    375.    268.
219          UI    173.    113.     77.     40.     40.     40.      0.      0.      0.      0.
220          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
             * DDM   ***** Preserved *****
```



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

221          KK     S8C
222          KM    COMBINE S7+S8
223          HC       2
             * DDM   ***** Preserved *****

224          KK    S8CR
225          KM    ROUTE S8C THROUGH S10A
226          RM       2    0.14    0.25
             *

227          KK  CP10Aa
228          KM   COMBINE FLOWS FROM SUBBASINS S-7 AND S-8 WITH FLOWS FROM SUBBASIN S-10A AND
229          KM   THE ROUTED FLOWS THAT CAME DOWN FROM THE NORTH IN SKUNK CREEK
230          KM   THE POINT IS IN SKUNK CREEK
231          HC       2
             * DDM   ***** Updated *****

232          KK      S9
233          KM   BASIN S9
234          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
235          KM    L=      2.3  Lca=       .9   S=  329.0  Kn= .044  LAG=  27.9
236          KM    PHOENIX MOUNTAIN S-GRAPH WAS USED FOR THIS BASIN
237          BA    1.02
238          LG     .20     .39    5.70     .19     .00
239          UI    123.    321.    680.    925.   1329.    913.    702.    590.    484.    372.
240          UI    299.    254.    185.    149.    126.     94.     76.     60.     60.     27.
241          UI     24.     24.     24.     24.     24.      0.      0.      0.      0.      0.
242          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
             * DDM   ***** Preserved *****

243          KK     S9R
244          KM    ROUTE S9 THROUGH S10B. ROUTING LENGTH IS APPROXIMATELY 8000 FEET
245          KM    DID NOT CHANGE THESE PARAMETERS FROM ORIGINAL SUPPLIED BY CONSULTANTS
246          RM       3    0.25    0.30
             * DDM   ***** Preserved *****

247          KK   S-10B
248          KM   BASIN S-10B
249          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
250          KM    L=      2.0  Lca=      1.0   S=  151.5  Kn= .030  LAG=  21.9
251          KM    DESERT/RANGELAND S-GRAPH WAS USED FOR THE BASIN
252          BA     .66
253          LG     .17     .38    5.40     .23    1.00
254          UI    101.    403.    740.    943.    916.    664.    447.    300.    199.    133.
255          UI     88.     68.     25.     25.     25.     25.      0.      0.      0.      0.
256          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
             *

257          KK  C-S10B
258          KM   COMBINE THE FLOW COMING SOUTH FROM SUBBASIN S-9 AND THE FLOW FROM SUBBASIN
259          KM   S-10B. THIS POINT IS LOCATED AT THE NEW RIVER ROAD, APPROXIMATELY 800 FEET
260          KM   EAST OF SKUNK CREEK
261          HC       2
             *
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```
LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9.....10

262          KK  RS-10B
263          KM   ROUTE THE FLOW FROM THE POINT C-S10B TO SKUNK CREEK, WHERE IT WILL BE
264          KM   COMBINED WITH THE OTHER FLOWS AND ROUTED TO SUBBASIN S-13
265          KM   FLOW LENGTH IS APPROXIMATELY 800 FEET
266          KM   (THE RM CARDS WILL HAVE TO BE EXAMINED FOR RESONABLENESS)
267          RM       1     .02     .30
             *

268          KK   F-10A
269          KM   THE FINAL CONCENTRATION POINT FOR THE 3 TRIBUTARY STUDY
270          KM   THIS POINT IS IN SKUNK CREEK
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```
 271          HC       2
              * DDM   ***** Preserved *****

 272          KK    S10R
 273          KM    ROUTE S10C THROUGH S13
 274          RM       1    0.09    0.25
              * DDM   ***** Updated *****

 275          KK     S13
 276          KM   BASIN S13
 277          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 278          KM    L=      2.7  Lca=      1.2   S=  425.1  Kn= .035  LAG=  24.5
 279          KM    PHOENIX MOUNTAIN S-GRAPH WAS USED FOR THIS BASIN
 280          BA    1.27
 281          LG     .22     .37    5.30     .23   20.00
 282          UI    175.    567.   1109.   1541.   1652.   1043.    851.    680.    503.    406.
 283          UI    318.    227.    191.    134.    108.     86.     73.     34.     34.     34.
 284          UI     34.     34.      0.      0.      0.      0.      0.      0.      0.      0.
 285          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
              * DDM   ***** Updated *****

 286          KK     S11
 287          KM   BASIN S11
 288          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 289          KM    L=      2.7  Lca=      1.3   S=  438.1  Kn= .037  LAG=  26.9
 290          KM    PHOENIX MOUNTAIN S-GRAPH WAS USED FOR THIS BASIN
 291          BA     .92
 292          LG     .20     .39    5.70     .19     .00
 293          UI    115.    317.    664.    896.   1241.    783.    631.    523.    422.    315.
 294          UI    265.    210.    154.    129.     98.     84.     56.     56.     36.     22.
 295          UI     22.     22.     22.     22.      0.      0.      0.      0.      0.      0.
 296          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
              * DDM   ***** Preserved *****

 297          KK    S11R
 298          KM    ROUTE S11 THROUGH S12
 299          RM       3    0.24    0.30
              * DDM   ***** Updated *****
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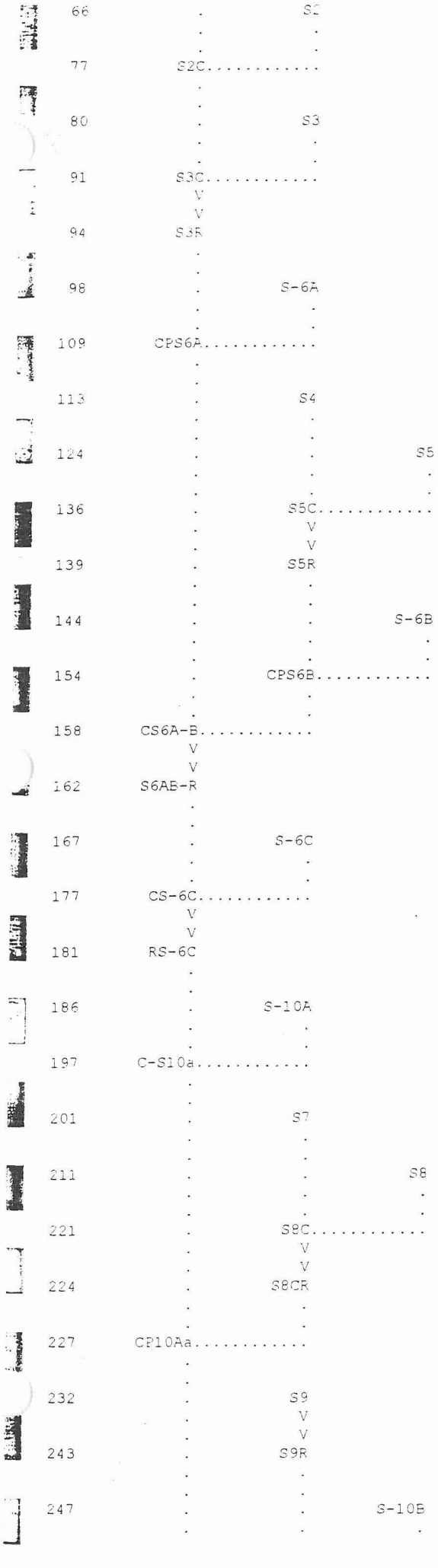
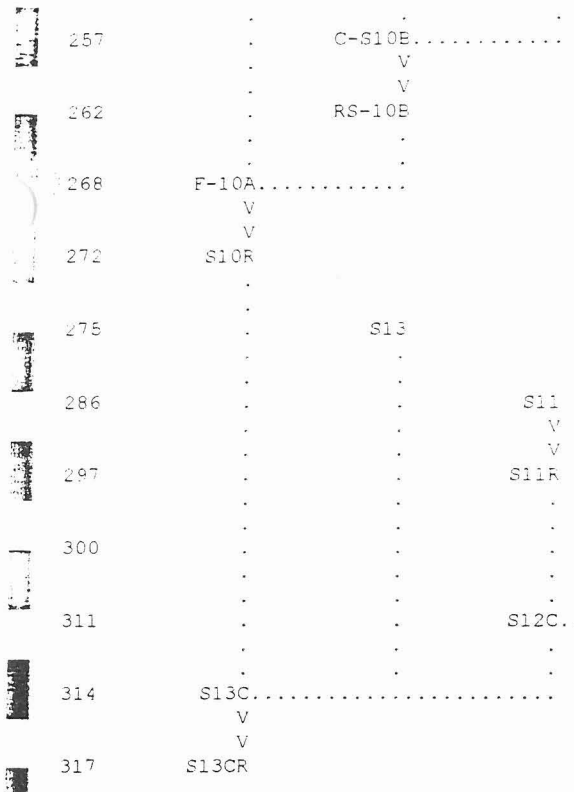
```
LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

 300          KK     S12
 301          KM   BASIN S12
 302          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 303          KM    L=      2.8  Lca=      1.3   S=  123.2  Kn= .031  LAG=  29.1
 304          KM    DESERT/RANGELAND S-GRAPH WAS USED FOR THE BASIN
 305          BA     .91
 306          LG     .15     .32    7.60     .09    1.00
 307          UI    105.    257.    558.    811.    971.    995.    868.    652.    482.    359.
 308          UI    262.    195.    146.    109.     72.     67.     26.     26.     26.     26.
 309          UI     26.      0.      0.      0.      0.      0.      0.      0.      0.      0.
 310          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
              * DDM   ***** Preserved *****

 311          KK    S12C
 312          KM    COMBINE S11R+S12 (SUBAREAS S11 AND S12)
 313          HC       2
              * DDM   ***** Preserved *****

 314          KK    S13C
 315          KM    COMBINE S10R+S13+S12C       (SUBAREAS S1-S13)
 316          HC       3
              * DDM   ***** Preserved *****

 317          KK   S13CR
 318          KM    ROUTE S13C THROUGH S14
 319          RM       2    0.15    0.25
 320          ZZ
```

SCHEMATIC DIAGRAM OF STREAM NETWORK

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

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

   52          S1
               V
               V
   63          S1R
               .
               .
```


66
S2
77
S2C
80
S3
91
S3C
94
S3R
98
S-6A
109
CPS6A
113
S4
124
S5
136
S5C
139
S5R
144
S-6B
154
CPS6B
158
CS6A-B
162
S6AB-R
167
S-6C
177
CS-6C
181
RS-6C
186
S-10A
197
C-S10a
201
S7
211
S8
221
S8C
224
S8CR
227
CP10Aa
232
S9
243
S9R
247
S-10B



(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
1*****************************************
 ***************************************
*                                       *                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *                                       *    U.S. ARMY CORPS OF
ENGINEERS     *
*              JUL   1997               *                                       *    HYDROLOGIC
   INEERING CENTER    *
            VERSION 4.1                 *                                       *          609 SECOND
STREET          *
*                                       *                                       *       DAVIS, CALIFORNIA
5616       *
*  RUN DATE   08OCT98  TIME  08:10:08   *                                       *           (916) 756-1104
*                                       *                                       *
 ***************************************
*****************************************
```

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

SKUNK CREEK FOODPLAIN DELINEATION STUDY
CAP AQUEDUCT THROUGH TOWN OF NEW RIVER

100-YEAR 24-HOUR FLOOD HYDROLOGY

METHODS OF STUDY:
- FCD STORM PATTERNS
- FCD PHOENIX AREA S-GRAPHS
- GREEN-AMPT LOSSES
- MUSKINGUM STREAM ROUTING
- FCD DDMS PROGRAM (VER 1.1, AUG 1995) USED TO COMPUTE PARAMETERS

INPUT FILE NAME - SC100Y24.DAT

MONTGOMERY WATSON
MARCH 1996

```
*********************************************************************************
*MODIFIED BY FLOOD CONTROL DISTRICT BY DOING: SPLIT BASIN S6 UP INTO 3 NEW       *
*BASINS, S-6A, S-6B, AND S-6C. ALSO SPLIT BASIN S10 INTO S-10A AND S-10B.        *
*ADDED THE NEW ROUTINGS FOR THESE SPLIT BASINS USING THE ASSUMPTIONS OF          *
*MONTGOMERY WATSON.                                                              *
*BASINS S-11, S-12 AND S-13 ADDED TO MODEL ON 10/8/98 BECAUSE FLOODPLAIN         *
*DELINEATION WILL ALSO INCLUDE WASH IN BASIN S-12
```

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

                    DDM MCUHP2 SKUNK CREEK FOODPLAIN DELINEATION STUDY

 32 IO          OUTPUT CONTROL VARIABLES
                      IPRNT          5  PRINT CONTROL
                      IPLOT          0  PLOT CONTROL
                      QSCAL         0.  HYDROGRAPH PLOT SCALE

    IT          HYDROGRAPH TIME DATA
                       NMIN          5  MINUTES IN COMPUTATION INTERVAL
                      IDATE    5JAN96   STARTING DATE
                      ITIME       0000  STARTING TIME
                         NQ        300  NUMBER OF HYDROGRAPH ORDINATES
                     NDDATE    6JAN96   ENDING DATE
                     NDTIME       0055  ENDING TIME
                      ICENT         19  CENTURY MARK

                 COMPUTATION INTERVAL      .08 HOURS
                      TOTAL TIME BASE    24.92 HOURS

        ENGLISH UNITS
             DRAINAGE AREA            SQUARE MILES
             PRECIPITATION DEPTH      INCHES
             LENGTH, ELEVATION        FEET
             FLOW                     CUBIC FEET PER SECOND
             STORAGE VOLUME           ACRE-FEET
             SURFACE AREA             ACRES
             TEMPERATURE              DEGREES FAHRENHEIT

 33 JD          INDEX STORM NO. 1
                      STRM        4.60  PRECIPITATION DEPTH
                      TRDA         .00  TRANSPOSITION DRAINAGE AREA

 34 PI           PRECIPITATION PATTERN
                     .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                     .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                     .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                     .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                     .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
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                     .00       .00       .00       .00       .00       .00       .01       .01       .01       .01
                     .01       .01       .01       .01       .01       .02       .02       .02       .05       .05
                     .05       .07       .07       .07       .01       .01       .01       .01       .01       .01
                     .01       .01       .01       .01       .01       .01       .00       .00       .00       .00
                     .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                     .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
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                     .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                     .00       .00       .00       .00       .00       .00       .00       .00

 44 JD          INDEX STORM NO. 2
                      STRM        4.57  PRECIPITATION DEPTH
                      TRDA        1.00  TRANSPOSITION DRAINAGE AREA

  0 PI           PRECIPITATION PATTERN
                     .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                     .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                     .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                     .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                     .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                     .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                     .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                     .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                     .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                     .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                     .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                     .00       .00       .00       .00       .00       .00       .00       .00       .00       .00
                     .00       .00       .00       .00       .00       .00       .01       .01       .01       .01
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.01	.01	.01	.01	.01	.02	.02	.02	.05	.05
.05	.07	.07	.07	.01	.01	.01	.01	.01	.01
.01	.01	.01	.01	.01	.01	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
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.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00

45 JD INDEX STORM NO. 3

STRM 4.46 PRECIPITATION DEPTH

TRDA 5.00 TRANSPOSITION DRAINAGE AREA

0 PI PRECIPITATION PATTERN

.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.01	.01	.01	.01
.01	.01	.01	.01	.01	.02	.02	.02	.05	.05
.05	.07	.07	.07	.01	.01	.01	.01	.01	.01
.01	.01	.01	.01	.01	.01	.00	.00	.00	.00
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.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00

46 JD INDEX STORM NO. 4

STRM 4.33 PRECIPITATION DEPTH

TRDA 10.00 TRANSPOSITION DRAINAGE AREA

0 PI PRECIPITATION PATTERN

.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
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.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.01	.01	.01	.01
.01	.01	.01	.01	.01	.02	.02	.02	.05	.05
.05	.07	.07	.07	.01	.01	.01	.01	.01	.01
.01	.01	.01	.01	.01	.01	.00	.00	.00	.00
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47 JD INDEX STORM NO. 5

STRM 4.19 PRECIPITATION DEPTH

TRDA 20.00 TRANSPOSITION DRAINAGE AREA

0 PI PRECIPITATION PATTERN

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.05	.07	.07	.07	.01	.01	.01	.01	.01	.01
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48 JD INDEX STORM NO. 6

STRM 4.14 PRECIPITATION DEPTH

TRDA 30.00 TRANSPOSITION DRAINAGE AREA

0 PI PRECIPITATION PATTERN

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49 JD INDEX STORM NO. 7

STRM 4.05 PRECIPITATION DEPTH

TRDA 40.00 TRANSPOSITION DRAINAGE AREA

0 PI PRECIPITATION PATTERN

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50 JD INDEX STORM NO. 8

STRM 4.00 PRECIPITATION DEPTH

TRDA 50.00 TRANSPOSITION DRAINAGE AREA

0 PI PRECIPITATION PATTERN

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51 JD INDEX STORM NO. 9

STRM 3.95 PRECIPITATION DEPTH

TRDA 65.00 TRANSPOSITION DRAINAGE AREA

0 PI PRECIPITATION PATTERN

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WARNING EXCESS AT PONDING LESS THAN ZERO FOR PERIOD. EXCESS SET TO ZERO

***** WARNING ***** POSSIBLE INSTABILITIES IN THE MUSKINGUM ROUTING FOR REACH RS-10B.
REDUCE NSTPS OR DECREASE YOUR COMPUTATION INTERVAL (FIRST FIELD OF THE IT RECORD).

***** WARNING ***** POSSIBLE INSTABILITIES IN THE MUSKINGUM ROUTING FOR REACH RS-10B.
REDUCE NSTPS OR DECREASE YOUR COMPUTATION INTERVAL (FIRST FIELD OF THE IT RECORD).

***** WARNING ***** POSSIBLE INSTABILITIES IN THE MUSKINGUM ROUTING FOR REACH RS-10B.
REDUCE NSTPS OR DECREASE YOUR COMPUTATION INTERVAL (FIRST FIELD OF THE IT RECORD).

***** WARNING ***** POSSIBLE INSTABILITIES IN THE MUSKINGUM ROUTING FOR REACH RS-10B.
REDUCE NSTPS OR DECREASE YOUR COMPUTATION INTERVAL (FIRST FIELD OF THE IT RECORD).

***** WARNING ***** POSSIBLE INSTABILITIES IN THE MUSKINGUM ROUTING FOR REACH RS-10B.
REDUCE NSTPS OR DECREASE YOUR COMPUTATION INTERVAL (FIRST FIELD OF THE IT RECORD).

***** WARNING ***** POSSIBLE INSTABILITIES IN THE MUSKINGUM ROUTING FOR REACH RS-10B.
REDUCE NSTPS OR DECREASE YOUR COMPUTATION INTERVAL (FIRST FIELD OF THE IT RECORD).

***** WARNING ***** POSSIBLE INSTABILITIES IN THE MUSKINGUM ROUTING FOR REACH RS-10B.
REDUCE NSTPS OR DECREASE YOUR COMPUTATION INTERVAL (FIRST FIELD OF THE IT RECORD).

***** WARNING ***** POSSIBLE INSTABILITIES IN THE MUSKINGUM ROUTING FOR REACH RS-10B.
REDUCE NSTPS OR DECREASE YOUR COMPUTATION INTERVAL (FIRST FIELD OF THE IT RECORD).

***** WARNING ***** POSSIBLE INSTABILITIES IN THE MUSKINGUM ROUTING FOR REACH RS-10B.
REDUCE NSTPS OR DECREASE YOUR COMPUTATION INTERVAL (FIRST FIELD OF THE IT RECORD).

WARNING EXCESS AT PONDING LESS THAN ZERO FOR PERIOD. EXCESS SET TO ZERO

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

OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	MAX TIME OF ?GE
HYDROGRAPH AT	S1	2911.	12.17	389.	102.	98.	2.08		
ROUTED TO	S1R	2737.	12.50	388.	102.	98.	2.08		
HYDROGRAPH AT	S2	1738.	12.17	240.	63.	61.	1.17		
2 COMBINED AT	S2C	3760.	12.33	619.	162.	156.	3.25		
HYDROGRAPH AT	S3	1415.	12.17	179.	46.	45.	1.03		
2 COMBINED AT	S3C	4899.	12.25	788.	206.	198.	4.28		
ROUTED TO	S3R	4710.	12.50	788.	206.	198.	4.28		
HYDROGRAPH AT	S-6A	347.	12.08	40.	10.	10.	.21		
2 COMBINED AT	CPS6A	4818.	12.50	826.	215.	208.	4.49		
HYDROGRAPH AT	S4	1295.	12.17	161.	40.	39.	.97		
HYDROGRAPH AT	S5	2007.	12.25	307.	77.	74.	1.85		
2 COMBINED AT	S5C	3169.	12.25	461.	115.	111.	2.82		
ROUTED TO	S5R	2980.	12.58	461.	115.	111.	2.82		
HYDROGRAPH AT									

	S-6B	622.	12.08	70.	18.	17.	.38
2 COMBINED AT	CPS6B	3110.	12.58	527.	132.	127.	3.20
2 COMBINED AT	CS6A-B	7678.	12.50	1305.	335.	323.	7.69
ROUTED TO	S6AB-R	7589.	12.58	1305.	335.	323.	7.69
HYDROGRAPH AT	S-6C	549.	12.08	64.	16.	15.	.34
2 COMBINED AT	CS-6C	7704.	12.58	1361.	349.	336.	8.03
ROUTED TO	RS-6C	7487.	12.75	1361.	349.	336.	8.03
HYDROGRAPH AT	S-10A	1605.	12.17	198.	50.	48.	1.14
2 COMBINED AT	C-S10a	7727.	12.75	1531.	392.	378.	9.17
HYDROGRAPH AT	S7	1061.	12.17	146.	37.	36.	.68
HYDROGRAPH AT	S8	1650.	12.17	186.	47.	45.	1.12
2 COMBINED AT	S8C	2685.	12.17	327.	83.	80.	1.80
ROUTED TO	S8CR	2567.	12.33	327.	83.	80.	1.80
2 COMBINED AT	CP10Aa	8525.	12.67	1813.	464.	447.	10.97
HYDROGRAPH AT	S9	1254.	12.17	169.	42.	41.	1.02
ROUTED TO	S9R	1190.	12.42	169.	42.	41.	1.02
HYDROGRAPH AT	S-10B	964.	12.17	106.	27.	26.	.66
2 COMBINED AT	C-S10B	1798.	12.25	272.	68.	66.	1.68
ROUTED TO	RS-10B	1787.	12.25	272.	68.	66.	1.68
2 COMBINED AT	F-10A	9611.	12.50	2041.	521.	502.	12.65
ROUTED TO	S10R	9561.	12.67	2041.	521.	502.	12.65
HYDROGRAPH AT	S13	1734.	12.17	249.	71.	69.	1.27
HYDROGRAPH AT	S11	1161.	12.17	153.	38.	37.	.92
ROUTED TO	S11R	1104.	12.42	153.	38.	37.	.92
HYDROGRAPH AT	S12	1307.	12.25	190.	48.	46.	.91
2 COMBINED AT	S12C	2246.	12.33	338.	85.	82.	1.83
3 COMBINED AT	S13C	11757.	12.50	2536.	653.	629.	15.75
ROUTED TO	S13CR	11617.	12.67	2536.	653.	629.	15.75

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

Appendix C

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*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
ENGINEERS      *
*             JUL   1997                *
'ER    *
*          VERSION 4.1                  *
*                                       *
5616       *
*  RUN DATE   08OCT98  TIME  08:58:08   *
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*                                       *
*    U.S. ARMY CORPS OF                 *
*    HYDROLOGIC ENGINEERING             *
*         609 SECOND STREET             *
*       DAVIS, CALIFORNIA               *
*           (916) 756-1104              *
*                                       *
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X      X  X        X     X          X
X      X  XXXXXXX   XXXXX           XXX
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THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

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

THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77
ERSION

NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

HEC-1 INPUT PAGE 1

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LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
    1         ID    FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
    2         ID
    3         ID    SKUNK CREEK FOODPLAIN DELINEATION STUDY
    4         ID    CAP AQUEDUCT THROUGH TOWN OF NEW RIVER
    5         ID
    6         ID    100-YEAR 6-HOUR FLOOD HYDROLOGY
    7         ID
    8         ID                METHODS OF STUDY:
    9         ID    - FCD STORM PATTERNS
   10         ID    - FCD PHOENIX AREA S-GRAPHS
   11         ID    - GREEN-AMPT LOSSES
   12         ID    - MUSKINGUM STREAM ROUTING
   13         ID    - FCD DDMS PROGRAM (VER 1.1, AUG 1995) USED TO COMPUTE PARAMETERS
   14         ID
   15         ID    INPUT FILE NAME - new6h.dat
   16         ID
   17         ID    MONTGOMERY WATSON
   18         ID    MARCH 1996
   19         ID
   20         ID    MODIFIED BY FLOOD CONTROL DISTRICT OF MARICOPA COUNTY ON 8/10/98 FOR THE
   21         ID    THREE TRIBUTARIES FLOOD DELINEATION.
   22         ID    BASINS S11, S12 AND S-13 ADDED TO MODEL ON 10/8/98 BECAUSE WASH IN BASIN
   23         ID    S12 WILL BE DELINEATED ALSO
   24         ID
   25         ID   DDM MCUHP2 SKUNK CREEK FOODPLAIN DELINEATION STUDY
              *DIAGRAM
   26         IT       5 05JAN96    0000     300
   27         IN      15
   28         IO       5
              *  THE FOLLOWING JD CARDS DESCRIBE A PRECIP DEPTH/AREA CURVE FOR HEC-1.
              *  THE JD CARD DATA IS DERIVED FROM DARF DATA GIVEN IN THE MARICOPA COUNTY
              *  DRAINAGE DESIGN MANUAL (TBL 5.2).  USING THE JD CARDS HEC-1 APPLIES THE
              *  CORRECT DARF TO POINT RAINFALL VALUES FOR EACH CONCENTRATION POINT.
   29         JD    3.4     0.01
   30         PC    .000    .008    .016    .025    .033    .041    .050    .058    .066    .074
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```
 31          PC    .087    .099    .118    .138    .216    .377    .834    .911    .931    .950
 32          PC    .962    .972    .983    .991   1.000
 33          JD   3.37    0.50
 34          JD    3.3    2.80
 35          PC    .000    .009    .016    .025    .034    .042    .051    .059    .067    .076
 36          PC    .087    .100    .120    .163    .252    .451    .694    .837    .900    .938
 37          PC    .950    .963    .975    .988   1.000
 38          JD   3.16    16.0
 39          PC    .000    .015    .020    .030    .048    .063    .076    .090    .105    .119
 40          PC    .135    .152    .175    .222    .304    .472    .670    .796    .868    .912
 41          PC    .946    .960    .973    .987   1.000
 42          JD   2.8     90.0
 43          PC    .000    .021    .035    .051    .071    .087    .105    .125    .143    .160
 44          PC    .179    .201    .232    .281    .364    .500    .658    .773    .841    .888
 45          PC    .927    .945    .964    .982   1.000
             * DDM   ***** Updated *****
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HEC-1 INPUT PAGE 2

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

 46          KK      S1
 47          KM   BASIN S1
 48          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 49          KM    L=      2.5  Lca=       .9   S=  535.5  Kn= .040  LAG=  24.0
 50          KM    PHOENIX MOUNTAIN S-GRAPH WAS USED FOR THIS BASIN
 51          BA    2.08
 52          LG     .22     .38    6.40     .14    6.00
 53          UI    292.    975.   1892.   2662.   2623.   1696.   1381.   1093.    796.    657.
 54          UI    486.    358.    293.    224.    156.    143.     92.     56.     56.     56.
 55          UI     56.     56.      0.      0.      0.      0.      0.      0.      0.      0.
 56          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
             * DDM   ***** Preserved *****

 57          KK     S1R
 58          KM    ROUTE S1 THROUGH S2
 59          RM       4    0.31    0.35
             * DDM   ***** Updated *****

 60          KK      S2
 61          KM   BASIN S2
 62          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 63          KM    L=      2.2  Lca=      1.1   S=  384.2  Kn= .036  LAG=  23.4
 64          KM    PHOENIX MOUNTAIN S-GRAPH WAS USED FOR THIS BASIN
 65          BA    1.17
 66          LG     .18     .35    7.00     .11    7.00
 67          UI    169.    592.   1118.   1615.   1407.    953.    770.    600.    436.    362.
 68          UI    251.    198.    152.    120.     83.     83.     33.     32.     32.     32.
 69          UI     32.      0.      0.      0.      0.      0.      0.      0.      0.      0.
 70          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
             * DDM   ***** Preserved *****

 71          KK     S2C
 72          KM    COMBINE S1+S2
 73          HC       2
             * DDM   ***** Updated *****

 74          KK      S3
 75          KM   BASIN S3
 76          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 77          KM    L=      2.3  Lca=      1.1   S=  331.3  Kn= .035  LAG=  23.5
 78          KM    PHOENIX MOUNTAIN S-GRAPH WAS USED FOR THIS BASIN
 79          BA    1.03
 80          LG     .17     .39    5.70     .19    4.00
 81          UI    148.    513.    974.   1398.   1248.    837.    677.    529.    385.    320.
 82          UI    222.    174.    135.    108.     72.     72.     32.     28.     28.     28.
 83          UI     28.      0.      0.      0.      0.      0.      0.      0.      0.      0.
 84          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
             * DDM   ***** Preserved *****
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HEC-1 INPUT PAGE 3

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

 85          KK     S3C
 86          KM    COMBINE S3+S2C (SUBAREAS S1-S3)
 87          HC       2
             * DDM   ***** Preserved *****

 88          KK     S3R
 89          KM    ROUTE S3C THROUGH S6A, APPROXIMATELY 5,000 FEET TO THE SOUTH
 90          KM    (RM RECORDS WILL HAVE TO BE CHANGED STILL)
 91          RM       3    0.27    0.30
             * DDM   ***** Preserved *****
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 92          KK    S-6A
 93          KM   BASIN S-6A
 94          KM    BASIN ADDED TO MODEL ON 7/30/98. THIS BASIN IN A SUB-WATERSHED OF S-6.
 95          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 96          KM    L=      1.7  Lca=       .9   S=  141.2  Kn= .030  LAG=  20.2
 97          KM    DESERT/RANGELAND S-GRAPH WAS USED FOR THE BASIN
 98          BA     .21
 99          LG     .23     .35    7.00     .12    4.00
100          UI     39.    153.    274.    330.    286.    190.    124.     79.     53.     33.
101          UI     24.     9.      8.      8.      0.      0.      0.      0.      0.      0.
102          UI      0.     0.      0.      0.      0.      0.      0.      0.      0.      0.

103          KK   CPS6A
104          KM   COMBINE FLOWS IN SKUNK CREEK APPROXIMATELY 5,000 FEET SOUTH OF COMBINATION
105          KM   POINT S3C.
106          HC      2
             * DDM   ***** Updated *****

107          KK      S4
108          KM   BASIN S4
109          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
110          KM    L=      2.3  Lca=      1.1   S=  588.7  Kn= .040  LAG=  24.4
111          KM    PHOENIX MOUNTAIN S-GRAPH WAS USED FOR THIS BASIN
112          BA     .97
113          LG     .20     .39    5.70     .19     .00
114          UI    134.    437.    853.   1188.   1253.    794.    648.    517.    381.    309.
115          UI    241.    170.    144.    103.     80.     66.     53.     26.     26.     26.
116          UI     26.     26.      0.      0.      0.      0.      0.      0.      0.      0.
117          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
             * DDM   ***** Updated *****

118          KK      S5
119          KM   BASIN S5
120          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
121          KM    L=      2.9  Lca=      1.8   S=  618.6  Kn= .043  LAG=  34.0
122          KM    PHOENIX MOUNTAIN S-GRAPH WAS USED FOR THIS BASIN
123          BA    1.85
124          LG     .23     .39    5.70     .18     .00
125          UI    183.    333.    782.   1176.   1442.   2021.   1475.   1109.    962.    830.
126          UI    702.    564.    461.    409.    335.    259.    220.    201.    142.    140.
127          UI     93.     90.     90.     49.     35.     35.     35.     35.     35.     35.
128          UI     35.      0.      0.      0.      0.      0.      0.      0.      0.      0.
129          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
             * DDM   ***** Preserved *****
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LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

130          KK     S5C
131          KM    COMBINE S4+S5
132          HC      2
             * DDM   ***** Preserved *****

133          KK     S5R
134          KM    ROUTE S5C THROUGH S6B TO A POINT JUST OUTSIDE OF SKUNK CREEK. THIS POINT IS
135          KM   APPROXIMATELY 8,500 FEET SOUTHWEST OF CONCENTRATION POINT S5C.
136          KM    'ROUTING WILL HAVE TO BE CHANGED
137          RM      5    0.38    0.30
             * DDM   ***** Preserved *****

138          KK    S-6B
139          KM   BASIN S-6B
140          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
141          KM    L=      1.6  Lca=       .9   S=  125.0  Kn= .030  LAG=  20.2
142          KM    DESERT/RANGELAND S-GRAPH WAS USED FOR THE BASIN
143          BA     .38
144          LG     .23     .36    6.80     .14    2.00
145          UI     73.    281.    504.    606.    526.    350.    228.    146.     97.     60.
146          UI     44.     17.     16.     16.      0.      0.      0.      0.      0.      0.
147          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
             *

148          KK   CPS6B
149          KM    COMBINE FLOWS FROM SUBBASINS S-4, S-5 AND S-6B JUST OUTSIDE OF SKUNK CREEK
150          KM    APPROXIMATELY 8,500 FEET SOUTHWEST OF CONCENTRATION POINT S5C.
151          HC      2
             *

152          KK  CS6A-B
153          KM    COMBINE FLOWS FROM CONCENTRATION POINT CPS6B AND CONCENTRATION POINT CPS6A
154          KM   IN SKUNK CREEK. FROM HERE THEY WILL BE ROUTED TO SUBBASIN S-6C
155          HC      2
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                *
                * DDM   ***** Preserved *****

  156           KK  S6AB-R
  157           KM    ROUTE FLOWS IN SKUNK CREEK TO SUBBASIN S-6C. ROUTING DISTANCE IS APPROXIMATE
  158           KM    2,500 FEET TO THE SOUTH
  159           KM   (RM RECORDS WILL HAVE TO BE CHANGED)
  160           RM       1    0.09    0.25
                * DDM   ***** Preserved *****

  161           KK    S-6C
  162           KM   BASIN S-6C
  163           KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
  164           KM    L=      2.0  Lca=      1.0   S=  181.8  Kn= .030  LAG=  21.2
  165           KM    DESERT/RANGELAND S-GRAPH WAS USED FOR THE BASIN
  166           BA     .34
  167           LG     .23     .35    7.00     .12     .00
  168           UI     57.    226.    409.    510.    475.    332.    221.    144.     96.     64.
  169           UI     40.     27.     13.     13.     13.      0.      0.      0.      0.      0.
  170           UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
                *
                                          HEC-1 INPUT                                          PAGE  5

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

  171           KK   CS-6C
  172           KM   COMBINE FLOWS FROM ALL THE S-6 SUBBASINS IN SKUNK CREEK. THIS IS APPROXIMATEY
  173           KM   WHERE NEW RIVER ROAD CROSSES SKUNK CREEK.
  174           HC       2
                *

  175           KK   RS-6C
  176           KM   ROUTE CONCENTRATION POINT CS-6C TO THE SOUTH IN SKUNK, THROUGH SUBBASIN S-10A
  177           KM   ROUTING DISTANCE IS APPROXIMATELY 5,500 FEET TO THE SOUTH.
  178           KM   (RM RECORDS WILL HAVE TO BE CHANGED)
  179           RM       2     .20     .25
                * DDM   ***** Preserved *****

  180           KK   S-10A
  181           KM   BASIN S-10A
  182           KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
  183           KM    L=      2.7  Lca=      1.2   S=  156.6  Kn= .030  LAG=  25.9
  184           KM    DESERT/RANGELAND S-GRAPH WAS USED FOR THE BASIN
  185           BA    1.14
  186           LG     .17     .39    6.20     .17    2.00
  187           UI    148.    445.    903.   1260.   1417.   1306.    970.    696.    497.    351.
  188           UI    254.    178.    125.    102.     46.     36.     36.     36.     36.      0.
  189           UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
  190           UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
                *

  191           KK  C-S10a
  192           KM    COMBINE FLOWS FROM ROUTED FLOW RS-6C AND SUBBASIN S-10A. POINT IS IN SKUNK
  193           KM   CREEK, 5,500 FEET SOUTH OF WHERE NEW RIVER ROAD CROSSES SKUNK CREEK.
  194           HC       2
                * DDM   ***** Updated *****

  195           KK      S7
  196           KM   BASIN S7
  197           KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
  198           KM    L=      2.1  Lca=      1.3   S=  136.4  Kn= .031  LAG=  25.5
  199           KM    DESERT/RANGELAND S-GRAPH WAS USED FOR THE BASIN
  200           BA     .68
  201           LG     .15     .32    7.60     .09    4.00
  202           UI     90.    278.    556.    774.    863.    777.    571.    406.    288.    202.
  203           UI    149.    100.     69.     59.     22.     22.     22.     22.      0.      0.
  204           UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
                * DDM   ***** Updated *****

  205           KK      S8
  206           KM   BASIN S8
  207           KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
  208           KM    L=      1.9  Lca=      1.0   S=  207.2  Kn= .034  LAG=  22.9
  209           KM    DESERT/RANGELAND S-GRAPH WAS USED FOR THE BASIN
  210           BA    1.12
  211           LG     .17     .39    5.70     .19     .00
  212           UI    165.    611.   1147.   1509.   1531.   1190.    814.    554.    375.    268.
  213           UI    173.    113.     77.     40.     40.     40.      0.      0.      0.      0.
  214           UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
                * DDM   ***** Preserved *****
                                          HEC-1 INPUT                                          PAGE  6

LINE            ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
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215          KK     S8C
216          KM    COMBINE S7+S8
217          HC       2
             * DDM   ***** Preserved *****

218          KK    S8CR
219          KM    ROUTE S8C THROUGH S10A
220          RM       2    0.14    0.25
             *

221          KK  CP10Aa
222          KM   COMBINE FLOWS FROM SUBBASINS S-7 AND S-8 WITH FLOWS FROM SUBBASIN S-10A AND
223          KM   THE ROUTED FLOWS THAT CAME DOWN FROM THE NORTH IN SKUNK CREEK
224          KM   THE POINT IS IN SKUNK CREEK
225          HC       2
             * DDM   ***** Updated *****

226          KK      S9
227          KM   BASIN S9
228          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
229          KM    L=      2.3  Lca=       .9   S=  329.0  Kn= .044  LAG=  27.9
230          KM    PHOENIX MOUNTAIN S-GRAPH WAS USED FOR THIS BASIN
231          BA    1.02
232          LG     .20     .39    5.70     .19     .00
233          UI    123.    321.    680.    925.   1329.    913.    702.    590.    484.    372.
234          UI    299.    254.    185.    149.    126.     94.     76.     60.     60.     27.
235          UI     24.     24.     24.     24.     24.      0.      0.      0.      0.      0.
236          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
             * DDM   ***** Preserved *****

237          KK     S9R
238          KM    ROUTE S9 THROUGH S10B. ROUTING LENGTH IS APPROXIMATELY 8000 FEET
239          KM    DID NOT CHANGE THESE PARAMETERS FROM ORIGINAL SUPPLIED BY CONSULTANTS
240          RM       3    0.24    0.30
             * DDM   ***** Preserved *****

241          KK   S-10B
242          KM   BASIN S-10B
243          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
244          KM    L=      2.0  Lca=      1.0   S=  151.5  Kn= .030  LAG=  21.9
245          KM    DESERT/RANGELAND S-GRAPH WAS USED FOR THE BASIN
246          BA     .66
247          LG     .17     .38    5.40     .23    1.00
248          UI    101.    403.    740.    943.    916.    664.    447.    300.    199.    133.
249          UI     88.     68.     25.     25.     25.     25.      0.      0.      0.      0.
250          UI      0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
             *

251          KK  C-S10B
252          KM   COMBINE THE FLOW COMING SOUTH FROM SUBBASIN S-9 AND THE FLOW FROM SUBBASIN
253          KM   S-10B. THIS POINT IS LOCATED AT THE NEW RIVER ROAD, APPROXIMATELY 800 FEET
254          KM   EAST OF SKUNK CREEK
255          HC       2
             *
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LINE         ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

256          KK  RS-10B
257          KM   ROUTE THE FLOW FROM THE POINT C-S10B TO SKUNK CREEK, WHERE IT WILL BE
258          KM   COMBINED WITH THE OTHER FLOWS AND ROUTED TO SUBBASIN S-13
259          KM   FLOW LENGTH IS APPROXIMATELY 800 FEET
260          KM   (THE RM CARDS WILL HAVE TO BE EXAMINED FOR RESONABLENESS)
261          RM       1     .02     .30
             *

262          KK   F-10A
263          KM   THE FINAL CONCENTRATION POINT FOR THE 3 TRIBUTARY STUDY
264          KM   THIS POINT IS IN SKUNK CREEK
265          HC       2
             * DDM   ***** Preserved *****

266          KK    S10R
267          KM    ROUTE S10C THROUGH S13
268          RM       1    0.09    0.25
             * DDM   ***** Updated *****

269          KK     S13
270          KM   BASIN S13
271          KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
272          KM    L=      2.7  Lca=      1.2   S=  425.1  Kn= .035  LAG=  24.5
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 273           KM    PHOENIX MOUNTAIN S-GRAPH WAS USED FOR THIS BASIN
 274           BA    1.27
 275           LG     .22     .37    5.30     .23   20.00
 276           UI   175.    567.   1109.   1541.   1652.   1043.    851.    680.    503.    406.
 277           UI   318.    227.    191.    134.    108.     86.     73.     34.     34.     34.
 278           UI    34.     34.      0.      0.      0.      0.      0.      0.      0.      0.
 279           UI     0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
               * DDM   ***** Updated *****

 280           KK     S11
 281           KM   BASIN S11
 282           KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 283           KM    L=      2.7  Lca=      1.3   S=  438.1  Kn= .037  LAG=  26.9
 284           KM    PHOENIX MOUNTAIN S-GRAPH WAS USED FOR THIS BASIN
 285           BA     .92
 286           LG     .20     .39    5.70     .19     .00
 287           UI   115.    317.    664.    896.   1241.    783.    631.    523.    422.    315.
 288           UI   265.    210.    154.    129.     99.     84.     56.     56.     36.     22.
 289           UI    22.     22.     22.     22.      0.      0.      0.      0.      0.      0.
 290           UI     0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
               * DDM   ***** Preserved *****

 291           KK    S11R
 292           KM    ROUTE S11 THROUGH S12
 293           RM       3    0.24    0.30
               * DDM   ***** Updated *****
                                        HEC-1 INPUT                                          PAGE  8

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

 294           KK     S12
 295           KM   BASIN S12
 296           KM    THE FOLLOWING PARAMETERS WERE PROVIDED FOR THIS BASIN
 297           KM    L=      2.8  Lca=      1.3   S=  123.2  Kn= .031  LAG=  29.1
 298           KM    DESERT/RANGELAND S-GRAPH WAS USED FOR THE BASIN
 299           BA     .91
 300           LG     .15     .32    7.60     .09    1.00
 301           UI   105.    257.    558.    811.    971.    995.    868.    652.    482.    359.
 302           UI   262.    195.    146.    109.     72.     67.     26.     26.     26.     26.
 303           UI    26.      0.      0.      0.      0.      0.      0.      0.      0.      0.
 304           UI     0.      0.      0.      0.      0.      0.      0.      0.      0.      0.
               * DDM   ***** Preserved *****

 305           KK    S12C
 306           KM    COMBINE S11R+S12 (SUBAREAS S11 AND S12)
 307           HC       2
               * DDM   ***** Preserved *****

 308           KK    S13C
 309           KM    COMBINE S10R+S13+S12C       (SUBAREAS S1-S13)
 310           HC       3
               * DDM   ***** Preserved *****

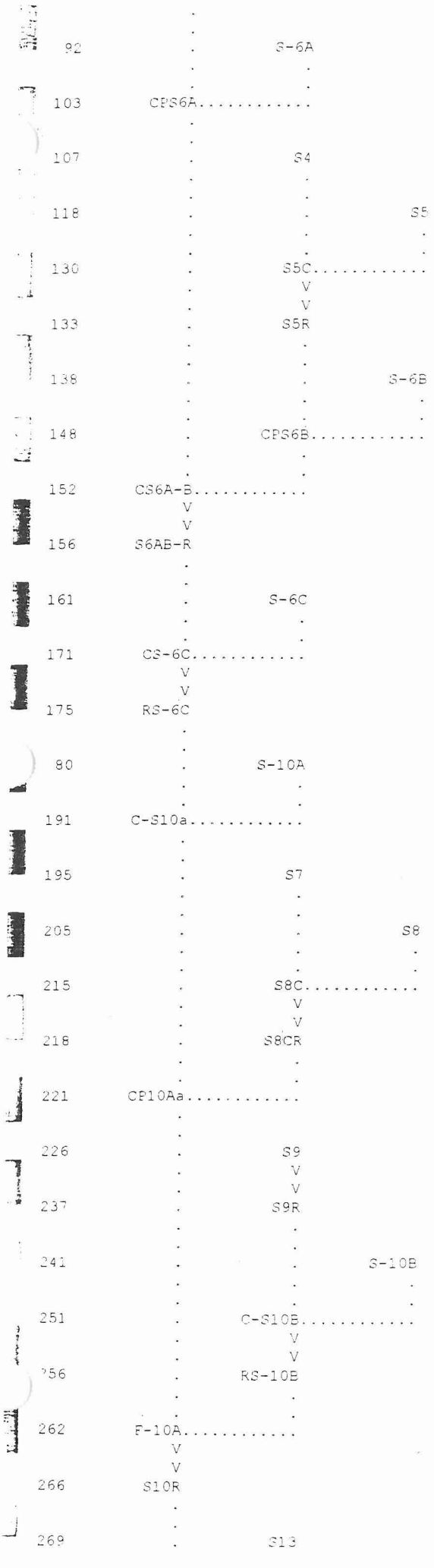
 311           KK   S13CR
 312           KM    ROUTE S13C THROUGH S14
 313           RM       2    0.15    0.25
 314           ZZ
```

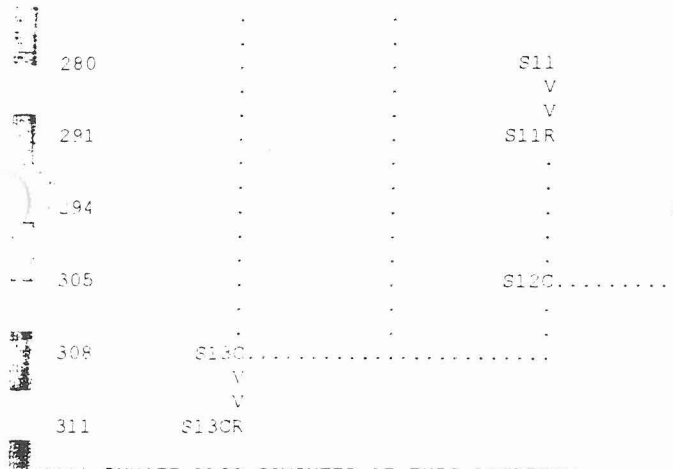
SCHEMATIC DIAGRAM OF STREAM NETWORK

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

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

   46          S1
               V
               V
   57          S1R
               .
               .
   60          .          S2
               .          .
               .          .
   71          S2C.........
               .
               .
   74          .          S3
               .          .
               .          .
   85          S3C.........
               V
               V
   88          S3R
```


92 S-6A
103 CPS6A
107 S4
118 S5
130 S5C
133 S5R
138 S-6B
148 CPS6B
152 CS6A-B
156 S6AB-R
161 S-6C
171 CS-6C
175 RS-6C
80 S-10A
191 C-S10a
195 S7
205 S8
215 S8C
218 S8CR
221 CP10Aa
226 S9
237 S9R
241 S-10B
251 C-S10B
256 RS-10B
262 F-10A
266 S10R
269 S13



(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

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*****************************************
*****************************************
*                                       *                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *                                       *    U.S. ARMY CORPS OF
NGINEERS      *
*              JUL   1997               *                                       *    HYDROLOGIC ENGINEERING
ENTER     *
*            VERSION 4.1                *                                       *          609 SECOND STREET
*                                       *                                       *       DAVIS,. CALIFORNIA
5616      *
*   RUN DATE   08OCT98  TIME  08:58:08  *                                       *           (916) 756-1104
*                                       *                                       *
*****************************************
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FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

SKUNK CREEK FOODPLAIN DELINEATION STUDY
CAP AQUEDUCT THROUGH TOWN OF NEW RIVER

100-YEAR 6-HOUR FLOOD HYDROLOGY

METHODS OF STUDY:
- FCD STORM PATTERNS
- FCD PHOENIX AREA S-GRAPHS
- GREEN-AMPT LOSSES
- MUSKINGUM STREAM ROUTING
- FCD DDMS PROGRAM (VER 1.1, AUG 1995) USED TO COMPUTE PARAMETERS

INPUT FILE NAME - new6h.dat

MONTGOMERY WATSON
MARCH 1996

MODIFIED BY FLOOD CONTROL DISTRICT OF MARICOPA COUNTY ON 8/10/98 FOR THE THREE TRIBUTARIES FLOOD DELINEATION.
BASINS S11, S12 AND S-13 ADDED TO MODEL ON 10/8/98 BECAUSE WASH IN BASIN S12 WILL BE DELINEATED ALSO

DDM MCUHP2 SKUNK CREEK FOODPLAIN DELINEATION STUDY

28 IO OUTPUT CONTROL VARIABLES

IPRNT	5	PRINT CONTROL
IPLOT	0	PLOT CONTROL
QSCAL	0.	HYDROGRAPH PLOT SCALE

IT HYDROGRAPH TIME DATA

NMIN	5	MINUTES IN COMPUTATION INTERVAL
IDATE	5JAN96	STARTING DATE
ITIME	0000	STARTING TIME
NQ	300	NUMBER OF HYDROGRAPH ORDINATES
NDDATE	6JAN96	ENDING DATE
NDTIME	0055	ENDING TIME
ICENT	19	CENTURY MARK

COMPUTATION INTERVAL .08 HOURS

TOTAL TIME BASE 24.92 HOURS

ENGLISH UNITS

DRAINAGE AREA	SQUARE MILES
PRECIPITATION DEPTH	INCHES
LENGTH, ELEVATION	FEET
FLOW	CUBIC FEET PER SECOND
STORAGE VOLUME	ACRE-FEET
SURFACE AREA	ACRES
TEMPERATURE	DEGREES FAHRENHEIT

29 JD INDEX STORM NO. 1

STRM 3.40 PRECIPITATION DEPTH

TRDA .01 TRANSPOSITION DRAINAGE AREA

30 PI PRECIPITATION PATTERN

.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.01	.01	.01	.01	.01	.01	.03
.03	.03	.05	.05	.05	.15	.15	.15	.03	.03
.03	.01	.01	.01	.01	.01	.01	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00								

33 JD INDEX STORM NO. 2

STRM 3.37 PRECIPITATION DEPTH

TRDA .50 TRANSPOSITION DRAINAGE AREA

0 PI PRECIPITATION PATTERN

.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.01	.01	.01	.01	.01	.01	.03
.03	.03	.05	.05	.05	.15	.15	.15	.03	.03
.03	.01	.01	.01	.01	.01	.01	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00								

34 JD INDEX STORM NO. 3

STRM 3.30 PRECIPITATION DEPTH

TRDA 2.80 TRANSPOSITION DRAINAGE AREA

35 PI PRECIPITATION PATTERN

.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.01	.01	.01	.01	.01	.01	.03
.03	.03	.07	.07	.07	.08	.08	.08	.05	.05
.05	.02	.02	.02	.01	.01	.01	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00								

38 JD INDEX STORM NO. 4

STRM 3.16 PRECIPITATION DEPTH

TRDA 16.00 TRANSPOSITION DRAINAGE AREA

39 PI PRECIPITATION PATTERN

.01	.01	.00	.00	.00	.00	.00	.00	.00	.01
.01	.01	.00	.01	.00	.00	.00	.00	.00	.00
.00	.00	.01	.00	.00	.00	.00	.01	.01	.01
.01	.01	.01	.01	.01	.01	.02	.02	.02	.03
.03	.03	.06	.06	.06	.07	.07	.07	.04	.04
.04	.02	.02	.02	.01	.01	.01	.01	.01	.01
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00								

42 JD INDEX STORM NO. 5

STRM 2.80 PRECIPITATION DEPTH

TRDA 90.00 TRANSPOSITION DRAINAGE AREA

43 PI PRECIPITATION PATTERN

.01	.01	.01	.00	.00	.00	.01	.01	.01	.01
.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
.01	.01	.01	.01	.01	.01	.02	.02	.02	.03
.03	.03	.05	.05	.05	.05	.05	.05	.04	.04
.04	.02	.02	.02	.02	.02	.02	.01	.01	.01
.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
.01	.01								

***** WARNING ***** POSSIBLE INSTABILITIES IN THE MUSKINGUM ROUTING FOR REACH RS-10B.
REDUCE NSTPS OR DECREASE YOUR COMPUTATION INTERVAL (FIRST FIELD OF THE IT RECORD).

***** WARNING ***** POSSIBLE INSTABILITIES IN THE MUSKINGUM ROUTING FOR REACH RS-10B.
REDUCE NSTPS OR DECREASE YOUR COMPUTATION INTERVAL (FIRST FIELD OF THE IT RECORD).

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REDUCE NSTPS OR DECREASE YOUR COMPUTATION INTERVAL (FIRST FIELD OF THE IT RECORD).
***** WARNING ***** POSSIBLE INSTABILITIES IN THE MUSKINGUM ROUTING FOR REACH RS-10B.
REDUCE NSTPS OR DECREASE YOUR COMPUTATION INTERVAL (FIRST FIELD OF THE IT RECORD).

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

OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME MAX STAGE
HYDROGRAPH AT	S1	2744.	4.17	402.	101.	97.	2.08		
ROUTED TO	S1R	2645.	4.50	402.	101.	97.	2.08		
HYDROGRAPH AT	S2	1932.	4.17	254.	64.	61.	1.17		
2 COMBINED AT	S2C	3508.	4.50	628.	157.	151.	3.25		
HYDROGRAPH AT	S3	1614.	4.17	195.	49.	47.	1.03		
2 COMBINED AT	S3C	4342.	4.42	783.	196.	189.	4.28		
ROUTED TO	S3R	4241.	4.67	782.	196.	189.	4.28		
HYDROGRAPH AT	S-6A	481.	4.17	45.	11.	11.	.21		
2 COMBINED AT	CPS6A	4323.	4.67	818.	205.	197.	4.49		
HYDROGRAPH AT	S4	1477.	4.17	176.	44.	42.	.97		
HYDROGRAPH AT	S5	1985.	4.33	318.	80.	77.	1.85		
2 COMBINED AT	S5C	2801.	4.33	463.	116.	111.	2.82		
ROUTED TO	S5R	2686.	4.67	463.	116.	111.	2.82		
HYDROGRAPH AT	S-6B	865.	4.17	79.	20.	19.	.38		
2 COMBINED AT	CPS6B	2828.	4.67	528.	131.	126.	3.20		
2 COMBINED AT	CS6A-B	6532.	4.67	1254.	314.	302.	7.69		
ROUTED TO	S6AB-R	6463.	4.75	1254.	314.	302.	7.69		
HYDROGRAPH AT	S-6C	758.	4.17	72.	18.	17.	.34		
2 COMBINED AT	CS-6C	6564.	4.75	1306.	327.	315.	8.03		
ROUTED TO	RS-6C	6404.	4.92	1306.	327.	315.	8.03		
HYDROGRAPH AT	S-10A	1778.	4.25	214.	53.	51.	1.14		
2 COMBINED AT	C-S10a	6600.	4.92	1461.	366.	352.	9.17		
HYDROGRAPH AT									

	S7	1322.	4.25	184.	39.	38.	.68
HYDROGRAPH AT	S8	1830.	4.17	282.	51.	49.	1.12
2 COMBINED AT	S8C	2652.	4.25	340.	86.	82.	1.80
ROUTED TO	S8CR	2576.	4.33	340.	86.	82.	1.80
2 COMBINED AT	CP10Aa	7330.	4.83	1721.	431.	415.	10.97
HYDROGRAPH AT	S9	1426.	4.25	194.	46.	44.	1.02
ROUTED TO	S9R	1346.	4.50	194.	46.	44.	1.02
HYDROGRAPH AT	S-10B	1249.	4.17	111.	30.	29.	.66
2 COMBINED AT	C-S10B	1820.	4.33	285.	71.	69.	1.68
ROUTED TO	RS-10B	1824.	4.42	285.	71.	69.	1.68
2 COMBINED AT	F-10A	8113.	4.75	1920.	481.	463.	12.65
ROUTED TO	S10R	8072.	4.83	1920.	481.	463.	12.65
HYDROGRAPH AT	S13	1876.	4.17	263.	66.	63.	1.27
HYDROGRAPH AT	S11	1344.	4.25	168.	42.	40.	.92
ROUTED TO	S11R	1264.	4.50	168.	42.	40.	.92
HYDROGRAPH AT	S12	1509.	4.25	202.	51.	49.	.91
2 COMBINED AT	S12C	2255.	4.42	352.	88.	85.	1.83
3 COMBINED AT	S13C	9588.	4.67	2368.	594.	572.	15.75
ROUTED TO	S13CR	9534.	4.83	2368.	594.	572.	15.75

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

APPENDIX E: HYDRAULIC ANALYSIS SUPPORTING DOCUMENTATION

E.1 Roughness Coefficient Estimation

Complete n-Value/Reconnaissance Report.

E.2 Cross Section Plots

E.3 Expansion and Contraction Coefficients

E.4 Analysis of Structures

E.5 Hydraulic Calculations

HEC-RAS standard summary pages.

n-VALUE / FIELD RECONNAISSANCE REPORT

FLOODPLAIN DELINEATION FOR TRIBUTARIES TO SKUNK CREEK

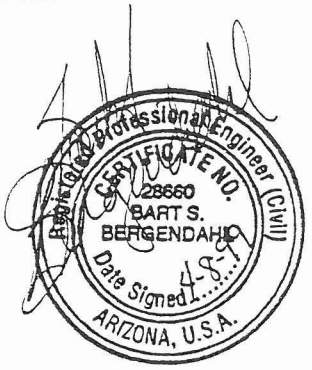
FCD Contract No. 98-22

Submitted to:

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
2801 West Durango Street
Phoenix, Arizona 85009

Submitted by:

TETRA TECH/SIMONS, LI & ASSOCIATES, INC.
4600 S. Mill Avenue, Suite 200
Tempe, Arizona 85282
(602) 491-1393



April 1999

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I. INTRODUCTION

This n-value field reconnaissance report was prepared pursuant to Scope of Work, "Topographic Mapping and Floodplain Delineation Study for Tributaries to Skunk Creek," Flood Control District of Maricopa County (FCD 98-22), Sections 6.6, 6.7, and 6.8. Specifically addressed in this report are the results of the field reconnaissance conducted for the five tributaries included in the study reach. The report will be incorporated into the final Technical Data Notebook prepared for the study.

The purpose of this report is to present the results of a detailed analysis to define Manning's n-values (roughness coefficients), and the locations and orientations of the cross-sections for the five tributaries to Skunk Creek. The tributaries are all located adjacent to the Tonto National Forest in Township 7 North, Range 3 East. The study area is approximately 3 miles east of the community of New River, off New River Road (See Figure 1)

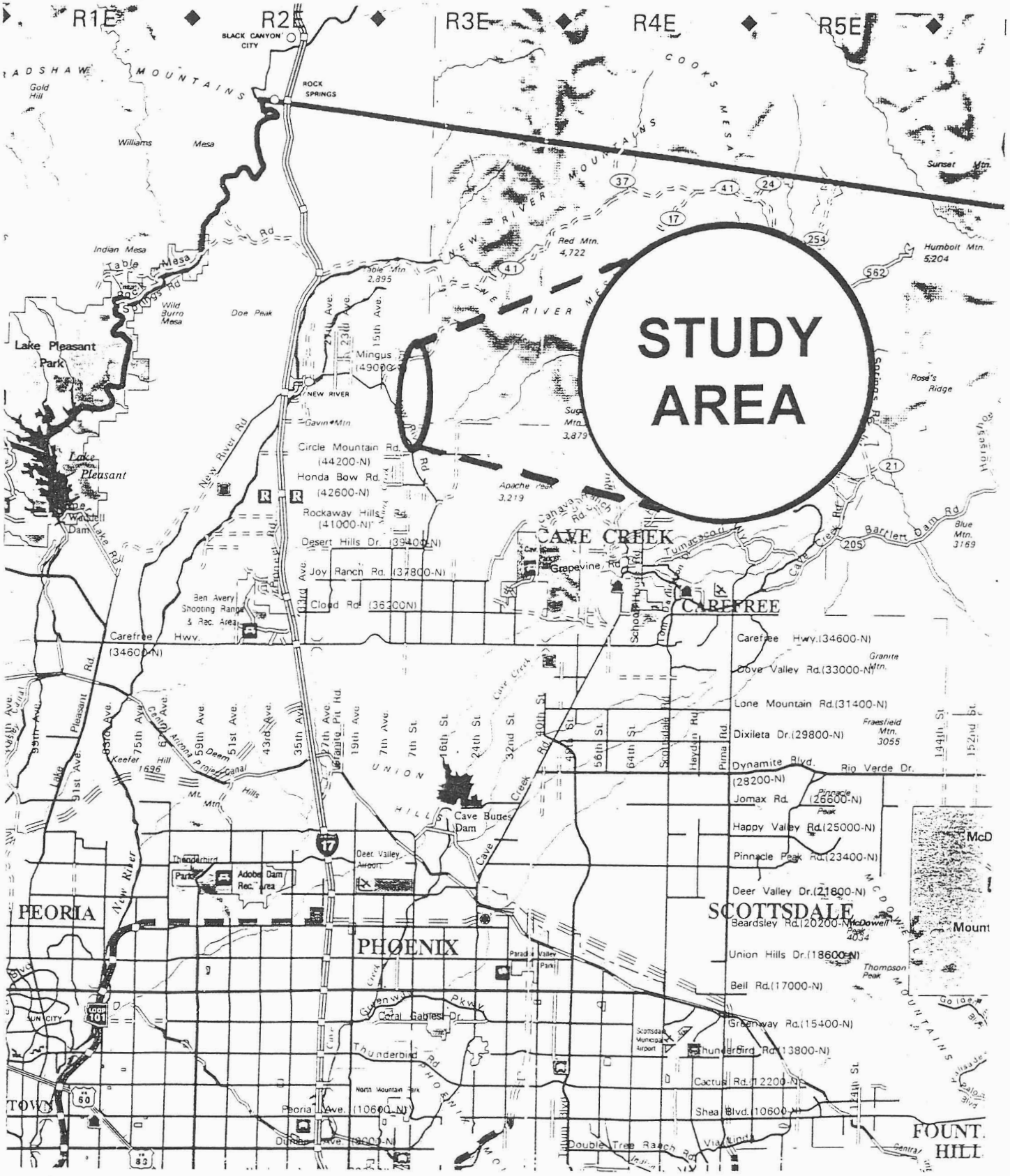
The study area is characterized by Sonoran desert shrubs, trees, and cacti of medium, uniform density. A relatively higher density vegetation is found along the limits of the alluvial washes and consists of palo verde, creosote bush, bush muhly, and mesquite. Scattered throughout the watershed are saguaros, buckhorn cholla, jojoba, ocotillo, and littleleaf palo verdes. The soils are characterized by alluvial deposits of shallow sands, gravels, and cobbles, with some boulders, and rock outcrops on moderately steep to steep slopes.

Residential development has and continues to occur within the study area. However, the development density is low and only minimal drainage improvements have been made for stormwater runoff. The existing improvements are limited to culverts constructed over the washes along the primary roadways in the area.

Section II of this report presents the methodology utilized to estimate the Manning's n-values. Section III contains the detailed n-value analyses for representative cross-sections of the tributaries, a digitally prepared plot of those cross sections, and color photographs of the main channel, overbank areas, and channel bed material. Section IV presents a summary of the recommended Manning's n-values to be used in the cross-section file of the HEC-RAS computer program and the proposed expansion and contraction coefficients.

Appendix A presents a photographic record of hydraulic structures in the tributaries to Skunk Creek. Included are all culverts under the main roadways in the study area. Appendix B contains a reduced copy of the preliminary topographic work maps which present the proposed cross section locations and orientations, and the hydraulic baselines. A full size copy of the work maps are provided as a supplement to this report. Appendix C contains the field reconnaissance sheets used to record proposed n-values for the representative cross-sections.

Figure 1: Study Area Location Map



II. METHODOLOGY

Values for the Manning's roughness coefficient, "n" may be assigned for conditions that exist at the time of a specific flow event, for average conditions over a range in stage, or for future conditions for some anticipated flow event. The Manning's n-values developed for this study are for existing conditions and the 100-year peak flood discharges.

Several sources of data were utilized to develop the n-values presented in this report (ref. Section V). The primary information included: 1) aerial photos by Kenny Aerial Mapping, Inc. (scale: 1"=8000', December 1, 1998); 2) ground level reconnaissance and photographs of the tributaries in the study reach; and 3) the effective Flood Insurance Studies for the project area (September 30, 1995). The ground level photographs were taken during field visits in March, 1999.

The n-values assigned to a stream reach represent the factors that tend to resist or impede flow. The detailed hydraulic analysis requires an n-value to be assigned horizontally to each subdivided segment of a specific cross section. The segments represent areas within the cross-section with similar roughness characteristics. The hydraulic model (HEC-RAS) then computes a conveyance-weighted, water-surface elevation for the specific discharge. For this study, the values of Manning's "n" were determined based on the methodology presented in "Estimated Manning's Roughness Coefficients for Stream Channels and Flood Plains in Maricopa County, Arizona" (USGS April, 1991).

The method of determining n-values is as follows: 1) select a base value of "n" for the bed material and a straight uniform channel; 2) select n-value adjustments for surface irregularities, obstructions, and vegetation; and 3) sum these values to determine the total n-value for that portion of the cross section. Due to the relative steepness of the tributary valleys, the representative cross-sections were divided into main channel and overbank sections only. The roughness of the overbank areas along any specific tributary in the study area is very similar in character. Therefore, the calculated overbank n-value represents both the right and left overbank, unless noted otherwise.

The final n-value is defined by the following equation:

$$n = n_b + n_1 + n_2 + n_3$$

Where;

n = total n-value,
n_b = base value of "n" for a straight uniform channel,
n_1 = value for surface irregularities,
n_2 = value for obstruction,
n_3 = value for vegetation.

The confluence point of each tributary with the main stem of Skunk Creek has been identified as River Mile 0.0. The confluence points were estimated from the thalwegs depicted on the aerial mapping prepared for the study. On all cross sections, the hydraulic baseline for the tributary is identified as Station 10,000 in feet. All cross-section identification numbers are in river miles measured from the confluence, along the hydraulic baseline.

For a typical channel reach, a contraction coefficient of 0.1 and expansion coefficient of 0.3 was used. For cross sections upstream and downstream of a culvert, a contraction coefficient of 0.3 and an expansion coefficient of 0.5, respectively, was used.

III. DETAILED ANALYSES

In the detailed analyses section which follows, the Mannng's n-values for each reach of each tributary are described using the following information:

Reach: provides a detailed description of the tributary reach.

Cross-section: identifies the representative cross-section for the reach. Cross-sections are identified by their distance, in river miles, upstream of their confluence with the main stem of Skunk Creek.

Description of Cross-section: includes location, relative to physical features within the reach; tributary bed and overbank composition; any structures; and vegetation type and density.

100-Year n-value: presents the components used to determine the total n-value for the main channel and overbank portions of the cross-section.

The detailed analysis for the representative cross-section is followed by a figure depicting the cross-section geometry and the lateral extent of the main channel and overbank n-values. Finally, a series of color photographs of the main channel and overbank areas, looking upstream and downstream of the cross-section, are provided.

III. A. Tributary 12

Reach 1:

From the confluence of Tributary 12 with Skunk Creek to New River Road. Includes Cross-sections 0.097 through 0.398. Reference Appendix B for plan view.

Cross-section: 0.398

Description of Cross-section:

Cross-section 0.398 is located just downstream of New River Road. The main channel bed consists of coarse sands, medium to large cobbles, and small boulders. The main channel remains in a natural condition with relatively large palo verde and mesquite trees lining the banks. The overbank remains in a natural state with a relatively dense growth of sage, small palo verde and cactus.

100-year n-value:

Portion of Cross-section	Components	"n" Total
Main Channel	$n_b = 0.035$ $n_1 = 0.005$ $n_2 = 0.005$ $n_3 = 0.0$	0.045
Overbank	$n_b = 0.030$ $n_1 = 0.005$ $n_2 = 0.0$ $n_3 = 0.025$	0.060

Figure 2: Cross-section 0.398

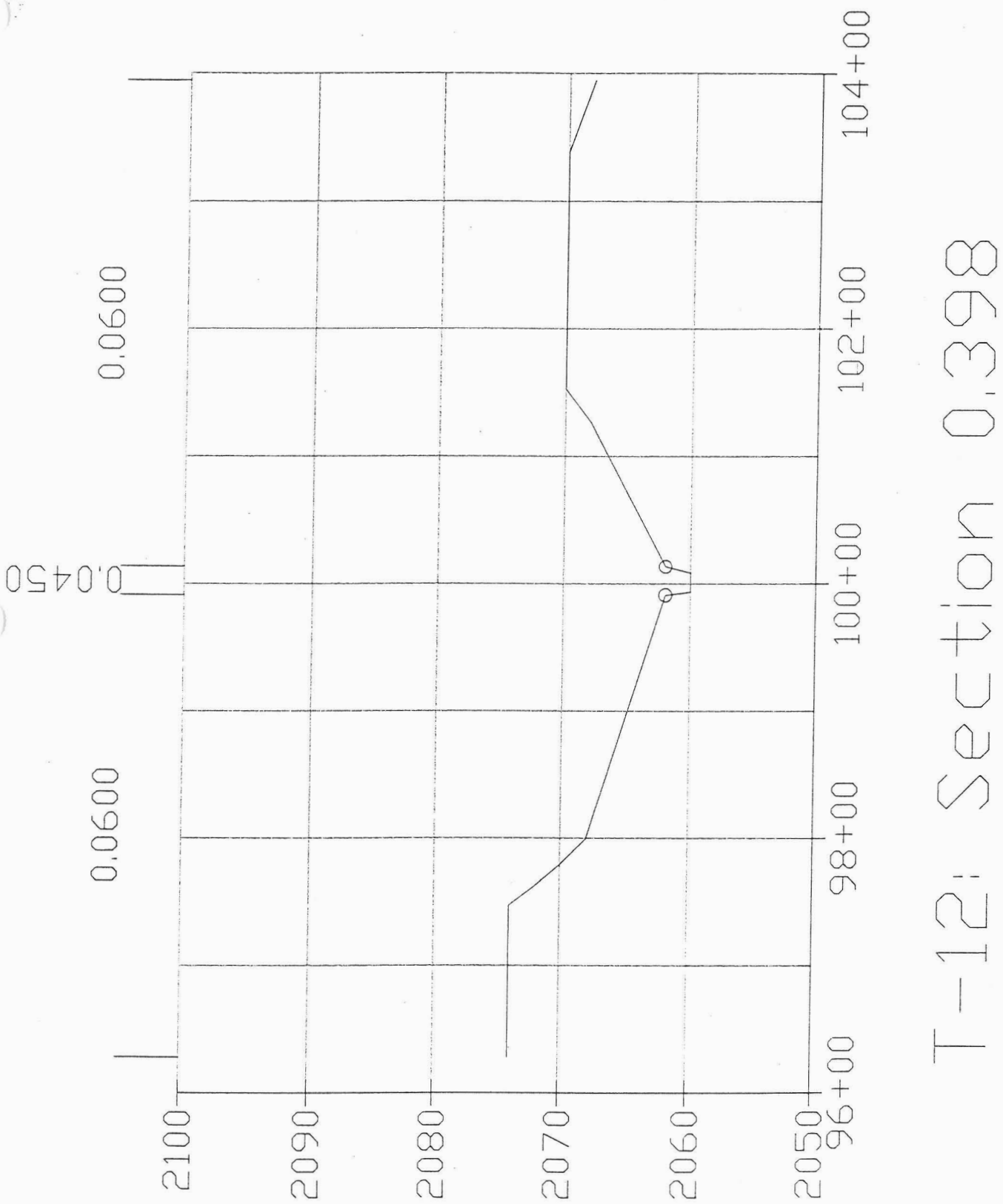


Photo 1 Main Channel, Looking Downstream

Photo 2 Bed Material

Photo 3 Left Overbank, Looking Downstream

Photo 4 Right Overbank, Looking Downstream

Reach 2:

From New River Road to a point approximately 1050 feet upstream. Includes Cross-sections 0.420 through 0.564. Reference Appendix B for plan view.

Cross-section: 0.420

Description of Cross-section:

Cross-section 0.420 is located just upstream of New River Road. The main channel bed consists of coarse sands, medium to large cobbles, and small boulders. The main channel remains in a natural condition with relatively large palo verde and mesquite trees lining the banks. The left overbank has been cleared of large vegetation for a horse correl and pasture. The right overbank remains in a natural state with a relatively dense growth of sage, small palo verde and cactus.

100-year n-value:

Portion of Cross-section		Components	"n" Total
Main Channel		n_b = 0.035 n_1 = 0.005 n_2 = 0.002 n_3 = 0.0	0.042
Overbank		Left	Right
		n_b = 0.030	0.030
		n_1 = 0.005	0.005
		n_2 = 0.0	0.0
		n_3 = 0.015	0.025
	"n" Total	0.050	0.060

Figure 3: Cross-section 0.420

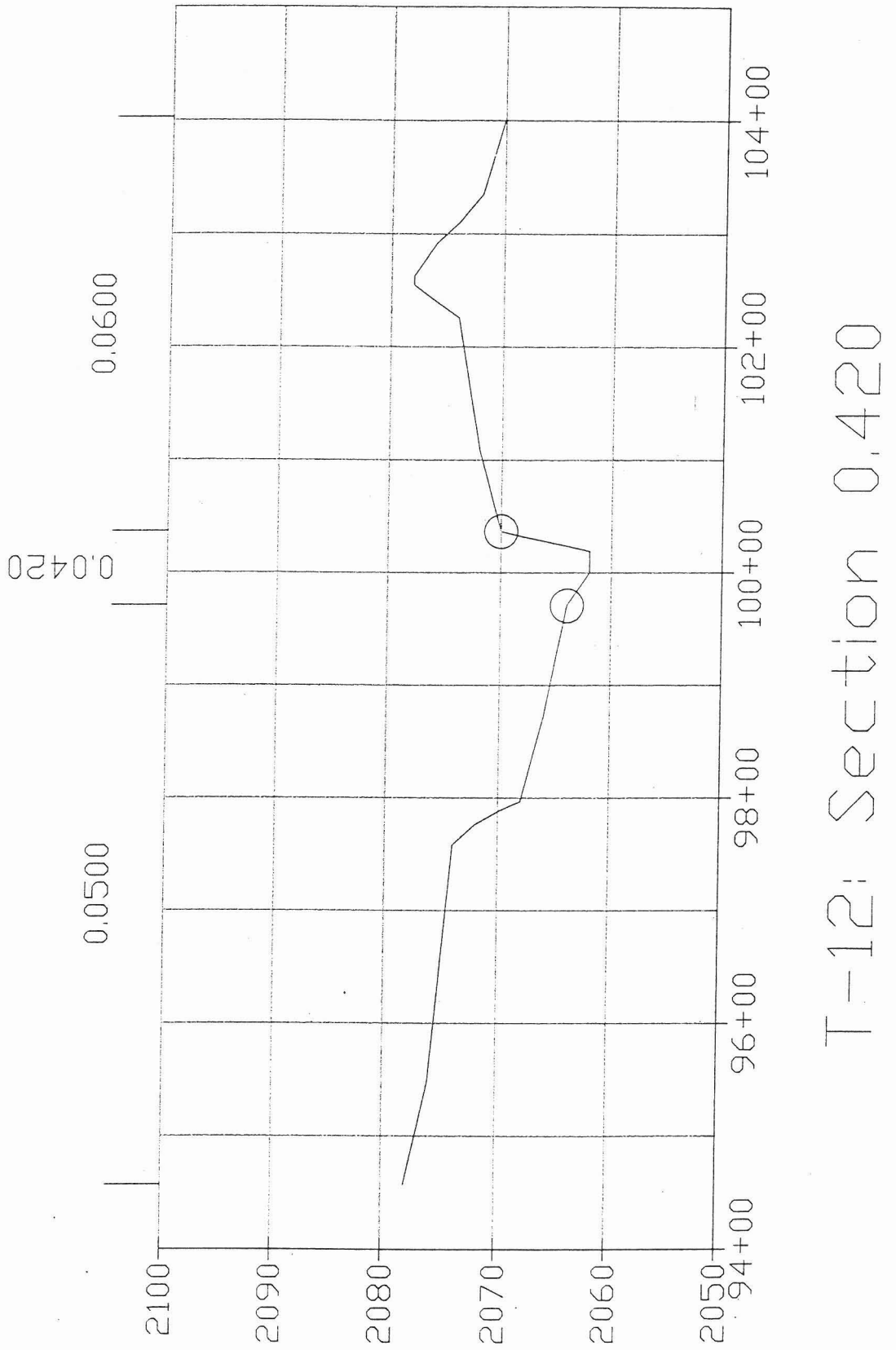


Photo 5 Main Channel, Looking Upstream

Photo 6 Left Overbank, Looking Upstream

Photo 7 Right Overbank, Looking Upstream

Reach 3:

Fom a point approximately 1050 feet upstream of New River Road to Sambrosa Road. Includes Cross-sections 0.659 through 0.847. Reference Appendix B for plan view.

Cross-section: 0.847

Description of Cross-section:

Cross-section 0.847 is located just upstream of Sambrosa Road. The main channel bed consists of coarse sands, medium to large cobbles, and a few small boulders. With the exception of a roadway dip-crossing, the main channel remains in a natural condition with relatively large palo verde and mesquite trees lining the banks. The overbank remains in a natural state with a relatively dense growth of sage, small palo verde and cactus.

100-year n-value:

Portion of Cross-section	Components	"n" Total
Main Channel	$n_b = 0.030$ $n_1 = 0.0$ $n_2 = 0.0$ $n_3 = 0.005$	0.035
Overbank	$n_b = 0.030$ $n_1 = 0.005$ $n_2 = 0.005$ $n_3 = 0.025$	0.065

Figure 4: Cross-section 0.847

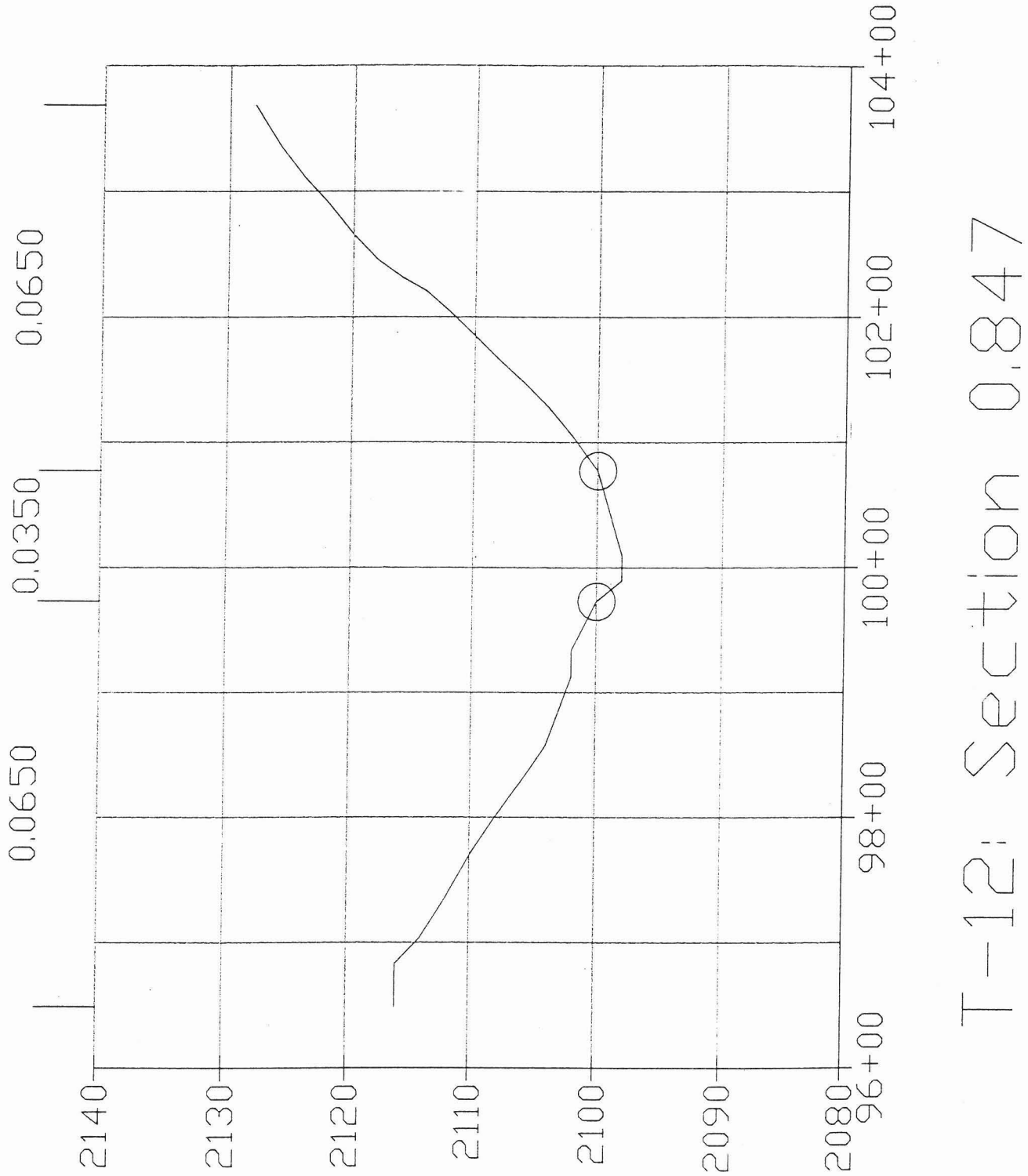


Photo 8 Main Channel, Looking Upstream

Photo 9 Main Channel, Looking Downstream

Photo 10 Left Overbank, Looking Downstream

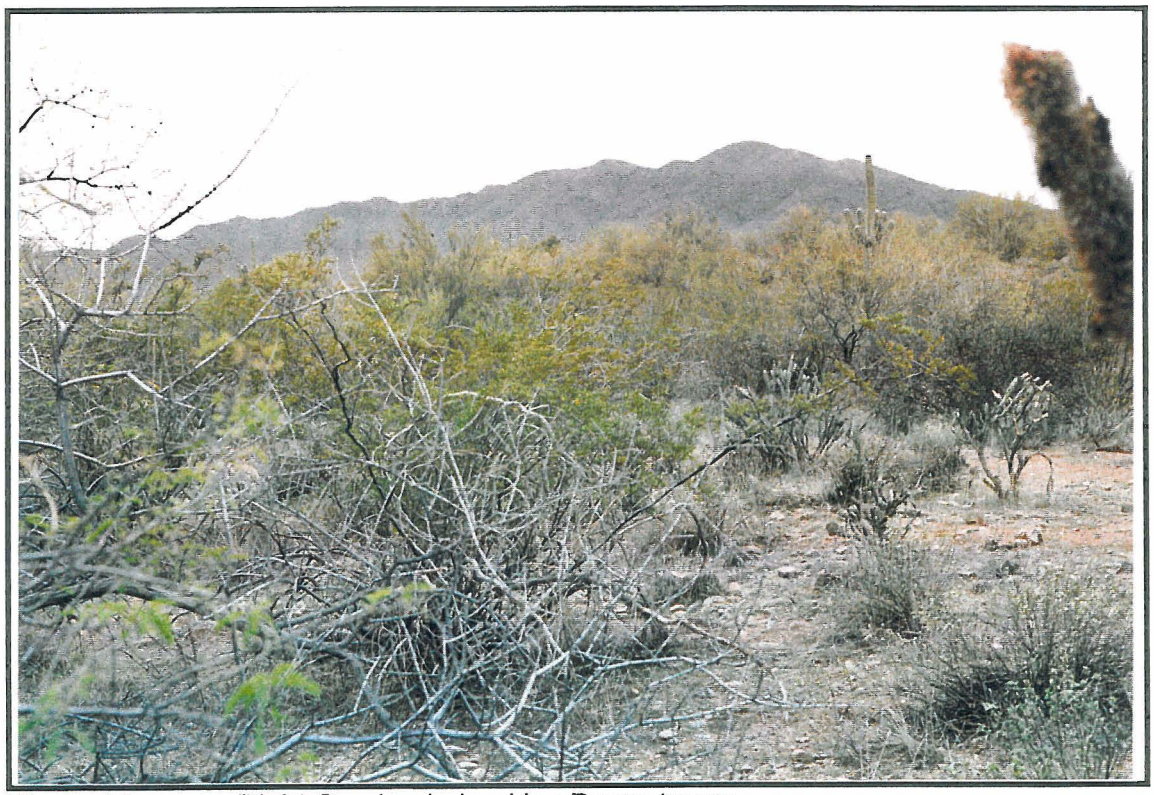


Photo 11 Right Overbank, Looking Downstream

Reach 4:

From Sambrosa Road to the Tonto National Forest Boundary. Includes Cross-sections 0.942 through 1.416. Reference Appendix B for plan view.

Cross-section: 0.942

Description of Cross-section:

Cross-section 0.942 is located upstream of Sambrosa Road. The main channel bed consists of coarse sands, medium to large cobbles, and a few small boulders. With the exception of a roadway dip-crossing, the main channel remains in a natural condition with relatively large palo verde and mesquite trees lining the banks. The overbank remains in a natural state with a relatively dense growth of sage, small palo verde and cactus.

100-year n-value:

Portion of Cross-section	Components	"n" Total
Main Channel	$n_b = 0.035$ $n_1 = 0.0$ $n_2 = 0.003$ $n_3 = 0.002$	0.040
Overbank	$n_b = 0.030$ $n_1 = 0.005$ $n_2 = 0.005$ $n_3 = 0.025$	0.065

Figure 5: Cross-section 0.942

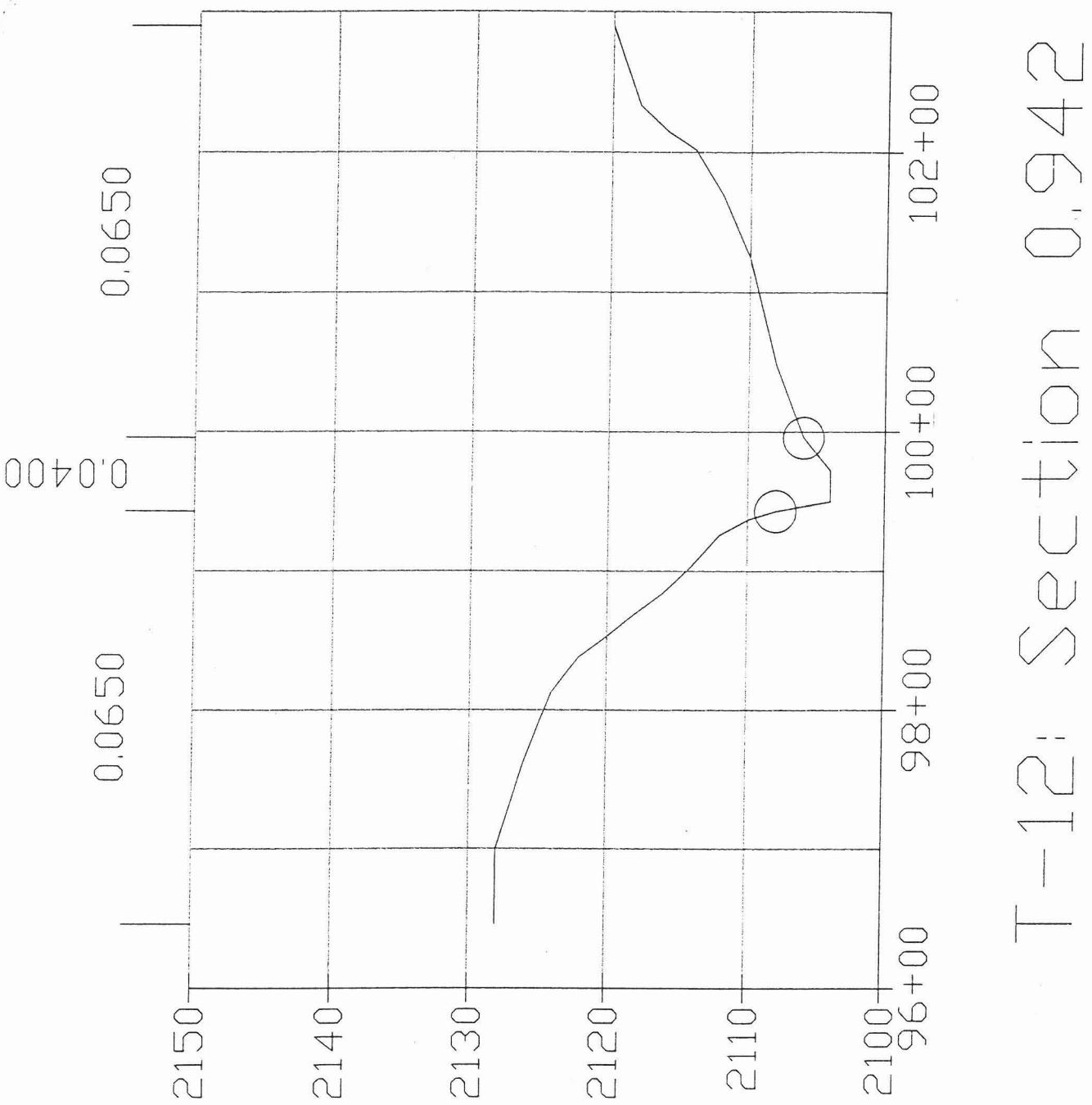


Photo 12 Main Channel, Looking Upstream

Photo 13 Main Channel, Looking Downstream

Photo 14 Left Overbank, Looking Upstream

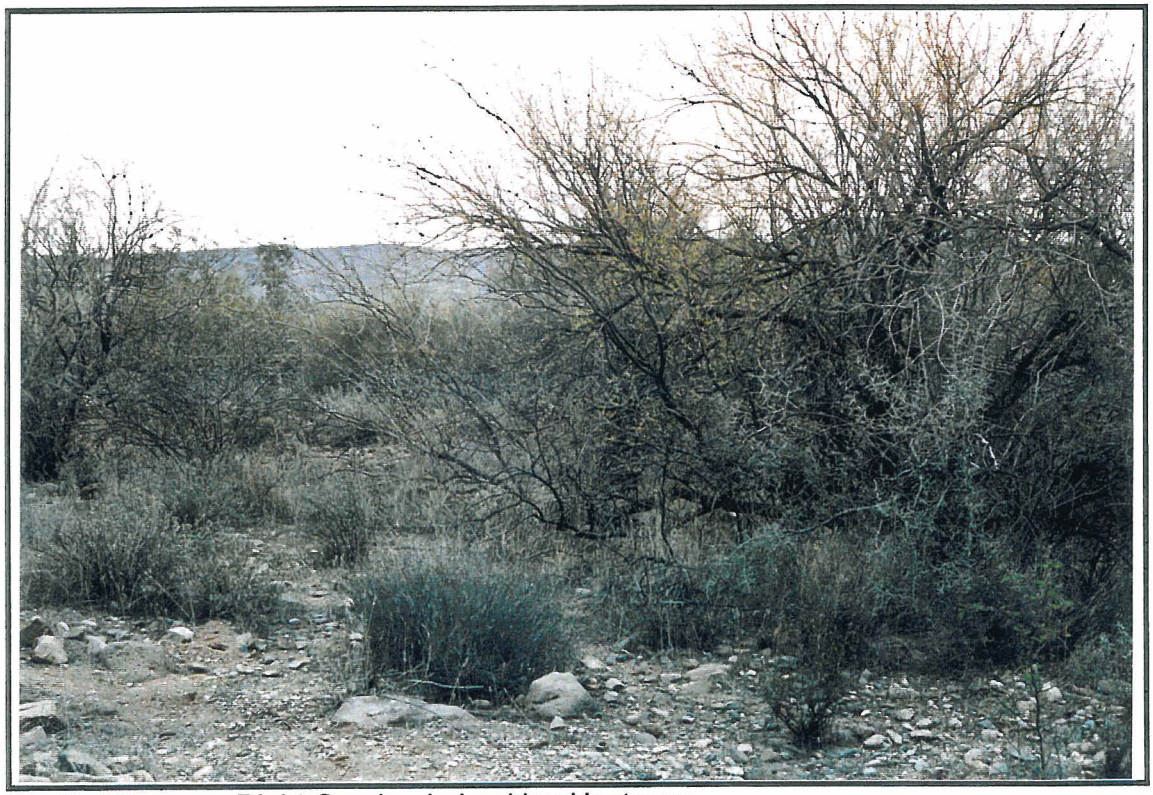


Photo 15 Right Overbank, Looking Upstream

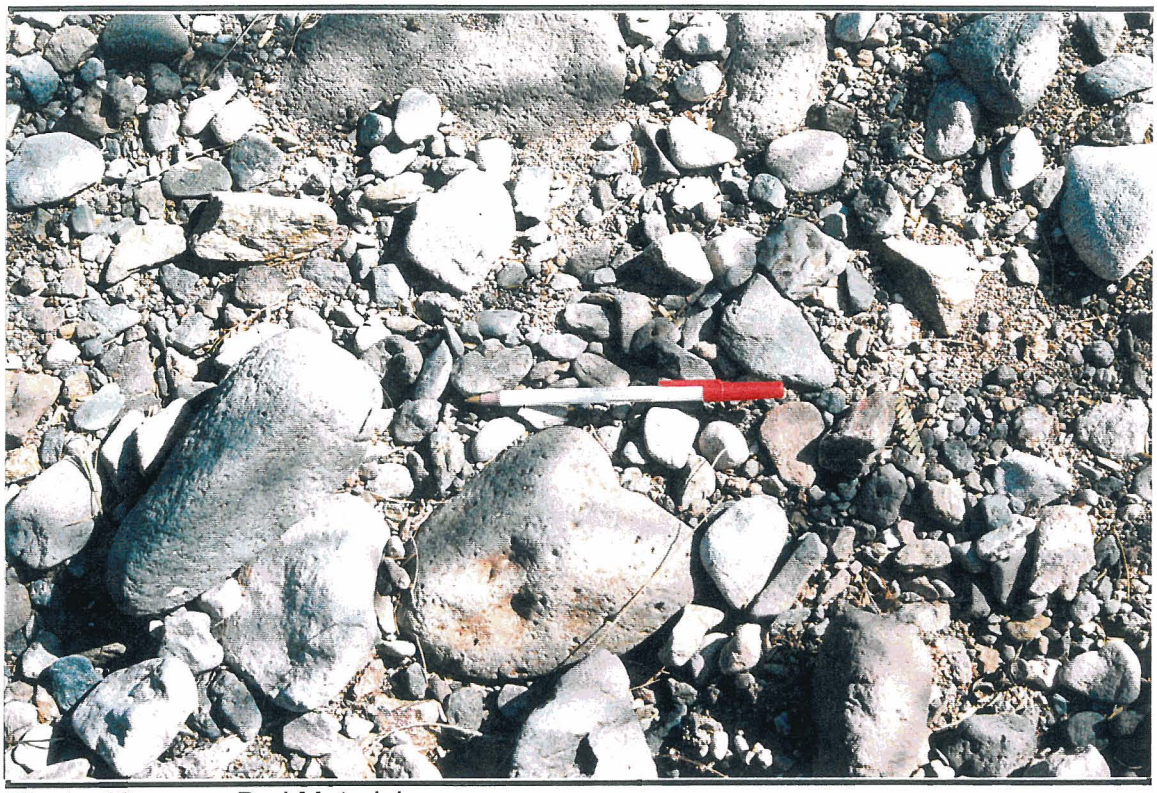


Photo 16 Bed Material

III. B. Tributary 10B

Reach 1:

From the confluence of Tributary 10B with Skunk Creek to Venato Drive. Includes Cross-sections 0.100 through 0.295 and the double, 60-inch reinforced concrete culvert under New River Road. Reference Appendix B for plan view.

Cross-section: 0.121

Description of Cross-section:

Cross-section 0.121 is located upstream of New River Road. The main channel bed consists of coarse sands, medium to large cobbles, and small boulders. With the exception of the New River Road crossing, the main channel remains in a natural condition with relatively large palo verde and mesquite trees lining the banks. The overbank remains in a natural state with a relatively dense growth of sage, small palo verde and cactus.

100-year n-value:

Portion of Cross-section	Components	"n" Total
Main Channel	$n_b = 0.035$ $n_1 = 0.005$ $n_2 = 0.0$ $n_3 = 0.002$	0.042
Overbank	$n_b = 0.030$ $n_1 = 0.005$ $n_2 = 0.005$ $n_3 = 0.025$	0.065

Figure 6: Cross-section 0.121

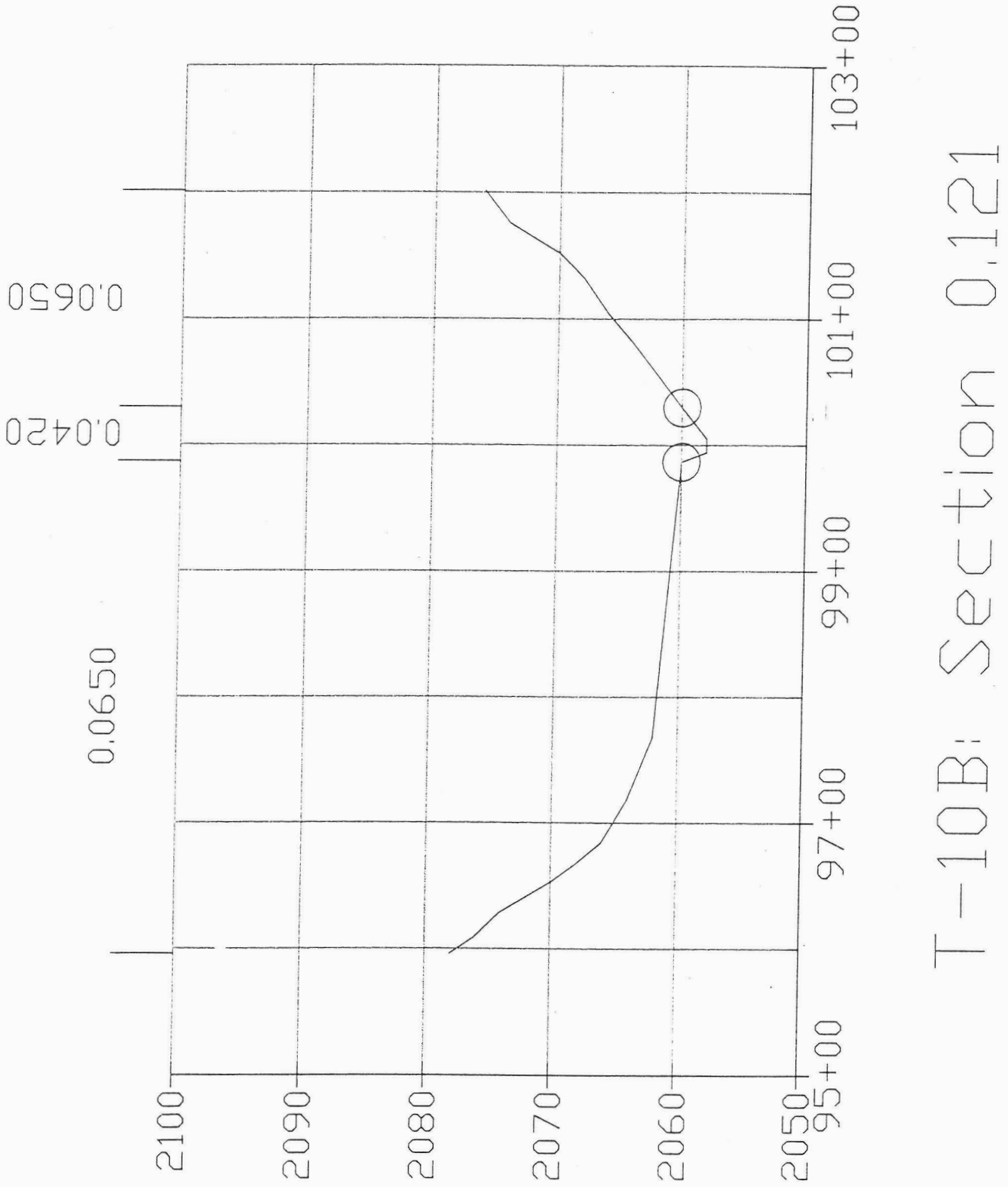


Photo 17 Main Channel, Looking Upstream

Photo 18 Bed Material

Photo 19 Left Overbank, Looking Upstream

Photo 20 Right Overbank, Looking Upstream

Reach 2:

From Venato Drive upstream to the Tonto National Forest Boundary. Includes Cross-sections 0.345 through 1.296. Reference Appendix B for plan view.

Cross-section: 0.345

Description of Cross-section:

Cross-section 0.345 is located upstream of Venato Drive. The main channel bed consists of coarse sands, medium to large cobbles, and small boulders. With the exception of a roadway dip-crossing, the main channel remains in a natural condition with relatively large palo verde and mesquite trees lining the banks. The overbank remains in a natural state with a relatively dense growth of sage, small palo verde and cactus.

100-year n-value:

Portion of Cross-section	Components	"n" Total
Main Channel	$n_b = 0.035$ $n_1 = 0.0$ $n_2 = 0.003$ $n_3 = 0.002$	0.040
Overbank	$n_b = 0.030$ $n_1 = 0.005$ $n_2 = 0.0$ $n_3 = 0.025$	0.060

Figure 7: Cross-section 0.345

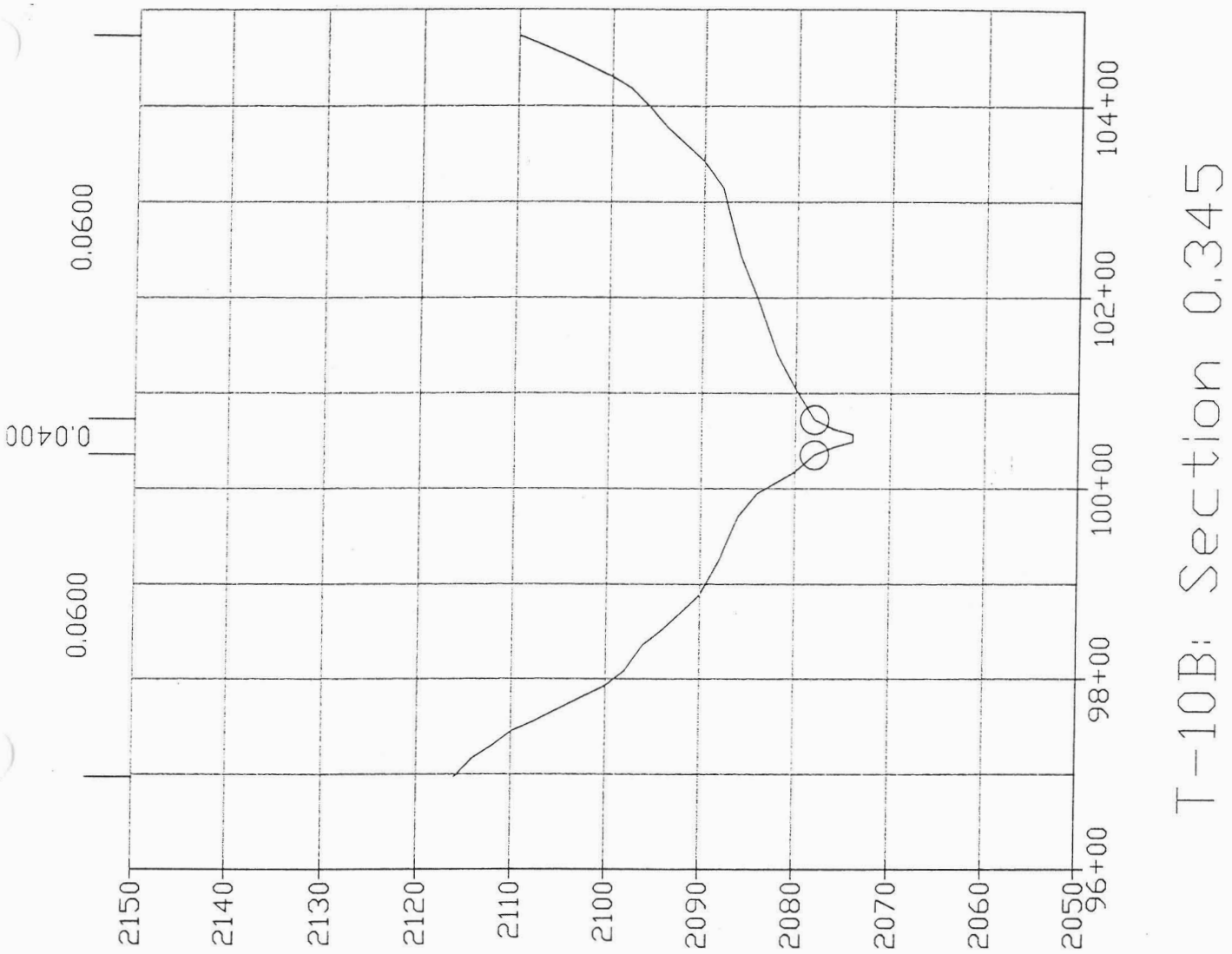


Photo 21 Main Channel, Looking Upstream

Photo 22 Main Channel, Looking Downstream

Photo 23 Bed Material #1

Photo 24 Bed Material #2

Photo 25 Left Overbank, Looking Upstream

Photo 26 Right Overbank, Looking Upstream

III. C. Tributary 10A

Reach 1:

From the New River Road Bridge over Skunk Creek to a point approximately 1900 feet up Tributary 10A. Includes Cross-sections 0.855 through 0.910. Reference Appendix B for plan view.

Cross-section: 0.910

Description of Cross-section:

Cross-section 0.910 is located approximately 1700 feet upstream of New River Road. The main channel bed consists of coarse sands, medium to large cobbles, and small boulders. The main channel remains in a natural condition with relatively large palo verde and mesquite trees lining the banks. The overbank remains in a natural state with a relatively dense growth of sage, small palo verde and cactus.

100-year n-value:

Portion of Cross-section	Components	"n" Total
Main Channel	$n_b = 0.035$ $n_1 = 0.005$ $n_2 = 0.005$ $n_3 = 0.0$	0.045
Overbank	$n_b = 0.030$ $n_1 = 0.005$ $n_2 = 0.005$ $n_3 = 0.020$	0.060

Figure 8: Cross-section 0.910

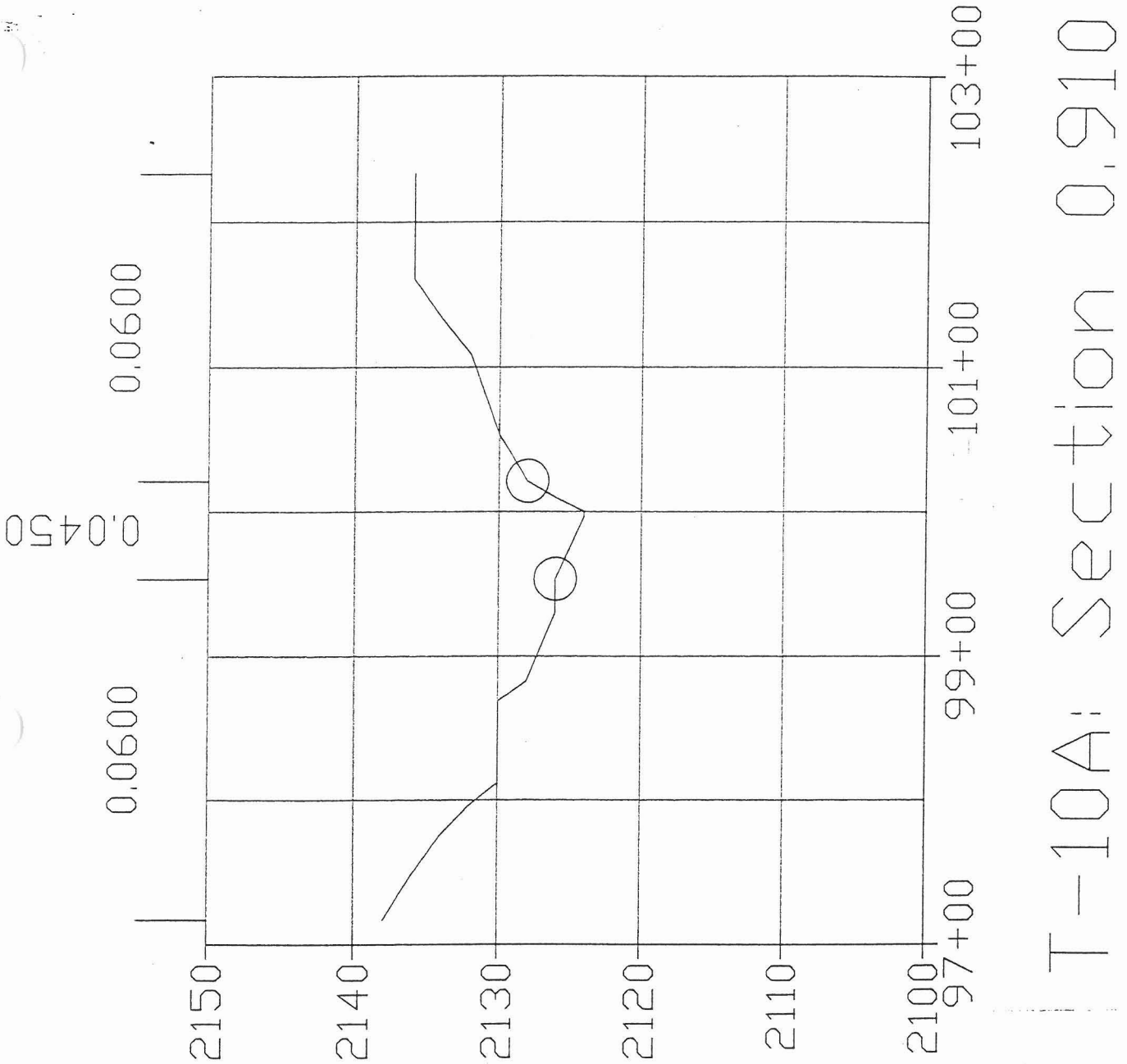


Photo 27 Main Channel, Looking Upstream

Photo 28 Main Channel, Looking Downstream

Photo 29 Left Overbank, Looking Upstream

Photo 30 Left Overbank, Looking Downstream

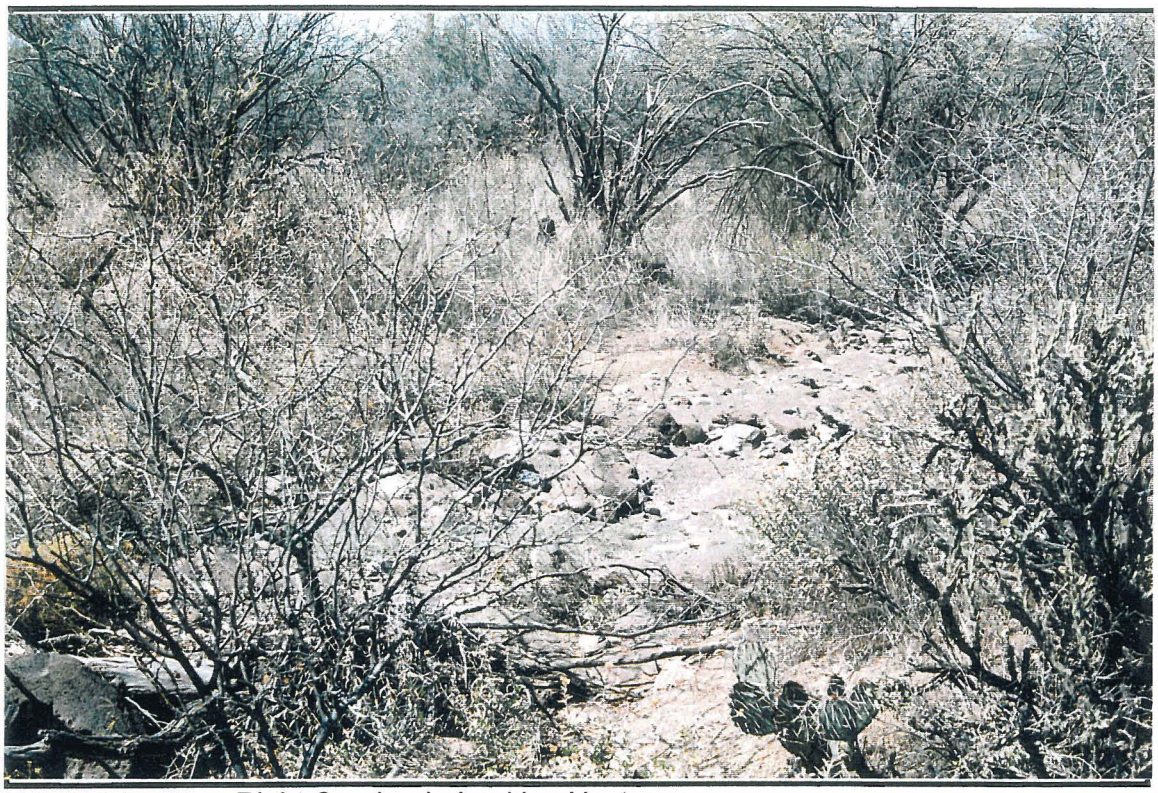


Photo 31 Right Overbank, Looking Upstream

Photo 32 Right Overbank, Looking Downstream

Photo 33 Bed Material

Reach 2:

From a point approximately 1900 feet upstream of the New River Road Bridge over Skunk Creek to the upstream limit of Tributary 10A. Includes Cross-sections 0.987 through 1.200. Reference Appendix B for plan view.

Cross-section: 1.069

Description of Cross-section:

Cross-section 1.069 is located approximately 2600 feet upstream of the New River Road Bridge over Skunk Creek. The main channel bed consists of coarse sands, medium to large cobbles, and a few small boulders. The main channel remains in a natural condition with relatively large palo verde and mesquite trees lining the banks. The overbank remains in a natural state with a relatively dense growth of sage, small palo verde and cactus.

100-year n-value:

Portion of Cross-section	Components	"n" Total
Main Channel	$n_b = 0.035$ $n_1 = 0.005$ $n_2 = 0.005$ $n_3 = 0.0$	0.045
Overbank	$n_b = 0.030$ $n_1 = 0.005$ $n_2 = 0.005$ $n_3 = 0.020$	0.060

Figure 9: Cross-section 1.069

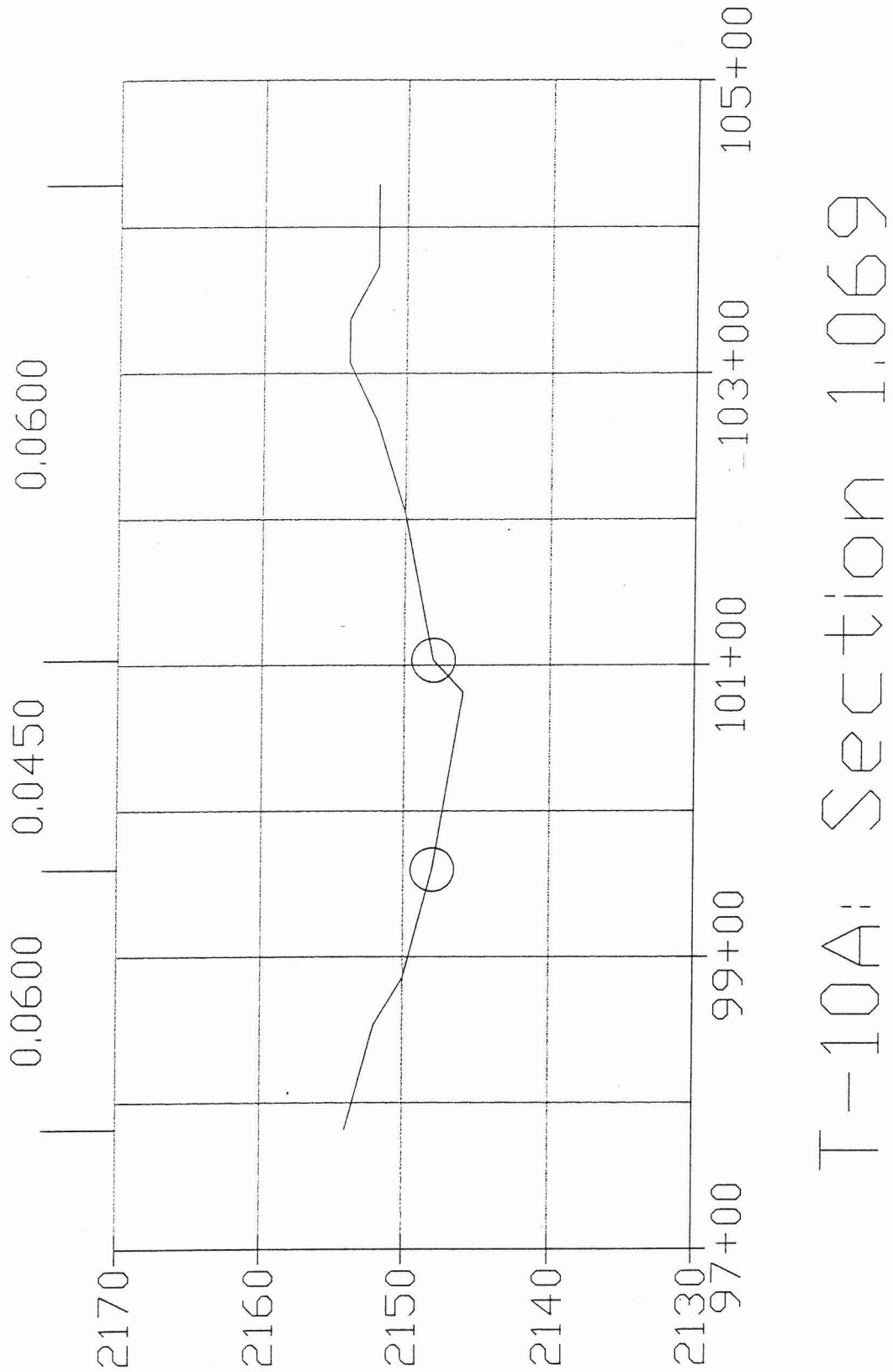


Photo 34 Main Channel, Looking Upstream

Photo 35 Main Channel, Looking Downstream

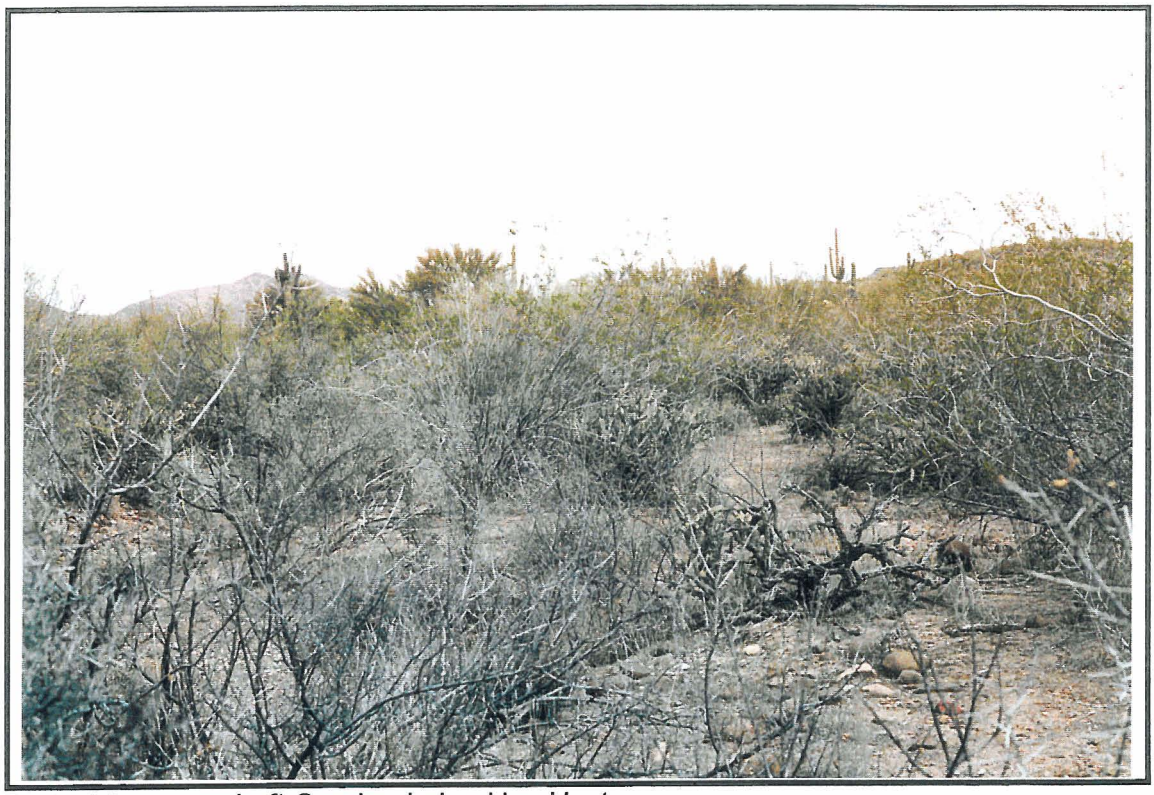


Photo 36 Left Overbank, Looking Upstream

Photo 37 Right Overbank, Looking Upstream

III. D. Tributary 6C

Due to fencing associated with private property, Tributary 6C was inaccessible. Consequently, ground-level photography was not obtained to establish Mannings' n-values for the channel and overbank areas. However, based on aerial photography, available soils mapping, and the field reconnaissance conducted on adjacent tributary watersheds, it is evident that the soils and groundcover in the study area are quite homogeneous. Therefore, n-values established for Tributary 10A, which is similar in size and orientation to Tributary 6C, will be used for Tributary 6C.

Reach 1:

From the confluence of Tributary 6C with Skunk Creek to a point approximately 1500 feet upstream. Includes Cross-section 0.072 though 0.157. Reference Appendix B for plan view. The reference cross-section for the Manning's n-values is Cross-section 0.910 of Tributary 10A.

Reach 2:

From a point approximately 1500 feet upstream of the confluence with Skunk Creek, to the upstream limit of Tributary 6C. Includes Cross-sections 0.245 through 0.923. Reference Appendix B for plan view. The reference cross-section for the Manning's n-values is Cross-section 1.069 of Tributary 10A.

III. E. Tributary 6B

Reach 1:

From the confluence of Tributary 6B with Skunk Creek to a point approximately 1500 feet upstream of Wolftrap Road. Includes Cross-sections 0.164 through 0.476. Reference Appendix B for plan view.

Cross-section: 0.258

Description of Cross-section:

Cross-section 0.258 is located just upstream of Wolftrap Road, approximately 1400 feet upstream of the confluence with Skunk Creek. At this location, the main channel bed consists of coarse sands, medium to large cobbles, and a few small boulders. With the exception of a roadway dip-crossing, the main channel remains in a natural condition with relatively large palo verde and mesquite trees lining the banks. The left overbank remains in a natural state with a relatively dense growth of sage, small palo verde and cactus. The right overbank has experienced some clearing for building construction. The buildings may act as minor obstructions to overbank flow.

100-year n-value:

Portion of Cross-section	Components	"n" Total
Main Channel	$n_b = 0.035$ $n_1 = 0.005$ $n_2 = 0.0$ $n_3 = 0.002$	0.042
Overbank	Left	Right
	$n_b = 0.030$	$n_b = 0.030$
	$n_1 = 0.005$	$n_1 = 0.005$
	$n_2 = 0.005$	$n_2 = 0.015$
	$n_3 = 0.020$	$n_3 = 0.010$
"n" total	0.060	0.060

Figure 10: Cross-section 0.258

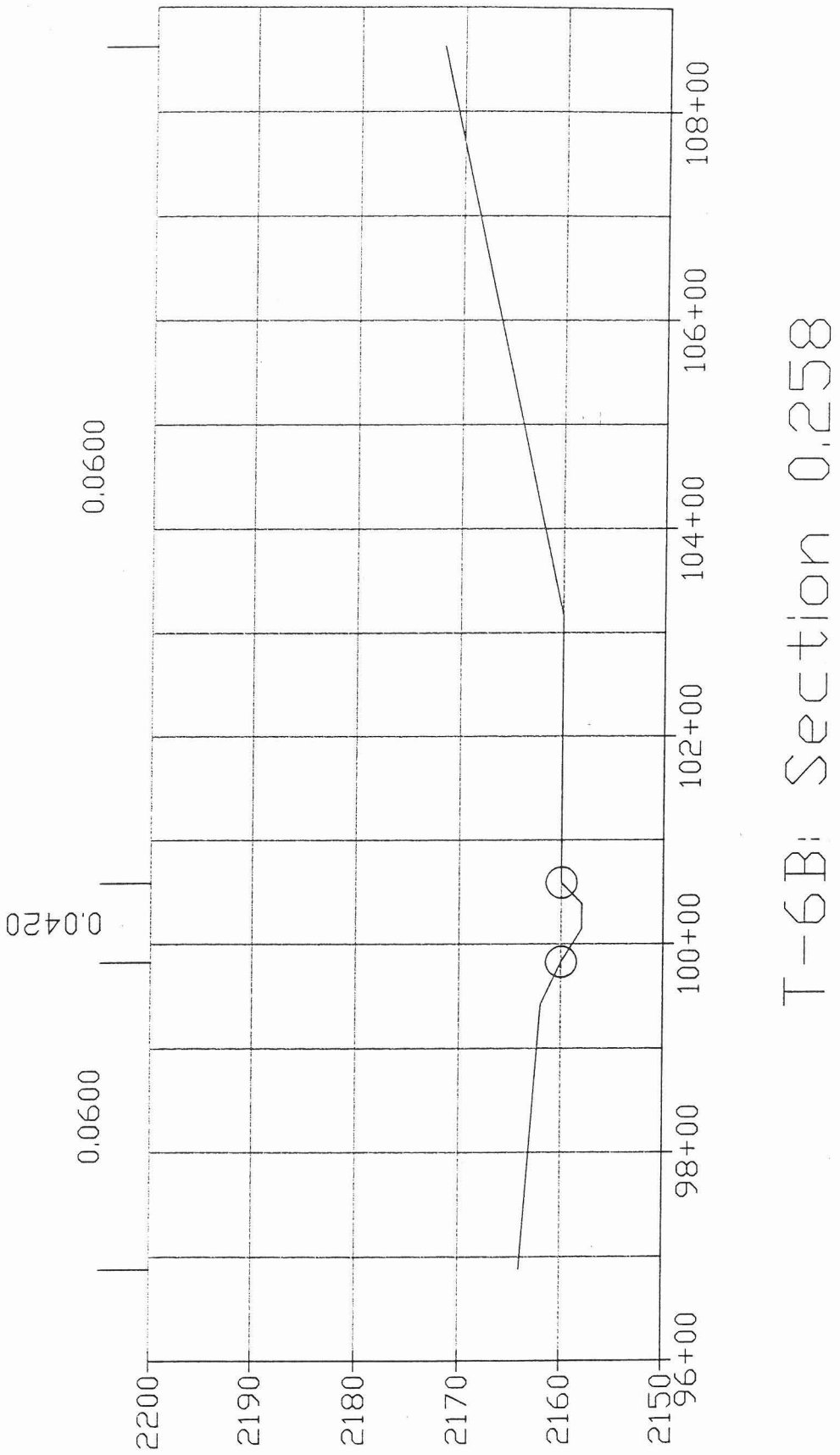


Photo 38 Main Channel, Looking Upstream

Photo 39 Main Channel, Looking Downstream

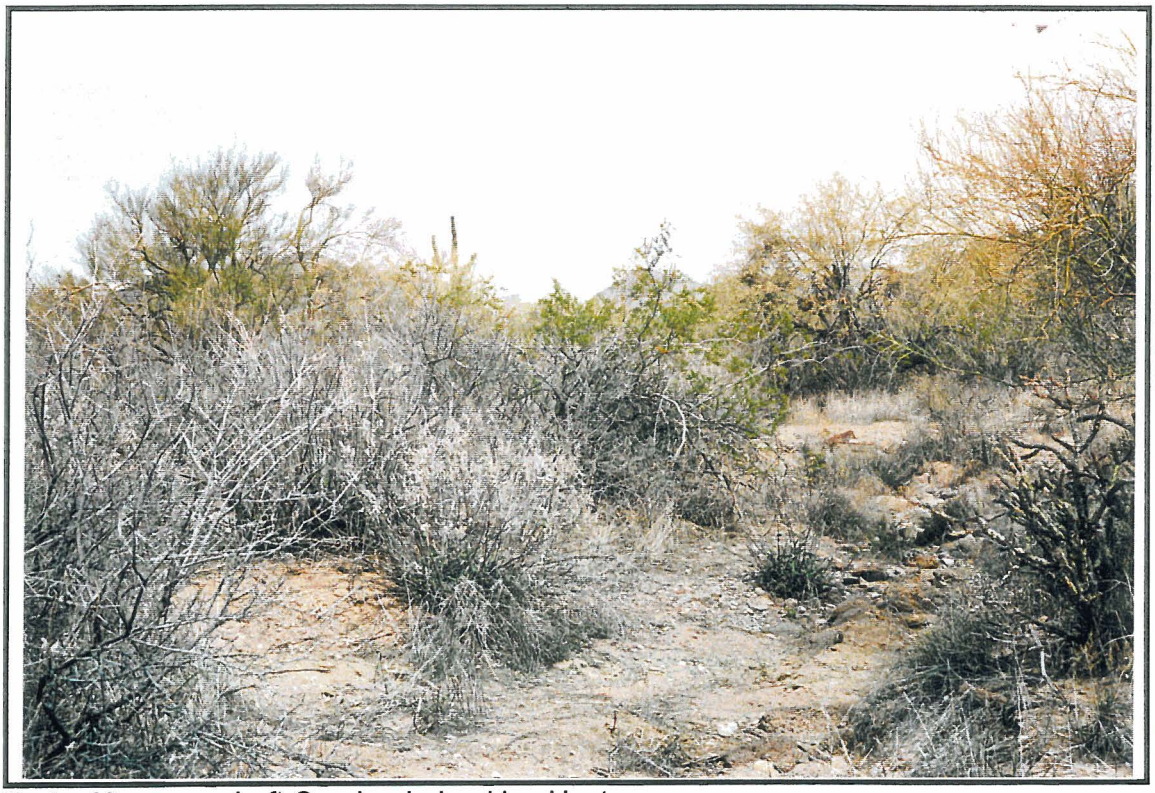


Photo 40 Left Overbank, Looking Upstream

Photo 41 Left Overbank, Looking Downstream

Photo 42 Right Overbank, Looking Upstream

Photo 43 Right Overbank, Looking Downstream

Photo 44 Bed Material

Reach 2:

From a point approximately 1500 feet upstream of Wolftrap Road to a point approximately 2500 feet downstream of the Mingus Lane crossing of Tributary 6B. Includes Cross-sections 0.547 through 0.976. Reference Appendix B for plan view.

Cross-section: 0.703

Description of Cross-section:

Cross-section 0.703 is located approximately 2400 feet upstream of Wolftrap Road. At this location, the main channel bed consists of coarse sands, medium to large cobbles, and small boulders. The main channel remains in a natural condition with relatively large palo verde and mesquite trees lining the banks. The overbank remains in a natural state with a relatively dense growth of sage, small palo verde and cactus.

100-year n-value:

Portion of Cross-section	Components	"n" Total
Main Channel	$n_b = 0.035$ $n_1 = 0.005$ $n_2 = 0.0$ $n_3 = 0.002$	0.042
Overbank	$n_b = 0.030$ $n_1 = 0.005$ $n_2 = 0.005$ $n_3 = 0.025$	0.065

Figure 11: Cross-section 0.703

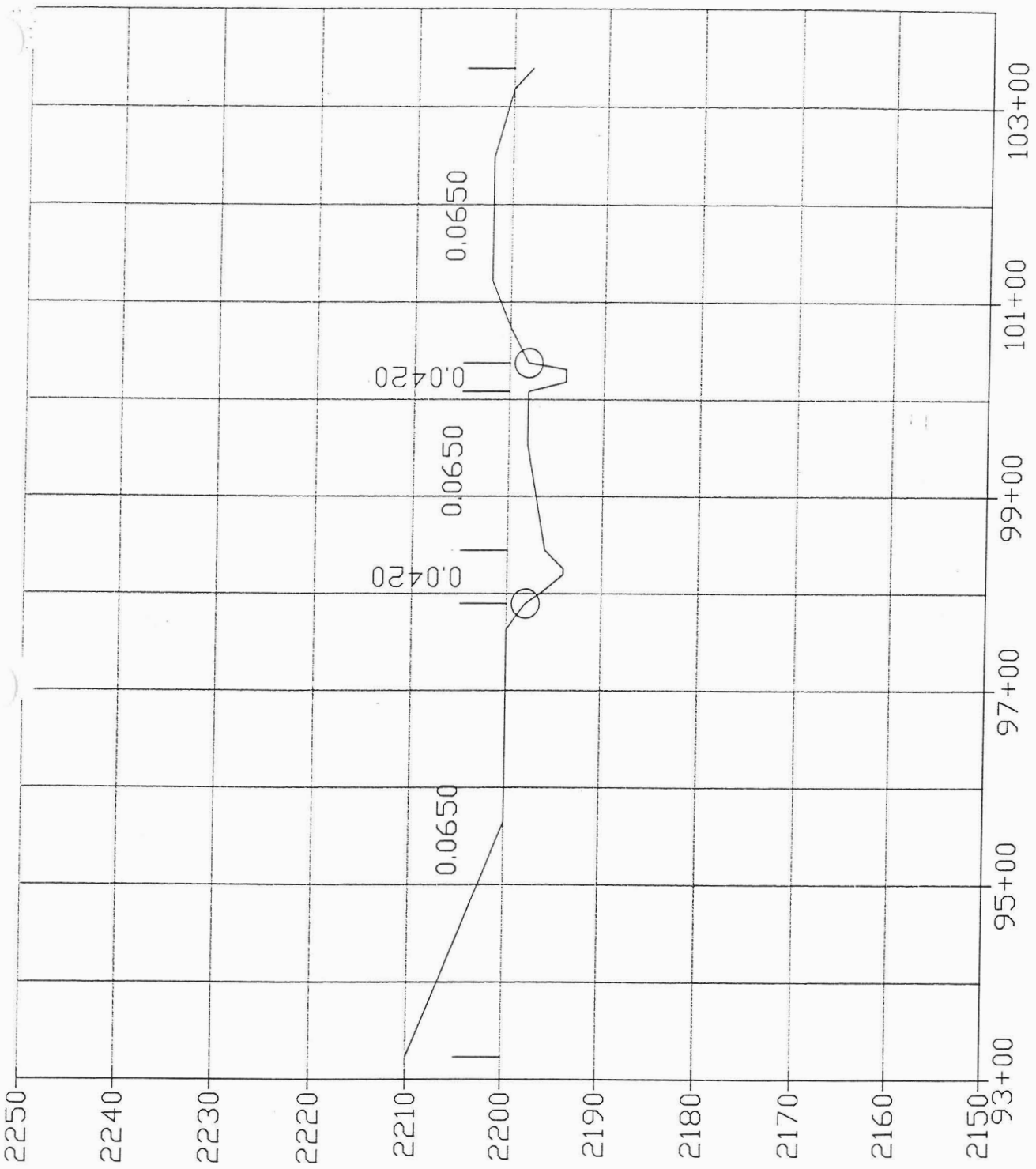


Photo 45 Main Channel, Looking Upstream

Photo 46 Main Channel, Looking Downstream

Photo 47 Left Overbank, Looking Upstream

Photo 48 Right Overbank, Looking Upstream

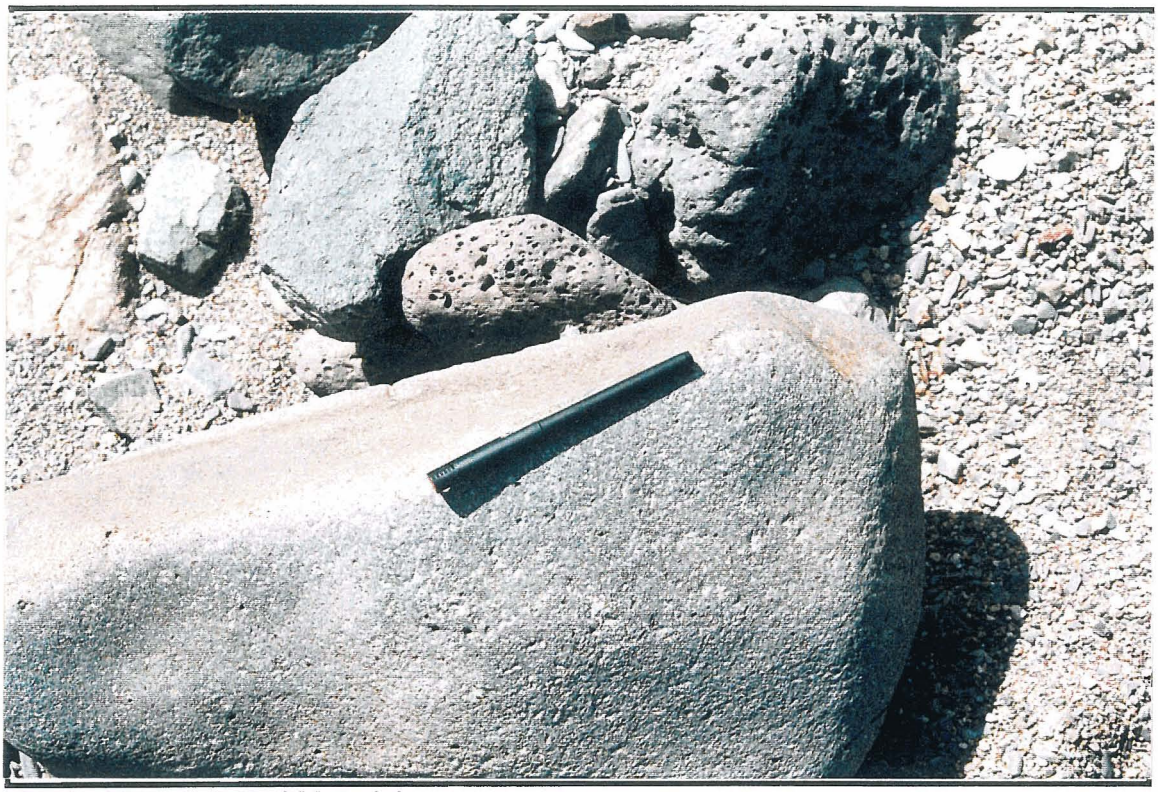


Photo 49 Bed Material

Reach 3:

From a point approximately 2500 feet downstream of the Mingus Lane crossing to the Mingus Lane crossing of Tributary 6B. Includes Cross-sections 1.056 through 1.480. Reference Appendix B for plan view.

Cross-section: 1.135

Description of Cross-section:

Cross-section 1.135 is located approximately 1800 feet downstream of the Mingus Lane crossing of Tributary 6B. At this location, the main channel bed consists of coarse sands, medium to large cobbles, and small boulders. The main channel remains in a natural condition with relatively large palo verde and mesquite trees lining the banks. The overbank remains in a natural state with a relatively dense growth of sage, small palo verde and cactus.

100-year n-value:

Portion of Cross-section	Components	"n" Total
Main Channel	$n_b = 0.035$ $n_1 = 0.005$ $n_2 = 0.0$ $n_3 = 0.002$	0.042
Overbank	$n_b = 0.030$ $n_1 = 0.005$ $n_2 = 0.005$ $n_3 = 0.025$	0.065

Figure 12: Cross-section 1.135

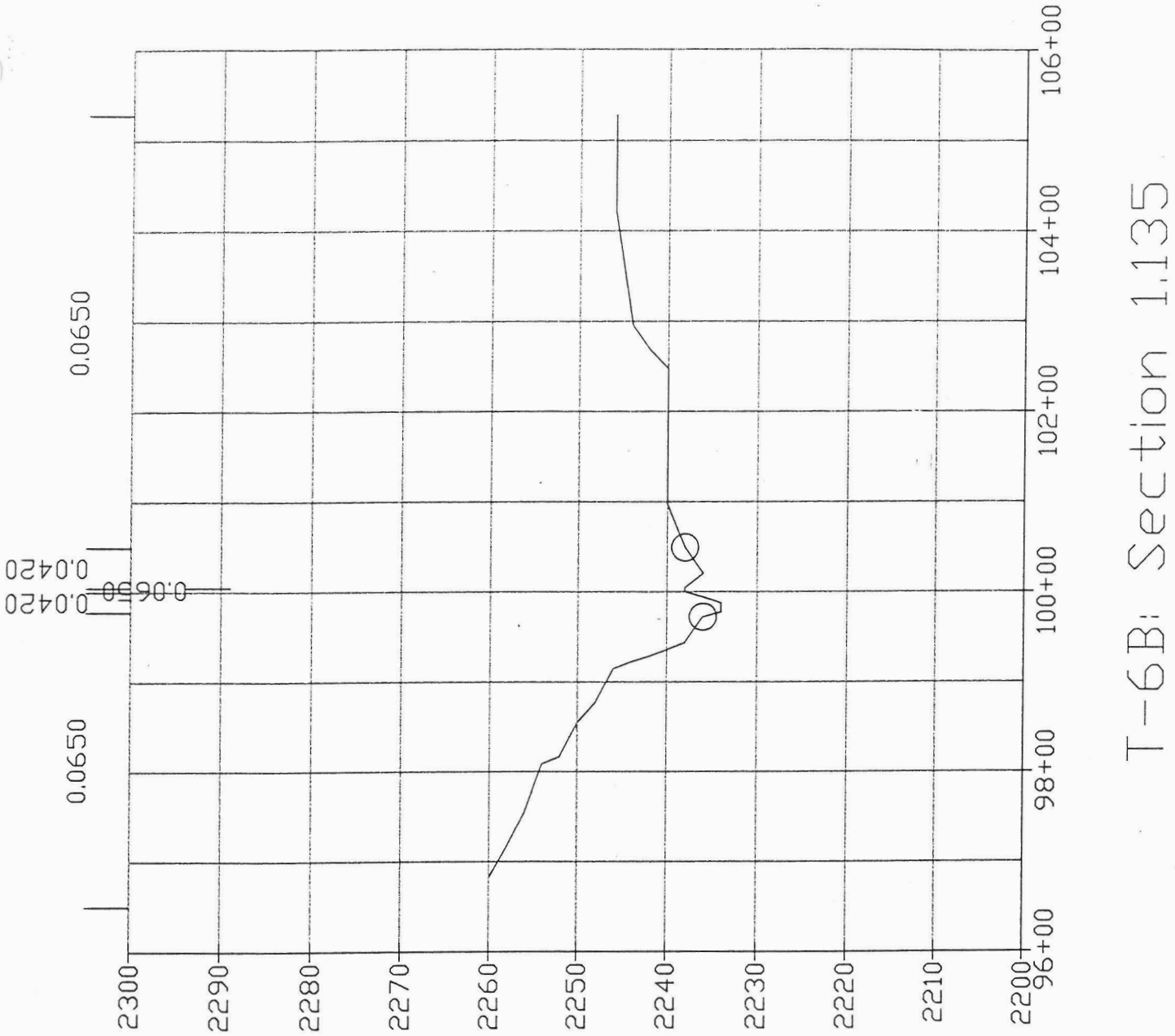


Photo 50 Main Channel, Looking Upstream

Photo 51 Main Channel, Looking Downstream

Photo 52 Left Overbank, Looking Upstream

Photo 53 Left Overbank, Looking Downstream

Photo 54 Right Overbank, Looking Upstream

Photo 55 Right Overbank, Looking Downstream

Photo 56 Bed Material

Reach 4:

From the Mingus Lane crossing of Tributary 6B to the Tonto National Forest Boundary. Includes Cross-sections 1.486 through 1.791. Reference Appendix B for plan view.

Cross-section: 1.530

Description of Cross-section:

Cross-section 1.530 is located approximately 250 feet upstream of the Mingus Lane crossing of Tributary 6B. At this location, the main channel bed consists of coarse sands and medium cobbles. The main channel remains in a natural condition with relatively large palo verde and mesquite trees lining the banks. The overbank remains in a natural state with a relatively dense growth of sage, small palo verde and cactus.

100-year n-value:

Portion of Cross-section	Components	"n" Total
Main Channel	$n_b = 0.030$ $n_1 = 0.0$ $n_2 = 0.0$ $n_3 = 0.005$	0.035
Overbank	$n_b = 0.030$ $n_1 = 0.005$ $n_2 = 0.005$ $n_3 = 0.025$	0.065

Figure 13: Cross-section 1.530

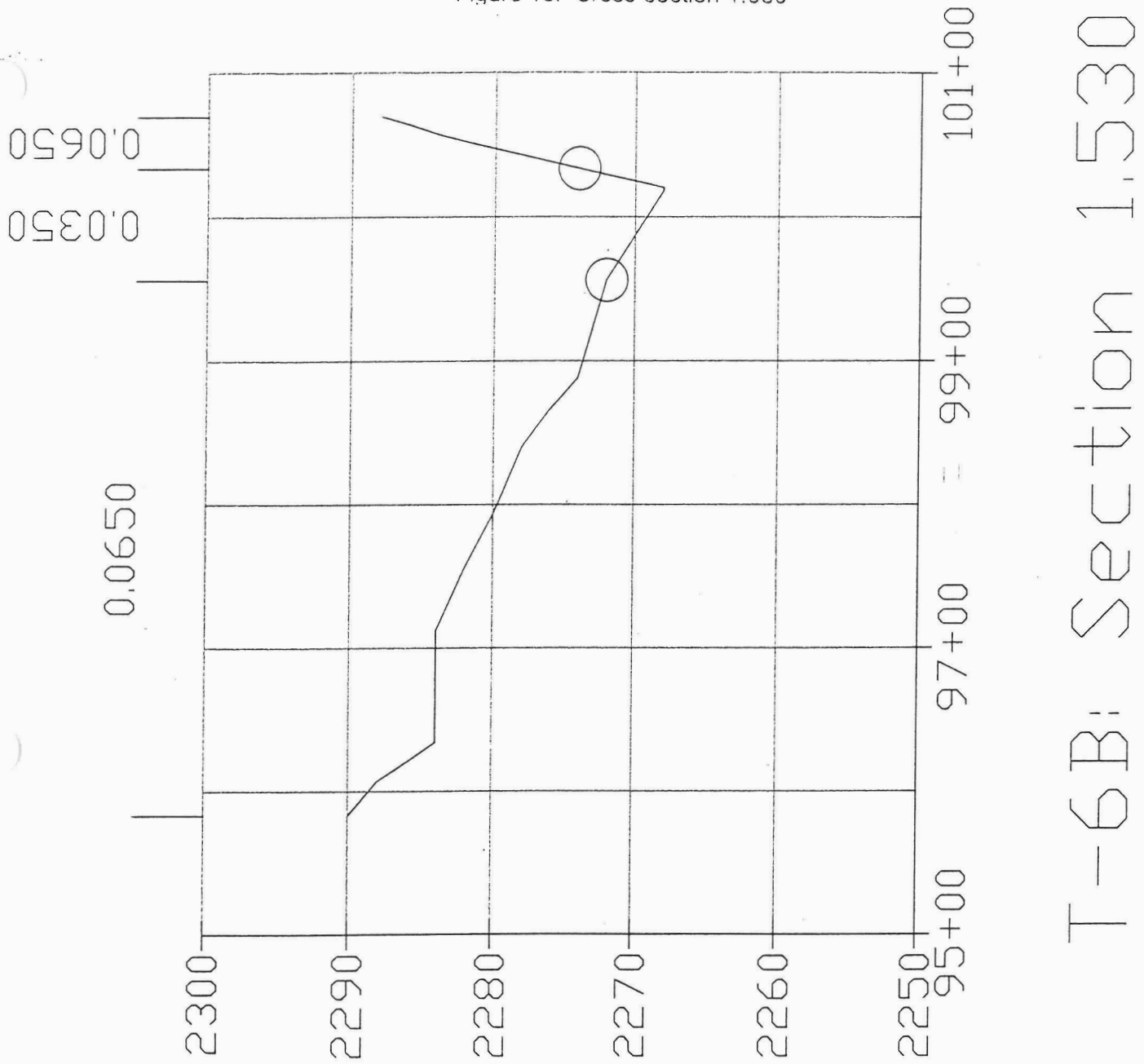


Photo 57 Main Channel, Looking Upstream

Photo 58 Bed Material

Photo 59 Left Overbank, Looking Upstream

Photo 60 Right Overbank, Looking Upstream

IV. SUMMARY

The following table presents a summary of recommended Manning's n-values, and the proposed contraction and expansion coefficients for the five tributaries to Skunk Creek.

Representative Cross-Section	Main Channel "n"	Overbank "n"	Contraction Coefficient	Expansion Coefficient	Begin Cross-Section	End Cross-Section
Tributary 12						
0.398	0.045	0.060	0.3	0.5	Confluence	0.398
(2-60" CMP)	(0.024)					
0.420	0.042	0.050 (lob)	0.3	0.5	0.420	0.564
		0.060 (rob)				
0.847	0.035	0.065	0.1	0.3	0.659	0.847
0.942	0.040	0.065	0.1	0.3	0.942	1.416
Tributary 10B						
0.100			0.3	0.5		
(2-60" RCP)	(0.015)					
0.121	0.042	0.065	0.3	0.5	Confluence	0.295
0.345	0.040	0.060	0.1	0.3	0.345	1.296
Tributary 10A						
0.910	0.045	0.060	0.1	0.3	Confluence	0.910
1.069	0.045	0.060	0.1	0.3	0.987	1.200
Tributary 6C						
0.910 (T-10A)	0.045	0.060	0.1	0.3	Confluence	0.157
1.069 (T-10A)	0.045	0.060	0.1	0.3	0.245	0.923
Tributary 6B						
0.258	0.042	0.060	0.1	0.3	Confluence	0.476
0.703	0.042	0.065	0.1	0.3	0.547	0.976
1.135	0.042	0.065	0.1	0.3	1.056	1.480
1.480			0.3	0.5		
(10'x6' RCB)	(0.015)					
1.486			0.3	0.5		
1.530	0.035	0.065	0.1	0.3	1.486	1.791

IV. REFERENCES

U.S. Army Corps of Engineers, Hydrologic Engineering Center, "HEC-RAS River Analysis System," Users Manual, Version 2.0, April, 1997.

Thomsen, B.W., and H.W. Hjalmerson, "Estimated Manning's Roughness Coefficients for Stream Channels and Flood Plains in Maricopa County, Arizona", United States Geological Survey, April, 1991.

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United States Geogological Survey, 7.5 Minute Quadrangle Map, "Daisy Mountain, AZ", 1964.

United States Department of Agriculture, Soil Conservation Service, "Soils Survey of Aguila-Carefree Area, Parts of Maricopa and Pinal Counties, Arizona", 1985.

Flood Control District of Maricopa County, Engineering Division, Hydrology Branch, "Skunk Creek 3 Tributaries Floodplain Delineation Study, Hydrologic Analysis", August, 1998.

APPENDIX A

Photographic Record of Hydraulic Structures

Photo 61 Looking at Upstream Face

Photo 62 Looking at Downstream Face

Photo 63 Looking at Upstream Face

Photo 64 Looking at Downstream Face

Photo 65 Looking at Upstream Face

Photo 66 Looking at Downstream Face

APPENDIX B

Proposed Cross-section Locations/Preliminary Work Maps

FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY

TOPOGRAPHIC MAPPING AND
FLOODPLAIN DELINEATION STUDY
FOR TRIBUTARIES TO SKUNK CREEK

MARICOPA COUNTY, ARIZONA

F.C.D. CONTRACT NO. 98-22

N

SHEET 1

SHEET 2

SHEET 3

SHEET 4

SHEET 5

SHEET 6

SHEET 7

SHEET 8

SKUNK CREEK

NEW RIVER

CAVE CREEK

TRIBUTARY 105

TRIBUTARY 13

TRIBUTARY 10

TRIBUTARY 8C

TRIBUTARY 8B

TONTO NATIONAL FOREST BOUNDARY

App. B maps empty in final TDM. These Xsec LOCATION MAPS were ADDED on 8-9-01 FROM Apr. 99 REPORT

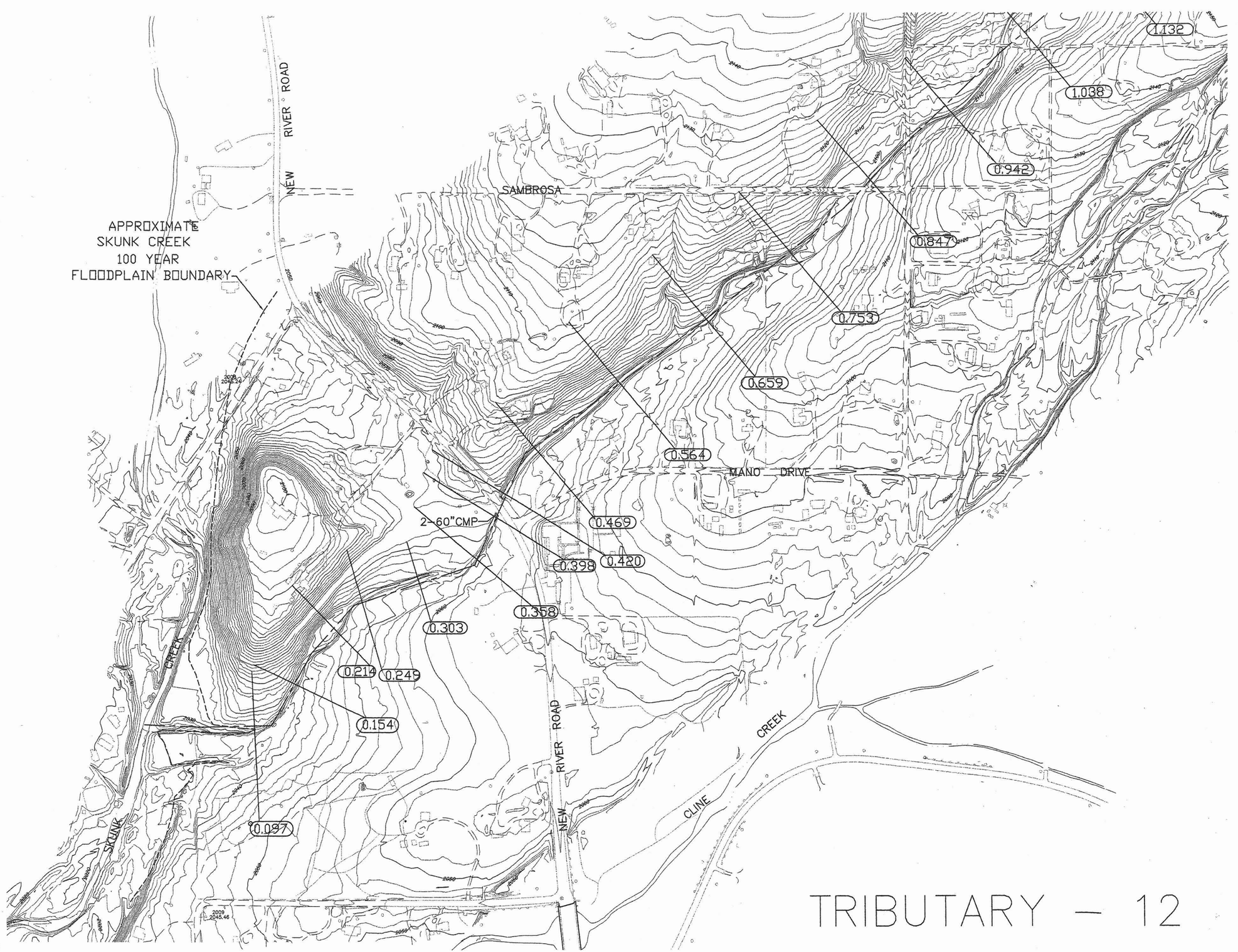
0 600' 1200'

SCALE: 1" = 600'

CONTOUR INTERVAL = 2 FEET

SIMONS, LI & ASSOCIATES, INC.

	BY	DATE	
DESIGN	LX	4/99	FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
DESIGN CHK.	BSB	4/99	
PLANS	ML	4/99	RECOMMENDED BY: DATE
PLANS CHK.	BSB	4/99	APPROVED BY: DATE
SUBMITTED BY: DATE:			SHEET 1 OF 1



TRIBUTARY – 12

FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY

TOPOGRAPHIC MAPPING AND
FLOODPLAIN DELINEATION STUDY
FOR TRIBUTARIES TO SKUNK CREEK

MARICOPA COUNTY, ARIZONA

F.C.D. CONTRACT NO. 98-22

LEGEND

- SECTION LINE
- CORPORATE BOUNDARY
- 100-YEAR FLOODPLAIN BOUNDARY
- FLOODWAY BOUNDARY
- HYDRAULIC BASE LINE
- CROSS-SECTION (FP=FLOODPLAIN WSE, FW=FLOODWAY WSE, 7.432)
- BASE FLOOD ELEVATION (1180)
- ELEVATION REFERENCE MARK (RM)
- BUILDING
- ROAD/PAVEMENT
- DIRT ROAD
- INDEX CONTOUR (1110)
- INTERMEDIATE CONTOUR
- WASH/ DRAINAGE/WATERLINE
- TREE LINE
- SPOT ELEVATION
- HOR & VERT CONTROL POINT
- VERTICAL CONTROL POINT
- SECTION CORNER
- QUARTER CORNER

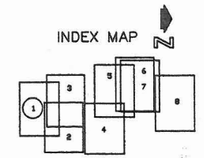
NOTES

1. CROSS-SECTION STATION 10,000 IS THE HYDRAULIC BASELINE EXCEPT WHERE NOTED.

ELEVATION REFERENCE MARKS

NOTE: ALL ELEVATIONS ARE BASED ON NATIONAL GEODETIC VERTICAL DATUM OF 1929

INDEX MAP



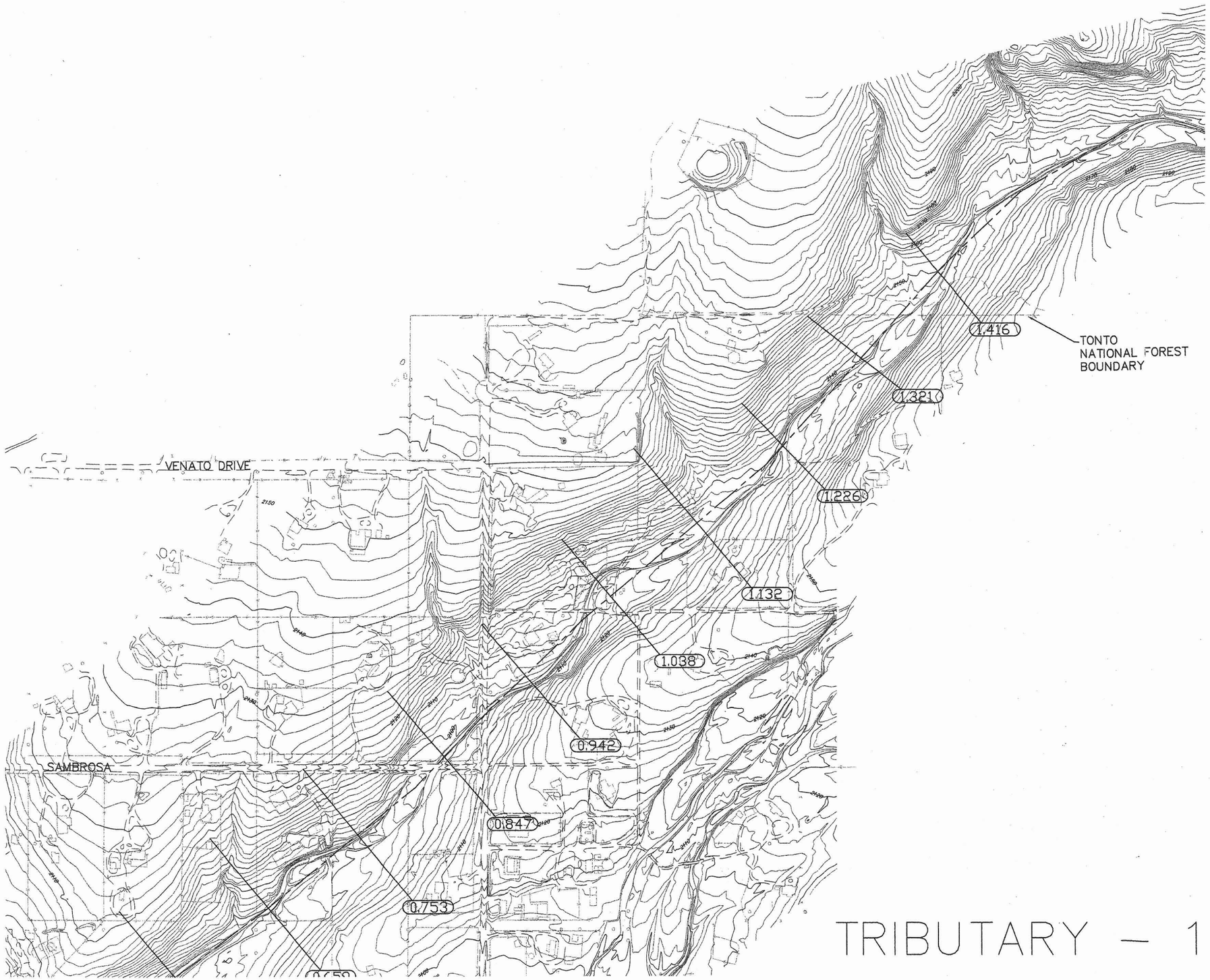
0 200' 400' 600'

SCALE: 1" = 200'

CONTOUR INTERVAL = 2 FEET

SIMONS, LI & ASSOCIATES, INC.

	BY	DATE	
DESIGN	LX	4/99	FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
DESIGN CHK.	BSB	4/99	
PLANS	ML	4/99	RECOMMENDED BY: DATE
PLANS CHK.	BSB	4/99	APPROVED BY: DATE
SUBMITTED BY: DATE:			SHEET 1 OF 8



TRIBUTARY – 12

FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY

TOPOGRAPHIC MAPPING AND
FLOODPLAIN DELINEATION STUDY
FOR TRIBUTARIES TO SKUNK CREEK

MARICOPA COUNTY, ARIZONA

F.C.D. CONTRACT NO. 98–22

LEGEND

- SECTION LINE
- CORPORATE BOUNDARY
- 100–YEAR FLOODPLAIN BOUNDARY
- FLOODWAY BOUNDARY
- HYDRAULIC BASE LINE
- CROSS–SECTION (FP=FLOODPLAIN WSE, FW=FLOODWAY WSE) (1,432)
- BASE FLOOD ELEVATION 1180
- ELEVATION REFERENCE MARK RM
- BUILDING
- ROAD/PAVEMENT
- DIRT ROAD
- INDEX CONTOUR 1110
- INTERMEDIATE CONTOUR
- WASH/ DRAINAGE/WATERLINE
- TREE LINE
- SPOT ELEVATION
- HOR & VERT CONTROL POINT
- VERTICAL CONTROL POINT
- SECTION CORNER
- QUARTER CORNER

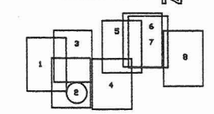
NOTES

1. CROSS–SECTION STATION 10,000 IS THE HYDRAULIC BASELINE EXCEPT WHERE NOTED.

ELEVATION REFERENCE MARKS

NOTE: ALL ELEVATIONS ARE BASED ON NATIONAL GEODETIC VERTICAL DATUM OF 1929

INDEX MAP



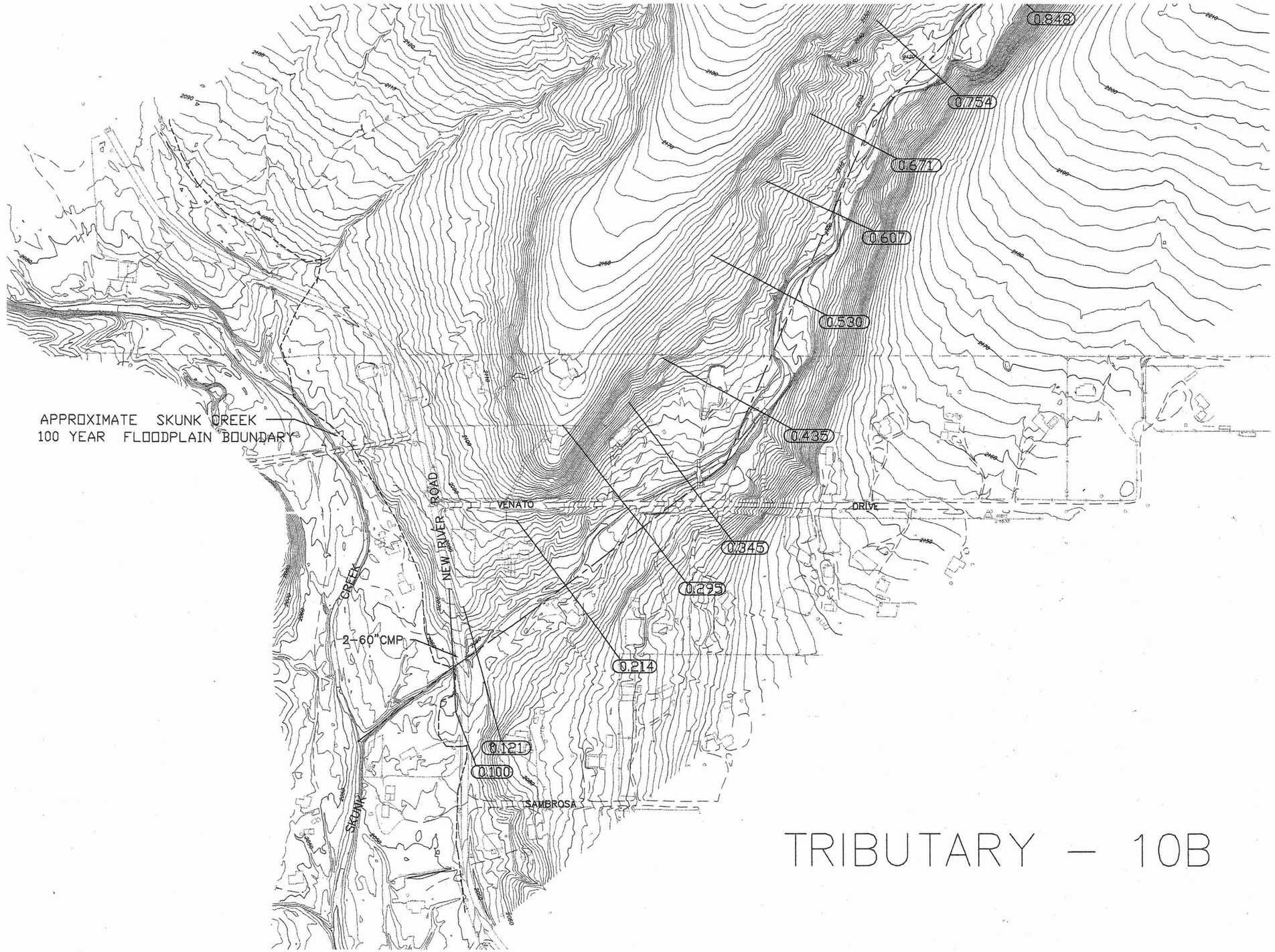
0 200' 400' 600'

SCALE: 1" = 200'

CONTOUR INTERVAL = 2 FEET

SIMONS, LI & ASSOCIATES, INC.

	BY	DATE	
DESIGN	LX	4/99	FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
DESIGN CHK.	BSB	4/99	
PLANS	ML	4/99	RECOMMENDED BY: DATE
PLANS CHK.	BSB	4/99	APPROVED BY: DATE
SUBMITTED BY: DATE:			SHEET 2 OF 8



TRIBUTARY – 10B

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

TOPOGRAPHIC MAPPING AND FLOODPLAIN DELINEATION STUDY FOR TRIBUTARIES TO SKUNK CREEK

MARICOPA COUNTY, ARIZONA

F.C.D. CONTRACT NO. 98–22

LEGEND

- SECTION LINE
- CORPORATE BOUNDARY
- 100–YEAR FLOODPLAIN BOUNDARY
- FLOODWAY BOUNDARY
- HYDRAULIC BASE LINE
- CROSS–SECTION (FP=FLOODPLAIN WSE, FW=FLOODWAY WSE; 1.432)
- BASE FLOOD ELEVATION (1160)
- ELEVATION REFERENCE MARK (RM)
- BUILDING
- ROAD/PAVEMENT
- DIRT ROAD
- INDEX CONTOUR (1110)
- INTERMEDIATE CONTOUR
- WASH/ DRAINAGE/WATERLINE
- TREE LINE
- SPOT ELEVATION (21.4)
- HOR & VERT CONTROL POINT
- VERTICAL CONTROL POINT
- SECTION CORNER
- QUARTER CORNER

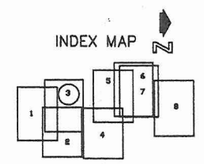
NOTES

1. CROSS–SECTION STATION 10,000 IS THE HYDRAULIC BASELINE EXCEPT WHERE NOTED.

ELEVATION REFERENCE MARKS

NOTE: ALL ELEVATIONS ARE BASED ON NATIONAL GEODETIC VERTICAL DATUM OF 1929

INDEX MAP



N

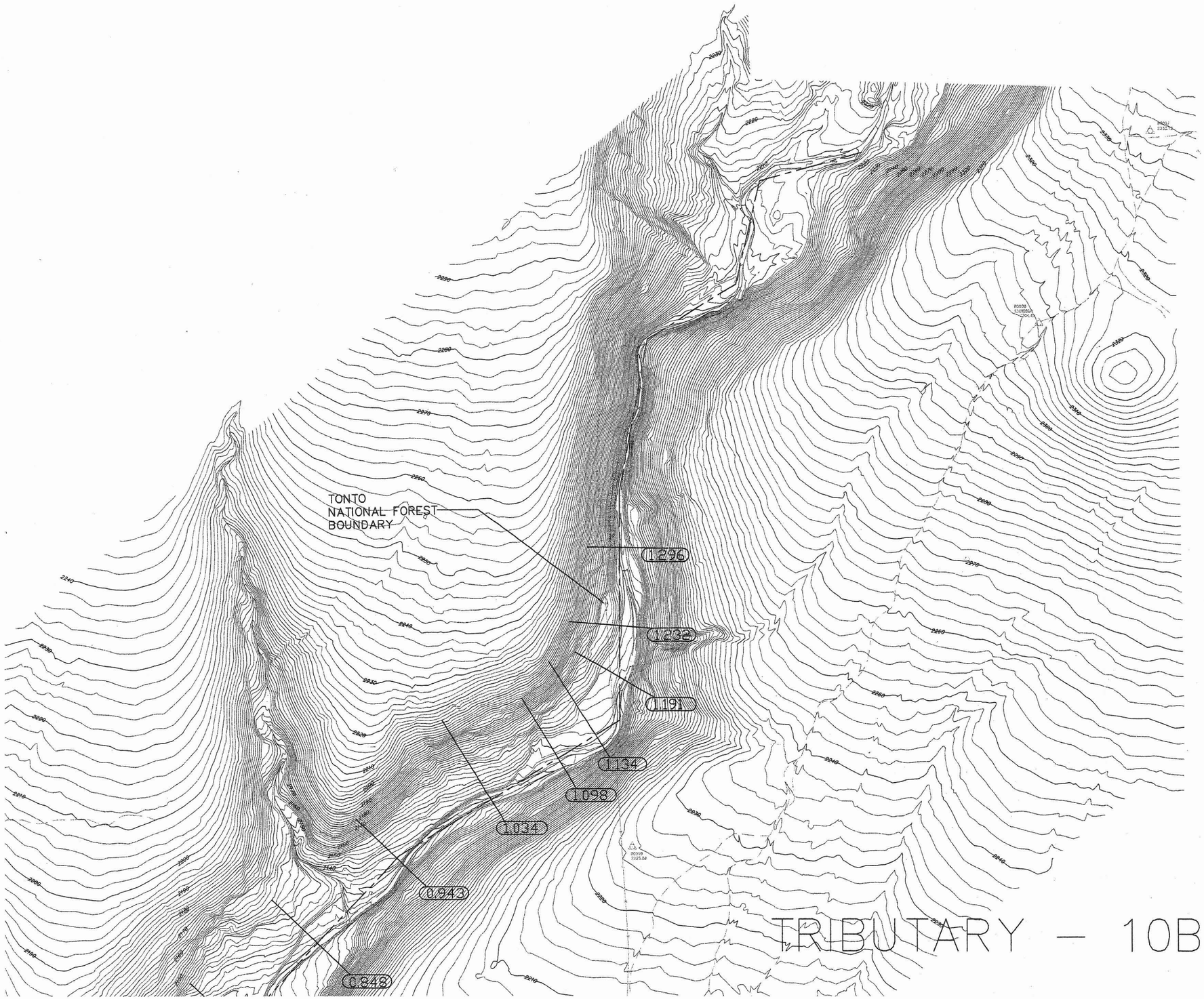
0 200' 400' 600'

SCALE: 1" = 200'

CONTOUR INTERVAL = 2 FEET

SIMONS, LI & ASSOCIATES, INC.

	BY	DATE	
DESIGN	LX	4/99	FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
DESIGN CHK.	BSB	4/99	
PLANS	BAL	4/99	RECOMMENDED BY: DATE
PLANS CHK.	BSB	4/99	APPROVED BY: DATE
SUBMITTED BY: DATE:			SHEET 3 OF 8



FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY

TOPOGRAPHIC MAPPING AND FLOODPLAIN DELINEATION STUDY FOR TRIBUTARIES TO SKUNK CREEK

MARICOPA COUNTY, ARIZONA

F.C.D. CONTRACT NO. 98–22

LEGEND

- SECTION LINE
- CORPORATE BOUNDARY
- 100–YEAR FLOODPLAIN BOUNDARY
- FLOODWAY BOUNDARY
- HYDRAULIC BASE LINE
- CROSS–SECTION — FP=FLOODPLAIN WSE, FW=FLOODWAY WSE (7.432)
- BASE FLOOD ELEVATION — 1160
- ELEVATION REFERENCE MARK — RM
- BUILDING
- ROAD/PAVEMENT
- DIRT ROAD
- INDEX CONTOUR — 1170
- INTERMEDIATE CONTOUR
- WASH/ DRAINAGE/WATERLINE
- TREE LINE
- SPOT ELEVATION — 21.4
- HOR & VERT CONTROL POINT
- VERTICAL CONTROL POINT
- SECTION CORNER
- QUARTER CORNER

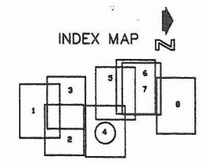
NOTES

1. CROSS–SECTION STATION 10,000 IS THE HYDRAULIC BASELINE EXCEPT WHERE NOTED.

ELEVATION REFERENCE MARKS

NOTE: ALL ELEVATIONS ARE BASED ON NATIONAL GEODETIC VERTICAL DATUM OF 1929

INDEX MAP



N

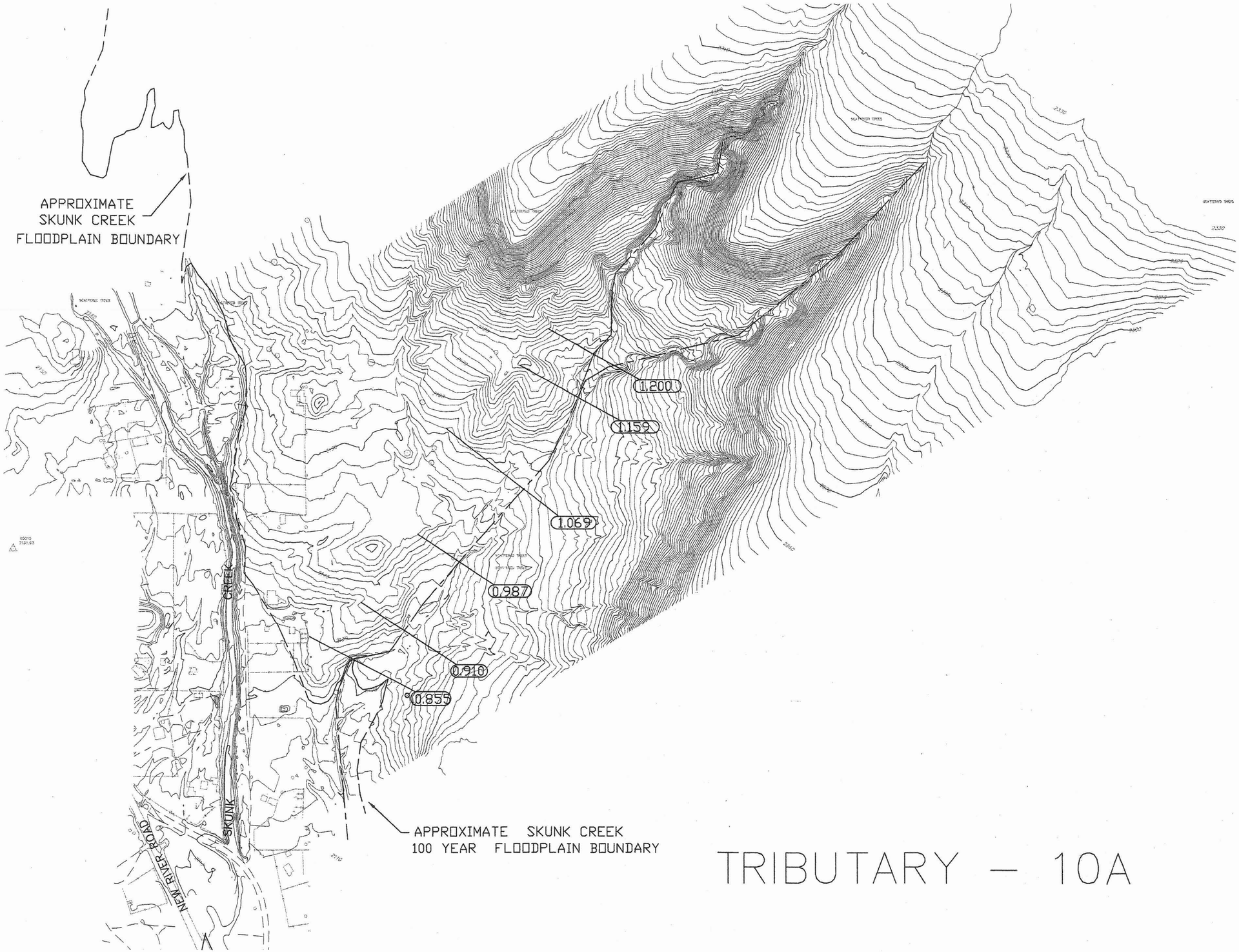
0 200' 400' 600'

SCALE: 1" = 200'

CONTOUR INTERVAL = 2 FEET

SIMONS, LI & ASSOCIATES, INC.

	BY	DATE	
DESIGN	LX	4/99	FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
DESIGN CHK.	BSB	4/99	
PLANS	ML	4/99	RECOMMENDED BY: DATE
PLANS CHK.	BSB	4/99	APPROVED BY: DATE
SUBMITTED BY: DATE:			SHEET 4 OF 8



TRIBUTARY – 10A

FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY

TOPOGRAPHIC MAPPING AND
FLOODPLAIN DELINEATION STUDY
FOR TRIBUTARIES TO SKUNK CREEK

MARICOPA COUNTY, ARIZONA

F.C.D. CONTRACT NO. 98–22

LEGEND

- SECTION LINE
- CORPORATE BOUNDARY
- 100–YEAR FLOODPLAIN BOUNDARY
- FLOODWAY BOUNDARY
- HYDRAULIC BASE LINE
- CROSS–SECTION (FP=FLOODPLAIN WSE / FW=FLOODWAY WSE) 1,482
- BASE FLOOD ELEVATION 1160
- ELEVATION REFERENCE MARK △ RM
- BUILDING
- ROAD/PAVEMENT
- DIRT ROAD
- INDEX CONTOUR 1110
- INTERMEDIATE CONTOUR
- WASH/ DRAINAGE/WATERLINE
- TREE LINE
- SPOT ELEVATION 21.4
- HOR & VERT CONTROL POINT △
- VERTICAL CONTROL POINT ⊙
- SECTION CORNER
- QUARTER CORNER

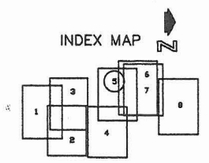
NOTES

1. CROSS–SECTION STATION 10,000 IS THE HYDRAULIC BASELINE EXCEPT WHERE NOTED.

ELEVATION REFERENCE MARKS

NOTE: ALL ELEVATIONS ARE BASED ON NATIONAL GEODETIC VERTICAL DATUM OF 1929

INDEX MAP



N

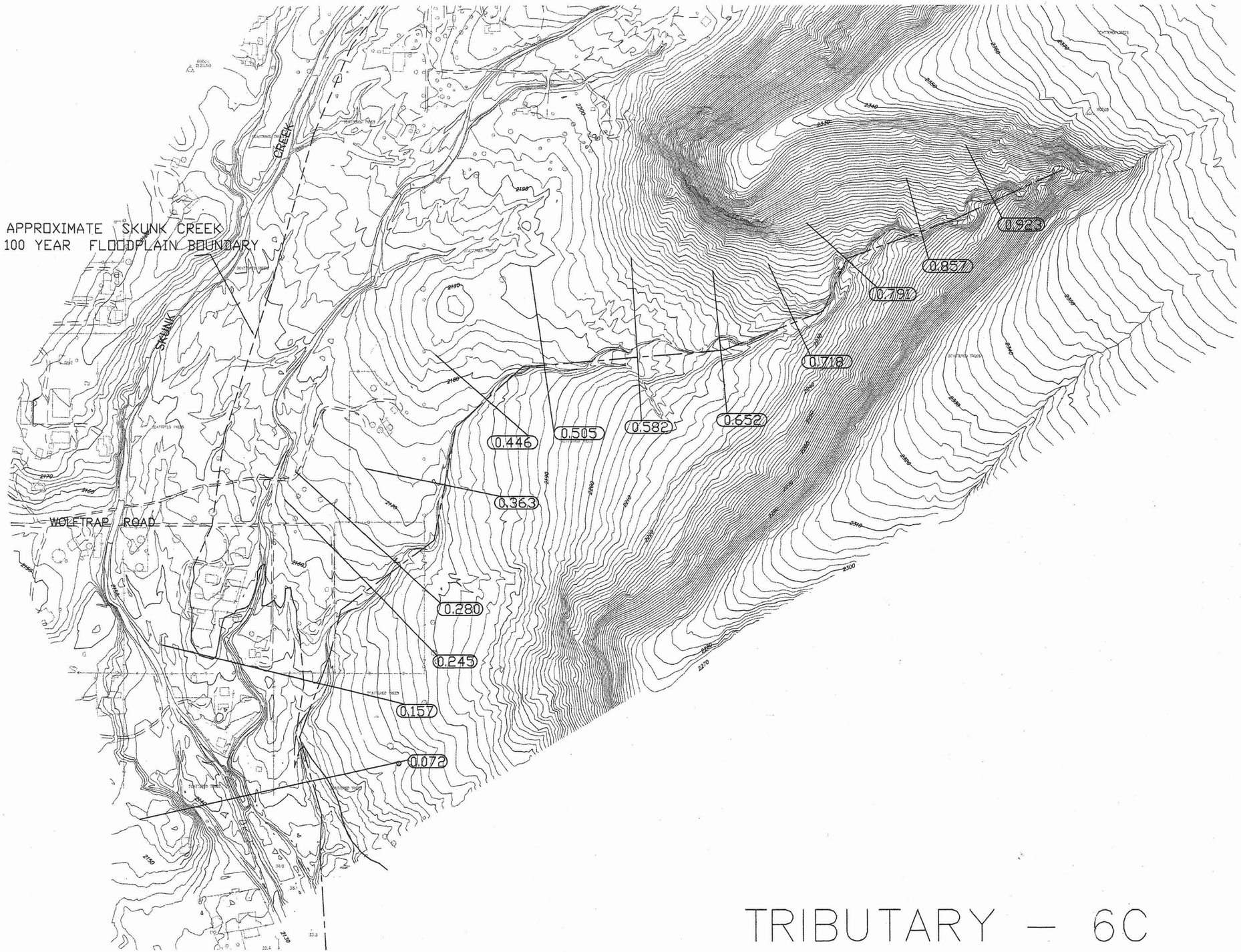
0 200' 400' 600'

SCALE: 1" = 200'

CONTOUR INTERVAL = 2 FEET

SIMONS, LI & ASSOCIATES, INC.

	BY	DATE	
DESIGN	LX	4/99	FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
DESIGN CHK.	BSB	4/99	
PLANS	ML	4/99	RECOMMENDED BY: DATE
PLANS CHK.	BSB	4/99	APPROVED BY: DATE
SUBMITTED BY: DATE:			SHEET 5 OF 8



TRIBUTARY – 6C

FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY

TOPOGRAPHIC MAPPING AND
FLOODPLAIN DELINEATION STUDY
FOR TRIBUTARIES TO SKUNK CREEK

MARICOPA COUNTY, ARIZONA

F.C.D. CONTRACT NO. 98-22

LEGEND

- SECTION LINE
- CORPORATE BOUNDARY
- 100-YEAR FLOODPLAIN BOUNDARY
- FLOODWAY BOUNDARY
- HYDRAULIC BASE LINE
- CROSS-SECTION (FP=FLOODPLAIN WSE, FW=FLOODWAY WSE) 1.432
- BASE FLOOD ELEVATION 1160
- ELEVATION REFERENCE MARK RM
- BUILDING
- ROAD/PAVEMENT
- DIRT ROAD
- INDEX CONTOUR 1110
- INTERMEDIATE CONTOUR
- WASH/ DRAINAGE/WATERLINE
- TREE LINE
- SPOT ELEVATION 21.4
- HOR & VERT CONTROL POINT
- VERTICAL CONTROL POINT
- SECTION CORNER
- QUARTER CORNER

NOTES

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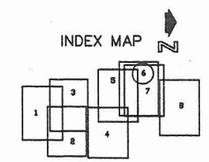
ELEVATION REFERENCE MARKS

NOTE: ALL ELEVATIONS ARE BASED ON NATIONAL GEODETIC VERTICAL DATUM OF 1929

INDEX MAP



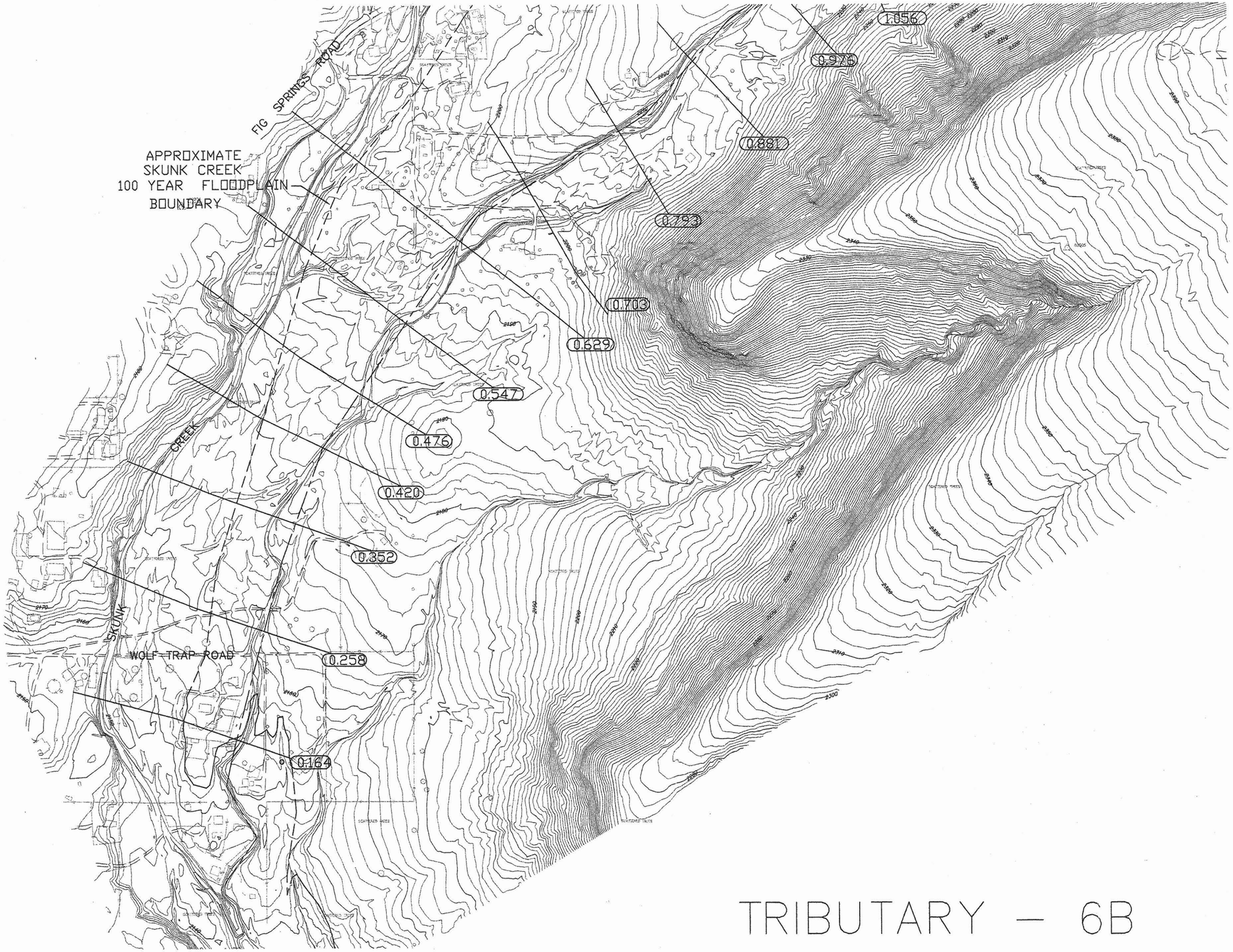
0 200' 400' 600'

SCALE: 1" = 200'

CONTOUR INTERVAL = 2 FEET

SIMONS, LI & ASSOCIATES, INC.

	BY	DATE	
DESIGN	LX	4/99	FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
DESIGN CHK.	BSB	4/99	
PLANS	BAL	4/99	RECOMMENDED BY: DATE
PLANS CHK.	BSB	4/99	APPROVED BY: DATE
SUBMITTED BY: DATE:			SHEET 6 OF 8



TRIBUTARY – 6B

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

TOPOGRAPHIC MAPPING AND FLOODPLAIN DELINEATION STUDY FOR TRIBUTARIES TO SKUNK CREEK

MARICOPA COUNTY, ARIZONA

F.C.D. CONTRACT NO. 98-22

LEGEND

- SECTION LINE
- CORPORATE BOUNDARY
- 100-YEAR FLOODPLAIN BOUNDARY
- FLOODWAY BOUNDARY
- HYDRAULIC BASE LINE
- CROSS-SECTION (FP=FLOODPLAIN WSE, FW=FLOODWAY WSE; 1.432)
- BASE FLOOD ELEVATION (1180)
- ELEVATION REFERENCE MARK (RM)
- BUILDING
- ROAD/PAVEMENT
- DIRT ROAD
- INDEX CONTOUR (1110)
- INTERMEDIATE CONTOUR
- WASH/ DRAINAGE/WATERLINE
- TREE LINE
- SPOT ELEVATION
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- VERTICAL CONTROL POINT
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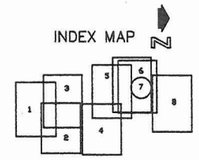
INDEX MAP



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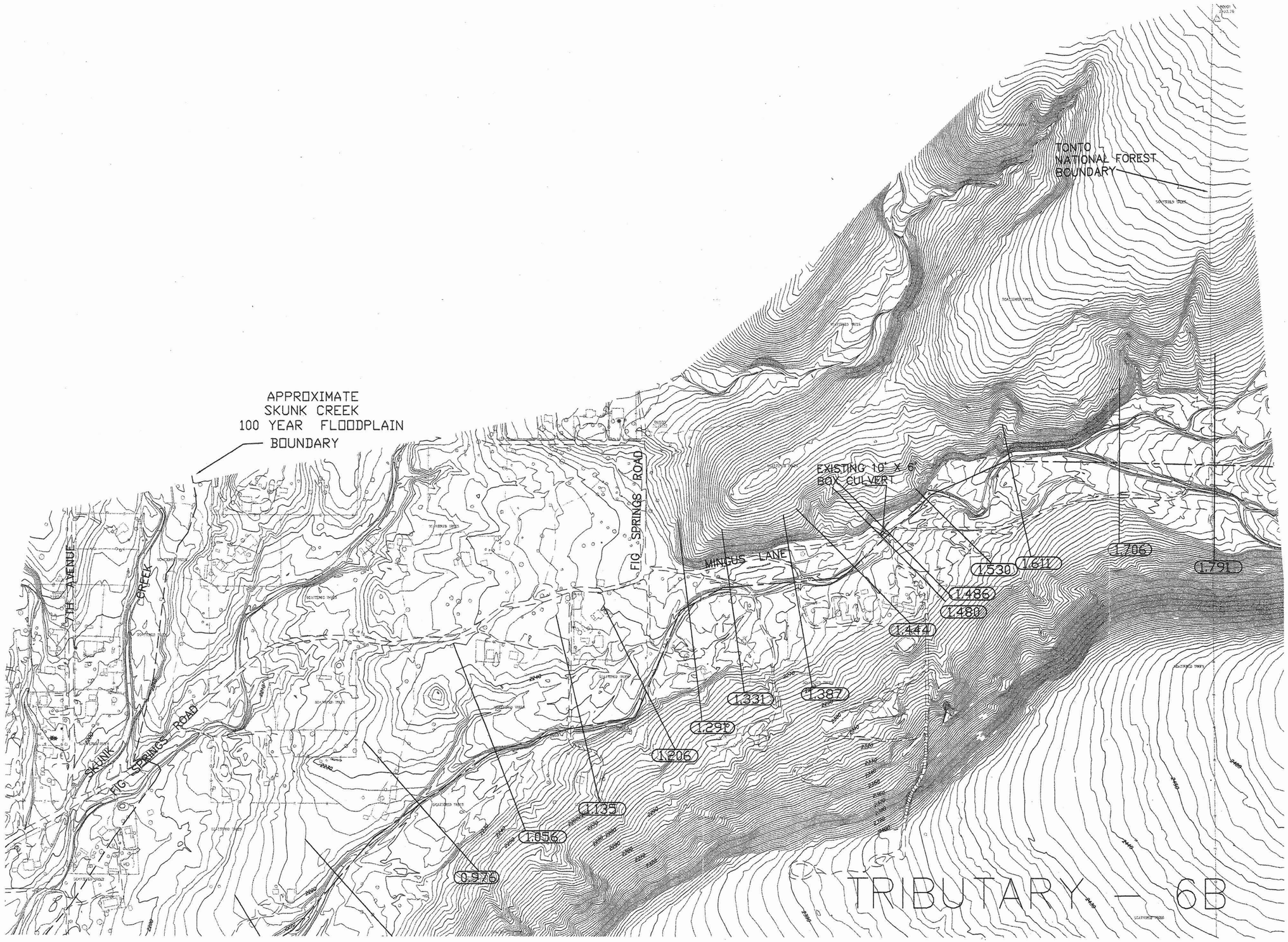
SIMONS, LI & ASSOCIATES, INC.

	BY	DATE	
DESIGN	LX	4/99	FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
DESIGN CHK.	BSB	4/99	
PLANS	BAL	4/99	RECOMMENDED BY: DATE
PLANS CHK.	BSB	4/99	APPROVED BY: DATE
SUBMITTED BY: DATE:			SHEET 7 OF 8



FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

TOPOGRAPHIC MAPPING AND FLOODPLAIN DELINEATION STUDY FOR TRIBUTARIES TO SKUNK CREEK

MARICOPA COUNTY, ARIZONA

F.C.D. CONTRACT NO. 98-22

LEGEND

- SECTION LINE
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- 100-YEAR FLOODPLAIN BOUNDARY
- FLOODWAY BOUNDARY
- HYDRAULIC BASE LINE
- CROSS-SECTION (FP=FLOODPLAIN WSE, FW=FLOODWAY WSE) 1,432
- BASE FLOOD ELEVATION 1160
- ELEVATION REFERENCE MARK RM
- BUILDING
- ROAD/PAVEMENT
- DIRT ROAD
- INDEX CONTOUR 1110
- INTERMEDIATE CONTOUR
- WASH/ DRAINAGE/WATERLINE
- TREE LINE
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NOTES

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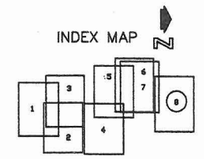
ELEVATION REFERENCE MARKS

NOTE: ALL ELEVATIONS ARE BASED ON NATIONAL GEODETIC VERTICAL DATUM OF 1929

INDEX MAP



0 200' 400' 600'

SCALE: 1" = 200'

CONTOUR INTERVAL = 2 FEET

SIMONS, LI & ASSOCIATES, INC.

DESIGN	BY LX	DATE 4/99	FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
DESIGN CHK.	BSB	4/99	
PLANS	ML	4/99	RECOMMENDED BY: DATE
PLANS CHK.	BSB	4/99	APPROVED BY: DATE
SUBMITTED BY: DATE:			SHEET 8 OF 8

APPENDIX C

Field Reconnaissance Sheets

Tributaries to Skunk Creek Field Reconnaissance					
Wash Name: Trib. 12					
Channel Conditions		n Value	Cross Section Number: 0.398		
			LB	Channel	RB
Material Involved	Concrete	0.012-0.018			
nb	Firm Soil	0.025-0.032			
	Coarse sand	0.026-0.035	.030		.030
	Gravel	0.028-0.035			
	Cobble	0.03-0.05		.035	
	Boulder	0.04-0.07			
Degree of Irregularity	Smooth	0			
n1	Minor	0.001-0.005	.005	.005	.005
	Moderate	0.006-0.01			
	Severe	0.011-0.02			
Relative Effect of Obstructions	Negligible	0.000-0.004			
n2	Minor	0.005-0.015		.005	
	Appreciable	0.02-0.03			
	Severe	0.04-0.06			
Vegetation	Small	0.002-0.01			
n3	Medium	0.01-0.025	.025		.025
	Large	0.025-0.05			
	Very Large	0.05-0.10			

Tributaries to Skunk Creek Field Reconnaissance					
Wash Name: Trib. 12					
Channel Conditions		n Value	Cross Section Number: 0.420		
			LB	Channel	RB
Material Involved	Concrete	0.012-0.018			
nb	Firm Soil	0.025-0.032			
	Coarse sand	0.026-0.035	.030		.030
	Gravel	0.028-0.035			
	Cobble	0.03-0.05		.035	
	Boulder	0.04-0.07			
Degree of Irregularity	Smooth	0			
n1	Minor	0.001-0.005	.005	.005	.005
	Moderate	0.006-0.01			
	Severe	0.011-0.02			
Relative Effect of Obstructions	Negligible	0.000-0.004			
n2	Minor	0.005-0.015			
	Appreciable	0.02-0.03			
	Severe	0.04-0.06			
Vegetation	Small	0.002-0.01		.002	
n3	Medium	0.01-0.025	.015		
	Large	0.025-0.05			.025
	Very Large	0.05-0.10			

Tributaries to Skunk Creek Field Reconnaissance					
Wash Name: Trib. 12					
Channel Conditions		n Value	Cross Section Number: 0.847		
			LB	Channel	RB
Material Involved	Concrete	0.012-0.018			
nb	Firm Soil	0.025-0.032			
	Coarse sand	0.026-0.035	.030		.030
	Gravel	0.028-0.035		.030	
	Cobble	0.03-0.05			
	Boulder	0.04-0.07			
Degree of Irregularity	Smooth	0			
n1	Minor	0.001-0.005	.005		.005
	Moderate	0.006-0.01			
	Severe	0.011-0.02			
Relative Effect of Obstructions	Negligible	0.000-0.004			
n2	Minor	0.005-0.015	.005		.005
	Appreciable	0.02-0.03			
	Severe	0.04-0.06			
Vegetation	Small	0.002-0.01		.005	
n3	Medium	0.01-0.025			
	Large	0.025-0.05	.025		.025
	Very Large	0.05-0.10			

Tributaries to Skunk Creek Field Reconnaissance					
Wash Name: Trib. 12					
Channel Conditions		n Value	Cross Section Number: 0.942		
			LB	Channel	RB
Material Involved	Concrete	0.012-0.018			
nb	Firm Soil	0.025-0.032			
	Coarse sand	0.026-0.035	.030		.030
	Gravel	0.028-0.035			
	Cobble	0.03-0.05		.035	
	Boulder	0.04-0.07			
Degree of Irregularity	Smooth	0			
n1	Minor	0.001-0.005	.005		.005
	Moderate	0.006-0.01			
	Severe	0.011-0.02			
Relative Effect of Obstructions	Negligible	0.000-0.004		.003	
n2	Minor	0.005-0.015	.005		.005
	Appreciable	0.02-0.03			
	Severe	0.04-0.06			
Vegetation	Small	0.002-0.01		.002	
n3	Medium	0.01-0.025			
	Large	0.025-0.05	.025		.025
	Very Large	0.05-0.10			

Tributaries to Skunk Creek Field Reconnaissance					
Wash Name: Trib. 18B					
Channel Conditions		n Value	Cross Section Number: 0.121		
			LB	Channel	RB
Material Involved	Concrete	0.012-0.018			
nb	Firm Soil	0.025-0.032			
	Coarse sand	0.026-0.035	.030		.030
	Gravel	0.028-0.035			
	Cobble	0.03-0.05		.035	
	Boulder	0.04-0.07			
Degree of Irregularity	Smooth	0			
n1	Minor	0.001-0.005	.005	.005	.005
	Moderate	0.006-0.01			
	Severe	0.011-0.02			
Relative Effect of Obstructions	Negligible	0.000-0.004			
n2	Minor	0.005-0.015	.005		.005
	Appreciable	0.02-0.03			
	Severe	0.04-0.06			
Vegetation	Small	0.002-0.01		.002	
n3	Medium	0.01-0.025			
	Large	0.025-0.05	.025		.025
	Very Large	0.05-0.10			

Tributaries to Skunk Creek Field Reconnaissance					
Wash Name: Trib. 10 B					
Channel Conditions		n Value	Cross Section Number: 0.345		
			LB	Channel	RB
Material Involved	Concrete	0.012-0.018			
nb	Firm Soil	0.025-0.032			
	Coarse sand	0.026-0.035	.030		.030
	Gravel	0.028-0.035			
	Cobble	0.03-0.05		0.035	
	Boulder	0.04-0.07			
Degree of Irregularity	Smooth	0			
n1	Minor	0.001-0.005	.005		.005
	Moderate	0.006-0.01			
	Severe	0.011-0.02			
Relative Effect of Obstructions	Negligible	0.000-0.004		.003	
n2	Minor	0.005-0.015			
	Appreciable	0.02-0.03			
	Severe	0.04-0.06			
Vegetation	Small	0.002-0.01		.002	
n3	Medium	0.01-0.025	.025		.025
	Large	0.025-0.05			
	Very Large	0.05-0.10			

Tributaries to Skunk Creek Field Reconnaissance					
Wash Name: Trib. 10A					
Channel Conditions		n Value	Cross Section Number: 0.910		
			LB	Channel	RB
Material Involved	Concrete	0.012-0.018			
nb	Firm Soil	0.025-0.032			
	Coarse sand	0.026-0.035	0.030		0.030
	Gravel	0.028-0.035			
	Cobble	0.03-0.05		0.035	
	Boulder	0.04-0.07			
Degree of Irregularity	Smooth	0			
n1	Minor	0.001-0.005	.005	.005	.005
	Moderate	0.006-0.01			
	Severe	0.011-0.02			
Relative Effect of Obstructions	Negligible	0.000-0.004			
n2	Minor	0.005-0.015	.005	.005	.005
	Appreciable	0.02-0.03			
	Severe	0.04-0.06			
Vegetation	Small	0.002-0.01			
n3	Medium	0.01-0.025	0.020		0.020
	Large	0.025-0.05			
	Very Large	0.05-0.10			

Tributaries to Skunk Creek Field Reconnaissance					
Wash Name: Trib. 10A					
Channel Conditions		n Value	Cross Section Number: 1.069		
			LB	Channel	RB
Material Involved	Concrete	0.012-0.018			
nb	Firm Soil	0.025-0.032			
	Coarse sand	0.026-0.035	.030		.030
	Gravel	0.028-0.035			
	Cobble	0.03-0.05		.035	
	Boulder	0.04-0.07			
Degree of Irregularity	Smooth	0			
n1	Minor	0.001-0.005	.005	.005	.005
	Moderate	0.006-0.01			
	Severe	0.011-0.02			
Relative Effect of Obstructions	Negligible	0.000-0.004			
n2	Minor	0.005-0.015	.005	.005	.005
	Appreciable	0.02-0.03			
	Severe	0.04-0.06			
Vegetation	Small	0.002-0.01			
n3	Medium	0.01-0.025	.020		.020
	Large	0.025-0.05			
	Very Large	0.05-0.10			

Tributaries to Skunk Creek Field Reconnaissance					
Wash Name: Trib. 6B					
Channel Conditions		n Value	Cross Section Number: 0.258		
			LB	Channel	RB
Material Involved	Concrete	0.012-0.018			
nb	Firm Soil	0.025-0.032			
	Coarse sand	0.026-0.035	.030		.030
	Gravel	0.028-0.035		.035	
	Cobble	0.03-0.05			
	Boulder	0.04-0.07			
Degree of Irregularity	Smooth	0			
n1	Minor	0.001-0.005	.005	.005	.005
	Moderate	0.006-0.01			
	Severe	0.011-0.02			
Relative Effect of Obstructions	Negligible	0.000-0.004			
n2	Minor	0.005-0.015	.005		.005
	Appreciable	0.02-0.03			
	Severe	0.04-0.06			
Vegetation	Small	0.002-0.01		.002	
n3	Medium	0.01-0.025	.020		.020
	Large	0.025-0.05			
	Very Large	0.05-0.10			

Tributaries to Skunk Creek Field Reconnaissance					
Wash Name: Trib. 6B					
Channel Conditions		n Value	Cross Section Number: 1530		
			LB	Channel	RB
Material Involved	Concrete	0.012-0.018			
nb	Firm Soil	0.025-0.032			
	Coarse sand	0.026-0.035	.030		.030
	Gravel	0.028-0.035		.030	
	Cobble	0.03-0.05			
	Boulder	0.04-0.07			
Degree of Irregularity	Smooth	0			
n1	Minor	0.001-0.005	.005		.005
	Moderate	0.006-0.01			
	Severe	0.011-0.02			
Relative Effect of Obstructions	Negligible	0.000-0.004			
n2	Minor	0.005-0.015	.005		.005
	Appreciable	0.02-0.03			
	Severe	0.04-0.06			
Vegetation	Small	0.002-0.01		.005	
n3	Medium	0.01-0.025			
	Large	0.025-0.05	.025		.025
	Very Large	0.05-0.10			

Tributaries to Skunk Creek Field Reconnaissance					
Wash Name: Trib. 6B					
Channel Conditions		n Value	Cross Section Number: 1,135		
			LB	Channel	RB
Material Involved	Concrete	0.012-0.018			
nb	Firm Soil	0.025-0.032			
	Coarse sand	0.026-0.035	.030		.030
	Gravel	0.028-0.035			
	Cobble	0.03-0.05		.035	
	Boulder	0.04-0.07			
Degree of Irregularity	Smooth	0			
n1	Minor	0.001-0.005	.005	.005	.005
	Moderate	0.006-0.01			
	Severe	0.011-0.02			
Relative Effect of Obstructions	Negligible	0.000-0.004			
n2	Minor	0.005-0.015	.005		.005
	Appreciable	0.02-0.03			
	Severe	0.04-0.06			
Vegetation	Small	0.002-0.01		.002	
n3	Medium	0.01-0.025			
	Large	0.025-0.05	.025		.025
	Very Large	0.05-0.10			

Tributaries to Skunk Creek Field Reconnaissance					
Wash Name: Trib. 6B					
Channel Conditions		n Value	Cross Section Number: 0.703		
			LB	Channel	RB
Material Involved	Concrete	0.012-0.018			
nb	Firm Soil	0.025-0.032			
	Coarse sand	0.026-0.035	.030		.030
	Gravel	0.028-0.035			
	Cobble	0.03-0.05		.035	
	Boulder	0.04-0.07			
Degree of Irregularity	Smooth	0			
n1	Minor	0.001-0.005	.005	.005	.005
	Moderate	0.006-0.01			
	Severe	0.011-0.02			
Relative Effect of Obstructions	Negligible	0.000-0.004			
n2	Minor	0.005-0.015	.005		.005
	Appreciable	0.02-0.03			
	Severe	0.04-0.06			
Vegetation	Small	0.002-0.01		.002	
n3	Medium	0.01-0.025			
	Large	0.025-0.05	0.025		0.025
	Very Large	0.05-0.10			

HEC-RAS September 1998 Version 2.2
U.S. Army Corp of Engineers
Hydrologic Engineering Center
609 Second Street, Suite D
Davis, California 95616-4687
(916) 756-1104

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

PROJECT DATA
Project Title: TRIB T-12 FLOODPLAIN DELINEATION
Project File : T_12.prj
Run Date and Time: 9/6/2000 9:38:04 AM

Project in English units

Project Description:
HEC-RAS MODEL FOR TRIBUTARY 12

PLAN DATA

Plan Title: HEC-RAS MODEL FOR TRIBUTARY 12
Plan File : y:\Mc-18\RAS FCD Disk\HEC-RAS\T_12\T_12.p02

Geometry Title: Base Conditions Geometry
Geometry File : y:\Mc-18\RAS FCD Disk\HEC-RAS\T_12\T_12.G01

Flow Title : 2 Flow Profiles
Flow File : y:\Mc-18\RAS FCD Disk\HEC-RAS\T_12\T_12.F01

Plan Summary Information:

Number of:	Cross Sections	= 21	Mulitple Openings	=	0
	Culverts	= 1	Inline Weirs	=	0
	Bridges	= 0			

Computational Information

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

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

FLOW DATA

Flow Title: 2 Flow Profiles
Flow File : y:\Mc-18\RAS FCD Disk\HEC-RAS\T_12\T_12.F01

Flow Data (cfs)

River	Reach	RS	PF 1	PF 2
TRIBUTARY 12	TRIBUTARY 12	1.416	2255	2255

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
TRIBUTARY 12	TRIBUTARY 12	PF 1		Normal S = .017
TRIBUTARY 12	TRIBUTARY 12	PF 2		Normal S = .017

GEOMETRY DATA

Geometry Title: Base Conditions Geometry
Geometry File : y:\Mc-18\RAS FCD Disk\HEC-RAS\T_12\T_12.G01

CROSS SECTION RIVER: TRIBUTARY 12
REACH: TRIBUTARY 12 RS: 1.416

INPUT
Description:
Station Elevation Data num= 24

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9712	2170	9728.72	2168	9750.73	2166	9775.63	2164	9800.15	2162
9824.92	2160	9850.78	2158	9870.07	2156	9883.32	2154	9901.59	2152
9921.74	2150	9961.11	2148	9983.46	214810004.43		215010059.79		2152
10092.44	2154	10121.9	215610139.29		215810156.49		216010167.37		2162
10182.44	216410203.72		216610211.02		216810218.52		2170		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9712	.065	9921.74	.0410004.43		.065

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
9850.7	10139.29	468.12	499.87	530.38	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2152.57	Element			
Vel Head (ft)	0.99	Wt. n-Val.		0.041	
W.S. Elev (ft)	2151.57	Reach Len. (ft)	468.12	499.87	530.38
Crit W.S. (ft)	2151.57	Flow Area (sq ft)		281.82	
E.G. Slope (ft/ft)	0.014992	Area (sq ft)		281.82	
Q Total (cfs)	2255.00	Flow (cfs)		2255.00	
Top Width (ft)	142.08	Top Width (ft)		142.08	
Vel Total (ft/s)	8.00	Avg. Vel. (ft/s)		8.00	
Max Chl Dpth (ft)	3.57	Hydr. Depth (ft)		1.98	
Conv. Total (cfs)	18416.9	Conv. (cfs)		18416.9	
Length Wtd. (ft)	499.87	Wetted Per. (ft)		142.33	
Min Ch El (ft)	2148.00	Shear (lb/sq ft)		1.85	
Alpha	1.00	Stream Power (lb/ft s)		14.83	
Frctn Loss (ft)	7.37	Cum Volume (acre-ft)		54.44	
C & E Loss (ft)	0.14	Cum SA (acres)		26.34	

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.

CROSS SECTION OUTPUT Profile #PF 2

			Left OB	Channel	Right OB
E.G. Elev (ft)	2152.57	Element			
Vel Head (ft)	0.99	Wt. n-Val.		0.041	
W.S. Elev (ft)	2151.57	Reach Len. (ft)	468.12	499.87	530.38
Crit W.S. (ft)	2151.57	Flow Area (sq ft)		281.82	
E.G. Slope (ft/ft)	0.014992	Area (sq ft)		281.82	
Q Total (cfs)	2255.00	Flow (cfs)		2255.00	
Top Width (ft)	142.08	Top Width (ft)		142.08	

Vel Total (ft/s)	8.00	Avg. Vel. (ft/s)	8.00
Max Chl Dpth (ft)	3.57	Hydr. Depth (ft)	1.98
Conv. Total (cfs)	18416.9	Conv. (cfs)	18416.9
Length Wtd. (ft)	499.87	Wetted Per. (ft)	142.33
Min Ch El (ft)	2148.00	Shear (lb/sq ft)	1.85
Alpha	1.00	Stream Power (lb/ft s)	14.83
Frctn Loss (ft)	7.37	Cum Volume (acre-ft)	54.44
C & E Loss (ft)	0.14	Cum SA (acres)	26.34

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.

FLOW DISTRIBUTION OUTPUT Profile #PF 1

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9850.78	9946.95	454.06	68.26	41.17	20.14	1.66	6.65
9946.95	10043.12	1800.71	213.13	96.31	79.85	2.22	8.45
10043.12	RB 10139.29	0.23	0.43	4.85	0.01	0.09	0.54

Warning: The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.
Warning: The 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.

FLOW DISTRIBUTION OUTPUT Profile #PF 2

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9850.78	9946.95	454.06	68.26	41.17	20.14	1.66	6.65
9946.95	10043.12	1800.71	213.13	96.31	79.85	2.22	8.45
10043.12	RB 10139.29	0.23	0.43	4.85	0.01	0.09	0.54

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

CROSS SECTION RIVER: TRIBUTARY 12
REACH: TRIBUTARY 12 RS: 1.321

INPUT
Description:
Station Elevation Data num= 33

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9776	2160	9787.41	2158	9798.93	2156	9810.53	2154	9822.58	2152
9835.63	2150	9848.58	2148	9867.41	2146	9880.7	2144	9889.3	2142
9896.56	2140	9898.08	2140	9962.87	2140	9974.88	2138	9977.18	2138
9987.68	2140	10021.9	2140	10025.47	2140	10048.37	2142	10074.41	2144
10104.82	2146	10122.2	2148	10142.13	2150	10165.69	2152	10186.61	2154
10205.26	2156	10221.71	2158	10233.89	2160	10243.03	2162	10252.71	2164
10263.67	2166	10276.56	2168	10289.18	2170				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9776	.065	9962.87	.04	9987.68	.065

T_12

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
9867.41	10104.82	526.06	513.73 500.38	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2142.97	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.53	Wt. n-Val.		0.055	
W.S. Elev (ft)	2142.44	Reach Len. (ft)	526.06	513.73	500.38
Crit W.S. (ft)		Flow Area (sq ft)		386.22	
E.G. Slope (ft/ft)	0.014520	Area (sq ft)		386.22	
Q Total (cfs)	2255.00	Flow (cfs)		2255.00	
Top Width (ft)	166.63	Top Width (ft)		166.63	
Vel Total (ft/s)	5.84	Avg. Vel. (ft/s)		5.84	
Max Chl Dpth (ft)	4.44	Hydr. Depth (ft)		2.32	
Conv. Total (cfs)	18713.8	Conv. (cfs)		18713.8	
Length Wtd. (ft)	513.73	Wetted Per. (ft)		167.41	
Min Ch El (ft)	2138.00	Shear (lb/sq ft)		2.09	
Alpha	1.00	Stream Power (lb/ft s)		12.21	
Frctn Loss (ft)	7.75	Cum Volume (acre-ft)		50.60	
C & E Loss (ft)	0.05	Cum SA (acres)		24.57	

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

CROSS SECTION OUTPUT Profile #PF 2

E.G. Elev (ft)	2142.97	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.53	Wt. n-Val.		0.055	
W.S. Elev (ft)	2142.44	Reach Len. (ft)	526.06	513.73	500.38
Crit W.S. (ft)		Flow Area (sq ft)		386.22	
E.G. Slope (ft/ft)	0.014520	Area (sq ft)		386.22	
Q Total (cfs)	2255.00	Flow (cfs)		2255.00	
Top Width (ft)	166.63	Top Width (ft)		166.63	
Vel Total (ft/s)	5.84	Avg. Vel. (ft/s)		5.84	
Max Chl Dpth (ft)	4.44	Hydr. Depth (ft)		2.32	
Conv. Total (cfs)	18713.8	Conv. (cfs)		18713.8	
Length Wtd. (ft)	513.73	Wetted Per. (ft)		167.41	
Min Ch El (ft)	2138.00	Shear (lb/sq ft)		2.09	
Alpha	1.00	Stream Power (lb/ft s)		12.21	
Frctn Loss (ft)	7.75	Cum Volume (acre-ft)		50.60	
C & E Loss (ft)	0.05	Cum SA (acres)		24.57	

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.

FLOW DISTRIBUTION OUTPUT Profile #PF 1

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9867.41	9946.55	615.00	132.65	59.45	27.27	2.24	4.64
9946.55	10025.68	1538.01	219.95	79.49	68.20	2.78	6.99
10025.68	RB 10104.82	101.99	33.62	28.48	4.52	1.19	3.03

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.

FLOW DISTRIBUTION OUTPUT Profile #PF 2

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9867.41	9946.55	615.00	132.65	59.45	27.27	2.24	4.64
9946.55	10025.68	1538.01	219.95	79.49	68.20	2.78	6.99
10025.68	RB 10104.82	101.99	33.62	28.48	4.52	1.19	3.03

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

CROSS SECTION RIVER: TRIBUTARY 12
REACH: TRIBUTARY 12 RS: 1.226

INPUT
Description:
Station Elevation Data num= 27

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9734	2150	9750.74	2148	9768.45	2146	9786.14	2144	9807.89	2142
9833.15	2140	9855.02	2138	9875.57	2136	9898.54	2134	9972.01	2132
9999.17	213010015.25		213010025.95		213210033.25		213410047.08		2136
10069.05	213810090.62		214010114.18		214210133.38		214410154.26		2146
10166.84	214810178.07		215010192.74		215210208.03		215410222.98		2156
10235.65	215810249.95		2160						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9734	.065	9972.01	.0410025.95		.065

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
9855.02	10069.05	512.71 503.76	501.5	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2135.16	Element			
Vel Head (ft)	1.02	Wt. n-Val.		0.043	
W.S. Elev (ft)	2134.15	Reach Len. (ft)	512.71	503.76	501.50
Crit W.S. (ft)	2134.15	Flow Area (sq ft)		278.84	
E.G. Slope (ft/ft)	0.015723	Area (sq ft)		278.84	
Q Total (cfs)	2255.00	Flow (cfs)		2255.00	
Top Width (ft)	137.44	Top Width (ft)		137.44	
Vel Total (ft/s)	8.09	Avg. Vel. (ft/s)		8.09	
Max Chl Dpth (ft)	4.15	Hydr. Depth (ft)		2.03	
Conv. Total (cfs)	17983.7	Conv. (cfs)		17983.7	
Length Wtd. (ft)	503.76	Wetted Per. (ft)		138.01	
Min Ch El (ft)	2130.00	Shear (lb/sq ft)		1.98	
Alpha	1.00	Stream Power (lb/ft s)		16.04	
Frctn Loss (ft)	7.47	Cum Volume (acre-ft)		46.68	
C & E Loss (ft)	0.04	Cum SA (acres)		22.77	

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 energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #PF 2

			Left OB	Channel	Right OB
E.G. Elev (ft)	2135.16	Element			
Vel Head (ft)	1.02	Wt. n-Val.		0.043	
W.S. Elev (ft)	2134.15	Reach Len. (ft)	512.71	503.76	501.50
Crit W.S. (ft)	2134.15	Flow Area (sq ft)		278.84	
E.G. Slope (ft/ft)	0.015723	Area (sq ft)		278.84	
Q Total (cfs)	2255.00	Flow (cfs)		2255.00	
Top Width (ft)	137.44	Top Width (ft)		137.44	
Vel Total (ft/s)	8.09	Avg. Vel. (ft/s)		8.09	
Max Chl Dpth (ft)	4.15	Hydr. Depth (ft)		2.03	
Conv. Total (cfs)	17983.7	Conv. (cfs)		17983.7	
Length Wtd. (ft)	503.76	Wetted Per. (ft)		138.01	
Min Ch El (ft)	2130.00	Shear (lb/sq ft)		1.98	
Alpha	1.00	Stream Power (lb/ft s)		16.04	
Frctn Loss (ft)	7.47	Cum Volume (acre-ft)		46.68	
C & E Loss (ft)	0.04	Cum SA (acres)		22.77	

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 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.

FLOW DISTRIBUTION OUTPUT Profile #PF 1

T_12

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9855.02	9926.36	26.25	14.78	29.54	1.16	0.50	1.78
9926.36	9997.71	1031.64	149.21	71.43	45.75	2.09	6.91
9997.71	RB 10069.05	1197.11	114.84	37.04	53.09	3.14	10.42

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 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.

FLOW DISTRIBUTION OUTPUT Profile #PF 2

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9855.02	9926.36	26.25	14.78	29.54	1.16	0.50	1.78
9926.36	9997.71	1031.64	149.21	71.43	45.75	2.09	6.91
9997.71	RB 10069.05	1197.11	114.84	37.04	53.09	3.14	10.42

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 energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION RIVER: TRIBUTARY 12
REACH: TRIBUTARY 12 RS: 1.132

INPUT
Description:
Station Elevation Data num= 38

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9624	2142	9660.39	2140	9681.12	2138	9714.13	2136	9779.89	2134
9810.63	2132	9836.99	2130	9856.7	2128	9886.64	2126	9923.79	2124
10022.53	212210023.47		212210031.18		212410046.35		212610064.43		2128
10082.69	2130	10103.2	213210124.77		2134	10147.6	213610170.92		2138
10191.05	214010209.08		214210215.61		214410224.41		214610238.75		2148
10255.53	215010275.56		215210307.82		215410323.21		215210334.92		2154
10354.21	215610376.82		215810385.02		216010390.37		216210395.56		2164
10401.45	216410410.82		216210426.76		2162				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9624	.065	9923.79	.041	0031.18	.065

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
9836.99	10103.2	494.01	495	495	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2126.38	Element			
Vel Head (ft)	0.88	Wt. n-Val.		0.041	
W.S. Elev (ft)	2125.50	Reach Len. (ft)	494.01	495.00	495.00
Crit W.S. (ft)	2125.39	Flow Area (sq ft)		299.35	
E.G. Slope (ft/ft)	0.014018	Area (sq ft)		299.35	
Q Total (cfs)	2255.00	Flow (cfs)		2255.00	
Top Width (ft)	146.72	Top Width (ft)		146.72	
Vel Total (ft/s)	7.53	Avg. Vel. (ft/s)		7.53	
Max Chl Dpth (ft)	3.50	Hydr. Depth (ft)		2.04	
Conv. Total (cfs)	19046.0	Conv. (cfs)		19046.0	
Length Wtd. (ft)	495.00	Wetted Per. (ft)		147.13	
Min Ch El (ft)	2122.00	Shear (lb/sq ft)		1.78	
Alpha	1.00	Stream Power (lb/ft s)		13.41	
Frctn Loss (ft)	8.29	Cum Volume (acre-ft)		43.34	
C & E Loss (ft)	0.02	Cum SA (acres)		21.13	

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

CROSS SECTION OUTPUT Profile #PF 2

			Left OB	Channel	Right OB
E.G. Elev (ft)	2126.38	Element			
Vel Head (ft)	0.88	Wt. n-Val.		0.041	
W.S. Elev (ft)	2125.50	Reach Len. (ft)	494.01	495.00	495.00
Crit W.S. (ft)	2125.39	Flow Area (sq ft)		299.35	
E.G. Slope (ft/ft)	0.014018	Area (sq ft)		299.35	
Q Total (cfs)	2255.00	Flow (cfs)		2255.00	
Top Width (ft)	146.72	Top Width (ft)		146.72	
Vel Total (ft/s)	7.53	Avg. Vel. (ft/s)		7.53	
Max Chl Dpth (ft)	3.50	Hydr. Depth (ft)		2.04	
Conv. Total (cfs)	19046.0	Conv. (cfs)		19046.0	
Length Wtd. (ft)	495.00	Wetted Per. (ft)		147.13	
Min Ch El (ft)	2122.00	Shear (lb/sq ft)		1.78	
Alpha	1.00	Stream Power (lb/ft s)		13.41	
Frctn Loss (ft)	8.29	Cum Volume (acre-ft)		43.34	
C & E Loss (ft)	0.02	Cum SA (acres)		21.13	

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.

FLOW DISTRIBUTION OUTPUT Profile #PF 1

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9836.99	9925.73	63.80	23.94	29.90	2.83	0.80	2.66
9925.73	10014.46	1719.46	216.64	88.76	76.25	2.44	7.94
10014.46	RB 10103.20	471.74	58.77	28.47	20.92	2.09	8.03

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.

FLOW DISTRIBUTION OUTPUT Profile #PF 2

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9836.99	9925.73	63.80	23.94	29.90	2.83	0.80	2.66
9925.73	10014.46	1719.46	216.64	88.76	76.25	2.44	7.94
10014.46	RB 10103.20	471.74	58.77	28.47	20.92	2.09	8.03

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

CROSS SECTION RIVER: TRIBUTARY 12
REACH: TRIBUTARY 12 RS: 1.038

INPUT
Description:
Station Elevation Data num= 32

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9668	2136	9723.32	2134	9758.08	2132	9786.24	2130	9808.43	2128
9826.62	2126	9845.35	2124	9865.13	2122	9889.82	2120	9910.38	2118
10024.69	211610042.56		2114	10050.6	2114	10072.7	211410078.77		2112
10094.38	211210096.48		211410098.58		211610100.68		211810125.58		2120
10159.42	212210173.72		212410184.89		212410194.68		2124	10218.3	2126
10247.9	212810264.12		213010277.79		213210291.45		213410301.84		2136
10311.16	213810322.27		2140						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9668	.065	10072.7	.041	0094.38	.065

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
9865.131	0173.72	490.92	491	491	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2118.08	Element			

Vel Head (ft)	1.05	Wt. n-Val.		0.048	
W.S. Elev (ft)	2117.03	Reach Len. (ft)	490.92	491.00	491.00
Crit W.S. (ft)	2117.03	Flow Area (sq ft)		274.74	
E.G. Slope (ft/ft)	0.020193	Area (sq ft)		274.74	
Q Total (cfs)	2255.00	Flow (cfs)		2255.00	
Top Width (ft)	134.08	Top Width (ft)		134.08	
Vel Total (ft/s)	8.21	Avg. Vel. (ft/s)		8.21	
Max Chl Dpth (ft)	5.03	Hydr. Depth (ft)		2.05	
Conv. Total (cfs)	15868.8	Conv. (cfs)		15868.8	
Length Wtd. (ft)	491.00	Wetted Per. (ft)		136.54	
Min Ch El (ft)	2112.00	Shear (lb/sq ft)		2.54	
Alpha	1.00	Stream Power (lb/ft s)		20.82	
Frctn Loss (ft)	8.33	Cum Volume (acre-ft)		40.08	
C & E Loss (ft)	0.01	Cum SA (acres)		19.53	

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.

CROSS SECTION OUTPUT Profile #PF 2

E.G. Elev (ft)	2118.08	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.05	Wt. n-Val.		0.048	
W.S. Elev (ft)	2117.03	Reach Len. (ft)	490.92	491.00	491.00
Crit W.S. (ft)	2117.03	Flow Area (sq ft)		274.74	
E.G. Slope (ft/ft)	0.020193	Area (sq ft)		274.74	
Q Total (cfs)	2255.00	Flow (cfs)		2255.00	
Top Width (ft)	134.08	Top Width (ft)		134.08	
Vel Total (ft/s)	8.21	Avg. Vel. (ft/s)		8.21	
Max Chl Dpth (ft)	5.03	Hydr. Depth (ft)		2.05	
Conv. Total (cfs)	15868.8	Conv. (cfs)		15868.8	
Length Wtd. (ft)	491.00	Wetted Per. (ft)		136.54	
Min Ch El (ft)	2112.00	Shear (lb/sq ft)		2.54	
Alpha	1.00	Stream Power (lb/ft s)		20.82	
Frctn Loss (ft)	8.33	Cum Volume (acre-ft)		40.08	
C & E Loss (ft)	0.01	Cum SA (acres)		19.53	

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.

FLOW DISTRIBUTION OUTPUT Profile #PF 1

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9865.13	9967.99	0.01	0.05	2.41	0.00	0.02	0.25
9967.99	10070.86	640.59	152.72	102.98	28.41	1.48	4.19
10070.86	RB 10173.72	1614.40	121.97	31.14	71.59	4.23	13.24

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.

FLOW DISTRIBUTION OUTPUT Profile #PF 2

Left Sta	Right Sta	Flow	Area	W.P.	% Conv.	Hydr D.	Velocity

(ft)	(ft)	(cfs)	(sq ft)	(ft)		(ft)	(ft/s)
LB 9865.13	9967.99	0.01	0.05	2.41	0.00	0.02	0.25
9967.99	10070.86	640.59	152.72	102.98	28.41	1.48	4.19
10070.86	RB 10173.72	1614.40	121.97	31.14	71.59	4.23	13.24

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.

CROSS SECTION RIVER: TRIBUTARY 12
REACH: TRIBUTARY 12 RS: 0.942

INPUT
Description:
Station Elevation Data num= 29

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9642	2128	9689.15	2128	9754.22	2126	9803.77	2124	9826.47	2122
9842.87	2120	9862.57	2118	9876.79	2116	9896.03	2114	9916.05	2112
9924.57	2110	9930.14	2108	9933.73	2106	9937.33	2104	9958.04	2104
9980.59	210610023.47		210810078.45		211010154.31		211210187.51		2114
10210.96	211610224.52		211810248.56		212010258.26		212210263.98		2122
10298.21	212210317.27		212410322.67		212610328.26		2128		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9642	.065	9933.73	.04	9980.59	.065

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
9876.79	10210.96	521	528.21	562.47	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2109.68	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.19	Wt. n-Val.		0.042	
W.S. Elev (ft)	2108.49	Reach Len. (ft)	521.00	528.21	562.47
Crit W.S. (ft)	2108.49	Flow Area (sq ft)		257.15	
E.G. Slope (ft/ft)	0.014440	Area (sq ft)		257.15	
Q Total (cfs)	2255.00	Flow (cfs)		2255.00	
Top Width (ft)	108.17	Top Width (ft)		108.17	
Vel Total (ft/s)	8.77	Avg. Vel. (ft/s)		8.77	
Max Chl Dpth (ft)	4.49	Hydr. Depth (ft)		2.38	
Conv. Total (cfs)	18765.3	Conv. (cfs)		18765.3	
Length Wtd. (ft)	528.21	Wetted Per. (ft)		109.44	
Min Ch El (ft)	2104.00	Shear (lb/sq ft)		2.12	
Alpha	1.00	Stream Power (lb/ft s)		18.58	
Frctn Loss (ft)	7.29	Cum Volume (acre-ft)		37.08	
C & E Loss (ft)	0.08	Cum SA (acres)		18.17	

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 energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #PF 2

E.G. Elev (ft)	2109.68	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.19	Wt. n-Val.		0.042	
W.S. Elev (ft)	2108.49	Reach Len. (ft)	521.00	528.21	562.47
Crit W.S. (ft)	2108.49	Flow Area (sq ft)		257.15	
E.G. Slope (ft/ft)	0.014440	Area (sq ft)		257.15	
Q Total (cfs)	2255.00	Flow (cfs)		2255.00	
Top Width (ft)	108.17	Top Width (ft)		108.17	
Vel Total (ft/s)	8.77	Avg. Vel. (ft/s)		8.77	
Max Chl Dpth (ft)	4.49	Hydr. Depth (ft)		2.38	

Conv. Total (cfs)	18765.3	Conv. (cfs)	18765.3
Length Wtd. (ft)	528.21	Wetted Per. (ft)	109.44
Min Ch El (ft)	2104.00	Shear (lb/sq ft)	2.12
Alpha	1.00	Stream Power (lb/ft s)	18.58
Frctn Loss (ft)	7.29	Cum Volume (acre-ft)	37.08
C & E Loss (ft)	0.08	Cum SA (acres)	18.17

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 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.

FLOW DISTRIBUTION OUTPUT Profile #PF 1

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9876.79	9988.18	2117.96	207.50	60.63	93.92	3.49	10.21
9988.18	10099.57	137.04	49.65	48.81	6.08	1.02	2.76

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

FLOW DISTRIBUTION OUTPUT Profile #PF 2

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9876.79	9988.18	2117.96	207.50	60.63	93.92	3.49	10.21
9988.18	10099.57	137.04	49.65	48.81	6.08	1.02	2.76

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

CROSS SECTION RIVER: TRIBUTARY 12
REACH: TRIBUTARY 12 RS: 0.847

INPUT
Description:
Station Elevation Data num= 26

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9634	2118	9693.7	2116	9720.61	2114	9747.77	2112	9779.96	2110
9808.57	2108	9833.66	2106	9863.11	2104	9927.54	2102	9965.44	2100
9979.18	2100	9979.68	2100	9995.15	209810016.64		2098	10092.4	2100
10124.9	210210140.12		210410152.92		210610165.77		2108	10179.7	2110
10195.31	211210210.88		211410226.33		211610245.91		211810268.09		2120
10290.83	2122								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9634	.065	9979.18	.035	10092.4	.065

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
9808.57	10165.77	503.85	500	504	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2102.01	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.91	Wt. n-Val.		0.036	
W.S. Elev (ft)	2101.10	Reach Len. (ft)	503.85	500.00	504.00

Crit W.S. (ft)	2101.10	Flow Area (sq ft)	294.41
E.G. Slope (ft/ft)	0.013191	Area (sq ft)	294.41
Q Total (cfs)	2255.00	Flow (cfs)	2255.00
Top Width (ft)	165.52	Top Width (ft)	165.52
Vel Total (ft/s)	7.66	Avg. Vel. (ft/s)	7.66
Max Chl Dpth (ft)	3.10	Hydr. Depth (ft)	1.78
Conv. Total (cfs)	19633.7	Conv. (cfs)	19633.7
Length Wtd. (ft)	500.00	Wetted Per. (ft)	165.74
Min Ch El (ft)	2098.00	Shear (lb/sq ft)	1.46
Alpha	1.00	Stream Power (lb/ft s)	11.20
Frctn Loss (ft)	7.13	Cum Volume (acre-ft)	33.73
C & E Loss (ft)	0.03	Cum SA (acres)	16.51

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 energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #PF 2

E.G. Elev (ft)	2102.01	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.91	Wt. n-Val.		0.036	
W.S. Elev (ft)	2101.10	Reach Len. (ft)	503.85	500.00	504.00
Crit W.S. (ft)	2101.10	Flow Area (sq ft)		294.41	
E.G. Slope (ft/ft)	0.013191	Area (sq ft)		294.41	
Q Total (cfs)	2255.00	Flow (cfs)		2255.00	
Top Width (ft)	165.52	Top Width (ft)		165.52	
Vel Total (ft/s)	7.66	Avg. Vel. (ft/s)		7.66	
Max Chl Dpth (ft)	3.10	Hydr. Depth (ft)		1.78	
Conv. Total (cfs)	19633.7	Conv. (cfs)		19633.7	
Length Wtd. (ft)	500.00	Wetted Per. (ft)		165.74	
Min Ch El (ft)	2098.00	Shear (lb/sq ft)		1.46	
Alpha	1.00	Stream Power (lb/ft s)		11.20	
Frctn Loss (ft)	7.13	Cum Volume (acre-ft)		33.73	
C & E Loss (ft)	0.03	Cum SA (acres)		16.51	

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 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.

FLOW DISTRIBUTION OUTPUT Profile #PF 1

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
9927.64	10046.70	1712.08	207.04	102.19	75.92	2.03	8.27
10046.70	RB 10165.77	542.92	87.37	63.55	24.08	1.38	6.21

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 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.

FLOW DISTRIBUTION OUTPUT Profile #PF 2

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
9927.64	10046.70	1712.08	207.04	102.19	75.92	2.03	8.27
10046.70	RB 10165.77	542.92	87.37	63.55	24.08	1.38	6.21

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 energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION RIVER: TRIBUTARY 12
REACH: TRIBUTARY 12 RS: 0.753

INPUT
Description:
Station Elevation Data num= 32

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9630	2106	9662.66	2104	9691.48	2102	9725.19	2100	9755.25	2098
9780.53	2096	9824.22	2094	9907.78	2092	9929.69	2090	9937.59	2090
9975.84	2090	9980.15	2088	9984.31	2086	9991.16	2086	9995.73	2088
10001.15	209010007.33		209210026.81		209410048.54		209610071.22		2098
10094.75	210010118.75		210210141.63		210410165.77		210610187.99		2108
10204.35	211010226.18		211210253.79		211410276.09		211610299.23		2118
10326.38	212010367.39		2122						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9630	.065	9975.84	.03510001.15		.065

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
9755.2	10071.22	280	280	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2093.41	Element			
Vel Head (ft)	1.18	Wt. n-Val.		0.042	
W.S. Elev (ft)	2092.23	Reach Len. (ft)	280.00	280.00	280.00
Crit W.S. (ft)	2092.23	Flow Area (sq ft)		258.62	
E.G. Slope (ft/ft)	0.015455	Area (sq ft)		258.62	
Q Total (cfs)	2255.00	Flow (cfs)		2255.00	
Top Width (ft)	111.41	Top Width (ft)		111.41	
Vel Total (ft/s)	8.72	Avg. Vel. (ft/s)		8.72	
Max Chl Dpth (ft)	6.23	Hydr. Depth (ft)		2.32	
Conv. Total (cfs)	18139.2	Conv. (cfs)		18139.2	
Length Wtd. (ft)	280.00	Wetted Per. (ft)		113.51	
Min Ch El (ft)	2086.00	Shear (lb/sq ft)		2.20	
Alpha	1.00	Stream Power (lb/ft s)		19.17	
Frctn Loss (ft)	3.88	Cum Volume (acre-ft)		30.56	
C & E Loss (ft)	0.05	Cum SA (acres)		14.92	

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 energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #PF 2

			Left OB	Channel	Right OB
E.G. Elev (ft)	2093.41	Element			
Vel Head (ft)	1.18	Wt. n-Val.		0.042	
W.S. Elev (ft)	2092.23	Reach Len. (ft)	280.00	280.00	280.00
Crit W.S. (ft)	2092.23	Flow Area (sq ft)		258.62	
E.G. Slope (ft/ft)	0.015455	Area (sq ft)		258.62	
Q Total (cfs)	2255.00	Flow (cfs)		2255.00	
Top Width (ft)	111.41	Top Width (ft)		111.41	
Vel Total (ft/s)	8.72	Avg. Vel. (ft/s)		8.72	
Max Chl Dpth (ft)	6.23	Hydr. Depth (ft)		2.32	
Conv. Total (cfs)	18139.2	Conv. (cfs)		18139.2	
Length Wtd. (ft)	280.00	Wetted Per. (ft)		113.51	
Min Ch El (ft)	2086.00	Shear (lb/sq ft)		2.20	
Alpha	1.00	Stream Power (lb/ft s)		19.17	
Frctn Loss (ft)	3.88	Cum Volume (acre-ft)		30.56	
C & E Loss (ft)	0.05	Cum SA (acres)		14.92	

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 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.

FLOW DISTRIBUTION OUTPUT Profile #PF 1

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
9860.57	9965.90	422.93	108.81	67.83	18.76	1.61	3.89
9965.90	RB 10071.22	1832.07	149.81	45.68	81.24	3.43	12.23

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 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.

FLOW DISTRIBUTION OUTPUT Profile #PF 2

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
9860.57	9965.90	422.93	108.81	67.83	18.76	1.61	3.89
9965.90	RB 10071.22	1832.07	149.81	45.68	81.24	3.43	12.23

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 energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION RIVER: TRIBUTARY 12
REACH: TRIBUTARY 12 RS: 0.701

INPUT
Description:
Station Elevation Data num= 36

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9650	2104	9695.58	2102	9725.03	2100	9748.81	2098	9763.64	2096
9780.48	2094	9798.77	2092	9826.48	2090	9950.89	2088	9970.11	2086
9977.06	2085	9987.78	208410002.02		208410017.93		208610040.89		2086
10063.98	208410067.13		2082	10078.7	208210081.35		208410083.97		2086
10086.57	208810089.19		209010090.58		209210091.82		209210100.11		2094
10123.31	209610151.29		209810174.58		210010186.51		210210208.45		2104
10218.5	210610241.97		210810265.18		211010285.73		2112	10343.1	2114
10494.59	2116								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9650	.065	9950.89	.03510086.57		.065

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
9826.48	10086.57	215	220	220	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2088.07	Element			
Vel Head (ft)	1.00	Wt. n-Val.		0.035	
W.S. Elev (ft)	2087.07	Reach Len. (ft)	215.00	220.00	220.00
Crit W.S. (ft)	2086.96	Flow Area (sq ft)		281.29	
E.G. Slope (ft/ft)	0.012505	Area (sq ft)		281.29	
Q Total (cfs)	2255.00	Flow (cfs)		2255.00	
Top Width (ft)	125.52	Top Width (ft)		125.52	
Vel Total (ft/s)	8.02	Avg. Vel. (ft/s)		8.02	

Max Chl Dpth (ft)	5.07	Hydr. Depth (ft)	2.24
Conv. Total (cfs)	20165.3	Conv. (cfs)	20165.3
Length Wtd. (ft)	220.00	Wetted Per. (ft)	128.20
Min Ch El (ft)	2082.00	Shear (lb/sq ft)	1.71
Alpha	1.00	Stream Power (lb/ft s)	13.73
Frctn Loss (ft)	2.57	Cum Volume (acre-ft)	28.83
C & E Loss (ft)	0.01	Cum SA (acres)	14.16

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

CROSS SECTION OUTPUT Profile #PF 2

			Left OB	Channel	Right OB
E.G. Elev (ft)	2088.07	Element			
Vel Head (ft)	1.00	Wt. n-Val.		0.035	
W.S. Elev (ft)	2087.07	Reach Len. (ft)	215.00	220.00	220.00
Crit W.S. (ft)	2086.96	Flow Area (sq ft)		281.29	
E.G. Slope (ft/ft)	0.012505	Area (sq ft)		281.29	
Q Total (cfs)	2255.00	Flow (cfs)		2255.00	
Top Width (ft)	125.52	Top Width (ft)		125.52	
Vel Total (ft/s)	8.02	Avg. Vel. (ft/s)		8.02	
Max Chl Dpth (ft)	5.07	Hydr. Depth (ft)		2.24	
Conv. Total (cfs)	20165.3	Conv. (cfs)		20165.3	
Length Wtd. (ft)	220.00	Wetted Per. (ft)		128.20	
Min Ch El (ft)	2082.00	Shear (lb/sq ft)		1.71	
Alpha	1.00	Stream Power (lb/ft s)		13.73	
Frctn Loss (ft)	2.57	Cum Volume (acre-ft)		28.83	
C & E Loss (ft)	0.01	Cum SA (acres)		14.16	

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.

FLOW DISTRIBUTION OUTPUT Profile #PF 1

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
9913.18	9999.87	613.02	81.06	40.21	27.18	2.02	7.56
9999.87	RB 10086.57	1641.98	200.24	87.99	72.82	2.34	8.20

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.

FLOW DISTRIBUTION OUTPUT Profile #PF 2

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
9913.18	9999.87	613.02	81.06	40.21	27.18	2.02	7.56
9999.87	RB 10086.57	1641.98	200.24	87.99	72.82	2.34	8.20

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

CROSS SECTION RIVER: TRIBUTARY 12
REACH: TRIBUTARY 12 RS: 0.659

INPUT
Description:
Station Elevation Data num= 30

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9652	2100	9693.64	2098	9719.67	2096	9745.57	2094	9771.47	2092
9792.05	2090	9820.4	2088	9857.15	2086	9900.03	2084	9936.32	2084
9937.98	2084	9978	2082	9982.68	208010000.08		208010026.96		2082
10033.58	208410049.32		208610074.47		208810106.68		209010133.58		2092
10152.5	209410170.41		209610197.17		209810249.04		2098	10251.8	2098
10262.7	210010291.48		210210317.62		210410348.92		210610391.97		2108

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9652	.065	9937.98	.035	10033.58	.065

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Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9792.05	10106.68	500	500	500	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2085.50	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.99	Wt. n-Val.		0.035	
W.S. Elev (ft)	2084.51	Reach Len. (ft)	500.00	500.00	500.00
Crit W.S. (ft)	2084.51	Flow Area (sq ft)		283.02	
E.G. Slope (ft/ft)	0.010834	Area (sq ft)		283.02	
Q Total (cfs)	2255.00	Flow (cfs)		2255.00	
Top Width (ft)	148.53	Top Width (ft)		148.53	
Vel Total (ft/s)	7.97	Avg. Vel. (ft/s)		7.97	
Max Chl Dpth (ft)	4.51	Hydr. Depth (ft)		1.91	
Conv. Total (cfs)	21664.3	Conv. (cfs)		21664.3	
Length Wtd. (ft)	500.00	Wetted Per. (ft)		149.41	
Min Ch El (ft)	2080.00	Shear (lb/sq ft)		1.28	
Alpha	1.00	Stream Power (lb/ft s)		10.21	
Frctn Loss (ft)	5.33	Cum Volume (acre-ft)		27.40	
C & E Loss (ft)	0.01	Cum SA (acres)		13.47	

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.

CROSS SECTION OUTPUT Profile #PF 2

E.G. Elev (ft)	2085.50	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.99	Wt. n-Val.		0.035	
W.S. Elev (ft)	2084.51	Reach Len. (ft)	500.00	500.00	500.00
Crit W.S. (ft)	2084.51	Flow Area (sq ft)		283.02	
E.G. Slope (ft/ft)	0.010834	Area (sq ft)		283.02	
Q Total (cfs)	2255.00	Flow (cfs)		2255.00	
Top Width (ft)	148.53	Top Width (ft)		148.53	
Vel Total (ft/s)	7.97	Avg. Vel. (ft/s)		7.97	
Max Chl Dpth (ft)	4.51	Hydr. Depth (ft)		1.91	
Conv. Total (cfs)	21664.3	Conv. (cfs)		21664.3	
Length Wtd. (ft)	500.00	Wetted Per. (ft)		149.41	
Min Ch El (ft)	2080.00	Shear (lb/sq ft)		1.28	
Alpha	1.00	Stream Power (lb/ft s)		10.21	
Frctn Loss (ft)	5.33	Cum Volume (acre-ft)		27.40	
C & E Loss (ft)	0.01	Cum SA (acres)		13.47	

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.

FLOW DISTRIBUTION OUTPUT Profile #PF 1

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9792.05	9896.93	1.10	1.44	7.87	0.05	0.18	0.76
9896.93	10001.80	1365.80	183.83	105.34	60.57	1.75	7.43
10001.80	RB 10106.68	888.10	97.75	36.20	39.38	2.73	9.09

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.

FLOW DISTRIBUTION OUTPUT Profile #PF 2

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9792.05	9896.93	1.10	1.44	7.87	0.05	0.18	0.76
9896.93	10001.80	1365.80	183.83	105.34	60.57	1.75	7.43
10001.80	RB 10106.68	888.10	97.75	36.20	39.38	2.73	9.09

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.

CROSS SECTION RIVER: TRIBUTARY 12
REACH: TRIBUTARY 12 RS: 0.564

INPUT
Description:
Station Elevation Data num= 31

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9599	2086	9702.53	2084	9749.94	2082	9789.65	2080	9823.46	2078
9972.09	2076	9985.62	2074	9993.29	207210012.26		207010013.63		2070
10019.48	2072	10025.3	207410034.86		207610050.42		207810063.47		2080
10073.89	208210081.66		208410090.18		2086	10102.6	208810115.08		2090
10125.73	209210137.32		209410149.85		209610163.36		209810178.08		2100
10193.14	210210213.04		210410231.85		210610259.18		210810311.59		2110
10370.73	2112								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9599	.05	9985.62	.04	210034.86	.06

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
9789.65	10063.47	500	500	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2077.86	Element			
Vel Head (ft)	1.08	Wt. n-Val.		0.042	
W.S. Elev (ft)	2076.79	Reach Len. (ft)	500.00	500.00	500.00
Crit W.S. (ft)	2076.79	Flow Area (sq ft)		270.75	
E.G. Slope (ft/ft)	0.010474	Area (sq ft)		270.75	
Q Total (cfs)	2255.00	Flow (cfs)		2255.00	
Top Width (ft)	127.41	Top Width (ft)		127.41	
Vel Total (ft/s)	8.33	Avg. Vel. (ft/s)		8.33	
Max Chl Dpth (ft)	6.79	Hydr. Depth (ft)		2.13	
Conv. Total (cfs)	22033.9	Conv. (cfs)		22033.9	
Length Wtd. (ft)	500.00	Wetted Per. (ft)		128.85	
Min Ch El (ft)	2070.00	Shear (lb/sq ft)		1.37	
Alpha	1.00	Stream Power (lb/ft s)		11.44	
Frctn Loss (ft)	3.61	Cum Volume (acre-ft)		24.22	
C & E Loss (ft)	0.20	Cum SA (acres)		11.88	

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

CROSS SECTION OUTPUT Profile #PF 2

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E.G. Elev (ft)	2077.86	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.08	Wt. n-Val.		0.042	
W.S. Elev (ft)	2076.79	Reach Len. (ft)	500.00	500.00	500.00
Crit W.S. (ft)	2076.79	Flow Area (sq ft)		270.75	
E.G. Slope (ft/ft)	0.010474	Area (sq ft)		270.75	
Q Total (cfs)	2255.00	Flow (cfs)		2255.00	
Top Width (ft)	127.41	Top Width (ft)		127.41	
Vel Total (ft/s)	8.33	Avg. Vel. (ft/s)		8.33	
Max Chl Dpth (ft)	6.79	Hydr. Depth (ft)		2.13	
Conv. Total (cfs)	22033.9	Conv. (cfs)		22033.9	
Length Wtd. (ft)	500.00	Wetted Per. (ft)		128.85	
Min Ch El (ft)	2070.00	Shear (lb/sq ft)		1.37	
Alpha	1.00	Stream Power (lb/ft s)		11.44	
Frctn Loss (ft)	3.61	Cum Volume (acre-ft)		24.22	
C & E Loss (ft)	0.20	Cum SA (acres)		11.88	

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

FLOW DISTRIBUTION OUTPUT Profile #PF 1

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
9880.92	9972.20	37.20	23.12	58.62	1.65	0.39	1.61
9972.20	RB 10063.47	2217.80	247.63	70.22	98.35	3.60	8.96

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

FLOW DISTRIBUTION OUTPUT Profile #PF 2

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
9880.92	9972.20	37.20	23.12	58.62	1.65	0.39	1.61
9972.20	RB 10063.47	2217.80	247.63	70.22	98.35	3.60	8.96

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

CROSS SECTION RIVER: TRIBUTARY 12
REACH: TRIBUTARY 12 RS: 0.469

INPUT
Description:
Station Elevation Data num= 26

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9560	2078	9676.54	2076	9693.58	2074	9743.99	2072	9781.17	2070
9954.14	2068	9963.02	2066	9971.97	2064	9994.72	206410000.26		2066
10005.64	206810017.16		207010026.33		207210036.04		207410048.64		2076
10064.24	207810078.37		2080	10095.1	208210117.55		208410133.32		2086

10139.18 208810149.31 209010196.25 209210228.33 209410242.04 2096
10276.67 2098

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9560	.05	9954.14	.04210005	5.64	.06

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
9693.58	10048.64	160.53	250.05 273.13	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2070.43	Element			
Vel Head (ft)	0.41	Wt. n-Val.		0.044	
W.S. Elev (ft)	2070.02	Reach Len. (ft)	160.53	250.05	273.13
Crit W.S. (ft)		Flow Area (sq ft)		441.18	
E.G. Slope (ft/ft)	0.005271	Area (sq ft)		441.18	
Q Total (cfs)	2255.00	Flow (cfs)		2255.00	
Top Width (ft)	236.48	Top Width (ft)		236.48	
Vel Total (ft/s)	5.11	Avg. Vel. (ft/s)		5.11	
Max Chl Dpth (ft)	6.02	Hydr. Depth (ft)		1.87	
Conv. Total (cfs)	31060.5	Conv. (cfs)		31060.5	
Length Wtd. (ft)	250.05	Wetted Per. (ft)		237.82	
Min Ch El (ft)	2064.00	Shear (lb/sq ft)		0.61	
Alpha	1.00	Stream Power (lb/ft s)		3.12	
Frctn Loss (ft)	0.32	Cum Volume (acre-ft)		20.14	
C & E Loss (ft)	0.10	Cum SA (acres)		9.79	

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

CROSS SECTION OUTPUT Profile #PF 2

			Left OB	Channel	Right OB
E.G. Elev (ft)	2070.43	Element			
Vel Head (ft)	0.41	Wt. n-Val.		0.044	
W.S. Elev (ft)	2070.02	Reach Len. (ft)	160.53	250.05	273.13
Crit W.S. (ft)		Flow Area (sq ft)		441.18	
E.G. Slope (ft/ft)	0.005271	Area (sq ft)		441.18	
Q Total (cfs)	2255.00	Flow (cfs)		2255.00	
Top Width (ft)	236.48	Top Width (ft)		236.48	
Vel Total (ft/s)	5.11	Avg. Vel. (ft/s)		5.11	
Max Chl Dpth (ft)	6.02	Hydr. Depth (ft)		1.87	
Conv. Total (cfs)	31060.5	Conv. (cfs)		31060.5	
Length Wtd. (ft)	250.05	Wetted Per. (ft)		237.82	
Min Ch El (ft)	2064.00	Shear (lb/sq ft)		0.61	
Alpha	1.00	Stream Power (lb/ft s)		3.12	
Frctn Loss (ft)	0.32	Cum Volume (acre-ft)		20.14	
C & E Loss (ft)	0.10	Cum SA (acres)		9.79	

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

FLOW DISTRIBUTION OUTPUT Profile #PF 1

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9693.58	9811.93	4.37	6.12	31.16	0.19	0.20	0.71
9811.93	9930.29	275.88	125.56	118.36	12.23	1.06	2.20
9930.29	RB 10048.64	1974.75	309.49	88.30	87.57	3.56	6.38

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

FLOW DISTRIBUTION OUTPUT Profile #PF 2

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9693.58	9811.93	4.37	6.12	31.16	0.19	0.20	0.71
9811.93	9930.29	275.88	125.56	118.36	12.23	1.06	2.20
9930.29	RB 10048.64	1974.75	309.49	88.30	87.57	3.56	6.38

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

CROSS SECTION RIVER: TRIBUTARY 12
REACH: TRIBUTARY 12 RS: 0.420

INPUT
Description:
Station Elevation Data num= 20

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9454	2078	9466.39	2078	9474.71	2078	9539.25	2076	9741.29	2074
9760.67	2072	9774.23	2070	9783.19	2068	9859.74	2066	9958.8	2064
9987.65	206210006.85		206210011.09		206410015.35		206610019.71		2068
10024.22	207010095.86		207210211.62		207410225.42		207610239.83		2078

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9454	.05	9958.8	.04210011.09		.06

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
9741.29	10024.22	118.46	118.46 118.46	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2070.00	Element			
Vel Head (ft)	0.06	Wt. n-Val.		0.049	
W.S. Elev (ft)	2069.94	Reach Len. (ft)	118.46	118.46	118.46
Crit W.S. (ft)	2066.08	Flow Area (sq ft)		1143.57	
E.G. Slope (ft/ft)	0.000561	Area (sq ft)		1143.57	
Q Total (cfs)	2255.00	Flow (cfs)		2255.00	
Top Width (ft)	249.60	Top Width (ft)		249.60	
Vel Total (ft/s)	1.97	Avg. Vel. (ft/s)		1.97	
Max Chl Dpth (ft)	7.94	Hydr. Depth (ft)		4.58	
Conv. Total (cfs)	95174.6	Conv. (cfs)		95174.6	
Length Wtd. (ft)	118.46	Wetted Per. (ft)		251.67	
Min Ch El (ft)	2062.00	Shear (lb/sq ft)		0.16	
Alpha	1.00	Stream Power (lb/ft s)		0.31	
Frctn Loss (ft)		Cum Volume (acre-ft)		15.59	
C & E Loss (ft)		Cum SA (acres)		8.40	

CROSS SECTION OUTPUT Profile #PF 2

			Left OB	Channel	Right OB
E.G. Elev (ft)	2070.00	Element			
Vel Head (ft)	0.06	Wt. n-Val.		0.049	
W.S. Elev (ft)	2069.94	Reach Len. (ft)	118.46	118.46	118.46
Crit W.S. (ft)	2066.08	Flow Area (sq ft)		1143.57	
E.G. Slope (ft/ft)	0.000561	Area (sq ft)		1143.57	
Q Total (cfs)	2255.00	Flow (cfs)		2255.00	
Top Width (ft)	249.60	Top Width (ft)		249.60	
Vel Total (ft/s)	1.97	Avg. Vel. (ft/s)		1.97	
Max Chl Dpth (ft)	7.94	Hydr. Depth (ft)		4.58	
Conv. Total (cfs)	95174.6	Conv. (cfs)		95174.6	
Length Wtd. (ft)	118.46	Wetted Per. (ft)		251.67	
Min Ch El (ft)	2062.00	Shear (lb/sq ft)		0.16	
Alpha	1.00	Stream Power (lb/ft s)		0.31	
Frctn Loss (ft)		Cum Volume (acre-ft)		15.59	
C & E Loss (ft)		Cum SA (acres)		8.40	

FLOW DISTRIBUTION OUTPUT Profile #PF 1

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9741.29	9835.60	160.96	146.12	61.34	7.14	2.39	1.10
9835.60	9929.91	685.05	413.88	94.33	30.38	4.39	1.66
9929.91	RB 10024.22	1409.00	583.58	96.00	62.48	6.20	2.41

FLOW DISTRIBUTION OUTPUT Profile #PF 2

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)

LB 9741.29	9835.60	160.96	146.12	61.34	7.14	2.39	1.10
9835.60	9929.91	685.05	413.88	94.33	30.38	4.39	1.66
9929.91	RB 10024.22	1409.00	583.58	96.00	62.48	6.20	2.41

CULVERT RIVER: TRIBUTARY 12
REACH: TRIBUTARY 12 RS: 0.409

INPUT
Description:
Distance from Upstream XS = 10
Deck/Roadway Width = 75
Weir Coefficient = 2.5
Bridge Deck/Roadway Skew =
Upstream Deck/Roadway Coordinates
num= 5

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
9660	2070		9720	2068		10020	2068	
10080	2070		10200	2074				

Upstream Bridge Cross Section Data
Station Elevation Data num= 20

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9454	2078	9466.39	2078	9474.71	2078	9539.25	2076	9741.29	2074
9760.67	2072	9774.23	2070	9783.19	2068	9859.74	2066	9958.8	2064
9987.65	2062	10006.85	2062	10011.09	2064	10015.35	2066	10019.71	2068
10024.22	2070	10095.86	2072	10211.62	2074	10225.42	2076	10239.83	2078

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9454	.05	9958.8	.04	10011.09	.06

Bank Sta: Left	Right	Coeff Contr.	Expan.
9741.29	10024.22	.1	.3

Downstream Deck/Roadway Coordinates
num= 5

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
9660	2070		9720	2068		10020	2068	
10080	2070		10200	2074				

Downstream Bridge Cross Section Data
Station Elevation Data num= 12

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9628	2074	9720	2074	9735	2072	9760	2070	9775	2068
9996.77	2062	9997.95	2060	10013.13	2060	10017.2	2062	10119.8	2068
10142.73	2070	10261.78	2072						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9628	.06	9996.77	.045	10017.2	.06

Bank Sta: Left	Right	Coeff Contr.	Expan.
9775	10119.8	.1	.3

Upstream Embankment side slope = 0 horiz. to 1.0 vertical
Downstream Embankment side slope = 0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow = .95
Elevation at which weir flow begins = 2067
Energy head used in spillway design =
Spillway height used in design =
Weir crest shape = Broad Crested

Number of Culverts = 1

Culvert Name	Shape	Rise	Span
Culvert #1	Circular	5	

FHWA Chart # 2 - Corrugated Metal Pipe Culvert
FHWA Scale # 1 - Headwall
Solution Criteria = Highest U.S. EG

Culvert Upstrm Dist	Length	n Value	Entrance Loss Coef	Exit Loss Coef
10	80	.018	.5	1

Number of Barrels = 2
Upstream Elevation = 2059.62

Centerline Stations
Sta. Sta.
9995 10002
Downstream Elevation = 2059.21
Centerline Stations
Sta. Sta.
10002 10009

CROSS SECTION RIVER: TRIBUTARY 12
REACH: TRIBUTARY 12 RS: 0.398

INPUT
Description:
Station Elevation Data num= 12

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9628	2074	9720	2074	9735	2072	9760	2070	9775	2068
9996.77	2062	9997.95	2060	10013.13	2060	10017.2	2062	10119.8	2068
10142.73	2070	10261.78	2072						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9628	.06	9996.77	.045	10017.2	.06

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
9775	10119.8	215 217.35	206.4	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2065.68	Element			
Vel Head (ft)	0.69	Wt. n-Val.		0.052	
W.S. Elev (ft)	2064.99	Reach Len. (ft)	215.00	217.35	206.40
Crit W.S. (ft)		Flow Area (sq ft)		339.24	
E.G. Slope (ft/ft)	0.018843	Area (sq ft)		339.24	
Q Total (cfs)	2255.00	Flow (cfs)		2255.00	
Top Width (ft)	182.34	Top Width (ft)		182.34	
Vel Total (ft/s)	6.65	Avg. Vel. (ft/s)		6.65	
Max Chl Dpth (ft)	4.99	Hydr. Depth (ft)		1.86	
Conv. Total (cfs)	16427.4	Conv. (cfs)		16427.4	
Length Wtd. (ft)	217.35	Wetted Per. (ft)		184.07	
Min Ch El (ft)	2060.00	Shear (lb/sq ft)		2.17	
Alpha	1.00	Stream Power (lb/ft s)		14.41	
Frctn Loss (ft)	4.51	Cum Volume (acre-ft)		13.57	
C & E Loss (ft)	0.01	Cum SA (acres)		7.81	

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

CROSS SECTION OUTPUT Profile #PF 2

			Left OB	Channel	Right OB
E.G. Elev (ft)	2065.68	Element			
Vel Head (ft)	0.69	Wt. n-Val.		0.052	
W.S. Elev (ft)	2064.99	Reach Len. (ft)	215.00	217.35	206.40
Crit W.S. (ft)		Flow Area (sq ft)		339.24	
E.G. Slope (ft/ft)	0.018843	Area (sq ft)		339.24	
Q Total (cfs)	2255.00	Flow (cfs)		2255.00	
Top Width (ft)	182.34	Top Width (ft)		182.34	
Vel Total (ft/s)	6.65	Avg. Vel. (ft/s)		6.65	
Max Chl Dpth (ft)	4.99	Hydr. Depth (ft)		1.86	
Conv. Total (cfs)	16427.4	Conv. (cfs)		16427.4	
Length Wtd. (ft)	217.35	Wetted Per. (ft)		184.07	
Min Ch El (ft)	2060.00	Shear (lb/sq ft)		2.17	
Alpha	1.00	Stream Power (lb/ft s)		14.41	
Frctn Loss (ft)	4.51	Cum Volume (acre-ft)		13.57	
C & E Loss (ft)	0.01	Cum SA (acres)		7.81	

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.

FLOW DISTRIBUTION OUTPUT Profile #PF 1

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)

LB 9775.00	9889.93	0.10	0.20	3.86	0.00	0.05	0.47
9889.93	10004.87	1211.45	204.82	116.11	53.72	1.78	5.91
10004.87	RB 10119.80	1043.46	134.22	64.10	46.27	2.11	7.77

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.

FLOW DISTRIBUTION OUTPUT Profile #PF 2

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9775.00	9889.93	0.10	0.20	3.86	0.00	0.05	0.47
9889.93	10004.87	1211.45	204.82	116.11	53.72	1.78	5.91
10004.87	RB 10119.80	1043.46	134.22	64.10	46.27	2.11	7.77

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

CROSS SECTION RIVER: TRIBUTARY 12
REACH: TRIBUTARY 12 RS: 0.358

INPUT
Description:
Station Elevation Data num= 14

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9611	2070	9733.74	2068	9886.48	2062	9949.73	2060	9991.32	2060
10004.27	2060	10006.63	2058	10009.82	2056	10022.56	2056	10030.32	2058
10171.08	2060	10228.03	2062	10386.75	2068	10386.9	2068		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9611	.06	10004.27	.045	10030.32	.06

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
9886.48	10228.03	355.29	288.2 181.95	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2061.16	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.65	Wt. n-Val.		0.052	
W.S. Elev (ft)	2060.51	Reach Len. (ft)	355.29	288.20	181.95
Crit W.S. (ft)	2060.47	Flow Area (sq ft)		348.31	
E.G. Slope (ft/ft)	0.022926	Area (sq ft)		348.31	
Q Total (cfs)	2255.00	Flow (cfs)		2255.00	
Top Width (ft)	252.16	Top Width (ft)		252.16	
Vel Total (ft/s)	6.47	Avg. Vel. (ft/s)		6.47	
Max Chl Dpth (ft)	4.51	Hydr. Depth (ft)		1.38	
Conv. Total (cfs)	14893.0	Conv. (cfs)		14893.0	
Length Wtd. (ft)	288.20	Wetted Per. (ft)		253.76	
Min Ch El (ft)	2056.00	Shear (lb/sq ft)		1.96	
Alpha	1.00	Stream Power (lb/ft s)		12.72	
Frctn Loss (ft)	5.18	Cum Volume (acre-ft)		11.86	
C & E Loss (ft)	0.04	Cum SA (acres)		6.73	

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

CROSS SECTION OUTPUT Profile #PF 2

E.G. Elev (ft)	2061.16	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.65	Wt. n-Val.		0.052	
W.S. Elev (ft)	2060.51	Reach Len. (ft)	355.29	288.20	181.95
Crit W.S. (ft)	2060.47	Flow Area (sq ft)		348.31	
E.G. Slope (ft/ft)	0.022926	Area (sq ft)		348.31	
Q Total (cfs)	2255.00	Flow (cfs)		2255.00	
Top Width (ft)	252.16	Top Width (ft)		252.16	
Vel Total (ft/s)	6.47	Avg. Vel. (ft/s)		6.47	
Max Chl Dpth (ft)	4.51	Hydr. Depth (ft)		1.38	
Conv. Total (cfs)	14893.0	Conv. (cfs)		14893.0	
Length Wtd. (ft)	288.20	Wetted Per. (ft)		253.76	
Min Ch El (ft)	2056.00	Shear (lb/sq ft)		1.96	

Alpha	1.00	Stream Power (lb/ft s)	12.72
Frctn Loss (ft)	5.18	Cum Volume (acre-ft)	11.86
C & E Loss (ft)	0.04	Cum SA (acres)	6.73

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.

FLOW DISTRIBUTION OUTPUT Profile #PF 1

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9886.48	10000.33	63.67	30.10	66.82	2.82	0.45	2.12
10000.33	10114.18	2020.52	262.30	115.42	89.60	2.30	7.70
10114.18	RB 10228.03	170.81	55.91	71.51	7.57	0.78	3.06

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.

FLOW DISTRIBUTION OUTPUT Profile #PF 2

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9886.48	10000.33	63.67	30.10	66.82	2.82	0.45	2.12
10000.33	10114.18	2020.52	262.30	115.42	89.60	2.30	7.70
10114.18	RB 10228.03	170.81	55.91	71.51	7.57	0.78	3.06

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

CROSS SECTION RIVER: TRIBUTARY 12
REACH: TRIBUTARY 12 RS: 0.303

INPUT
Description:
Station Elevation Data num= 13

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9813	2060	9882.28	2058	9898.59	2056	9972.69	2054	9991.63	2052
10017.9	205	10034.11	205	10037.55	205	10045.62	205	10110.99	2056
10145.79	2058	10167.5	206	10203.92	2062				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9813	.06	9972.69	.045	10045.62	.06

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
9882.28	10145.79	300.8	279.25	289.41	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2055.94	Element			
Vel Head (ft)	1.03	Wt. n-Val.		0.045	
W.S. Elev (ft)	2054.91	Reach Len. (ft)	300.80	279.25	289.41
Crit W.S. (ft)	2054.91	Flow Area (sq ft)		276.77	
E.G. Slope (ft/ft)	0.014479	Area (sq ft)		276.77	
Q Total (cfs)	2255.00	Flow (cfs)		2255.00	
Top Width (ft)	136.67	Top Width (ft)		136.67	
Vel Total (ft/s)	8.15	Avg. Vel. (ft/s)		8.15	
Max Chl Dpth (ft)	4.91	Hydr. Depth (ft)		2.03	
Conv. Total (cfs)	18740.5	Conv. (cfs)		18740.5	
Length Wtd. (ft)	279.25	Wetted Per. (ft)		137.66	
Min Ch El (ft)	2050.00	Shear (lb/sq ft)		1.82	
Alpha	1.00	Stream Power (lb/ft s)		14.81	
Frctn Loss (ft)	4.89	Cum Volume (acre-ft)		9.79	
C & E Loss (ft)	0.06	Cum SA (acres)		5.44	

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.

CROSS SECTION OUTPUT Profile #PF 2

E.G. Elev (ft)	2055.94	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.03	Wt. n-Val.		0.045	
W.S. Elev (ft)	2054.91	Reach Len. (ft)	300.80	279.25	289.41
Crit W.S. (ft)	2054.91	Flow Area (sq ft)		276.77	
E.G. Slope (ft/ft)	0.014479	Area (sq ft)		276.77	
Q Total (cfs)	2255.00	Flow (cfs)		2255.00	
Top Width (ft)	136.67	Top Width (ft)		136.67	
Vel Total (ft/s)	8.15	Avg. Vel. (ft/s)		8.15	
Max Chl Dpth (ft)	4.91	Hydr. Depth (ft)		2.03	
Conv. Total (cfs)	18740.5	Conv. (cfs)		18740.5	
Length Wtd. (ft)	279.25	Wetted Per. (ft)		137.66	
Min Ch El (ft)	2050.00	Shear (lb/sq ft)		1.82	
Alpha	1.00	Stream Power (lb/ft s)		14.81	
Frctn Loss (ft)	4.89	Cum Volume (acre-ft)		9.79	
C & E Loss (ft)	0.06	Cum SA (acres)		5.44	

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.

FLOW DISTRIBUTION OUTPUT Profile #PF 1

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9882.28	9970.12	22.13	13.22	31.30	0.98	0.42	1.67
9970.12	10057.95	2227.05	258.85	88.81	98.76	2.95	8.60
10057.95	RB 10145.79	5.82	4.71	17.55	0.26	0.27	1.24

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.

FLOW DISTRIBUTION OUTPUT Profile #PF 2

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9882.28	9970.12	22.13	13.22	31.30	0.98	0.42	1.67
9970.12	10057.95	2227.05	258.85	88.81	98.76	2.95	8.60
10057.95	RB 10145.79	5.82	4.71	17.55	0.26	0.27	1.24

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.

CROSS SECTION RIVER: TRIBUTARY 12
REACH: TRIBUTARY 12 RS: 0.249

INPUT
Description:
Station Elevation Data num= 19

T_12

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9677	2054	9793.1	2052	9883.24	2050	9903.91	204810030.35		2048
10048.58	205010063.23		205210083.44		2054	10093.4	2056	10106.4	2058
10128.9	2060	10149.4	206210190.36		206810201.66		207010213.12		2072
10224.57	207410237.86		207610250.81		207810263.06		2080		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9677	.06	9883.24	.045	10048.58	.06

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
9793.1	10106.4	85.38	185.28 224.97	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2050.93	Element			
Vel Head (ft)	0.83	Wt. n-Val.		0.045	
W.S. Elev (ft)	2050.10	Reach Len. (ft)	85.38	185.28	224.97
Crit W.S. (ft)	2050.03	Flow Area (sq ft)		307.88	
E.G. Slope (ft/ft)	0.021565	Area (sq ft)		307.88	
Q Total (cfs)	2255.00	Flow (cfs)		2255.00	
Top Width (ft)	170.37	Top Width (ft)		170.37	
Vel Total (ft/s)	7.32	Avg. Vel. (ft/s)		7.32	
Max Chl Dpth (ft)	2.10	Hydr. Depth (ft)		1.81	
Conv. Total (cfs)	15355.8	Conv. (cfs)		15355.8	
Length Wtd. (ft)	185.28	Wetted Per. (ft)		170.58	
Min Ch El (ft)	2048.00	Shear (lb/sq ft)		2.43	
Alpha	1.00	Stream Power (lb/ft s)		17.80	
Frctn Loss (ft)	3.30	Cum Volume (acre-ft)		7.91	
C & E Loss (ft)	0.06	Cum SA (acres)		4.46	

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

CROSS SECTION OUTPUT Profile #PF 2

			Left OB	Channel	Right OB
E.G. Elev (ft)	2050.93	Element			
Vel Head (ft)	0.83	Wt. n-Val.		0.045	
W.S. Elev (ft)	2050.10	Reach Len. (ft)	85.38	185.28	224.97
Crit W.S. (ft)	2050.03	Flow Area (sq ft)		307.88	
E.G. Slope (ft/ft)	0.021565	Area (sq ft)		307.88	
Q Total (cfs)	2255.00	Flow (cfs)		2255.00	
Top Width (ft)	170.37	Top Width (ft)		170.37	
Vel Total (ft/s)	7.32	Avg. Vel. (ft/s)		7.32	
Max Chl Dpth (ft)	2.10	Hydr. Depth (ft)		1.81	
Conv. Total (cfs)	15355.8	Conv. (cfs)		15355.8	
Length Wtd. (ft)	185.28	Wetted Per. (ft)		170.58	
Min Ch El (ft)	2048.00	Shear (lb/sq ft)		2.43	
Alpha	1.00	Stream Power (lb/ft s)		17.80	
Frctn Loss (ft)	3.30	Cum Volume (acre-ft)		7.91	
C & E Loss (ft)	0.06	Cum SA (acres)		4.46	

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.

FLOW DISTRIBUTION OUTPUT Profile #PF 1

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9793.10	9897.53	45.44	11.46	18.69	2.01	0.62	3.96
9897.53	10001.97	1673.00	216.92	104.46	74.19	2.08	7.71
10001.97	RB 10106.40	536.57	79.50	47.43	23.79	1.68	6.75

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.

FLOW DISTRIBUTION OUTPUT Profile #PF 2

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9793.10	9897.53	45.44	11.46	18.69	2.01	0.62	3.96

9897.53	10001.97	1673.00	216.92	104.46	74.19	2.08	7.71
10001.97	RB 10106.40	536.57	79.50	47.43	23.79	1.68	6.75

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

CROSS SECTION RIVER: TRIBUTARY 12
REACH: TRIBUTARY 12 RS: 0.214

INPUT
Description:
Station Elevation Data num= 29

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9758	2052	9839.81	2050	9872.98	2048	9912.51	2046	9954.2	2044
9960.55	2042	9973.73	2042	9979.99	204410055.74		204610061.82		2048
10067.88	205010073.95		2052	10080	205410086.04		205610094.18		2058
10102.62	206010111.32		206210136.48		206810145.18		207010153.37		2072
10162.45	207410171.06		207610181.01		207810189.98		208010200.17		2082
10213.44	208410228.75		208610251.86		208810279.05		2090		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9758	.06	9954.2	.045	9979.99	.06

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
9839.81	10073.95	268.13 314.59	349.2	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2047.57	Element			
Vel Head (ft)	0.64	Wt. n-Val.		0.052	
W.S. Elev (ft)	2046.94	Reach Len. (ft)	268.13	314.59	349.20
Crit W.S. (ft)		Flow Area (sq ft)		352.27	
E.G. Slope (ft/ft)	0.014771	Area (sq ft)		352.27	
Q Total (cfs)	2255.00	Flow (cfs)		2255.00	
Top Width (ft)	164.61	Top Width (ft)		164.61	
Vel Total (ft/s)	6.40	Avg. Vel. (ft/s)		6.40	
Max Chl Dpth (ft)	4.94	Hydr. Depth (ft)		2.14	
Conv. Total (cfs)	18554.2	Conv. (cfs)		18554.2	
Length Wtd. (ft)	314.59	Wetted Per. (ft)		165.47	
Min Ch El (ft)	2042.00	Shear (lb/sq ft)		1.96	
Alpha	1.00	Stream Power (lb/ft s)		12.57	
Frctn Loss (ft)	4.73	Cum Volume (acre-ft)		6.51	
C & E Loss (ft)	0.04	Cum SA (acres)		3.74	

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

CROSS SECTION OUTPUT Profile #PF 2

			Left OB	Channel	Right OB
E.G. Elev (ft)	2047.57	Element			
Vel Head (ft)	0.64	Wt. n-Val.		0.052	
W.S. Elev (ft)	2046.94	Reach Len. (ft)	268.13	314.59	349.20
Crit W.S. (ft)		Flow Area (sq ft)		352.27	
E.G. Slope (ft/ft)	0.014771	Area (sq ft)		352.27	
Q Total (cfs)	2255.00	Flow (cfs)		2255.00	
Top Width (ft)	164.61	Top Width (ft)		164.61	
Vel Total (ft/s)	6.40	Avg. Vel. (ft/s)		6.40	
Max Chl Dpth (ft)	4.94	Hydr. Depth (ft)		2.14	
Conv. Total (cfs)	18554.2	Conv. (cfs)		18554.2	
Length Wtd. (ft)	314.59	Wetted Per. (ft)		165.47	
Min Ch El (ft)	2042.00	Shear (lb/sq ft)		1.96	
Alpha	1.00	Stream Power (lb/ft s)		12.57	
Frctn Loss (ft)	4.73	Cum Volume (acre-ft)		6.51	
C & E Loss (ft)	0.04	Cum SA (acres)		3.74	

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.

FLOW DISTRIBUTION OUTPUT Profile #PF 1

T_12

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9839.81	9917.86	29.98	14.38	23.90	1.33	0.60	2.08
9917.86	9995.90	1794.77	233.20	78.71	79.59	2.99	7.70
9995.90	RB 10073.95	430.25	104.69	62.86	19.08	1.67	4.11

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.

FLOW DISTRIBUTION OUTPUT Profile #PF 2

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9839.81	9917.86	29.98	14.38	23.90	1.33	0.60	2.08
9917.86	9995.90	1794.77	233.20	78.71	79.59	2.99	7.70
9995.90	RB 10073.95	430.25	104.69	62.86	19.08	1.67	4.11

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

CROSS SECTION RIVER: TRIBUTARY 12
REACH: TRIBUTARY 12 RS: 0.154

INPUT
Description:
Station Elevation Data num= 21

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9628	2050	9730.38	2048	9804.34	2046	9858.03	2044	9897.15	2042
9950.33	2040	9974.2	2038	9980.6	2036	9990.79	203610000.24		2038
10009.7	204010019.21		2042	10029.1	2044	10042.8	204610057.05		2048
10081.88	205010107.74		205210136.56		205410153.82		205610178.69		2058
10206.28	2060								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9628	.06	9950.33	.04	10019.21	.06

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
9730.38	10081.88	537.89	282.53	184.4	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2042.80	Element			
Vel Head (ft)	1.06	Wt. n-Val.		0.046	
W.S. Elev (ft)	2041.75	Reach Len. (ft)	537.89	282.53	184.40
Crit W.S. (ft)	2041.62	Flow Area (sq ft)		273.19	
E.G. Slope (ft/ft)	0.015279	Area (sq ft)		273.19	
Q Total (cfs)	2255.00	Flow (cfs)		2255.00	
Top Width (ft)	114.13	Top Width (ft)		114.13	
Vel Total (ft/s)	8.25	Avg. Vel. (ft/s)		8.25	
Max Chl Dpth (ft)	5.75	Hydr. Depth (ft)		2.39	
Conv. Total (cfs)	18242.9	Conv. (cfs)		18242.9	
Length Wtd. (ft)	282.53	Wetted Per. (ft)		115.15	
Min Ch El (ft)	2036.00	Shear (lb/sq ft)		2.26	
Alpha	1.00	Stream Power (lb/ft s)		18.68	
Frctn Loss (ft)	5.09	Cum Volume (acre-ft)		4.25	
C & E Loss (ft)	0.07	Cum SA (acres)		2.74	

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

CROSS SECTION OUTPUT Profile #PF 2

			Left OB	Channel	Right OB
E.G. Elev (ft)	2042.80	Element			
Vel Head (ft)	1.06	Wt. n-Val.		0.046	
W.S. Elev (ft)	2041.75	Reach Len. (ft)	537.89	282.53	184.40
Crit W.S. (ft)	2041.62	Flow Area (sq ft)		273.19	
E.G. Slope (ft/ft)	0.015279	Area (sq ft)		273.19	
Q Total (cfs)	2255.00	Flow (cfs)		2255.00	
Top Width (ft)	114.13	Top Width (ft)		114.13	
Vel Total (ft/s)	8.25	Avg. Vel. (ft/s)		8.25	

Max Chl Dpth (ft)	5.75	Hydr. Depth (ft)	2.39
Conv. Total (cfs)	18242.9	Conv. (cfs)	18242.9
Length Wtd. (ft)	282.53	Wetted Per. (ft)	115.15
Min Ch El (ft)	2036.00	Shear (lb/sq ft)	2.26
Alpha	1.00	Stream Power (lb/ft s)	18.68
Frctn Loss (ft)	5.09	Cum Volume (acre-ft)	4.25
C & E Loss (ft)	0.07	Cum SA (acres)	2.74

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.

FLOW DISTRIBUTION OUTPUT Profile #PF 1

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
9847.55	9964.71	351.79	74.37	60.92	15.60	1.22	4.73
9964.71	RB 10081.88	1903.21	198.82	54.23	84.40	3.73	9.57

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.

FLOW DISTRIBUTION OUTPUT Profile #PF 2

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
9847.55	9964.71	351.79	74.37	60.92	15.60	1.22	4.73
9964.71	RB 10081.88	1903.21	198.82	54.23	84.40	3.73	9.57

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

CROSS SECTION RIVER: TRIBUTARY 12
REACH: TRIBUTARY 12 RS: 0.097

INPUT
Description:
Station Elevation Data num= 26

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9574	2048	9651.17	2046	9695.76	2044	9743.72	2042	9765.23	2040
9838.86	2038	9863.87	2036	9894.77	2036	9909.43	2036	9922.09	2036
9954.07	2036	9974.12	2034	9980.19	2032	9992.44	203210003.06		2034
10040.29	203610063.36		203810078.96		204010094.19		204210133.91		2044
10162.3	204610183.95		204810213.88		205010236.46		2052	10251.3	2054
10266.15	2056								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9574	.06	9954.07	.04510003.06		.06

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
9743.72	10094.19	271.43	274 273.67	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2037.65	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.84	Wt. n-Val.		0.049	
W.S. Elev (ft)	2036.81	Reach Len. (ft)	271.43	274.00	273.67
Crit W.S. (ft)	2036.81	Flow Area (sq ft)		307.48	
E.G. Slope (ft/ft)	0.021580	Area (sq ft)		307.48	
Q Total (cfs)	2255.00	Flow (cfs)		2255.00	
Top Width (ft)	195.94	Top Width (ft)		195.94	
Vel Total (ft/s)	7.33	Avg. Vel. (ft/s)		7.33	
Max Chl Dpth (ft)	4.81	Hydr. Depth (ft)		1.57	
Conv. Total (cfs)	15350.4	Conv. (cfs)		15350.4	
Length Wtd. (ft)	274.00	Wetted Per. (ft)		196.66	
Min Ch El (ft)	2032.00	Shear (lb/sq ft)		2.11	
Alpha	1.00	Stream Power (lb/ft s)		15.45	
Frctn Loss (ft)	5.23	Cum Volume (acre-ft)		2.37	
C & E Loss (ft)	0.13	Cum SA (acres)		1.73	

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.

CROSS SECTION OUTPUT Profile #PF 2

E.G. Elev (ft)	2037.65	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.84	Wt. n-Val.		0.049	
W.S. Elev (ft)	2036.81	Reach Len. (ft)	271.43	274.00	273.67
Crit W.S. (ft)	2036.81	Flow Area (sq ft)		307.48	
E.G. Slope (ft/ft)	0.021580	Area (sq ft)		307.48	
Q Total (cfs)	2255.00	Flow (cfs)		2255.00	
Top Width (ft)	195.94	Top Width (ft)		195.94	
Vel Total (ft/s)	7.33	Avg. Vel. (ft/s)		7.33	
Max Chl Dpth (ft)	4.81	Hydr. Depth (ft)		1.57	
Conv. Total (cfs)	15350.4	Conv. (cfs)		15350.4	
Length Wtd. (ft)	274.00	Wetted Per. (ft)		196.66	
Min Ch El (ft)	2032.00	Shear (lb/sq ft)		2.11	
Alpha	1.00	Stream Power (lb/ft s)		15.45	
Frctn Loss (ft)	5.23	Cum Volume (acre-ft)		2.37	
C & E Loss (ft)	0.13	Cum SA (acres)		1.73	

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.

FLOW DISTRIBUTION OUTPUT Profile #PF 1

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9743.72	9860.54	2.70	1.86	6.85	0.12	0.27	1.45
9860.54	9977.37	570.35	122.67	117.11	25.29	1.05	4.65
9977.37	RB 10094.19	1681.96	182.95	72.71	74.59	2.53	9.19

Warning: The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.
Warning: 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.

FLOW DISTRIBUTION OUTPUT Profile #PF 2

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9743.72	9860.54	2.70	1.86	6.85	0.12	0.27	1.45
9860.54	9977.37	570.35	122.67	117.11	25.29	1.05	4.65
9977.37	RB 10094.19	1681.96	182.95	72.71	74.59	2.53	9.19

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

CROSS SECTION RIVER: TRIBUTARY 12

REACH: TRIBUTARY 12 RS: 0.053

INPUT
Description:
Station Elevation Data num= 23

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9600	2036	9677.22	2034	9738.59	2032	9835.16	2030	9843.61	2030
9910.81	2032	9913.04	2032	9958.75	2032	9963.72	2032	9977.15	2030
9989.33	202810007.35		202810023.49		203010168.94		203210301.16		2034
10326.1	203610343.75		203810356.92		204010370.52		2042	10386.5	2044
10400.66	204610410.49		204810421.13		2050				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9600	.06	9958.75	.04510023.49		.06

Bank Sta: Left	Right	Coeff Contr.	Expan.
9677.22	10301.16	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2032.26	Element			
Vel Head (ft)	0.40	Wt. n-Val.		0.051	
W.S. Elev (ft)	2031.86	Reach Len. (ft)			
Crit W.S. (ft)	2031.63	Flow Area (sq ft)		445.58	
E.G. Slope (ft/ft)	0.016995	Area (sq ft)		445.58	
Q Total (cfs)	2255.00	Flow (cfs)		2255.00	
Top Width (ft)	354.97	Top Width (ft)		354.97	
Vel Total (ft/s)	5.06	Avg. Vel. (ft/s)		5.06	
Max Chl Dpth (ft)	3.86	Hydr. Depth (ft)		1.26	
Conv. Total (cfs)	17297.4	Conv. (cfs)		17297.4	
Length Wtd. (ft)		Wetted Per. (ft)		355.45	
Min Ch El (ft)	2028.00	Shear (lb/sq ft)		1.33	
Alpha	1.00	Stream Power (lb/ft s)		6.73	
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT Profile #PF 2

			Left OB	Channel	Right OB
E.G. Elev (ft)	2032.26	Element			
Vel Head (ft)	0.40	Wt. n-Val.		0.051	
W.S. Elev (ft)	2031.86	Reach Len. (ft)			
Crit W.S. (ft)	2031.63	Flow Area (sq ft)		445.58	
E.G. Slope (ft/ft)	0.016995	Area (sq ft)		445.58	
Q Total (cfs)	2255.00	Flow (cfs)		2255.00	
Top Width (ft)	354.97	Top Width (ft)		354.97	
Vel Total (ft/s)	5.06	Avg. Vel. (ft/s)		5.06	
Max Chl Dpth (ft)	3.86	Hydr. Depth (ft)		1.26	
Conv. Total (cfs)	17297.4	Conv. (cfs)		17297.4	
Length Wtd. (ft)		Wetted Per. (ft)		355.45	
Min Ch El (ft)	2028.00	Shear (lb/sq ft)		1.33	
Alpha	1.00	Stream Power (lb/ft s)		6.73	
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

Warning: Divided flow computed for this cross-section.

FLOW DISTRIBUTION OUTPUT Profile #PF 1

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9677.22	9885.20	496.06	150.96	139.92	22.00	1.08	3.29
9885.20	10093.18	1704.52	265.01	149.89	75.59	1.77	6.43
10093.18	RB 10301.16	54.42	29.62	65.64	2.41	0.45	1.84

Warning: Divided flow computed for this cross-section.

FLOW DISTRIBUTION OUTPUT Profile #PF 2

T_12

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9677.22	9885.20	496.06	150.96	139.92	22.00	1.08	3.29
9885.20	10093.18	1704.52	265.01	149.89	75.59	1.77	6.43
10093.18	RB 10301.16	54.42	29.62	65.64	2.41	0.45	1.84

Warning: Divided flow computed for this cross-section.

SUMMARY OF MANNING'S N VALUES

River:TRIBUTARY 12

Reach	River Sta.	n1	n2	n3
TRIBUTARY 12	1.416	.065	.04	.065
TRIBUTARY 12	1.321	.065	.04	.065
TRIBUTARY 12	1.226	.065	.04	.065
TRIBUTARY 12	1.132	.065	.04	.065
TRIBUTARY 12	1.038	.065	.04	.065
TRIBUTARY 12	0.942	.065	.04	.065
TRIBUTARY 12	0.847	.065	.035	.065
TRIBUTARY 12	0.753	.065	.035	.065
TRIBUTARY 12	0.701	.065	.035	.065
TRIBUTARY 12	0.659	.065	.035	.065
TRIBUTARY 12	0.564	.05	.042	.06
TRIBUTARY 12	0.469	.05	.042	.06
TRIBUTARY 12	0.420	.05	.042	.06
TRIBUTARY 12	0.409	Culvert		
TRIBUTARY 12	0.398	.06	.045	.06
TRIBUTARY 12	0.358	.06	.045	.06
TRIBUTARY 12	0.303	.06	.045	.06
TRIBUTARY 12	0.249	.06	.045	.06
TRIBUTARY 12	0.214	.06	.045	.06
TRIBUTARY 12	0.154	.06	.045	.06
TRIBUTARY 12	0.097	.06	.045	.06
TRIBUTARY 12	0.053	.06	.045	.06

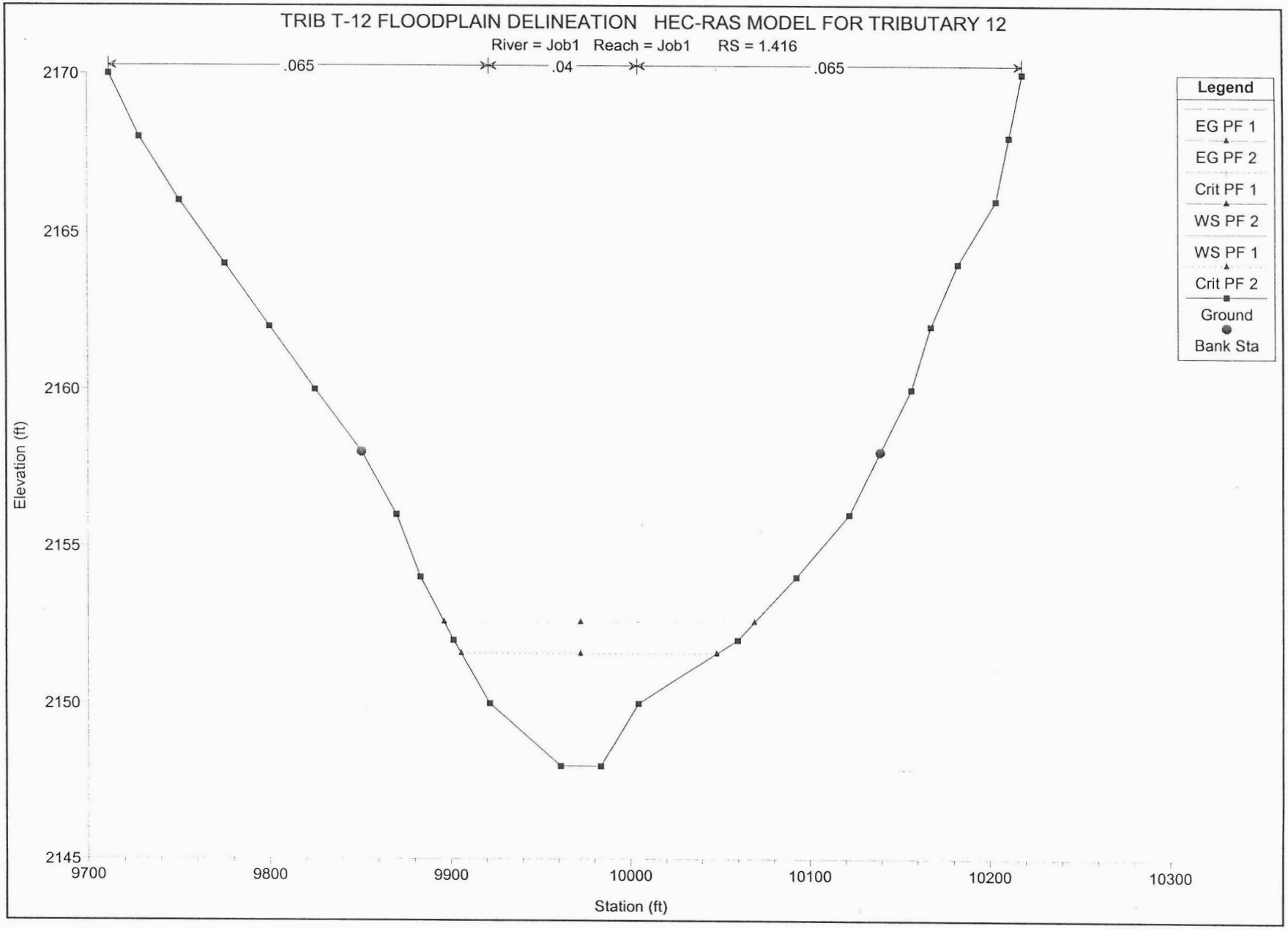
SUMMARY OF REACH LENGTHS

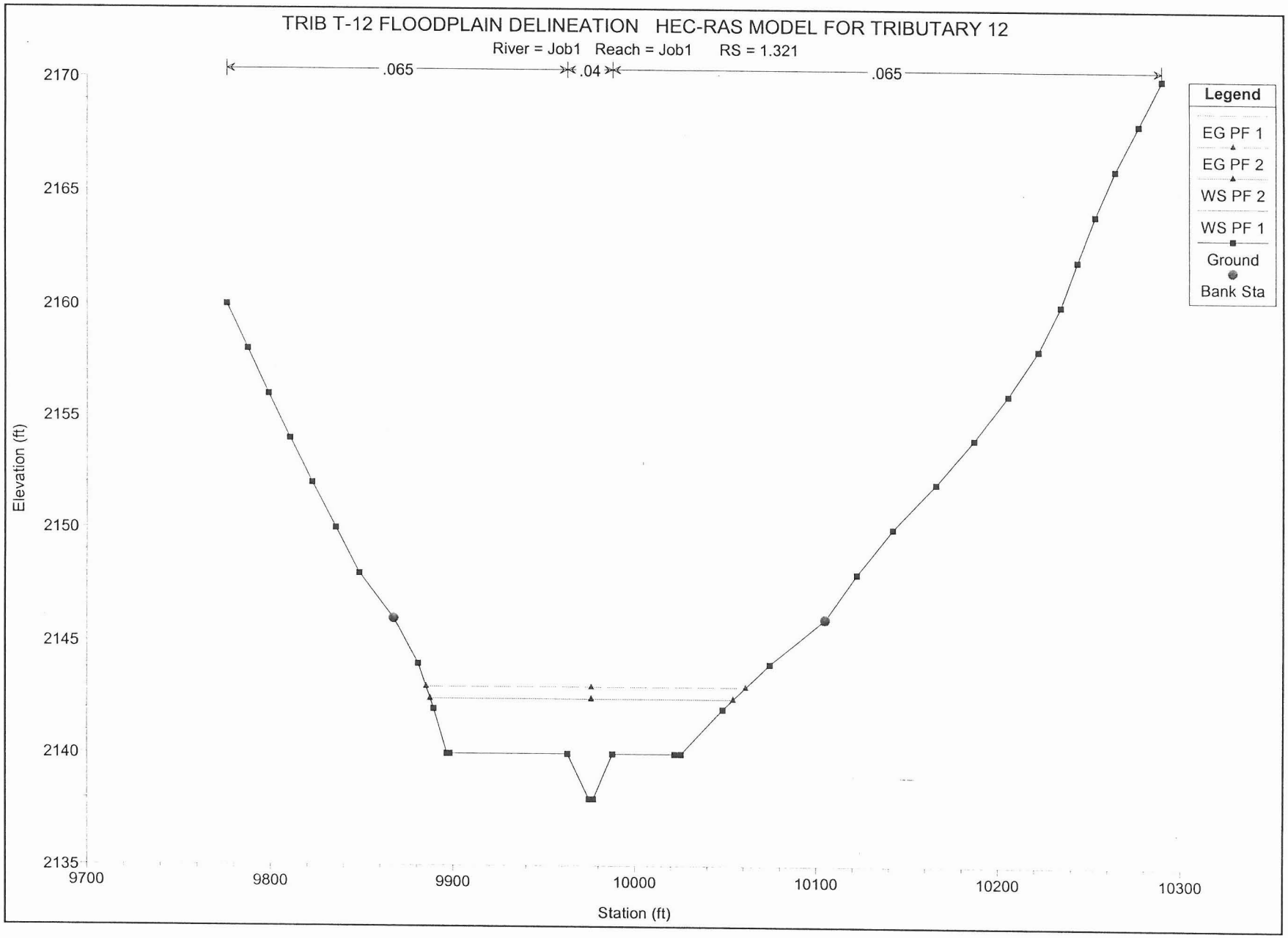
River: TRIBUTARY 12

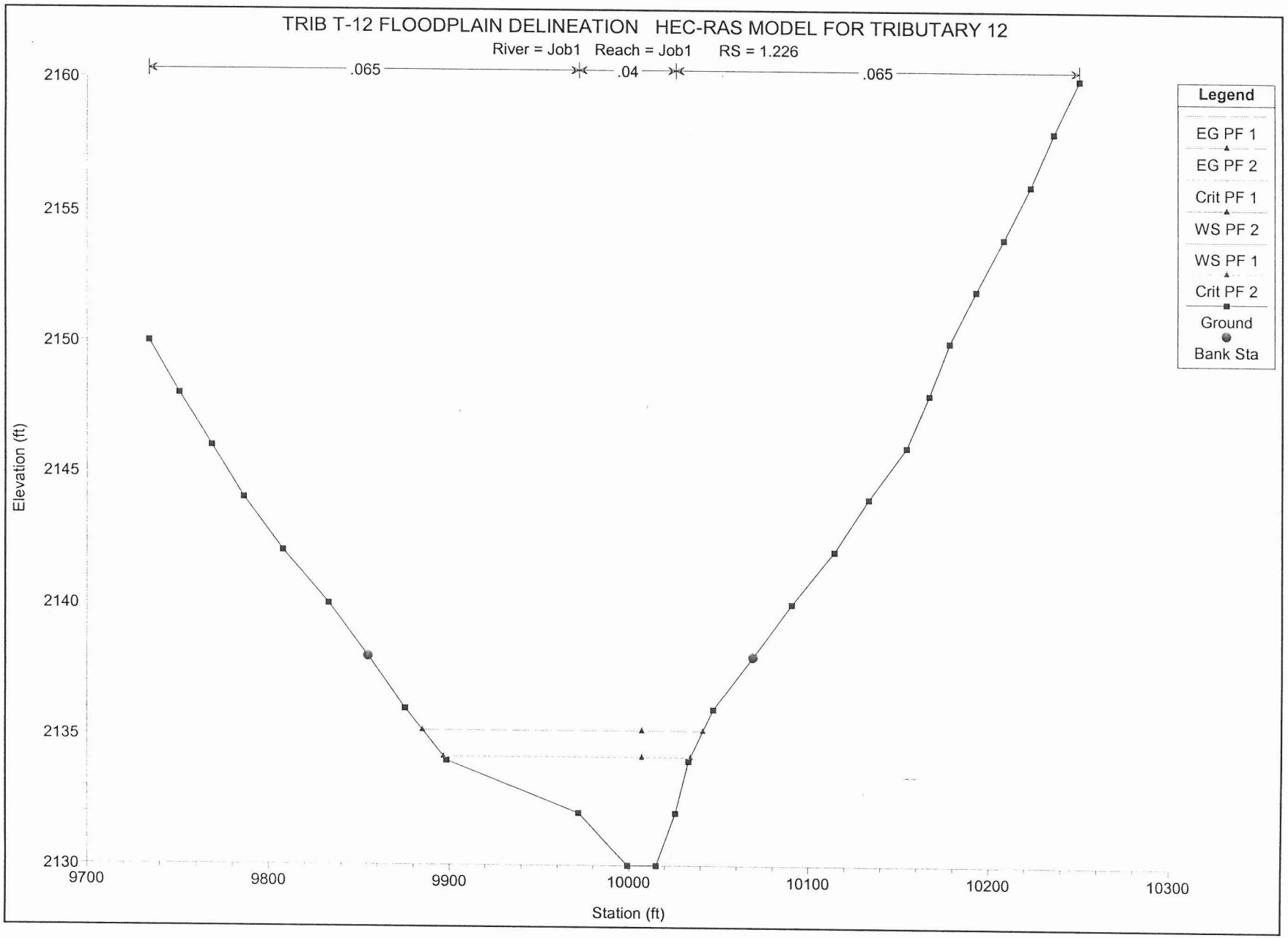
Reach	River Sta.	Left	Channel	Right
TRIBUTARY 12	1.416	468.12	499.87	530.38
TRIBUTARY 12	1.321	526.06	513.73	500.38
TRIBUTARY 12	1.226	512.71	503.76	501.5
TRIBUTARY 12	1.132	494.01	495	495
TRIBUTARY 12	1.038	490.92	491	491
TRIBUTARY 12	0.942	521	528.21	562.47
TRIBUTARY 12	0.847	503.85	500	504
TRIBUTARY 12	0.753	280	280	280
TRIBUTARY 12	0.701	215	220	220
TRIBUTARY 12	0.659	500	500	500
TRIBUTARY 12	0.564	500	500	500
TRIBUTARY 12	0.469	160.53	250.05	273.13
TRIBUTARY 12	0.420	118.46	118.46	118.46
TRIBUTARY 12	0.409	Culvert		
TRIBUTARY 12	0.398	215	217.35	206.4
TRIBUTARY 12	0.358	355.29	288.2	181.95
TRIBUTARY 12	0.303	300.8	279.25	289.41
TRIBUTARY 12	0.249	85.38	185.28	224.97
TRIBUTARY 12	0.214	268.13	314.59	349.2
TRIBUTARY 12	0.154	537.89	282.53	184.4
TRIBUTARY 12	0.097	271.43	274	273.67
TRIBUTARY 12	0.053			

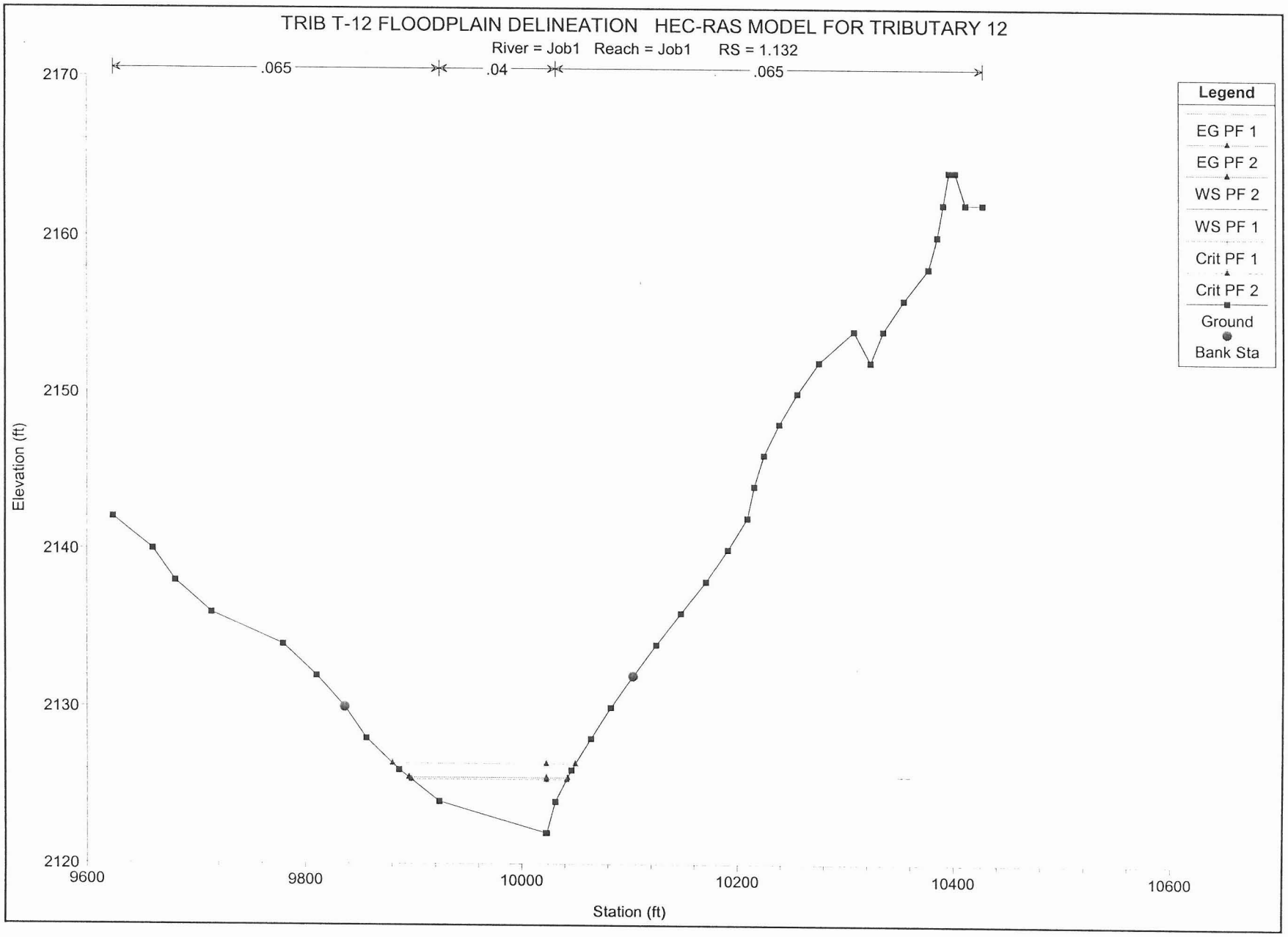
SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: TRIBUTARY 12

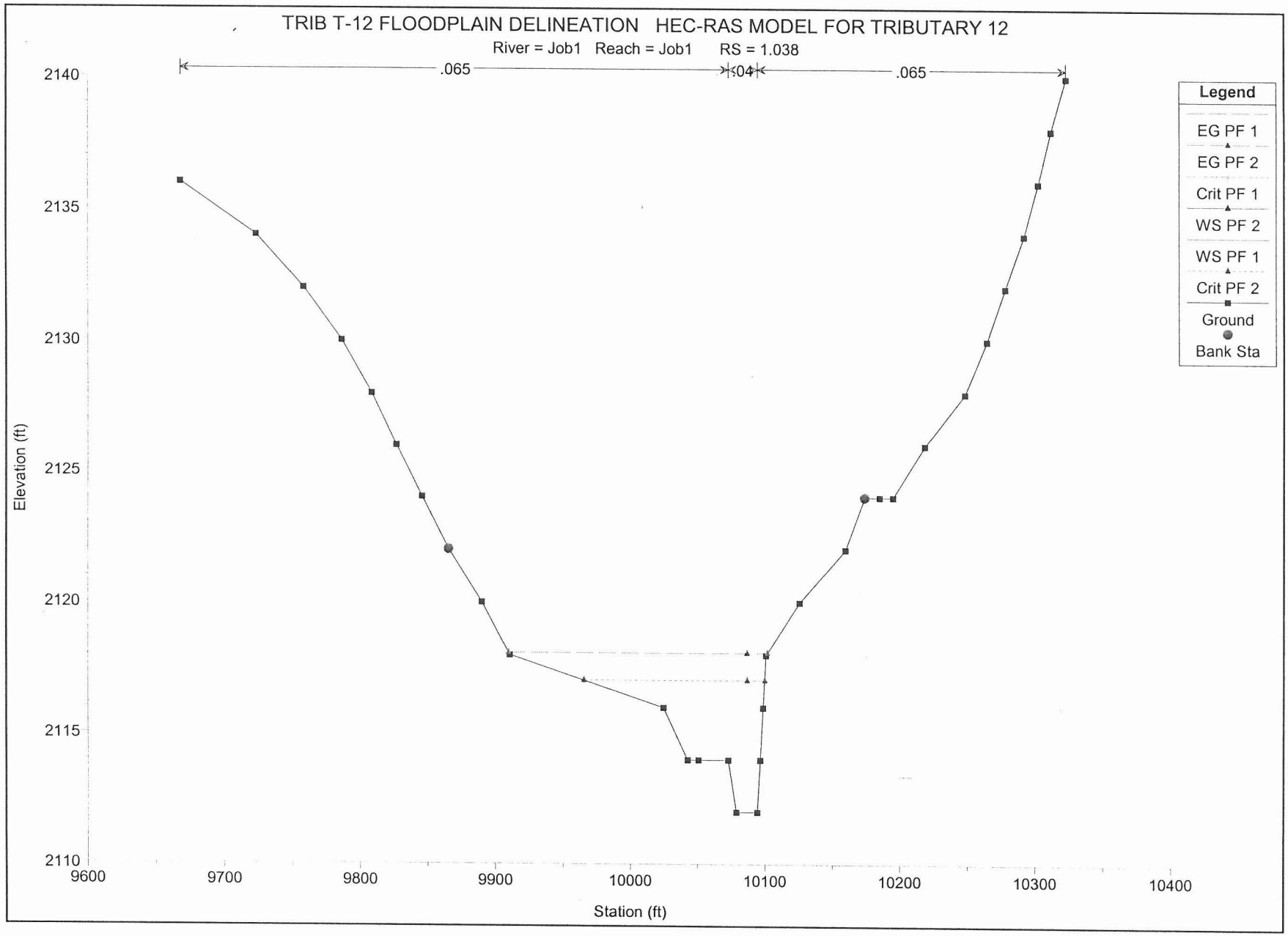
Reach	River Sta.	Contr.	Expan.
TRIBUTARY 12	1.416	.1	.3
TRIBUTARY 12	1.321	.1	.3
TRIBUTARY 12	1.226	.1	.3
TRIBUTARY 12	1.132	.1	.3
TRIBUTARY 12	1.038	.1	.3
TRIBUTARY 12	0.942	.1	.3
TRIBUTARY 12	0.847	.1	.3
TRIBUTARY 12	0.753	.1	.3
TRIBUTARY 12	0.701	.1	.3
TRIBUTARY 12	0.659	.1	.3
TRIBUTARY 12	0.564	.1	.3
TRIBUTARY 12	0.469	.1	.3
TRIBUTARY 12	0.420	.1	.3
TRIBUTARY 12	0.409	Culvert	
TRIBUTARY 12	0.398	.1	.3
TRIBUTARY 12	0.358	.1	.3
TRIBUTARY 12	0.303	.1	.3
TRIBUTARY 12	0.249	.1	.3
TRIBUTARY 12	0.214	.1	.3
TRIBUTARY 12	0.154	.1	.3
TRIBUTARY 12	0.097	.1	.3
TRIBUTARY 12	0.053	.1	.3

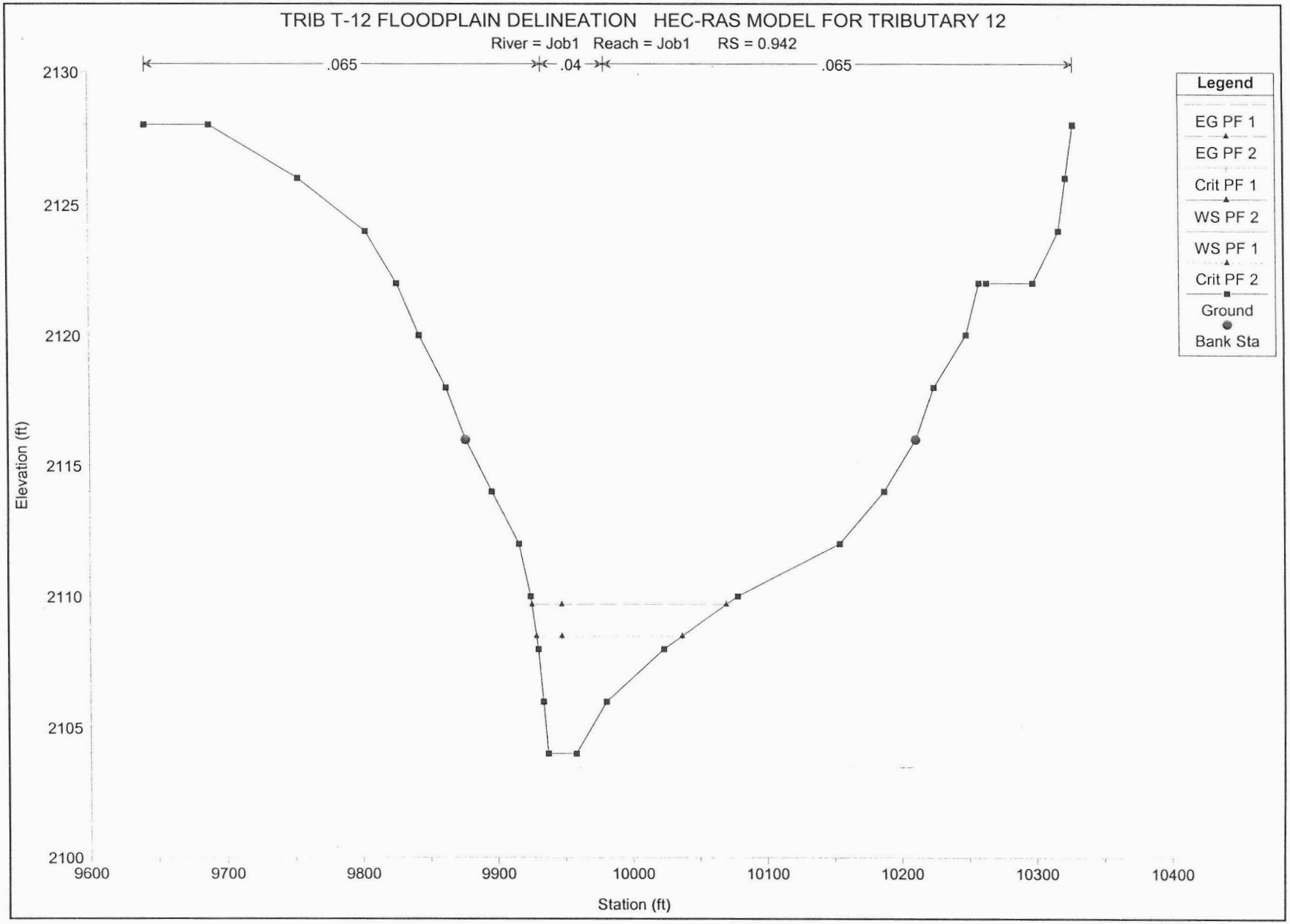

TRIB T-12 FLOODPLAIN DELINEATION HEC-RAS MODEL FOR TRIBUTARY 12
River = Job1 Reach = Job1 RS = 1.416
.065
.04
.065
Legend
EG PF 1
EG PF 2
Crit PF 1
WS PF 2
WS PF 1
Crit PF 2
Ground
Bank Sta
Elevation (ft)
2170
2165
2160
2155
2150
2145
9700
9800
9900
10000
10100
10200
10300
Station (ft)

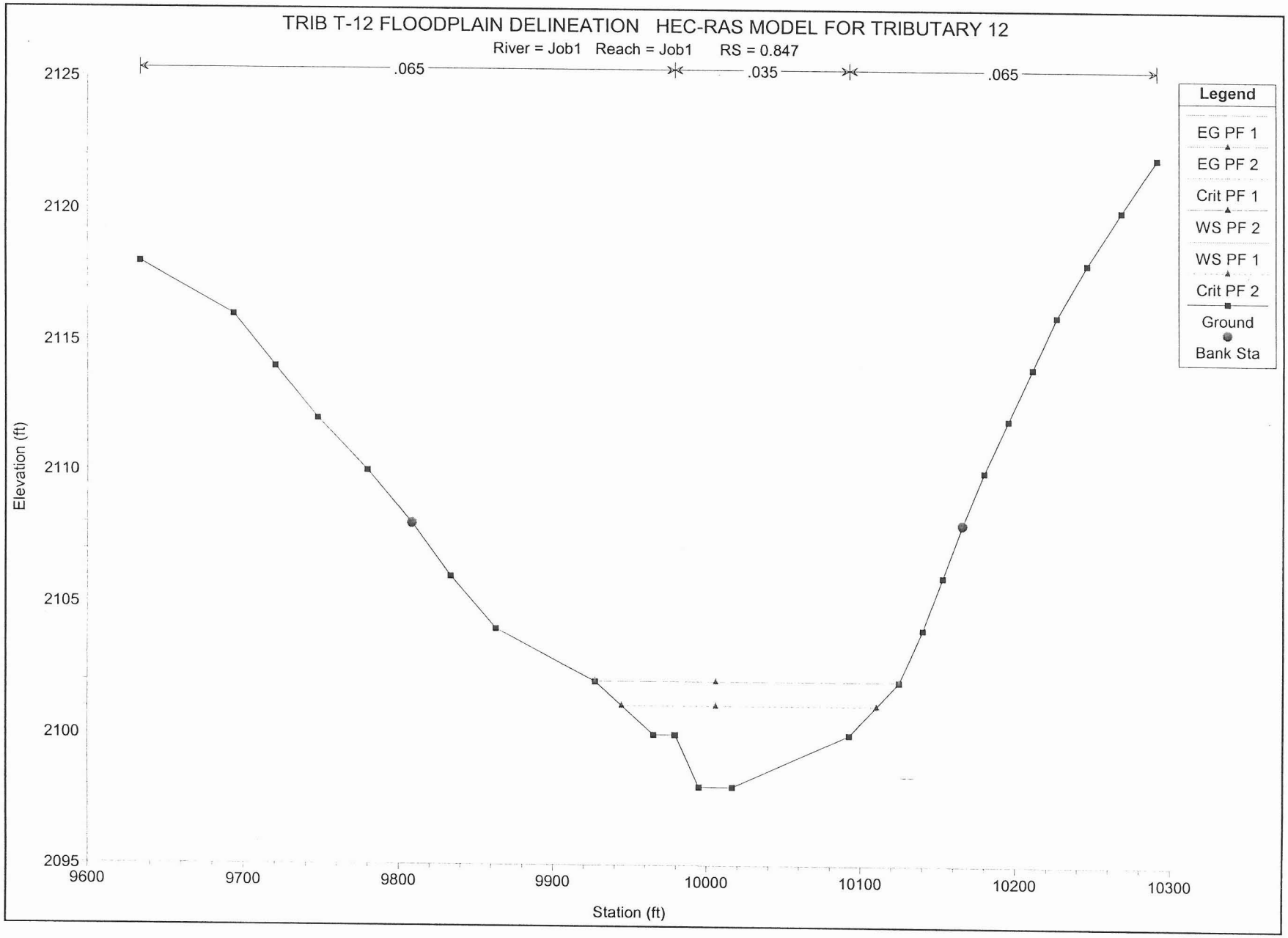

TRIB T-12 FLOODPLAIN DELINEATION HEC-RAS MODEL FOR TRIBUTARY 12
River = Job1 Reach = Job1 RS = 1.321
.065
.04
.065
Legend
EG PF 1
EG PF 2
WS PF 2
WS PF 1
Ground
Bank Sta
Elevation (ft)
2170
2165
2160
2155
2150
2145
2140
2135
9700
9800
9900
10000
10100
10200
10300
Station (ft)

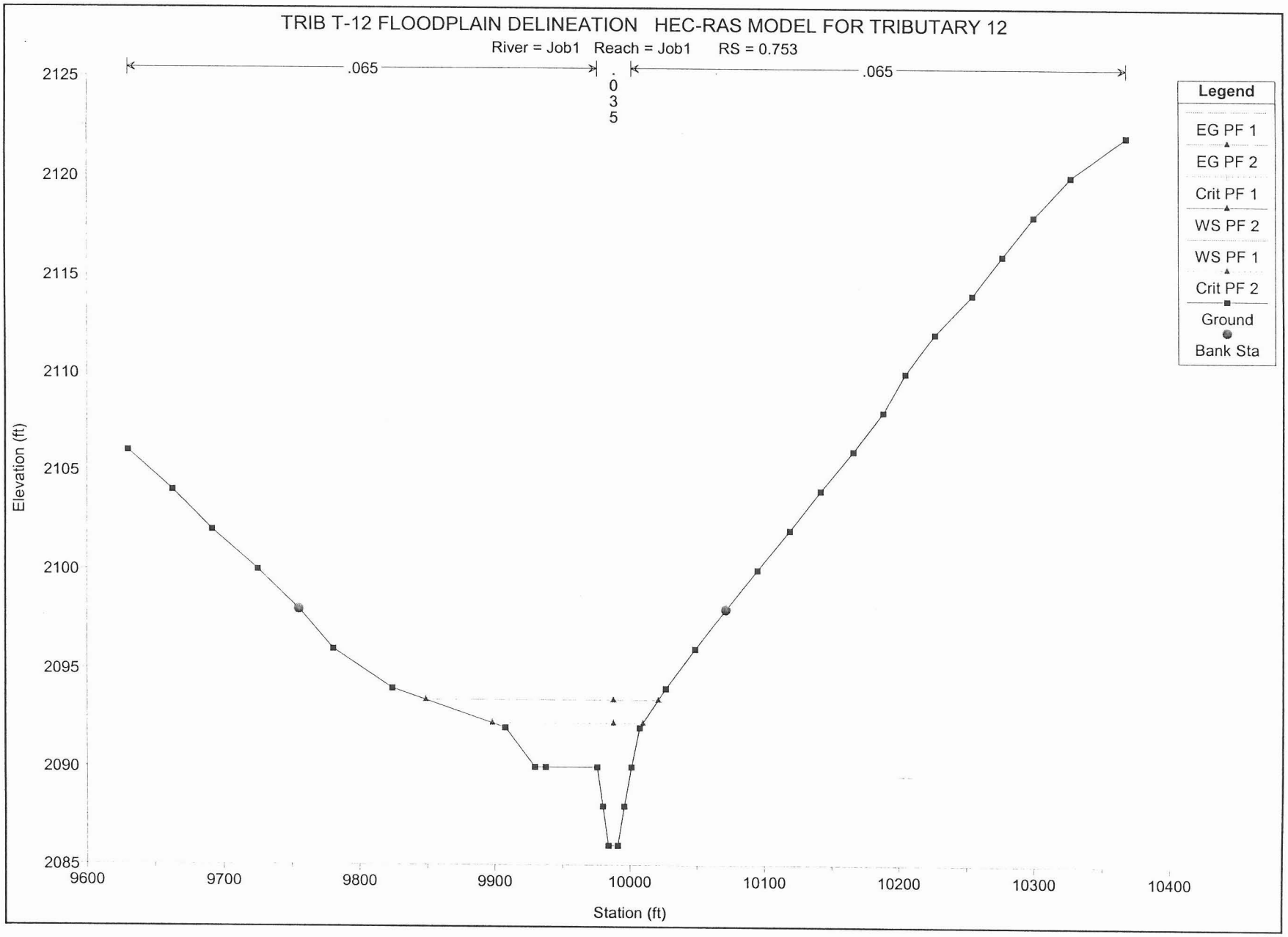

TRIB T-12 FLOODPLAIN DELINEATION HEC-RAS MODEL FOR TRIBUTARY 12
River = Job1 Reach = Job1 RS = 1.226
.065
.04
.065
Legend
EG PF 1
EG PF 2
Crit PF 1
WS PF 2
WS PF 1
Crit PF 2
Ground
Bank Sta
Elevation (ft)
2160
2155
2150
2145
2140
2135
2130
9700
9800
9900
10000
10100
10200
10300
Station (ft)

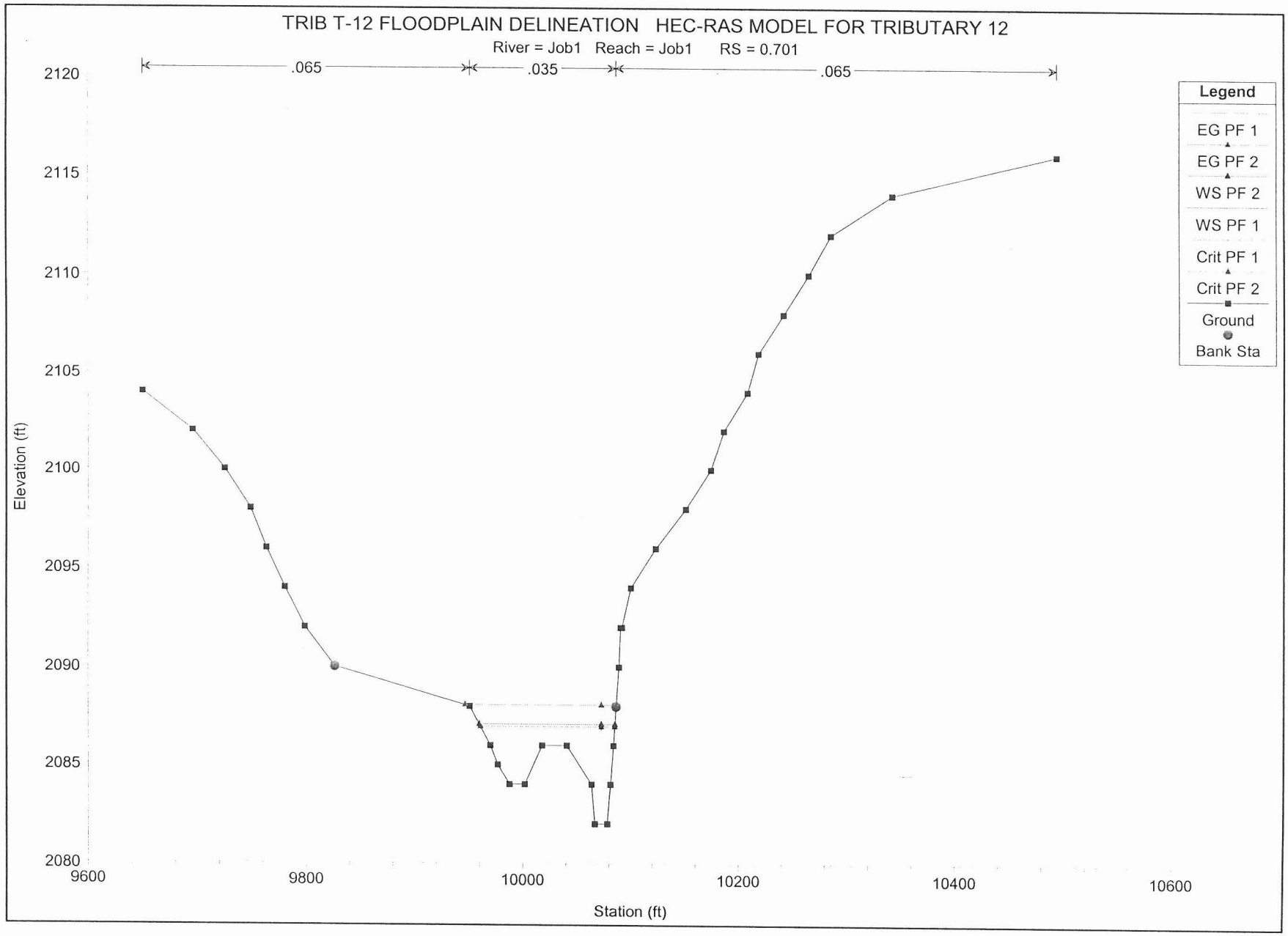

TRIB T-12 FLOODPLAIN DELINEATION HEC-RAS MODEL FOR TRIBUTARY 12
River = Job1 Reach = Job1 RS = 1.132
.065
.04
.065
Legend
EG PF 1
EG PF 2
WS PF 2
WS PF 1
Crit PF 1
Crit PF 2
Ground
Bank Sta
Elevation (ft)
2170
2160
2150
2140
2130
2120
9600
9800
10000
10200
10400
10600
Station (ft)

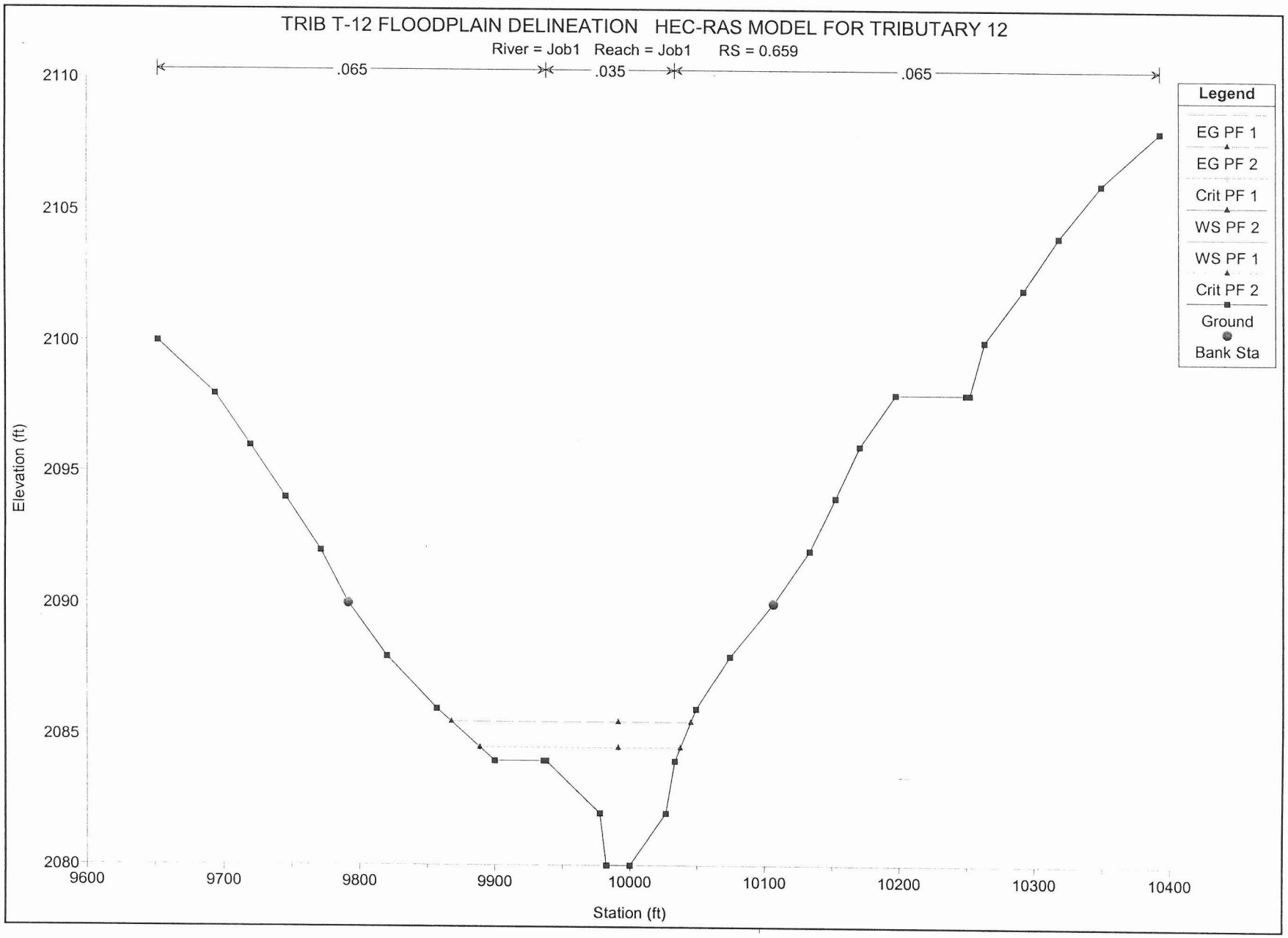

TRIB T-12 FLOODPLAIN DELINEATION HEC-RAS MODEL FOR TRIBUTARY 12
River = Job1 Reach = Job1 RS = 1.038
.065
.04
.065
Legend
EG PF 1
EG PF 2
Crit PF 1
WS PF 2
WS PF 1
Crit PF 2
Ground
Bank Sta
Elevation (ft)
2140
2135
2130
2125
2120
2115
2110
9600
9700
9800
9900
10000
10100
10200
10300
10400
Station (ft)

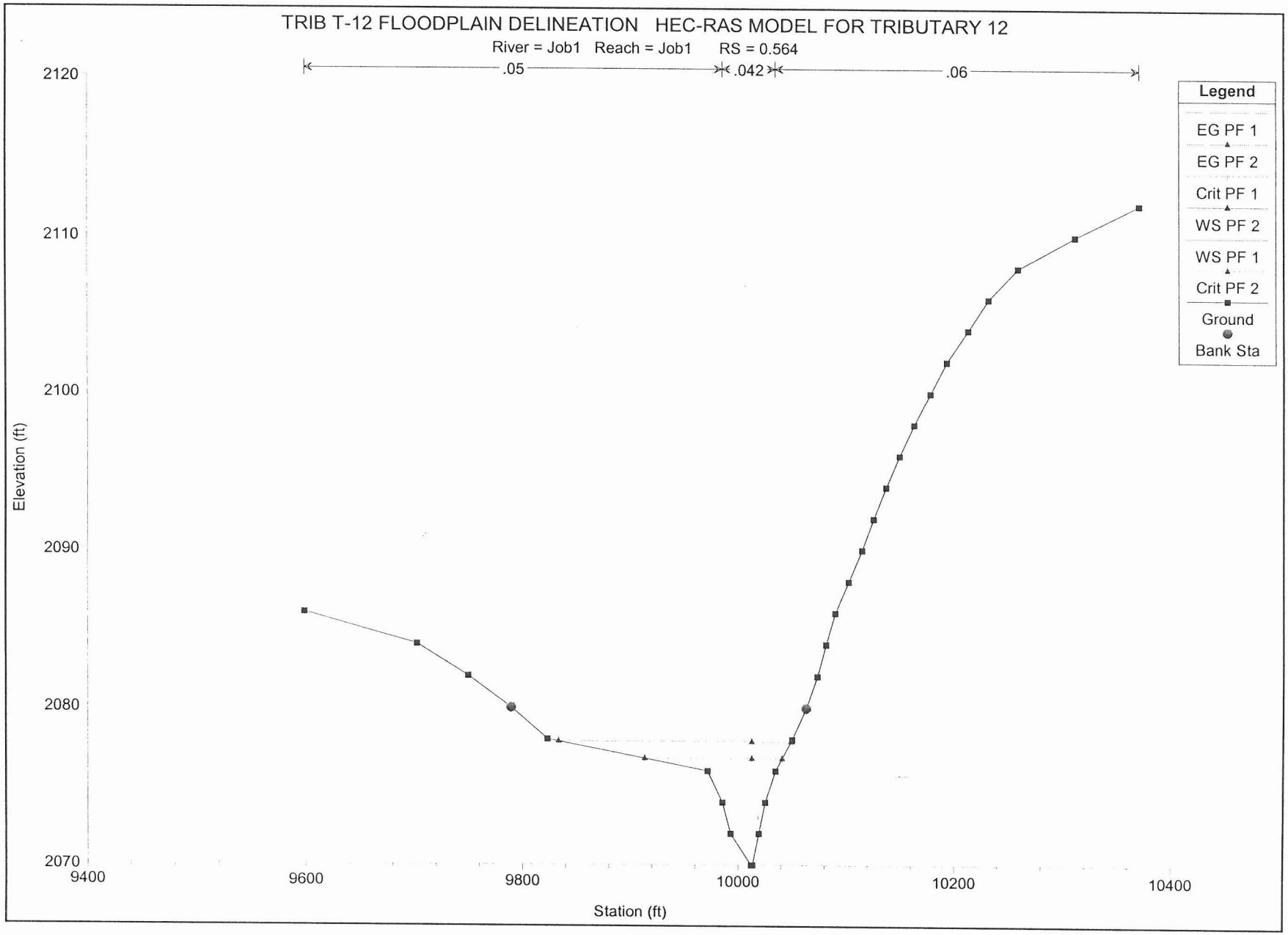

TRIB T-12 FLOODPLAIN DELINEATION HEC-RAS MODEL FOR TRIBUTARY 12
River = Job1 Reach = Job1 RS = 0.942
.065
.04
.065
Legend
EG PF 1
EG PF 2
Crit PF 1
WS PF 2
WS PF 1
Crit PF 2
Ground
Bank Sta
Elevation (ft)
2130
2125
2120
2115
2110
2105
2100
9600
9700
9800
9900
10000
10100
10200
10300
10400
Station (ft)

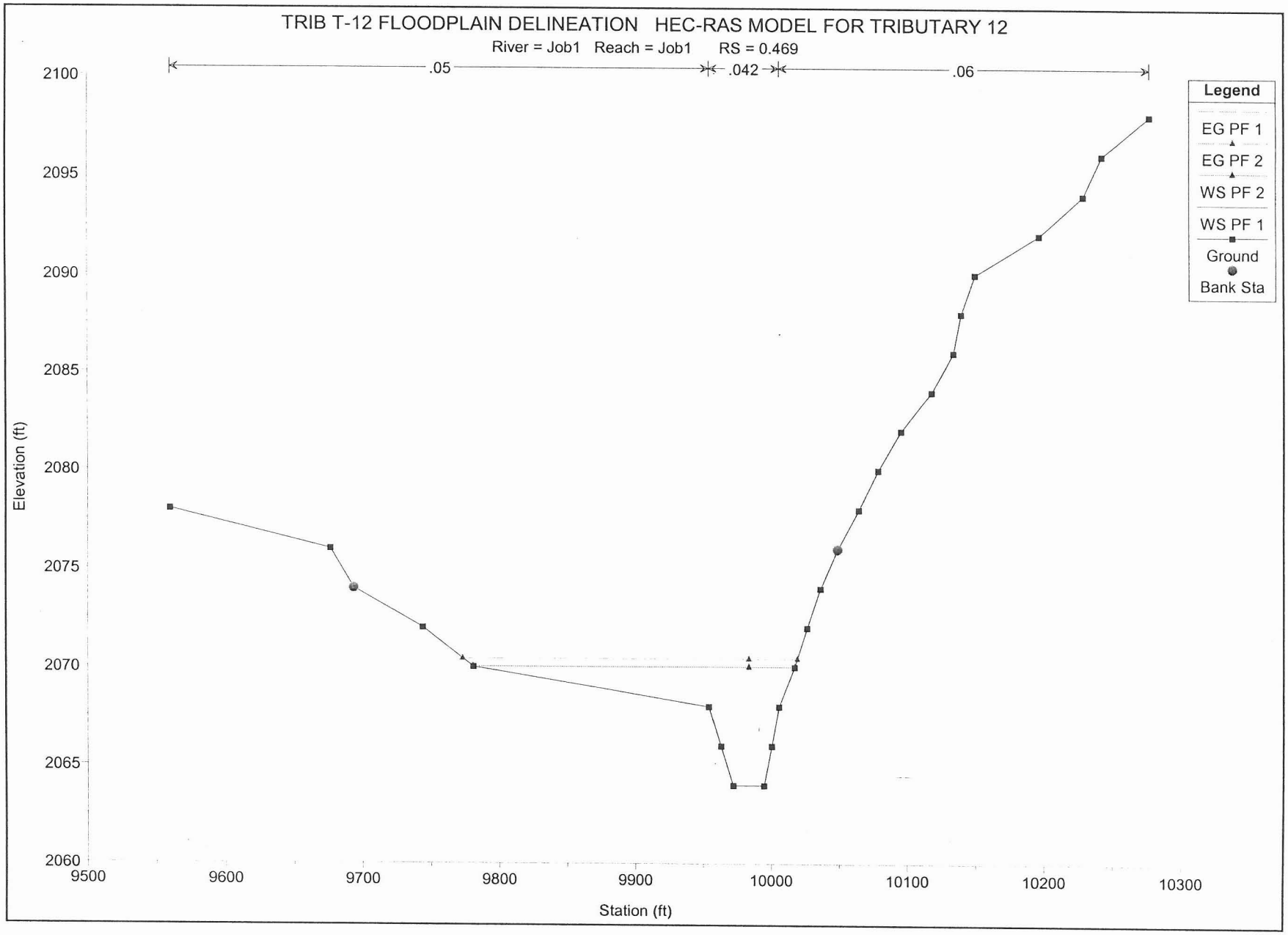

TRIB T-12 FLOODPLAIN DELINEATION HEC-RAS MODEL FOR TRIBUTARY 12
River = Job1 Reach = Job1 RS = 0.847
.065
.035
.065
Legend
EG PF 1
EG PF 2
Crit PF 1
WS PF 2
WS PF 1
Crit PF 2
Ground
Bank Sta
Elevation (ft)
2125
2120
2115
2110
2105
2100
2095
9600
9700
9800
9900
10000
10100
10200
10300
Station (ft)

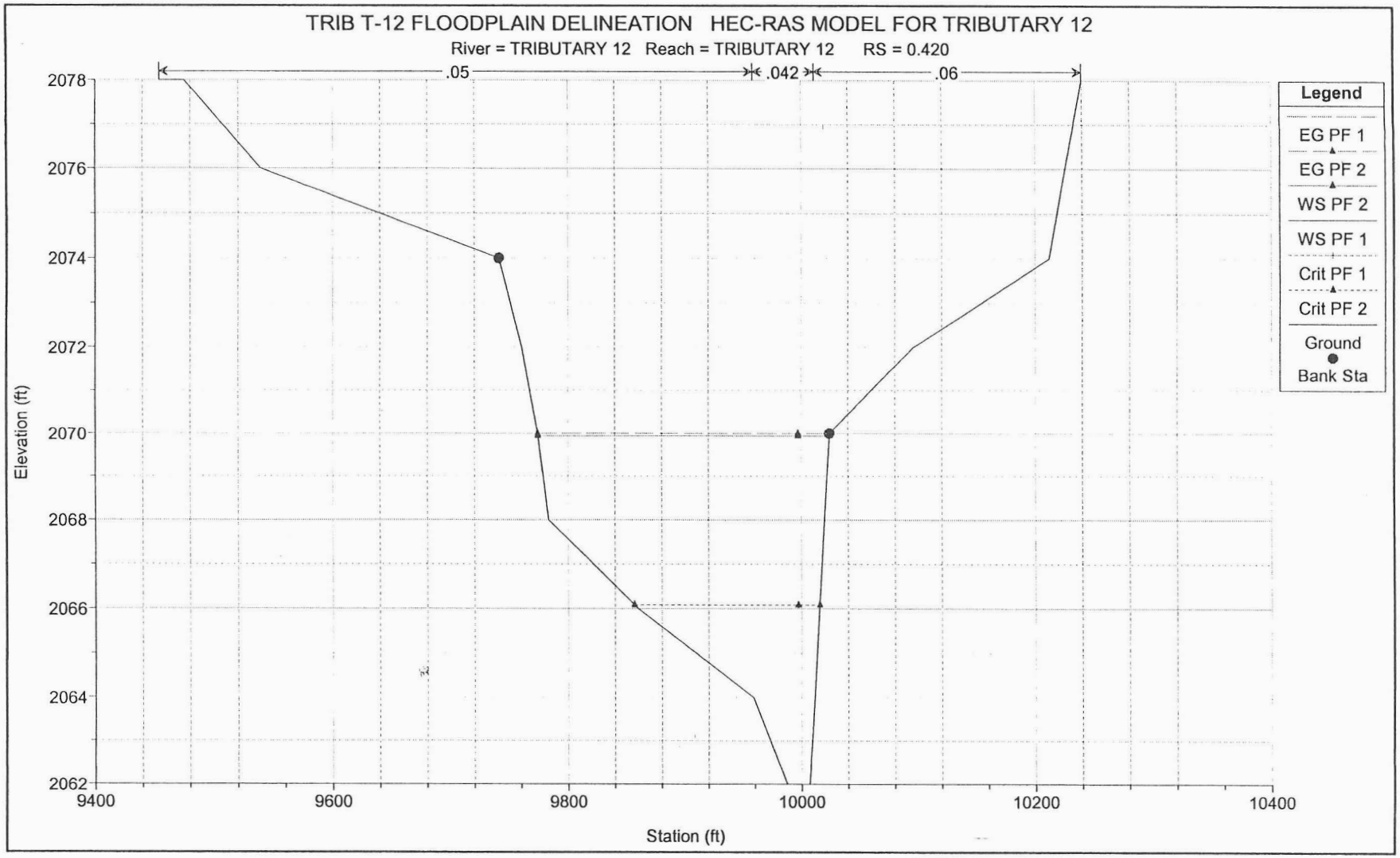

TRIB T-12 FLOODPLAIN DELINEATION HEC-RAS MODEL FOR TRIBUTARY 12
River = Job1 Reach = Job1 RS = 0.753
.065
.035
.065
Legend
EG PF 1
EG PF 2
Crit PF 1
WS PF 2
WS PF 1
Crit PF 2
Ground
Bank Sta
Elevation (ft)
2125
2120
2115
2110
2105
2100
2095
2090
2085
9600
9700
9800
9900
10000
10100
10200
10300
10400
Station (ft)

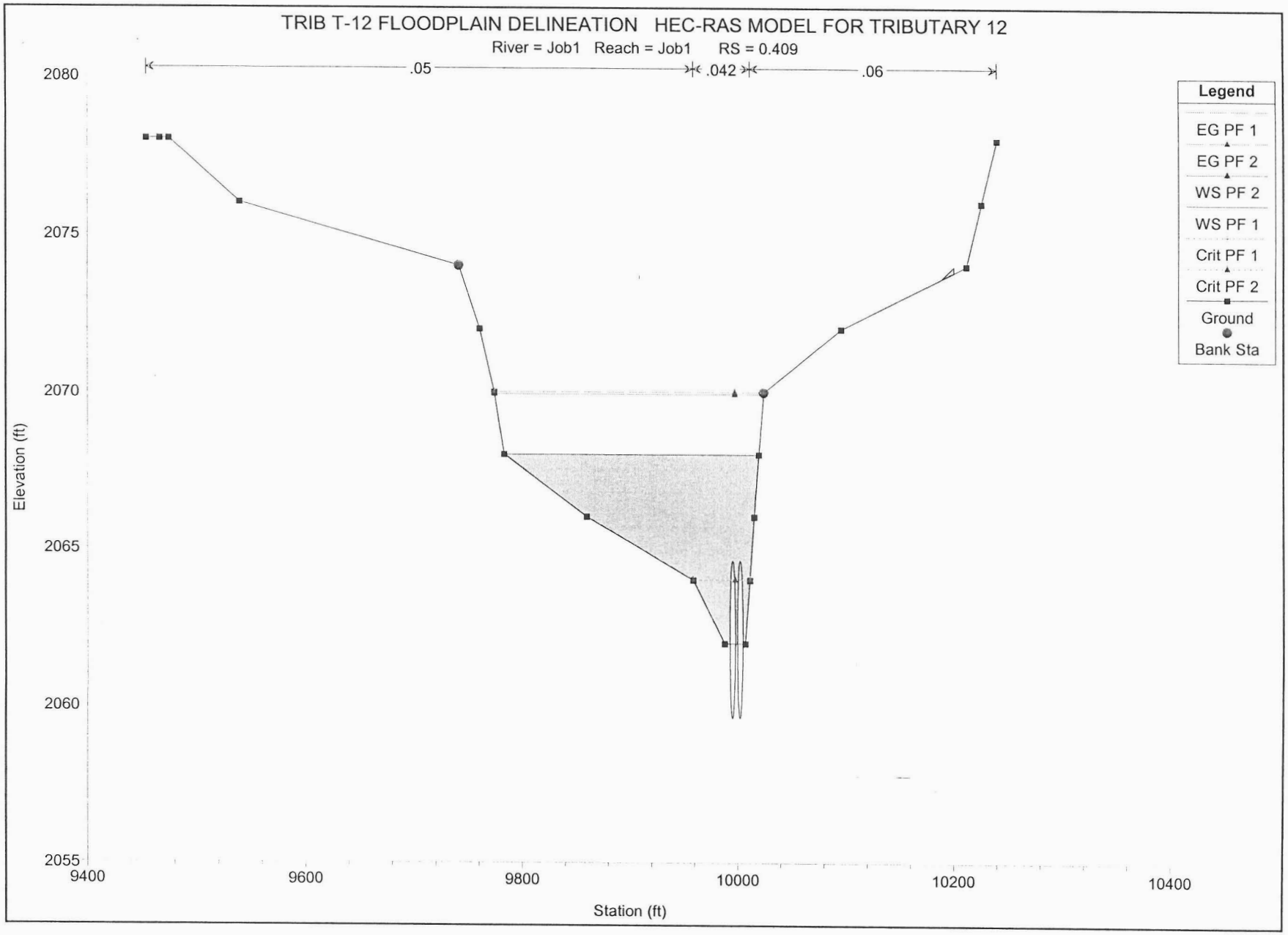

TRIB T-12 FLOODPLAIN DELINEATION HEC-RAS MODEL FOR TRIBUTARY 12
River = Job1 Reach = Job1 RS = 0.701
.065
.035
.065
Legend
EG PF 1
EG PF 2
WS PF 2
WS PF 1
Crit PF 1
Crit PF 2
Ground
Bank Sta
Elevation (ft)
2120
2115
2110
2105
2100
2095
2090
2085
2080
9600
9800
10000
10200
10400
10600
Station (ft)

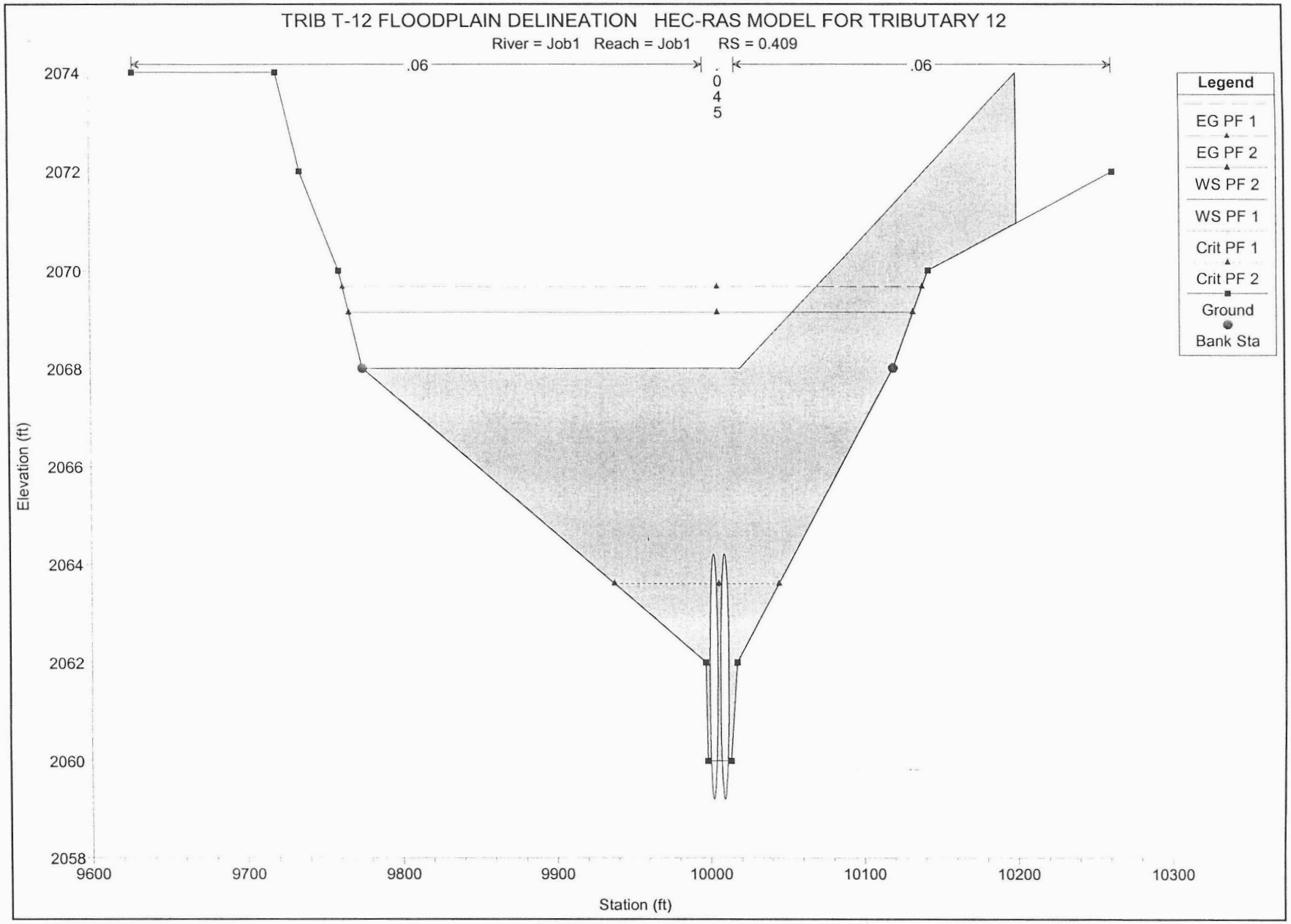

TRIB T-12 FLOODPLAIN DELINEATION HEC-RAS MODEL FOR TRIBUTARY 12
River = Job1 Reach = Job1 RS = 0.659
.065
.035
.065
Legend
EG PF 1
EG PF 2
Crit PF 1
WS PF 2
WS PF 1
Crit PF 2
Ground
Bank Sta
Elevation (ft)
2110
2105
2100
2095
2090
2085
2080
9600
9700
9800
9900
10000
10100
10200
10300
10400
Station (ft)

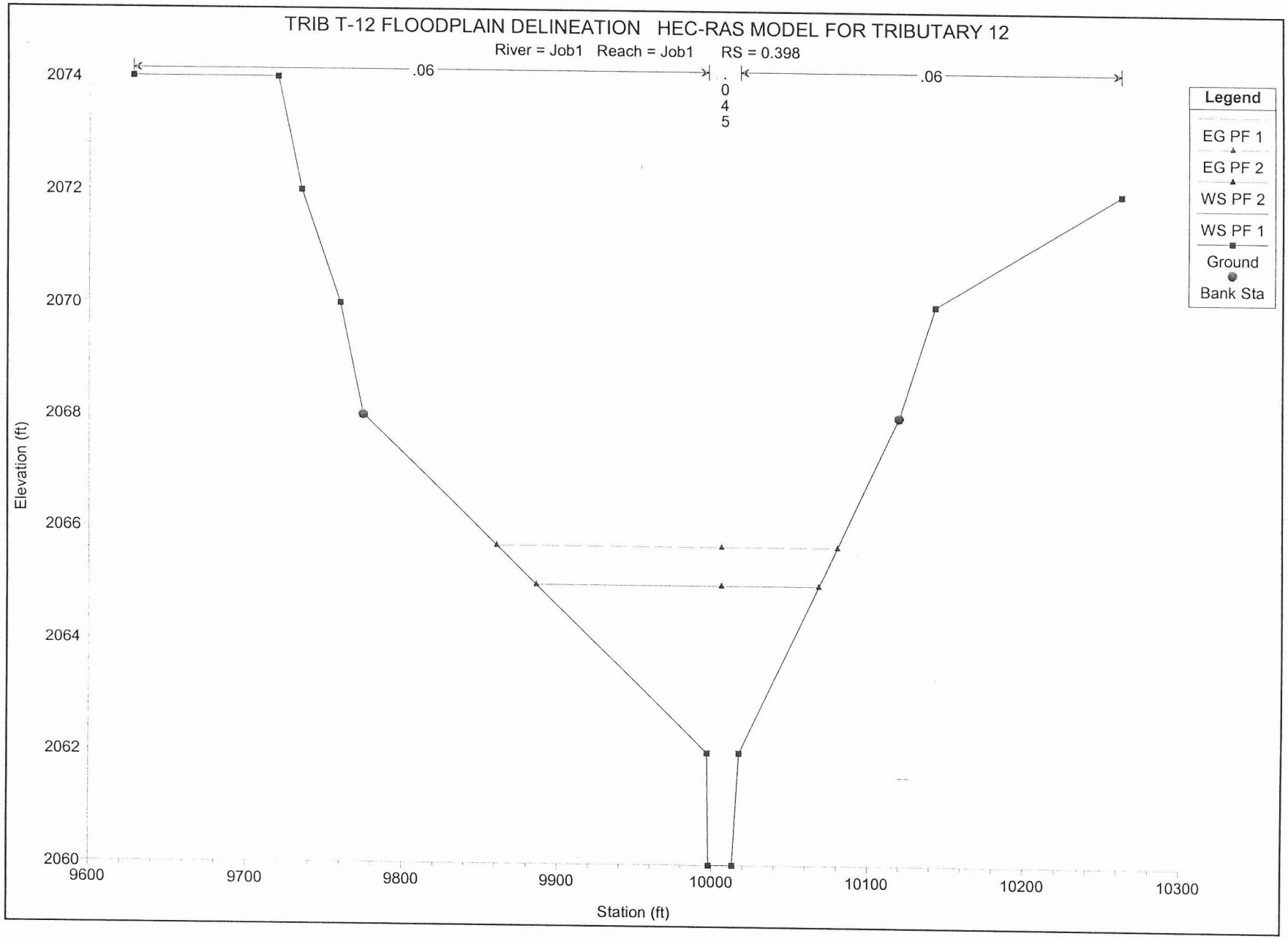

TRIB T-12 FLOODPLAIN DELINEATION HEC-RAS MODEL FOR TRIBUTARY 12
River = Job1 Reach = Job1 RS = 0.564
.05
.042
.06
Legend
EG PF 1
EG PF 2
Crit PF 1
WS PF 2
WS PF 1
Crit PF 2
Ground
Bank Sta
Elevation (ft)
2120
2110
2100
2090
2080
2070
9400
9600
9800
10000
10200
10400
Station (ft)

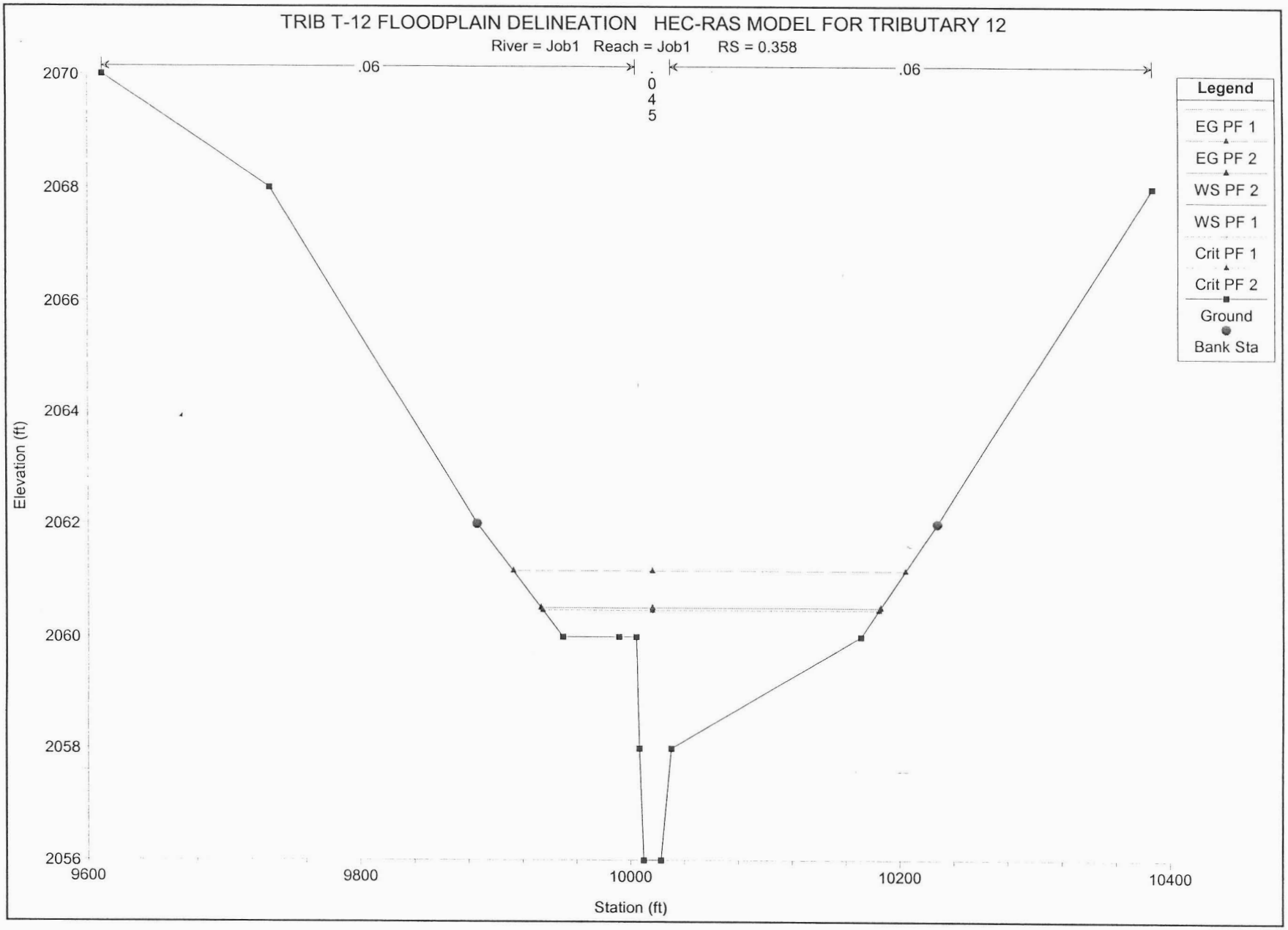

TRIB T-12 FLOODPLAIN DELINEATION HEC-RAS MODEL FOR TRIBUTARY 12
River = Job1 Reach = Job1 RS = 0.469
.05
.042
.06
Legend
EG PF 1
EG PF 2
WS PF 2
WS PF 1
Ground
Bank Sta
Elevation (ft)
2100
2095
2090
2085
2080
2075
2070
2065
2060
9500
9600
9700
9800
9900
10000
10100
10200
10300
Station (ft)

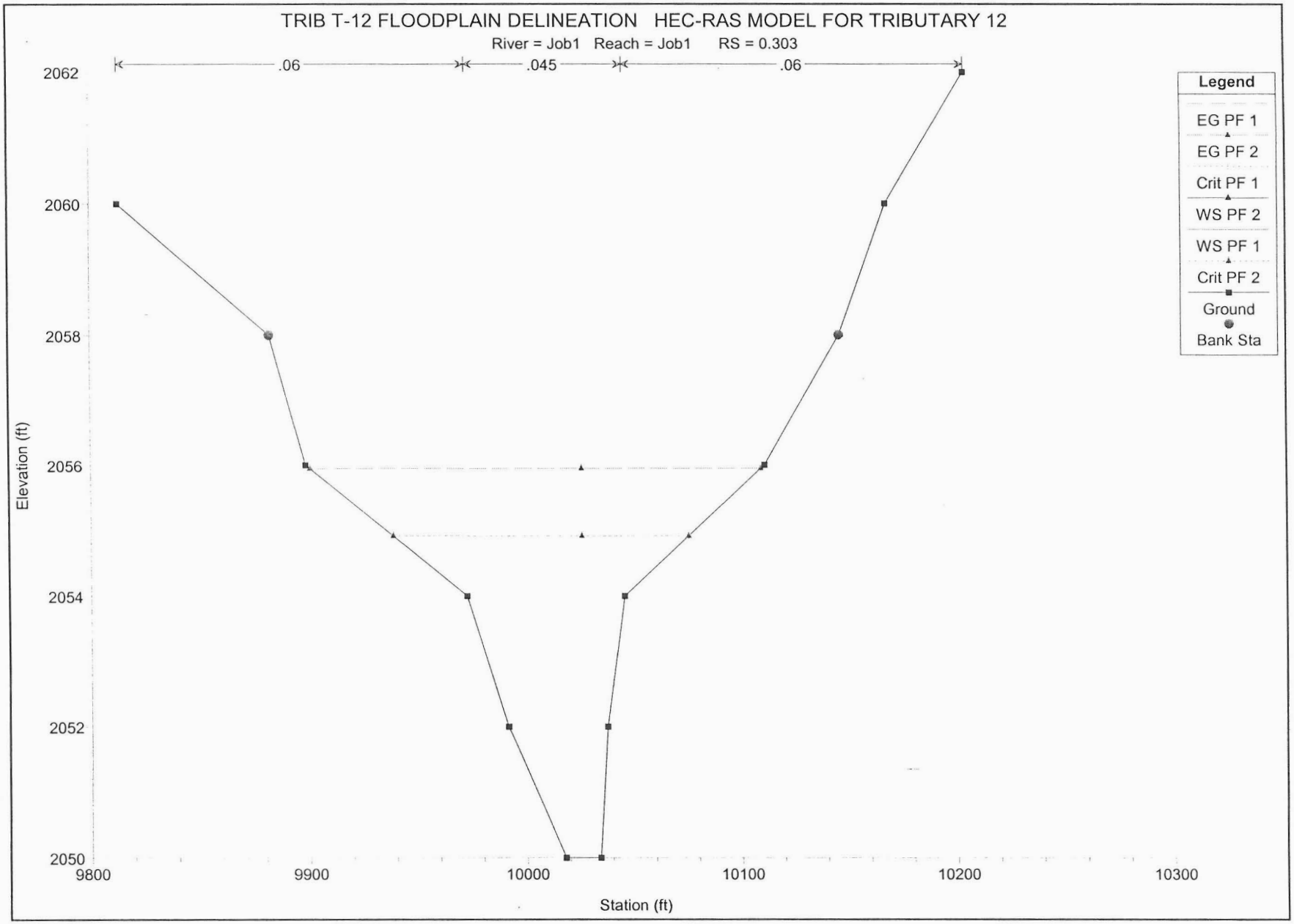

TRIB T-12 FLOODPLAIN DELINEATION HEC-RAS MODEL FOR TRIBUTARY 12
River = TRIBUTARY 12 Reach = TRIBUTARY 12 RS = 0.420
.05
.042
.06
Legend
EG PF 1
EG PF 2
WS PF 2
WS PF 1
Crit PF 1
Crit PF 2
Ground
Bank Sta
Elevation (ft)
2078
2076
2074
2072
2070
2068
2066
2064
2062
9400
9600
9800
10000
10200
10400
Station (ft)

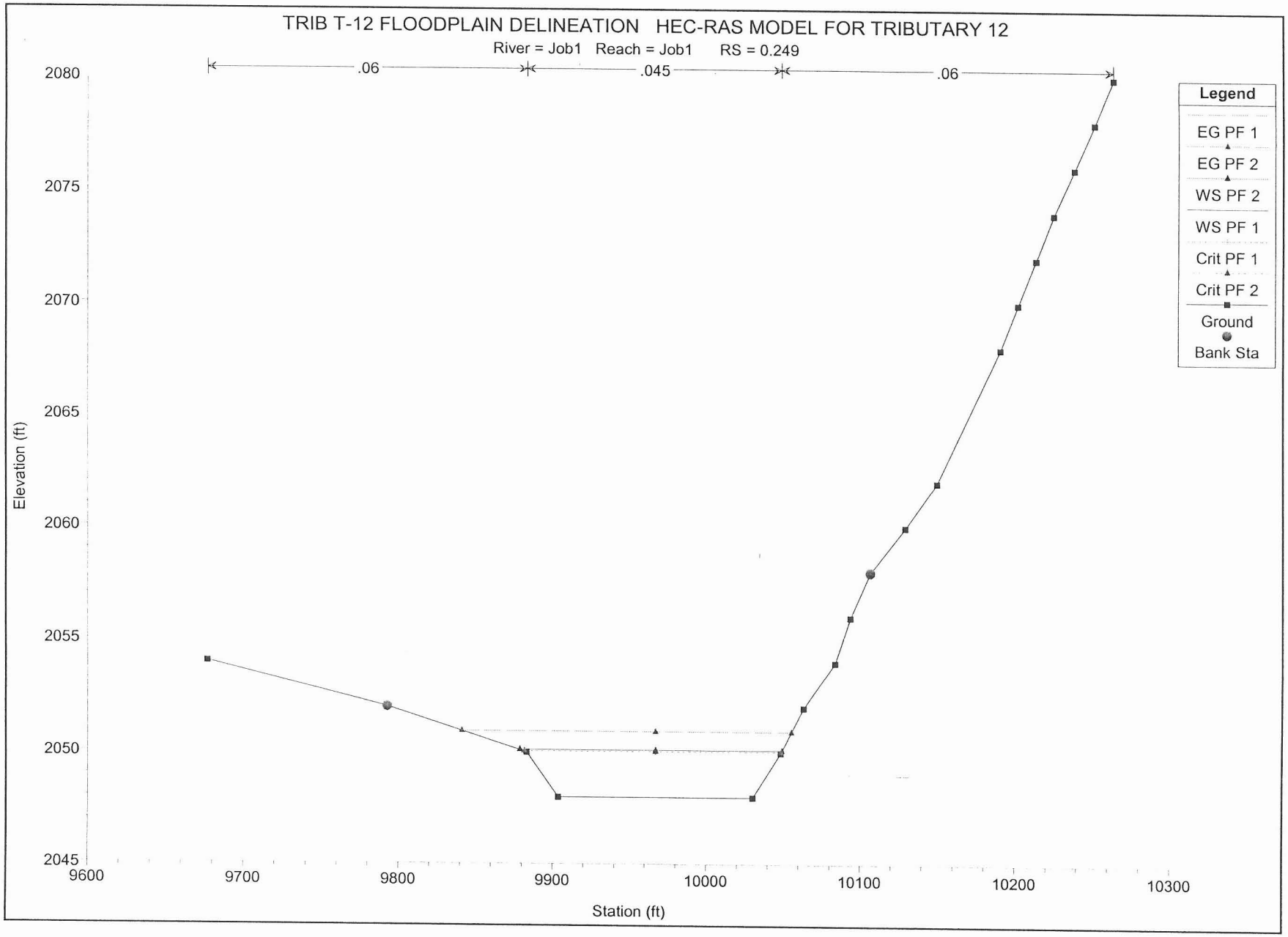

TRIB T-12 FLOODPLAIN DELINEATION HEC-RAS MODEL FOR TRIBUTARY 12
River = Job1 Reach = Job1 RS = 0.409
.05
.042
.06
Legend
EG PF 1
EG PF 2
WS PF 2
WS PF 1
Crit PF 1
Crit PF 2
Ground
Bank Sta
Elevation (ft)
2080
2075
2070
2065
2060
2055
9400
9600
9800
10000
10200
10400
Station (ft)

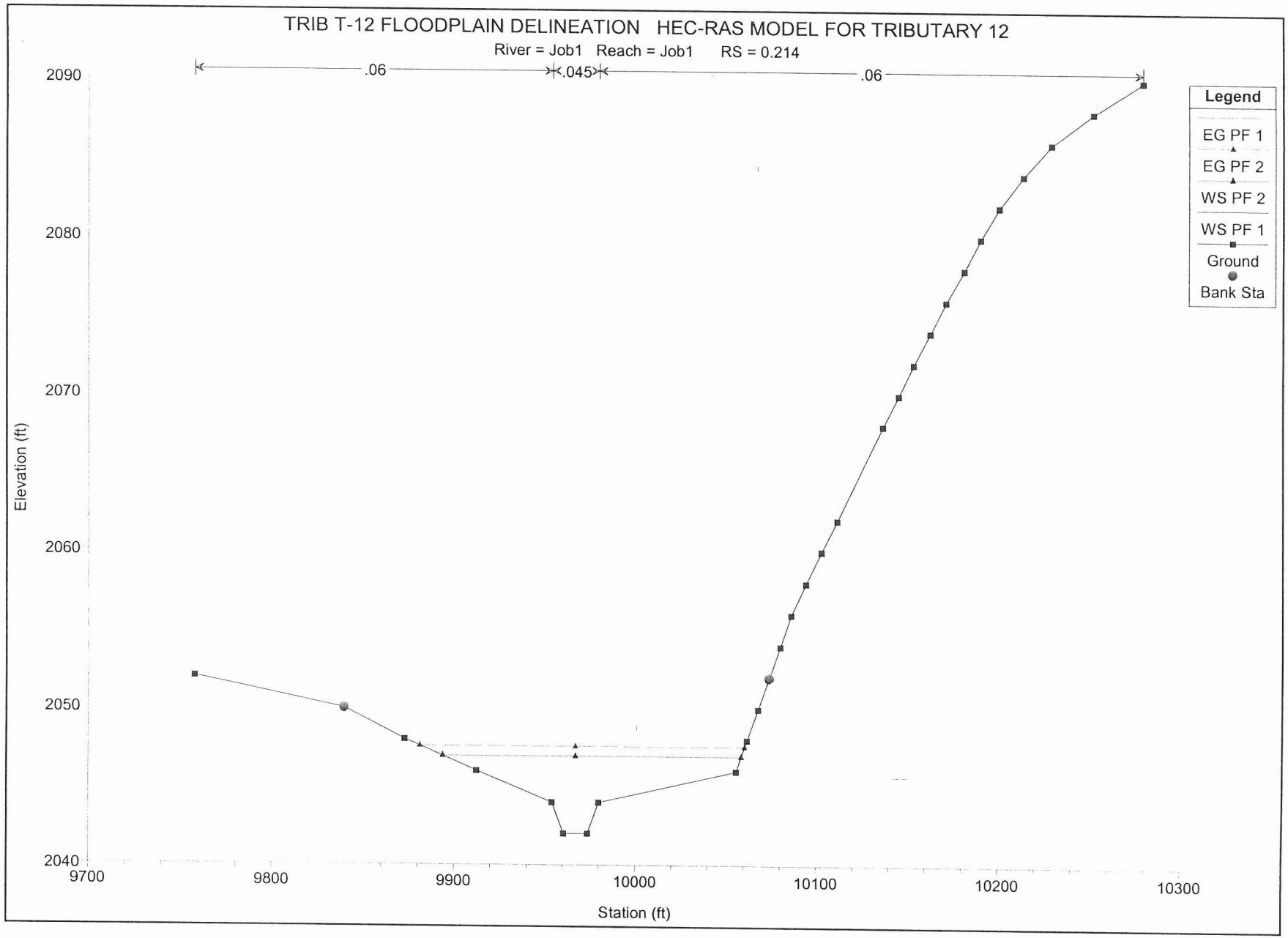

TRIB T-12 FLOODPLAIN DELINEATION HEC-RAS MODEL FOR TRIBUTARY 12
River = Job1 Reach = Job1 RS = 0.409
.06
.045
.06
Legend
EG PF 1
EG PF 2
WS PF 2
WS PF 1
Crit PF 1
Crit PF 2
Ground
Bank Sta
Elevation (ft)
2074
2072
2070
2068
2066
2064
2062
2060
2058
9600
9700
9800
9900
10000
10100
10200
10300
Station (ft)

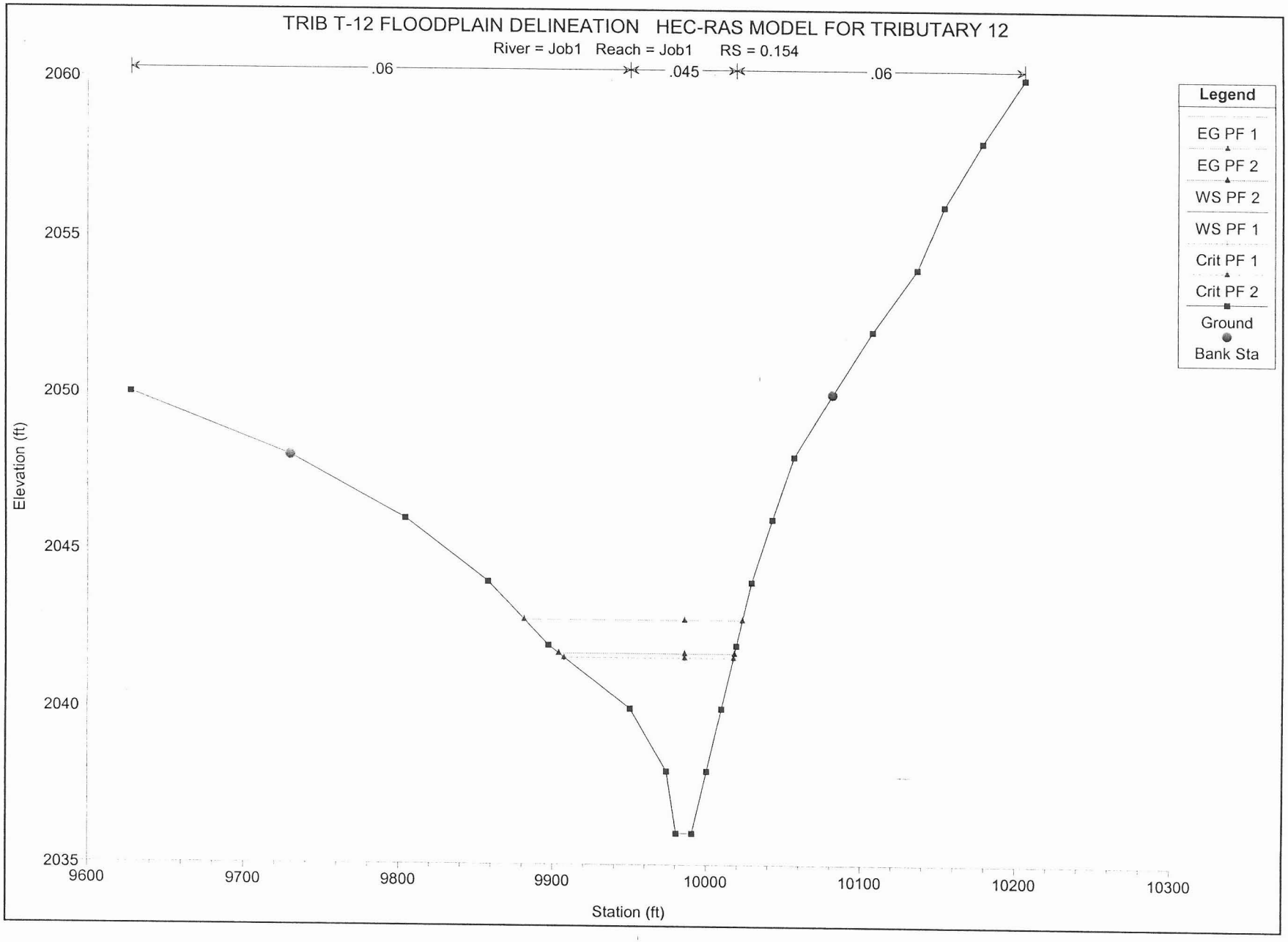

TRIB T-12 FLOODPLAIN DELINEATION HEC-RAS MODEL FOR TRIBUTARY 12
River = Job1 Reach = Job1 RS = 0.398
.06
.045
.06
Legend
EG PF 1
EG PF 2
WS PF 2
WS PF 1
Ground
Bank Sta
Elevation (ft)
2074
2072
2070
2068
2066
2064
2062
2060
9600
9700
9800
9900
10000
10100
10200
10300
Station (ft)

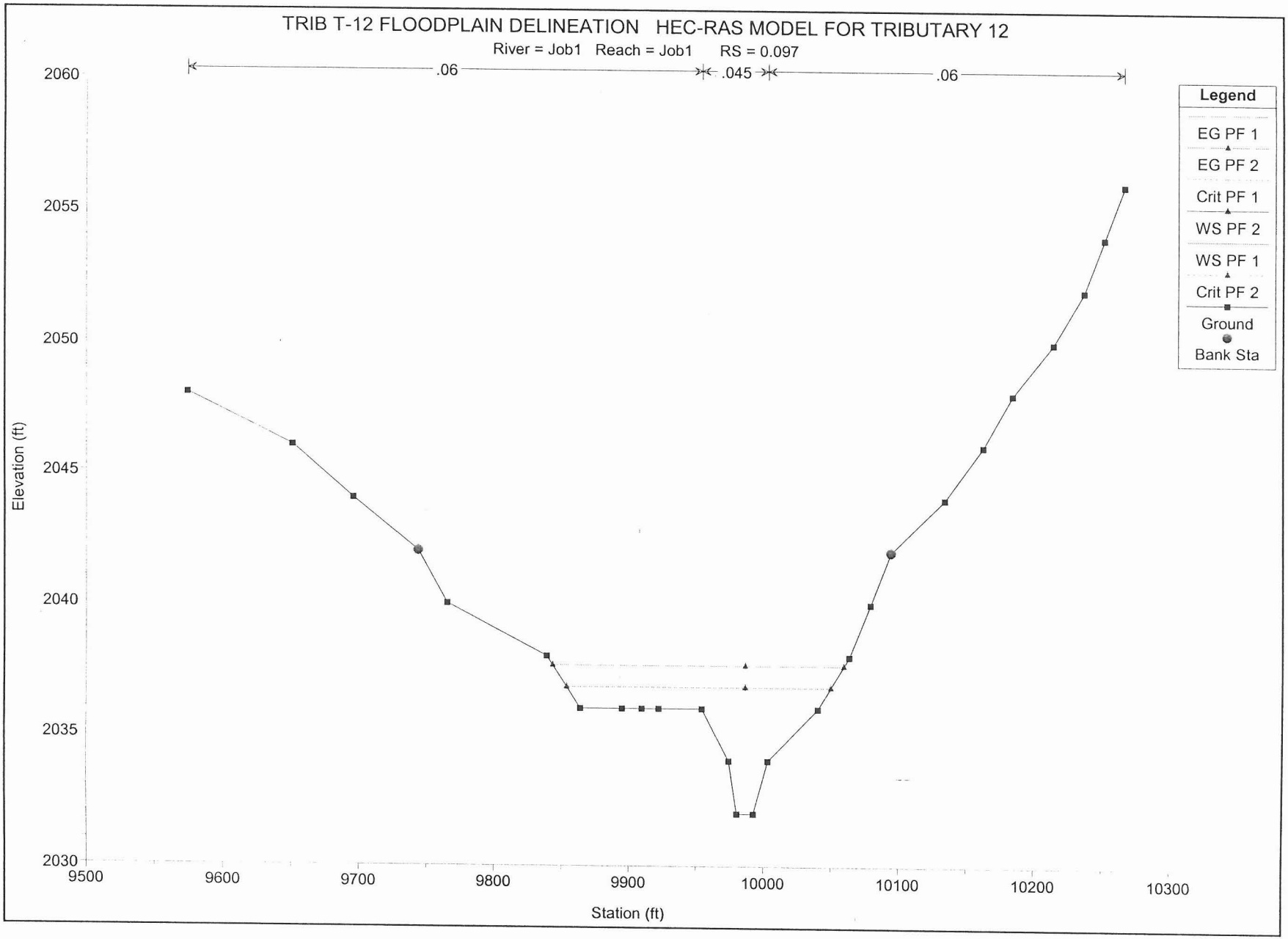

TRIB T-12 FLOODPLAIN DELINEATION HEC-RAS MODEL FOR TRIBUTARY 12
River = Job1 Reach = Job1 RS = 0.358
.06
.045
.06
Legend
EG PF 1
EG PF 2
WS PF 2
WS PF 1
Crit PF 1
Crit PF 2
Ground
Bank Sta
Elevation (ft)
2070
2068
2066
2064
2062
2060
2058
2056
9600
9800
10000
10200
10400
Station (ft)

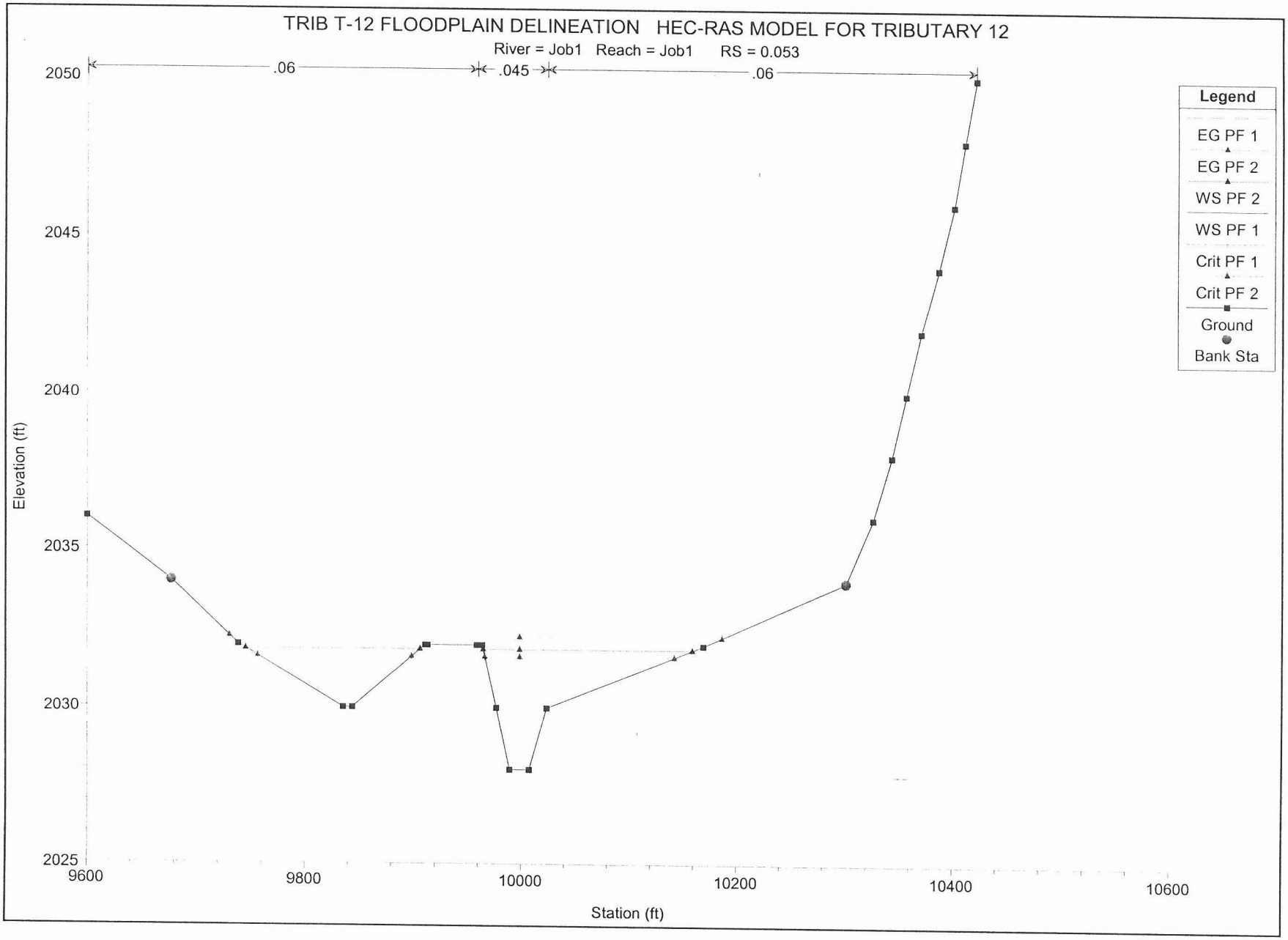

TRIB T-12 FLOODPLAIN DELINEATION HEC-RAS MODEL FOR TRIBUTARY 12
River = Job1 Reach = Job1 RS = 0.303
.06
.045
.06
Legend
EG PF 1
EG PF 2
Crit PF 1
WS PF 2
WS PF 1
Crit PF 2
Ground
Bank Sta
Elevation (ft)
2062
2060
2058
2056
2054
2052
2050
9800
9900
10000
10100
10200
10300
Station (ft)


TRIB T-12 FLOODPLAIN DELINEATION HEC-RAS MODEL FOR TRIBUTARY 12
River = Job1 Reach = Job1 RS = 0.249
.06
.045
.06
Legend
EG PF 1
EG PF 2
WS PF 2
WS PF 1
Crit PF 1
Crit PF 2
Ground
Bank Sta
Elevation (ft)
2080
2075
2070
2065
2060
2055
2050
2045
9600
9700
9800
9900
10000
10100
10200
10300
Station (ft)


TRIB T-12 FLOODPLAIN DELINEATION HEC-RAS MODEL FOR TRIBUTARY 12
River = Job1 Reach = Job1 RS = 0.214
.06
.045
.06
Legend
EG PF 1
EG PF 2
WS PF 2
WS PF 1
Ground
Bank Sta
Elevation (ft)
2090
2080
2070
2060
2050
2040
9700
9800
9900
10000
10100
10200
10300
Station (ft)


TRIB T-12 FLOODPLAIN DELINEATION HEC-RAS MODEL FOR TRIBUTARY 12
River = Job1 Reach = Job1 RS = 0.154
.06
.045
.06
Legend
EG PF 1
EG PF 2
WS PF 2
WS PF 1
Crit PF 1
Crit PF 2
Ground
Bank Sta
Elevation (ft)
2060
2055
2050
2045
2040
2035
9600
9700
9800
9900
10000
10100
10200
10300
Station (ft)


TRIB T-12 FLOODPLAIN DELINEATION HEC-RAS MODEL FOR TRIBUTARY 12
River = Job1 Reach = Job1 RS = 0.097
.06
.045
.06
Legend
EG PF 1
EG PF 2
Crit PF 1
WS PF 2
WS PF 1
Crit PF 2
Ground
Bank Sta
Elevation (ft)
2060
2055
2050
2045
2040
2035
2030
9500
9600
9700
9800
9900
10000
10100
10200
10300
Station (ft)


TRIB T-12 FLOODPLAIN DELINEATION HEC-RAS MODEL FOR TRIBUTARY 12
River = Job1 Reach = Job1 RS = 0.053
.06
.045
.06
Legend
EG PF 1
EG PF 2
WS PF 2
WS PF 1
Crit PF 1
Crit PF 2
Ground
Bank Sta
Elevation (ft)
2050
2045
2040
2035
2030
2025
9600
9800
10000
10200
10400
10600
Station (ft)

HEC-RAS September 1998 Version 2.2
U.S. Army Corp of Engineers
Hydrologic Engineering Center
609 Second Street, Suite D
Davis, California 95616-4687
(916) 756-1104

```
X     X  XXXXXX    XXXX        XXXX       XX      XXXX
X     X  X        X    X      X   X     X  X    X
X     X  X        X           X   X    X    X   X
XXXXXXX  XXXX     X       XXX  XXXX     XXXXXX    XXXX
X     X  X        X           X  X     X    X        X
X     X  X        X    X      X   X    X    X        X
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PROJECT DATA
Project Title: TRIB 10B FLOODPLAIN DELINEATION
Project File : T_10B.prj
Run Date and Time: 9/6/2000 9:34:57 AM

Project in English units

Project Description:
TRIBUTARY 10B

PLAN DATA

Plan Title: TRIBUTARY 10B
Plan File : y:\Mc-18\RAS FCD Disk\HEC-RAS\T_10B\T_10B.P01

Geometry Title: Base Conditions Geometry
Geometry File : y:\Mc-18\RAS FCD Disk\HEC-RAS\T_10B\T_10B.G01

Flow Title : 2 Flow Profiles
Flow File : y:\Mc-18\RAS FCD Disk\HEC-RAS\T_10B\T_10B.F01

Plan Summary Information:
Number of: Cross Sections = 21 Mulitple Openings = 0
Culverts = 1 Inline Weirs = 0
Bridges = 0

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

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

FLOW DATA

Flow Title: 2 Flow Profiles
Flow File : y:\Mc-18\RAS FCD Disk\HEC-RAS\T_10B\T_10B.F01

Flow Data (cfs)

River	Reach	RS	PF 1	PF 2
TRIBUTARY 10B	TRIBUTARY 10B	1.296	1820	1820

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
TRIBUTARY 10B	TRIBUTARY 10B	PF 1		Normal S = .018
TRIBUTARY 10B	TRIBUTARY 10B	PF 2		Normal S = .018

GEOMETRY DATA

Geometry Title: Base Conditions Geometry
Geometry File : y:\Mc-18\RAS FCD Disk\HEC-RAS\T_10B\T_10B.G01

CROSS SECTION RIVER: TRIBUTARY 10B
REACH: TRIBUTARY 10B RS: 1.296

INPUT
Description:
Station Elevation Data num= 42

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9851	2192	9856.27	2190	9861.31	2188	9867.73	2186	9875.59	2184
9884.08	2182	9893.64	2180	9904.02	2178	9914.93	2176	9933.46	2174
9947.56	2172	9957.13	2170	9965.62	2168	9973.49	2166	9981.52	2164
9989.99	2162	9994.13	2162	10006.8	216210018.56		2162	10024.9	2164
10029.91	216610033.63		216810037.25		217010041.06		217210044.77		2174
10048.68	217610052.87		217810056.93		218010061.42		218210065.52		2184
10069.79	218610077.34		2188	10085.2	219010092.44		219210099.71		2194
10106.59	2196	10113.7	219810120.83		220010128.07		220210135.19		2204
10142.22	220610149.36		2208						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9851	.06	9973.49	.0410033.63		.06

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
9947.5610041.06		342.59	339.61 332.43	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2167.73	Element			
Vel Head (ft)	1.59	Wt. n-Val.		0.040	
W.S. Elev (ft)	2166.14	Reach Len. (ft)	342.59	339.61	332.43
Crit W.S. (ft)	2166.14	Flow Area (sq ft)		179.95	
E.G. Slope (ft/ft)	0.016747	Area (sq ft)		179.95	
Q Total (cfs)	1820.00	Flow (cfs)		1820.00	
Top Width (ft)	57.26	Top Width (ft)		57.26	
Vel Total (ft/s)	10.11	Avg. Vel. (ft/s)		10.11	
Max Chl Dpth (ft)	4.14	Hydr. Depth (ft)		3.14	
Conv. Total (cfs)	14063.8	Conv. (cfs)		14063.8	
Length Wtd. (ft)	339.61	Wetted Per. (ft)		58.48	
Min Ch El (ft)	2162.00	Shear (lb/sq ft)		3.22	
Alpha	1.00	Stream Power (lb/ft s)		32.54	
Frctn Loss (ft)	5.07	Cum Volume (acre-ft)		41.66	0.22
C & E Loss (ft)	0.15	Cum SA (acres)		15.42	0.21

Warning: The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Note: Manning's n values were composited to a single value in the main channel.

CROSS SECTION OUTPUT Profile #PF 2

T_10b

E.G. Elev (ft)	2167.73	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.59	Wt. n-Val.		0.040	
W.S. Elev (ft)	2166.14	Reach Len. (ft)	342.59	339.61	332.43
Crit W.S. (ft)	2166.14	Flow Area (sq ft)		179.95	
E.G. Slope (ft/ft)	0.016747	Area (sq ft)		179.95	
Q Total (cfs)	1820.00	Flow (cfs)		1820.00	
Top Width (ft)	57.26	Top Width (ft)		57.26	
Vel Total (ft/s)	10.11	Avg. Vel. (ft/s)		10.11	
Max Chl Dpth (ft)	4.14	Hydr. Depth (ft)		3.14	
Conv. Total (cfs)	14063.8	Conv. (cfs)		14063.8	
Length Wtd. (ft)	339.61	Wetted Per. (ft)		58.48	
Min Ch El (ft)	2162.00	Shear (lb/sq ft)		3.22	
Alpha	1.00	Stream Power (lb/ft s)		32.54	
Frctn Loss (ft)	5.07	Cum Volume (acre-ft)		41.66	0.22
C & E Loss (ft)	0.15	Cum SA (acres)		15.42	0.21

Warning: The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Note: Manning's n values were composited to a single value in the main channel.

FLOW DISTRIBUTION OUTPUT Profile #PF 1

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9947.56	9978.73	16.04	4.21	5.98	0.88	0.73	3.81
9978.73	10009.89	1228.40	114.13	31.48	67.49	3.66	10.76
10009.89	RB 10041.06	575.56	61.61	21.01	31.62	3.04	9.34

Warning: The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Note: Manning's n values were composited to a single value in the main channel.

FLOW DISTRIBUTION OUTPUT Profile #PF 2

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9947.56	9978.73	16.04	4.21	5.98	0.88	0.73	3.81
9978.73	10009.89	1228.40	114.13	31.48	67.49	3.66	10.76
10009.89	RB 10041.06	575.56	61.61	21.01	31.62	3.04	9.34

Warning: The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Note: Manning's n values were composited to a single value in the main channel.

CROSS SECTION RIVER: TRIBUTARY 10B
REACH: TRIBUTARY 10B RS: 1.232

INPUT
Description:
Station Elevation Data num= 44

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9881	2180	9889.55	2178	9897.86	2176	9903.33	2174	9907.94	2172
9912.54	2170	9916.96	2168	9921.2	2166	9925.71	2164	9930.31	2162
9934.77	2160	9939.27	2158	9943.57	2156	9948.23	2154	9948.69	2154
9966.24	2156	9990.13	2158	10016.1	216010020.95		216210026.49		2164
10033.92	216610041.59		216810049.14		217010057.93		217210081.71		2174
10108.65	217610116.68		217810123.29		218010129.68		218210136.91		2184
10146.08	218610155.96		218810166.37		219010176.17		219210184.59		2194
10191.51	219610198.64		219810205.58		220010212.57		220210218.93		2204
10224.86	220610231.03		220810237.09		221010243.14		2212		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9881	.06	9934.77	.04	10016.1	.06

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
9921.21	10033.92	247.93	206.89 191.27	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2160.95	Element			
Vel Head (ft)	1.08	Wt. n-Val.		0.040	
W.S. Elev (ft)	2159.87	Reach Len. (ft)	247.93	206.89	191.27
Crit W.S. (ft)	2159.58	Flow Area (sq ft)		218.32	
E.G. Slope (ft/ft)	0.013393	Area (sq ft)		218.32	
Q Total (cfs)	1820.00	Flow (cfs)		1820.00	
Top Width (ft)	79.33	Top Width (ft)		79.33	
Vel Total (ft/s)	8.34	Avg. Vel. (ft/s)		8.34	
Max Chl Dpth (ft)	5.87	Hydr. Depth (ft)		2.75	
Conv. Total (cfs)	15726.3	Conv. (cfs)		15726.3	
Length Wtd. (ft)	206.89	Wetted Per. (ft)		80.85	
Min Ch El (ft)	2154.00	Shear (lb/sq ft)		2.26	
Alpha	1.00	Stream Power (lb/ft s)		18.82	
Frctn Loss (ft)	3.37	Cum Volume (acre-ft)		40.11	0.22
C & E Loss (ft)	0.03	Cum SA (acres)		14.89	0.21

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Manning's n values were composited to a single value in the main channel.

CROSS SECTION OUTPUT Profile #PF 2

			Left OB	Channel	Right OB
E.G. Elev (ft)	2160.95	Element			
Vel Head (ft)	1.08	Wt. n-Val.		0.040	
W.S. Elev (ft)	2159.87	Reach Len. (ft)	247.93	206.89	191.27
Crit W.S. (ft)	2159.58	Flow Area (sq ft)		218.32	
E.G. Slope (ft/ft)	0.013393	Area (sq ft)		218.32	
Q Total (cfs)	1820.00	Flow (cfs)		1820.00	
Top Width (ft)	79.33	Top Width (ft)		79.33	
Vel Total (ft/s)	8.34	Avg. Vel. (ft/s)		8.34	
Max Chl Dpth (ft)	5.87	Hydr. Depth (ft)		2.75	
Conv. Total (cfs)	15726.3	Conv. (cfs)		15726.3	
Length Wtd. (ft)	206.89	Wetted Per. (ft)		80.85	
Min Ch El (ft)	2154.00	Shear (lb/sq ft)		2.26	
Alpha	1.00	Stream Power (lb/ft s)		18.82	
Frctn Loss (ft)	3.37	Cum Volume (acre-ft)		40.11	0.22
C & E Loss (ft)	0.03	Cum SA (acres)		14.89	0.21

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Manning's n values were composited to a single value in the main channel.

FLOW DISTRIBUTION OUTPUT Profile #PF 1

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9921.20	9958.77	899.34	95.04	25.02	49.41	4.01	9.46
9958.77	9996.35	882.47	110.73	37.72	48.49	2.95	7.97
9996.35	RB 10033.92	38.19	12.55	18.10	2.10	0.70	3.04

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Manning's n values were composited to a single value in the main channel.

FLOW DISTRIBUTION OUTPUT Profile #PF 2

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9921.20	9958.77	899.34	95.04	25.02	49.41	4.01	9.46
9958.77	9996.35	882.47	110.73	37.72	48.49	2.95	7.97
9996.35	RB 10033.92	38.19	12.55	18.10	2.10	0.70	3.04

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Manning's n values were composited to a single value in the main channel.

CROSS SECTION RIVER: TRIBUTARY 10B
REACH: TRIBUTARY 10B RS: 1.191

INPUT
Description:
Station Elevation Data num= 34

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9841	2180	9848.2	2178	9861.71	2176	9877.58	2174	9892.87	2172
9909.88	2170	9922	2168	9932.76	2166	9941.49	2164	9947.81	2162
9952.69	2160	9958.28	2158	9964.67	2156	9970.32	2154	9975.1	2152
9994.74	2152	10019	215410029.22		215610054.93		215810083.97		2160
10109.13	216210119.27		216410129.23		216610138.67		216810150.38		2170
10163.08	217210173.01		217410181.24		217610194.27		217810208.13		2180
10217.36	218210226.63		218410235.06		218610239.69		2188		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9841	.06	9964.67	.04	10019	.06

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
9941.49	10109.13	312.39	260	260	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2157.55	Element			
Vel Head (ft)	1.41	Wt. n-Val.		0.044	
W.S. Elev (ft)	2156.15	Reach Len. (ft)	312.39	260.00	260.00
Crit W.S. (ft)	2156.12	Flow Area (sq ft)		191.31	
E.G. Slope (ft/ft)	0.020072	Area (sq ft)		191.31	
Q Total (cfs)	1820.00	Flow (cfs)		1820.00	
Top Width (ft)	66.93	Top Width (ft)		66.93	
Vel Total (ft/s)	9.51	Avg. Vel. (ft/s)		9.51	
Max Chl Dpth (ft)	4.15	Hydr. Depth (ft)		2.86	
Conv. Total (cfs)	12846.2	Conv. (cfs)		12846.2	
Length Wtd. (ft)	260.00	Wetted Per. (ft)		67.98	
Min Ch El (ft)	2152.00	Shear (lb/sq ft)		3.53	
Alpha	1.00	Stream Power (lb/ft s)		33.55	
Frctn Loss (ft)	5.30	Cum Volume (acre-ft)		39.14	0.22
C & E Loss (ft)	0.01	Cum SA (acres)		14.54	0.21

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Manning's n values were composited to a single value in the main channel.

CROSS SECTION OUTPUT Profile #PF 2

			Left OB	Channel	Right OB
E.G. Elev (ft)	2157.55	Element			
Vel Head (ft)	1.41	Wt. n-Val.		0.044	
W.S. Elev (ft)	2156.15	Reach Len. (ft)	312.39	260.00	260.00
Crit W.S. (ft)	2156.12	Flow Area (sq ft)		191.31	
E.G. Slope (ft/ft)	0.020072	Area (sq ft)		191.31	
Q Total (cfs)	1820.00	Flow (cfs)		1820.00	
Top Width (ft)	66.93	Top Width (ft)		66.93	
Vel Total (ft/s)	9.51	Avg. Vel. (ft/s)		9.51	

Max Chl Dpth (ft)	4.15	Hydr. Depth (ft)	2.86	
Conv. Total (cfs)	12846.2	Conv. (cfs)	12846.2	
Length Wtd. (ft)	260.00	Wetted Per. (ft)	67.98	
Min Ch El (ft)	2152.00	Shear (lb/sq ft)	3.53	
Alpha	1.00	Stream Power (lb/ft s)	33.55	
Frctn Loss (ft)	5.30	Cum Volume (acre-ft)	39.14	0.22
C & E Loss (ft)	0.01	Cum SA (acres)	14.54	0.21

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Manning's n values were composited to a single value in the main channel.

FLOW DISTRIBUTION OUTPUT Profile #PF 1

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9941.49	9997.37	1162.02	113.67	33.95	63.85	3.43	10.22
9997.37	10053.25	657.98	77.63	34.03	36.15	2.30	8.48

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Manning's n values were composited to a single value in the main channel.

FLOW DISTRIBUTION OUTPUT Profile #PF 2

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9941.49	9997.37	1162.02	113.67	33.95	63.85	3.43	10.22
9997.37	10053.25	657.98	77.63	34.03	36.15	2.30	8.48

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Manning's n values were composited to a single value in the main channel.

CROSS SECTION RIVER: TRIBUTARY 10B
REACH: TRIBUTARY 10B RS: 1.134

INPUT
Description:
Station Elevation Data num= 45

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9909.7	2168	9913.54	2166	9917.35	2164	9921.12	2162	9924.93	2160
9928.81	2158	9932.93	2156	9936.96	2154	9940.97	2152	9944.04	2150
9947.37	2148	9950.75	2146	9968.89	2146	9975.08	214810005.77		2150
10027.88	215210093.97		215410148.58		215610163.96		2158 10175.8		2160
10186.53	216210196.41		216410213.45		216610230.51		216810242.95		2170
10255.46	217210264.32		217410270.64		217610277.03		217810283.37		2180
10289.88	218210296.19		218410304.43		218610312.96		218810320.42		2190
10326.41	219210332.23		219410338.59		219610344.82		219810350.72		2200
10355.79	220210360.21		220410369.54		220610379.06		220810387.94		2210

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9909.7	.06	9944.04	.041	0005.77	.06

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
9928.81	10148.58	188.73	188.48 194.62	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2152.24	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.36	Wt. n-Val.		0.043	
W.S. Elev (ft)	2150.88	Reach Len. (ft)	188.73	188.48	194.62
Crit W.S. (ft)	2150.88	Flow Area (sq ft)		194.42	
E.G. Slope (ft/ft)	0.020772	Area (sq ft)		194.42	
Q Total (cfs)	1820.00	Flow (cfs)		1820.00	
Top Width (ft)	72.80	Top Width (ft)		72.80	
Vel Total (ft/s)	9.36	Avg. Vel. (ft/s)		9.36	
Max Chl Dpth (ft)	4.88	Hydr. Depth (ft)		2.67	
Conv. Total (cfs)	12627.8	Conv. (cfs)		12627.8	
Length Wtd. (ft)	188.48	Wetted Per. (ft)		74.58	

Min Ch El (ft)	2146.00	Shear (lb/sq ft)	3.38	
Alpha	1.00	Stream Power (lb/ft s)	31.65	
Frctn Loss (ft)	3.24	Cum Volume (acre-ft)	37.99	0.22
C & E Loss (ft)	0.08	Cum SA (acres)	14.13	0.21

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 energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Note: Manning's n values were composited to a single value in the main channel.

CROSS SECTION OUTPUT Profile #PF 2

E.G. Elev (ft)	2152.24	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.36	Wt. n-Val.		0.043	
W.S. Elev (ft)	2150.88	Reach Len. (ft)	188.73	188.48	194.62
Crit W.S. (ft)	2150.88	Flow Area (sq ft)		194.42	
E.G. Slope (ft/ft)	0.020772	Area (sq ft)		194.42	
Q Total (cfs)	1820.00	Flow (cfs)		1820.00	
Top Width (ft)	72.80	Top Width (ft)		72.80	
Vel Total (ft/s)	9.36	Avg. Vel. (ft/s)		9.36	
Max Chl Dpth (ft)	4.88	Hydr. Depth (ft)		2.67	
Conv. Total (cfs)	12627.8	Conv. (cfs)		12627.8	
Length Wtd. (ft)	188.48	Wetted Per. (ft)		74.58	
Min Ch El (ft)	2146.00	Shear (lb/sq ft)		3.38	
Alpha	1.00	Stream Power (lb/ft s)		31.65	
Frctn Loss (ft)	3.24	Cum Volume (acre-ft)		37.99	0.22
C & E Loss (ft)	0.08	Cum SA (acres)		14.13	0.21

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 energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Note: Manning's n values were composited to a single value in the main channel.

FLOW DISTRIBUTION OUTPUT Profile #PF 1

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9928.81	10002.07	1795.87	186.45	61.11	98.67	3.14	9.63
10002.07	10075.32	24.13	7.97	13.47	1.33	0.59	3.03

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 energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Note: Manning's n values were composited to a single value in the main channel.

FLOW DISTRIBUTION OUTPUT Profile #PF 2

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9928.81	10002.07	1795.87	186.45	61.11	98.67	3.14	9.63
10002.07	10075.32	24.13	7.97	13.47	1.33	0.59	3.03

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 energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there

is not a valid subcritical answer. The program defaulted to critical depth.
Note: Manning's n values were composited to a single value in the main channel.

CROSS SECTION RIVER: TRIBUTARY 10B
REACH: TRIBUTARY 10B RS: 1.098

INPUT
Description:
Station Elevation Data num= 45

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9884.8	2170	9892.75	2168	9900.78	2166	9908.89	2164	9917.15	2162
9925.04	2160	9933.47	2158	9941.67	2156	9948.55	2154	9953.29	2152
9958.07	2150	9962.72	2148	9967.17	2146	9973.5	2144	9983.83	2142
10009.13	214210029.28		214410050.16		214610057.08		214810081.05		2150
10131.88	215210145.27		215410157.94		215610169.78		215810180.92		2160
10187.5	216210194.88		216410202.39		216610209.46		216810220.16		2170
10230.86	217210244.28		217410256.09		217610264.16		217810270.81		2180
10277.01	218210282.91		2184	10288.7	218610294.93		218810301.12		2190
10307.32	219210312.36		2194	10317.7	219610324.07		219810332.14		2200

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9884.8	.06	9962.72	.0410050.16		.06

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9953.2	10131.88	334.79	335	335	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2147.05	Element			
Vel Head (ft)	1.11	Wt. n-Val.		0.040	
W.S. Elev (ft)	2145.95	Reach Len. (ft)	334.79	335.00	335.00
Crit W.S. (ft)		Flow Area (sq ft)		215.49	
E.G. Slope (ft/ft)	0.014475	Area (sq ft)		215.49	
Q Total (cfs)	1820.00	Flow (cfs)		1820.00	
Top Width (ft)	82.27	Top Width (ft)		82.27	
Vel Total (ft/s)	8.45	Avg. Vel. (ft/s)		8.45	
Max Chl Dpth (ft)	3.95	Hydr. Depth (ft)		2.62	
Conv. Total (cfs)	15127.1	Conv. (cfs)		15127.1	
Length Wtd. (ft)	335.00	Wetted Per. (ft)		82.96	
Min Ch El (ft)	2142.00	Shear (lb/sq ft)		2.35	
Alpha	1.00	Stream Power (lb/ft s)		19.83	
Frctn Loss (ft)	4.93	Cum Volume (acre-ft)		37.10	0.22
C & E Loss (ft)	0.04	Cum SA (acres)		13.79	0.21

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Manning's n values were composited to a single value in the main channel.

CROSS SECTION OUTPUT Profile #PF 2

			Left OB	Channel	Right OB
E.G. Elev (ft)	2147.05	Element			
Vel Head (ft)	1.11	Wt. n-Val.		0.040	
W.S. Elev (ft)	2145.95	Reach Len. (ft)	334.79	335.00	335.00
Crit W.S. (ft)		Flow Area (sq ft)		215.49	
E.G. Slope (ft/ft)	0.014475	Area (sq ft)		215.49	
Q Total (cfs)	1820.00	Flow (cfs)		1820.00	
Top Width (ft)	82.27	Top Width (ft)		82.27	
Vel Total (ft/s)	8.45	Avg. Vel. (ft/s)		8.45	
Max Chl Dpth (ft)	3.95	Hydr. Depth (ft)		2.62	
Conv. Total (cfs)	15127.1	Conv. (cfs)		15127.1	
Length Wtd. (ft)	335.00	Wetted Per. (ft)		82.96	
Min Ch El (ft)	2142.00	Shear (lb/sq ft)		2.35	
Alpha	1.00	Stream Power (lb/ft s)		19.83	
Frctn Loss (ft)	4.93	Cum Volume (acre-ft)		37.10	0.22
C & E Loss (ft)	0.04	Cum SA (acres)		13.79	0.21

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Manning's n values were composited to a single value in the main channel.

FLOW DISTRIBUTION OUTPUT Profile #PF 1

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9953.29	10012.82	1412.42	150.20	45.99	77.61	3.30	9.40
10012.82	10072.35	407.58	65.29	36.96	22.39	1.77	6.24

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Manning's n values were composited to a single value in the main channel.

FLOW DISTRIBUTION OUTPUT Profile #PF 2

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9953.29	10012.82	1412.42	150.20	45.99	77.61	3.30	9.40
10012.82	10072.35	407.58	65.29	36.96	22.39	1.77	6.24

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Manning's n values were composited to a single value in the main channel.

CROSS SECTION RIVER: TRIBUTARY 10B
REACH: TRIBUTARY 10B RS: 1.034

INPUT
Description:
Station Elevation Data num= 51

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9889	2158	9895.93	2156	9905.45	2154	9915.31	2152	9925.69	2150
9935.56	2148	9948.65	2146	9963.53	2144	9977.02	2142	9983.53	2140
9989.85	2138	10001.2	2136	10014.3	213610032.47		213810037.67		2140
10042.84	214210047.71		214410061.18		2146	10073.9	214810085.47		2150
10100.17	215210116.69		215410136.76		215610158.16		2158	10179.4	2160
10187.91	216210196.37		216410210.89		216610221.11		216810230.71		2170
10242.08	217210253.07		217410262.77		217610272.17		217810281.57		2180
10289.29	218210295.88		218410301.89		218610306.92		218810311.77		2190
10316.78	219210322.08		219410327.15		219610332.19		219810338.75		2200
10347.94	220210357.35		2204	10366.9	220610377.89		220810389.51		2210
10401.08	2212								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9889	.06	9983.53	.04	10037.67	.06

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
9915.31	10100.17	445.84	475.95	491.01	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2142.08	Element			
Vel Head (ft)	1.55	Wt. n-Val.		0.040	
W.S. Elev (ft)	2140.53	Reach Len. (ft)	445.84	475.95	491.01
Crit W.S. (ft)	2140.50	Flow Area (sq ft)		181.88	
E.G. Slope (ft/ft)	0.014971	Area (sq ft)		181.88	
Q Total (cfs)	1820.00	Flow (cfs)		1820.00	
Top Width (ft)	57.22	Top Width (ft)		57.22	
Vel Total (ft/s)	10.01	Avg. Vel. (ft/s)		10.01	
Max Chl Dpth (ft)	4.53	Hydr. Depth (ft)		3.18	
Conv. Total (cfs)	14874.8	Conv. (cfs)		14874.8	
Length Wtd. (ft)	475.95	Wetted Per. (ft)		58.37	
Min Ch El (ft)	2136.00	Shear (lb/sq ft)		2.91	
Alpha	1.00	Stream Power (lb/ft s)		29.14	
Frctn Loss (ft)	7.43	Cum Volume (acre-ft)		35.57	0.22
C & E Loss (ft)	0.03	Cum SA (acres)		13.25	0.21

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

CROSS SECTION OUTPUT Profile #PF 2

E.G. Elev (ft)	2142.08	Element	Left OB	Channel	Right OB

Vel Head (ft)	1.55	Wt. n-Val.		0.040	
W.S. Elev (ft)	2140.53	Reach Len. (ft)	445.84	475.95	491.01
Crit W.S. (ft)	2140.50	Flow Area (sq ft)		181.88	
E.G. Slope (ft/ft)	0.014971	Area (sq ft)		181.88	
Q Total (cfs)	1820.00	Flow (cfs)		1820.00	
Top Width (ft)	57.22	Top Width (ft)		57.22	
Vel Total (ft/s)	10.01	Avg. Vel. (ft/s)		10.01	
Max Chl Dpth (ft)	4.53	Hydr. Depth (ft)		3.18	
Conv. Total (cfs)	14874.8	Conv. (cfs)		14874.8	
Length Wtd. (ft)	475.95	Wetted Per. (ft)		58.37	
Min Ch El (ft)	2136.00	Shear (lb/sq ft)		2.91	
Alpha	1.00	Stream Power (lb/ft s)		29.14	
Frctn Loss (ft)	7.43	Cum Volume (acre-ft)		35.57	0.22
C & E Loss (ft)	0.03	Cum SA (acres)		13.25	0.21

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.

FLOW DISTRIBUTION OUTPUT Profile #PF 1

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
9976.93	10038.55	1819.97	181.84	57.85	100.00	3.20	10.01
10038.55	RB 10100.17	0.03	0.05	0.52	0.00	0.09	0.60

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.

FLOW DISTRIBUTION OUTPUT Profile #PF 2

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
9976.93	10038.55	1819.97	181.84	57.85	100.00	3.20	10.01
10038.55	RB 10100.17	0.03	0.05	0.52	0.00	0.09	0.60

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

CROSS SECTION RIVER: TRIBUTARY 10B
REACH: TRIBUTARY 10B RS: 0.943

INPUT
Description:
Station Elevation Data num= 45

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9849	2160	9860.38	2158	9872.26	2156	9883.76	2154	9894.15	2152
9902.84	2150	9911.32	2148	9919.61	2146	9927.55	2144	9934.7	2142
9941.21	2140	9946.49	2138	9950.44	2136	9955.19	2134	9960.39	2132
9965.59	2130	9971.22	2128	9994.39	2128	9998.65	213010003.01		2132
10008.1	213410028.54		213610057.35		213810078.37		214010091.53		2142
10101.68	214410116.45		214610134.73		214810154.78		215010169.73		2152
10176.26	215410182.74		215610189.19		215810195.56		216010202.08		2162
10209.11	216410215.73		216610222.65		216810229.68		2170	10236.3	2172
10243.22	217410250.12		217610257.15		2178	10263.9	218010270.69		2182

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9849	.06	9955.19	.04	10008.1	.06

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
9934.71	10078.37	502.44	493.22	505.21	.1 .3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2134.63	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.82	Wt. n-Val.		0.040	
W.S. Elev (ft)	2132.81	Reach Len. (ft)	502.44	493.22	505.21
Crit W.S. (ft)	2132.81	Flow Area (sq ft)		168.11	
E.G. Slope (ft/ft)	0.016275	Area (sq ft)		168.11	
Q Total (cfs)	1820.00	Flow (cfs)		1820.00	
Top Width (ft)	46.79	Top Width (ft)		46.79	

Vel Total (ft/s)	10.83	Avg. Vel. (ft/s)	10.83	
Max Chl Dpth (ft)	4.81	Hydr. Depth (ft)	3.59	
Conv. Total (cfs)	14266.5	Conv. (cfs)	14266.5	
Length Wtd. (ft)	493.22	Wetted Per. (ft)	48.69	
Min Ch El (ft)	2128.00	Shear (lb/sq ft)	3.51	
Alpha	1.00	Stream Power (lb/ft s)	37.98	
Frctn Loss (ft)	7.49	Cum Volume (acre-ft)	33.66	0.22
C & E Loss (ft)	0.19	Cum SA (acres)	12.69	0.21

Warning: The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Note: Manning's n values were composited to a single value in the main channel.

CROSS SECTION OUTPUT Profile #PF 2

		Element	Left OB	Channel	Right OB
E.G. Elev (ft)	2134.63	Wt. n-Val.		0.040	
Vel Head (ft)	1.82	Reach Len. (ft)	502.44	493.22	505.21
W.S. Elev (ft)	2132.81	Flow Area (sq ft)		168.11	
Crit W.S. (ft)	2132.81	Area (sq ft)		168.11	
E.G. Slope (ft/ft)	0.016275	Flow (cfs)		1820.00	
Q Total (cfs)	1820.00	Top Width (ft)		46.79	
Top Width (ft)	46.79	Avg. Vel. (ft/s)		10.83	
Vel Total (ft/s)	10.83	Hydr. Depth (ft)		3.59	
Max Chl Dpth (ft)	4.81	Conv. (cfs)		14266.5	
Conv. Total (cfs)	14266.5	Wetted Per. (ft)		48.69	
Length Wtd. (ft)	493.22	Shear (lb/sq ft)		3.51	
Min Ch El (ft)	2128.00	Stream Power (lb/ft s)		37.98	
Alpha	1.00	Cum Volume (acre-ft)		33.66	0.22
Frctn Loss (ft)	7.49	Cum SA (acres)		12.69	0.21
C & E Loss (ft)	0.19				

Warning: The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Note: Manning's n values were composited to a single value in the main channel.

FLOW DISTRIBUTION OUTPUT Profile #PF 1

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9934.70	9982.59	931.68	86.40	25.17	51.19	3.55	10.78
9982.59	10030.48	888.32	81.71	23.52	48.81	3.63	10.87

Warning: The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Note: Manning's n values were composited to a single value in the main channel.

FLOW DISTRIBUTION OUTPUT Profile #PF 2

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9934.70	9982.59	931.68	86.40	25.17	51.19	3.55	10.78
9982.59	10030.48	888.32	81.71	23.52	48.81	3.63	10.87

Warning: The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Note: Manning's n values were composited to a single value in the main channel.

CROSS SECTION RIVER: TRIBUTARY 10B
REACH: TRIBUTARY 10B RS: 0.848

INPUT
Description:
Station Elevation Data num= 30

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9830	2150	9835.39	2148	9841.02	2146	9846.85	2144	9852.47	2142
9858.08	2140	9863.45	2138	9868.92	2136	9874.48	2134	9879.75	2132
9895.53	2130	9959.46	2128	9980.91	2126	9990.73	2124	9996.3	2122
10030.55	2122	10045.3	212410075.51		212610094.02		212810100.55		2130
10106.49	213210112.32		213410134.64		213610151.82		213810176.57		2140
10200.22	214210232.96		214410251.02		2146 10262.5		214810289.01		2150

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9830	.06	9990.73	.04	10045.3	.06

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
9895.53	10100.55	495.69	494.58 514.07	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2126.86	Element			
Vel Head (ft)	1.20	Wt. n-Val.		0.041	
W.S. Elev (ft)	2125.66	Reach Len. (ft)	495.69	494.58	514.07
Crit W.S. (ft)	2125.66	Flow Area (sq ft)		207.27	
E.G. Slope (ft/ft)	0.014192	Area (sq ft)		207.27	
Q Total (cfs)	1820.00	Flow (cfs)		1820.00	
Top Width (ft)	87.86	Top Width (ft)		87.86	
Vel Total (ft/s)	8.78	Avg. Vel. (ft/s)		8.78	
Max Chl Dpth (ft)	3.66	Hydr. Depth (ft)		2.36	
Conv. Total (cfs)	15277.4	Conv. (cfs)		15277.4	
Length Wtd. (ft)	494.58	Wetted Per. (ft)		88.57	
Min Ch El (ft)	2122.00	Shear (lb/sq ft)		2.07	
Alpha	1.00	Stream Power (lb/ft s)		18.21	
Frctn Loss (ft)	7.25	Cum Volume (acre-ft)		31.53	0.22
C & E Loss (ft)	0.19	Cum SA (acres)		11.92	0.21

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

CROSS SECTION OUTPUT Profile #PF 2

			Left OB	Channel	Right OB
E.G. Elev (ft)	2126.86	Element			
Vel Head (ft)	1.20	Wt. n-Val.		0.041	

W.S. Elev (ft)	2125.66	Reach Len. (ft)	495.69	494.58	514.07
Crit W.S. (ft)	2125.66	Flow Area (sq ft)		207.27	
E.G. Slope (ft/ft)	0.014192	Area (sq ft)		207.27	
Q Total (cfs)	1820.00	Flow (cfs)		1820.00	
Top Width (ft)	87.86	Top Width (ft)		87.86	
Vel Total (ft/s)	8.78	Avg. Vel. (ft/s)		8.78	
Max Chl Dpth (ft)	3.66	Hydr. Depth (ft)		2.36	
Conv. Total (cfs)	15277.4	Conv. (cfs)		15277.4	
Length Wtd. (ft)	494.58	Wetted Per. (ft)		88.57	
Min Ch El (ft)	2122.00	Shear (lb/sq ft)		2.07	
Alpha	1.00	Stream Power (lb/ft s)		18.21	
Frctn Loss (ft)	7.25	Cum Volume (acre-ft)		31.53	0.22
C & E Loss (ft)	0.19	Cum SA (acres)		11.92	0.21

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

FLOW DISTRIBUTION OUTPUT Profile #PF 1

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
9963.87	10032.21	1494.21	152.99	50.18	82.10	3.08	9.77
10032.21	RB 10100.55	325.79	54.28	38.39	17.90	1.42	6.00

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

FLOW DISTRIBUTION OUTPUT Profile #PF 2

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
9963.87	10032.21	1494.21	152.99	50.18	82.10	3.08	9.77
10032.21	RB 10100.55	325.79	54.28	38.39	17.90	1.42	6.00

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

CROSS SECTION RIVER: TRIBUTARY 10B
REACH: TRIBUTARY 10B RS: 0.754

INPUT
Description:
Station Elevation Data num= 41

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9805	2156	9810.61	2154	9816.82	2152	9823.34	2150	9829.61	2148
9836.11	2146	9843.65	2144	9852.34	2142	9861.13	2140	9870.42	2138
9879.81	2136	9889.33	2134	9898.79	2132	9902.6	2130	9906.79	2128

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9910.38	2126 9914.29	2124 9917.62	2122 9920.81	2120 9924.66	2118
9929.14	2116 9937.54	2114 9953.65	2114 9990.77	211610040.52	2116
10052.04	211610063.01	211810073.59	212010110.11	212010134.91	2118
10174.78	211810191.12	212010198.37	212210205.84	212410219.03	2126
10232.87	212810246.96	213010260.88	213210280.32	213410292.86	2136
10305.45	2138				

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
9805	.06	9924.66	.04	9990.77	.06	10110.11	.04	10191.12	.06

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
9917.62	10205.84	404.02	431.07 473.49	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2118.29	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.57	Wt. n-Val.		0.051	
W.S. Elev (ft)	2117.72	Reach Len. (ft)	404.02	431.07	473.49
Crit W.S. (ft)		Flow Area (sq ft)		300.09	
E.G. Slope (ft/ft)	0.015133	Area (sq ft)		300.09	
Q Total (cfs)	1820.00	Flow (cfs)		1820.00	
Top Width (ft)	136.16	Top Width (ft)		136.16	
Vel Total (ft/s)	6.06	Avg. Vel. (ft/s)		6.06	
Max Chl Dpth (ft)	3.72	Hydr. Depth (ft)		2.20	
Conv. Total (cfs)	14794.7	Conv. (cfs)		14794.7	
Length Wtd. (ft)	431.07	Wetted Per. (ft)		136.97	
Min Ch El (ft)	2114.00	Shear (lb/sq ft)		2.07	
Alpha	1.00	Stream Power (lb/ft s)		12.55	
Frctn Loss (ft)	8.07	Cum Volume (acre-ft)		28.65	0.22
C & E Loss (ft)	0.02	Cum SA (acres)		10.65	0.21

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Manning's n values were composited to a single value in the main channel.

CROSS SECTION OUTPUT Profile #PF 2

E.G. Elev (ft)	2118.29	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.57	Wt. n-Val.		0.051	
W.S. Elev (ft)	2117.72	Reach Len. (ft)	404.02	431.07	473.49
Crit W.S. (ft)		Flow Area (sq ft)		300.09	
E.G. Slope (ft/ft)	0.015133	Area (sq ft)		300.09	
Q Total (cfs)	1820.00	Flow (cfs)		1820.00	
Top Width (ft)	136.16	Top Width (ft)		136.16	
Vel Total (ft/s)	6.06	Avg. Vel. (ft/s)		6.06	
Max Chl Dpth (ft)	3.72	Hydr. Depth (ft)		2.20	
Conv. Total (cfs)	14794.7	Conv. (cfs)		14794.7	
Length Wtd. (ft)	431.07	Wetted Per. (ft)		136.97	
Min Ch El (ft)	2114.00	Shear (lb/sq ft)		2.07	
Alpha	1.00	Stream Power (lb/ft s)		12.55	
Frctn Loss (ft)	8.07	Cum Volume (acre-ft)		28.65	0.22
C & E Loss (ft)	0.02	Cum SA (acres)		10.65	0.21

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Manning's n values were composited to a single value in the main channel.

FLOW DISTRIBUTION OUTPUT Profile #PF 1

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9917.62	10013.69	1568.92	226.18	89.05	86.20	2.56	6.94
10013.69	10109.77	251.08	73.90	47.92	13.80	1.55	3.40

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Manning's n values were composited to a single value in the main channel.

FLOW DISTRIBUTION OUTPUT Profile #PF 2

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Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9917.62	10013.69	1568.92	226.18	89.05	86.20	2.56	6.94
10013.69	10109.77	251.08	73.90	47.92	13.80	1.55	3.40

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Manning's n values were composited to a single value in the main channel.

CROSS SECTION RIVER: TRIBUTARY 10B
REACH: TRIBUTARY 10B RS: 0.671

INPUT
Description:
Station Elevation Data num= 33

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9833	2132	9841.87	2130	9851.52	2128	9861.74	2126	9867.46	2124
9875.58	2122	9883.5	2120	9889.03	2118	9894.89	2116	9900.82	2114
9906.89	2112	9915.25	2110	9924.56	2108	9948.15	2106	9965.01	2106
9982.44	2108	9996.35	2108	10048.4	210810053.91		211010059.73		2112
10065.53	211410073.47		211610095.25		211810109.93		212010125.61		2122
10144.06	212410160.05		212610175.85		212810191.74		213010209.24		2132
10228.04	213410241.63		213610253.76		2138				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9833	.06	9924.56	.04	9982.44	.06

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
9900.82	10073.47	334.05	334.05	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2110.20	Element			
Vel Head (ft)	0.74	Wt. n-Val.		0.052	
W.S. Elev (ft)	2109.46	Reach Len. (ft)	334.05	334.05	334.05
Crit W.S. (ft)	2109.28	Flow Area (sq ft)		263.93	
E.G. Slope (ft/ft)	0.023795	Area (sq ft)		263.93	
Q Total (cfs)	1820.00	Flow (cfs)		1820.00	
Top Width (ft)	134.69	Top Width (ft)		134.69	
Vel Total (ft/s)	6.90	Avg. Vel. (ft/s)		6.90	
Max Chl Dpth (ft)	3.46	Hydr. Depth (ft)		1.96	
Conv. Total (cfs)	11798.5	Conv. (cfs)		11798.5	
Length Wtd. (ft)	334.05	Wetted Per. (ft)		135.30	
Min Ch El (ft)	2106.00	Shear (lb/sq ft)		2.90	
Alpha	1.00	Stream Power (lb/ft s)		19.98	
Frctn Loss (ft)	6.48	Cum Volume (acre-ft)		25.86	0.22
C & E Loss (ft)	0.05	Cum SA (acres)		9.31	0.21

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Manning's n values were composited to a single value in the main channel.

CROSS SECTION OUTPUT Profile #PF 2

			Left OB	Channel	Right OB
E.G. Elev (ft)	2110.20	Element			
Vel Head (ft)	0.74	Wt. n-Val.		0.052	
W.S. Elev (ft)	2109.46	Reach Len. (ft)	334.05	334.05	334.05
Crit W.S. (ft)	2109.28	Flow Area (sq ft)		263.93	
E.G. Slope (ft/ft)	0.023795	Area (sq ft)		263.93	
Q Total (cfs)	1820.00	Flow (cfs)		1820.00	
Top Width (ft)	134.69	Top Width (ft)		134.69	
Vel Total (ft/s)	6.90	Avg. Vel. (ft/s)		6.90	
Max Chl Dpth (ft)	3.46	Hydr. Depth (ft)		1.96	
Conv. Total (cfs)	11798.5	Conv. (cfs)		11798.5	
Length Wtd. (ft)	334.05	Wetted Per. (ft)		135.30	
Min Ch El (ft)	2106.00	Shear (lb/sq ft)		2.90	
Alpha	1.00	Stream Power (lb/ft s)		19.98	
Frctn Loss (ft)	6.48	Cum Volume (acre-ft)		25.86	0.22
C & E Loss (ft)	0.05	Cum SA (acres)		9.31	0.21

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Manning's n values were composited to a single value in the main channel.

FLOW DISTRIBUTION OUTPUT Profile #PF 1

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9900.82	9958.37	851.23	98.50	40.86	46.77	2.42	8.64
9958.37	10015.92	779.10	114.94	57.66	42.81	2.00	6.78
10015.92	RB 10073.47	189.68	50.49	36.77	10.42	1.38	3.76

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Manning's n values were composited to a single value in the main channel.

FLOW DISTRIBUTION OUTPUT Profile #PF 2

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9900.82	9958.37	851.23	98.50	40.86	46.77	2.42	8.64
9958.37	10015.92	779.10	114.94	57.66	42.81	2.00	6.78
10015.92	RB 10073.47	189.68	50.49	36.77	10.42	1.38	3.76

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Manning's n values were composited to a single value in the main channel.

CROSS SECTION RIVER: TRIBUTARY 10B
REACH: TRIBUTARY 10B RS: 0.607

INPUT
Description:
Station Elevation Data num= 36

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9801	2130	9812.64	2128	9819.73	2126	9828.34	2124	9838.87	2122
9849.23	2120	9859.22	2118	9868.88	2116	9877.55	2114	9887.11	2112
9898.58	2110	9908.19	2108	9914.77	2106	9919.89	2104	9924.98	2102
9960.01	2100	9970.32	2098	9982.82	2098	9997.47	210010004.99		2102
10021.33	210410060.62		210610102.72		210810112.31		211010122.53		2112
10146.95	211410164.37		211610185.81		211810213.07		212010231.57		2122
10245.45	212410263.82		2126	10296.8	212810310.58		213010319.87		2132
10330.11	2134								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9801	.06	9960.01	.0410004.99		.06

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
9908.19	10102.72	135	135	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2103.68	Element			
Vel Head (ft)	1.22	Wt. n-Val.		0.042	
W.S. Elev (ft)	2102.46	Reach Len. (ft)	135.00	135.00	135.00
Crit W.S. (ft)	2102.46	Flow Area (sq ft)		205.66	
E.G. Slope (ft/ft)	0.015982	Area (sq ft)		205.66	
Q Total (cfs)	1820.00	Flow (cfs)		1820.00	
Top Width (ft)	84.98	Top Width (ft)		84.98	
Vel Total (ft/s)	8.85	Avg. Vel. (ft/s)		8.85	
Max Chl Dpth (ft)	4.46	Hydr. Depth (ft)		2.42	
Conv. Total (cfs)	14396.4	Conv. (cfs)		14396.4	
Length Wtd. (ft)	135.00	Wetted Per. (ft)		85.74	
Min Ch El (ft)	2098.00	Shear (lb/sq ft)		2.39	
Alpha	1.00	Stream Power (lb/ft s)		21.18	
Frctn Loss (ft)	1.30	Cum Volume (acre-ft)		24.06	0.22
C & E Loss (ft)	0.20	Cum SA (acres)		8.47	0.21

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

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

CROSS SECTION OUTPUT Profile #PF 2

			Left OB	Channel	Right OB
E.G. Elev (ft)	2103.68	Element			
Vel Head (ft)	1.22	Wt. n-Val.		0.042	
W.S. Elev (ft)	2102.46	Reach Len. (ft)	135.00	135.00	135.00
Crit W.S. (ft)	2102.46	Flow Area (sq ft)		205.66	
E.G. Slope (ft/ft)	0.015982	Area (sq ft)		205.66	
Q Total (cfs)	1820.00	Flow (cfs)		1820.00	
Top Width (ft)	84.98	Top Width (ft)		84.98	
Vel Total (ft/s)	8.85	Avg. Vel. (ft/s)		8.85	
Max Chl Dpth (ft)	4.46	Hydr. Depth (ft)		2.42	
Conv. Total (cfs)	14396.4	Conv. (cfs)		14396.4	
Length Wtd. (ft)	135.00	Wetted Per. (ft)		85.74	
Min Ch El (ft)	2098.00	Shear (lb/sq ft)		2.39	
Alpha	1.00	Stream Power (lb/ft s)		21.18	
Frctn Loss (ft)	1.30	Cum Volume (acre-ft)		24.06	0.22
C & E Loss (ft)	0.20	Cum SA (acres)		8.47	0.21

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.

FLOW DISTRIBUTION OUTPUT Profile #PF 1

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9908.19	9973.03	732.03	99.35	49.57	40.22	2.02	7.37
9973.03	10037.88	1087.97	106.30	36.17	59.78	2.97	10.23

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.

FLOW DISTRIBUTION OUTPUT Profile #PF 2

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9908.19	9973.03	732.03	99.35	49.57	40.22	2.02	7.37
9973.03	10037.88	1087.97	106.30	36.17	59.78	2.97	10.23

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less

than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION RIVER: TRIBUTARY 10B
REACH: TRIBUTARY 10B RS: 0.583

INPUT
Description:
Station Elevation Data num= 29

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9815	2118	9828.97	2116	9841	2114	9850.35	2112	9858.31	2110
9869.26	2108	9884.06	2106	9906.89	2104	9919.24	2102	9920.87	2100
9922.55	2098	9924.81	2096	9959.04	2096	9990.1	209810039.42		2100
10053.92	210210061.55		210410077.14		210610094.01		210810112.71		2110
10132.55	211210160.26		2114	10184.3	211610198.21		211810215.22		2120
10238.99	2122	10258	212410272.15		212610282.08		2128		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9815	.06	9919.24	.04	9990.1	.06

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
9919.24	10053.92	280	280	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2100.69	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.56	Wt. n-Val.		0.041	
W.S. Elev (ft)	2100.14	Reach Len. (ft)	280.00	280.00	280.00
Crit W.S. (ft)		Flow Area (sq ft)		304.25	
E.G. Slope (ft/ft)	0.006437	Area (sq ft)		304.25	
Q Total (cfs)	1820.00	Flow (cfs)		1820.00	
Top Width (ft)	119.66	Top Width (ft)		119.66	
Vel Total (ft/s)	5.98	Avg. Vel. (ft/s)		5.98	
Max Chl Dpth (ft)	4.14	Hydr. Depth (ft)		2.54	
Conv. Total (cfs)	22684.4	Conv. (cfs)		22684.4	
Length Wtd. (ft)	280.00	Wetted Per. (ft)		121.53	
Min Ch El (ft)	2096.00	Shear (lb/sq ft)		1.01	
Alpha	1.00	Stream Power (lb/ft s)		6.02	
Frctn Loss (ft)	3.45	Cum Volume (acre-ft)		23.27	0.22
C & E Loss (ft)	0.05	Cum SA (acres)		8.15	0.21

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

CROSS SECTION OUTPUT Profile #PF 2

E.G. Elev (ft)	2100.69	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.56	Wt. n-Val.		0.041	
W.S. Elev (ft)	2100.14	Reach Len. (ft)	280.00	280.00	280.00
Crit W.S. (ft)		Flow Area (sq ft)		304.25	
E.G. Slope (ft/ft)	0.006437	Area (sq ft)		304.25	
Q Total (cfs)	1820.00	Flow (cfs)		1820.00	
Top Width (ft)	119.66	Top Width (ft)		119.66	
Vel Total (ft/s)	5.98	Avg. Vel. (ft/s)		5.98	
Max Chl Dpth (ft)	4.14	Hydr. Depth (ft)		2.54	
Conv. Total (cfs)	22684.4	Conv. (cfs)		22684.4	
Length Wtd. (ft)	280.00	Wetted Per. (ft)		121.53	
Min Ch El (ft)	2096.00	Shear (lb/sq ft)		1.01	
Alpha	1.00	Stream Power (lb/ft s)		6.02	
Frctn Loss (ft)	3.45	Cum Volume (acre-ft)		23.27	0.22
C & E Loss (ft)	0.05	Cum SA (acres)		8.15	0.21

Warning: The conveyance ratio (upstream 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.

FLOW DISTRIBUTION OUTPUT Profile #PF 1

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9919.24	9964.13	1220.17	170.88	45.14	67.04	3.94	7.14
9964.13	10009.03	563.28	110.40	44.96	30.95	2.46	5.10
10009.03	RB 10053.92	36.55	22.97	31.42	2.01	0.73	1.59

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

FLOW DISTRIBUTION OUTPUT Profile #PF 2

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9919.24	9964.13	1220.17	170.88	45.14	67.04	3.94	7.14
9964.13	10009.03	563.28	110.40	44.96	30.95	2.46	5.10
10009.03	RB 10053.92	36.55	22.97	31.42	2.01	0.73	1.59

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

CROSS SECTION RIVER: TRIBUTARY 10B
REACH: TRIBUTARY 10B RS: 0.530

INPUT
Description:
Station Elevation Data num= 35

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9847	2110	9854.98	2108	9862.95	2106	9871.31	2104	9887.09	2102
9903.23	2100	9913.53	2098	9963.35	209610026.25		209410038.35		2092
10060.22	209210064.98		209410069.23		209610073.92		209810078.91		2100
10083.66	210210088.59		210410109.29		210610132.67		210810152.87		2110
10175.84	211210183.56		211410190.16		2116 10196.1		211810202.34		2120
10208.61	212210231.31		212410255.46		212610284.14		212810302.62		2130
10311.37	213210331.65		213410358.77		213610391.09		213810416.22		2140

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9847	.0610026.25		.0410069.23		.06

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
9903.2310083.66		300	300 290	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2097.20	Element			
Vel Head (ft)	1.02	Wt. n-Val.		0.053	
W.S. Elev (ft)	2096.18	Reach Len. (ft)	300.00	300.00	290.00
Crit W.S. (ft)	2096.18	Flow Area (sq ft)		224.73	
E.G. Slope (ft/ft)	0.032426	Area (sq ft)		224.73	
Q Total (cfs)	1820.00	Flow (cfs)		1820.00	
Top Width (ft)	110.79	Top Width (ft)		110.79	
Vel Total (ft/s)	8.10	Avg. Vel. (ft/s)		8.10	
Max Chl Dpth (ft)	4.18	Hydr. Depth (ft)		2.03	
Conv. Total (cfs)	10107.0	Conv. (cfs)		10107.0	
Length Wtd. (ft)		Wetted Per. (ft)		111.88	
Min Ch El (ft)	2092.00	Shear (lb/sq ft)		4.07	
Alpha	1.00	Stream Power (lb/ft s)		32.93	
Frctn Loss (ft)		Cum Volume (acre-ft)		21.57	0.22
C & E Loss (ft)		Cum SA (acres)		7.41	0.21

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less

than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Manning's n values were composited to a single value in the main channel.

CROSS SECTION OUTPUT Profile #PF 2

			Left OB	Channel	Right OB
E.G. Elev (ft)	2097.20	Element			
Vel Head (ft)	1.02	Wt. n-Val.		0.053	
W.S. Elev (ft)	2096.18	Reach Len. (ft)	300.00	300.00	290.00
Crit W.S. (ft)	2096.18	Flow Area (sq ft)		224.73	
E.G. Slope (ft/ft)	0.032426	Area (sq ft)		224.73	
Q Total (cfs)	1820.00	Flow (cfs)		1820.00	
Top Width (ft)	110.79	Top Width (ft)		110.79	
Vel Total (ft/s)	8.10	Avg. Vel. (ft/s)		8.10	
Max Chl Dpth (ft)	4.18	Hydr. Depth (ft)		2.03	
Conv. Total (cfs)	10107.0	Conv. (cfs)		10107.0	
Length Wtd. (ft)		Wetted Per. (ft)		111.88	
Min Ch El (ft)	2092.00	Shear (lb/sq ft)		4.07	
Alpha	1.00	Stream Power (lb/ft s)		32.93	
Frctn Loss (ft)		Cum Volume (acre-ft)		21.57	0.22
C & E Loss (ft)		Cum SA (acres)		7.41	0.21

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Manning's n values were composited to a single value in the main channel.

FLOW DISTRIBUTION OUTPUT Profile #PF 1

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9903.23	9963.37	0.25	0.41	4.52	0.01	0.09	0.62
9963.37	10023.52	228.10	68.39	60.17	12.53	1.14	3.34
10023.52	RB 10083.66	1591.65	155.93	47.19	87.45	3.38	10.21

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Manning's n values were composited to a single value in the main channel.

FLOW DISTRIBUTION OUTPUT Profile #PF 2

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9903.23	9963.37	0.25	0.41	4.52	0.01	0.09	0.62
9963.37	10023.52	228.10	68.39	60.17	12.53	1.14	3.34
10023.52	RB 10083.66	1591.65	155.93	47.19	87.45	3.38	10.21

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Manning's n values were composited to a single value in the main channel.

CROSS SECTION RIVER: TRIBUTARY 10B
REACH: TRIBUTARY 10B RS: 0.492

INPUT
Description:
Station Elevation Data num= 36

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9850	2112	9862.32	2110	9879.29	2108	9895.76	2106	9908.9	2104

9916.63	2102 9923.23	2100 9929.34	2098 9934.28	2096 9938.4	2094
9942.84	2092 9947.21	2090 9951.42	2088 9961.41	2086 9970.19	2086
10011.2	208810018.56	209010025.83	209210060.42	209410113.61	2096
10161.74	209810198.15	210010207.19	210210212.22	210310217.25	2104
10232.98	210610254.47	210810280.75	211010309.53	211210352.99	2114
10368.1	211610379.46	211810387.94	212010403.92	2122 10425.8	2124
10447.85	2126				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9850	.06	9942.84	.041	0025.83	.06

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
9923.23	10198.15	200	200	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2091.34	Element			
Vel Head (ft)	1.07	Wt. n-Val.		0.040	
W.S. Elev (ft)	2090.27	Reach Len. (ft)	200.00	200.00	200.00
Crit W.S. (ft)	2089.92	Flow Area (sq ft)		219.28	
E.G. Slope (ft/ft)	0.011728	Area (sq ft)		219.28	
Q Total (cfs)	1820.00	Flow (cfs)		1820.00	
Top Width (ft)	72.93	Top Width (ft)		72.93	
Vel Total (ft/s)	8.30	Avg. Vel. (ft/s)		8.30	
Max Chl Dpth (ft)	4.27	Hydr. Depth (ft)		3.01	
Conv. Total (cfs)	16806.2	Conv. (cfs)		16806.2	
Length Wtd. (ft)	200.00	Wetted Per. (ft)		73.99	
Min Ch El (ft)	2086.00	Shear (lb/sq ft)		2.17	
Alpha	1.00	Stream Power (lb/ft s)		18.01	
Frctn Loss (ft)	2.82	Cum Volume (acre-ft)		20.04	0.22
C & E Loss (ft)	0.03	Cum SA (acres)		6.78	0.21

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Manning's n values were composited to a single value in the main channel.

CROSS SECTION OUTPUT Profile #PF 2

			Left OB	Channel	Right OB
E.G. Elev (ft)	2091.34	Element			
Vel Head (ft)	1.07	Wt. n-Val.		0.040	
W.S. Elev (ft)	2090.27	Reach Len. (ft)	200.00	200.00	200.00
Crit W.S. (ft)	2089.92	Flow Area (sq ft)		219.28	
E.G. Slope (ft/ft)	0.011728	Area (sq ft)		219.28	
Q Total (cfs)	1820.00	Flow (cfs)		1820.00	
Top Width (ft)	72.93	Top Width (ft)		72.93	
Vel Total (ft/s)	8.30	Avg. Vel. (ft/s)		8.30	
Max Chl Dpth (ft)	4.27	Hydr. Depth (ft)		3.01	
Conv. Total (cfs)	16806.2	Conv. (cfs)		16806.2	
Length Wtd. (ft)	200.00	Wetted Per. (ft)		73.99	
Min Ch El (ft)	2086.00	Shear (lb/sq ft)		2.17	
Alpha	1.00	Stream Power (lb/ft s)		18.01	
Frctn Loss (ft)	2.82	Cum Volume (acre-ft)		20.04	0.22
C & E Loss (ft)	0.03	Cum SA (acres)		6.78	0.21

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Manning's n values were composited to a single value in the main channel.

FLOW DISTRIBUTION OUTPUT Profile #PF 1

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9923.23	10014.87	1811.54	216.29	69.14	99.54	3.17	8.38
10014.87	10106.51	8.46	2.99	4.85	0.46	0.64	2.83

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Manning's n values were composited to a single value in the main channel.

FLOW DISTRIBUTION OUTPUT Profile #PF 2

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9923.23	10014.87	1811.54	216.29	69.14	99.54	3.17	8.38
10014.87	10106.51	8.46	2.99	4.85	0.46	0.64	2.83

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Manning's n values were composited to a single value in the main channel.

CROSS SECTION RIVER: TRIBUTARY 10B
REACH: TRIBUTARY 10B RS: 0.435

INPUT
Description:
Station Elevation Data num= 38

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9831.9	2112	9842.03	2110	9852.12	2108	9862.25	2106	9878.91	2104
9893.97	2102	9907.81	2100	9921.36	2098	9934.72	2096	9947.37	2094
9959.73	2092	9964.78	2090	9969.49	2088	9973.91	2086	9985.94	2084
10005.66	208410021.06		208410033.11		208410041.81		208610045.75		2088
10050.97	209010105.28		209210123.53		209410189.61		209610263.73		2096
10275.5	209610314.09		2098	10333.7	210010363.19		210210413.15		2104
10430.13	210610441.83		210810453.13		211010460.28		211210466.76		2114
10473.56	211610480.89		2118	10495.1	2120				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9831.9	.06	9964.78	.0410050.97		.06

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
9934.7	210189.61	420	400	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2088.49	Element			
Vel Head (ft)	1.36	Wt. n-Val.		0.040	
W.S. Elev (ft)	2087.13	Reach Len. (ft)	420.00	420.00	400.00
Crit W.S. (ft)	2087.13	Flow Area (sq ft)		194.63	
E.G. Slope (ft/ft)	0.017308	Area (sq ft)		194.63	
Q Total (cfs)	1820.00	Flow (cfs)		1820.00	
Top Width (ft)	72.63	Top Width (ft)		72.63	
Vel Total (ft/s)	9.35	Avg. Vel. (ft/s)		9.35	
Max Chl Dpth (ft)	3.13	Hydr. Depth (ft)		2.68	
Conv. Total (cfs)	13834.1	Conv. (cfs)		13834.1	
Length Wtd. (ft)	420.00	Wetted Per. (ft)		73.54	
Min Ch El (ft)	2084.00	Shear (lb/sq ft)		2.86	
Alpha	1.00	Stream Power (lb/ft s)		26.74	
Frctn Loss (ft)	6.17	Cum Volume (acre-ft)		19.09	0.22
C & E Loss (ft)	0.08	Cum SA (acres)		6.45	0.21

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.

CROSS SECTION OUTPUT Profile #PF 2

			Left OB	Channel	Right OB
E.G. Elev (ft)	2088.49	Element			
Vel Head (ft)	1.36	Wt. n-Val.		0.040	
W.S. Elev (ft)	2087.13	Reach Len. (ft)	420.00	420.00	400.00
Crit W.S. (ft)	2087.13	Flow Area (sq ft)		194.63	
E.G. Slope (ft/ft)	0.017308	Area (sq ft)		194.63	
Q Total (cfs)	1820.00	Flow (cfs)		1820.00	
Top Width (ft)	72.63	Top Width (ft)		72.63	
Vel Total (ft/s)	9.35	Avg. Vel. (ft/s)		9.35	
Max Chl Dpth (ft)	3.13	Hydr. Depth (ft)		2.68	
Conv. Total (cfs)	13834.1	Conv. (cfs)		13834.1	

Length Wtd. (ft)	420.00	Wetted Per. (ft)	73.54	
Min Ch El (ft)	2084.00	Shear (lb/sq ft)	2.86	
Alpha	1.00	Stream Power (lb/ft s)	26.74	
Frctn Loss (ft)	6.17	Cum Volume (acre-ft)	19.09	0.22
C & E Loss (ft)	0.08	Cum SA (acres)	6.45	0.21

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.

FLOW DISTRIBUTION OUTPUT Profile #PF 1

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9934.72	10019.68	1265.19	132.76	48.68	69.52	2.75	9.53
10019.68	10104.65	554.81	61.87	24.85	30.48	2.54	8.97

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.

FLOW DISTRIBUTION OUTPUT Profile #PF 2

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9934.72	10019.68	1265.19	132.76	48.68	69.52	2.75	9.53
10019.68	10104.65	554.81	61.87	24.85	30.48	2.54	8.97

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.

CROSS SECTION RIVER: TRIBUTARY 10B
REACH: TRIBUTARY 10B RS: 0.345

INPUT
Description:
Station Elevation Data num= 37

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9657.1	2118	9670.38	2116	9689.65	2114	9703.57	2112	9717.18	2110
9729.02	2108	9739.89	2106	9748.75	2104	9759.83	2102	9770.18	2100
9781.28	2098	9810.34	2096	9826.56	2094	9838.3	2092	9862.42	2090
9899.27	2088	9939.56	2086	9966.01	2084	9978.06	2082	9989.23	2080
10004.65	207810012.33		2076	10029.7	2076	10037.2	207810061.42		2080
10084.68	208210121.24		208410152.73		208410163.42		208410195.91		2086
10225.73	208810301.46		209010336.62		2092	10357.1	209410376.95		2096
10392.81	209810407.88		2100						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9657.1	.06	9989.23	.041	0061.42	.06

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
9939.56	10195.91	287.24	304.4 315.09	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2081.88	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.08	Wt. n-Val.		0.040	
W.S. Elev (ft)	2080.80	Reach Len. (ft)	287.24	304.40	315.09
Crit W.S. (ft)		Flow Area (sq ft)		218.18	
E.G. Slope (ft/ft)	0.012628	Area (sq ft)		218.18	
Q Total (cfs)	1820.00	Flow (cfs)		1820.00	
Top Width (ft)	86.01	Top Width (ft)		86.01	
Vel Total (ft/s)	8.34	Avg. Vel. (ft/s)		8.34	
Max Chl Dpth (ft)	4.80	Hydr. Depth (ft)		2.54	
Conv. Total (cfs)	16195.7	Conv. (cfs)		16195.7	
Length Wtd. (ft)	304.40	Wetted Per. (ft)		86.85	
Min Ch El (ft)	2076.00	Shear (lb/sq ft)		1.98	
Alpha	1.00	Stream Power (lb/ft s)		16.52	
Frctn Loss (ft)	4.46	Cum Volume (acre-ft)		17.10	0.22
C & E Loss (ft)	0.02	Cum SA (acres)		5.68	0.21

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

CROSS SECTION OUTPUT Profile #PF 2

E.G. Elev (ft)	2081.88	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.08	Wt. n-Val.		0.040	
W.S. Elev (ft)	2080.80	Reach Len. (ft)	287.24	304.40	315.09
Crit W.S. (ft)		Flow Area (sq ft)		218.18	
E.G. Slope (ft/ft)	0.012628	Area (sq ft)		218.18	
Q Total (cfs)	1820.00	Flow (cfs)		1820.00	
Top Width (ft)	86.01	Top Width (ft)		86.01	
Vel Total (ft/s)	8.34	Avg. Vel. (ft/s)		8.34	
Max Chl Dpth (ft)	4.80	Hydr. Depth (ft)		2.54	
Conv. Total (cfs)	16195.7	Conv. (cfs)		16195.7	
Length Wtd. (ft)	304.40	Wetted Per. (ft)		86.85	
Min Ch El (ft)	2076.00	Shear (lb/sq ft)		1.98	
Alpha	1.00	Stream Power (lb/ft s)		16.52	
Frctn Loss (ft)	4.46	Cum Volume (acre-ft)		17.10	0.22
C & E Loss (ft)	0.02	Cum SA (acres)		5.68	0.21

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.

FLOW DISTRIBUTION OUTPUT Profile #PF 1

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9939.56	10025.01	1076.76	119.71	40.72	59.16	2.97	8.99
10025.01	10110.46	743.24	98.47	46.13	40.84	2.15	7.55

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.

FLOW DISTRIBUTION OUTPUT Profile #PF 2

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9939.56	10025.01	1076.76	119.71	40.72	59.16	2.97	8.99
10025.01	10110.46	743.24	98.47	46.13	40.84	2.15	7.55

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

CROSS SECTION RIVER: TRIBUTARY 10B
REACH: TRIBUTARY 10B RS: 0.295

INPUT
Description:
Station Elevation Data num= 57

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9573	2110	9595.31	2108	9619.97	2106	9637.03	2104	9651.59	2102
9675.3	2100	9694.15	2098	9714.98	2096	9724.58	2094	9731.91	2092

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9758.5	2090 9785.2	2088 9806.18	2086 9855.14	2084 9875.35	2082
9898.39	2080 9927.32	2078 9953.88	2076 9983.51	2074 9995.71	2072
9996.21	207210029.34	207410048.19	2076 10055.6	207810062.59	2080
10124.85	208210160.92	208410175.87	208610189.69	208810204.94	2090
10219.22	209210235.02	209410242.82	209610250.48	209810258.71	2100
10267.49	210210275.97	210410283.22	210610290.01	210810296.74	2110
10303.48	211210310.13	211410316.36	2116 10322.4	211810328.33	2120
10334.09	212210339.83	212410345.59	212610351.06	212810356.82	2130
10364.3	213210374.41	213410384.62	213610394.54	213810404.66	2140
10416.52	2142 10459.2	2144			

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9573	.065	9983.51	.04	210048.19	.065

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
9855.14	10160.92	439.42	423.99 429.82	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2077.41	Element			
Vel Head (ft)	1.02	Wt. n-Val.		0.044	
W.S. Elev (ft)	2076.39	Reach Len. (ft)	439.42	423.99	429.82
Crit W.S. (ft)	2076.32	Flow Area (sq ft)		224.48	
E.G. Slope (ft/ft)	0.017169	Area (sq ft)		224.48	
Q Total (cfs)	1820.00	Flow (cfs)		1820.00	
Top Width (ft)	100.92	Top Width (ft)		100.92	
Vel Total (ft/s)	8.11	Avg. Vel. (ft/s)		8.11	
Max Chl Dpth (ft)	4.39	Hydr. Depth (ft)		2.22	
Conv. Total (cfs)	13889.8	Conv. (cfs)		13889.8	
Length Wtd. (ft)	423.99	Wetted Per. (ft)		101.39	
Min Ch El (ft)	2072.00	Shear (lb/sq ft)		2.37	
Alpha	1.00	Stream Power (lb/ft s)		19.24	
Frctn Loss (ft)	7.73	Cum Volume (acre-ft)		15.56	0.22
C & E Loss (ft)	0.03	Cum SA (acres)		5.03	0.21

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

CROSS SECTION OUTPUT Profile #PF 2

			Left OB	Channel	Right OB
E.G. Elev (ft)	2077.41	Element			
Vel Head (ft)	1.02	Wt. n-Val.		0.044	
W.S. Elev (ft)	2076.39	Reach Len. (ft)	439.42	423.99	429.82
Crit W.S. (ft)	2076.32	Flow Area (sq ft)		224.48	
E.G. Slope (ft/ft)	0.017169	Area (sq ft)		224.48	
Q Total (cfs)	1820.00	Flow (cfs)		1820.00	
Top Width (ft)	100.92	Top Width (ft)		100.92	
Vel Total (ft/s)	8.11	Avg. Vel. (ft/s)		8.11	
Max Chl Dpth (ft)	4.39	Hydr. Depth (ft)		2.22	
Conv. Total (cfs)	13889.8	Conv. (cfs)		13889.8	
Length Wtd. (ft)	423.99	Wetted Per. (ft)		101.39	
Min Ch El (ft)	2072.00	Shear (lb/sq ft)		2.37	
Alpha	1.00	Stream Power (lb/ft s)		19.24	
Frctn Loss (ft)	7.73	Cum Volume (acre-ft)		15.56	0.22
C & E Loss (ft)	0.03	Cum SA (acres)		5.03	0.21

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.

FLOW DISTRIBUTION OUTPUT Profile #PF 1

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9855.14	9957.07	3.52	2.59	8.38	0.19	0.31	1.36
9957.07	10058.99	1816.48	221.89	93.01	99.81	2.40	8.19

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

FLOW DISTRIBUTION OUTPUT Profile #PF 2

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9855.14	9957.07	3.52	2.59	8.38	0.19	0.31	1.36
9957.07	10058.99	1816.48	221.89	93.01	99.81	2.40	8.19

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

CROSS SECTION RIVER: TRIBUTARY 10B
REACH: TRIBUTARY 10B RS: 0.214

INPUT
Description:
Station Elevation Data num= 29

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9549.7	2096	9592.43	2094	9632	2092	9658.51	2090	9682.17	2088
9697.42	2086	9713.25	2084	9729.85	2082	9747.31	2080	9765.14	2078
9783.06	2076	9794.6	2074	9874.31	2072	9902.01	2070	9921.68	2068
9933.81	2066	9963.64	206610037.48		206810066.61		207010077.23		2072
10093.03	207410113.43		207610130.13		207810169.08		208010200.86		2082
10222.67	208410251.77		208610291.45		208810305.21		2090		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9549.7	.065	9921.68	.04210037.48		.065

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
9794.6	10093.03	599.49	491.4	475.9	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2069.65	Element			
Vel Head (ft)	0.91	Wt. n-Val.		0.042	
W.S. Elev (ft)	2068.74	Reach Len. (ft)	599.49	491.40	475.90
Crit W.S. (ft)	2068.74	Flow Area (sq ft)		238.26	
E.G. Slope (ft/ft)	0.019400	Area (sq ft)		238.26	
Q Total (cfs)	1820.00	Flow (cfs)		1820.00	
Top Width (ft)	133.90	Top Width (ft)		133.90	
Vel Total (ft/s)	7.64	Avg. Vel. (ft/s)		7.64	
Max Chl Dpth (ft)	2.74	Hydr. Depth (ft)		1.78	
Conv. Total (cfs)	13066.8	Conv. (cfs)		13066.8	
Length Wtd. (ft)	491.36	Wetted Per. (ft)		134.16	
Min Ch El (ft)	2066.00	Shear (lb/sq ft)		2.15	
Alpha	1.00	Stream Power (lb/ft s)		16.43	
Frctn Loss (ft)	0.44	Cum Volume (acre-ft)		13.30	0.22
C & E Loss (ft)	0.26	Cum SA (acres)		3.88	0.21

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

CROSS SECTION OUTPUT Profile #PF 2

			Left OB	Channel	Right OB
E.G. Elev (ft)	2069.65	Element			
Vel Head (ft)	0.91	Wt. n-Val.		0.042	
W.S. Elev (ft)	2068.74	Reach Len. (ft)	599.49	491.40	475.90
Crit W.S. (ft)	2068.74	Flow Area (sq ft)		238.26	
E.G. Slope (ft/ft)	0.019400	Area (sq ft)		238.26	
Q Total (cfs)	1820.00	Flow (cfs)		1820.00	
Top Width (ft)	133.90	Top Width (ft)		133.90	
Vel Total (ft/s)	7.64	Avg. Vel. (ft/s)		7.64	
Max Chl Dpth (ft)	2.74	Hydr. Depth (ft)		1.78	
Conv. Total (cfs)	13066.8	Conv. (cfs)		13066.8	

Length Wtd. (ft)	491.36	Wetted Per. (ft)	134.16	
Min Ch El (ft)	2066.00	Shear (lb/sq ft)	2.15	
Alpha	1.00	Stream Power (lb/ft s)	16.43	
Frctn Loss (ft)	0.44	Cum Volume (acre-ft)	13.30	0.22
C & E Loss (ft)	0.26	Cum SA (acres)	3.88	0.21

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.

FLOW DISTRIBUTION OUTPUT Profile #PF 1

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
9894.08	9993.55	1475.27	175.53	79.38	81.06	2.22	8.40
9993.55	RB 10093.03	344.73	62.73	54.77	18.94	1.15	5.50

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.

FLOW DISTRIBUTION OUTPUT Profile #PF 2

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
9894.08	9993.55	1475.27	175.53	79.38	81.06	2.22	8.40
9993.55	RB 10093.03	344.73	62.73	54.77	18.94	1.15	5.50

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

CROSS SECTION RIVER: TRIBUTARY 10B
REACH: TRIBUTARY 10B RS: 0.121

INPUT
Description:
Station Elevation Data num= 22

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9760	2076	9775	2074	9795	2072	9820	2070	9855	2068
9890	2066	9920	2064	9950	2062	10000	206010042.17		2060
10050.83	205810062.05		205810091.76		206010122.45		206210141.82		2064
10159.24	206610191.81		206810210.02		207010240.45		207210285.16		2074
10310.24	207410338.89		2074						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val

9760 .06510042.17 .04210091.76 .065

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
982010141.82 250 220 270 .1 .3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2066.45	Element			
Vel Head (ft)	0.03	Wt. n-Val.		0.054	0.065
W.S. Elev (ft)	2066.42	Reach Len. (ft)	250.00	220.00	270.00
Crit W.S. (ft)	2061.54	Flow Area (sq ft)		1301.36	26.28
E.G. Slope (ft/ft)	0.000278	Area (sq ft)		1301.36	26.28
Q Total (cfs)	1820.00	Flow (cfs)		1809.49	10.51
Top Width (ft)	283.58	Top Width (ft)		259.25	24.33
Vel Total (ft/s)	1.37	Avg. Vel. (ft/s)		1.39	0.40
Max Chl Dpth (ft)	8.42	Hydr. Depth (ft)		5.02	1.08
Conv. Total (cfs)	109078.4	Conv. (cfs)		108448.2	630.2
Length Wtd. (ft)	220.00	Wetted Per. (ft)		259.89	24.46
Min Ch El (ft)	2058.00	Shear (lb/sq ft)		0.09	0.02
Alpha	1.02	Stream Power (lb/ft s)		0.12	0.01
Frctn Loss (ft)		Cum Volume (acre-ft)		4.62	0.08
C & E Loss (ft)		Cum SA (acres)		1.67	0.08

CROSS SECTION OUTPUT Profile #PF 2

			Left OB	Channel	Right OB
E.G. Elev (ft)	2066.45	Element			
Vel Head (ft)	0.03	Wt. n-Val.		0.054	0.065
W.S. Elev (ft)	2066.42	Reach Len. (ft)	250.00	220.00	270.00
Crit W.S. (ft)	2061.54	Flow Area (sq ft)		1301.36	26.28
E.G. Slope (ft/ft)	0.000278	Area (sq ft)		1301.36	26.28
Q Total (cfs)	1820.00	Flow (cfs)		1809.49	10.51
Top Width (ft)	283.58	Top Width (ft)		259.25	24.33
Vel Total (ft/s)	1.37	Avg. Vel. (ft/s)		1.39	0.40
Max Chl Dpth (ft)	8.42	Hydr. Depth (ft)		5.02	1.08
Conv. Total (cfs)	109078.4	Conv. (cfs)		108448.2	630.2
Length Wtd. (ft)	220.00	Wetted Per. (ft)		259.89	24.46
Min Ch El (ft)	2058.00	Shear (lb/sq ft)		0.09	0.02
Alpha	1.02	Stream Power (lb/ft s)		0.12	0.01
Frctn Loss (ft)		Cum Volume (acre-ft)		4.62	0.08
C & E Loss (ft)		Cum SA (acres)		1.67	0.08

FLOW DISTRIBUTION OUTPUT Profile #PF 1

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9820.00	9927.27	29.53	63.70	44.79	1.62	1.43	0.46
9927.27	10034.55	648.11	576.49	107.36	35.61	5.37	1.12
10034.55	RB 10141.82	1131.84	661.17	107.74	62.19	6.16	1.71
10141.82	10338.89	10.51	26.28	24.46	0.58	1.08	0.40

FLOW DISTRIBUTION OUTPUT Profile #PF 2

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9820.00	9927.27	29.53	63.70	44.79	1.62	1.43	0.46
9927.27	10034.55	648.11	576.49	107.36	35.61	5.37	1.12
10034.55	RB 10141.82	1131.84	661.17	107.74	62.19	6.16	1.71
10141.82	10338.89	10.51	26.28	24.46	0.58	1.08	0.40

CULVERT RIVER: TRIBUTARY 10B
REACH: TRIBUTARY 10B RS: 0.110

INPUT
Description:
Distance from Upstream XS = 20
Deck/Roadway Width = 50
Weir Coefficient = 2.6
Bridge Deck/Roadway Skew =
Upstream Deck/Roadway Coordinates
num= 8

T_10b

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
9400	2056	9690	2058	9800	2060
9840	2062	9970	2064	10080	2066
10140	2068	10200	2070		

Upstream Bridge Cross Section Data
Station Elevation Data num= 22

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9760	2076	9775	2074	9795	2072	9820	2070	9855	2068
9890	2066	9920	2064	9950	2062	10000	206010042.17		2060
10050.83	205810062.05		205810091.76		206010122.45		206210141.82		2064
10159.24	206610191.81		206810210.02		207010240.45		207210285.16		2074
10310.24	207410338.89		2074						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9760	.06510042.17		.04210091.76		.065

Bank Sta: Left Right Coeff Contr. Expan.
982010141.82 .1 .3

Downstream Deck/Roadway Coordinates
num= 8

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
9400	2056	9690	2058	9800	2060
9840	2062	9970	2064	10080	2066
10140	2068	10200	2070		

Downstream Bridge Cross Section Data
Station Elevation Data num= 22

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9602	2060	9644.3	2060	9668.69	2058	9763.77	2058	9800.79	2058
9830.54	2058	9858.32	2060	9940.64	2060	9984.26	2060	9990.42	2060
10029.08	205810036.36		205610044.76		205610052.44		205810058.75		2060
10077.94	206210126.79		206410175.52		2066 10219.4		206810263.91		2070
10326.03	207210392.28		2074						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9602	.065	9990.42	.04210058.75		.065

Bank Sta: Left Right Coeff Contr. Expan.
9644.310077.94 .1 .3

Upstream Embankment side slope = 0 horiz. to 1.0 vertical
Downstream Embankment side slope = 0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow = .95
Elevation at which weir flow begins = 2055
Energy head used in spillway design =
Spillway height used in design =
Weir crest shape = Broad Crested

Number of Culverts = 1

Culvert Name	Shape	Rise	Span
Culvert #1	Circular	5	

FHWA Chart # 2 - Corrugated Metal Pipe Culvert
FHWA Scale # 1 - Headwall
Solution Criteria = Highest U.S. EG

Culvert Upstrm Dist	Length	n Value	Entrance Loss Coef	Exit Loss Coef
30	75	.018	.5	1

Number of Barrels = 2
Upstream Elevation = 2056.45
Centerline Stations

Sta.	Sta.
10052	10059

Downstream Elevation = 2055.82
Centerline Stations

Sta.	Sta.
10037	10044

CROSS SECTION RIVER: TRIBUTARY 10B
REACH: TRIBUTARY 10B RS: 0.100

INPUT
Description:
Station Elevation Data num= 22

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9602	2060	9644.3	2060	9668.69	2058	9763.77	2058	9800.79	2058
9830.54	2058	9858.32	2060	9940.64	2060	9984.26	2060	9990.42	2060
10029.08	205810036.36		205610044.76		205610052.44		205810058.75		2060
10077.94	206210126.79		206410175.52		2066	10219.4	206810263.91		2070
10326.03	207210392.28		2074						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9602	.065	9990.42	.04210058.75		.065

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
9644.310077.94		56.72	65 67.12	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2059.83	Element		0.056	
Vel Head (ft)	0.49	Wt. n-Val.		65.00	67.12
W.S. Elev (ft)	2059.34	Reach Len. (ft)	56.72	324.06	
Crit W.S. (ft)		Flow Area (sq ft)		324.06	
E.G. Slope (ft/ft)	0.031750	Area (sq ft)		1820.00	
Q Total (cfs)	1820.00	Flow (cfs)		250.39	
Top Width (ft)	250.39	Top Width (ft)		5.62	
Vel Total (ft/s)	5.62	Avg. Vel. (ft/s)		1.29	
Max Chl Dpth (ft)	3.34	Hydr. Depth (ft)		10214.0	
Conv. Total (cfs)	10214.0	Conv. (cfs)		251.26	
Length Wtd. (ft)	65.00	Wetted Per. (ft)		2.56	
Min Ch El (ft)	2056.00	Shear (lb/sq ft)		14.36	
Alpha	1.00	Stream Power (lb/ft s)		0.52	
Frctn Loss (ft)	1.52	Cum Volume (acre-ft)		0.38	
C & E Loss (ft)	0.03	Cum SA (acres)			

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

CROSS SECTION OUTPUT Profile #PF 2

			Left OB	Channel	Right OB
E.G. Elev (ft)	2059.83	Element		0.056	
Vel Head (ft)	0.49	Wt. n-Val.		65.00	67.12
W.S. Elev (ft)	2059.34	Reach Len. (ft)	56.72	324.06	
Crit W.S. (ft)		Flow Area (sq ft)		324.06	
E.G. Slope (ft/ft)	0.031750	Area (sq ft)		1820.00	
Q Total (cfs)	1820.00	Flow (cfs)		250.39	
Top Width (ft)	250.39	Top Width (ft)		5.62	
Vel Total (ft/s)	5.62	Avg. Vel. (ft/s)		1.29	
Max Chl Dpth (ft)	3.34	Hydr. Depth (ft)		10214.0	
Conv. Total (cfs)	10214.0	Conv. (cfs)		251.26	
Length Wtd. (ft)	65.00	Wetted Per. (ft)		2.56	
Min Ch El (ft)	2056.00	Shear (lb/sq ft)		14.36	
Alpha	1.00	Stream Power (lb/ft s)		0.52	
Frctn Loss (ft)	1.52	Cum Volume (acre-ft)		0.38	
C & E Loss (ft)	0.03	Cum SA (acres)			

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

FLOW DISTRIBUTION OUTPUT Profile #PF 1

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9644.30	9788.85	818.28	172.24	136.58	44.96	1.26	4.75
9788.85	9933.39	302.99	68.46	60.38	16.65	1.13	4.43
9933.39	RB 10077.94	698.73	83.36	54.30	38.39	1.56	8.38

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

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

FLOW DISTRIBUTION OUTPUT Profile #PF 2

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9644.30	9788.85	818.28	172.24	136.58	44.96	1.26	4.75
9788.85	9933.39	302.99	68.46	60.38	16.65	1.13	4.43
9933.39	RB 10077.94	698.73	83.36	54.30	38.39	1.56	8.38

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

CROSS SECTION RIVER: TRIBUTARY 10B
REACH: TRIBUTARY 10B RS: 0.088

INPUT
Description:
Station Elevation Data num= 23

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9478	2062	9521.36	2060	9595.1	2058	9683.59	2056	9736.98	2056
9794.72	2058	9884.69	2060	9907.44	2060	9927.95	2060	9942.26	2060
9972.72	2058	9993.29	2056	9998.3	205610004.99		205610026.17		2054
10027.54	205410035.12		205610041.69		205810114.32		206010230.15		2062
10273.73	206410319.32		2066	10415.1	2068				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9478	.065	9972.72	.04	210041.69	.065

Bank Sta: Left	Right	Coeff Contr.	Expan.
9595.1	10114.32	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2058.27	Element			
Vel Head (ft)	0.38	Wt. n-Val.		0.052	
W.S. Elev (ft)	2057.89	Reach Len. (ft)			
Crit W.S. (ft)	2057.56	Flow Area (sq ft)		367.21	
E.G. Slope (ft/ft)	0.018026	Area (sq ft)		367.21	
Q Total (cfs)	1820.00	Flow (cfs)		1820.00	
Top Width (ft)	259.36	Top Width (ft)		259.36	
Vel Total (ft/s)	4.96	Avg. Vel. (ft/s)		4.96	
Max Chl Dpth (ft)	3.89	Hydr. Depth (ft)		1.42	
Conv. Total (cfs)	13555.8	Conv. (cfs)		13555.8	
Length Wtd. (ft)		Wetted Per. (ft)		260.14	
Min Ch El (ft)	2054.00	Shear (lb/sq ft)		1.59	
Alpha	1.00	Stream Power (lb/ft s)		7.87	
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT Profile #PF 2

			Left OB	Channel	Right OB
E.G. Elev (ft)	2058.27	Element			
Vel Head (ft)	0.38	Wt. n-Val.		0.052	
W.S. Elev (ft)	2057.89	Reach Len. (ft)			
Crit W.S. (ft)	2057.56	Flow Area (sq ft)		367.21	
E.G. Slope (ft/ft)	0.018026	Area (sq ft)		367.21	
Q Total (cfs)	1820.00	Flow (cfs)		1820.00	
Top Width (ft)	259.36	Top Width (ft)		259.36	
Vel Total (ft/s)	4.96	Avg. Vel. (ft/s)		4.96	
Max Chl Dpth (ft)	3.89	Hydr. Depth (ft)		1.42	
Conv. Total (cfs)	13555.8	Conv. (cfs)		13555.8	
Length Wtd. (ft)		Wetted Per. (ft)		260.14	
Min Ch El (ft)	2054.00	Shear (lb/sq ft)		1.59	
Alpha	1.00	Stream Power (lb/ft s)		7.87	
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

Warning: Divided flow computed for this cross-section.

FLOW DISTRIBUTION OUTPUT Profile #PF 1

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9595.10	9768.17	809.73	222.63	168.40	44.49	1.32	3.64
9768.17	9941.25	15.80	9.54	23.49	0.87	0.41	1.66
9941.25	RB 10114.32	994.47	135.04	68.25	54.64	2.00	7.36

Warning: Divided flow computed for this cross-section.

FLOW DISTRIBUTION OUTPUT Profile #PF 2

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9595.10	9768.17	809.73	222.63	168.40	44.49	1.32	3.64
9768.17	9941.25	15.80	9.54	23.49	0.87	0.41	1.66
9941.25	RB 10114.32	994.47	135.04	68.25	54.64	2.00	7.36

Warning: Divided flow computed for this cross-section.

SUMMARY OF MANNING'S N VALUES

River:TRIBUTARY 10B

Reach	River Sta.	n1	n2	n3	n4	n5
TRIBUTARY 10B	1.296	.06	.04	.06		
TRIBUTARY 10B	1.232	.06	.04	.06		
TRIBUTARY 10B	1.191	.06	.04	.06		
TRIBUTARY 10B	1.134	.06	.04	.06		
TRIBUTARY 10B	1.098	.06	.04	.06		
TRIBUTARY 10B	1.034	.06	.04	.06		
TRIBUTARY 10B	0.943	.06	.04	.06		
TRIBUTARY 10B	0.848	.06	.04	.06		
TRIBUTARY 10B	0.754	.06	.04	.06	.04	.06
TRIBUTARY 10B	0.671	.06	.04	.06		
TRIBUTARY 10B	0.607	.06	.04	.06		
TRIBUTARY 10B	0.583	.06	.04	.06		
TRIBUTARY 10B	0.530	.06	.04	.06		
TRIBUTARY 10B	0.492	.06	.04	.06		
TRIBUTARY 10B	0.435	.06	.04	.06		
TRIBUTARY 10B	0.345	.06	.04	.06		
TRIBUTARY 10B	0.295	.065	.042	.065		
TRIBUTARY 10B	0.214	.065	.042	.065		
TRIBUTARY 10B	0.121	.065	.042	.065		
TRIBUTARY 10B	0.110	Culvert				
TRIBUTARY 10B	0.100	.065	.042	.065		
TRIBUTARY 10B	0.088	.065	.042	.065		

SUMMARY OF REACH LENGTHS

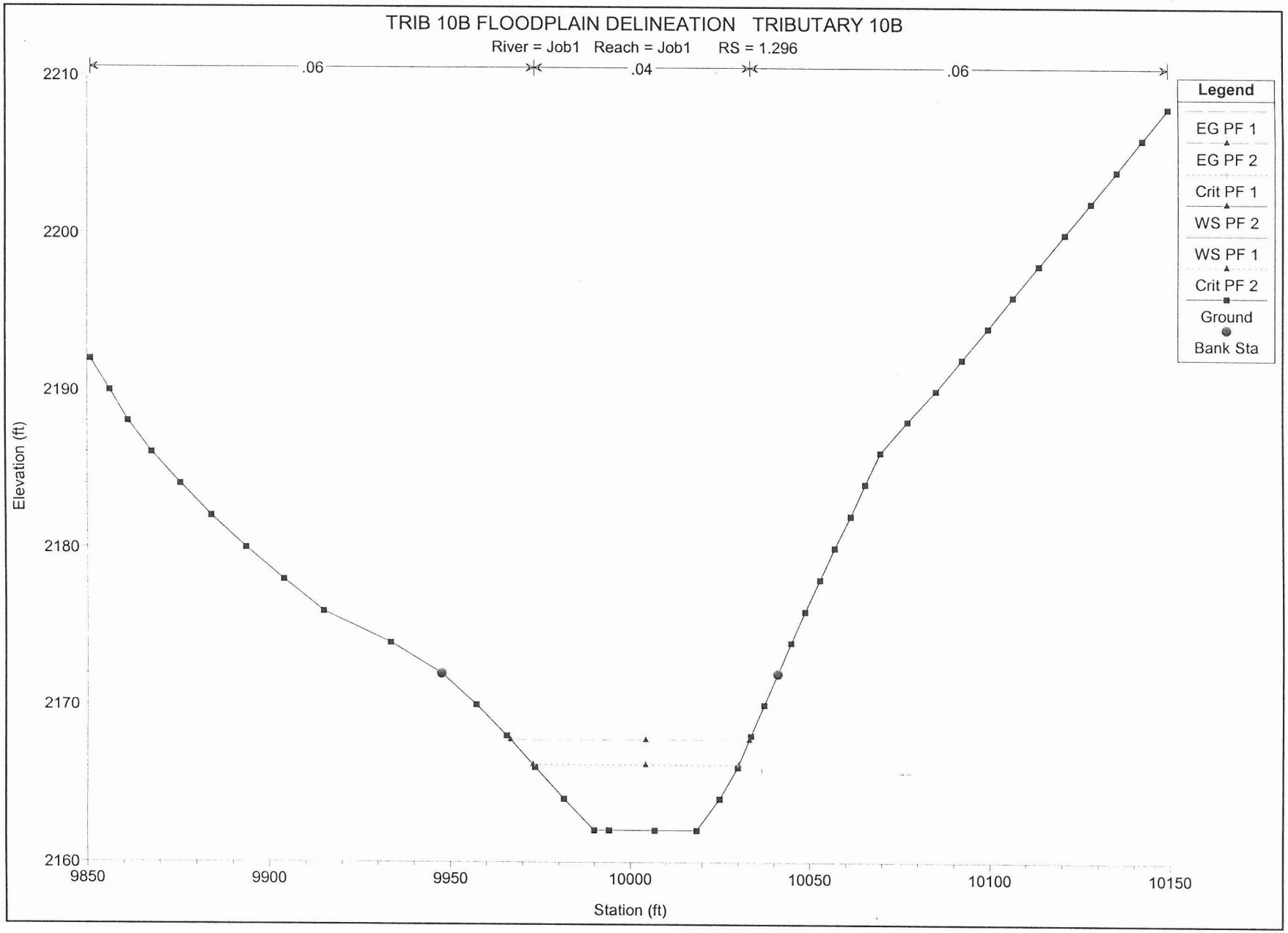
River: TRIBUTARY 10B

Reach	River Sta.	Left	Channel	Right
TRIBUTARY 10B	1.296	342.59	339.61	332.43
TRIBUTARY 10B	1.232	247.93	206.89	191.27
TRIBUTARY 10B	1.191	312.39	260	260
TRIBUTARY 10B	1.134	188.73	188.48	194.62
TRIBUTARY 10B	1.098	334.79	335	335
TRIBUTARY 10B	1.034	445.84	475.95	491.01
TRIBUTARY 10B	0.943	502.44	493.22	505.21
TRIBUTARY 10B	0.848	495.69	494.58	514.07
TRIBUTARY 10B	0.754	404.02	431.07	473.49

			T_10b	
TRIBUTARY 10B	0.671	334.05	334.05	334.05
TRIBUTARY 10B	0.607	135	135	135
TRIBUTARY 10B	0.583	280	280	280
TRIBUTARY 10B	0.530	300	300	290
TRIBUTARY 10B	0.492	200	200	200
TRIBUTARY 10B	0.435	420	420	400
TRIBUTARY 10B	0.345	287.24	304.4	315.09
TRIBUTARY 10B	0.295	439.42	423.99	429.82
TRIBUTARY 10B	0.214	599.49	491.4	475.9
TRIBUTARY 10B	0.121	250	220	270
TRIBUTARY 10B	0.110	Culvert		
TRIBUTARY 10B	0.100	56.72	65	67.12
TRIBUTARY 10B	0.088			

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: TRIBUTARY 10B

Reach	River Sta.	Contr.	Expan.
TRIBUTARY 10B	1.296	.1	.3
TRIBUTARY 10B	1.232	.1	.3
TRIBUTARY 10B	1.191	.1	.3
TRIBUTARY 10B	1.134	.1	.3
TRIBUTARY 10B	1.098	.1	.3
TRIBUTARY 10B	1.034	.1	.3
TRIBUTARY 10B	0.943	.1	.3
TRIBUTARY 10B	0.848	.1	.3
TRIBUTARY 10B	0.754	.1	.3
TRIBUTARY 10B	0.671	.1	.3
TRIBUTARY 10B	0.607	.1	.3
TRIBUTARY 10B	0.583	.1	.3
TRIBUTARY 10B	0.530	.1	.3
TRIBUTARY 10B	0.492	.1	.3
TRIBUTARY 10B	0.435	.1	.3
TRIBUTARY 10B	0.345	.1	.3
TRIBUTARY 10B	0.295	.1	.3
TRIBUTARY 10B	0.214	.1	.3
TRIBUTARY 10B	0.121	.1	.3
TRIBUTARY 10B	0.110	Culvert	
TRIBUTARY 10B	0.100	.1	.3
TRIBUTARY 10B	0.088	.1	.3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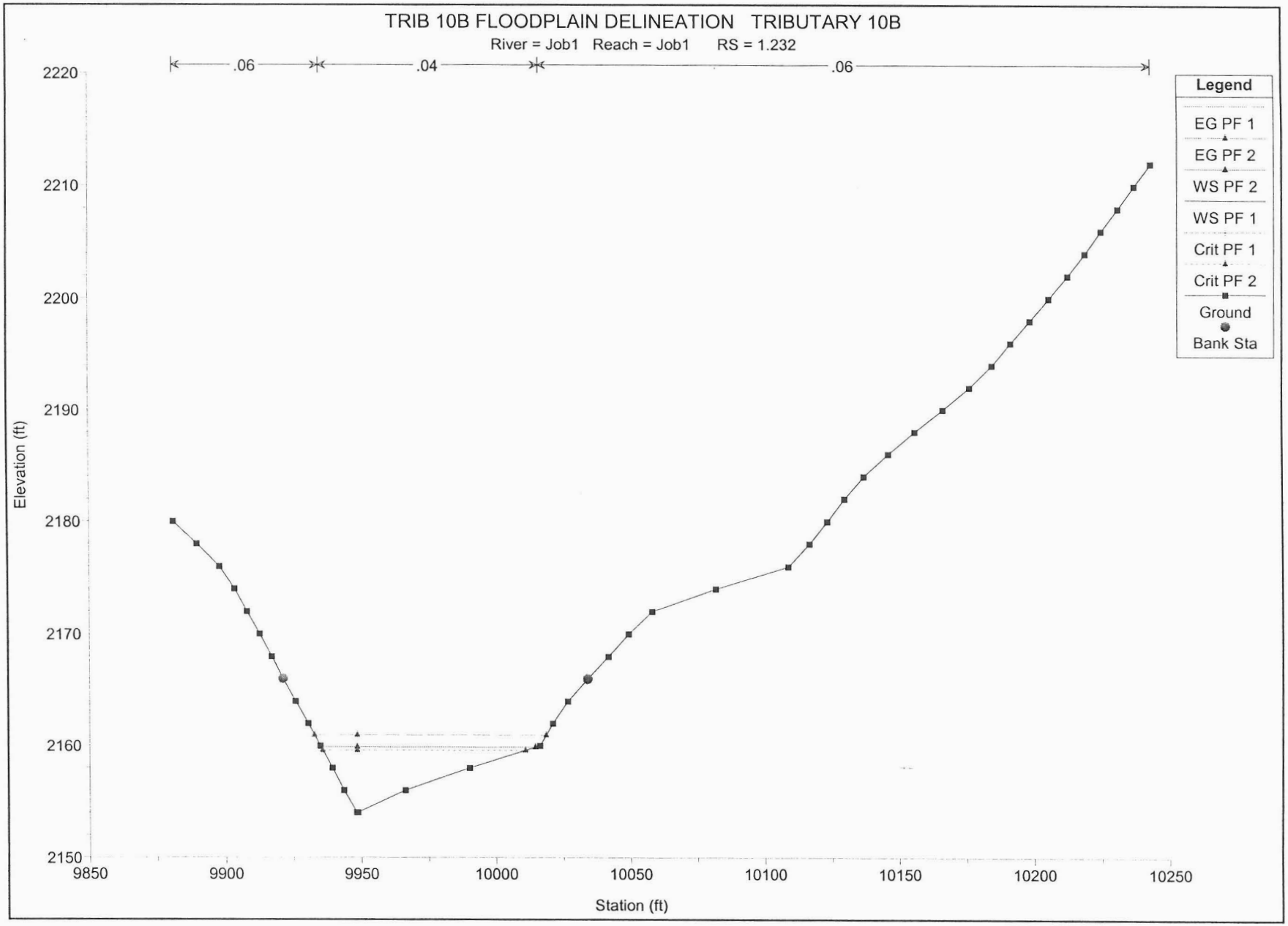
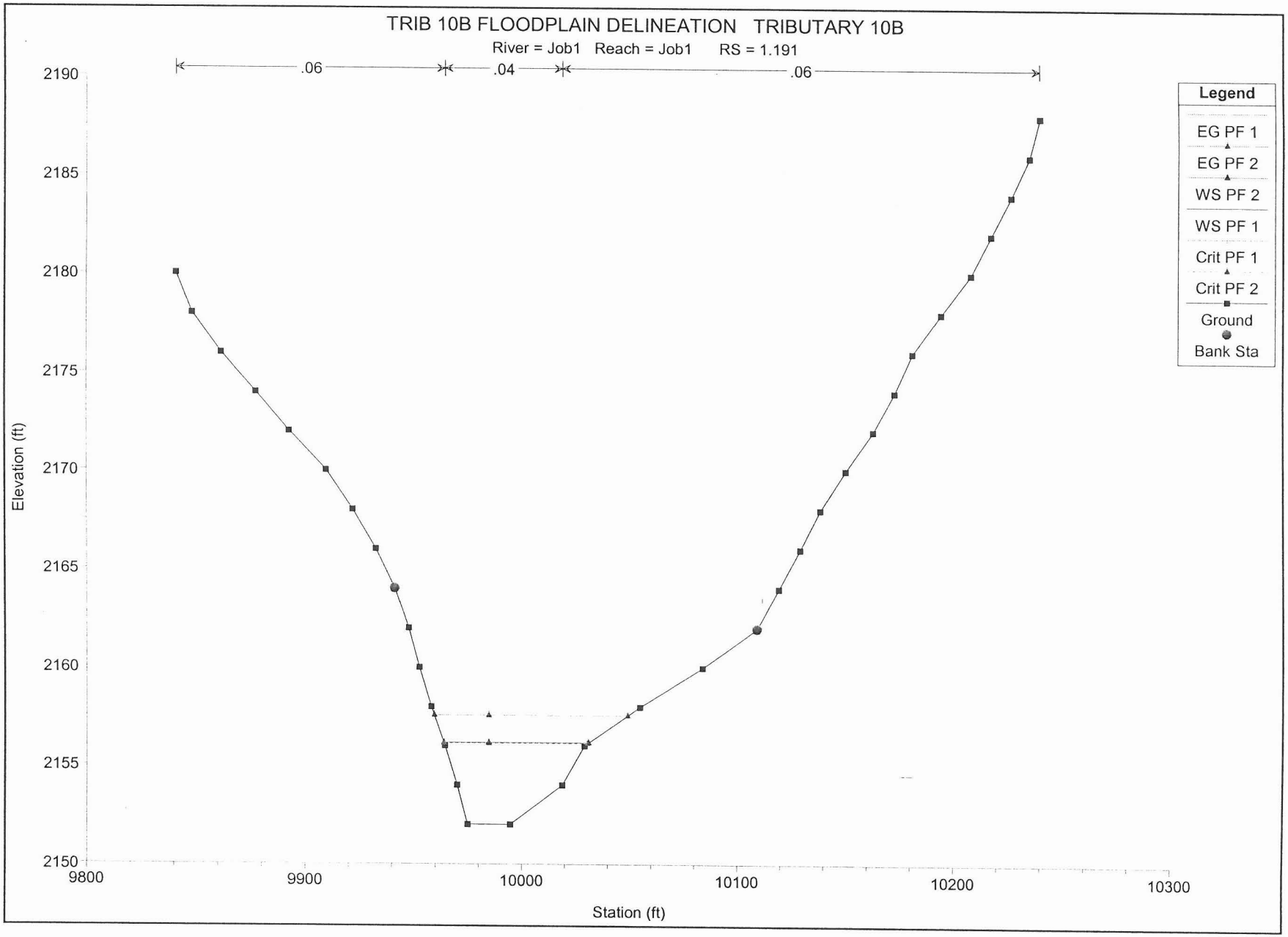
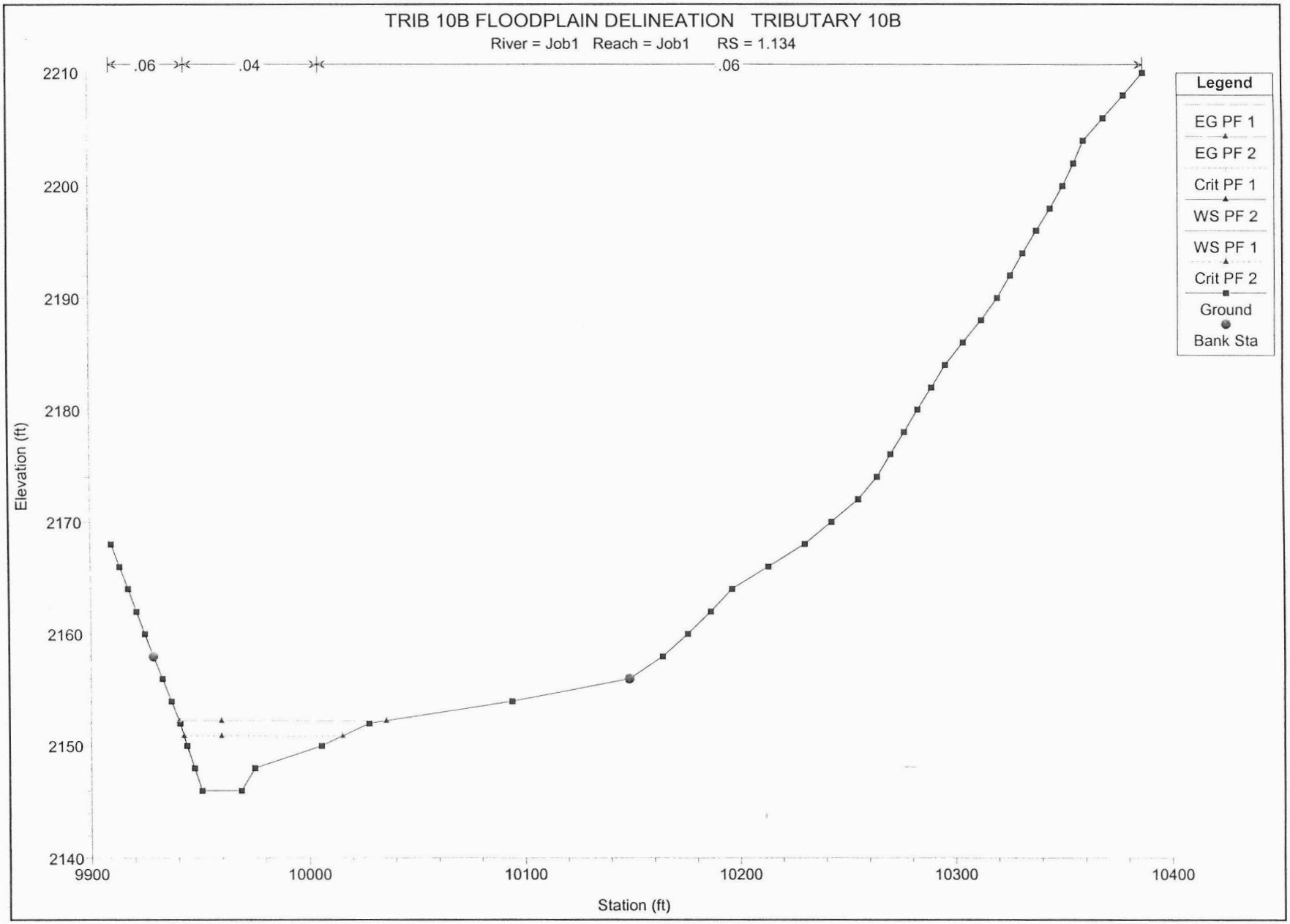
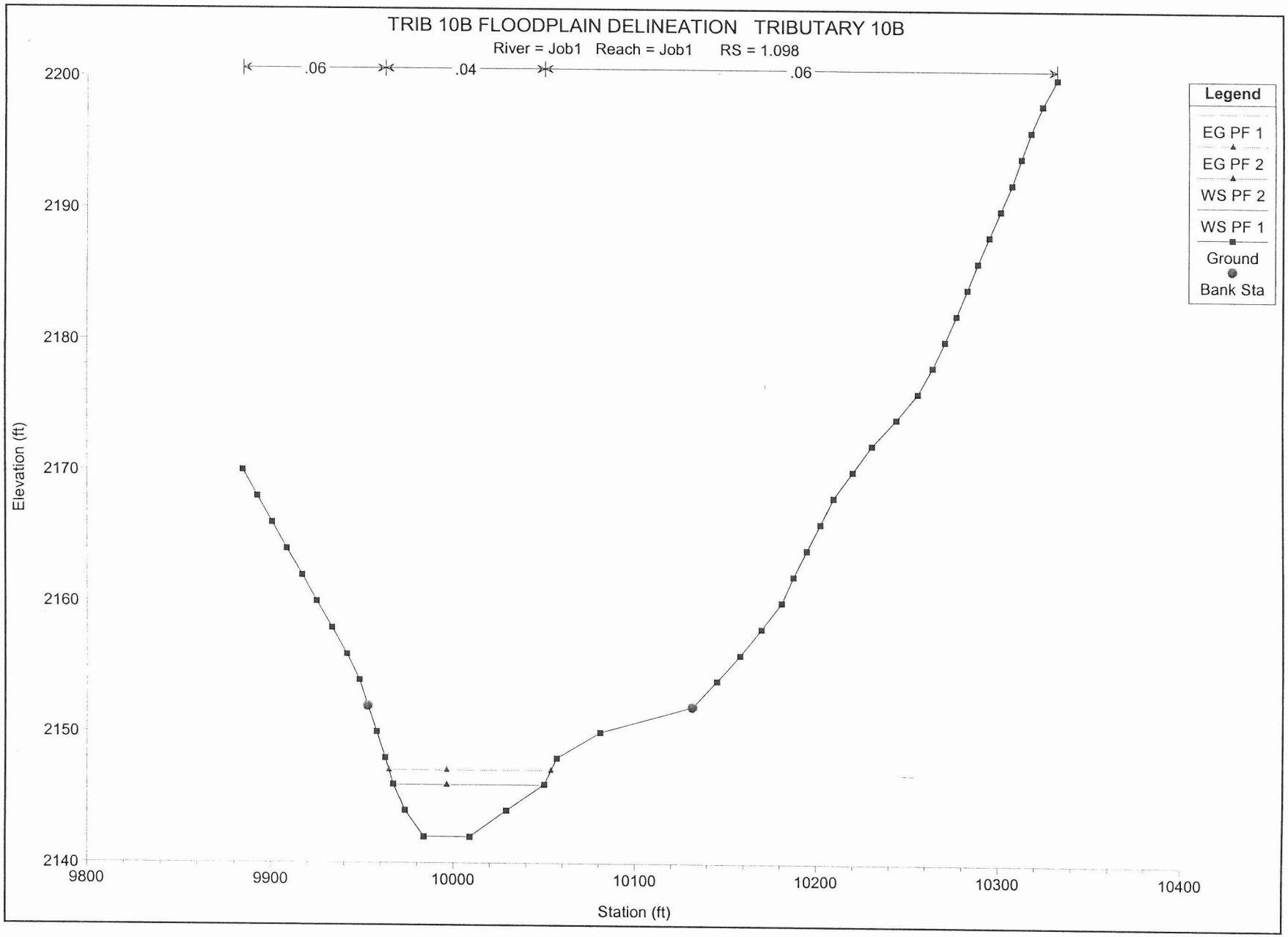
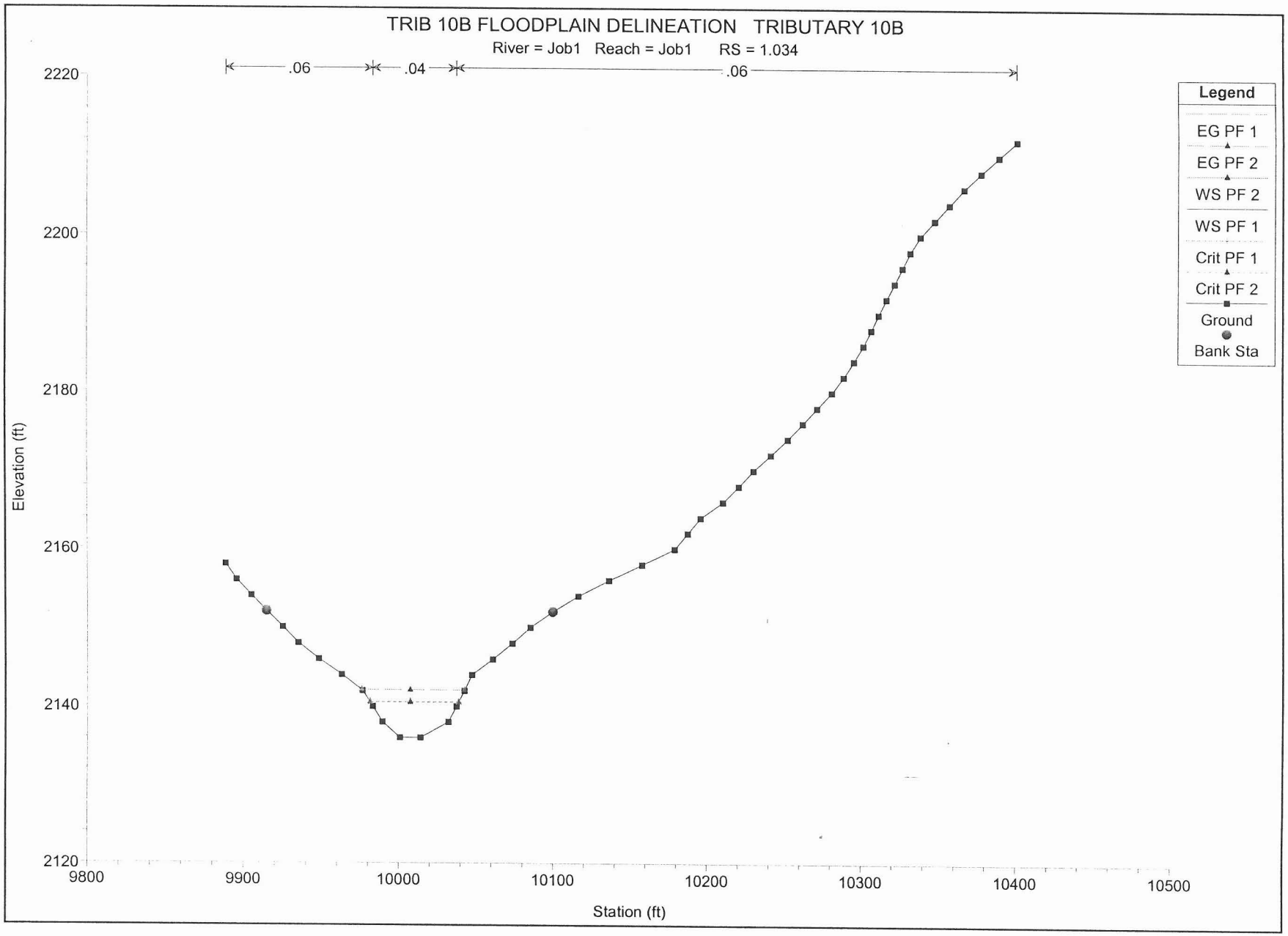
River = Job1 Reach = Job1 RS = 1.296
.06
.04
.06
Legend
EG PF 1
EG PF 2
Crit PF 1
WS PF 2
WS PF 1
Crit PF 2
Ground
Bank Sta
Elevation (ft)
2210
2200
2190
2180
2170
2160
9850
9900
9950
10000
10050
10100
10150
Station (ft)

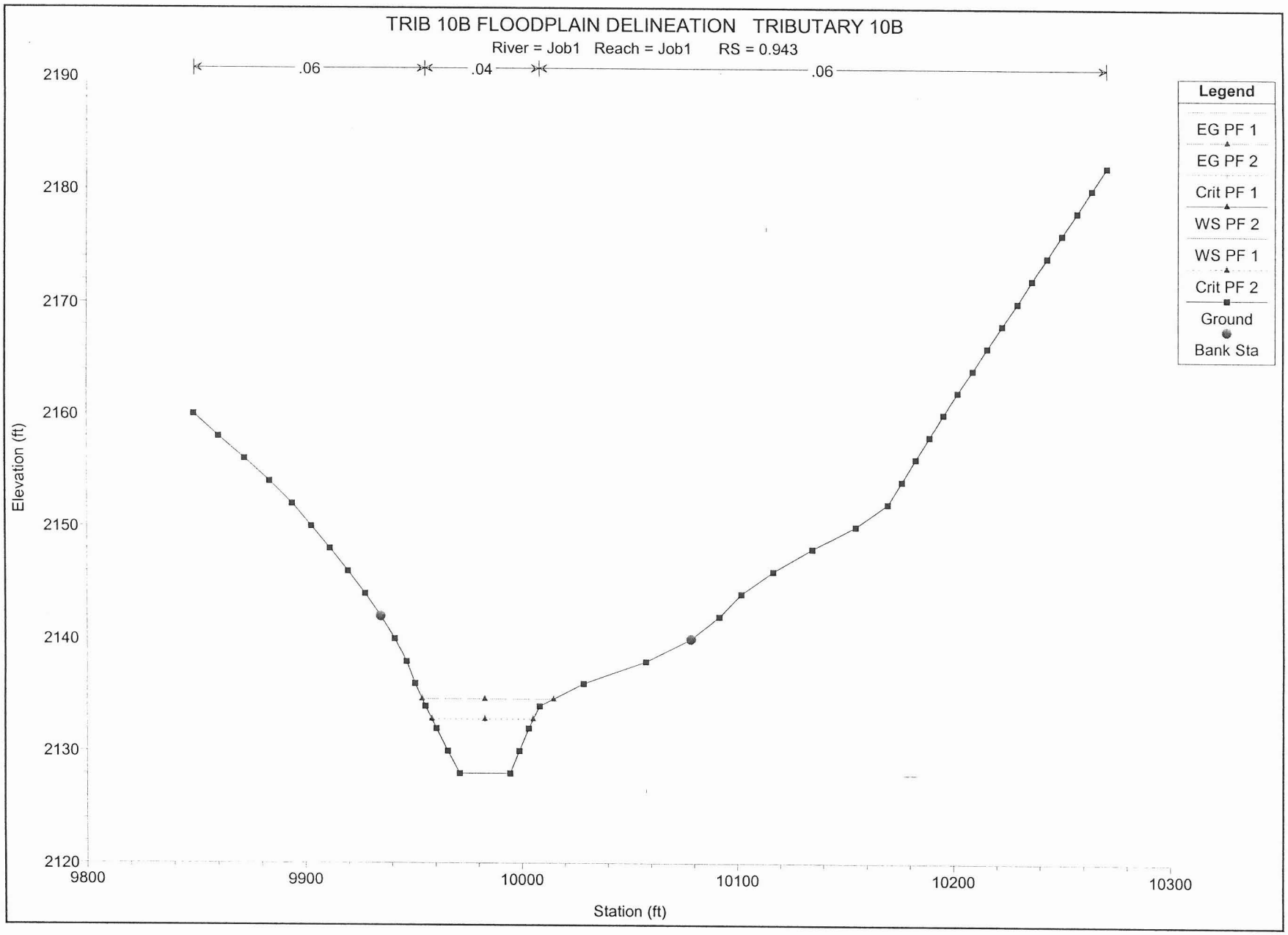

TRIB 10B FLOODPLAIN DELINEATION TRIBUTARY 10B
River = Job1 Reach = Job1 RS = 1.232
.06
.04
.06
Legend
EG PF 1
EG PF 2
WS PF 2
WS PF 1
Crit PF 1
Crit PF 2
Ground
Bank Sta
Elevation (ft)
2220
2210
2200
2190
2180
2170
2160
2150
9850
9900
9950
10000
10050
10100
10150
10200
10250
Station (ft)

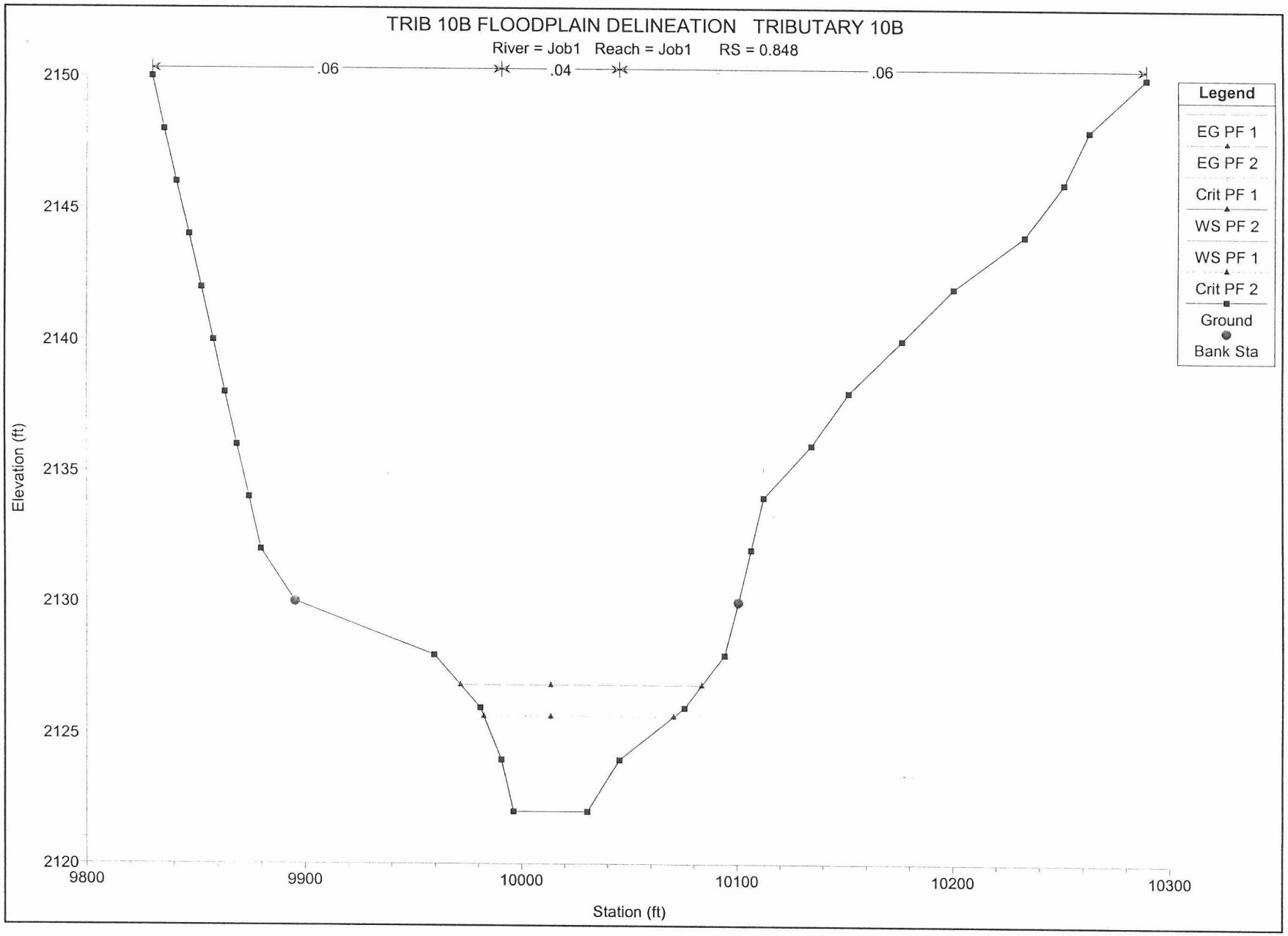

TRIB 10B FLOODPLAIN DELINEATION TRIBUTARY 10B
River = Job1 Reach = Job1 RS = 1.191
.06
.04
.06
Legend
EG PF 1
EG PF 2
WS PF 2
WS PF 1
Crit PF 1
Crit PF 2
Ground
Bank Sta
Elevation (ft)
2190
2185
2180
2175
2170
2165
2160
2155
2150
9800
9900
10000
10100
10200
10300
Station (ft)

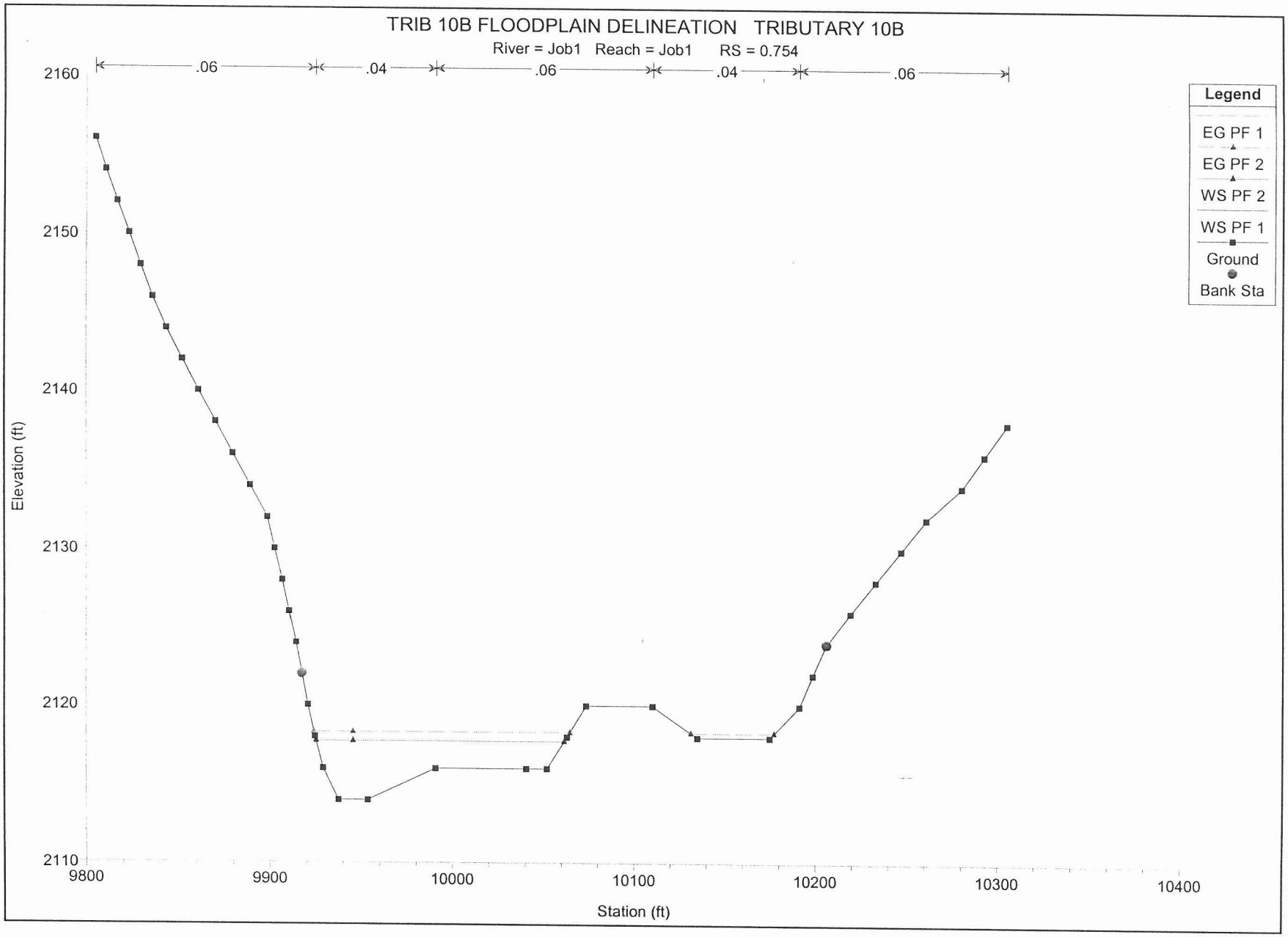

TRIB 10B FLOODPLAIN DELINEATION TRIBUTARY 10B
River = Job1 Reach = Job1 RS = 1.134
.06
.04
.06
Legend
EG PF 1
EG PF 2
Crit PF 1
WS PF 2
WS PF 1
Crit PF 2
Ground
Bank Sta
Elevation (ft)
2210
2200
2190
2180
2170
2160
2150
2140
9900
10000
10100
10200
10300
10400
Station (ft)

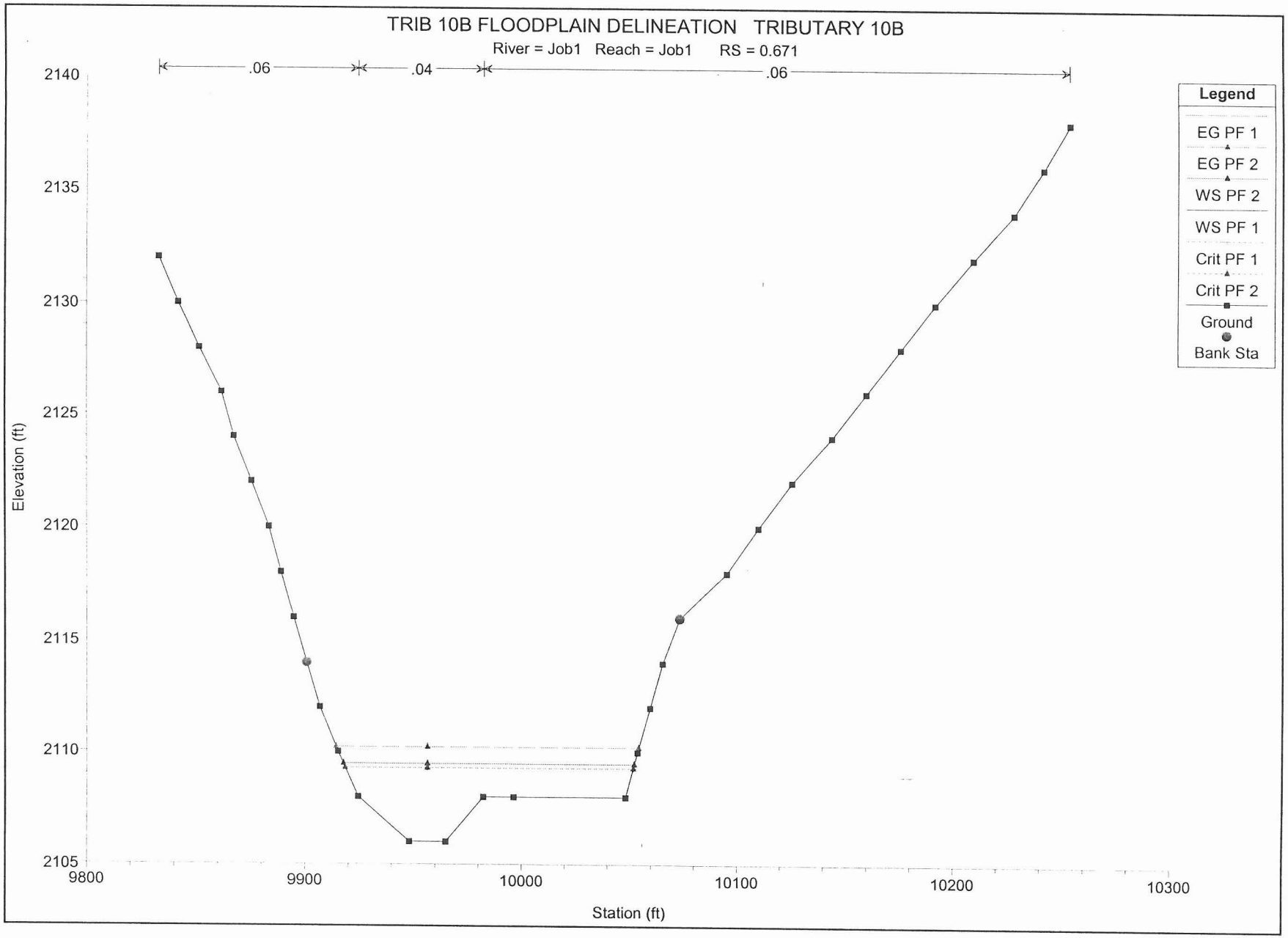

TRIB 10B FLOODPLAIN DELINEATION TRIBUTARY 10B
River = Job1 Reach = Job1 RS = 1.098
.06
.04
.06
Legend
EG PF 1
EG PF 2
WS PF 2
WS PF 1
Ground
Bank Sta
Elevation (ft)
2200
2190
2180
2170
2160
2150
2140
9800
9900
10000
10100
10200
10300
10400
Station (ft)

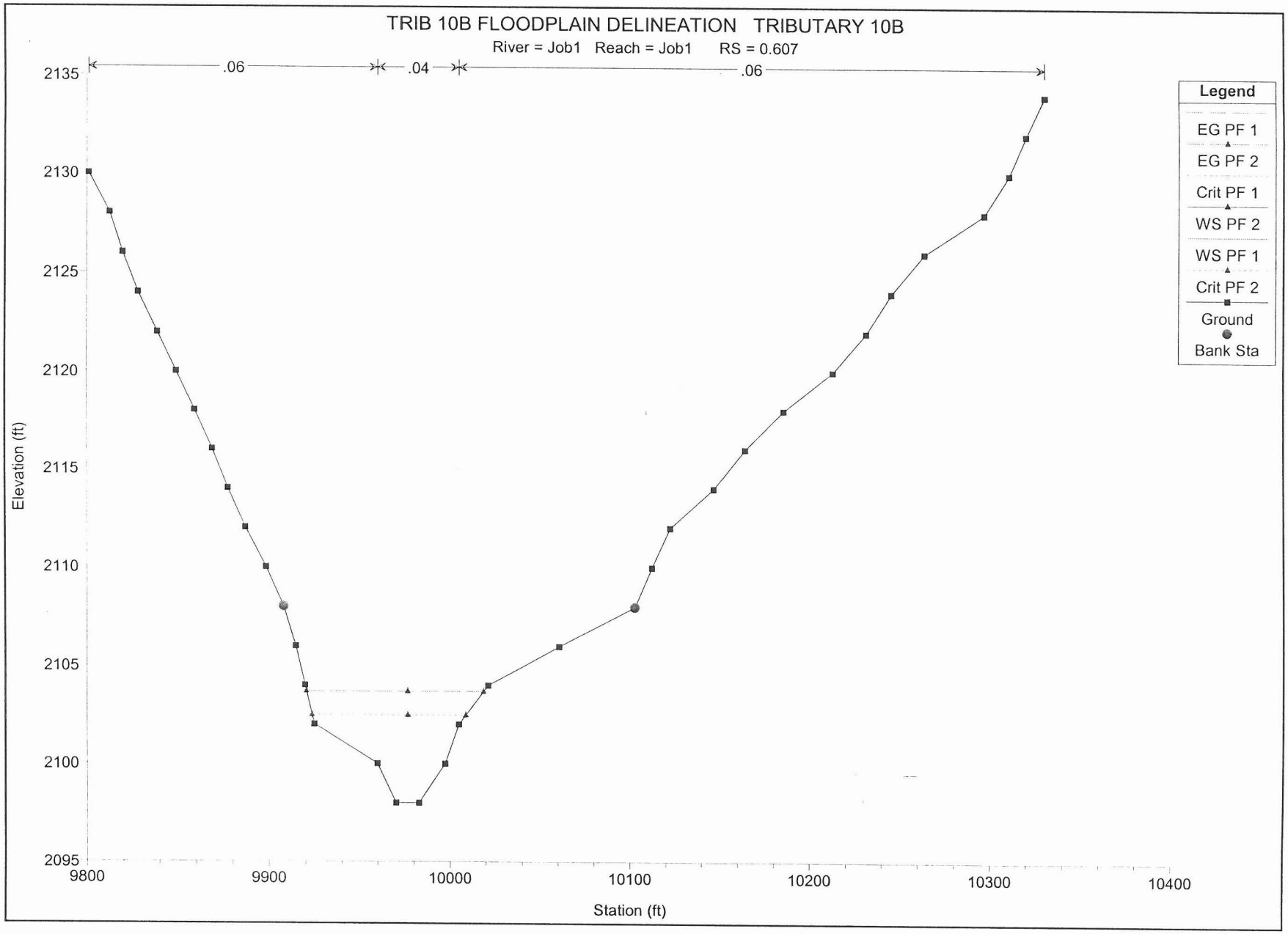

TRIB 10B FLOODPLAIN DELINEATION TRIBUTARY 10B
River = Job1 Reach = Job1 RS = 1.034
.06
.04
.06
Legend
EG PF 1
EG PF 2
WS PF 2
WS PF 1
Crit PF 1
Crit PF 2
Ground
Bank Sta
Elevation (ft)
2220
2200
2180
2160
2140
2120
9800
9900
10000
10100
10200
10300
10400
10500
Station (ft)

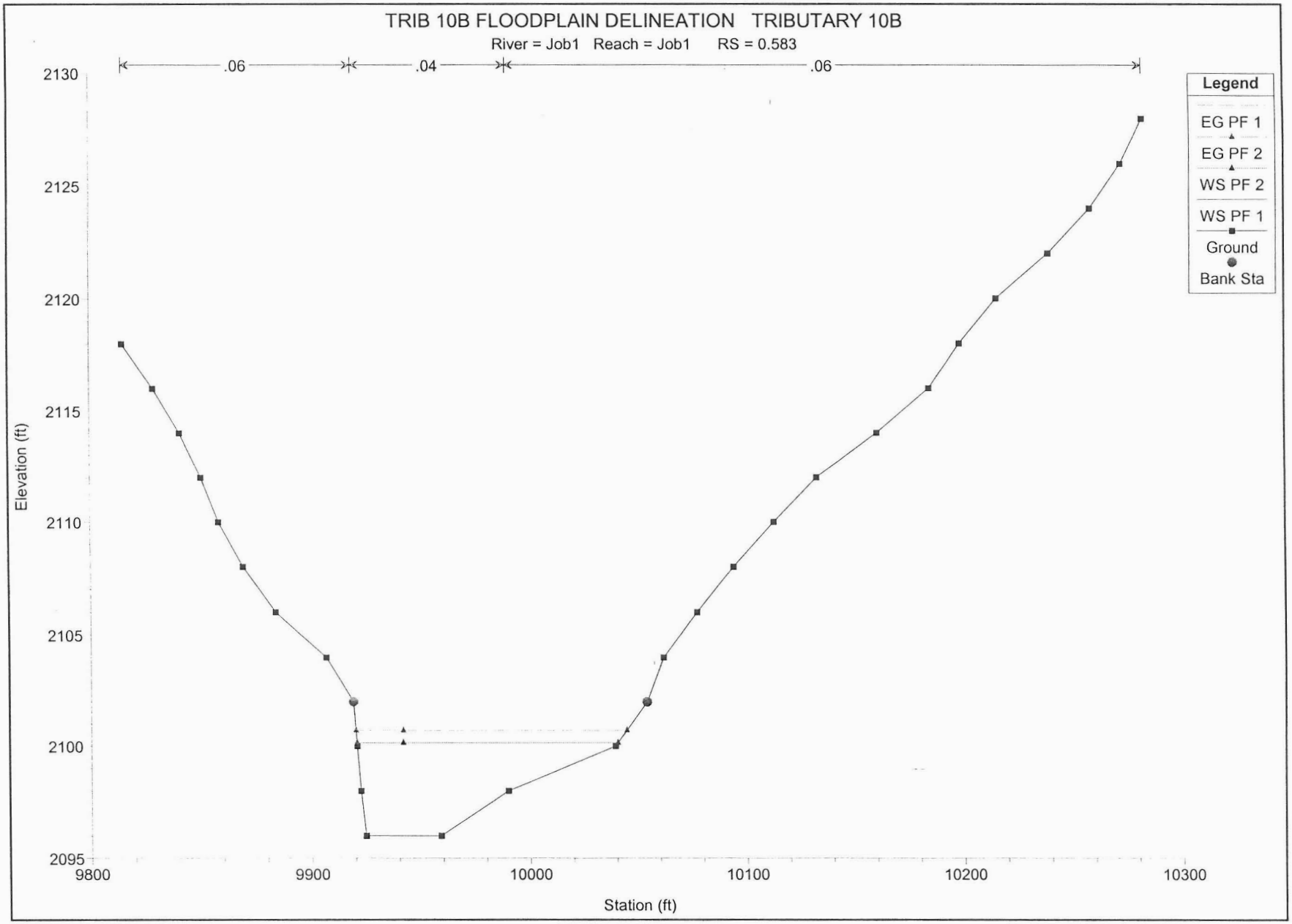

TRIB 10B FLOODPLAIN DELINEATION TRIBUTARY 10B
River = Job1 Reach = Job1 RS = 0.943
.06
.04
.06
Legend
EG PF 1
EG PF 2
Crit PF 1
WS PF 2
WS PF 1
Crit PF 2
Ground
Bank Sta
Elevation (ft)
2190
2180
2170
2160
2150
2140
2130
2120
9800
9900
10000
10100
10200
10300
Station (ft)

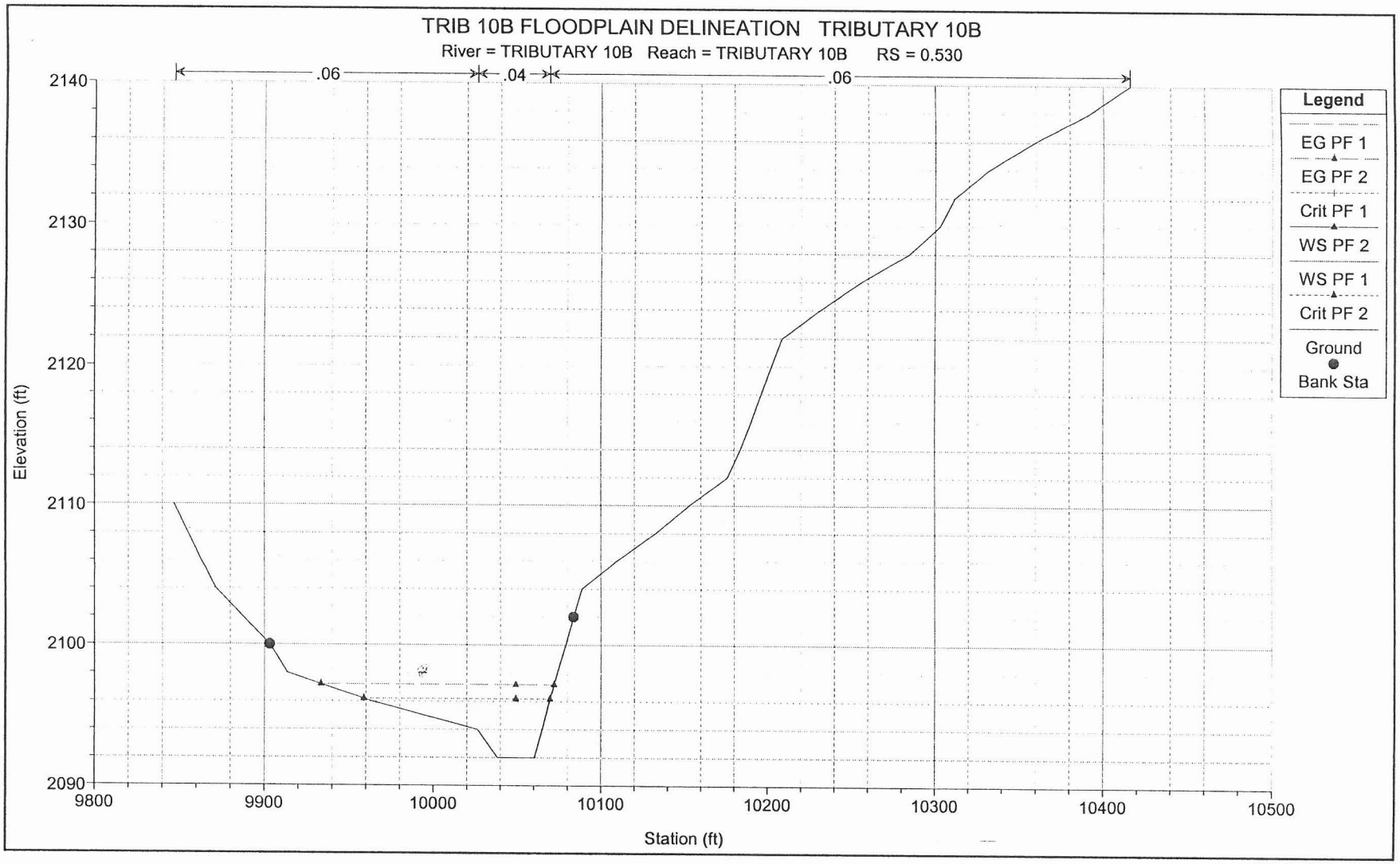

TRIB 10B FLOODPLAIN DELINEATION TRIBUTARY 10B
River = Job1 Reach = Job1 RS = 0.848
.06
.04
.06
Legend
EG PF 1
EG PF 2
Crit PF 1
WS PF 2
WS PF 1
Crit PF 2
Ground
Bank Sta
Elevation (ft)
2150
2145
2140
2135
2130
2125
2120
9800
9900
10000
10100
10200
10300
Station (ft)

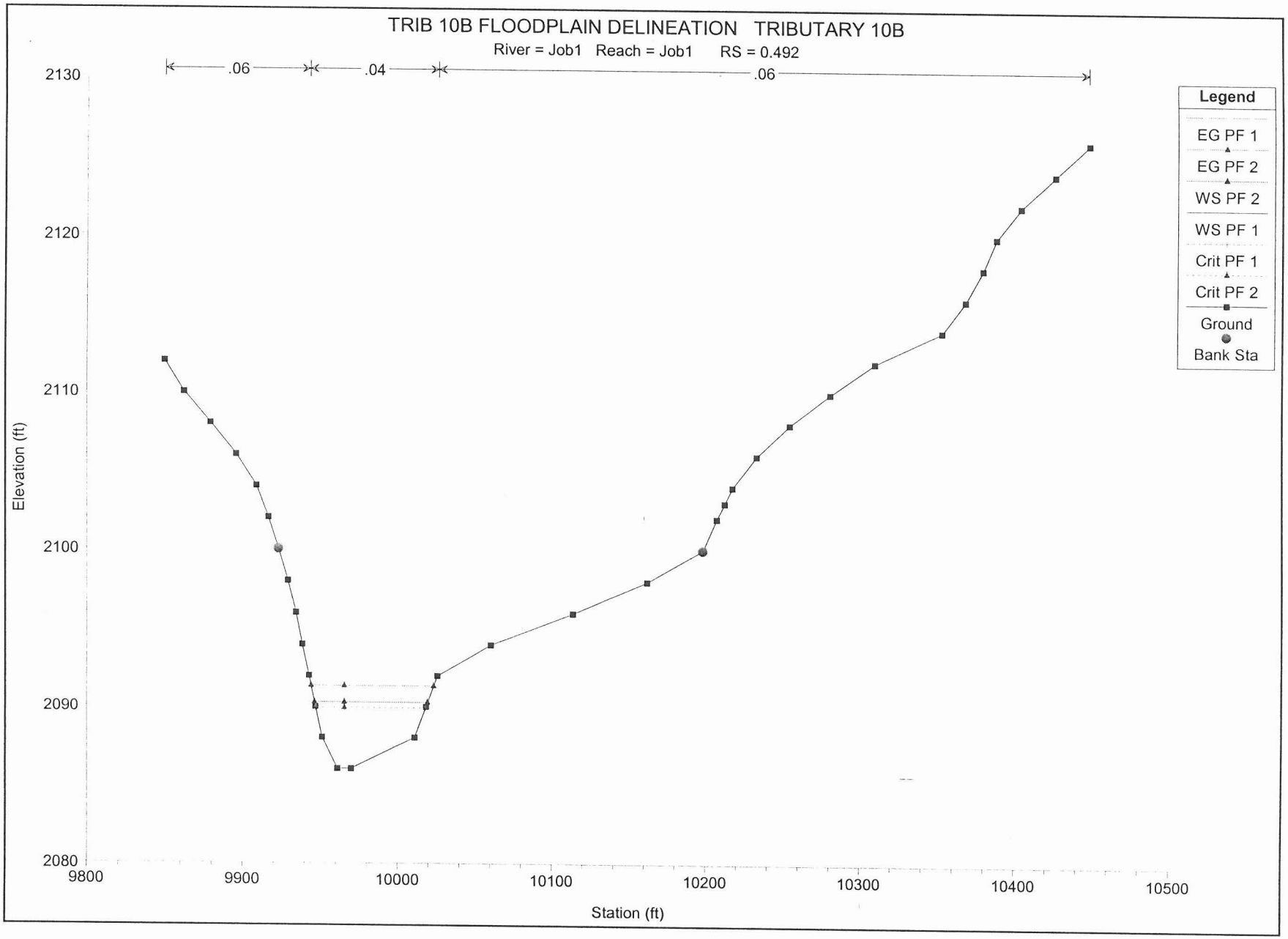

TRIB 10B FLOODPLAIN DELINEATION TRIBUTARY 10B
River = Job1 Reach = Job1 RS = 0.754
.06
.04
.06
.04
.06
Legend
EG PF 1
EG PF 2
WS PF 2
WS PF 1
Ground
Bank Sta
Elevation (ft)
2160
2150
2140
2130
2120
2110
9800
9900
10000
10100
10200
10300
10400
Station (ft)

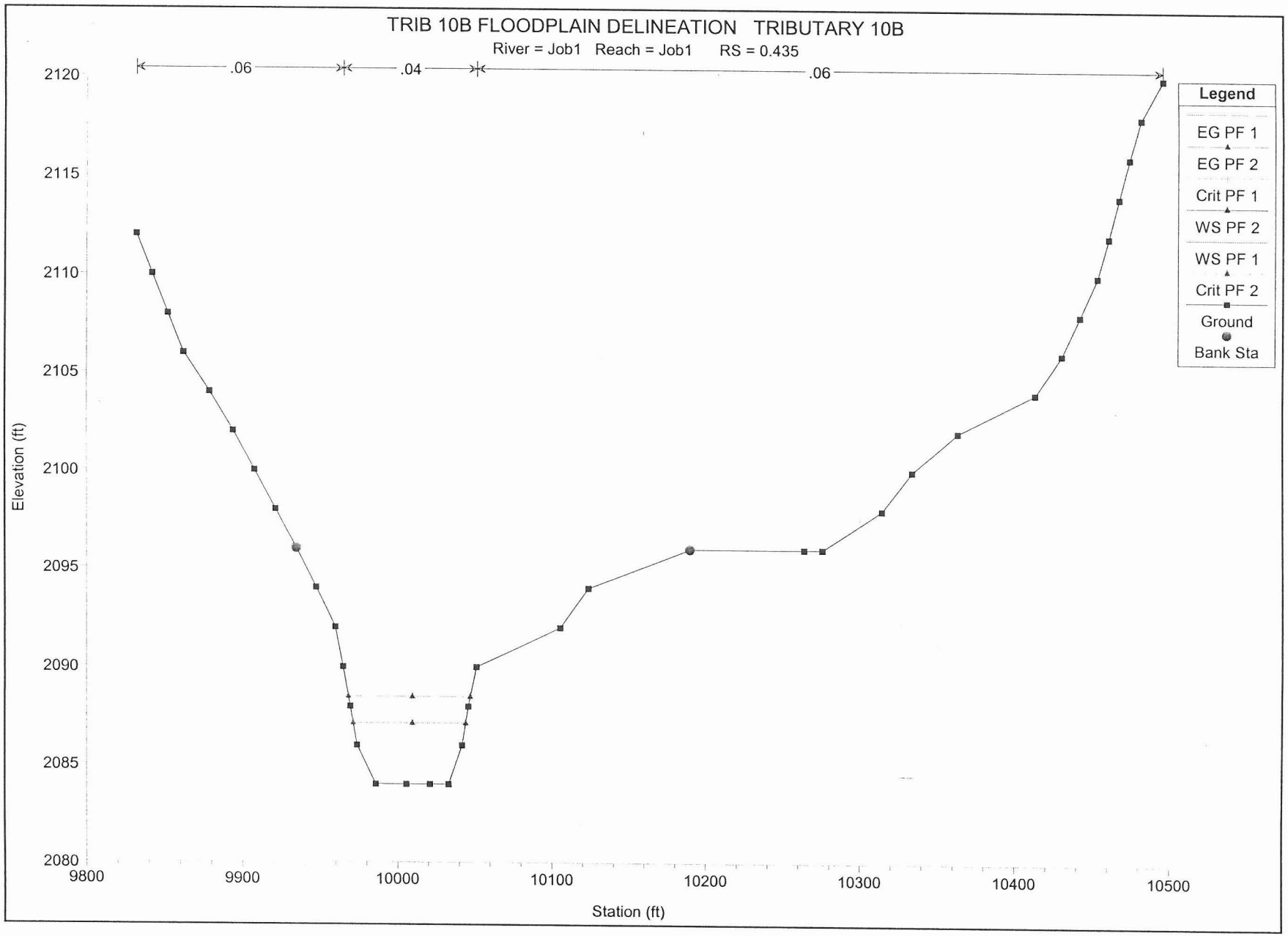

TRIB 10B FLOODPLAIN DELINEATION TRIBUTARY 10B
River = Job1 Reach = Job1 RS = 0.671
.06
.04
.06
Legend
EG PF 1
EG PF 2
WS PF 2
WS PF 1
Crit PF 1
Crit PF 2
Ground
Bank Sta
Elevation (ft)
2140
2135
2130
2125
2120
2115
2110
2105
9800
9900
10000
10100
10200
10300
Station (ft)

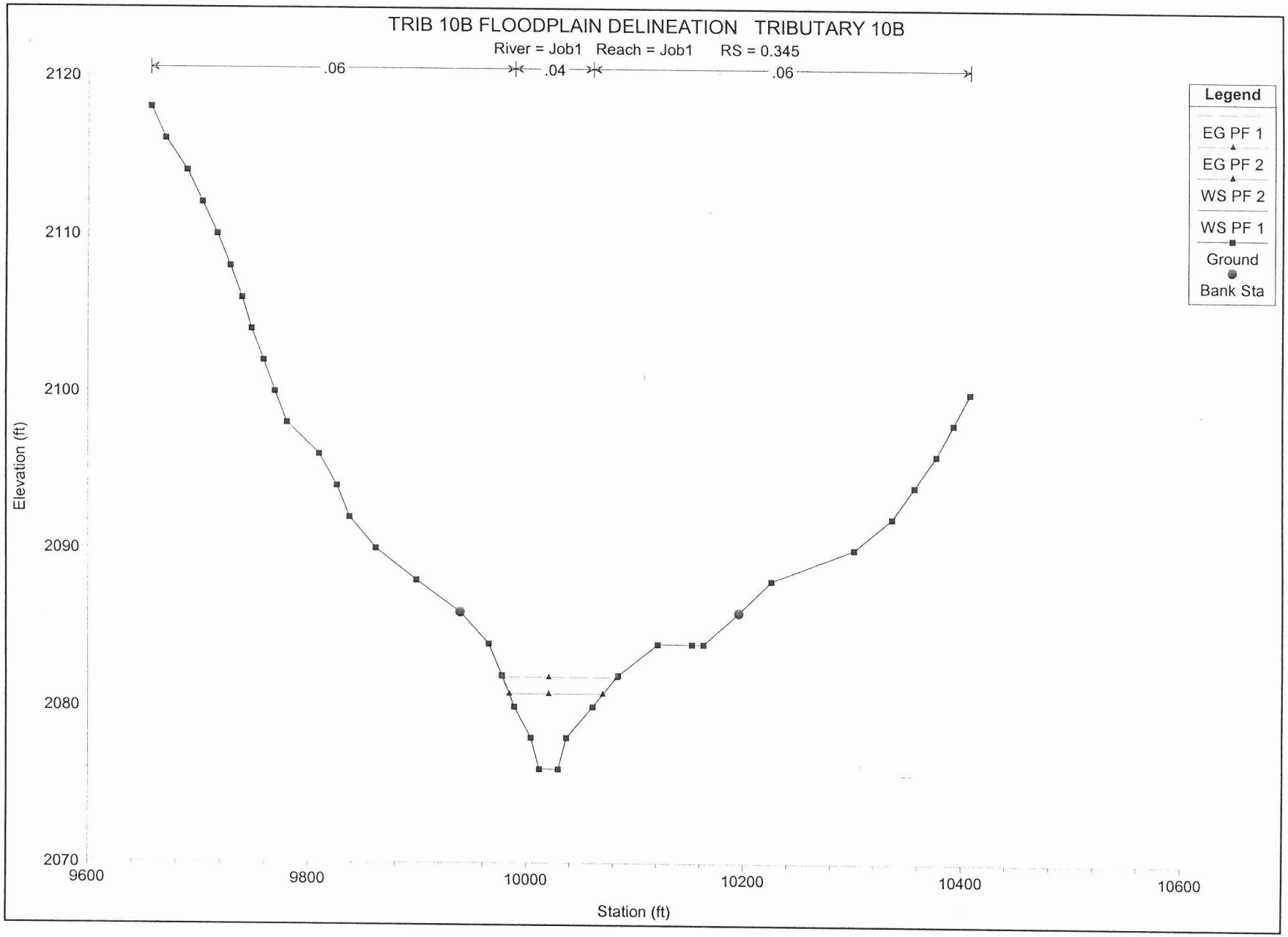

TRIB 10B FLOODPLAIN DELINEATION TRIBUTARY 10B
River = Job1 Reach = Job1 RS = 0.607
.06
.04
.06
Legend
EG PF 1
EG PF 2
Crit PF 1
WS PF 2
WS PF 1
Crit PF 2
Ground
Bank Sta
Elevation (ft)
2135
2130
2125
2120
2115
2110
2105
2100
2095
9800
9900
10000
10100
10200
10300
10400
Station (ft)

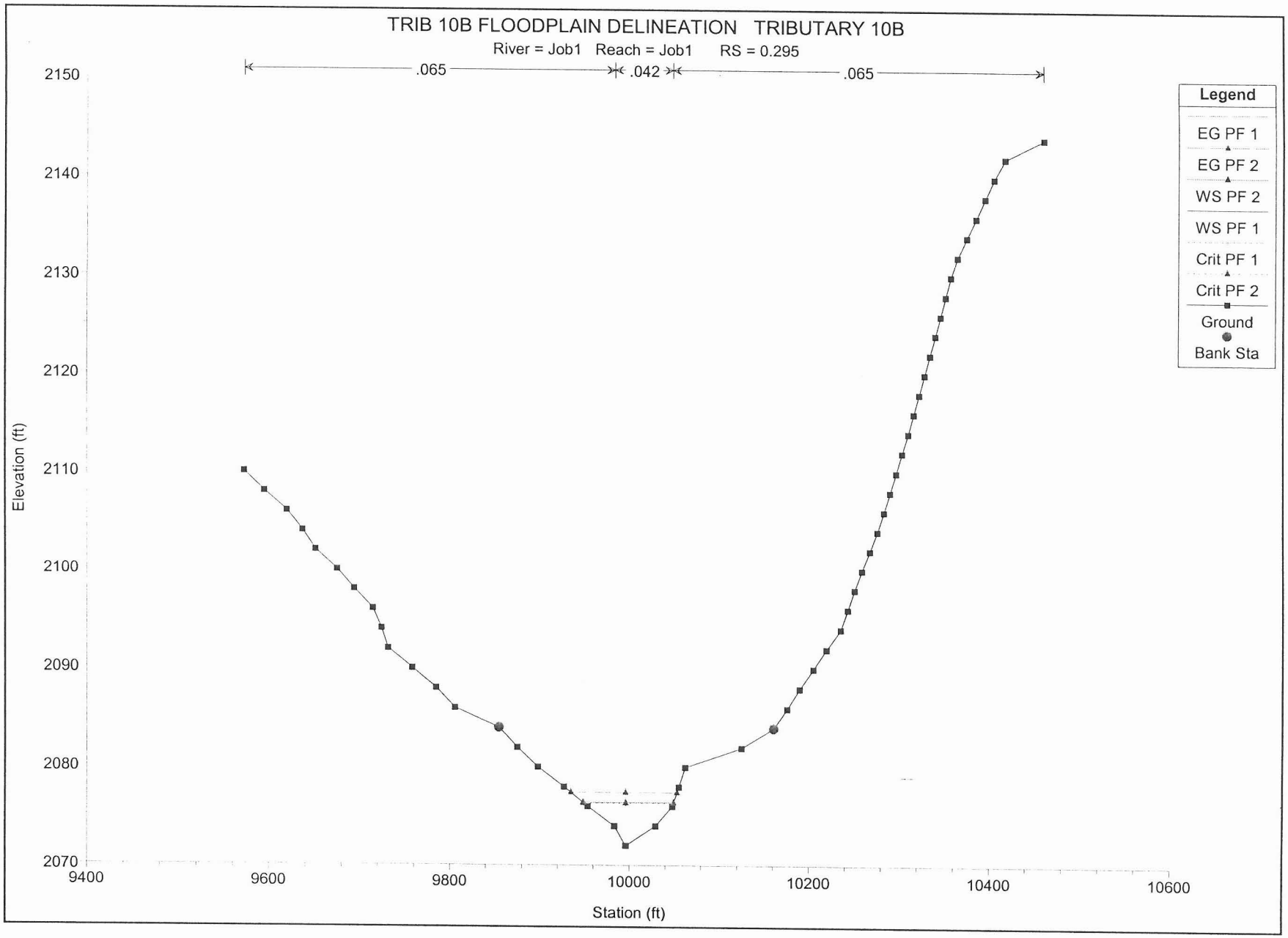

TRIB 10B FLOODPLAIN DELINEATION TRIBUTARY 10B
River = Job1 Reach = Job1 RS = 0.583
.06
.04
.06
Legend
EG PF 1
EG PF 2
WS PF 2
WS PF 1
Ground
Bank Sta
Elevation (ft)
2130
2125
2120
2115
2110
2105
2100
2095
9800
9900
10000
10100
10200
10300
Station (ft)

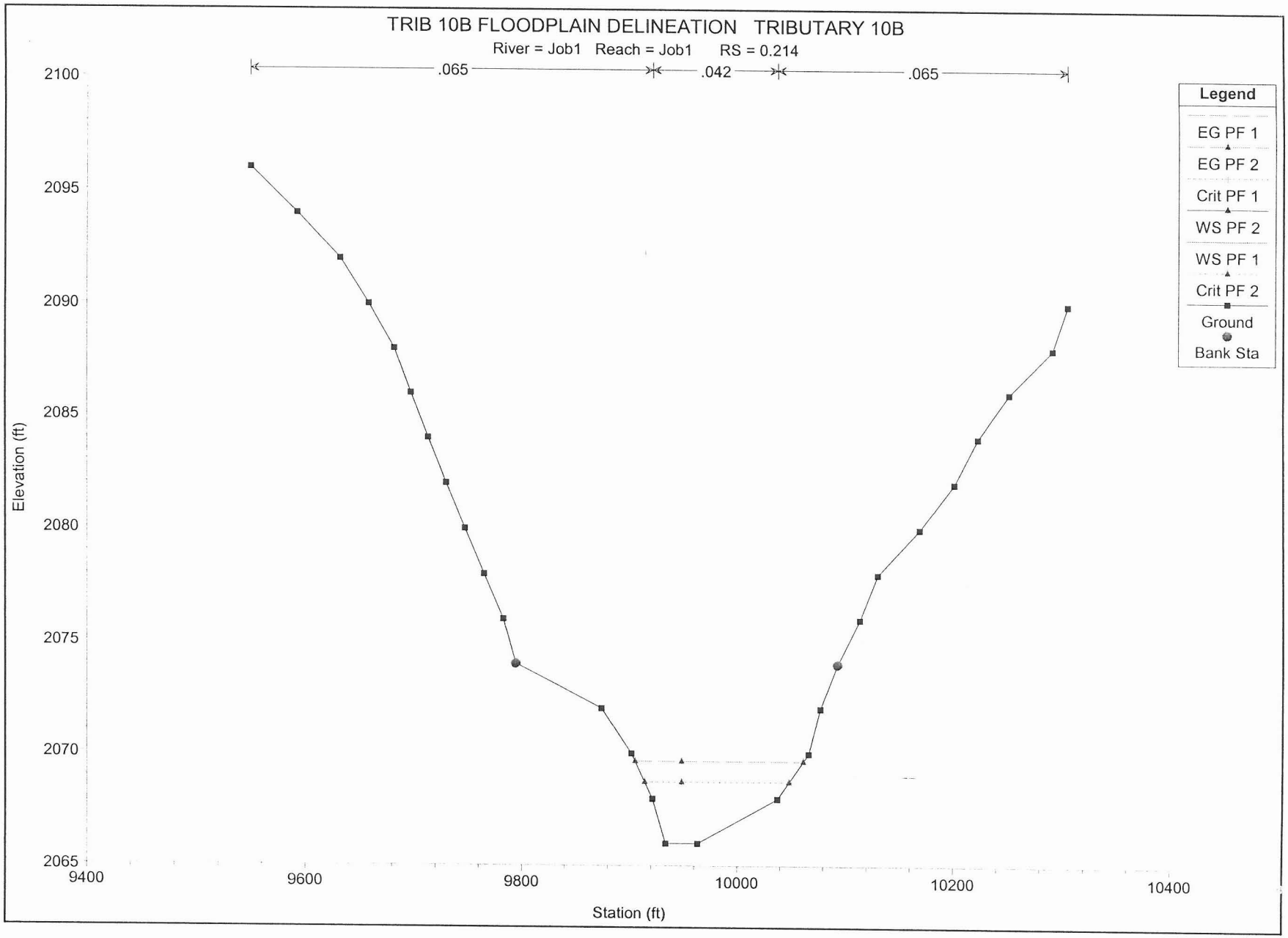

TRIB 10B FLOODPLAIN DELINEATION TRIBUTARY 10B
River = TRIBUTARY 10B Reach = TRIBUTARY 10B RS = 0.530
.06
.04
.06
Legend
EG PF 1
EG PF 2
Crit PF 1
WS PF 2
WS PF 1
Crit PF 2
Ground
Bank Sta
Elevation (ft)
2140
2130
2120
2110
2100
2090
9800
9900
10000
10100
10200
10300
10400
10500
Station (ft)

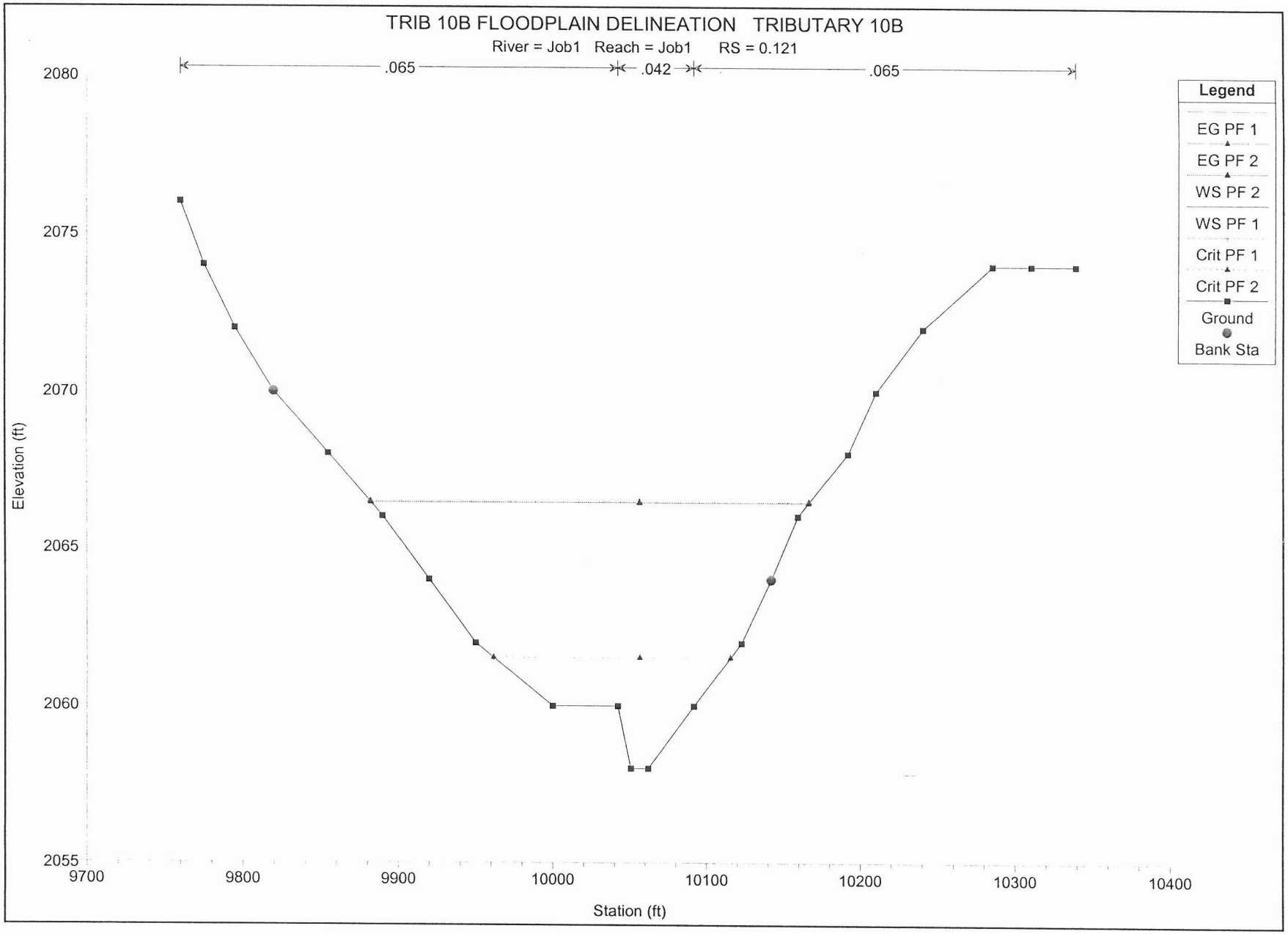

TRIB 10B FLOODPLAIN DELINEATION TRIBUTARY 10B
River = Job1 Reach = Job1 RS = 0.492
.06
.04
.06
Legend
EG PF 1
EG PF 2
WS PF 2
WS PF 1
Crit PF 1
Crit PF 2
Ground
Bank Sta
Elevation (ft)
2130
2120
2110
2100
2090
2080
9800
9900
10000
10100
10200
10300
10400
10500
Station (ft)

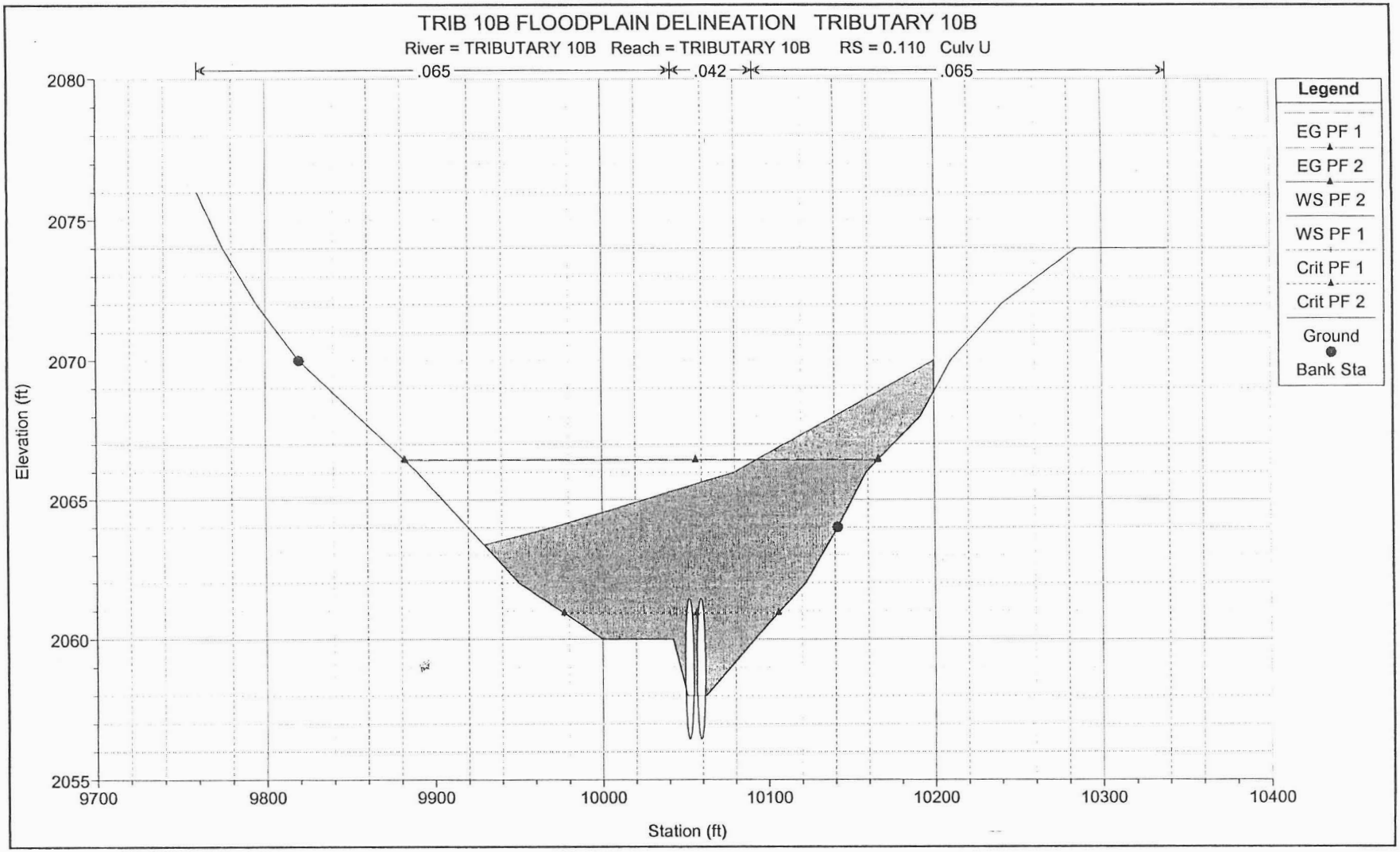

TRIB 10B FLOODPLAIN DELINEATION TRIBUTARY 10B
River = Job1 Reach = Job1 RS = 0.435
.06
.04
.06
Legend
EG PF 1
EG PF 2
Crit PF 1
WS PF 2
WS PF 1
Crit PF 2
Ground
Bank Sta
Elevation (ft)
2120
2115
2110
2105
2100
2095
2090
2085
2080
9800
9900
10000
10100
10200
10300
10400
10500
Station (ft)

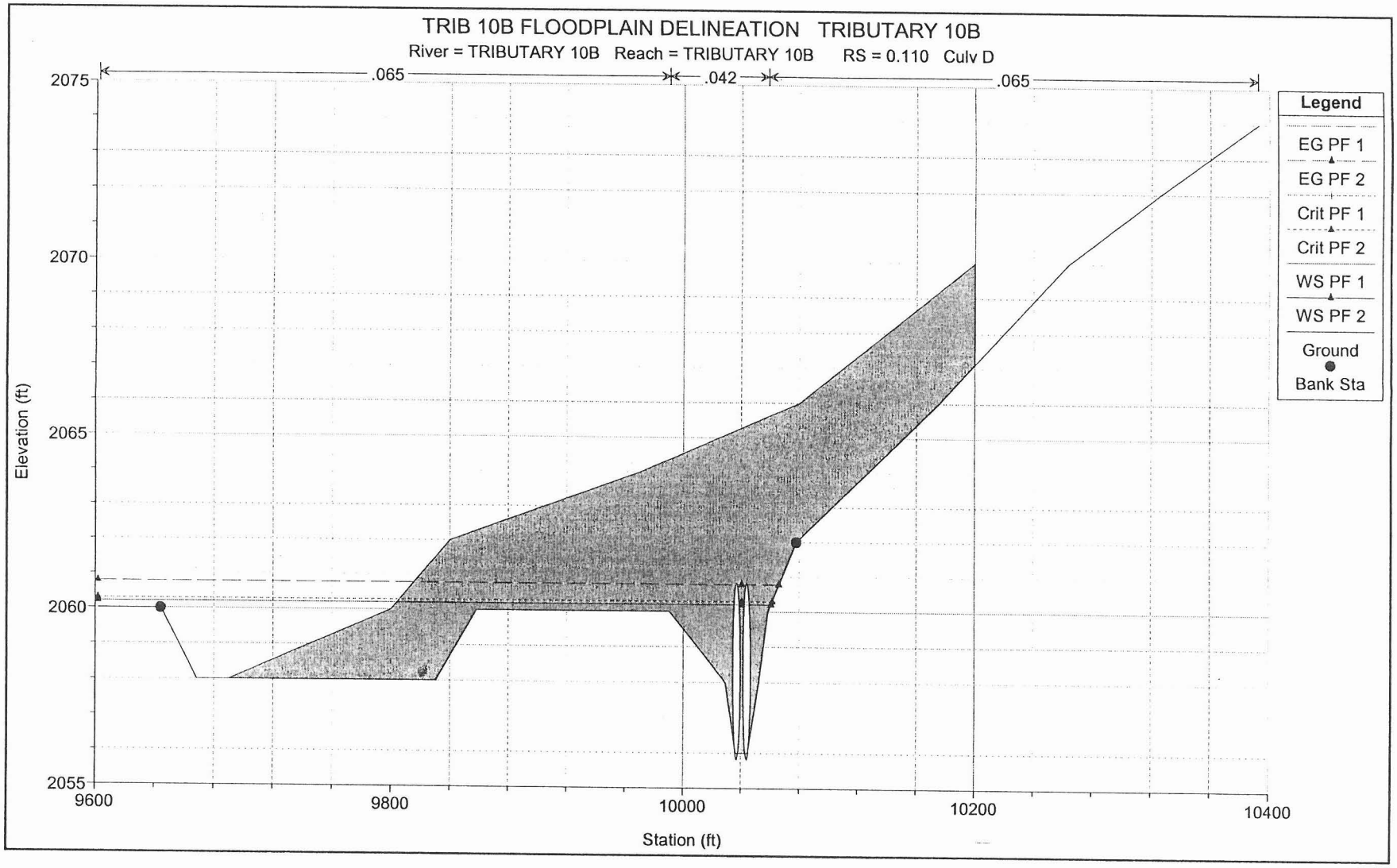

TRIB 10B FLOODPLAIN DELINEATION TRIBUTARY 10B
River = Job1 Reach = Job1 RS = 0.345
.06
.04
.06
Legend
EG PF 1
EG PF 2
WS PF 2
WS PF 1
Ground
Bank Sta
Elevation (ft)
2120
2110
2100
2090
2080
2070
9600
9800
10000
10200
10400
10600
Station (ft)

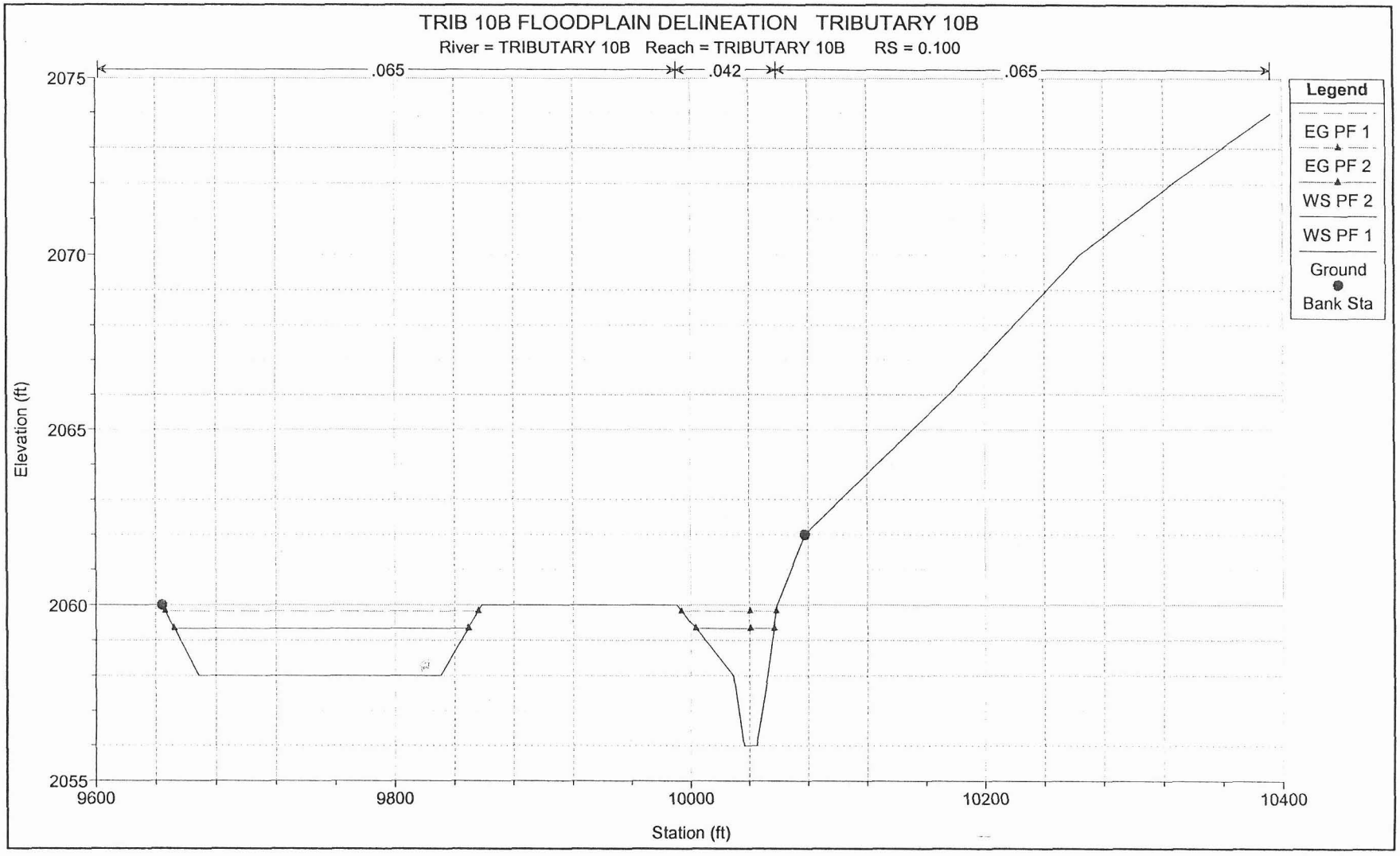

TRIB 10B FLOODPLAIN DELINEATION TRIBUTARY 10B
River = Job1 Reach = Job1 RS = 0.295
.065
.042
.065
Legend
EG PF 1
EG PF 2
WS PF 2
WS PF 1
Crit PF 1
Crit PF 2
Ground
Bank Sta
Elevation (ft)
2150
2140
2130
2120
2110
2100
2090
2080
2070
9400
9600
9800
10000
10200
10400
10600
Station (ft)

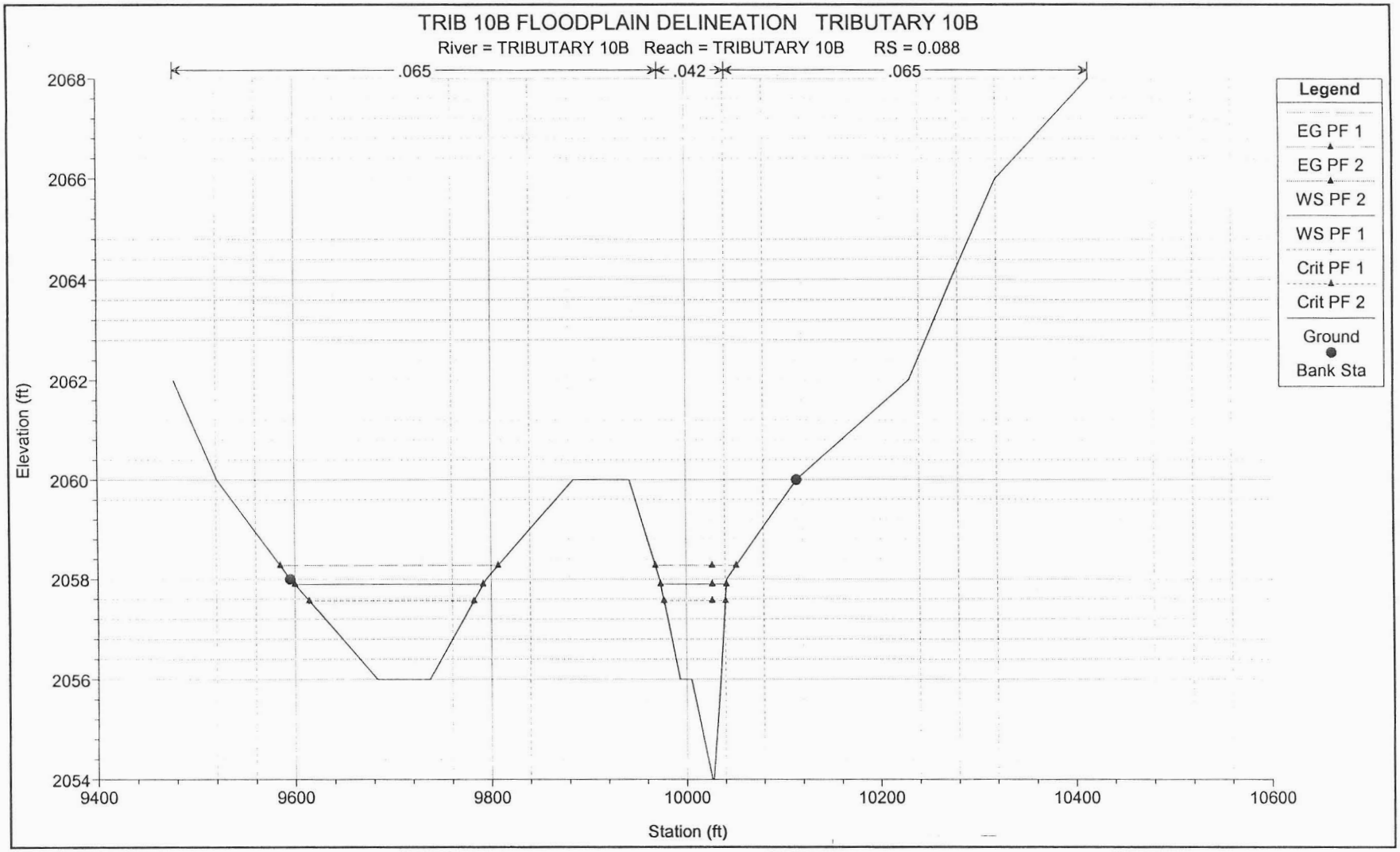

TRIB 10B FLOODPLAIN DELINEATION TRIBUTARY 10B
River = Job1 Reach = Job1 RS = 0.214
.065
.042
.065
Legend
EG PF 1
EG PF 2
Crit PF 1
WS PF 2
WS PF 1
Crit PF 2
Ground
Bank Sta
Elevation (ft)
2100
2095
2090
2085
2080
2075
2070
2065
9400
9600
9800
10000
10200
10400
Station (ft)


TRIB 10B FLOODPLAIN DELINEATION TRIBUTARY 10B
River = Job1 Reach = Job1 RS = 0.121
.065
.042
.065
Legend
EG PF 1
EG PF 2
WS PF 2
WS PF 1
Crit PF 1
Crit PF 2
Ground
Bank Sta
Elevation (ft)
2080
2075
2070
2065
2060
2055
9700
9800
9900
10000
10100
10200
10300
10400
Station (ft)


TRIB 10B FLOODPLAIN DELINEATION TRIBUTARY 10B
River = TRIBUTARY 10B Reach = TRIBUTARY 10B RS = 0.110 Culv U
.065
.042
.065
Legend
EG PF 1
EG PF 2
WS PF 2
WS PF 1
Crit PF 1
Crit PF 2
Ground
Bank Sta
Elevation (ft)
2080
2075
2070
2065
2060
2055
9700
9800
9900
10000
10100
10200
10300
10400
Station (ft)


TRIB 10B FLOODPLAIN DELINEATION TRIBUTARY 10B
River = TRIBUTARY 10B Reach = TRIBUTARY 10B RS = 0.110 Culv D
.065
.042
.065
Legend
EG PF 1
EG PF 2
Crit PF 1
Crit PF 2
WS PF 1
WS PF 2
Ground
Bank Sta
Elevation (ft)
2075
2070
2065
2060
2055
9600
9800
10000
10200
10400
Station (ft)


TRIB 10B FLOODPLAIN DELINEATION TRIBUTARY 10B
River = TRIBUTARY 10B Reach = TRIBUTARY 10B RS = 0.100
.065
.042
.065
Legend
EG PF 1
EG PF 2
WS PF 2
WS PF 1
Ground
Bank Sta
Elevation (ft)
2075
2070
2065
2060
2055
9600
9800
10000
10200
10400
Station (ft)


TRIB 10B FLOODPLAIN DELINEATION TRIBUTARY 10B
River = TRIBUTARY 10B Reach = TRIBUTARY 10B RS = 0.088
.065
.042
.065
Legend
EG PF 1
EG PF 2
WS PF 2
WS PF 1
Crit PF 1
Crit PF 2
Ground
Bank Sta
Elevation (ft)
2068
2066
2064
2062
2060
2058
2056
2054
9400
9600
9800
10000
10200
10400
10600
Station (ft)

HEC-RAS September 1998 Version 2.2
U.S. Army Corp of Engineers
Hydrologic Engineering Center
609 Second Street, Suite D
Davis, California 95616-4687
(916) 756-1104

```
X     X  XXXXXX    XXXX        XXXX       XX      XXXX
X     X  X        X    X       X   X     X  X    X
X     X  X        X            X   X    X    X   X
XXXXXXX  XXXX     X       XXX  XXXX     XXXXXX    XXXX
X     X  X        X            X  X     X    X        X
X     X  X        X    X       X   X    X    X        X
X     X  XXXXXX    XXXX        X    X   X    X   XXXXX
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PROJECT DATA
Project Title: NEW TRIB 10A FLOODPLAIN DELINEATION
Project File : T_10A.prj
Run Date and Time: 9/6/2000 9:29:15 AM

Project in English units

Project Description:
TRIBUTARY 10A

PLAN DATA

Plan Title: Two Profiles
Plan File : y:\Mc-18\RAS FCD Disk\HEC-RAS\T_10A\T_10A.p02

Geometry Title: Base Conditions Geometry
Geometry File : y:\Mc-18\RAS FCD Disk\HEC-RAS\T_10A\T_10A.G01

Flow Title : 2 Flow Profiles
Flow File : y:\Mc-18\RAS FCD Disk\HEC-RAS\T_10A\T_10A.F01

Plan Summary Information:
Number of: Cross Sections = 17 Mulitple Openings = 0
Culverts = 1 Inline Weirs = 0
Bridges = 0

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

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

FLOW DATA

Flow Title: 2 Flow Profiles
Flow File : y:\Mc-18\RAS FCD Disk\HEC-RAS\T_10A\T_10A.F01

Flow Data (cfs)

River	Reach	RS	PF 1	PF 2
Tributary 10A	Tributary 10A	1.107	978	978

T_10a

Tributary 10A	Tributary 10A	0.505	1778	1778

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
Tributary 10A	Tributary 10A	PF 1		Normal S = .02
Tributary 10A	Tributary 10A	PF 2		Normal S = .02

GEOMETRY DATA

Geometry Title: Base Conditions Geometry
Geometry File : y:\Mc-18\RAS FCD Disk\HEC-RAS\T_10A\T_10A.G01

CROSS SECTION RIVER: Tributary 10A
REACH: Tributary 10A RS: 1.107

INPUT
Description:
Station Elevation Data num= 22

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9786	2172	9819.82	2170	9851.22	2168	9863.23	2166	9900.99	2164
9936.3	2162	9960.97	2160	9985.67	215810003.06		215810018.84		2160
10033.87	216210051.32		2164	10085.4	2166	10106.8	216810121.55		2170
10140.88	217210157.19		217410188.23		217610218.45		217810245.21		2178
10274.79	217810302.32		2180						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9786	.06	9960.97	.04	510033.87	.06

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
9900.9	9910051.32	493.75	471.99 463.91	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2161.71	Element			
Vel Head (ft)	0.89	Wt. n-Val.		0.045	
W.S. Elev (ft)	2160.82	Reach Len. (ft)	493.75	471.99	463.91
Crit W.S. (ft)	2160.82	Flow Area (sq ft)		129.25	—
E.G. Slope (ft/ft)	0.022659	Area (sq ft)		129.25	
Q Total (cfs)	978.00	Flow (cfs)		978.00	
Top Width (ft)	74.11	Top Width (ft)		74.11	
Vel Total (ft/s)	7.57	Avg. Vel. (ft/s)		7.57	
Max Chl Dpth (ft)	2.82	Hydr. Depth (ft)		1.74	
Conv. Total (cfs)	6497.0	Conv. (cfs)		6497.0	
Length Wtd. (ft)	471.99	Wetted Per. (ft)		74.40	
Min Ch El (ft)	2158.00	Shear (lb/sq ft)		2.46	
Alpha	1.00	Stream Power (lb/ft s)		18.59	
Frctn Loss (ft)	11.41	Cum Volume (acre-ft)	1.54	32.97	1.95
C & E Loss (ft)	0.10	Cum SA (acres)	1.60	16.78	3.81

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

CROSS SECTION OUTPUT Profile #PF 2

			Left OB	Channel	Right OB
E.G. Elev (ft)	2161.71	Element			
Vel Head (ft)	0.89	Wt. n-Val.		0.045	
W.S. Elev (ft)	2160.82	Reach Len. (ft)	493.75	471.99	463.91
Crit W.S. (ft)	2160.82	Flow Area (sq ft)		129.25	
E.G. Slope (ft/ft)	0.022659	Area (sq ft)		129.25	
Q Total (cfs)	978.00	Flow (cfs)		978.00	
Top Width (ft)	74.11	Top Width (ft)		74.11	

Vel Total (ft/s)	7.57	Avg. Vel. (ft/s)		7.57	
Max Chl Dpth (ft)	2.82	Hydr. Depth (ft)		1.74	
Conv. Total (cfs)	6497.0	Conv. (cfs)		6497.0	
Length Wtd. (ft)	471.99	Wetted Per. (ft)		74.40	
Min Ch El (ft)	2158.00	Shear (lb/sq ft)		2.46	
Alpha	1.00	Stream Power (lb/ft s)		18.59	
Frctn Loss (ft)	11.41	Cum Volume (acre-ft)	1.54	32.97	1.95
C & E Loss (ft)	0.10	Cum SA (acres)	1.60	16.78	3.81

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

FLOW DISTRIBUTION OUTPUT Profile #PF 1

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9900.99	9951.10	0.00	0.00	0.22	0.00	0.01	0.16
9951.10	10001.21	742.46	92.83	50.22	75.92	1.85	8.00
10001.21	RB 10051.32	235.54	36.42	23.96	24.08	1.53	6.47

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 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.

FLOW DISTRIBUTION OUTPUT Profile #PF 2

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9900.99	9951.10	0.00	0.00	0.22	0.00	0.01	0.16
9951.10	10001.21	742.46	92.83	50.22	75.92	1.85	8.00
10001.21	RB 10051.32	235.54	36.42	23.96	24.08	1.53	6.47

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 energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION RIVER: Tributary 10A
REACH: Tributary 10A RS: 1.016

INPUT
Description:
Station Elevation Data num= 13

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9797	2154	9806.7	2154	9878.77	2152	9907.58	2150	9983.88	2148
10100.77	2146	10101.97	2146	10116.46	2148	10211.53	2150	10257.12	2152
10288.97	2154	10338.54	2156	10340.59	2156				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9797	.06	9983.88	.045	10116.46	.06

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
9907.58	10211.53	445.07	442.99	469	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2148.77	Element	Left OB	Channel	Right OB	
Vel Head (ft)	0.56	Wt. n-Val.		0.045		

T_10a

W.S. Elev (ft)	2148.21	Reach Len. (ft)	445.07	442.99	469.00
Crit W.S. (ft)	2148.21	Flow Area (sq ft)		163.25	
E.G. Slope (ft/ft)	0.025865	Area (sq ft)		163.25	
Q Total (cfs)	978.00	Flow (cfs)		978.00	
Top Width (ft)	150.42	Top Width (ft)		150.42	
Vel Total (ft/s)	5.99	Avg. Vel. (ft/s)		5.99	
Max Chl Dpth (ft)	2.21	Hydr. Depth (ft)		1.09	
Conv. Total (cfs)	6081.1	Conv. (cfs)		6081.1	
Length Wtd. (ft)	442.99	Wetted Per. (ft)		150.58	
Min Ch El (ft)	2146.00	Shear (lb/sq ft)		1.75	
Alpha	1.00	Stream Power (lb/ft s)		10.49	
Frctn Loss (ft)	9.83	Cum Volume (acre-ft)	1.54	31.38	1.95
C & E Loss (ft)	0.00	Cum SA (acres)	1.60	15.56	3.81

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

CROSS SECTION OUTPUT Profile #PF 2

E.G. Elev (ft)	2148.77	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.56	Wt. n-Val.		0.045	
W.S. Elev (ft)	2148.21	Reach Len. (ft)	445.07	442.99	469.00
Crit W.S. (ft)	2148.21	Flow Area (sq ft)		163.25	
E.G. Slope (ft/ft)	0.025865	Area (sq ft)		163.25	
Q Total (cfs)	978.00	Flow (cfs)		978.00	
Top Width (ft)	150.42	Top Width (ft)		150.42	
Vel Total (ft/s)	5.99	Avg. Vel. (ft/s)		5.99	
Max Chl Dpth (ft)	2.21	Hydr. Depth (ft)		1.09	
Conv. Total (cfs)	6081.1	Conv. (cfs)		6081.1	
Length Wtd. (ft)	442.99	Wetted Per. (ft)		150.58	
Min Ch El (ft)	2146.00	Shear (lb/sq ft)		1.75	
Alpha	1.00	Stream Power (lb/ft s)		10.49	
Frctn Loss (ft)	9.83	Cum Volume (acre-ft)	1.54	31.38	1.95
C & E Loss (ft)	0.00	Cum SA (acres)	1.60	15.56	3.81

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

FLOW DISTRIBUTION OUTPUT Profile #PF 1

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9907.58	10008.90	30.17	11.39	32.97	3.09	0.35	2.65
10008.90	10110.21	932.37	146.83	101.41	95.33	1.45	6.35
10110.21	RB 10211.53	15.46	5.02	16.21	1.58	0.31	3.08

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 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.

FLOW DISTRIBUTION OUTPUT Profile #PF 2

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9907.58	10008.90	30.17	11.39	32.97	3.09	0.35	2.65
10008.90	10110.21	932.37	146.83	101.41	95.33	1.45	6.35
10110.21	RB 10211.53	15.46	5.02	16.21	1.58	0.31	3.08

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 energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION RIVER: Tributary 10A
REACH: Tributary 10A RS: 0.931

INPUT
Description:
Station Elevation Data num= 17

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9813	2142	9854.02	2140	9881.59	2138	9918.69	2136	9951.57	2134
9993.43	2132	10000.2	213	10000.89	213	10015.11	213	10030.03	2134
10042.72	213	10072.16	213	10134.09	213	10155.32	213	10180.15	2140
10203.19	214	10227.31	2144						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9813	.06	9993.43	.045	10030.03	.06

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
9918.69	10134.09	375.3	364.68	365.05	.1 .3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2134.87	Element			
Vel Head (ft)	0.60	Wt. n-Val.		0.048	
W.S. Elev (ft)	2134.28	Reach Len. (ft)	375.30	364.68	365.05
Crit W.S. (ft)	2134.27	Flow Area (sq ft)		157.71	
E.G. Slope (ft/ft)	0.019262	Area (sq ft)		157.71	
Q Total (cfs)	978.00	Flow (cfs)		978.00	
Top Width (ft)	133.71	Top Width (ft)		133.71	
Vel Total (ft/s)	6.20	Avg. Vel. (ft/s)		6.20	
Max Chl Dpth (ft)	4.28	Hydr. Depth (ft)		1.18	
Conv. Total (cfs)	7046.7	Conv. (cfs)		7046.7	
Length Wtd. (ft)	364.68	Wetted Per. (ft)		134.34	
Min Ch El (ft)	2130.00	Shear (lb/sq ft)		1.41	
Alpha	1.00	Stream Power (lb/ft s)		8.75	
Frctn Loss (ft)	6.54	Cum Volume (acre-ft)	1.54	29.75	1.95
C & E Loss (ft)	0.05	Cum SA (acres)	1.60	14.11	3.81

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

CROSS SECTION OUTPUT Profile #PF 2

			Left OB	Channel	Right OB
E.G. Elev (ft)	2134.87	Element			
Vel Head (ft)	0.60	Wt. n-Val.		0.048	
W.S. Elev (ft)	2134.28	Reach Len. (ft)	375.30	364.68	365.05
Crit W.S. (ft)	2134.27	Flow Area (sq ft)		157.71	
E.G. Slope (ft/ft)	0.019262	Area (sq ft)		157.71	
Q Total (cfs)	978.00	Flow (cfs)		978.00	
Top Width (ft)	133.71	Top Width (ft)		133.71	
Vel Total (ft/s)	6.20	Avg. Vel. (ft/s)		6.20	
Max Chl Dpth (ft)	4.28	Hydr. Depth (ft)		1.18	
Conv. Total (cfs)	7046.7	Conv. (cfs)		7046.7	
Length Wtd. (ft)	364.68	Wetted Per. (ft)		134.34	
Min Ch El (ft)	2130.00	Shear (lb/sq ft)		1.41	
Alpha	1.00	Stream Power (lb/ft s)		8.75	
Frctn Loss (ft)	6.54	Cum Volume (acre-ft)	1.54	29.75	1.95
C & E Loss (ft)	0.05	Cum SA (acres)	1.60	14.11	3.81

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.

FLOW DISTRIBUTION OUTPUT Profile #PF 1

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9918.69	9990.49	172.59	47.59	43.52	17.65	1.09	3.63
9990.49	10062.29	800.64	106.20	72.37	81.87	1.48	7.54
10062.29	RB 10134.09	4.77	3.92	18.45	0.49	0.21	1.22

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.

FLOW DISTRIBUTION OUTPUT Profile #PF 2

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9918.69	9990.49	172.59	47.59	43.52	17.65	1.09	3.63
9990.49	10062.29	800.64	106.20	72.37	81.87	1.48	7.54
10062.29	RB 10134.09	4.77	3.92	18.45	0.49	0.21	1.22

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

CROSS SECTION RIVER: Tributary 10A
REACH: Tributary 10A RS: 0.860

INPUT
Description:
Station Elevation Data num= 20

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9715	2138	9747.62	2136	9774.09	2134	9794.61	2132	9809.32	2130
9810.09	2130	9874.16	2130	9890.04	2128	9946.96	212610014.07		2126
10026.05	212810037.68		213010069.69		213210091.78		213410101.43		2134
10113.43	213410136.41		213610159.44		213810182.92		213810200.28		2138

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9715	.06	9946.96	.04510014.07		.06

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
9874.16	10037.68	228.9	252.72 290.66	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2128.30	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.44	Wt. n-Val.		0.048	
W.S. Elev (ft)	2127.86	Reach Len. (ft)	228.90	252.72	290.66
Crit W.S. (ft)	2127.61	Flow Area (sq ft)		184.05	
E.G. Slope (ft/ft)	0.016491	Area (sq ft)		184.05	
Q Total (cfs)	978.00	Flow (cfs)		978.00	
Top Width (ft)	131.09	Top Width (ft)		131.09	
Vel Total (ft/s)	5.31	Avg. Vel. (ft/s)		5.31	
Max Chl Dpth (ft)	1.86	Hydr. Depth (ft)		1.40	
Conv. Total (cfs)	7615.9	Conv. (cfs)		7615.9	
Length Wtd. (ft)	252.72	Wetted Per. (ft)		131.28	
Min Ch El (ft)	2126.00	Shear (lb/sq ft)		1.44	
Alpha	1.00	Stream Power (lb/ft s)		7.67	
Frctn Loss (ft)	5.17	Cum Volume (acre-ft)	1.54	28.32	1.95
C & E Loss (ft)	0.05	Cum SA (acres)	1.60	13.01	3.81

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

CROSS SECTION OUTPUT Profile #PF 2

E.G. Elev (ft)	2128.30	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.44	Wt. n-Val.		0.048	
W.S. Elev (ft)	2127.86	Reach Len. (ft)	228.90	252.72	290.66
Crit W.S. (ft)	2127.61	Flow Area (sq ft)		184.05	
E.G. Slope (ft/ft)	0.016491	Area (sq ft)		184.05	
Q Total (cfs)	978.00	Flow (cfs)		978.00	
Top Width (ft)	131.09	Top Width (ft)		131.09	
Vel Total (ft/s)	5.31	Avg. Vel. (ft/s)		5.31	

Max Chl Dpth (ft)	1.86	Hydr. Depth (ft)		1.40	
Conv. Total (cfs)	7615.9	Conv. (cfs)		7615.9	
Length Wtd. (ft)	252.72	Wetted Per. (ft)		131.28	
Min Ch El (ft)	2126.00	Shear (lb/sq ft)		1.44	
Alpha	1.00	Stream Power (lb/ft s)		7.67	
Frctn Loss (ft)	5.17	Cum Volume (acre-ft)	1.54	28.32	1.95
C & E Loss (ft)	0.05	Cum SA (acres)	1.60	13.01	3.81

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.

FLOW DISTRIBUTION OUTPUT Profile #PF 1

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9874.16	9928.67	46.96	20.99	34.58	4.80	0.61	2.24
9928.67	9983.17	539.71	95.35	54.52	55.19	1.75	5.66
9983.17	RB 10037.68	391.33	67.71	42.18	40.01	1.61	5.78

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.

FLOW DISTRIBUTION OUTPUT Profile #PF 2

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9874.16	9928.67	46.96	20.99	34.58	4.80	0.61	2.24
9928.67	9983.17	539.71	95.35	54.52	55.19	1.75	5.66
9983.17	RB 10037.68	391.33	67.71	42.18	40.01	1.61	5.78

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

CROSS SECTION RIVER: Tributary 10A
REACH: Tributary 10A RS: 0.802

INPUT
Description:
Station Elevation Data num= 15

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9676	2130	9695.63	2128	9734.98	2126	9756.62	2124	9803.38	2122
9854.6	2122	9973.26	2122	9996.8	212010009.17		212010015.68		2122
10021.25	212410056.47		212610112.17		212810167.16		212810220.68		2126

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9676	.06	9973.26	.04510015.68		.06

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
9756.62	10021.25	280	280	290	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2123.08	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.27	Wt. n-Val.		0.057	
W.S. Elev (ft)	2122.81	Reach Len. (ft)	280.00	280.00	290.00
Crit W.S. (ft)		Flow Area (sq ft)		234.84	
E.G. Slope (ft/ft)	0.025761	Area (sq ft)		234.84	
Q Total (cfs)	978.00	Flow (cfs)		978.00	
Top Width (ft)	233.44	Top Width (ft)		233.44	
Vel Total (ft/s)	4.16	Avg. Vel. (ft/s)		4.16	
Max Chl Dpth (ft)	2.81	Hydr. Depth (ft)		1.01	
Conv. Total (cfs)	6093.3	Conv. (cfs)		6093.3	
Length Wtd. (ft)	280.43	Wetted Per. (ft)		233.98	
Min Ch El (ft)	2120.00	Shear (lb/sq ft)		1.61	
Alpha	1.00	Stream Power (lb/ft s)		6.72	
Frctn Loss (ft)	5.88	Cum Volume (acre-ft)	1.54	27.11	1.95
C & E Loss (ft)	0.01	Cum SA (acres)	1.60	11.95	3.81

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

section. This may indicate the need for additional cross sections.
Note: Manning's n values were composited to a single value in the main channel.

CROSS SECTION OUTPUT Profile #PF 2

E.G. Elev (ft)	2123.08	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.27	Wt. n-Val.		0.057	
W.S. Elev (ft)	2122.81	Reach Len. (ft)	280.00	280.00	290.00
Crit W.S. (ft)		Flow Area (sq ft)		234.84	
E.G. Slope (ft/ft)	0.025761	Area (sq ft)		234.84	
Q Total (cfs)	978.00	Flow (cfs)		978.00	
Top Width (ft)	233.44	Top Width (ft)		233.44	
Vel Total (ft/s)	4.16	Avg. Vel. (ft/s)		4.16	
Max Chl Dpth (ft)	2.81	Hydr. Depth (ft)		1.01	
Conv. Total (cfs)	6093.3	Conv. (cfs)		6093.3	
Length Wtd. (ft)	280.43	Wetted Per. (ft)		233.98	
Min Ch El (ft)	2120.00	Shear (lb/sq ft)		1.61	
Alpha	1.00	Stream Power (lb/ft s)		6.72	
Frctn Loss (ft)	5.88	Cum Volume (acre-ft)	1.54	27.11	1.95
C & E Loss (ft)	0.01	Cum SA (acres)	1.60	11.95	3.81

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Manning's n values were composited to a single value in the main channel.

FLOW DISTRIBUTION OUTPUT Profile #PF 1

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9756.62	9844.83	98.57	41.12	60.36	10.08	0.68	2.40
9844.83	9933.04	191.41	71.26	88.21	19.57	0.81	2.69
9933.04	RB 10021.25	688.02	122.46	85.42	70.35	1.44	5.62

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Manning's n values were composited to a single value in the main channel.

FLOW DISTRIBUTION OUTPUT Profile #PF 2

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9756.62	9844.83	98.57	41.12	60.36	10.08	0.68	2.40
9844.83	9933.04	191.41	71.26	88.21	19.57	0.81	2.69
9933.04	RB 10021.25	688.02	122.46	85.42	70.35	1.44	5.62

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Manning's n values were composited to a single value in the main channel.

CROSS SECTION RIVER: Tributary 10A
REACH: Tributary 10A RS: 0.741

INPUT
Description:
Station Elevation Data num= 29

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9660	2130	9683.64	2128	9712.45	2126	9730.65	2124	9755.87	2122
9796.95	2120	9834.67	2118	9904.1	2116	9910.81	2116	9978.03	2116
9978.04	2116	9985.21	2114	9985.69	2114	9995.11	2116	9997.51	2116
10007.7	2114	10018.3	211410026.93		211610080.43		211810089.31		2118
10120.91	211610142.76		211610219.19		211810395.31		212010474.32		2122
10601.97	2124	10680.1	212610701.39		212810722.92		2130		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9660	.06	9978.03	.04510026.93		.06

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
9834.67	10089.31	165	175	230	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2117.19	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.35	Wt. n-Val.		0.049	0.060
W.S. Elev (ft)	2116.84	Reach Len. (ft)	165.00	175.00	230.00
Crit W.S. (ft)		Flow Area (sq ft)		182.70	37.51
E.G. Slope (ft/ft)	0.017515	Area (sq ft)		182.70	37.51
Q Total (cfs)	978.00	Flow (cfs)		894.76	83.24
Top Width (ft)	241.86	Top Width (ft)		174.56	67.31
Vel Total (ft/s)	4.44	Avg. Vel. (ft/s)		4.90	2.22
Max Chl Dpth (ft)	2.84	Hydr. Depth (ft)		1.05	0.56
Conv. Total (cfs)	7389.9	Conv. (cfs)		6760.9	629.0
Length Wtd. (ft)	183.08	Wetted Per. (ft)		175.49	67.34
Min Ch El (ft)	2114.00	Shear (lb/sq ft)		1.14	0.61
Alpha	1.13	Stream Power (lb/ft s)		5.57	1.35
Frctn Loss (ft)	2.16	Cum Volume (acre-ft)	1.54	25.76	1.82
C & E Loss (ft)	0.02	Cum SA (acres)	1.60	10.64	3.58

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

CROSS SECTION OUTPUT Profile #PF 2

E.G. Elev (ft)	2117.19	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.35	Wt. n-Val.		0.049	0.060
W.S. Elev (ft)	2116.84	Reach Len. (ft)	165.00	175.00	230.00
Crit W.S. (ft)		Flow Area (sq ft)		182.70	37.51
E.G. Slope (ft/ft)	0.017515	Area (sq ft)		182.70	37.51
Q Total (cfs)	978.00	Flow (cfs)		894.76	83.24
Top Width (ft)	241.86	Top Width (ft)		174.56	67.31
Vel Total (ft/s)	4.44	Avg. Vel. (ft/s)		4.90	2.22
Max Chl Dpth (ft)	2.84	Hydr. Depth (ft)		1.05	0.56
Conv. Total (cfs)	7389.9	Conv. (cfs)		6760.9	629.0
Length Wtd. (ft)	183.08	Wetted Per. (ft)		175.49	67.34
Min Ch El (ft)	2114.00	Shear (lb/sq ft)		1.14	0.61
Alpha	1.13	Stream Power (lb/ft s)		5.57	1.35
Frctn Loss (ft)	2.16	Cum Volume (acre-ft)	1.54	25.76	1.82
C & E Loss (ft)	0.02	Cum SA (acres)	1.60	10.64	3.58

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

FLOW DISTRIBUTION OUTPUT Profile #PF 1

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9834.67	9919.55	55.69	25.30	44.68	5.69	0.57	2.20
9919.55	10004.43	407.03	93.68	85.50	41.62	1.10	4.34
10004.43	RB 10089.31	432.03	63.73	45.32	44.17	1.42	6.78
10089.31	10722.92	83.24	37.51	67.34	8.51	0.56	2.22

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

FLOW DISTRIBUTION OUTPUT Profile #PF 2

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9834.67	9919.55	55.69	25.30	44.68	5.69	0.57	2.20
9919.55	10004.43	407.03	93.68	85.50	41.62	1.10	4.34
10004.43	RB 10089.31	432.03	63.73	45.32	44.17	1.42	6.78
10089.31	10722.92	83.24	37.51	67.34	8.51	0.56	2.22

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

CROSS SECTION RIVER: Tributary 10A
REACH: Tributary 10A RS: 0.707

INPUT
Description:
Station Elevation Data num= 18

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9780.85	2120	9799.62	2118	9822.71	2116	9952.69	2114	9958.76	2114
9980.41	2114	9990.54	2112	9998	2112	10010	2112	10015	2112
10050	211410085.68		211410088.64		211410147.94		211410196.88		2114
10206.68	211410286.77		211610359.17		2116				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9780.85	.06	9980.41	.045	10050	.06

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
9980.41	10050	491.4	500.3	500.3	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2115.01	Element			
Vel Head (ft)	0.29	Wt. n-Val.	0.060	0.045	0.060
W.S. Elev (ft)	2114.72	Reach Len. (ft)	491.40	500.30	500.30
Crit W.S. (ft)		Flow Area (sq ft)	36.53	143.90	122.50
E.G. Slope (ft/ft)	0.008579	Area (sq ft)	36.53	143.90	122.50
Q Total (cfs)	978.00	Flow (cfs)	52.21	712.60	213.20
Top Width (ft)	329.23	Top Width (ft)	74.27	69.59	185.36
Vel Total (ft/s)	3.23	Avg. Vel. (ft/s)	1.43	4.95	1.74
Max Chl Dpth (ft)	2.72	Hydr. Depth (ft)	0.49	2.07	0.66
Conv. Total (cfs)	10559.0	Conv. (cfs)	563.6	7693.5	2301.8
Length Wtd. (ft)	500.06	Wetted Per. (ft)	74.28	69.84	185.37
Min Ch El (ft)	2112.00	Shear (lb/sq ft)	0.26	1.10	0.35
Alpha	1.79	Stream Power (lb/ft s)	0.38	5.46	0.62
Frctn Loss (ft)	6.18	Cum Volume (acre-ft)	1.47	25.11	1.40
C & E Loss (ft)	0.02	Cum SA (acres)	1.46	10.15	2.92

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

CROSS SECTION OUTPUT Profile #PF 2

			Left OB	Channel	Right OB
E.G. Elev (ft)	2115.01	Element			
Vel Head (ft)	0.29	Wt. n-Val.	0.060	0.045	0.060
W.S. Elev (ft)	2114.72	Reach Len. (ft)	491.40	500.30	500.30
Crit W.S. (ft)		Flow Area (sq ft)	36.53	143.90	122.50
E.G. Slope (ft/ft)	0.008579	Area (sq ft)	36.53	143.90	122.50
Q Total (cfs)	978.00	Flow (cfs)	52.21	712.60	213.20
Top Width (ft)	329.23	Top Width (ft)	74.27	69.59	185.36
Vel Total (ft/s)	3.23	Avg. Vel. (ft/s)	1.43	4.95	1.74
Max Chl Dpth (ft)	2.72	Hydr. Depth (ft)	0.49	2.07	0.66
Conv. Total (cfs)	10559.0	Conv. (cfs)	563.6	7693.5	2301.8
Length Wtd. (ft)	500.06	Wetted Per. (ft)	74.28	69.84	185.37
Min Ch El (ft)	2112.00	Shear (lb/sq ft)	0.26	1.10	0.35
Alpha	1.79	Stream Power (lb/ft s)	0.38	5.46	0.62
Frctn Loss (ft)	6.18	Cum Volume (acre-ft)	1.47	25.11	1.40
C & E Loss (ft)	0.02	Cum SA (acres)	1.46	10.15	2.92

Warning: The conveyance ratio (upstream 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.

FLOW DISTRIBUTION OUTPUT Profile #PF 1

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
9780.85	9980.41	52.21	36.53	74.28	5.34	0.49	1.43
LB 9980.41	10003.61	269.72	52.88	23.39	27.58	2.28	5.10
10003.61	10026.80	325.64	59.03	23.22	33.30	2.54	5.52
10026.80	RB 10050.00	117.23	31.99	23.23	11.99	1.38	3.66
10050.00	10359.17	213.20	122.50	185.37	21.80	0.66	1.74

Warning: The conveyance ratio (upstream 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.

FLOW DISTRIBUTION OUTPUT Profile #PF 2

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
9780.85	9980.41	52.21	36.53	74.28	5.34	0.49	1.43
LB 9980.41	10003.61	269.72	52.88	23.39	27.58	2.28	5.10
10003.61	10026.80	325.64	59.03	23.22	33.30	2.54	5.52
10026.80	RB 10050.00	117.23	31.99	23.23	11.99	1.38	3.66
10050.00	10359.17	213.20	122.50	185.37	21.80	0.66	1.74

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

CROSS SECTION RIVER: Tributary 10A
REACH: Tributary 10A RS: 0.612

INPUT
Description:
Station Elevation Data num= 11

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9819.34	2114	9838.41	2112	9873.92	2110	9919.84	2108	9994.5	2106
10007.99	210610032.03		210810105.91		210810117.27		210810291.28		2110
10294.34	2110								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9819.34	.06	9919.84	.04510032.03		.06

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
9873.9210032.03		580.6 567.86	546.6	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2108.81	Element			
Vel Head (ft)	0.50	Wt. n-Val.		0.045	0.060
W.S. Elev (ft)	2108.31	Reach Len. (ft)	580.60	567.86	546.60
Crit W.S. (ft)	2108.31	Flow Area (sq ft)		161.34	30.39
E.G. Slope (ft/ft)	0.019354	Area (sq ft)		161.34	30.39
Q Total (cfs)	978.00	Flow (cfs)		934.12	43.88
Top Width (ft)	231.31	Top Width (ft)		119.26	112.05
Vel Total (ft/s)	5.10	Avg. Vel. (ft/s)		5.79	1.44
Max Chl Dpth (ft)	2.31	Hydr. Depth (ft)		1.35	0.27
Conv. Total (cfs)	7029.9	Conv. (cfs)		6714.5	315.4
Length Wtd. (ft)	567.48	Wetted Per. (ft)		119.38	112.05
Min Ch El (ft)	2106.00	Shear (lb/sq ft)		1.63	0.33
Alpha	1.23	Stream Power (lb/ft s)		9.45	0.47
Frctn Loss (ft)	5.13	Cum Volume (acre-ft)	1.27	23.36	0.52
C & E Loss (ft)	0.02	Cum SA (acres)	1.04	9.06	1.21

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross

section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #PF 2

			Left OB	Channel	Right OB
E.G. Elev (ft)	2108.81	Element			
Vel Head (ft)	0.50	Wt. n-Val.		0.045	0.060
W.S. Elev (ft)	2108.31	Reach Len. (ft)	580.60	567.86	546.60
Crit W.S. (ft)	2108.31	Flow Area (sq ft)		161.34	30.39
E.G. Slope (ft/ft)	0.019354	Area (sq ft)		161.34	30.39
Q Total (cfs)	978.00	Flow (cfs)		934.12	43.88
Top Width (ft)	231.31	Top Width (ft)		119.26	112.05
Vel Total (ft/s)	5.10	Avg. Vel. (ft/s)		5.79	1.44
Max Chl Dpth (ft)	2.31	Hydr. Depth (ft)		1.35	0.27
Conv. Total (cfs)	7029.9	Conv. (cfs)		6714.5	315.4
Length Wtd. (ft)	567.48	Wetted Per. (ft)		119.38	112.05
Min Ch El (ft)	2106.00	Shear (lb/sq ft)		1.63	0.33
Alpha	1.23	Stream Power (lb/ft s)		9.45	0.47
Frctn Loss (ft)	5.13	Cum Volume (acre-ft)	1.27	23.36	0.52
C & E Loss (ft)	0.02	Cum SA (acres)	1.04	9.06	1.21

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

FLOW DISTRIBUTION OUTPUT Profile #PF 1

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9873.92	9926.62	7.49	3.80	13.87	0.77	0.27	1.97
9926.62	9979.33	312.66	63.02	52.72	31.97	1.20	4.96
9979.33	RB 10032.03	613.97	94.52	52.79	62.78	1.79	6.50
10032.03	10294.34	43.88	30.39	112.05	4.49	0.27	1.44

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

FLOW DISTRIBUTION OUTPUT Profile #PF 2

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9873.92	9926.62	7.49	3.80	13.87	0.77	0.27	1.97
9926.62	9979.33	312.66	63.02	52.72	31.97	1.20	4.96
9979.33	RB 10032.03	613.97	94.52	52.79	62.78	1.79	6.50
10032.03	10294.34	43.88	30.39	112.05	4.49	0.27	1.44

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

CROSS SECTION RIVER: Tributary 10A
REACH: Tributary 10A RS: 0.505

INPUT
Description:
Station Elevation Data num= 14

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9732.68	2108	9762.5	2106	9812.72	2104	9865.72	2102	9927.94	2100
9984.51	2098	9998.44	2096	10000.8	209610018.03		209810044.48		2100
10093.03	2102	10130.8	210410233.51		210610234.16		2106		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9732.68	.06	9927.94	.04510044.48		.06

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
9927.94	10044.48	462.2	499.28	504.9	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2101.62	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.42	Wt. n-Val.	0.060	0.045	0.060
W.S. Elev (ft)	2101.20	Reach Len. (ft)	462.20	499.28	504.90
Crit W.S. (ft)		Flow Area (sq ft)	22.27	325.38	17.38
E.G. Slope (ft/ft)	0.006558	Area (sq ft)	22.27	325.38	17.38
Q Total (cfs)	1778.00	Flow (cfs)	31.70	1721.57	24.73
Top Width (ft)	182.81	Top Width (ft)	37.22	116.54	29.05
Vel Total (ft/s)	4.87	Avg. Vel. (ft/s)	1.42	5.29	1.42
Max Chl Dpth (ft)	5.20	Hydr. Depth (ft)	0.60	2.79	0.60
Conv. Total (cfs)	21955.9	Conv. (cfs)	391.5	21259.1	305.4
Length Wtd. (ft)	498.99	Wetted Per. (ft)	37.24	116.91	29.07
Min Ch El (ft)	2096.00	Shear (lb/sq ft)	0.24	1.14	0.24
Alpha	1.15	Stream Power (lb/ft s)	0.35	6.03	0.35
Frctn Loss (ft)	5.48	Cum Volume (acre-ft)	1.12	20.18	0.22
C & E Loss (ft)	0.08	Cum SA (acres)	0.79	7.53	0.32

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

CROSS SECTION OUTPUT Profile #PF 2

			Left OB	Channel	Right OB
E.G. Elev (ft)	2101.62	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.42	Wt. n-Val.	0.060	0.045	0.060
W.S. Elev (ft)	2101.20	Reach Len. (ft)	462.20	499.28	504.90
Crit W.S. (ft)		Flow Area (sq ft)	22.27	325.38	17.38
E.G. Slope (ft/ft)	0.006558	Area (sq ft)	22.27	325.38	17.38
Q Total (cfs)	1778.00	Flow (cfs)	31.70	1721.57	24.73
Top Width (ft)	182.81	Top Width (ft)	37.22	116.54	29.05
Vel Total (ft/s)	4.87	Avg. Vel. (ft/s)	1.42	5.29	1.42
Max Chl Dpth (ft)	5.20	Hydr. Depth (ft)	0.60	2.79	0.60
Conv. Total (cfs)	21955.9	Conv. (cfs)	391.5	21259.1	305.4
Length Wtd. (ft)	498.99	Wetted Per. (ft)	37.24	116.91	29.07
Min Ch El (ft)	2096.00	Shear (lb/sq ft)	0.24	1.14	0.24
Alpha	1.15	Stream Power (lb/ft s)	0.35	6.03	0.35
Frctn Loss (ft)	5.48	Cum Volume (acre-ft)	1.12	20.18	0.22
C & E Loss (ft)	0.08	Cum SA (acres)	0.79	7.53	0.32

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.

FLOW DISTRIBUTION OUTPUT Profile #PF 1

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)

9732.68	9927.94	31.70	22.27	37.24	1.78	0.60	1.42
LB 9927.94	9966.79	286.49	73.16	38.87	16.11	1.88	3.92
9966.79	10005.63	899.44	145.58	39.03	50.59	3.75	6.18
10005.63	RB 10044.48	535.64	106.64	39.01	30.13	2.75	5.02
10044.48	10234.16	24.73	17.38	29.07	1.39	0.60	1.42

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.

FLOW DISTRIBUTION OUTPUT Profile #PF 2

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
9732.68	9927.94	31.70	22.27	37.24	1.78	0.60	1.42
LB 9927.94	9966.79	286.49	73.16	38.87	16.11	1.88	3.92
9966.79	10005.63	899.44	145.58	39.03	50.59	3.75	6.18
10005.63	RB 10044.48	535.64	106.64	39.01	30.13	2.75	5.02
10044.48	10234.16	24.73	17.38	29.07	1.39	0.60	1.42

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

CROSS SECTION RIVER: Tributary 10A
REACH: Tributary 10A RS: 0.410

INPUT
Description:
Station Elevation Data num= 21

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9687	2108	9770.57	2106	9834.9	2104	9878.26	2102	9907.34	2100
9935.41	2098	9948.53	2096	9963.33	2094	9979.11	2092	9997.14	2090
10000.27	209010011.73		209210032.23		209410050.07		209610050.08		2096
10057.42	209610137.15		209810337.62		210010385.16		210210392.49		2104
10399.35	2106								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9687	.06	9935.41	.04	10050.07	.06

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
9935.41	10137.15	463.85	463.59	459.13	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2096.06	Element			
Vel Head (ft)	1.21	Wt. n-Val.		0.045	
W.S. Elev (ft)	2094.84	Reach Len. (ft)	463.85	463.59	459.13
Crit W.S. (ft)	2094.83	Flow Area (sq ft)		201.21	
E.G. Slope (ft/ft)	0.022089	Area (sq ft)		201.21	
Q Total (cfs)	1778.00	Flow (cfs)		1778.00	
Top Width (ft)	82.67	Top Width (ft)		82.67	
Vel Total (ft/s)	8.84	Avg. Vel. (ft/s)		8.84	
Max Chl Dpth (ft)	4.84	Hydr. Depth (ft)		2.43	
Conv. Total (cfs)	11963.2	Conv. (cfs)		11963.2	
Length Wtd. (ft)	463.59	Wetted Per. (ft)		83.28	
Min Ch El (ft)	2090.00	Shear (lb/sq ft)		3.33	
Alpha	1.00	Stream Power (lb/ft s)		29.44	
Frctn Loss (ft)	4.74	Cum Volume (acre-ft)	1.00	17.17	0.12
C & E Loss (ft)	0.24	Cum SA (acres)	0.59	6.38	0.16

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

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

CROSS SECTION OUTPUT Profile #PF 2

E.G. Elev (ft)	2096.06	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.21	Wt. n-Val.		0.045	
W.S. Elev (ft)	2094.84	Reach Len. (ft)	463.85	463.59	459.13
Crit W.S. (ft)	2094.83	Flow Area (sq ft)		201.21	
E.G. Slope (ft/ft)	0.022089	Area (sq ft)		201.21	
Q Total (cfs)	1778.00	Flow (cfs)		1778.00	
Top Width (ft)	82.67	Top Width (ft)		82.67	
Vel Total (ft/s)	8.84	Avg. Vel. (ft/s)		8.84	
Max Chl Dpth (ft)	4.84	Hydr. Depth (ft)		2.43	
Conv. Total (cfs)	11963.2	Conv. (cfs)		11963.2	
Length Wtd. (ft)	463.59	Wetted Per. (ft)		83.28	
Min Ch El (ft)	2090.00	Shear (lb/sq ft)		3.33	
Alpha	1.00	Stream Power (lb/ft s)		29.44	
Frctn Loss (ft)	4.74	Cum Volume (acre-ft)	1.00	17.17	0.12
C & E Loss (ft)	0.24	Cum SA (acres)	0.59	6.38	0.16

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

FLOW DISTRIBUTION OUTPUT Profile #PF 1

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9935.41	10002.66	1214.41	127.26	45.90	68.30	2.79	9.54
10002.66	10069.90	563.59	73.96	37.38	31.70	1.99	7.62

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.

FLOW DISTRIBUTION OUTPUT Profile #PF 2

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9935.41	10002.66	1214.41	127.26	45.90	68.30	2.79	9.54
10002.66	10069.90	563.59	73.96	37.38	31.70	1.99	7.62

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

CROSS SECTION RIVER: Tributary 10A
REACH: Tributary 10A RS: 0.323

INPUT
Description:
Station Elevation Data num= 13

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9743.4	2098	9799.11	2096	9871.35	2094	9915.47	2092	9933.92	2090
9953.19	2088	9972.93	208610009.83		208610020.83		208810031.39		2090
10056.4	209210275.05		2094	10286.9	2096				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9743.4	.06	9915.47	.045	10056.4	.06

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
9871.35	10056.4	483	511.3 524.35	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2091.08	Element			
Vel Head (ft)	0.43	Wt. n-Val.		0.045	
W.S. Elev (ft)	2090.65	Reach Len. (ft)	483.00	511.30	524.35
Crit W.S. (ft)		Flow Area (sq ft)		337.34	
E.G. Slope (ft/ft)	0.005870	Area (sq ft)		337.34	
Q Total (cfs)	1778.00	Flow (cfs)		1778.00	
Top Width (ft)	111.54	Top Width (ft)		111.54	
Vel Total (ft/s)	5.27	Avg. Vel. (ft/s)		5.27	
Max Chl Dpth (ft)	4.65	Hydr. Depth (ft)		3.02	
Conv. Total (cfs)	23207.1	Conv. (cfs)		23207.1	
Length Wtd. (ft)	511.30	Wetted Per. (ft)		112.18	
Min Ch El (ft)	2086.00	Shear (lb/sq ft)		1.10	
Alpha	1.00	Stream Power (lb/ft s)		5.81	
Frctn Loss (ft)	5.52	Cum Volume (acre-ft)	1.00	14.30	0.12
C & E Loss (ft)	0.03	Cum SA (acres)	0.59	5.35	0.16

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

CROSS SECTION OUTPUT Profile #PF 2

			Left OB	Channel	Right OB
E.G. Elev (ft)	2091.08	Element			
Vel Head (ft)	0.43	Wt. n-Val.		0.045	
W.S. Elev (ft)	2090.65	Reach Len. (ft)	483.00	511.30	524.35
Crit W.S. (ft)		Flow Area (sq ft)		337.34	
E.G. Slope (ft/ft)	0.005870	Area (sq ft)		337.34	
Q Total (cfs)	1778.00	Flow (cfs)		1778.00	
Top Width (ft)	111.54	Top Width (ft)		111.54	
Vel Total (ft/s)	5.27	Avg. Vel. (ft/s)		5.27	
Max Chl Dpth (ft)	4.65	Hydr. Depth (ft)		3.02	
Conv. Total (cfs)	23207.1	Conv. (cfs)		23207.1	
Length Wtd. (ft)	511.30	Wetted Per. (ft)		112.18	
Min Ch El (ft)	2086.00	Shear (lb/sq ft)		1.10	
Alpha	1.00	Stream Power (lb/ft s)		5.81	
Frctn Loss (ft)	5.52	Cum Volume (acre-ft)	1.00	14.30	0.12
C & E Loss (ft)	0.03	Cum SA (acres)	0.59	5.35	0.16

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

FLOW DISTRIBUTION OUTPUT Profile #PF 1

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9871.35	9933.03	1.46	1.40	5.12	0.08	0.28	1.04
9933.03	9994.72	1125.97	205.55	61.89	63.33	3.33	5.48
9994.72	RB 10056.40	650.57	130.39	45.17	36.59	2.91	4.99

Warning: The conveyance ratio (upstream 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.

FLOW DISTRIBUTION OUTPUT Profile #PF 2

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9871.35	9933.03	1.46	1.40	5.12	0.08	0.28	1.04
9933.03	9994.72	1125.97	205.55	61.89	63.33	3.33	5.48
9994.72	RB 10056.40	650.57	130.39	45.17	36.59	2.91	4.99

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

CROSS SECTION RIVER: Tributary 10A
REACH: Tributary 10A RS: 0.225

INPUT
Description:
Station Elevation Data num= 10

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9721.73	2090	9834.66	2088	9906.57	2086	9949.75	2084	9990.24	2082
10011.5	208210072.36		208410144.17		208610180.74		208610185.91		2086

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9721.73	.06	9906.57	.04510144.17		.06

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
9906.57	10144.17	466.26	487.81	497.55	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2085.52	Element			
Vel Head (ft)	0.77	Wt. n-Val.		0.045	
W.S. Elev (ft)	2084.75	Reach Len. (ft)	466.26	487.81	497.55
Crit W.S. (ft)	2084.75	Flow Area (sq ft)		251.96	
E.G. Slope (ft/ft)	0.026147	Area (sq ft)		251.96	
Q Total (cfs)	1778.00	Flow (cfs)		1778.00	
Top Width (ft)	165.72	Top Width (ft)		165.72	
Vel Total (ft/s)	7.06	Avg. Vel. (ft/s)		7.06	
Max Chl Dpth (ft)	2.75	Hydr. Depth (ft)		1.52	
Conv. Total (cfs)	10995.7	Conv. (cfs)		10995.7	
Length Wtd. (ft)	487.81	Wetted Per. (ft)		165.83	
Min Ch El (ft)	2082.00	Shear (lb/sq ft)		2.48	
Alpha	1.00	Stream Power (lb/ft s)		17.50	
Frctn Loss (ft)	2.46	Cum Volume (acre-ft)	1.00	10.84	0.12
C & E Loss (ft)	0.18	Cum SA (acres)	0.59	3.72	0.16

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

CROSS SECTION OUTPUT Profile #PF 2

			Left OB	Channel	Right OB
E.G. Elev (ft)	2085.52	Element			
Vel Head (ft)	0.77	Wt. n-Val.		0.045	
W.S. Elev (ft)	2084.75	Reach Len. (ft)	466.26	487.81	497.55
Crit W.S. (ft)	2084.75	Flow Area (sq ft)		251.96	
E.G. Slope (ft/ft)	0.026147	Area (sq ft)		251.96	
Q Total (cfs)	1778.00	Flow (cfs)		1778.00	
Top Width (ft)	165.72	Top Width (ft)		165.72	
Vel Total (ft/s)	7.06	Avg. Vel. (ft/s)		7.06	
Max Chl Dpth (ft)	2.75	Hydr. Depth (ft)		1.52	
Conv. Total (cfs)	10995.7	Conv. (cfs)		10995.7	
Length Wtd. (ft)	487.81	Wetted Per. (ft)		165.83	
Min Ch El (ft)	2082.00	Shear (lb/sq ft)		2.48	
Alpha	1.00	Stream Power (lb/ft s)		17.50	
Frctn Loss (ft)	2.46	Cum Volume (acre-ft)	1.00	10.84	0.12
C & E Loss (ft)	0.18	Cum SA (acres)	0.59	3.72	0.16

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.

FLOW DISTRIBUTION OUTPUT Profile #PF 1

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9906.57	9985.77	363.10	65.12	52.27	20.42	1.25	5.58
9985.77	10064.97	1366.00	170.31	79.23	76.83	2.15	8.02
10064.97	RB 10144.17	48.91	16.53	34.32	2.75	0.48	2.96

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.

FLOW DISTRIBUTION OUTPUT Profile #PF 2

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9906.57	9985.77	363.10	65.12	52.27	20.42	1.25	5.58
9985.77	10064.97	1366.00	170.31	79.23	76.83	2.15	8.02
10064.97	RB 10144.17	48.91	16.53	34.32	2.75	0.48	2.96

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

CROSS SECTION RIVER: Tributary 10A
REACH: Tributary 10A RS: 0.133

INPUT
Description:
Station Elevation Data num= 15

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9766.79	2084	9821.07	2084	9881.66	2082	9912.87	2080	9954.38	2078
9964.62	2076	9979.45	207610000.73		207610002.29		207610080.94		2076
10084.43	207610094.11		207810102.61		208010111.68		208210128.52		2084

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9766.79	.06	9954.38	.04	510102.61	.06

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
9912.87	10102.61	203.6	176.1	159.1	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2079.91	Element	Left OB	Channel	Right OB

Vel Head (ft)	0.17	Wt. n-Val.		0.045	
W.S. Elev (ft)	2079.74	Reach Len. (ft)	203.60	176.10	159.10
Crit W.S. (ft)		Flow Area (sq ft)		541.01	
E.G. Slope (ft/ft)	0.002066	Area (sq ft)		541.01	
Q Total (cfs)	1778.00	Flow (cfs)		1778.00	
Top Width (ft)	183.31	Top Width (ft)		183.31	
Vel Total (ft/s)	3.29	Avg. Vel. (ft/s)		3.29	
Max Chl Dpth (ft)	3.74	Hydr. Depth (ft)		2.95	
Conv. Total (cfs)	39114.1	Conv. (cfs)		39114.1	
Length Wtd. (ft)	177.52	Wetted Per. (ft)		183.95	
Min Ch El (ft)	2076.00	Shear (lb/sq ft)		0.38	
Alpha	1.00	Stream Power (lb/ft s)		1.25	
Frctn Loss (ft)	0.21	Cum Volume (acre-ft)	1.00	6.40	0.12
C & E Loss (ft)	0.02	Cum SA (acres)	0.59	1.77	0.16

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

CROSS SECTION OUTPUT Profile #PF 2

E.G. Elev (ft)	2079.91	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.17	Wt. n-Val.		0.045	
W.S. Elev (ft)	2079.74	Reach Len. (ft)	203.60	176.10	159.10
Crit W.S. (ft)		Flow Area (sq ft)		541.01	
E.G. Slope (ft/ft)	0.002066	Area (sq ft)		541.01	
Q Total (cfs)	1778.00	Flow (cfs)		1778.00	
Top Width (ft)	183.31	Top Width (ft)		183.31	
Vel Total (ft/s)	3.29	Avg. Vel. (ft/s)		3.29	
Max Chl Dpth (ft)	3.74	Hydr. Depth (ft)		2.95	
Conv. Total (cfs)	39114.1	Conv. (cfs)		39114.1	
Length Wtd. (ft)	177.52	Wetted Per. (ft)		183.95	
Min Ch El (ft)	2076.00	Shear (lb/sq ft)		0.38	
Alpha	1.00	Stream Power (lb/ft s)		1.25	
Frctn Loss (ft)	0.21	Cum Volume (acre-ft)	1.00	6.40	0.12
C & E Loss (ft)	0.02	Cum SA (acres)	0.59	1.77	0.16

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

FLOW DISTRIBUTION OUTPUT Profile #PF 1

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9912.87	9976.12	265.41	102.63	58.14	14.93	1.77	2.59
9976.12	10039.36	853.95	236.71	63.25	48.03	3.74	3.61
10039.36	RB 10102.61	658.64	201.67	62.56	37.04	3.24	3.27

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

FLOW DISTRIBUTION OUTPUT Profile #PF 2

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9912.87	9976.12	265.41	102.63	58.14	14.93	1.77	2.59
9976.12	10039.36	853.95	236.71	63.25	48.03	3.74	3.61
10039.36	RB 10102.61	658.64	201.67	62.56	37.04	3.24	3.27

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

CROSS SECTION RIVER: Tributary 10A
REACH: Tributary 10A RS: 0.101

INPUT
Description:
Station Elevation Data num= 13

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9799.4	2084	9831.33	2082	9871.6	2080	9922.06	2078	9980.14	2076
9989.23	2074	9998.77	207210001.62		207210053.14		207410064.54		2076

10078.06 207810088.82 208010132.37 2082

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9799.4	.06	9980.14	.04	10078.06	.06

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
9980.14	10078.06	247.7	82	74	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2079.68	Element			
Vel Head (ft)	0.12	Wt. n-Val.	0.060	0.045	0.060
W.S. Elev (ft)	2079.57	Reach Len. (ft)	247.70	82.00	74.00
Crit W.S. (ft)		Flow Area (sq ft)	180.10	550.87	6.61
E.G. Slope (ft/ft)	0.000770	Area (sq ft)	180.10	550.87	6.61
Q Total (cfs)	1778.00	Flow (cfs)	186.09	1588.09	3.82
Top Width (ft)	203.98	Top Width (ft)	97.63	97.92	8.43
Vel Total (ft/s)	2.41	Avg. Vel. (ft/s)	1.03	2.88	0.58
Max Chl Dpth (ft)	7.57	Hydr. Depth (ft)	1.84	5.63	0.78
Conv. Total (cfs)	64075.5	Conv. (cfs)	6706.3	57231.6	137.6
Length Wtd. (ft)	90.93	Wetted Per. (ft)	97.69	98.70	8.58
Min Ch El (ft)	2072.00	Shear (lb/sq ft)	0.09	0.27	0.04
Alpha	1.30	Stream Power (lb/ft s)	0.09	0.77	0.02
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)	0.58	4.19	0.11
C & E Loss (ft)	0.02	Cum SA (acres)	0.36	1.20	0.14

CROSS SECTION OUTPUT Profile #PF 2

			Left OB	Channel	Right OB
E.G. Elev (ft)	2079.68	Element			
Vel Head (ft)	0.12	Wt. n-Val.	0.060	0.045	0.060
W.S. Elev (ft)	2079.57	Reach Len. (ft)	247.70	82.00	74.00
Crit W.S. (ft)		Flow Area (sq ft)	180.10	550.87	6.61
E.G. Slope (ft/ft)	0.000770	Area (sq ft)	180.10	550.87	6.61
Q Total (cfs)	1778.00	Flow (cfs)	186.09	1588.09	3.82
Top Width (ft)	203.98	Top Width (ft)	97.63	97.92	8.43
Vel Total (ft/s)	2.41	Avg. Vel. (ft/s)	1.03	2.88	0.58
Max Chl Dpth (ft)	7.57	Hydr. Depth (ft)	1.84	5.63	0.78
Conv. Total (cfs)	64075.5	Conv. (cfs)	6706.3	57231.6	137.6
Length Wtd. (ft)	90.93	Wetted Per. (ft)	97.69	98.70	8.58
Min Ch El (ft)	2072.00	Shear (lb/sq ft)	0.09	0.27	0.04
Alpha	1.30	Stream Power (lb/ft s)	0.09	0.77	0.02
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)	0.58	4.19	0.11
C & E Loss (ft)	0.02	Cum SA (acres)	0.36	1.20	0.14

FLOW DISTRIBUTION OUTPUT Profile #PF 1

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
9799.40	9980.14	186.09	180.10	97.69	10.47	1.84	1.03
LB 9980.14	10012.78	633.12	207.77	33.07	35.61	6.37	3.05
10012.78	10045.42	661.14	212.18	32.67	37.18	6.50	3.12
10045.42	RB 10078.06	293.83	130.91	32.97	16.53	4.01	2.24
10078.06	10132.37	3.82	6.61	8.58	0.21	0.78	0.58

FLOW DISTRIBUTION OUTPUT Profile #PF 2

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
9799.40	9980.14	186.09	180.10	97.69	10.47	1.84	1.03
LB 9980.14	10012.78	633.12	207.77	33.07	35.61	6.37	3.05
10012.78	10045.42	661.14	212.18	32.67	37.18	6.50	3.12
10045.42	RB 10078.06	293.83	130.91	32.97	16.53	4.01	2.24
10078.06	10132.37	3.82	6.61	8.58	0.21	0.78	0.58

CROSS SECTION RIVER: Tributary 10A
REACH: Tributary 10A RS: 0.090

INPUT
Description:

Station Elevation Data num= 12

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9767.3	2082	9807.3	2080	9835.3	2078	9894.3	2076	9939.3	2074
9961.72	207210005.18		207210010.24		207410015.66		207610020.51		2078
10090.3	2080	10129.3	2082						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9767.3	.06	9835.3	.04510020.51		.06

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
9835.310020.51		95	130	140	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2079.62	Element			
Vel Head (ft)	0.06	Wt. n-Val.	0.060	0.045	0.060
W.S. Elev (ft)	2079.56	Reach Len. (ft)	95.00	130.00	140.00
Crit W.S. (ft)	2075.15	Flow Area (sq ft)	17.00	901.89	42.37
E.G. Slope (ft/ft)	0.000423	Area (sq ft)	17.00	901.89	42.37
Q Total (cfs)	1778.00	Flow (cfs)	7.32	1752.40	18.28
Top Width (ft)	261.41	Top Width (ft)	21.82	185.21	54.38
Vel Total (ft/s)	1.85	Avg. Vel. (ft/s)	0.43	1.94	0.43
Max Chl Dpth (ft)	7.56	Hydr. Depth (ft)	0.78	4.87	0.78
Conv. Total (cfs)	86404.5	Conv. (cfs)	355.9	85160.3	888.3
Length Wtd. (ft)	130.00	Wetted Per. (ft)	21.87	186.51	54.40
Min Ch El (ft)	2072.00	Shear (lb/sq ft)	0.02	0.13	0.02
Alpha	1.09	Stream Power (lb/ft s)	0.01	0.25	0.01
Frctn Loss (ft)		Cum Volume (acre-ft)	0.02	2.83	0.07
C & E Loss (ft)		Cum SA (acres)	0.02	0.93	0.09

CROSS SECTION OUTPUT Profile #PF 2

			Left OB	Channel	Right OB
E.G. Elev (ft)	2079.62	Element			
Vel Head (ft)	0.06	Wt. n-Val.	0.060	0.045	0.060
W.S. Elev (ft)	2079.56	Reach Len. (ft)	95.00	130.00	140.00
Crit W.S. (ft)	2075.15	Flow Area (sq ft)	17.00	901.89	42.37
E.G. Slope (ft/ft)	0.000423	Area (sq ft)	17.00	901.89	42.37
Q Total (cfs)	1778.00	Flow (cfs)	7.32	1752.40	18.28
Top Width (ft)	261.41	Top Width (ft)	21.82	185.21	54.38
Vel Total (ft/s)	1.85	Avg. Vel. (ft/s)	0.43	1.94	0.43
Max Chl Dpth (ft)	7.56	Hydr. Depth (ft)	0.78	4.87	0.78
Conv. Total (cfs)	86404.5	Conv. (cfs)	355.9	85160.3	888.3
Length Wtd. (ft)	130.00	Wetted Per. (ft)	21.87	186.51	54.40
Min Ch El (ft)	2072.00	Shear (lb/sq ft)	0.02	0.13	0.02
Alpha	1.09	Stream Power (lb/ft s)	0.01	0.25	0.01
Frctn Loss (ft)		Cum Volume (acre-ft)	0.02	2.83	0.07
C & E Loss (ft)		Cum SA (acres)	0.02	0.93	0.09

FLOW DISTRIBUTION OUTPUT Profile #PF 1

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
9767.30	9835.30	7.32	17.00	21.87	0.41	0.78	0.43
LB 9835.30	9897.04	193.50	160.85	61.77	10.88	2.61	1.20
9897.04	9958.77	609.59	320.38	61.86	34.29	5.19	1.90
9958.77	RB 10020.51	949.31	420.67	62.88	53.39	6.81	2.26
10020.51	10129.30	18.28	42.37	54.40	1.03	0.78	0.43

FLOW DISTRIBUTION OUTPUT Profile #PF 2

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
9767.30	9835.30	7.32	17.00	21.87	0.41	0.78	0.43
LB 9835.30	9897.04	193.50	160.85	61.77	10.88	2.61	1.20
9897.04	9958.77	609.59	320.38	61.86	34.29	5.19	1.90
9958.77	RB 10020.51	949.31	420.67	62.88	53.39	6.81	2.26
10020.51	10129.30	18.28	42.37	54.40	1.03	0.78	0.43

REACH: Tributary 10A RS: 0.082

INPUT
Description:
Distance from Upstream XS = 30
Deck/Roadway Width = 50
Weir Coefficient = 2.6
Bridge Deck/Roadway Skew =
Upstream Deck/Roadway Coordinates
num= 6

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
9540	2082	9625	2080	9720	2078
10020	2078	10100	2080	10170	2082

Upstream Bridge Cross Section Data
Station Elevation Data num= 12

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9767.3	2082	9807.3	2080	9835.3	2078	9894.3	2076	9939.3	2074
9961.72	207210005.18		207210010.24		207410015.66		207610020.51		2078
10090.3	2080	10129.3	2082						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9767.3	.06	9835.3	.04	10020.51	.06

Bank Sta: Left Right Coeff Contr. Expan.
9835.31 10020.51 .1 .3

Downstream Deck/Roadway Coordinates
num= 6

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
9540	2082	9625	2080	9720	2078
10020	2078	10100	2080	10170	2082

Downstream Bridge Cross Section Data
Station Elevation Data num= 12

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9640	2080	9700	2078	9738.7	2076	9933.04	2074	9953.92	2072
9994.51	2070	9998.7	207010058.62		207210081.51		207410102.15		2076
10120.93	207810146.01		2078						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9640	.06	9933.04	.04	10081.51	.06

Bank Sta: Left Right Coeff Contr. Expan.
9933.04 10081.51 .1 .3

Upstream Embankment side slope = horiz. to 1.0 vertical
Downstream Embankment side slope = horiz. to 1.0 vertical
Maximum allowable submergence for weir flow = .95
Elevation at which weir flow begins = 2077
Energy head used in spillway design =
Spillway height used in design =
Weir crest shape = Broad Crested

Number of Culverts = 1

Culvert Name	Shape	Rise	Span
New River Rd	Circular	6	

FHWA Chart # 2 - Corrugated Metal Pipe Culvert
FHWA Scale # 1 - Headwall
Solution Criteria = Highest U.S. EG

Culvert	Upstrm Dist	Length	n Value	Entrance Loss Coef	Exit Loss Coef
	10	73.25	.018	.5	1

Number of Barrels = 2
Upstream Elevation = 2071
Centerline Stations

Sta.	Sta.
9990	9999

Downstream Elevation = 2069.6
Centerline Stations

Sta.	Sta.
9992	10001

CROSS SECTION RIVER: Tributary 10A
REACH: Tributary 10A RS: 0.064

INPUT
Description:
Station Elevation Data num= 12

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9640	2080	9700	2078	9738.7	2076	9933.04	2074	9953.92	2072
9994.51	2070	9998.7	207010058.62		207210081.51		207410102.15		2076
10120.93	207810146.01		2078						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9640	.06	9933.04	.04510081.51		.06

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
9933.04	10081.51	180	190	170	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2074.07	Element			
Vel Head (ft)	0.60	Wt. n-Val.		0.045	
W.S. Elev (ft)	2073.47	Reach Len. (ft)	180.00	190.00	170.00
Crit W.S. (ft)		Flow Area (sq ft)		287.01	
E.G. Slope (ft/ft)	0.013153	Area (sq ft)		287.01	
Q Total (cfs)	1778.00	Flow (cfs)		1778.00	
Top Width (ft)	136.96	Top Width (ft)		136.96	
Vel Total (ft/s)	6.19	Avg. Vel. (ft/s)		6.19	
Max Chl Dpth (ft)	3.47	Hydr. Depth (ft)		2.10	
Conv. Total (cfs)	15503.1	Conv. (cfs)		15503.1	
Length Wtd. (ft)	190.00	Wetted Per. (ft)		137.18	
Min Ch El (ft)	2070.00	Shear (lb/sq ft)		1.72	
Alpha	1.00	Stream Power (lb/ft s)		10.64	
Frctn Loss (ft)	3.06	Cum Volume (acre-ft)		1.05	
C & E Loss (ft)	0.07	Cum SA (acres)		0.45	

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

CROSS SECTION OUTPUT Profile #PF 2

			Left OB	Channel	Right OB
E.G. Elev (ft)	2074.07	Element			
Vel Head (ft)	0.60	Wt. n-Val.		0.045	
W.S. Elev (ft)	2073.47	Reach Len. (ft)	180.00	190.00	170.00
Crit W.S. (ft)		Flow Area (sq ft)		287.01	
E.G. Slope (ft/ft)	0.013153	Area (sq ft)		287.01	
Q Total (cfs)	1778.00	Flow (cfs)		1778.00	
Top Width (ft)	136.96	Top Width (ft)		136.96	
Vel Total (ft/s)	6.19	Avg. Vel. (ft/s)		6.19	
Max Chl Dpth (ft)	3.47	Hydr. Depth (ft)		2.10	
Conv. Total (cfs)	15503.1	Conv. (cfs)		15503.1	
Length Wtd. (ft)	190.00	Wetted Per. (ft)		137.18	
Min Ch El (ft)	2070.00	Shear (lb/sq ft)		1.72	
Alpha	1.00	Stream Power (lb/ft s)		10.64	
Frctn Loss (ft)	3.06	Cum Volume (acre-ft)		1.05	
C & E Loss (ft)	0.07	Cum SA (acres)		0.45	

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

FLOW DISTRIBUTION OUTPUT Profile #PF 1

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9933.04	9982.53	369.75	73.68	44.11	20.80	1.67	5.02
9982.53	10032.02	1117.56	149.87	49.52	62.85	3.03	7.46
10032.02	RB 10081.51	290.69	63.46	43.55	16.35	1.46	4.58

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.

FLOW DISTRIBUTION OUTPUT Profile #PF 2

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9933.04	9982.53	369.75	73.68	44.11	20.80	1.67	5.02
9982.53	10032.02	1117.56	149.87	49.52	62.85	3.03	7.46
10032.02	RB 10081.51	290.69	63.46	43.55	16.35	1.46	4.58

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

CROSS SECTION RIVER: Tributary 10A
REACH: Tributary 10A RS: 0.029

INPUT
Description:
Station Elevation Data num= 13

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9774.87	2072	9955.09	2070	9983.15	2068	9989.9	2066	9996.29	2064
10007.57	206410015.74		206610023.58		206810031.96		207010047.14		2072
10065.14	207410141.26		2074	10157.8	2072				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9774.87	.06	9955.09	.045	10031.96	.06

Bank Sta: Left	Right	Coeff Contr.	Expan.
9955.09	10031.96	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2070.94	Element			
Vel Head (ft)	1.28	Wt. n-Val.		0.045	
W.S. Elev (ft)	2069.66	Reach Len. (ft)			
Crit W.S. (ft)	2069.55	Flow Area (sq ft)		195.57	
E.G. Slope (ft/ft)	0.020006	Area (sq ft)		195.57	
Q Total (cfs)	1778.00	Flow (cfs)		1778.00	
Top Width (ft)	70.67	Top Width (ft)		70.67	
Vel Total (ft/s)	9.09	Avg. Vel. (ft/s)		9.09	
Max Chl Dpth (ft)	5.66	Hydr. Depth (ft)		2.77	
Conv. Total (cfs)	12570.5	Conv. (cfs)		12570.5	
Length Wtd. (ft)		Wetted Per. (ft)		72.01	
Min Ch El (ft)	2064.00	Shear (lb/sq ft)		3.39	
Alpha	1.00	Stream Power (lb/ft s)		30.84	
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

CROSS SECTION OUTPUT Profile #PF 2

			Left OB	Channel	Right OB
E.G. Elev (ft)	2070.94	Element			
Vel Head (ft)	1.28	Wt. n-Val.		0.045	
W.S. Elev (ft)	2069.66	Reach Len. (ft)			
Crit W.S. (ft)	2069.55	Flow Area (sq ft)		195.57	
E.G. Slope (ft/ft)	0.020006	Area (sq ft)		195.57	
Q Total (cfs)	1778.00	Flow (cfs)		1778.00	
Top Width (ft)	70.67	Top Width (ft)		70.67	
Vel Total (ft/s)	9.09	Avg. Vel. (ft/s)		9.09	
Max Chl Dpth (ft)	5.66	Hydr. Depth (ft)		2.77	
Conv. Total (cfs)	12570.5	Conv. (cfs)		12570.5	
Length Wtd. (ft)		Wetted Per. (ft)		72.01	
Min Ch El (ft)	2064.00	Shear (lb/sq ft)		3.39	
Alpha	1.00	Stream Power (lb/ft s)		30.84	
Frctn Loss (ft)		Cum Volume (acre-ft)			

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

FLOW DISTRIBUTION OUTPUT Profile #PF 1

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9955.09	9980.71	51.58	15.48	20.90	2.90	0.74	3.33
9980.71	10006.34	1136.18	108.42	26.23	63.90	4.23	10.48
10006.34	RB 10031.96	590.24	71.67	24.88	33.20	2.96	8.24

FLOW DISTRIBUTION OUTPUT Profile #PF 2

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9955.09	9980.71	51.58	15.48	20.90	2.90	0.74	3.33
9980.71	10006.34	1136.18	108.42	26.23	63.90	4.23	10.48
10006.34	RB 10031.96	590.24	71.67	24.88	33.20	2.96	8.24

SUMMARY OF MANNING'S N VALUES

River:Tributary 10A

Reach	River Sta.	n1	n2	n3
Tributary 10A	1.107	.06	.045	.06
Tributary 10A	1.016	.06	.045	.06
Tributary 10A	0.931	.06	.045	.06
Tributary 10A	0.860	.06	.045	.06
Tributary 10A	0.802	.06	.045	.06
Tributary 10A	0.741	.06	.045	.06
Tributary 10A	0.707	.06	.045	.06
Tributary 10A	0.612	.06	.045	.06
Tributary 10A	0.505	.06	.045	.06
Tributary 10A	0.410	.06	.045	.06
Tributary 10A	0.323	.06	.045	.06
Tributary 10A	0.225	.06	.045	.06
Tributary 10A	0.133	.06	.045	.06
Tributary 10A	0.101	.06	.045	.06
Tributary 10A	0.090	.06	.045	.06
Tributary 10A	0.082	Culvert		
Tributary 10A	0.064	.06	.045	.06
Tributary 10A	0.029	.06	.045	.06

SUMMARY OF REACH LENGTHS

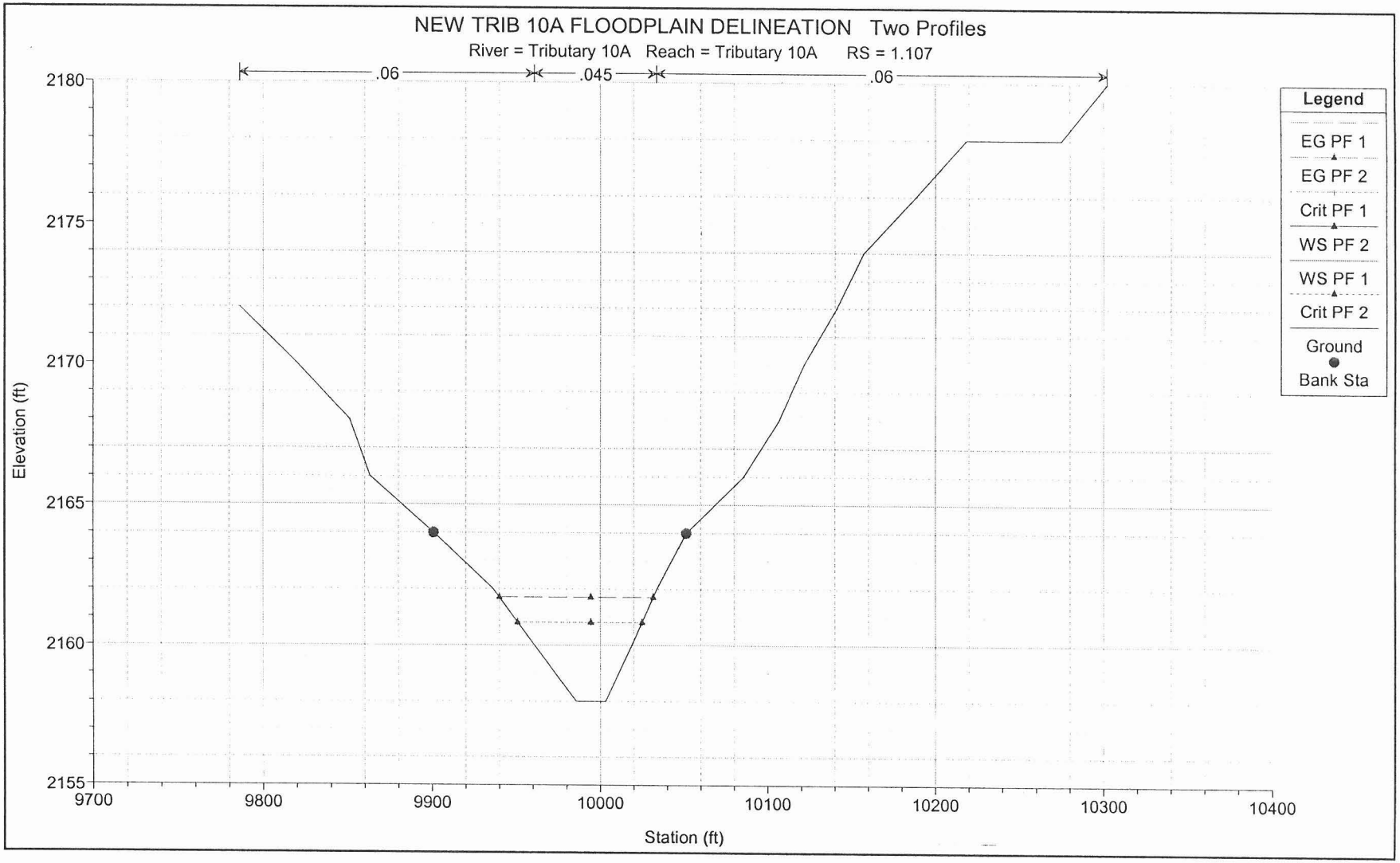
River: Tributary 10A

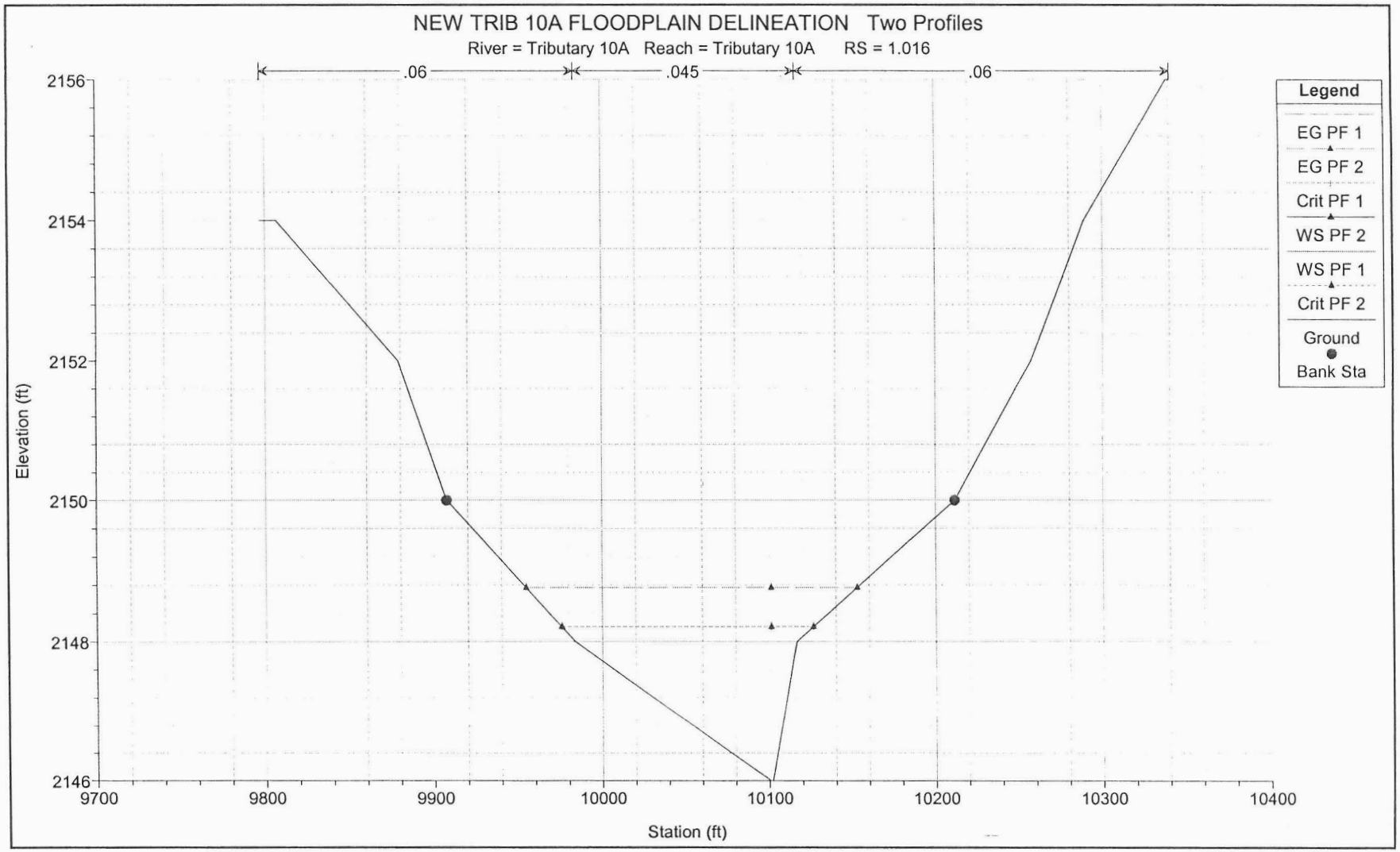
Reach	River Sta.	Left	Channel	Right
Tributary 10A	1.107	493.75	471.99	463.91
Tributary 10A	1.016	445.07	442.99	469
Tributary 10A	0.931	375.3	364.68	365.05
Tributary 10A	0.860	228.9	252.72	290.66
Tributary 10A	0.802	280	280	290
Tributary 10A	0.741	165	175	230
Tributary 10A	0.707	491.4	500.3	500.3
Tributary 10A	0.612	580.6	567.86	546.6
Tributary 10A	0.505	462.2	499.28	504.9
Tributary 10A	0.410	463.85	463.59	459.13
Tributary 10A	0.323	483	511.3	524.35
Tributary 10A	0.225	466.26	487.81	497.55
Tributary 10A	0.133	203.6	176.1	159.1
Tributary 10A	0.101	247.7	82	74
Tributary 10A	0.090	95	130	140
Tributary 10A	0.082	Culvert		
Tributary 10A	0.064	180	190	170

Tributary 10A 0.029

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: Tributary 10A

Reach	River Sta.	Contr.	Expan.
Tributary 10A	1.107	.1	.3
Tributary 10A	1.016	.1	.3
Tributary 10A	0.931	.1	.3
Tributary 10A	0.860	.1	.3
Tributary 10A	0.802	.1	.3
Tributary 10A	0.741	.1	.3
Tributary 10A	0.707	.1	.3
Tributary 10A	0.612	.1	.3
Tributary 10A	0.505	.1	.3
Tributary 10A	0.410	.1	.3
Tributary 10A	0.323	.1	.3
Tributary 10A	0.225	.1	.3
Tributary 10A	0.133	.1	.3
Tributary 10A	0.101	.1	.3
Tributary 10A	0.090	.1	.3
Tributary 10A	0.082	Culvert	
Tributary 10A	0.064	.1	.3
Tributary 10A	0.029	.1	.3


NEW TRIB 10A FLOODPLAIN DELINEATION Two Profiles
River = Tributary 10A Reach = Tributary 10A RS = 1.107
.06
.045
.06
Legend
EG PF 1
EG PF 2
Crit PF 1
WS PF 2
WS PF 1
Crit PF 2
Ground
Bank Sta
Elevation (ft)
2180
2175
2170
2165
2160
2155
9700
9800
9900
10000
10100
10200
10300
10400
Station (ft)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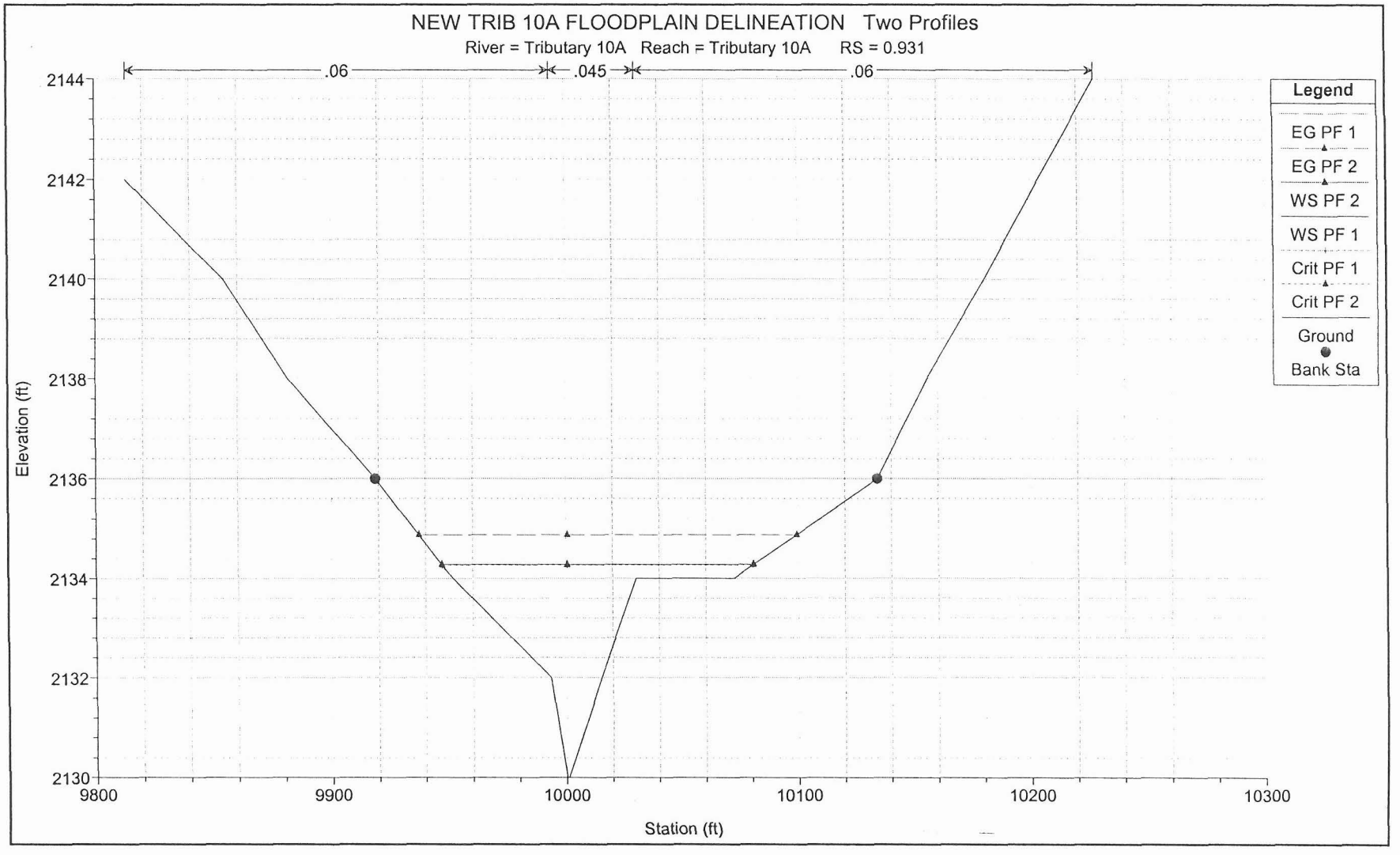
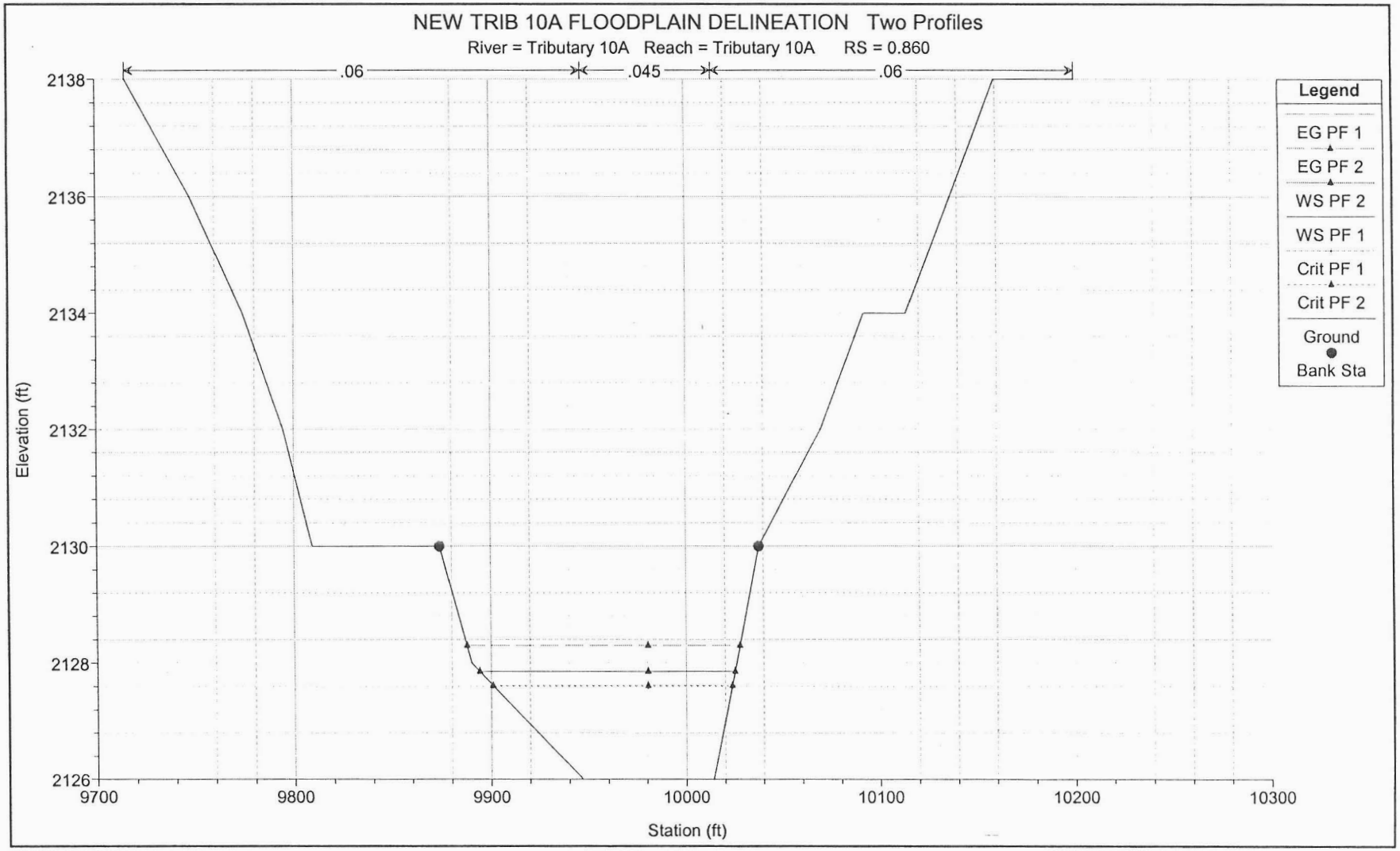
River = Tributary 10A Reach = Tributary 10A RS = 1.016
.06
.045
.06
Legend
EG PF 1
EG PF 2
Crit PF 1
WS PF 2
WS PF 1
Crit PF 2
Ground
Bank Sta
Elevation (ft)
2156
2154
2152
2150
2148
2146
9700
9800
9900
10000
10100
10200
10300
10400
Station (ft)


NEW TRIB 10A FLOODPLAIN DELINEATION Two Profiles
River = Tributary 10A Reach = Tributary 10A RS = 0.931
.06
.045
.06
Legend
EG PF 1
EG PF 2
WS PF 2
WS PF 1
Crit PF 1
Crit PF 2
Ground
Bank Sta
Elevation (ft)
2144
2142
2140
2138
2136
2134
2132
2130
9800
9900
10000
10100
10200
10300
Station (ft)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River = Tributary 10A Reach = Tributary 10A RS = 0.860
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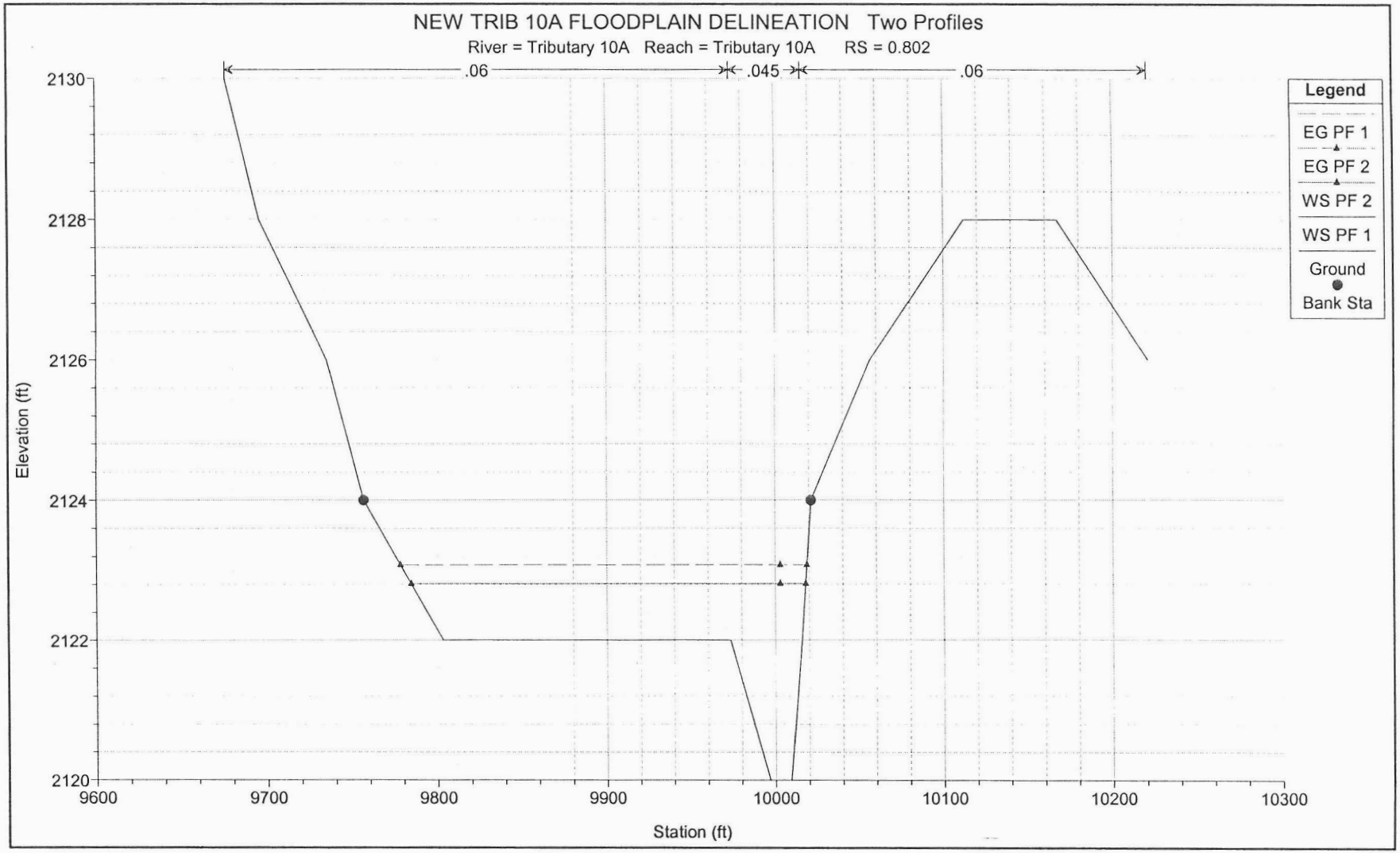
.045
.06
Legend
EG PF 1
EG PF 2
WS PF 2
WS PF 1
Crit PF 1
Crit PF 2
Ground
Bank Sta
Elevation (ft)
2138
2136
2134
2132
2130
2128
2126
9700
9800
9900
10000
10100
10200
10300
Station (ft)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River = Tributary 10A Reach = Tributary 10A RS = 0.802
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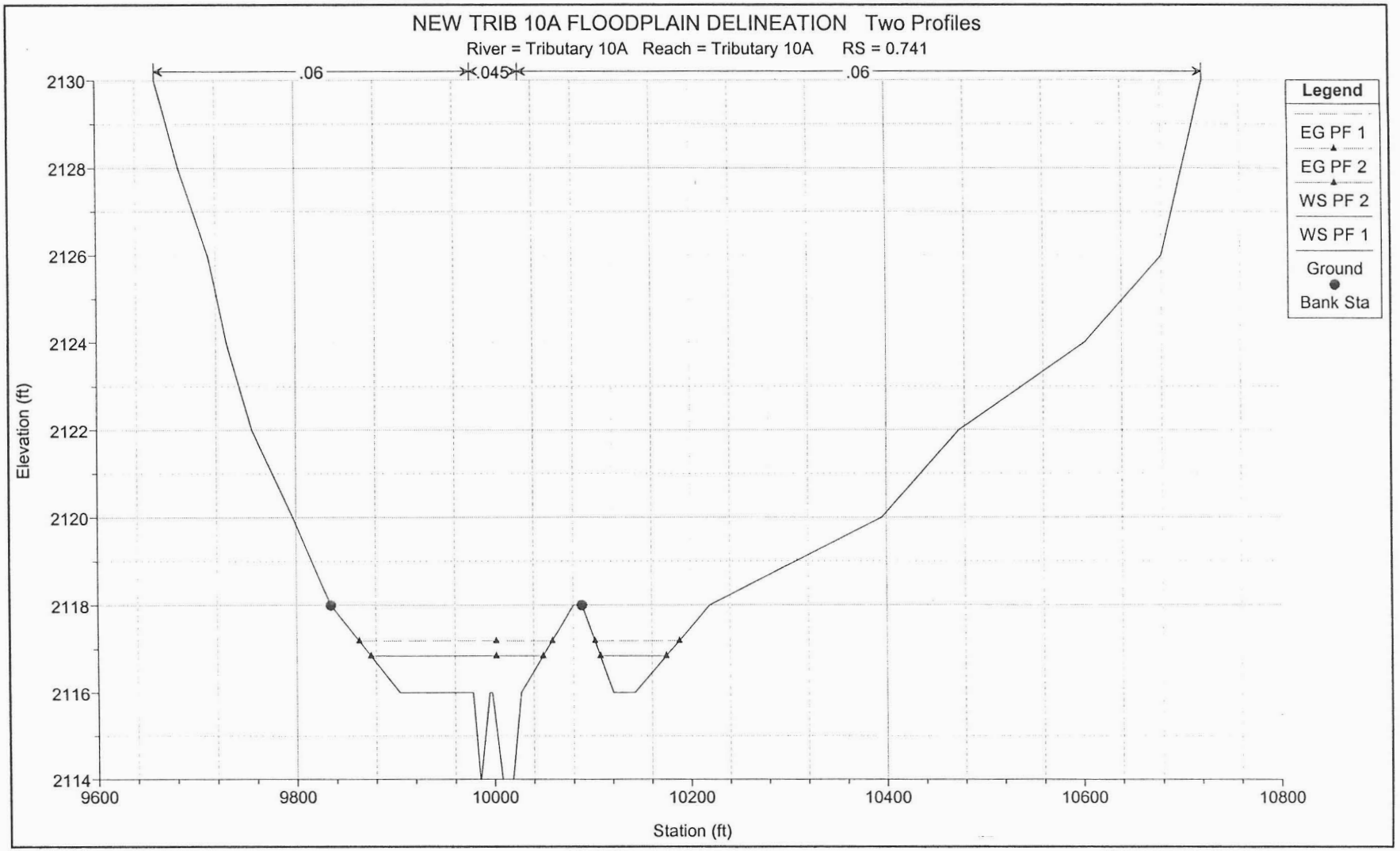
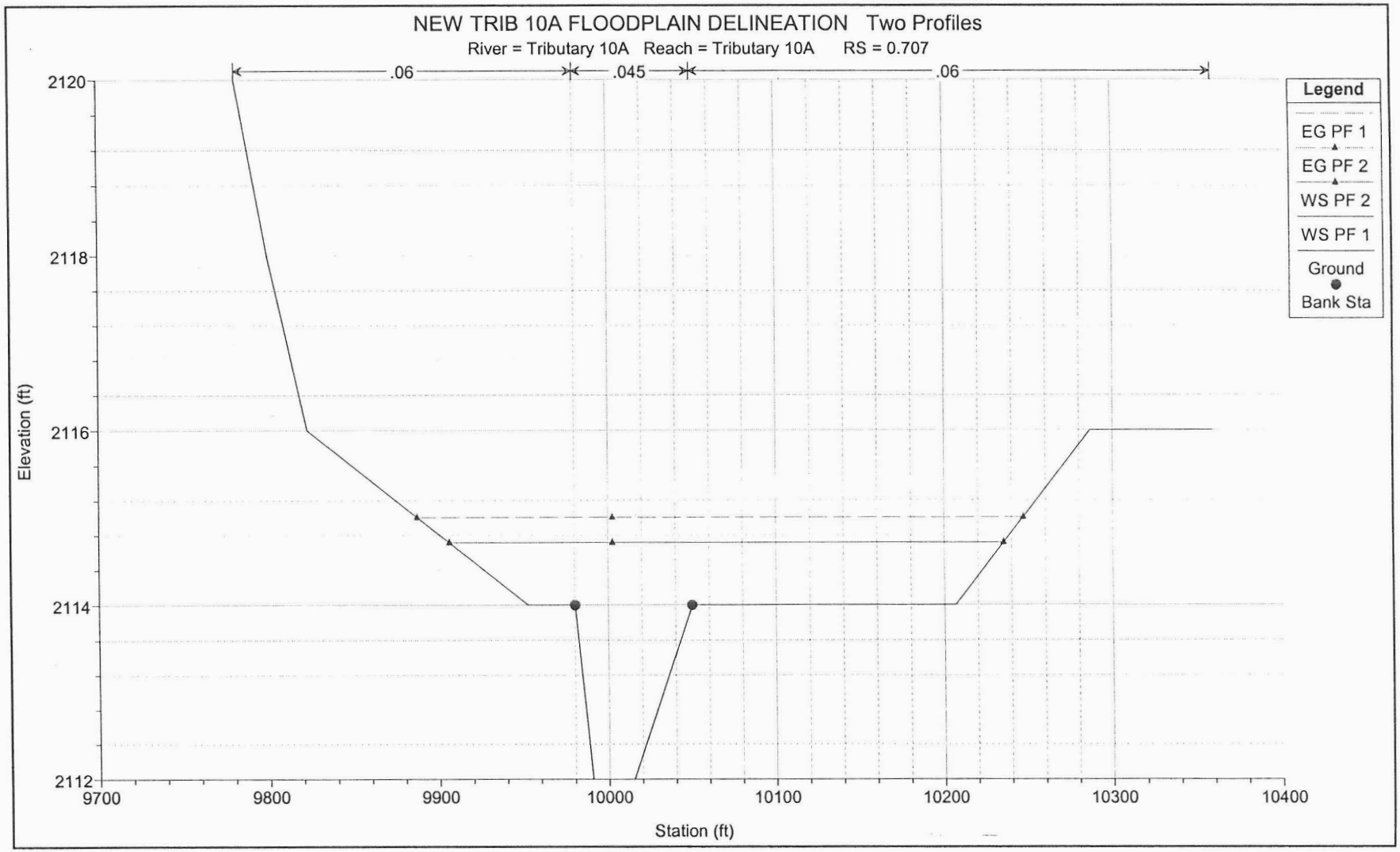
.045
.06
Legend
EG PF 1
EG PF 2
WS PF 2
WS PF 1
Ground
Bank Sta
Elevation (ft)
2130
2128
2126
2124
2122
2120
9600
9700
9800
9900
10000
10100
10200
10300
Station (ft)


NEW TRIB 10A FLOODPLAIN DELINEATION Two Profiles
River = Tributary 10A Reach = Tributary 10A RS = 0.741
.06
.045
.06
Legend
EG PF 1
EG PF 2
WS PF 2
WS PF 1
Ground
Bank Sta
Elevation (ft)
2130
2128
2126
2124
2122
2120
2118
2116
2114
9600
9800
10000
10200
10400
10600
10800
Station (ft)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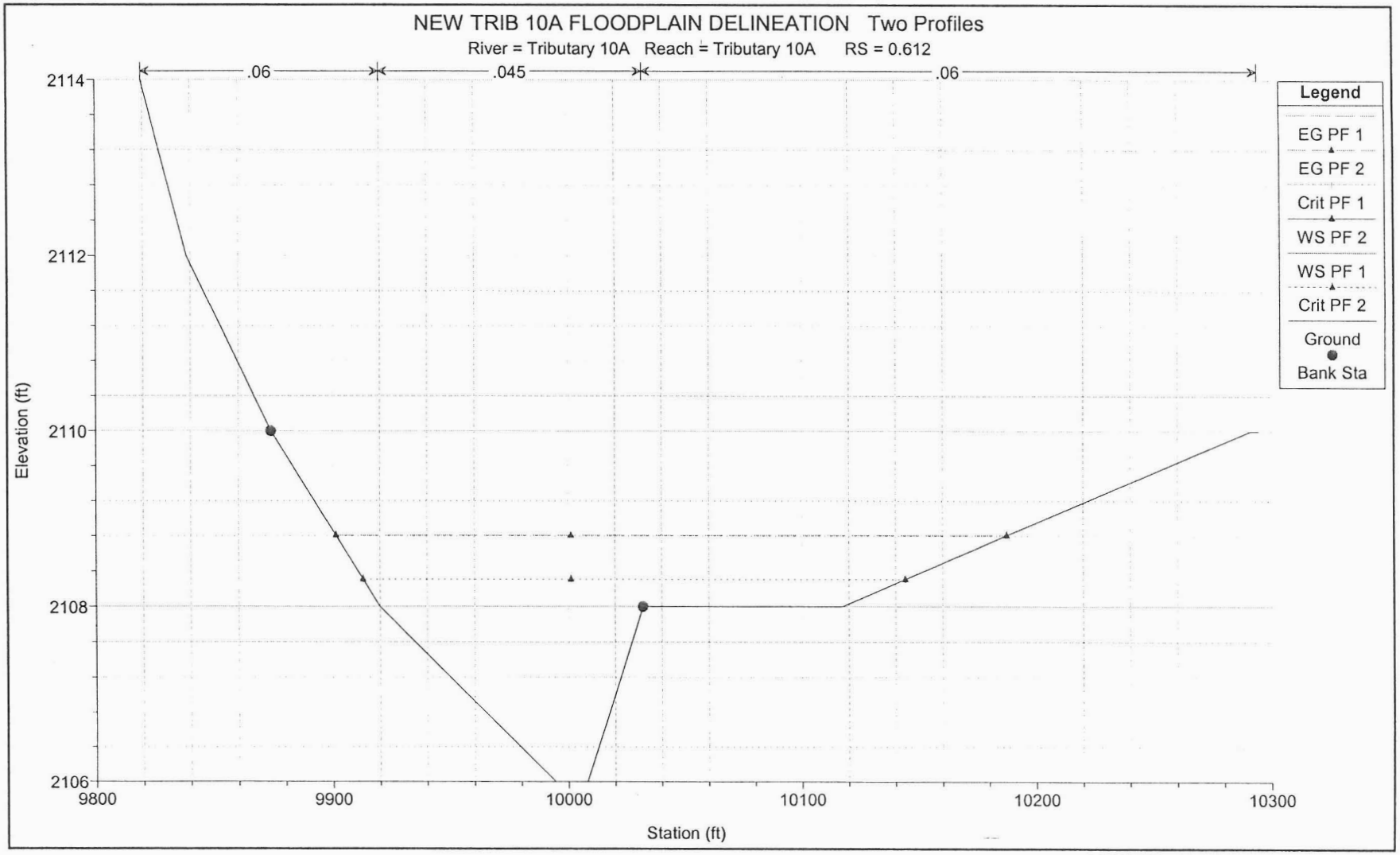
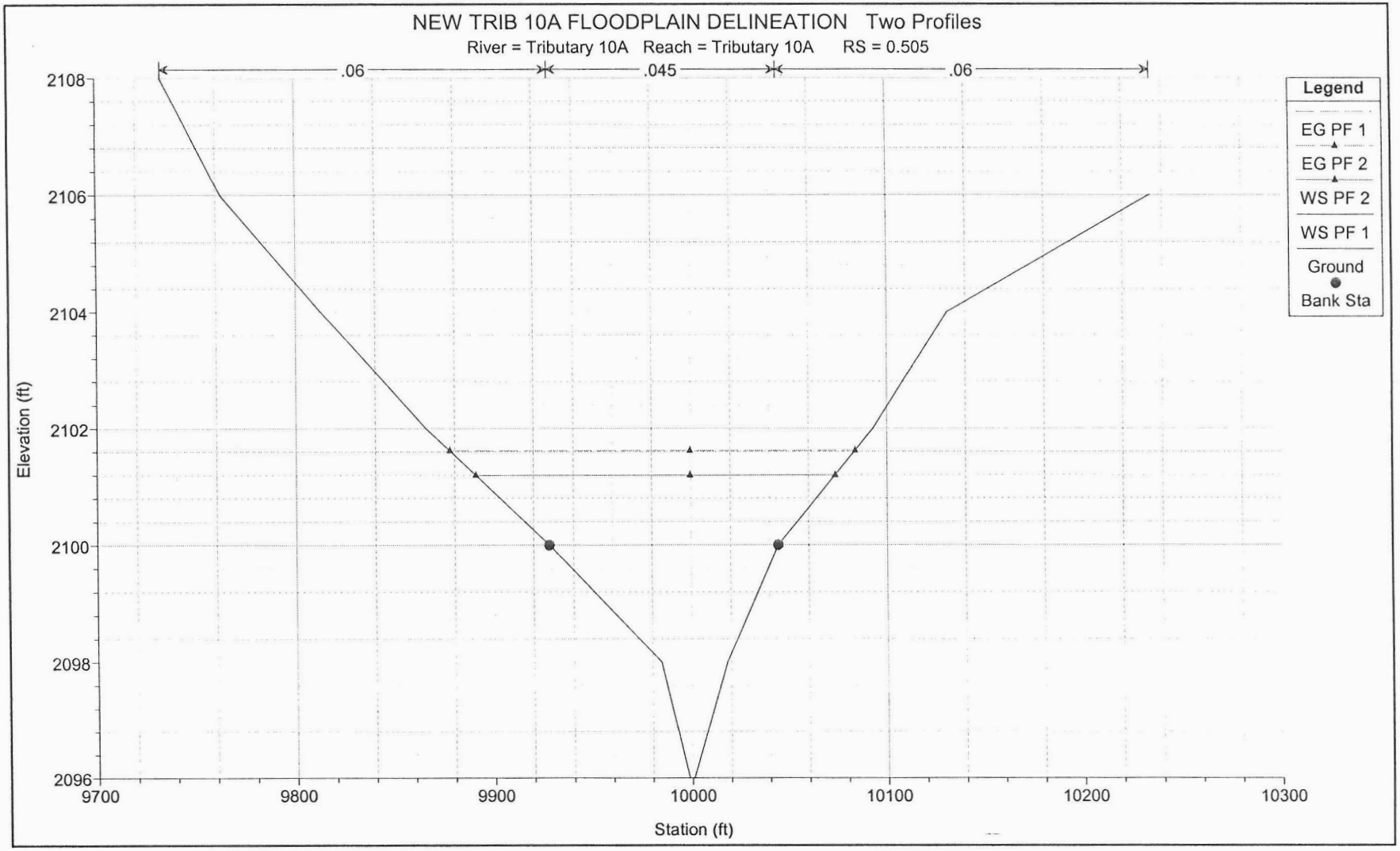
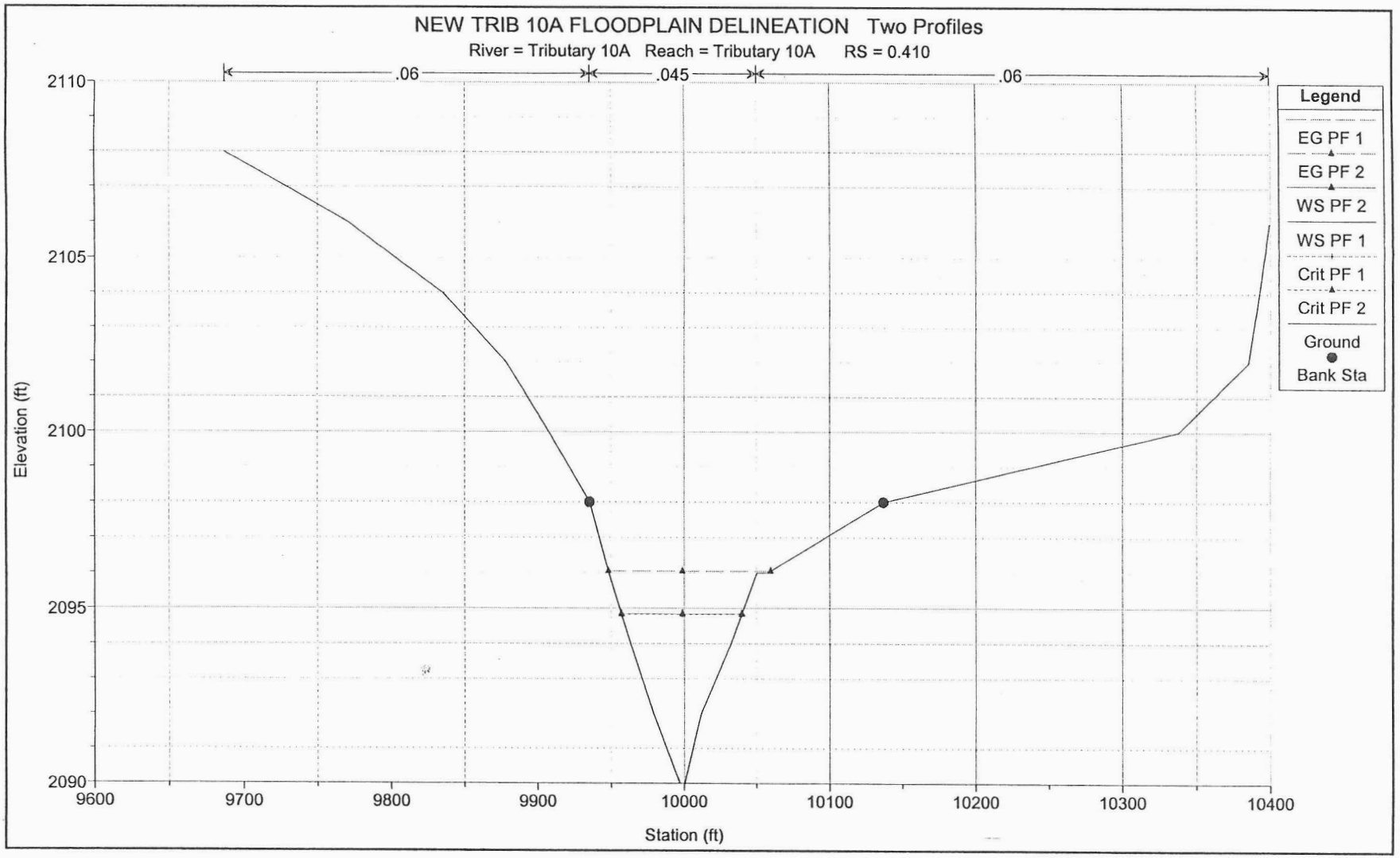
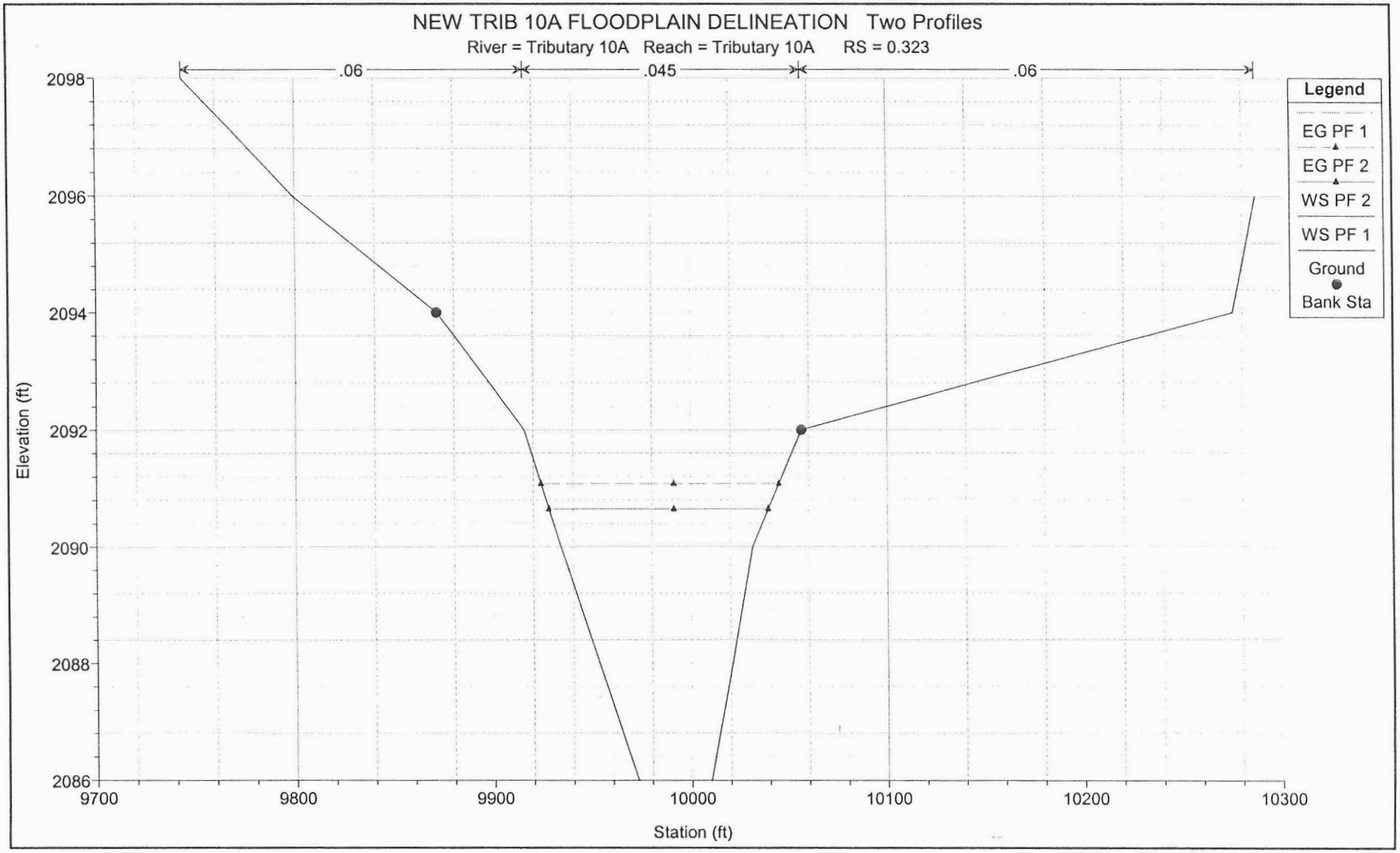
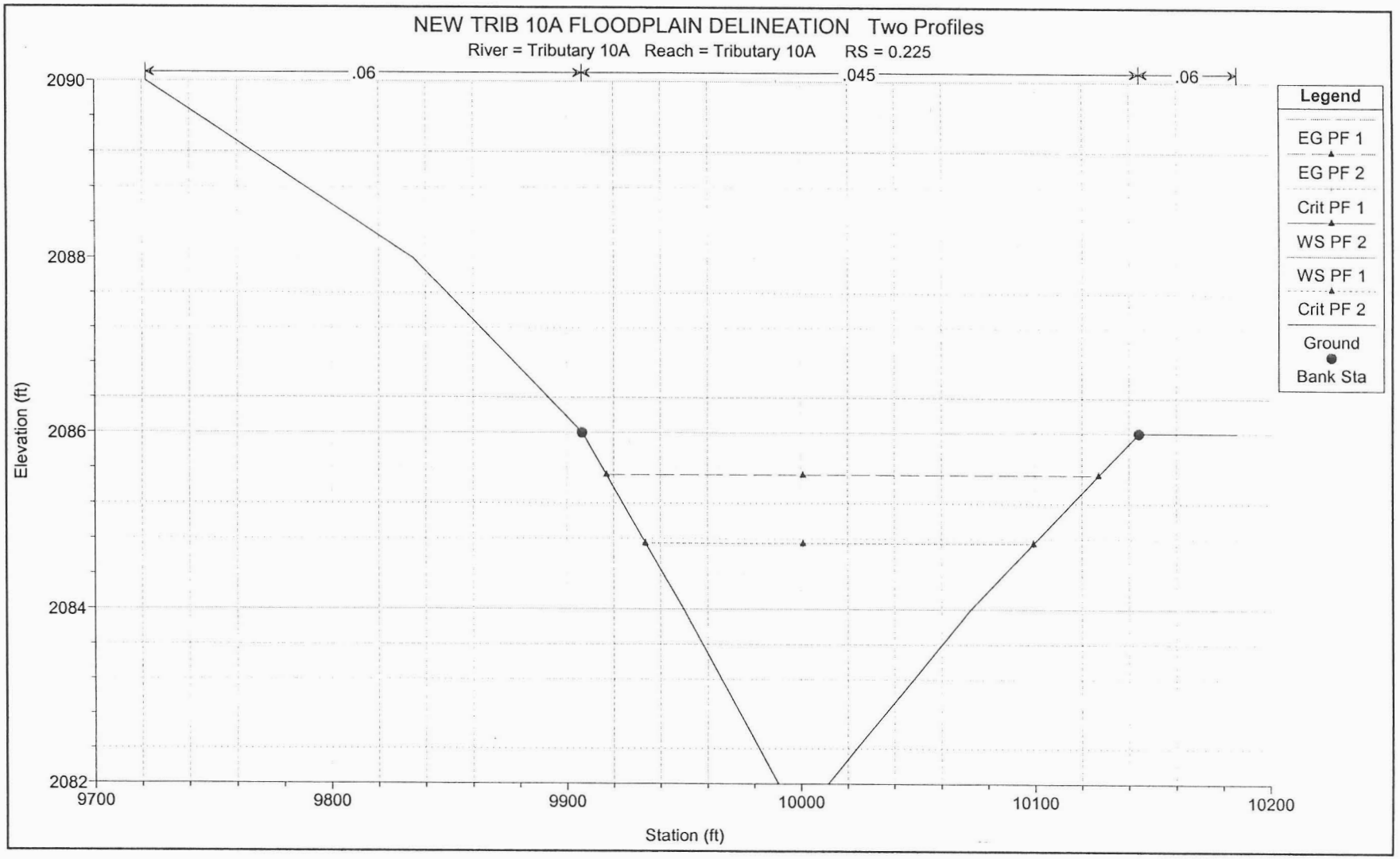
River = Tributary 10A Reach = Tributary 10A RS = 0.707
.06
.045
.06
Legend
EG PF 1
EG PF 2
WS PF 2
WS PF 1
Ground
Bank Sta
Elevation (ft)
2120
2118
2116
2114
2112
9700
9800
9900
10000
10100
10200
10300
10400
Station (ft)

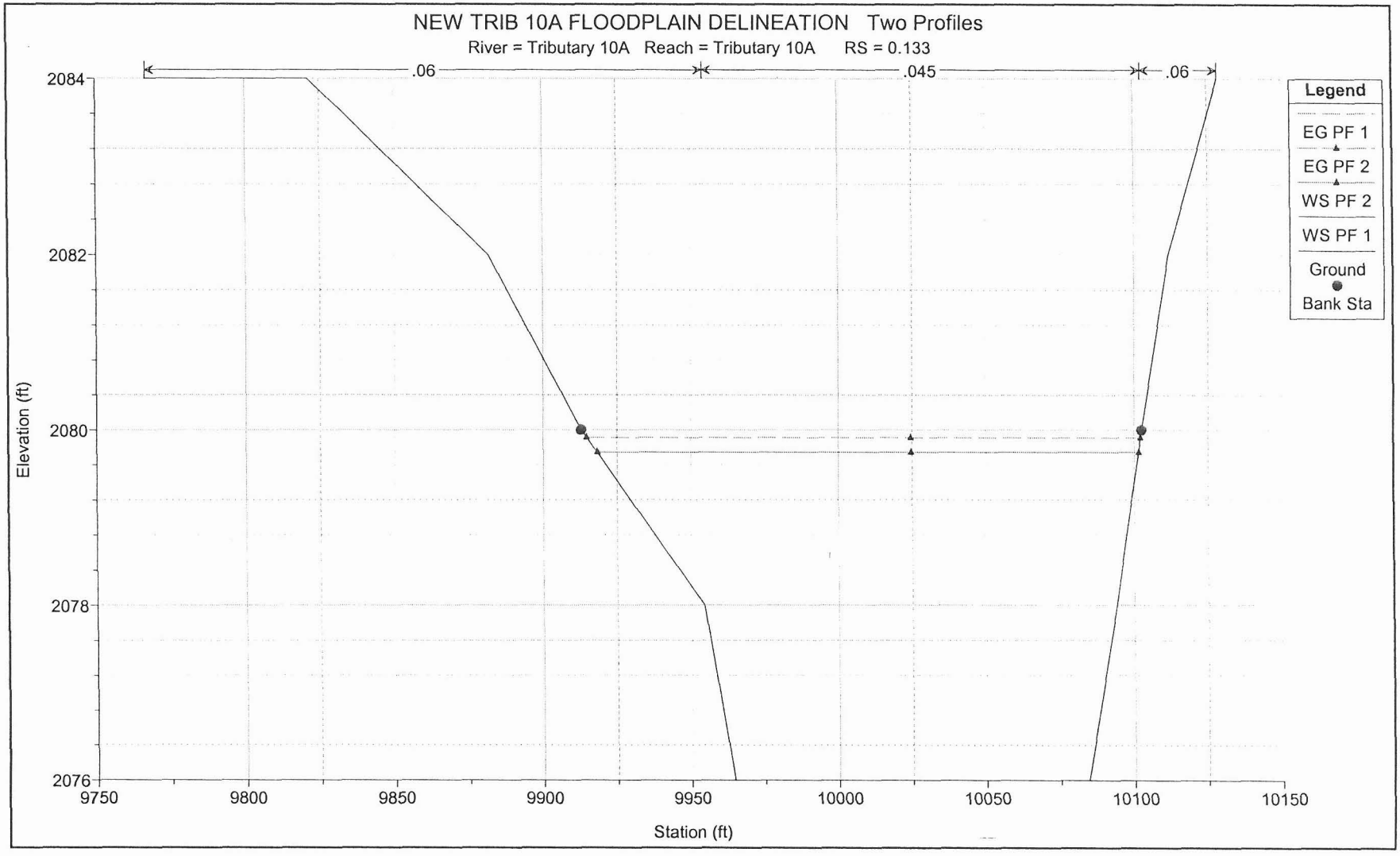

NEW TRIB 10A FLOODPLAIN DELINEATION Two Profiles
River = Tributary 10A Reach = Tributary 10A RS = 0.612
.06
.045
.06
Legend
EG PF 1
EG PF 2
Crit PF 1
WS PF 2
WS PF 1
Crit PF 2
Ground
Bank Sta
Elevation (ft)
2114
2112
2110
2108
2106
9800
9900
10000
10100
10200
10300
Station (ft)

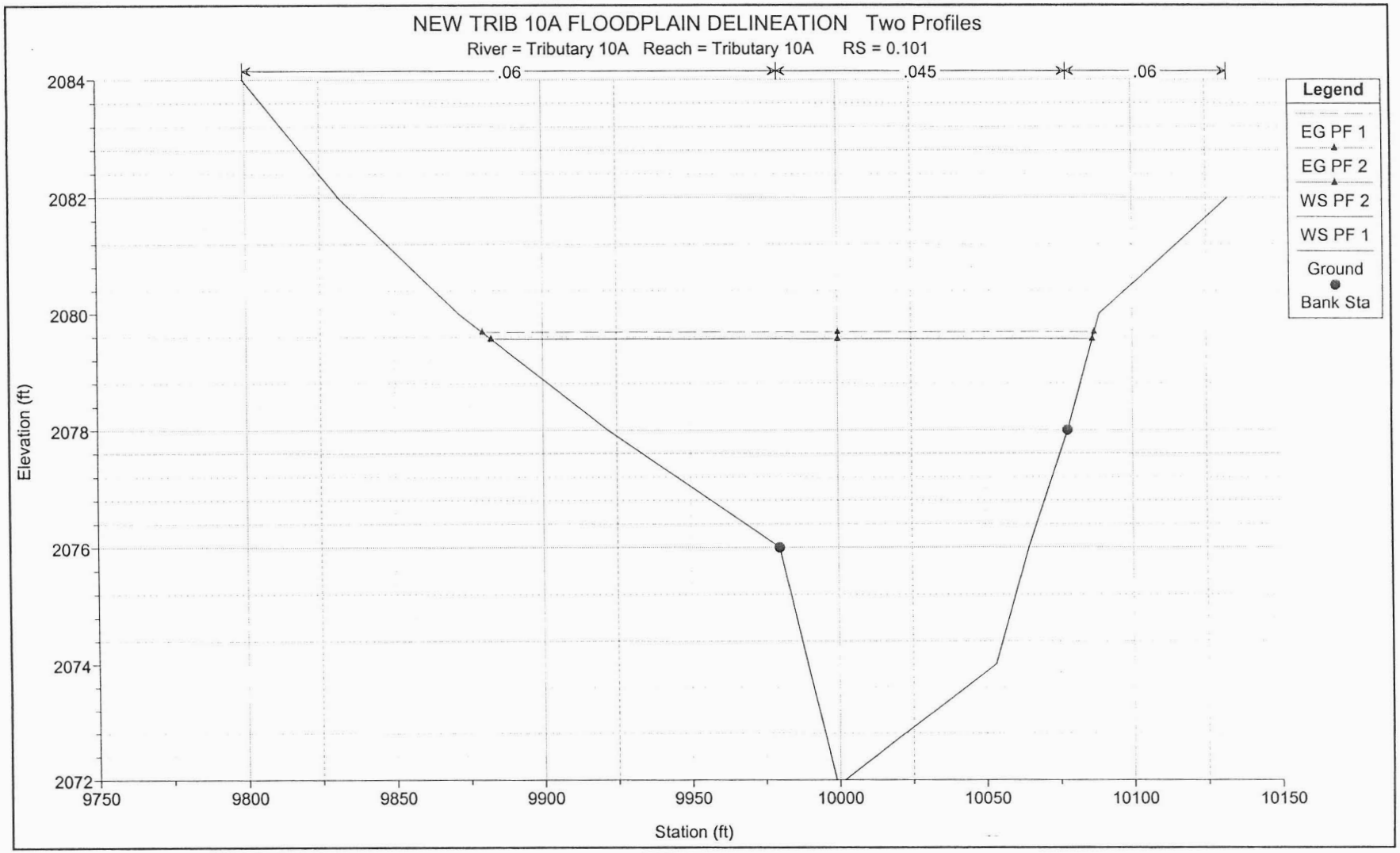

NEW TRIB 10A FLOODPLAIN DELINEATION Two Profiles
River = Tributary 10A Reach = Tributary 10A RS = 0.505
.06
.045
.06
Legend
EG PF 1
EG PF 2
WS PF 2
WS PF 1
Ground
Bank Sta
Elevation (ft)
2108
2106
2104
2102
2100
2098
2096
9700
9800
9900
10000
10100
10200
10300
Station (ft)

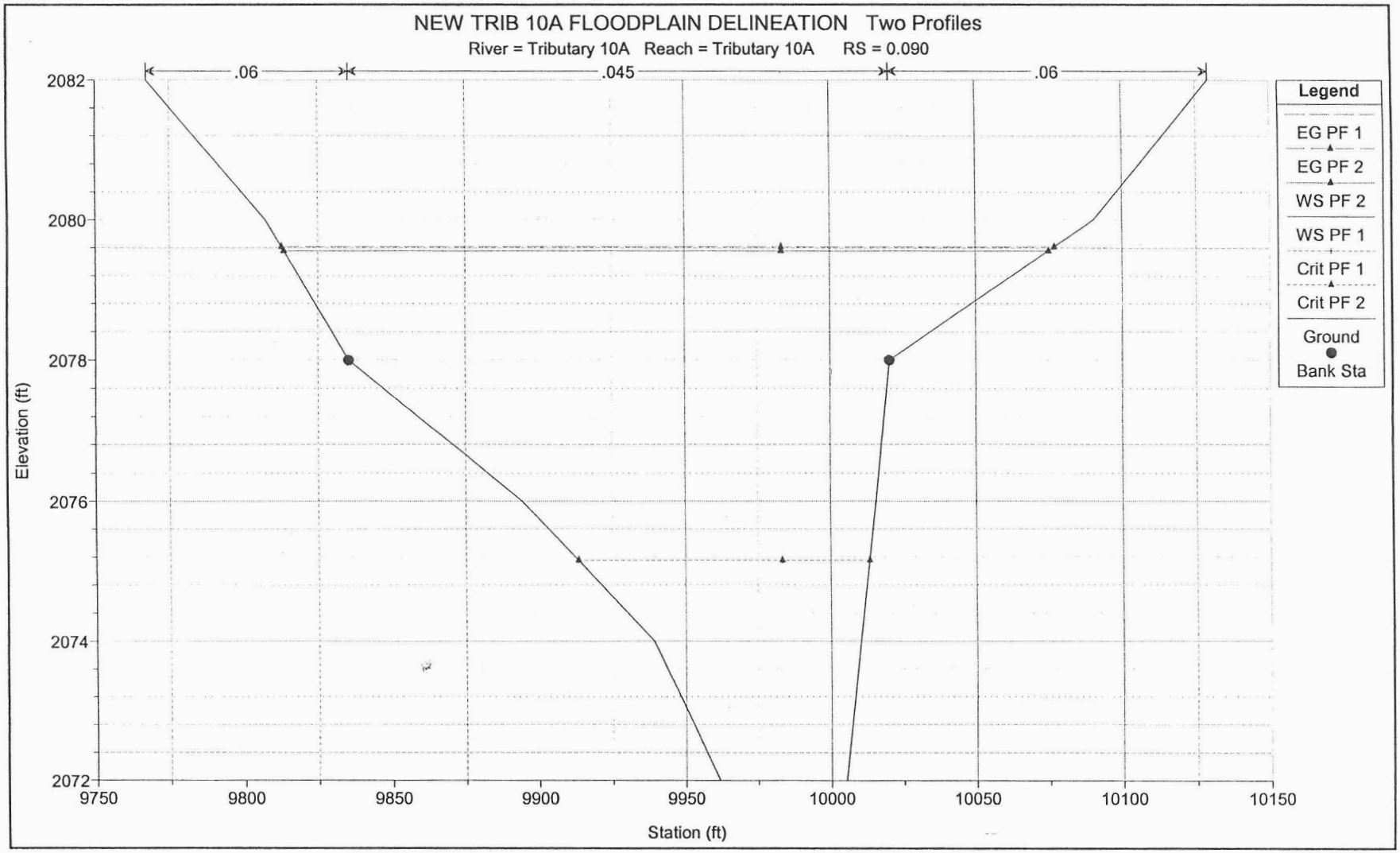

NEW TRIB 10A FLOODPLAIN DELINEATION Two Profiles
River = Tributary 10A Reach = Tributary 10A RS = 0.410
.06
.045
.06
Legend
EG PF 1
EG PF 2
WS PF 2
WS PF 1
Crit PF 1
Crit PF 2
Ground
Bank Sta
Elevation (ft)
2110
2105
2100
2095
2090
9600
9700
9800
9900
10000
10100
10200
10300
10400
Station (ft)

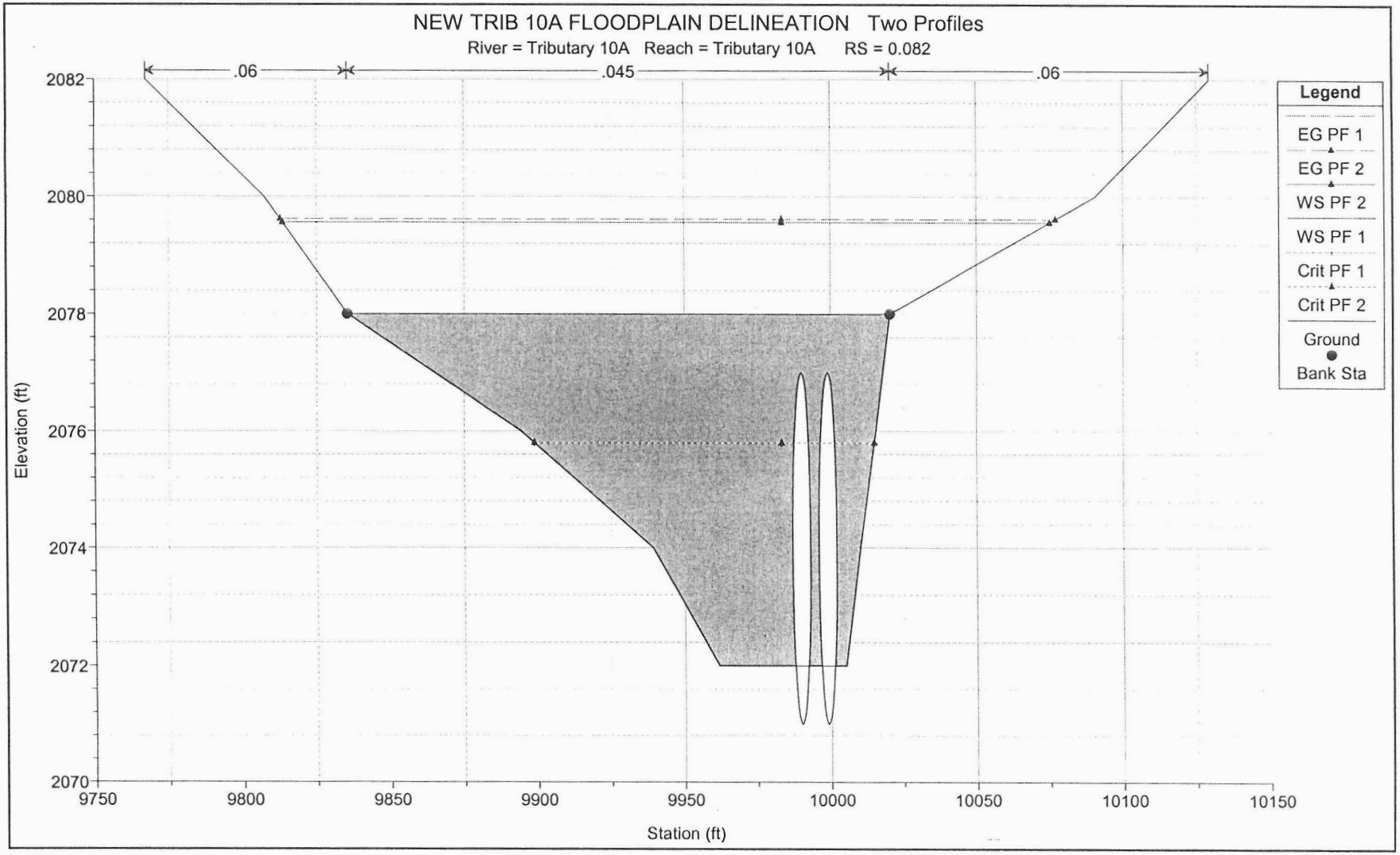

NEW TRIB 10A FLOODPLAIN DELINEATION Two Profiles
River = Tributary 10A Reach = Tributary 10A RS = 0.323
.06
.045
.06
Legend
EG PF 1
EG PF 2
WS PF 2
WS PF 1
Ground
Bank Sta
Elevation (ft)
2098
2096
2094
2092
2090
2088
2086
9700
9800
9900
10000
10100
10200
10300
Station (ft)

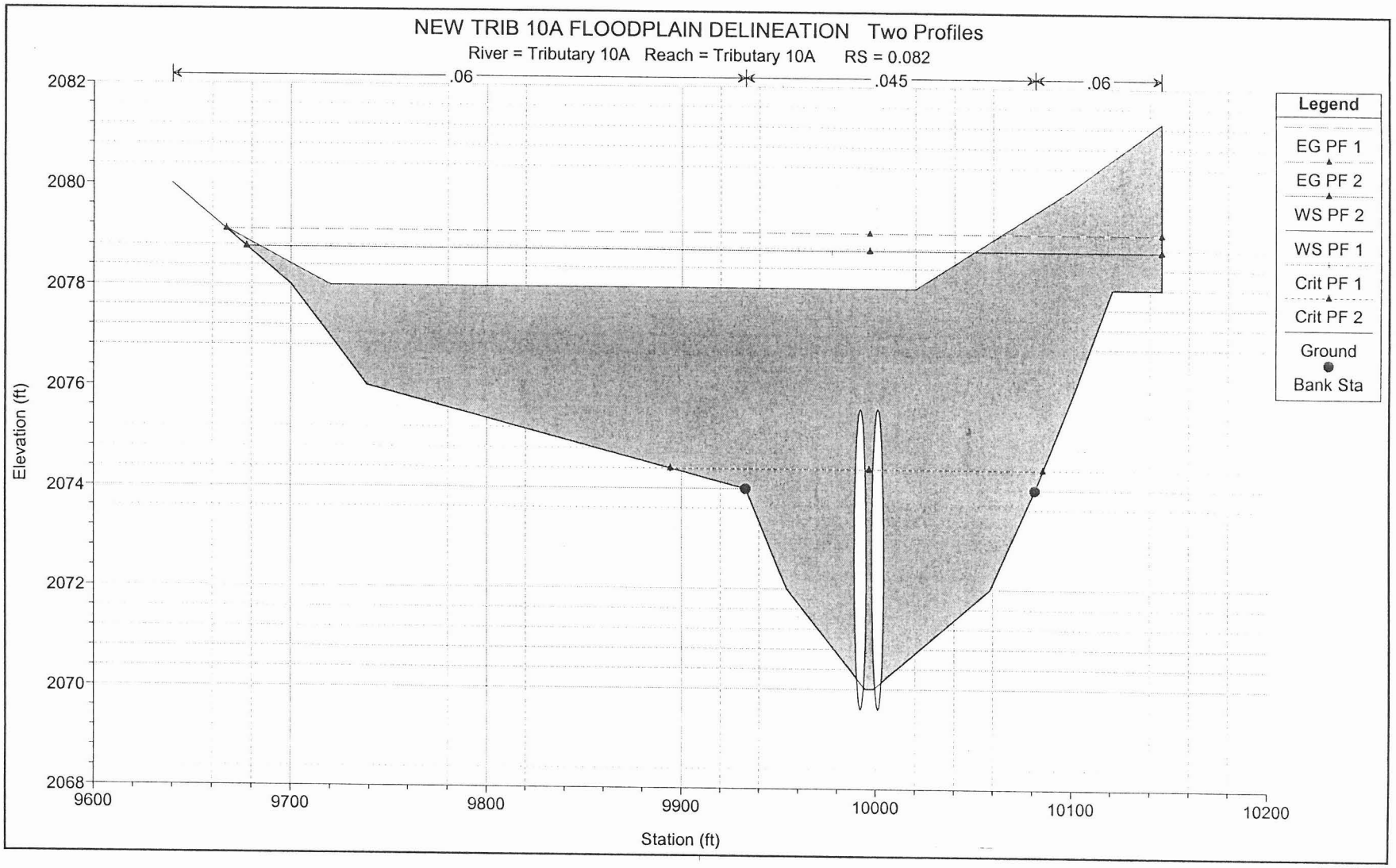

NEW TRIB 10A FLOODPLAIN DELINEATION Two Profiles
River = Tributary 10A Reach = Tributary 10A RS = 0.225
.06
.045
.06
Legend
EG PF 1
EG PF 2
Crit PF 1
WS PF 2
WS PF 1
Crit PF 2
Ground
Bank Sta
Elevation (ft)
2090
2088
2086
2084
2082
9700
9800
9900
10000
10100
10200
Station (ft)


NEW TRIB 10A FLOODPLAIN DELINEATION Two Profiles
River = Tributary 10A Reach = Tributary 10A RS = 0.133
.06
.045
.06
Legend
EG PF 1
EG PF 2
WS PF 2
WS PF 1
Ground
Bank Sta
Elevation (ft)
2084
2082
2080
2078
2076
9750
9800
9850
9900
9950
10000
10050
10100
10150
Station (ft)


NEW TRIB 10A FLOODPLAIN DELINEATION Two Profiles
River = Tributary 10A Reach = Tributary 10A RS = 0.101
.06
.045
.06
Legend
EG PF 1
EG PF 2
WS PF 2
WS PF 1
Ground
Bank Sta
Elevation (ft)
2084
2082
2080
2078
2076
2074
2072
9750
9800
9850
9900
9950
10000
10050
10100
10150
Station (ft)


NEW TRIB 10A FLOODPLAIN DELINEATION Two Profiles
River = Tributary 10A Reach = Tributary 10A RS = 0.090
.06
.045
.06
Legend
EG PF 1
EG PF 2
WS PF 2
WS PF 1
Crit PF 1
Crit PF 2
Ground
Bank Sta
Elevation (ft)
2082
2080
2078
2076
2074
2072
9750
9800
9850
9900
9950
10000
10050
10100
10150
Station (ft)


NEW TRIB 10A FLOODPLAIN DELINEATION Two Profiles
River = Tributary 10A Reach = Tributary 10A RS = 0.082
.06
.045
.06
Legend
EG PF 1
EG PF 2
WS PF 2
WS PF 1
Crit PF 1
Crit PF 2
Ground
Bank Sta
Elevation (ft)
2082
2080
2078
2076
2074
2072
2070
9750
9800
9850
9900
9950
10000
10050
10100
10150
Station (ft)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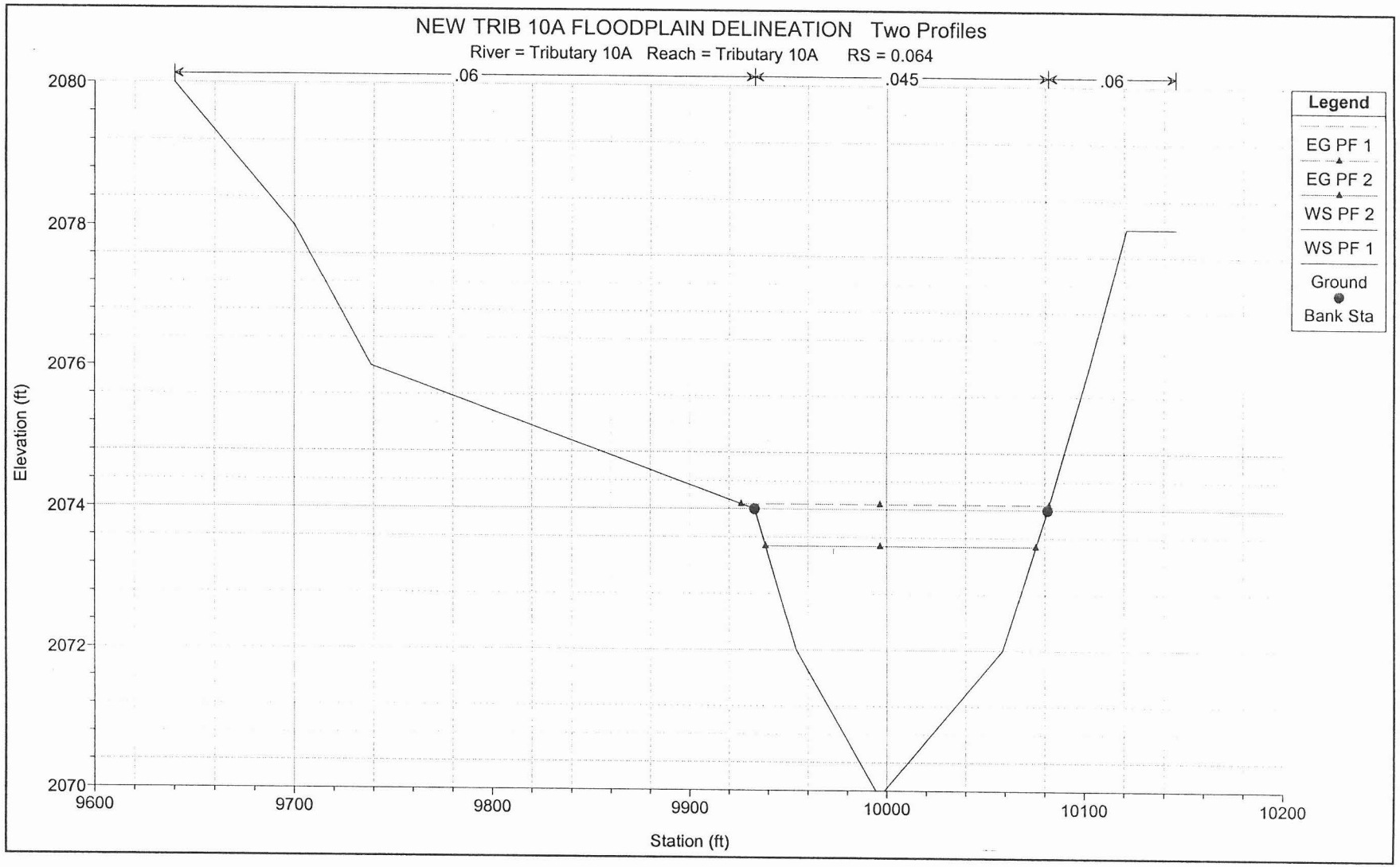
.06
.045
.06
Legend
EG PF 1
EG PF 2
WS PF 2
WS PF 1
Crit PF 1
Crit PF 2
Ground
Bank Sta
Elevation (ft)
2082
2080
2078
2076
2074
2072
2070
2068
9600
9700
9800
9900
10000
10100
10200
Station (ft)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River = Tributary 10A Reach = Tributary 10A RS = 0.064
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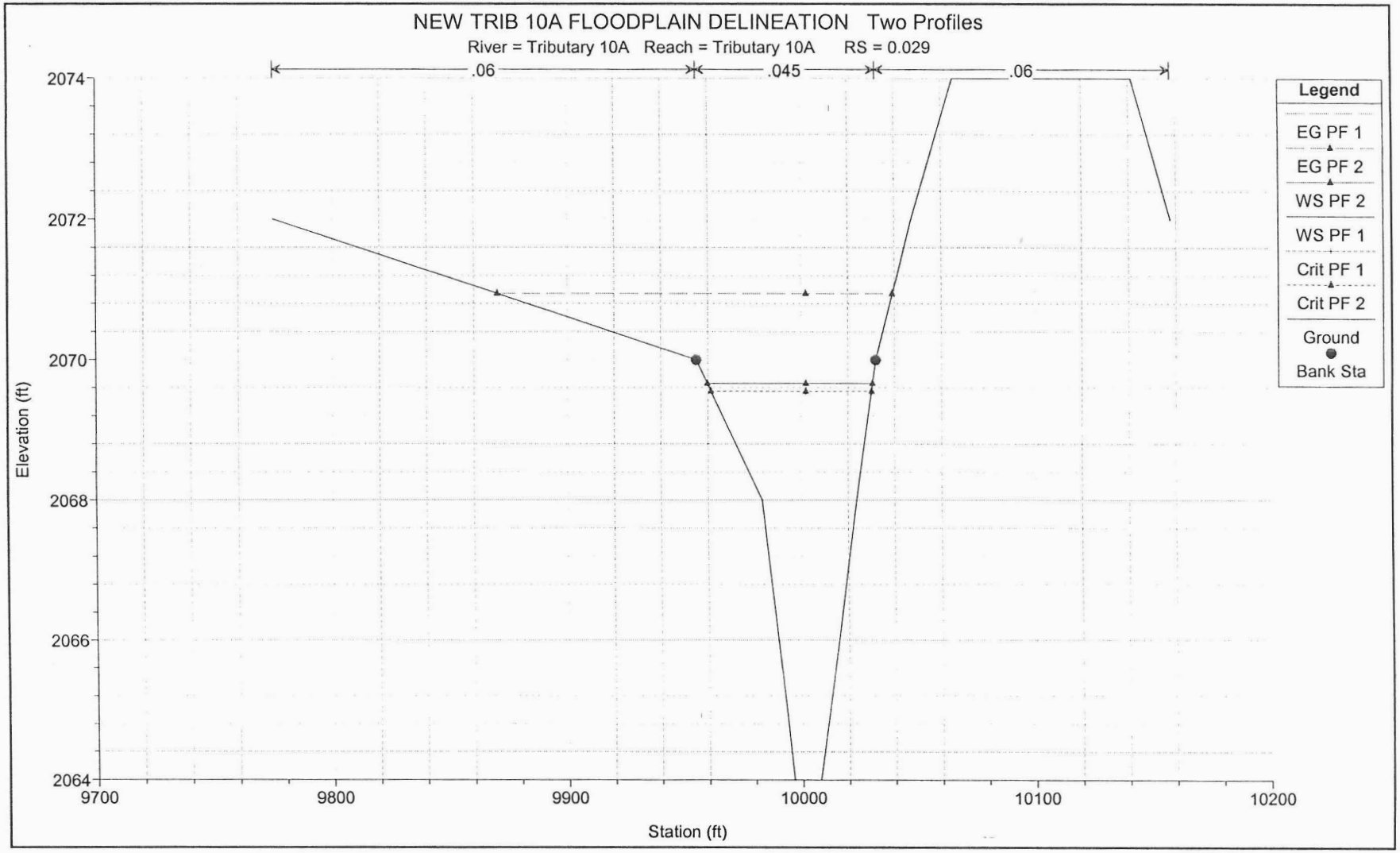
.045
.06
Legend
EG PF 1
EG PF 2
WS PF 2
WS PF 1
Ground
Bank Sta
Elevation (ft)
2080
2078
2076
2074
2072
2070
9600
9700
9800
9900
10000
10100
10200
Station (ft)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.06
.045
.06
Legend
EG PF 1
EG PF 2
WS PF 2
WS PF 1
Crit PF 1
Crit PF 2
Ground
Bank Sta
Elevation (ft)
2074
2072
2070
2068
2066
2064
9700
9800
9900
10000
10100
10200
Station (ft)

HEC-RAS September 1998 Version 2.2
U.S. Army Corp of Engineers
Hydrologic Engineering Center
609 Second Street, Suite D
Davis, California 95616-4687
(916) 756-1104

```
X     X  XXXXXX    XXXX        XXXX        XX      XXXX
X     X  X        X    X       X   X     X  X    X
X     X  X        X            X   X     X    X   X
XXXXXXX  XXXX     X       XXX  XXXX      XXXXXX    XXXX
X     X  X        X            X  X      X    X        X
X     X  X        X    X       X   X     X    X        X
X     X  XXXXXX    XXXX        X    X    X    X   XXXXX
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PROJECT DATA
Project Title: TRIB 6C FLOODPLAIN DELINEATION
Project File : T_6C.prj
Run Date and Time: 9/6/2000 9:40:38 AM

Project in English units

Project Description:
TRIBUTARY 6C

PLAN DATA

Plan Title: TRIBUTARY 6C
Plan File : y:\Mc-18\RAS FCD Disk\HEC-RAS\T_6C\T_6C.P01

Geometry Title: Base Conditions Geometry
Geometry File : y:\Mc-18\RAS FCD Disk\HEC-RAS\T_6C\T_6C.G01

Flow Title : 2 Flow Profiles
Flow File : y:\Mc-18\RAS FCD Disk\HEC-RAS\T_6C\T_6C.F01

Plan Summary Information:
Number of: Cross Sections = 13 Mulitple Openings = 0
Culverts = 0 Inline Weirs = 0
Bridges = 0

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

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

FLOW DATA

Flow Title: 2 Flow Profiles
Flow File : y:\Mc-18\RAS FCD Disk\HEC-RAS\T_6C\T_6C.F01

Flow Data (cfs)

River	Reach	RS	PF 1	PF 2
TRIBUTARY 6C	TRIBUTARY 6C	0.923	758	758

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
TRIBUTARY 6C	TRIBUTARY 6C	PF 1		Normal S = .018
TRIBUTARY 6C	TRIBUTARY 6C	PF 2		Normal S = .018

GEOMETRY DATA

Geometry Title: Base Conditions Geometry
Geometry File : y:\Mc-18\RAS FCD Disk\HEC-RAS\T_6C\T_6C.G01

CROSS SECTION RIVER: TRIBUTARY 6C
REACH: TRIBUTARY 6C RS: 0.923

INPUT
Description:
Station Elevation Data num= 30

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9900	2292	9914.31	2290	9934.96	2288	9951.65	2286	9969.22	2284
9974.01	2282	9978.54	2280	9983.26	2278	9987.94	2276	9992.65	2274
10000.87	227410010.32		227610020.57		227810030.51		228010041.12		2282
10058.19	228410082.37		228610101.82		2288 10120.4		229010132.07		2292
10141.62	229410153.96		229610170.47		229810181.75		230010192.95		2302
10204.76	230410217.15		230610229.18		230810241.33		231010254.36		2312

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9900	.06	9974.01	.045	10041.12	.06

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
9969.22	10058.19	350.91	341.93 337.02	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2279.09	Element			
Vel Head (ft)	1.20	Wt. n-Val.		0.045	
W.S. Elev (ft)	2277.89	Reach Len. (ft)	350.91	341.93	337.02
Crit W.S. (ft)	2277.89	Flow Area (sq ft)		86.31	
E.G. Slope (ft/ft)	0.023438	Area (sq ft)		86.31	
Q Total (cfs)	758.00	Flow (cfs)		758.00	
Top Width (ft)	36.50	Top Width (ft)		36.50	
Vel Total (ft/s)	8.78	Avg. Vel. (ft/s)		8.78	
Max Chl Dpth (ft)	3.89	Hydr. Depth (ft)		2.36	
Conv. Total (cfs)	4951.1	Conv. (cfs)		4951.1	
Length Wtd. (ft)	341.93	Wetted Per. (ft)		37.69	
Min Ch El (ft)	2274.00	Shear (lb/sq ft)		3.35	
Alpha	1.00	Stream Power (lb/ft s)		29.43	
Frctn Loss (ft)	7.98	Cum Volume (acre-ft)		12.15	
C & E Loss (ft)	0.00	Cum SA (acres)		9.49	

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 energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Note: Manning's n values were composited to a single value in the main channel.

CROSS SECTION OUTPUT Profile #PF 2

			Left OB	Channel	Right OB
E.G. Elev (ft)	2279.09	Element			
Vel Head (ft)	1.20	Wt. n-Val.		0.045	
W.S. Elev (ft)	2277.89	Reach Len. (ft)	350.91	341.93	337.02
Crit W.S. (ft)	2277.89	Flow Area (sq ft)		86.31	
E.G. Slope (ft/ft)	0.023438	Area (sq ft)		86.31	
Q Total (cfs)	758.00	Flow (cfs)		758.00	

T_6c

Top Width (ft)	36.50	Top Width (ft)	36.50
Vel Total (ft/s)	8.78	Avg. Vel. (ft/s)	8.78
Max Chl Dpth (ft)	3.89	Hydr. Depth (ft)	2.36
Conv. Total (cfs)	4951.1	Conv. (cfs)	4951.1
Length Wtd. (ft)	341.93	Wetted Per. (ft)	37.69
Min Ch El (ft)	2274.00	Shear (lb/sq ft)	3.35
Alpha	1.00	Stream Power (lb/ft s)	29.43
Frctn Loss (ft)	7.98	Cum Volume (acre-ft)	12.15
C & E Loss (ft)	0.00	Cum SA (acres)	9.49

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 energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Note: Manning's n values were composited to a single value in the main channel.

FLOW DISTRIBUTION OUTPUT Profile #PF 1

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9969.22	9998.88	399.03	42.05	16.16	52.64	2.74	9.49
9998.88	10028.53	358.97	44.26	21.53	47.36	2.09	8.11

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 energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Note: Manning's n values were composited to a single value in the main channel.

FLOW DISTRIBUTION OUTPUT Profile #PF 2

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9969.22	9998.88	399.03	42.05	16.16	52.64	2.74	9.49
9998.88	10028.53	358.97	44.26	21.53	47.36	2.09	8.11

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 energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Note: Manning's n values were composited to a single value in the main channel.

CROSS SECTION RIVER: TRIBUTARY 6C
REACH: TRIBUTARY 6C RS: 0.857

INPUT
Description:
Station Elevation Data num= 26

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9885	2270	9910.65	2268	9927.31	2266	9939.47	2264	9951.63	2262
9963.81	2260	9973.82	2258	9979.18	2256	9984.81	2254	9990.3	2252
9999.12	225210007.26		225410015.86		225610024.61		225810042.56		2260
10075.1	226210098.65		226410118.58		226610142.14		226810160.25		2270
10179.19	227210196.39		227410212.11		227610229.36		227810238.92		2280
10250.15	2282								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9885	.06	9973.82	.04	510024.61	.06

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
9951.63	10042.56	311.58	349.61 369.38	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2257.08	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.21	Wt. n-Val.		0.045	
W.S. Elev (ft)	2255.87	Reach Len. (ft)	311.58	349.61	369.38
Crit W.S. (ft)	2255.87	Flow Area (sq ft)		85.79	
E.G. Slope (ft/ft)	0.023257	Area (sq ft)		85.79	
Q Total (cfs)	758.00	Flow (cfs)		758.00	
Top Width (ft)	35.77	Top Width (ft)		35.77	
Vel Total (ft/s)	8.84	Avg. Vel. (ft/s)		8.84	
Max Chl Dpth (ft)	3.87	Hydr. Depth (ft)		2.40	
Conv. Total (cfs)	4970.4	Conv. (cfs)		4970.4	
Length Wtd. (ft)	349.61	Wetted Per. (ft)		36.91	
Min Ch El (ft)	2252.00	Shear (lb/sq ft)		3.37	
Alpha	1.00	Stream Power (lb/ft s)		29.82	
Frctn Loss (ft)	8.46	Cum Volume (acre-ft)		11.47	
C & E Loss (ft)	0.09	Cum SA (acres)		9.21	

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 energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #PF 2

E.G. Elev (ft)	2257.08	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.21	Wt. n-Val.		0.045	
W.S. Elev (ft)	2255.87	Reach Len. (ft)	311.58	349.61	369.38
Crit W.S. (ft)	2255.87	Flow Area (sq ft)		85.79	
E.G. Slope (ft/ft)	0.023257	Area (sq ft)		85.79	
Q Total (cfs)	758.00	Flow (cfs)		758.00	
Top Width (ft)	35.77	Top Width (ft)		35.77	
Vel Total (ft/s)	8.84	Avg. Vel. (ft/s)		8.84	
Max Chl Dpth (ft)	3.87	Hydr. Depth (ft)		2.40	
Conv. Total (cfs)	4970.4	Conv. (cfs)		4970.4	
Length Wtd. (ft)	349.61	Wetted Per. (ft)		36.91	
Min Ch El (ft)	2252.00	Shear (lb/sq ft)		3.37	
Alpha	1.00	Stream Power (lb/ft s)		29.82	
Frctn Loss (ft)	8.46	Cum Volume (acre-ft)		11.47	
C & E Loss (ft)	0.09	Cum SA (acres)		9.21	

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 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.

FLOW DISTRIBUTION OUTPUT Profile #PF 1

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9951.63	9981.94	2.60	1.02	2.55	0.34	0.43	2.54
9981.94	10012.25	752.89	83.67	31.21	99.33	2.76	9.00
10012.25	RB 10042.56	2.51	1.09	3.14	0.33	0.36	2.30

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 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.

FLOW DISTRIBUTION OUTPUT Profile #PF 2

T_6c

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9951.63	9981.94	2.60	1.02	2.55	0.34	0.43	2.54
9981.94	10012.25	752.89	83.67	31.21	99.33	2.76	9.00
10012.25	RB 10042.56	2.51	1.09	3.14	0.33	0.36	2.30

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 energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION RIVER: TRIBUTARY 6C
REACH: TRIBUTARY 6C RS: 0.791

INPUT
Description:
Station Elevation Data num= 26

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9830	2250	9844.79	2248	9859.89	2246	9878.67	2244	9901.47	2242
9921.77	2240	9945.51	2238	9965.56	2236	9976.49	223410000.45		2232
10005.71	223210025.49		223410032.11		223610038.65		223810054.35		2240
10079.53	224210094.81		224410113.13		224610132.24		224810157.12		2250
10175.09	225210190.17		2254	10205.7	225610223.11		225810236.28		2260
10249.42	2262								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9830	.06	9965.56	.04510032.11		.06

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
9945.51	10054.35	372.21	347.64 332.45	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2235.76	Element			
Vel Head (ft)	0.90	Wt. n-Val.		0.045	
W.S. Elev (ft)	2234.86	Reach Len. (ft)	372.21	347.64	332.45
Crit W.S. (ft)	2234.86	Flow Area (sq ft)		99.60	
E.G. Slope (ft/ft)	0.025200	Area (sq ft)		99.60	
Q Total (cfs)	758.00	Flow (cfs)		758.00	
Top Width (ft)	56.54	Top Width (ft)		56.54	
Vel Total (ft/s)	7.61	Avg. Vel. (ft/s)		7.61	
Max Chl Dpth (ft)	2.86	Hydr. Depth (ft)		1.76	
Conv. Total (cfs)	4774.9	Conv. (cfs)		4774.9	
Length Wtd. (ft)	347.64	Wetted Per. (ft)		56.93	
Min Ch El (ft)	2232.00	Shear (lb/sq ft)		2.75	
Alpha	1.00	Stream Power (lb/ft s)		20.95	
Frctn Loss (ft)	9.03	Cum Volume (acre-ft)		10.73	
C & E Loss (ft)	0.06	Cum SA (acres)		8.84	

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 energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #PF 2

			Left OB	Channel	Right OB
E.G. Elev (ft)	2235.76	Element			
Vel Head (ft)	0.90	Wt. n-Val.		0.045	
W.S. Elev (ft)	2234.86	Reach Len. (ft)	372.21	347.64	332.45
Crit W.S. (ft)	2234.86	Flow Area (sq ft)		99.60	
E.G. Slope (ft/ft)	0.025200	Area (sq ft)		99.60	
Q Total (cfs)	758.00	Flow (cfs)		758.00	
Top Width (ft)	56.54	Top Width (ft)		56.54	
Vel Total (ft/s)	7.61	Avg. Vel. (ft/s)		7.61	
Max Chl Dpth (ft)	2.86	Hydr. Depth (ft)		1.76	

Conv. Total (cfs)	4774.9	Conv. (cfs)	4774.9
Length Wtd. (ft)	347.64	Wetted Per. (ft)	56.93
Min Ch El (ft)	2232.00	Shear (lb/sq ft)	2.75
Alpha	1.00	Stream Power (lb/ft s)	20.95
Frctn Loss (ft)	9.03	Cum Volume (acre-ft)	10.73
C & E Loss (ft)	0.06	Cum SA (acres)	8.84

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 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.

FLOW DISTRIBUTION OUTPUT Profile #PF 1

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9945.51	9981.79	31.48	7.74	10.09	4.15	0.77	4.07
9981.79	10018.07	676.30	81.47	36.41	89.22	2.25	8.30
10018.07	RB 10054.35	50.21	10.38	10.43	6.62	1.01	4.84

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 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.

FLOW DISTRIBUTION OUTPUT Profile #PF 2

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9945.51	9981.79	31.48	7.74	10.09	4.15	0.77	4.07
9981.79	10018.07	676.30	81.47	36.41	89.22	2.25	8.30
10018.07	RB 10054.35	50.21	10.38	10.43	6.62	1.01	4.84

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 energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION RIVER: TRIBUTARY 6C
REACH: TRIBUTARY 6C RS: 0.718

INPUT
Description:
Station Elevation Data num= 23

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9835	2232	9860.94	2230	9881.25	2228	9896.92	2226	9912.33	2224
9927.43	2222	9940.15	2220	9950.05	2218	9959.72	2216	9963.06	2216
10013.61	221	610022.39	221	610034.06	221	810046.82	222	010061.53	2222
10078.28	222	410128.35	222	610153.38	222	810161.99	223	010185.33	2232
10218.22	223	410245.82	223	610278.05	2238				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9835	.06	9950.05	.045	10034.06	.06

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
9927.43	10046.82	362.23	338.25	323.35	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2218.29	Element	Left OB	Channel	Right OB	
Vel Head (ft)	0.71	Wt. n-Val.		0.045		

W.S. Elev (ft)	2217.57	Reach Len. (ft)	362.23	338.25	323.35
Crit W.S. (ft)	2217.57	Flow Area (sq ft)		111.94	
E.G. Slope (ft/ft)	0.026771	Area (sq ft)		111.94	
Q Total (cfs)	758.00	Flow (cfs)		758.00	
Top Width (ft)	79.47	Top Width (ft)		79.47	
Vel Total (ft/s)	6.77	Avg. Vel. (ft/s)		6.77	
Max Chl Dpth (ft)	1.57	Hydr. Depth (ft)		1.41	
Conv. Total (cfs)	4632.7	Conv. (cfs)		4632.7	
Length Wtd. (ft)	338.25	Wetted Per. (ft)		79.77	
Min Ch El (ft)	2216.00	Shear (lb/sq ft)		2.35	
Alpha	1.00	Stream Power (lb/ft s)		15.88	
Frctn Loss (ft)	9.53	Cum Volume (acre-ft)		9.88	
C & E Loss (ft)	0.07	Cum SA (acres)		8.29	

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

CROSS SECTION OUTPUT Profile #PF 2

			Left OB	Channel	Right OB
E.G. Elev (ft)	2218.29	Element			
Vel Head (ft)	0.71	Wt. n-Val.		0.045	
W.S. Elev (ft)	2217.57	Reach Len. (ft)	362.23	338.25	323.35
Crit W.S. (ft)	2217.57	Flow Area (sq ft)		111.94	
E.G. Slope (ft/ft)	0.026771	Area (sq ft)		111.94	
Q Total (cfs)	758.00	Flow (cfs)		758.00	
Top Width (ft)	79.47	Top Width (ft)		79.47	
Vel Total (ft/s)	6.77	Avg. Vel. (ft/s)		6.77	
Max Chl Dpth (ft)	1.57	Hydr. Depth (ft)		1.41	
Conv. Total (cfs)	4632.7	Conv. (cfs)		4632.7	
Length Wtd. (ft)	338.25	Wetted Per. (ft)		79.77	
Min Ch El (ft)	2216.00	Shear (lb/sq ft)		2.35	
Alpha	1.00	Stream Power (lb/ft s)		15.88	
Frctn Loss (ft)	9.53	Cum Volume (acre-ft)		9.88	
C & E Loss (ft)	0.07	Cum SA (acres)		8.29	

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

FLOW DISTRIBUTION OUTPUT Profile #PF 1

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9927.43	9967.23	105.73	17.82	15.28	13.95	1.18	5.93
9967.23	10007.02	454.45	62.68	39.80	59.95	1.57	7.25
10007.02	RB 10046.82	197.82	31.44	24.69	26.10	1.28	6.29

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

FLOW DISTRIBUTION OUTPUT Profile #PF 2

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9927.43	9967.23	105.73	17.82	15.28	13.95	1.18	5.93
9967.23	10007.02	454.45	62.68	39.80	59.95	1.57	7.25
10007.02	RB 10046.82	197.82	31.44	24.69	26.10	1.28	6.29

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

CROSS SECTION RIVER: TRIBUTARY 6C
REACH: TRIBUTARY 6C RS: 0.652

INPUT
Description:
Station Elevation Data num= 20

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9725	2216	9767.79	2214	9840.19	2212	9856.91	2212	9926.33	2212
9956.59	2210	9964.72	2208	9976.6	220610031.77		220610040.88		2206
10053.79	220410058.02		220410063.37		220610182.89		220810217.16		2210
10246.14	221210275.31		221410298.57		221610317.07		221810350.04		2220

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9725	.06	10031.77	.045	10063.37	.06

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
9956.59	10182.89	373.02	371.13	361.22	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2207.41	Element			
Vel Head (ft)	0.47	Wt. n-Val.		0.051	
W.S. Elev (ft)	2206.95	Reach Len. (ft)	373.02	371.13	361.22
Crit W.S. (ft)	2206.95	Flow Area (sq ft)		138.28	
E.G. Slope (ft/ft)	0.029673	Area (sq ft)		138.28	
Q Total (cfs)	758.00	Flow (cfs)		758.00	
Top Width (ft)	148.96	Top Width (ft)		148.96	
Vel Total (ft/s)	5.48	Avg. Vel. (ft/s)		5.48	
Max Chl Dpth (ft)	2.95	Hydr. Depth (ft)		0.93	
Conv. Total (cfs)	4400.3	Conv. (cfs)		4400.3	
Length Wtd. (ft)	371.13	Wetted Per. (ft)		149.56	
Min Ch El (ft)	2204.00	Shear (lb/sq ft)		1.71	
Alpha	1.00	Stream Power (lb/ft s)		9.39	
Frctn Loss (ft)	8.62	Cum Volume (acre-ft)		8.91	
C & E Loss (ft)	0.06	Cum SA (acres)		7.41	

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 energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #PF 2

			Left OB	Channel	Right OB
E.G. Elev (ft)	2207.41	Element			
Vel Head (ft)	0.47	Wt. n-Val.		0.051	
W.S. Elev (ft)	2206.95	Reach Len. (ft)	373.02	371.13	361.22
Crit W.S. (ft)	2206.95	Flow Area (sq ft)		138.28	
E.G. Slope (ft/ft)	0.029673	Area (sq ft)		138.28	
Q Total (cfs)	758.00	Flow (cfs)		758.00	
Top Width (ft)	148.96	Top Width (ft)		148.96	
Vel Total (ft/s)	5.48	Avg. Vel. (ft/s)		5.48	
Max Chl Dpth (ft)	2.95	Hydr. Depth (ft)		0.93	
Conv. Total (cfs)	4400.3	Conv. (cfs)		4400.3	
Length Wtd. (ft)	371.13	Wetted Per. (ft)		149.56	
Min Ch El (ft)	2204.00	Shear (lb/sq ft)		1.71	
Alpha	1.00	Stream Power (lb/ft s)		9.39	
Frctn Loss (ft)	8.62	Cum Volume (acre-ft)		8.91	
C & E Loss (ft)	0.06	Cum SA (acres)		7.41	

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 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.

FLOW DISTRIBUTION OUTPUT Profile #PF 1

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9956.59	10032.02	217.61	55.12	61.13	28.71	0.90	3.95
10032.02	10107.46	539.17	81.86	75.95	71.13	1.09	6.59
10107.46	RB 10182.89	1.22	1.30	12.48	0.16	0.10	0.94

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 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.

FLOW DISTRIBUTION OUTPUT Profile #PF 2

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9956.59	10032.02	217.61	55.12	61.13	28.71	0.90	3.95
10032.02	10107.46	539.17	81.86	75.95	71.13	1.09	6.59
10107.46	RB 10182.89	1.22	1.30	12.48	0.16	0.10	0.94

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 energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION RIVER: TRIBUTARY 6C
REACH: TRIBUTARY 6C RS: 0.582

INPUT
Description:
Station Elevation Data num= 14

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9725	2206	9793.93	2204	9850.84	2202	9882.52	2200	9901.81	2198
9915.57	2196	9927.05	219410060.83		219410180.71		219610209.56		2198
10305.21	220010339.35		220210399.92		220410441.32		2206		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9725	.06	9927.05	.04510060.83		.06

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
9901.81	10180.71	413.16	403.35 422.98	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2195.34	Element			
Vel Head (ft)	0.27	Wt. n-Val.		0.047	
W.S. Elev (ft)	2195.07	Reach Len. (ft)	413.16	403.35	422.98
Crit W.S. (ft)	2194.92	Flow Area (sq ft)		180.46	
E.G. Slope (ft/ft)	0.018687	Area (sq ft)		180.46	
Q Total (cfs)	758.00	Flow (cfs)		758.00	
Top Width (ft)	203.97	Top Width (ft)		203.97	
Vel Total (ft/s)	4.20	Avg. Vel. (ft/s)		4.20	
Max Chl Dpth (ft)	1.07	Hydr. Depth (ft)		0.88	
Conv. Total (cfs)	5545.0	Conv. (cfs)		5545.0	
Length Wtd. (ft)	403.35	Wetted Per. (ft)		204.07	

Min Ch El (ft)	2194.00	Shear (lb/sq ft)	1.03
Alpha	1.00	Stream Power (lb/ft s)	4.33
Frctn Loss (ft)	8.53	Cum Volume (acre-ft)	7.55
C & E Loss (ft)	0.04	Cum SA (acres)	5.90

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

CROSS SECTION OUTPUT Profile #PF 2

E.G. Elev (ft)	2195.34	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.27	Wt. n-Val.		0.047	
W.S. Elev (ft)	2195.07	Reach Len. (ft)	413.16	403.35	422.98
Crit W.S. (ft)	2194.92	Flow Area (sq ft)		180.46	
E.G. Slope (ft/ft)	0.018687	Area (sq ft)		180.46	
Q Total (cfs)	758.00	Flow (cfs)		758.00	
Top Width (ft)	203.97	Top Width (ft)		203.97	
Vel Total (ft/s)	4.20	Avg. Vel. (ft/s)		4.20	
Max Chl Dpth (ft)	1.07	Hydr. Depth (ft)		0.88	
Conv. Total (cfs)	5545.0	Conv. (cfs)		5545.0	
Length Wtd. (ft)	403.35	Wetted Per. (ft)		204.07	
Min Ch El (ft)	2194.00	Shear (lb/sq ft)		1.03	
Alpha	1.00	Stream Power (lb/ft s)		4.33	
Frctn Loss (ft)	8.53	Cum Volume (acre-ft)		7.55	
C & E Loss (ft)	0.04	Cum SA (acres)		5.90	

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.

FLOW DISTRIBUTION OUTPUT Profile #PF 1

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9901.81	9994.78	344.05	75.65	73.95	45.39	1.02	4.55
9994.78	10087.74	396.36	93.30	92.97	52.29	1.00	4.25
10087.74	RB 10180.71	17.60	11.51	37.14	2.32	0.31	1.53

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.

FLOW DISTRIBUTION OUTPUT Profile #PF 2

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9901.81	9994.78	344.05	75.65	73.95	45.39	1.02	4.55
9994.78	10087.74	396.36	93.30	92.97	52.29	1.00	4.25
10087.74	RB 10180.71	17.60	11.51	37.14	2.32	0.31	1.53

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

CROSS SECTION RIVER: TRIBUTARY 6C
REACH: TRIBUTARY 6C RS: 0.505

INPUT
Description:
Station Elevation Data num= 9

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9700	2190	9872.6	2188	9965.88	2186	9976.66	2184	10005.7	2184
10044.01	2186	10104.28	2188	10223.8	2190	10437.58	2190		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9700	.06	9965.88	.045	10044.01	.06

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
9872.6	10104.28	236.96	298.48	379.46	.1 .3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2186.77	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.68	Wt. n-Val.		0.045	
W.S. Elev (ft)	2186.09	Reach Len. (ft)	236.96	298.48	379.46
Crit W.S. (ft)	2186.09	Flow Area (sq ft)		114.75	
E.G. Slope (ft/ft)	0.024291	Area (sq ft)		114.75	
Q Total (cfs)	758.00	Flow (cfs)		758.00	
Top Width (ft)	85.25	Top Width (ft)		85.25	
Vel Total (ft/s)	6.61	Avg. Vel. (ft/s)		6.61	
Max Chl Dpth (ft)	2.09	Hydr. Depth (ft)		1.35	
Conv. Total (cfs)	4863.5	Conv. (cfs)		4863.5	
Length Wtd. (ft)	298.48	Wetted Per. (ft)		85.49	
Min Ch El (ft)	2184.00	Shear (lb/sq ft)		2.04	
Alpha	1.00	Stream Power (lb/ft s)		13.45	
Frctn Loss (ft)	5.98	Cum Volume (acre-ft)		6.19	
C & E Loss (ft)	0.07	Cum SA (acres)		4.56	

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 energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #PF 2

E.G. Elev (ft)	2186.77	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.68	Wt. n-Val.		0.045	
W.S. Elev (ft)	2186.09	Reach Len. (ft)	236.96	298.48	379.46
Crit W.S. (ft)	2186.09	Flow Area (sq ft)		114.75	
E.G. Slope (ft/ft)	0.024291	Area (sq ft)		114.75	
Q Total (cfs)	758.00	Flow (cfs)		758.00	
Top Width (ft)	85.25	Top Width (ft)		85.25	
Vel Total (ft/s)	6.61	Avg. Vel. (ft/s)		6.61	
Max Chl Dpth (ft)	2.09	Hydr. Depth (ft)		1.35	
Conv. Total (cfs)	4863.5	Conv. (cfs)		4863.5	
Length Wtd. (ft)	298.48	Wetted Per. (ft)		85.49	
Min Ch El (ft)	2184.00	Shear (lb/sq ft)		2.04	
Alpha	1.00	Stream Power (lb/ft s)		13.45	
Frctn Loss (ft)	5.98	Cum Volume (acre-ft)		6.19	
C & E Loss (ft)	0.07	Cum SA (acres)		4.56	

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 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.

FLOW DISTRIBUTION OUTPUT Profile #PF 1

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
9949.83	10027.05	729.07	105.54	65.71	96.18	1.61	6.91
10027.05	RB 10104.28	28.93	9.21	19.78	3.82	0.47	3.14

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 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.

FLOW DISTRIBUTION OUTPUT Profile #PF 2

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
9949.83	10027.05	729.07	105.54	65.71	96.18	1.61	6.91
10027.05	RB 10104.28	28.93	9.21	19.78	3.82	0.47	3.14

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 energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION RIVER: TRIBUTARY 6C
REACH: TRIBUTARY 6C RS: 0.446

INPUT
Description:
Station Elevation Data num= 14

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9760	2186	9816.49	2184	9892.91	2182	9947.48	2180	9971.79	2178
9998.74	217610007.58		217610038.21		217810059.94		217810069.29		2178
10147.34	218010198.11		218210245.69		218410295.81		2186		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9760	.06	9971.79	.04510038.21		.06

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
9947.4810147.34		399.85	411 480.82	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2179.04	Element			
Vel Head (ft)	0.44	Wt. n-Val.		0.046	
W.S. Elev (ft)	2178.59	Reach Len. (ft)	399.85	411.00	480.82
Crit W.S. (ft)		Flow Area (sq ft)		142.17	
E.G. Slope (ft/ft)	0.016819	Area (sq ft)		142.17	
Q Total (cfs)	758.00	Flow (cfs)		758.00	
Top Width (ft)	127.89	Top Width (ft)		127.89	
Vel Total (ft/s)	5.33	Avg. Vel. (ft/s)		5.33	
Max Chl Dpth (ft)	2.59	Hydr. Depth (ft)		1.11	
Conv. Total (cfs)	5844.8	Conv. (cfs)		5844.8	
Length Wtd. (ft)	411.00	Wetted Per. (ft)		128.06	
Min Ch El (ft)	2176.00	Shear (lb/sq ft)		1.17	
Alpha	1.00	Stream Power (lb/ft s)		6.22	
Frctn Loss (ft)	7.68	Cum Volume (acre-ft)		5.31	
C & E Loss (ft)	0.02	Cum SA (acres)		3.83	

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

CROSS SECTION OUTPUT Profile #PF 2

			Left OB	Channel	Right OB
E.G. Elev (ft)	2179.04	Element			
Vel Head (ft)	0.44	Wt. n-Val.		0.046	
W.S. Elev (ft)	2178.59	Reach Len. (ft)	399.85	411.00	480.82
Crit W.S. (ft)		Flow Area (sq ft)		142.17	
E.G. Slope (ft/ft)	0.016819	Area (sq ft)		142.17	
Q Total (cfs)	758.00	Flow (cfs)		758.00	
Top Width (ft)	127.89	Top Width (ft)		127.89	
Vel Total (ft/s)	5.33	Avg. Vel. (ft/s)		5.33	
Max Chl Dpth (ft)	2.59	Hydr. Depth (ft)		1.11	
Conv. Total (cfs)	5844.8	Conv. (cfs)		5844.8	
Length Wtd. (ft)	411.00	Wetted Per. (ft)		128.06	
Min Ch El (ft)	2176.00	Shear (lb/sq ft)		1.17	
Alpha	1.00	Stream Power (lb/ft s)		6.22	
Frctn Loss (ft)	7.68	Cum Volume (acre-ft)		5.31	
C & E Loss (ft)	0.02	Cum SA (acres)		3.83	

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.

FLOW DISTRIBUTION OUTPUT Profile #PF 1

T_6c

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9947.48	10014.10	532.59	83.55	49.64	70.26	1.69	6.37
10014.10	10080.72	223.84	56.86	66.67	29.53	0.85	3.94
10080.72	RB 10147.34	1.58	1.77	11.75	0.21	0.15	0.89

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.

FLOW DISTRIBUTION OUTPUT Profile #PF 2

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9947.48	10014.10	532.59	83.55	49.64	70.26	1.69	6.37
10014.10	10080.72	223.84	56.86	66.67	29.53	0.85	3.94
10080.72	RB 10147.34	1.58	1.77	11.75	0.21	0.15	0.89

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

CROSS SECTION RIVER: TRIBUTARY 6C
REACH: TRIBUTARY 6C RS: 0.363

INPUT
Description:
Station Elevation Data num= 14

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9750	2180	9816.67	2178	9876.11	2176	9895.8	2174	9952.53	2172
9974.14	2170	9993.59	2168	10004.2	2168	10020.7	217010036.16		2170
10047.69	217010105.18		217210208.18		217210356.33		2170		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9750	.06	9974.14	.045	10020.7	.06

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
9952.53	10105.18	431.77	414.24 363.41	.1	.3

Blocked Obstructions num= 1

Sta L	Sta R	Elev
1012010356.33		2175

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2171.34	Element			
Vel Head (ft)	0.60	Wt. n-Val.		0.046	
W.S. Elev (ft)	2170.74	Reach Len. (ft)	431.77	414.24	363.41
Crit W.S. (ft)	2170.74	Flow Area (sq ft)		122.28	
E.G. Slope (ft/ft)	0.020897	Area (sq ft)		122.28	
Q Total (cfs)	758.00	Flow (cfs)		758.00	
Top Width (ft)	102.76	Top Width (ft)		102.76	
Vel Total (ft/s)	6.20	Avg. Vel. (ft/s)		6.20	
Max Chl Dpth (ft)	2.74	Hydr. Depth (ft)		1.19	
Conv. Total (cfs)	5243.6	Conv. (cfs)		5243.6	
Length Wtd. (ft)	414.24	Wetted Per. (ft)		103.03	
Min Ch El (ft)	2168.00	Shear (lb/sq ft)		1.55	
Alpha	1.00	Stream Power (lb/ft s)		9.60	
Frctn Loss (ft)	7.86	Cum Volume (acre-ft)		4.06	
C & E Loss (ft)	0.00	Cum SA (acres)		2.75	

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 energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #PF 2

			Left OB	Channel	Right OB
E.G. Elev (ft)	2171.34	Element			
Vel Head (ft)	0.60	Wt. n-Val.		0.046	

T_6c

W.S. Elev (ft)	2170.74	Reach Len. (ft)	431.77	414.24	363.41
Crit W.S. (ft)	2170.74	Flow Area (sq ft)		122.28	
E.G. Slope (ft/ft)	0.020897	Area (sq ft)		122.28	
Q Total (cfs)	758.00	Flow (cfs)		758.00	
Top Width (ft)	102.76	Top Width (ft)		102.76	
Vel Total (ft/s)	6.20	Avg. Vel. (ft/s)		6.20	
Max Chl Dpth (ft)	2.74	Hydr. Depth (ft)		1.19	
Conv. Total (cfs)	5243.6	Conv. (cfs)		5243.6	
Length Wtd. (ft)	414.24	Wetted Per. (ft)		103.03	
Min Ch El (ft)	2168.00	Shear (lb/sq ft)		1.55	
Alpha	1.00	Stream Power (lb/ft s)		9.60	
Frctn Loss (ft)	7.86	Cum Volume (acre-ft)		4.06	
C & E Loss (ft)	0.00	Cum SA (acres)		2.75	

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 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.

FLOW DISTRIBUTION OUTPUT Profile #PF 1

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9952.53	10003.41	471.03	63.66	37.39	62.14	1.71	7.40
10003.41	10054.30	281.68	54.89	51.01	37.16	1.08	5.13
10054.30	RB 10105.18	5.29	3.72	14.63	0.70	0.25	1.42

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 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.

FLOW DISTRIBUTION OUTPUT Profile #PF 2

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9952.53	10003.41	471.03	63.66	37.39	62.14	1.71	7.40
10003.41	10054.30	281.68	54.89	51.01	37.16	1.08	5.13
10054.30	RB 10105.18	5.29	3.72	14.63	0.70	0.25	1.42

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 energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION RIVER: TRIBUTARY 6C
REACH: TRIBUTARY 6C RS: 0.280

INPUT
Description:
Station Elevation Data num= 14

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9755	2170	9847.56	2168	9912.21	2166	9948.33	2164	9971.17	2162
9990.35	2160	10019.93	2160	10026.28	2160	10030.08	2160	10039.31	2162
10058.84	2164	10386.54	2164	10405.77	2164	10611.03	2166		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9755	.06	9971.17	.045	10039.31	.06

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
9948.33	10058.84	171.49	161.48	205	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2162.79	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.62	Wt. n-Val.		0.045	
W.S. Elev (ft)	2162.18	Reach Len. (ft)	171.49	161.48	205.00
Crit W.S. (ft)		Flow Area (sq ft)		120.33	
E.G. Slope (ft/ft)	0.017305	Area (sq ft)		120.33	
Q Total (cfs)	758.00	Flow (cfs)		758.00	
Top Width (ft)	71.91	Top Width (ft)		71.91	
Vel Total (ft/s)	6.30	Avg. Vel. (ft/s)		6.30	
Max Chl Dpth (ft)	2.18	Hydr. Depth (ft)		1.67	
Conv. Total (cfs)	5762.1	Conv. (cfs)		5762.1	
Length Wtd. (ft)	161.48	Wetted Per. (ft)		72.25	
Min Ch El (ft)	2160.00	Shear (lb/sq ft)		1.80	
Alpha	1.00	Stream Power (lb/ft s)		11.34	
Frctn Loss (ft)	2.85	Cum Volume (acre-ft)		2.91	
C & E Loss (ft)	0.02	Cum SA (acres)		1.92	

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

CROSS SECTION OUTPUT Profile #PF 2

E.G. Elev (ft)	2162.79	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.62	Wt. n-Val.		0.045	
W.S. Elev (ft)	2162.18	Reach Len. (ft)	171.49	161.48	205.00
Crit W.S. (ft)		Flow Area (sq ft)		120.33	
E.G. Slope (ft/ft)	0.017305	Area (sq ft)		120.33	
Q Total (cfs)	758.00	Flow (cfs)		758.00	
Top Width (ft)	71.91	Top Width (ft)		71.91	
Vel Total (ft/s)	6.30	Avg. Vel. (ft/s)		6.30	
Max Chl Dpth (ft)	2.18	Hydr. Depth (ft)		1.67	
Conv. Total (cfs)	5762.1	Conv. (cfs)		5762.1	
Length Wtd. (ft)	161.48	Wetted Per. (ft)		72.25	
Min Ch El (ft)	2160.00	Shear (lb/sq ft)		1.80	
Alpha	1.00	Stream Power (lb/ft s)		11.34	
Frctn Loss (ft)	2.85	Cum Volume (acre-ft)		2.91	
C & E Loss (ft)	0.02	Cum SA (acres)		1.92	

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.

FLOW DISTRIBUTION OUTPUT Profile #PF 1

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9948.33	9985.17	49.52	12.89	16.11	6.53	0.80	3.84
9985.17	10022.00	544.64	78.83	36.86	71.85	2.14	6.91
10022.00	RB 10058.84	163.84	28.62	19.27	21.62	1.50	5.73

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.

FLOW DISTRIBUTION OUTPUT Profile #PF 2

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9948.33	9985.17	49.52	12.89	16.11	6.53	0.80	3.84
9985.17	10022.00	544.64	78.83	36.86	71.85	2.14	6.91
10022.00	RB 10058.84	163.84	28.62	19.27	21.62	1.50	5.73

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

CROSS SECTION RIVER: TRIBUTARY 6C
REACH: TRIBUTARY 6C RS: 0.245

INPUT
Description:

Station Elevation Data num= 15

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9580	2170	9695.18	2168	9777.06	2166	9861.51	2164	9911.77	2162
9931.42	2160	9940.46	2158	9959.94	2156	9965.1	2156	9973.14	2158
10057.74	216010175.92		216210194.46		216210262.52		216210536.18		2162

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9580	.06	9931.42	.045	9973.14	.06

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
9861.51	10175.92	415.74	464.23 549.53	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2159.93	Element			
Vel Head (ft)	0.55	Wt. n-Val.		0.047	
W.S. Elev (ft)	2159.38	Reach Len. (ft)	415.74	464.23	549.53
Crit W.S. (ft)	2159.28	Flow Area (sq ft)		127.77	
E.G. Slope (ft/ft)	0.017787	Area (sq ft)		127.77	
Q Total (cfs)	758.00	Flow (cfs)		758.00	
Top Width (ft)	97.41	Top Width (ft)		97.41	
Vel Total (ft/s)	5.93	Avg. Vel. (ft/s)		5.93	
Max Chl Dpth (ft)	3.38	Hydr. Depth (ft)		1.31	
Conv. Total (cfs)	5683.6	Conv. (cfs)		5683.6	
Length Wtd. (ft)	464.23	Wetted Per. (ft)		97.93	
Min Ch El (ft)	2156.00	Shear (lb/sq ft)		1.45	
Alpha	1.00	Stream Power (lb/ft s)		8.60	
Frctn Loss (ft)	9.27	Cum Volume (acre-ft)		2.45	
C & E Loss (ft)	0.02	Cum SA (acres)		1.60	

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

CROSS SECTION OUTPUT Profile #PF 2

			Left OB	Channel	Right OB
E.G. Elev (ft)	2159.93	Element			
Vel Head (ft)	0.55	Wt. n-Val.		0.047	
W.S. Elev (ft)	2159.38	Reach Len. (ft)	415.74	464.23	549.53
Crit W.S. (ft)	2159.28	Flow Area (sq ft)		127.77	
E.G. Slope (ft/ft)	0.017787	Area (sq ft)		127.77	
Q Total (cfs)	758.00	Flow (cfs)		758.00	
Top Width (ft)	97.41	Top Width (ft)		97.41	
Vel Total (ft/s)	5.93	Avg. Vel. (ft/s)		5.93	
Max Chl Dpth (ft)	3.38	Hydr. Depth (ft)		1.31	
Conv. Total (cfs)	5683.6	Conv. (cfs)		5683.6	
Length Wtd. (ft)	464.23	Wetted Per. (ft)		97.93	
Min Ch El (ft)	2156.00	Shear (lb/sq ft)		1.45	
Alpha	1.00	Stream Power (lb/ft s)		8.60	
Frctn Loss (ft)	9.27	Cum Volume (acre-ft)		2.45	
C & E Loss (ft)	0.02	Cum SA (acres)		1.60	

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.

FLOW DISTRIBUTION OUTPUT Profile #PF 1

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9861.51	9966.31	541.35	72.11	32.39	71.42	2.25	7.51
9966.31	10071.12	216.65	55.66	65.53	28.58	0.85	3.89

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.

FLOW DISTRIBUTION OUTPUT Profile #PF 2

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9861.51	9966.31	541.35	72.11	32.39	71.42	2.25	7.51
9966.31	10071.12	216.65	55.66	65.53	28.58	0.85	3.89

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

CROSS SECTION RIVER: TRIBUTARY 6C
REACH: TRIBUTARY 6C RS: 0.157

INPUT
Description:
Station Elevation Data num= 30

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9615	2164	9679.64	2162	9736.94	2160	9803.27	2158	9856.46	2156
9903.79	2154	9936.66	2152	9945.7	2150	9955.15	2148	9964.9	2146
9966.88	2146	9977.61	214810015.46		215010029.35		215010133.42		2148
10138.9	214810233.29		215010260.34		215010354.23		214810358.58		2146
10369.86	214610381.98		214810395.98		215010457.96		215210567.94		2152
10613.57	215010636.58		214810660.67		214810697.89		214810712.67		2146

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9615	.06	9936.66	.04	10015.46	.06

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
9936.66	10015.46	383.77	434.25 807.76	.1	.3

Blocked Obstructions num= 1

Sta L	Sta R	Elev
1001410712.67		2154

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2150.64	Element			
Vel Head (ft)	0.73	Wt. n-Val.		0.045	
W.S. Elev (ft)	2149.92	Reach Len. (ft)	383.77	434.25	807.76
Crit W.S. (ft)	2149.83	Flow Area (sq ft)		110.90	
E.G. Slope (ft/ft)	0.022502	Area (sq ft)		110.90	
Q Total (cfs)	758.00	Flow (cfs)		758.00	
Top Width (ft)	67.78	Top Width (ft)		67.78	
Vel Total (ft/s)	6.83	Avg. Vel. (ft/s)		6.83	
Max Chl Dpth (ft)	3.92	Hydr. Depth (ft)		1.64	
Conv. Total (cfs)	5053.1	Conv. (cfs)		5053.1	
Length Wtd. (ft)	434.25	Wetted Per. (ft)		68.42	
Min Ch El (ft)	2146.00	Shear (lb/sq ft)		2.28	
Alpha	1.00	Stream Power (lb/ft s)		15.56	
Frctn Loss (ft)	8.71	Cum Volume (acre-ft)		1.17	
C & E Loss (ft)	0.05	Cum SA (acres)		0.72	

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

CROSS SECTION OUTPUT Profile #PF 2

			Left OB	Channel	Right OB
E.G. Elev (ft)	2150.64	Element			
Vel Head (ft)	0.73	Wt. n-Val.		0.045	
W.S. Elev (ft)	2149.92	Reach Len. (ft)	383.77	434.25	807.76
Crit W.S. (ft)	2149.83	Flow Area (sq ft)		110.90	
E.G. Slope (ft/ft)	0.022502	Area (sq ft)		110.90	
Q Total (cfs)	758.00	Flow (cfs)		758.00	
Top Width (ft)	67.78	Top Width (ft)		67.78	
Vel Total (ft/s)	6.83	Avg. Vel. (ft/s)		6.83	
Max Chl Dpth (ft)	3.92	Hydr. Depth (ft)		1.64	
Conv. Total (cfs)	5053.1	Conv. (cfs)		5053.1	
Length Wtd. (ft)	434.25	Wetted Per. (ft)		68.42	
Min Ch El (ft)	2146.00	Shear (lb/sq ft)		2.28	
Alpha	1.00	Stream Power (lb/ft s)		15.56	
Frctn Loss (ft)	8.71	Cum Volume (acre-ft)		1.17	
C & E Loss (ft)	0.05	Cum SA (acres)		0.72	

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.

FLOW DISTRIBUTION OUTPUT Profile #PF 1

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9936.66	9962.93	187.84	29.78	17.19	24.78	1.77	6.31
9962.93	9989.19	517.28	65.03	26.51	68.24	2.48	7.95
9989.19	RB 10015.46	52.88	16.09	24.72	6.98	0.65	3.29

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.

FLOW DISTRIBUTION OUTPUT Profile #PF 2

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9936.66	9962.93	187.84	29.78	17.19	24.78	1.77	6.31
9962.93	9989.19	517.28	65.03	26.51	68.24	2.48	7.95
9989.19	RB 10015.46	52.88	16.09	24.72	6.98	0.65	3.29

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

CROSS SECTION RIVER: TRIBUTARY 6C
REACH: TRIBUTARY 6C RS: 0.072

INPUT
Description:
Station Elevation Data num= 45

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9565	2158	9609.02	2156	9754.08	2154	9799.33	2152	9850.24	2150
9893.56	2148	9916.6	2146	9940.25	2144	9961.09	2142	9993.95	2140
10016.2	213810017.71		213810037.91		2140	10055.7	214210099.03		2142
10153.2	214210223.44		214210236.37		214010246.32		214010271.88		2140
10279.89	213810291.16		213810302.88		214010320.82		214010327.04		2138
10333.24	213610356.11		213610377.13		213810401.16		214010477.09		2140
10490.4	213810503.17		213610520.01		213610528.39		213810533.87		2140
10541.23	214210551.02		214410559.57		214610566.82		214810576.09		2150
10585.51	215210595.48		215410603.57		215610651.37		2156	10768.2	2154

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
9565	.06	9961.09	.045	10055.7	.0610271.88		.04510401.16		.06
10477.09	.04510533.87		.06						

Bank Sta: Left	Right	Coeff Contr.	Expan.
9850.24	10055.7	.1	.3

Blocked Obstructions num= 1

Sta L	Sta R	Elev
10056	10768.2	2154

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2141.88	Element			
Vel Head (ft)	0.58	Wt. n-Val.		0.045	
W.S. Elev (ft)	2141.31	Reach Len. (ft)			
Crit W.S. (ft)	2141.09	Flow Area (sq ft)		124.55	
E.G. Slope (ft/ft)	0.018003	Area (sq ft)		124.55	
Q Total (cfs)	758.00	Flow (cfs)		758.00	
Top Width (ft)	77.06	Top Width (ft)		77.06	
Vel Total (ft/s)	6.09	Avg. Vel. (ft/s)		6.09	
Max Chl Dpth (ft)	3.31	Hydr. Depth (ft)		1.62	
Conv. Total (cfs)	5649.4	Conv. (cfs)		5649.4	
Length Wtd. (ft)		Wetted Per. (ft)		77.36	
Min Ch El (ft)	2138.00	Shear (lb/sq ft)		1.81	
Alpha	1.00	Stream Power (lb/ft s)		11.01	
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

CROSS SECTION OUTPUT Profile #PF 2

			Left OB	Channel	Right OB
E.G. Elev (ft)	2141.88	Element			
Vel Head (ft)	0.58	Wt. n-Val.		0.045	

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W.S. Elev (ft)	2141.31	Reach Len. (ft)	
Crit W.S. (ft)	2141.09	Flow Area (sq ft)	124.55
E.G. Slope (ft/ft)	0.018003	Area (sq ft)	124.55
Q Total (cfs)	758.00	Flow (cfs)	758.00
Top Width (ft)	77.06	Top Width (ft)	77.06
Vel Total (ft/s)	6.09	Avg. Vel. (ft/s)	6.09
Max Chl Dpth (ft)	3.31	Hydr. Depth (ft)	1.62
Conv. Total (cfs)	5649.4	Conv. (cfs)	5649.4
Length Wtd. (ft)		Wetted Per. (ft)	77.36
Min Ch El (ft)	2138.00	Shear (lb/sq ft)	1.81
Alpha	1.00	Stream Power (lb/ft s)	11.01
Frctn Loss (ft)		Cum Volume (acre-ft)	
C & E Loss (ft)		Cum SA (acres)	

FLOW DISTRIBUTION OUTPUT Profile #PF 1

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
9918.73	9987.21	15.95	6.61	14.76	2.10	0.45	2.41
9987.21	RB 10055.70	742.05	117.94	62.60	97.90	1.89	6.29

FLOW DISTRIBUTION OUTPUT Profile #PF 2

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
9918.73	9987.21	15.95	6.61	14.76	2.10	0.45	2.41
9987.21	RB 10055.70	742.05	117.94	62.60	97.90	1.89	6.29

SUMMARY OF MANNING'S N VALUES

River:TRIBUTARY 6C

Reach	River Sta.	n1	n2	n3	n4	n5	n6	n7
TRIBUTARY 6C	0.923	.06	.045	.06				
TRIBUTARY 6C	0.857	.06	.045	.06				
TRIBUTARY 6C	0.791	.06	.045	.06				
TRIBUTARY 6C	0.718	.06	.045	.06				
TRIBUTARY 6C	0.652	.06	.045	.06				
TRIBUTARY 6C	0.582	.06	.045	.06				
TRIBUTARY 6C	0.505	.06	.045	.06				
TRIBUTARY 6C	0.446	.06	.045	.06				
TRIBUTARY 6C	0.363	.06	.045	.06				
TRIBUTARY 6C	0.280	.06	.045	.06				
TRIBUTARY 6C	0.245	.06	.045	.06				
TRIBUTARY 6C	0.157	.06	.045	.06				
TRIBUTARY 6C	0.072	.06	.045	.06	.045	.06	.045	.06

SUMMARY OF REACH LENGTHS

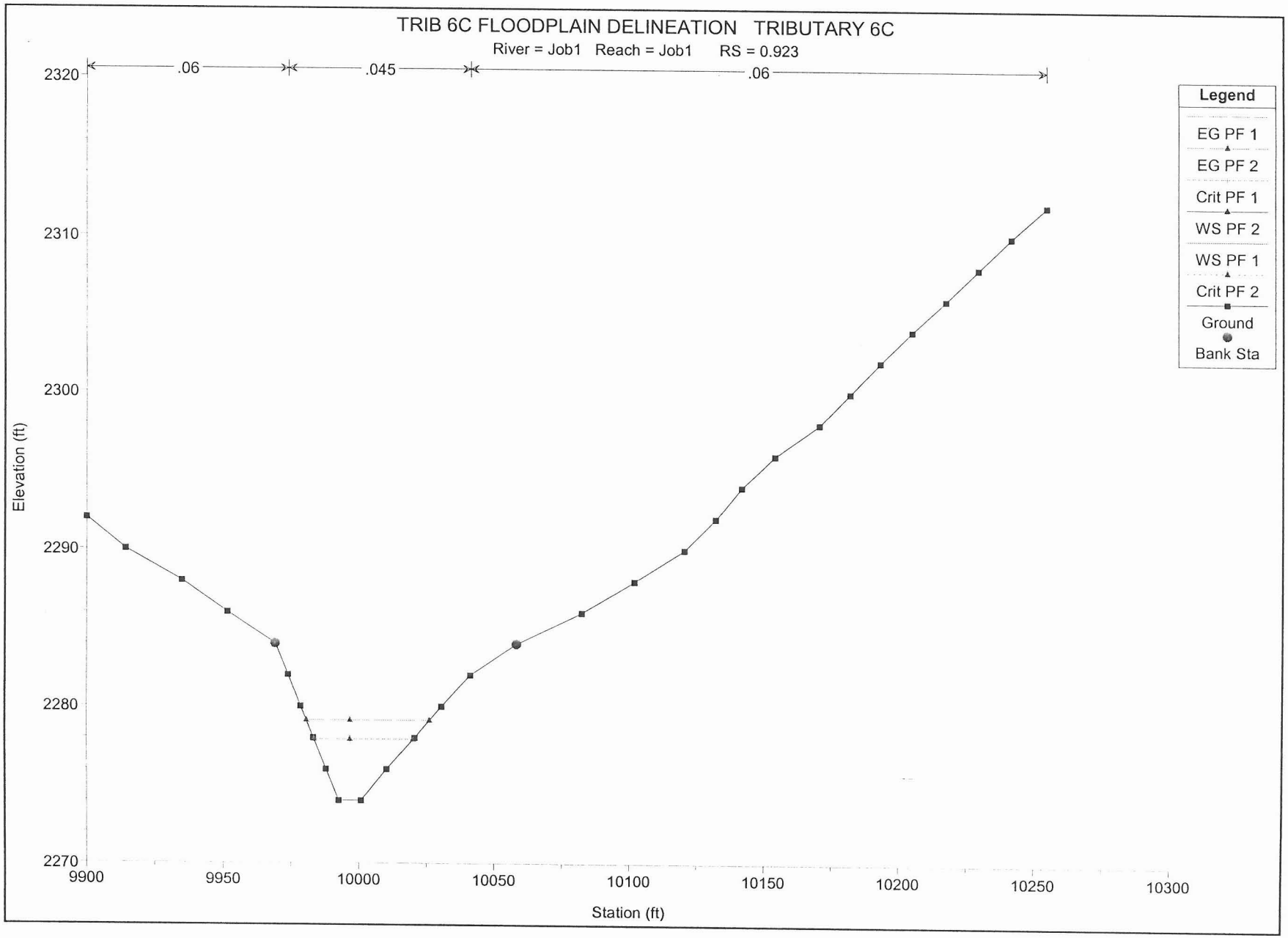
River: TRIBUTARY 6C

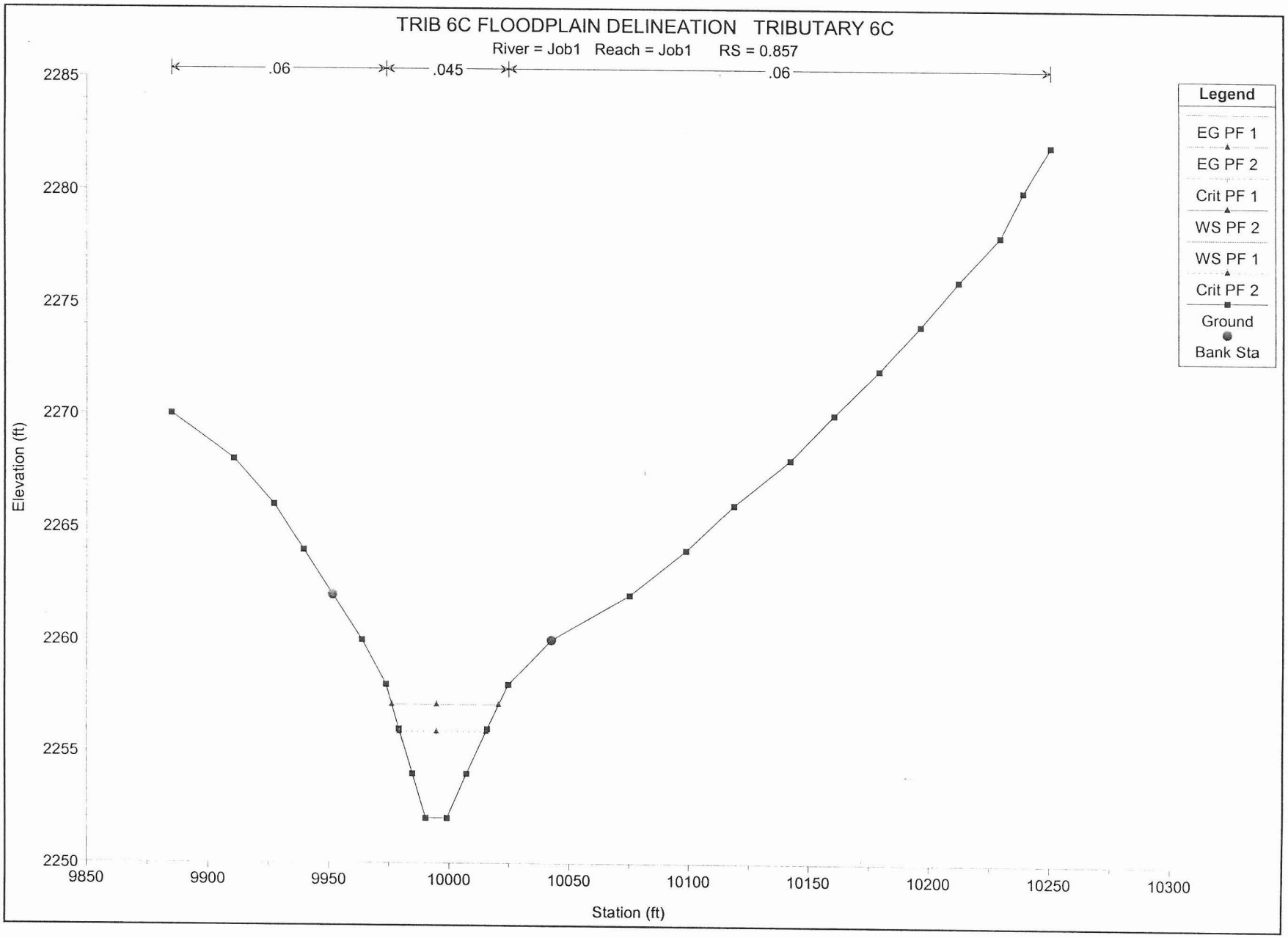
Reach	River Sta.	Left	Channel	Right
TRIBUTARY 6C	0.923	350.91	341.93	337.02
TRIBUTARY 6C	0.857	311.58	349.61	369.38
TRIBUTARY 6C	0.791	372.21	347.64	332.45
TRIBUTARY 6C	0.718	362.23	338.25	323.35
TRIBUTARY 6C	0.652	373.02	371.13	361.22
TRIBUTARY 6C	0.582	413.16	403.35	422.98
TRIBUTARY 6C	0.505	236.96	298.48	379.46
TRIBUTARY 6C	0.446	399.85	411	480.82
TRIBUTARY 6C	0.363	431.77	414.24	363.41
TRIBUTARY 6C	0.280	171.49	161.48	205
TRIBUTARY 6C	0.245	415.74	464.23	549.53
TRIBUTARY 6C	0.157	383.77	434.25	807.76

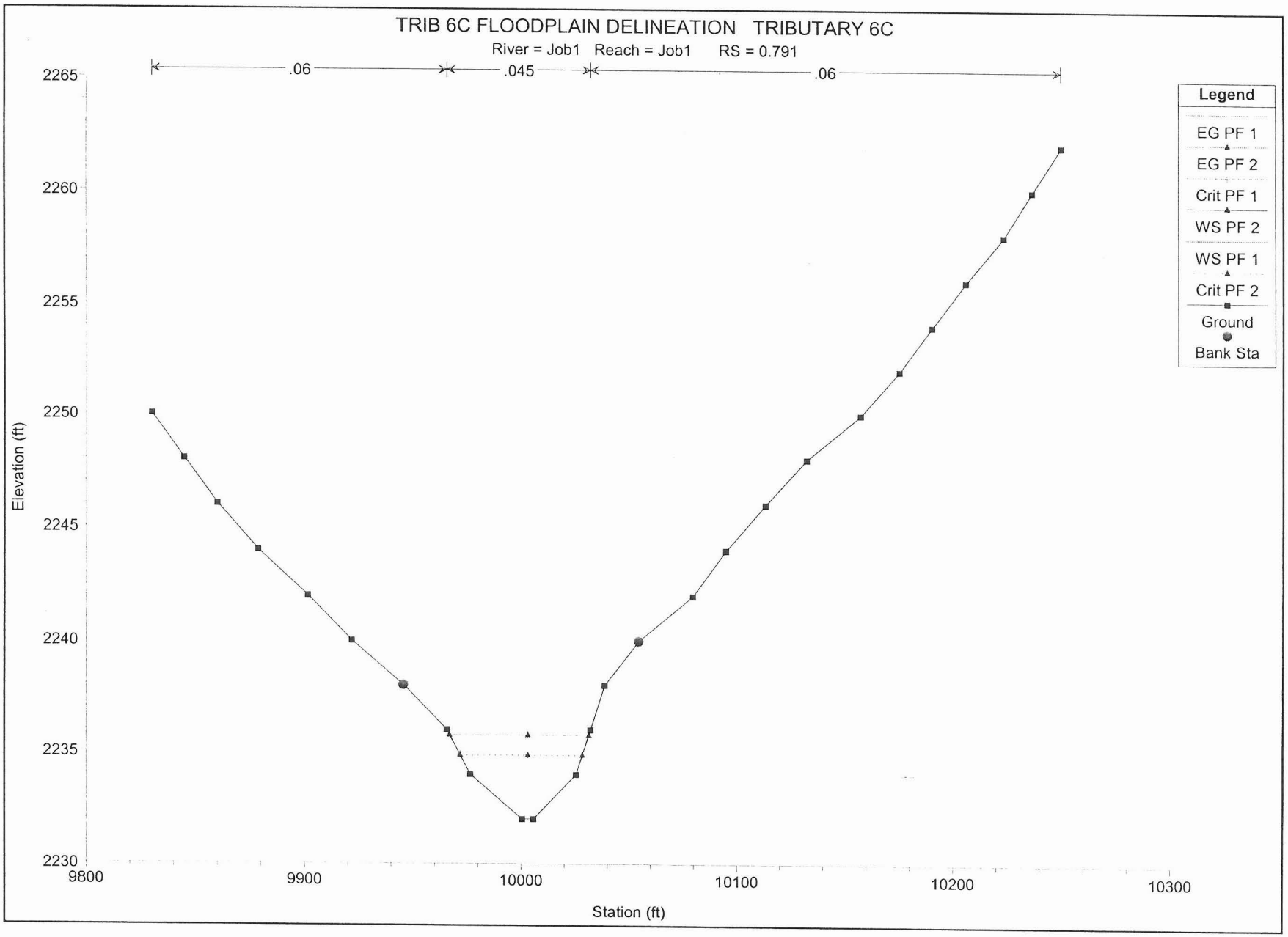
TRIBUTARY 6C 0.072

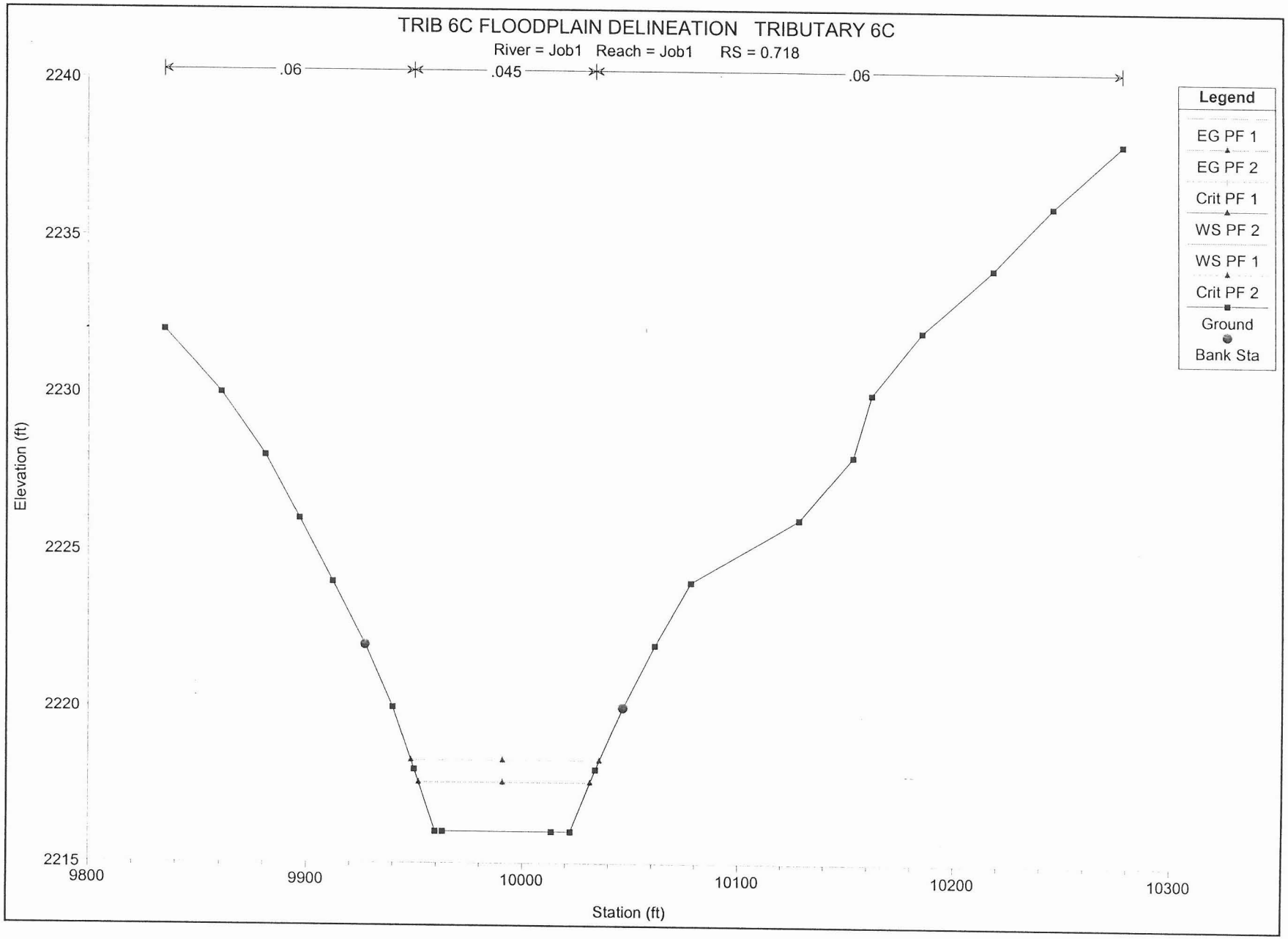
SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: TRIBUTARY 6C

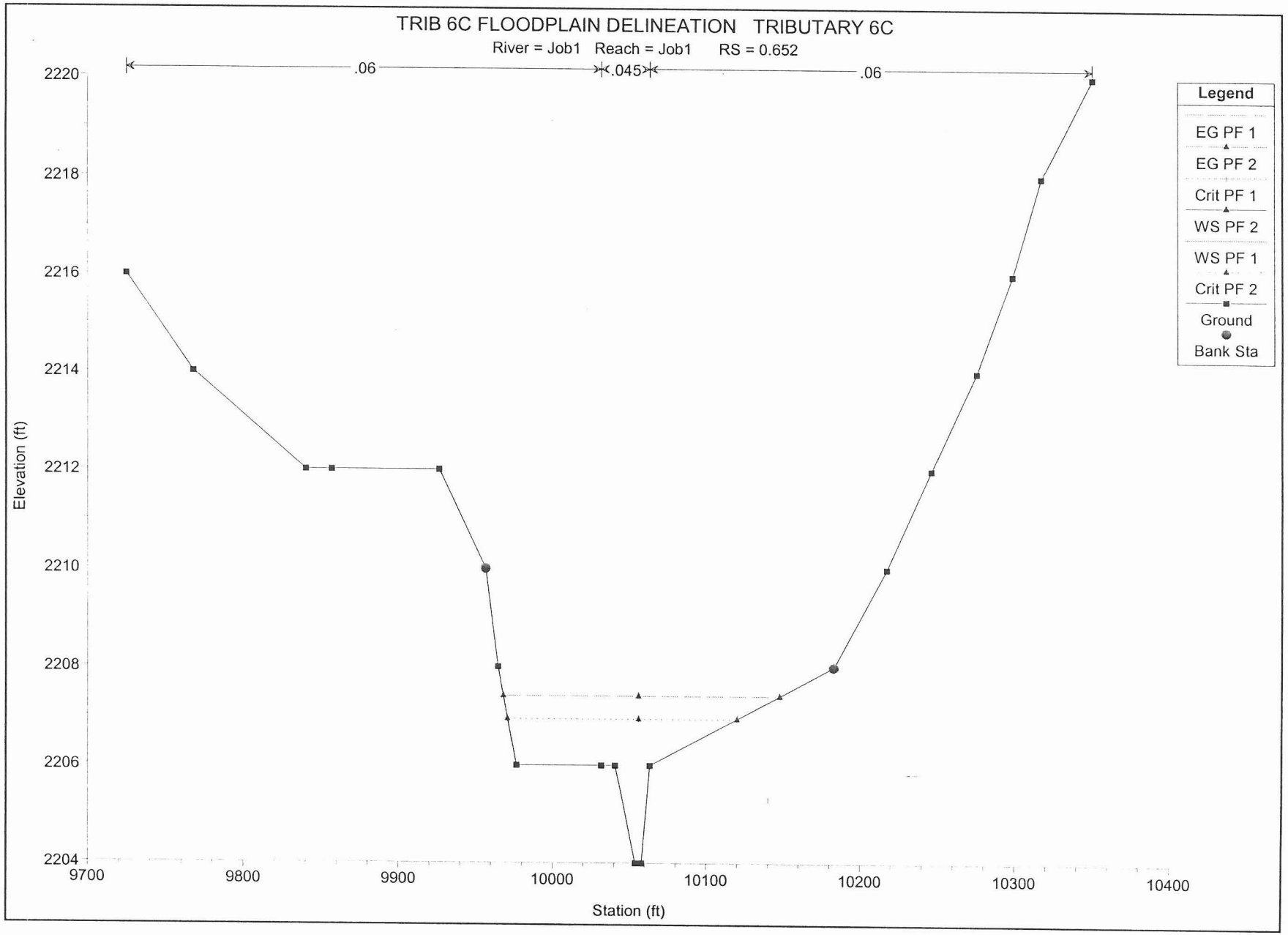
Reach	River Sta.	Contr.	Expan.
TRIBUTARY 6C	0.923	.1	.3
TRIBUTARY 6C	0.857	.1	.3
TRIBUTARY 6C	0.791	.1	.3
TRIBUTARY 6C	0.718	.1	.3
TRIBUTARY 6C	0.652	.1	.3
TRIBUTARY 6C	0.582	.1	.3
TRIBUTARY 6C	0.505	.1	.3
TRIBUTARY 6C	0.446	.1	.3
TRIBUTARY 6C	0.363	.1	.3
TRIBUTARY 6C	0.280	.1	.3
TRIBUTARY 6C	0.245	.1	.3
TRIBUTARY 6C	0.157	.1	.3
TRIBUTARY 6C	0.072	.1	.3

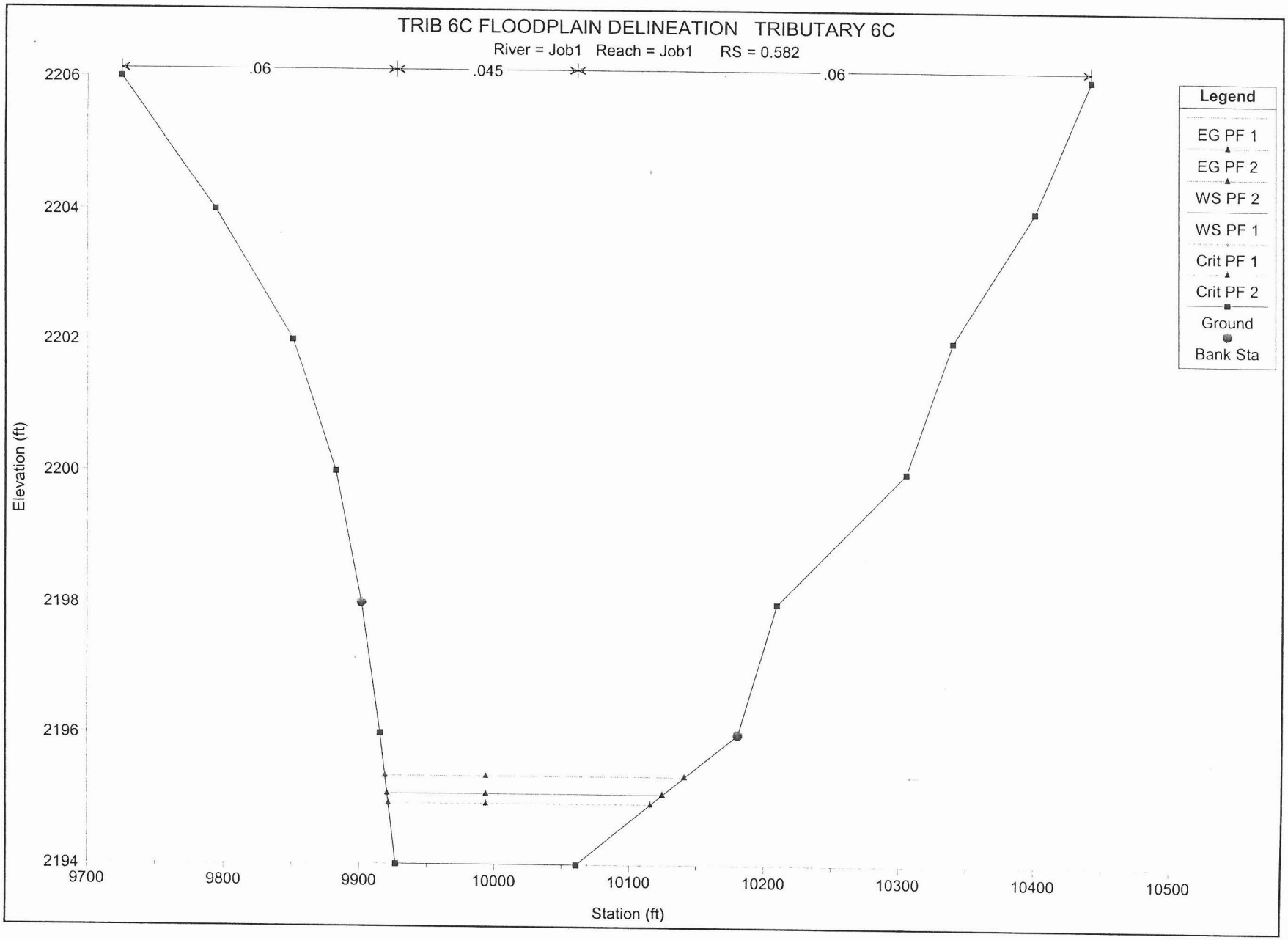

TRIB 6C FLOODPLAIN DELINEATION TRIBUTARY 6C
River = Job1 Reach = Job1 RS = 0.923
.06
.045
.06
Legend
EG PF 1
EG PF 2
Crit PF 1
WS PF 2
WS PF 1
Crit PF 2
Ground
Bank Sta
Elevation (ft)
2320
2310
2300
2290
2280
2270
9900
9950
10000
10050
10100
10150
10200
10250
10300
Station (ft)

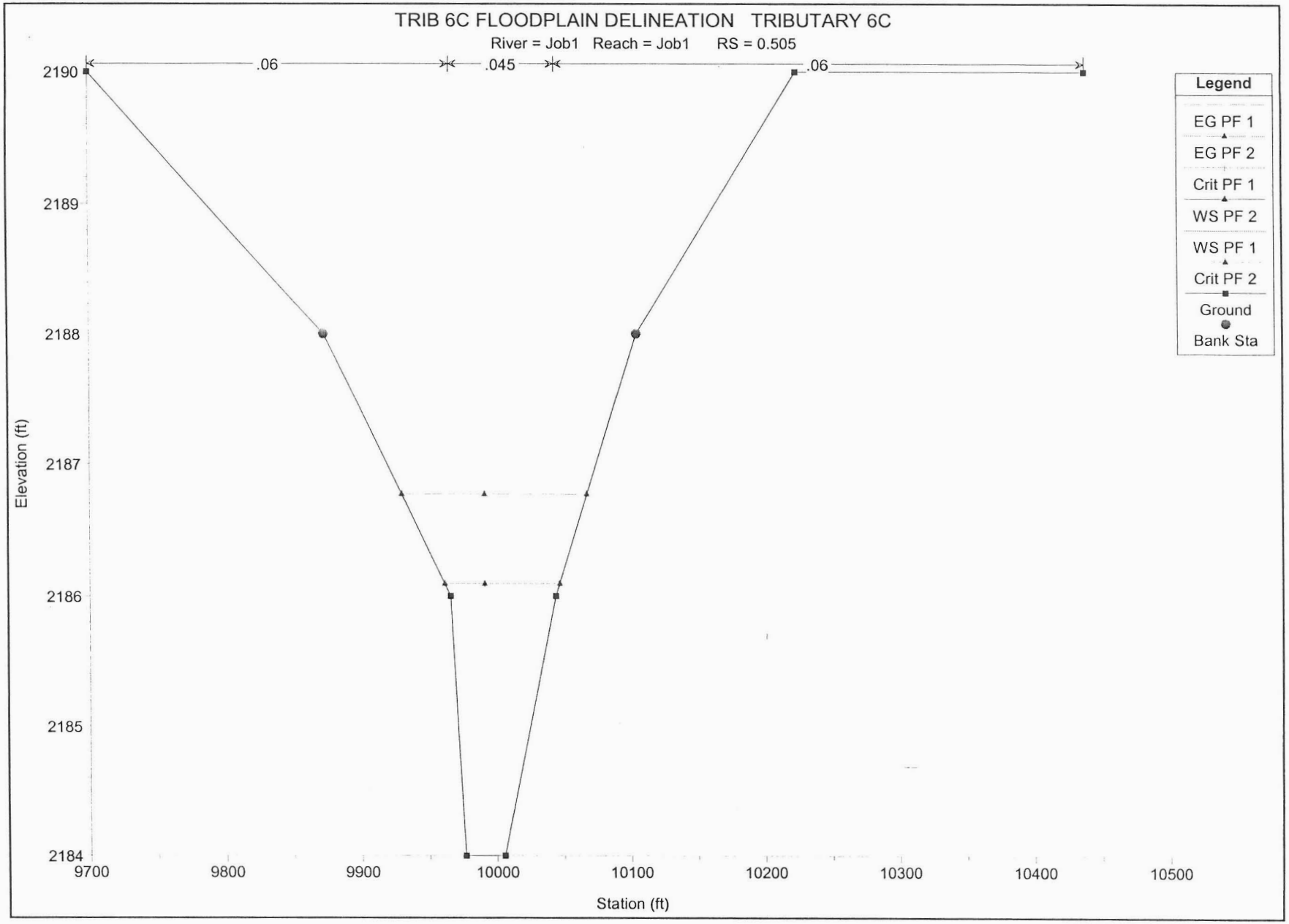

TRIB 6C FLOODPLAIN DELINEATION TRIBUTARY 6C
River = Job1 Reach = Job1 RS = 0.857
.06
.045
.06
Legend
EG PF 1
EG PF 2
Crit PF 1
WS PF 2
WS PF 1
Crit PF 2
Ground
Bank Sta
Elevation (ft)
2285
2280
2275
2270
2265
2260
2255
2250
9850
9900
9950
10000
10050
10100
10150
10200
10250
10300
Station (ft)

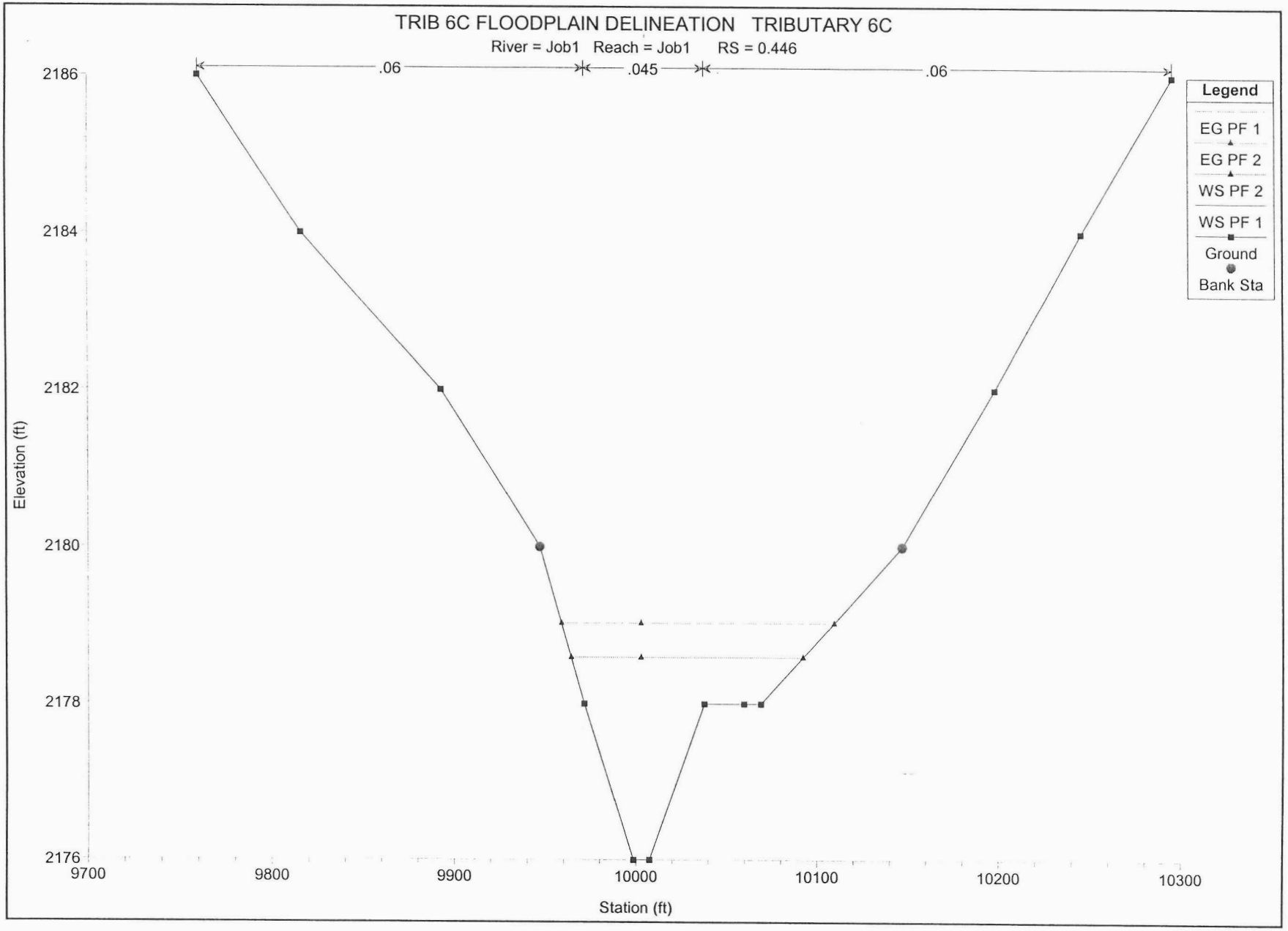

TRIB 6C FLOODPLAIN DELINEATION TRIBUTARY 6C
River = Job1 Reach = Job1 RS = 0.791
.06
.045
.06
Legend
EG PF 1
EG PF 2
Crit PF 1
WS PF 2
WS PF 1
Crit PF 2
Ground
Bank Sta
Elevation (ft)
2265
2260
2255
2250
2245
2240
2235
2230
9800
9900
10000
10100
10200
10300
Station (ft)

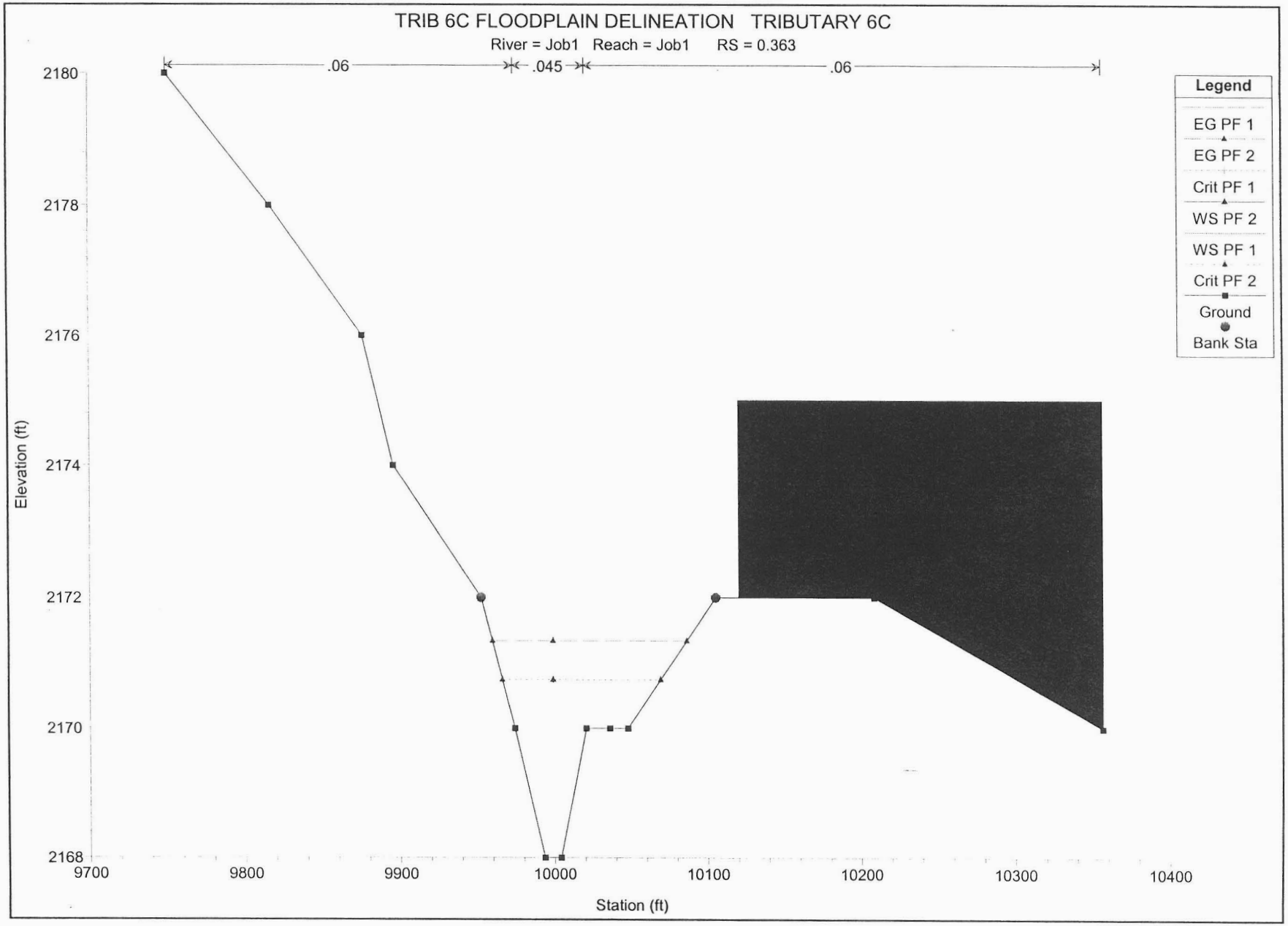

TRIB 6C FLOODPLAIN DELINEATION TRIBUTARY 6C
River = Job1 Reach = Job1 RS = 0.718
.06
.045
.06
Legend
EG PF 1
EG PF 2
Crit PF 1
WS PF 2
WS PF 1
Crit PF 2
Ground
Bank Sta
Elevation (ft)
2240
2235
2230
2225
2220
2215
9800
9900
10000
10100
10200
10300
Station (ft)

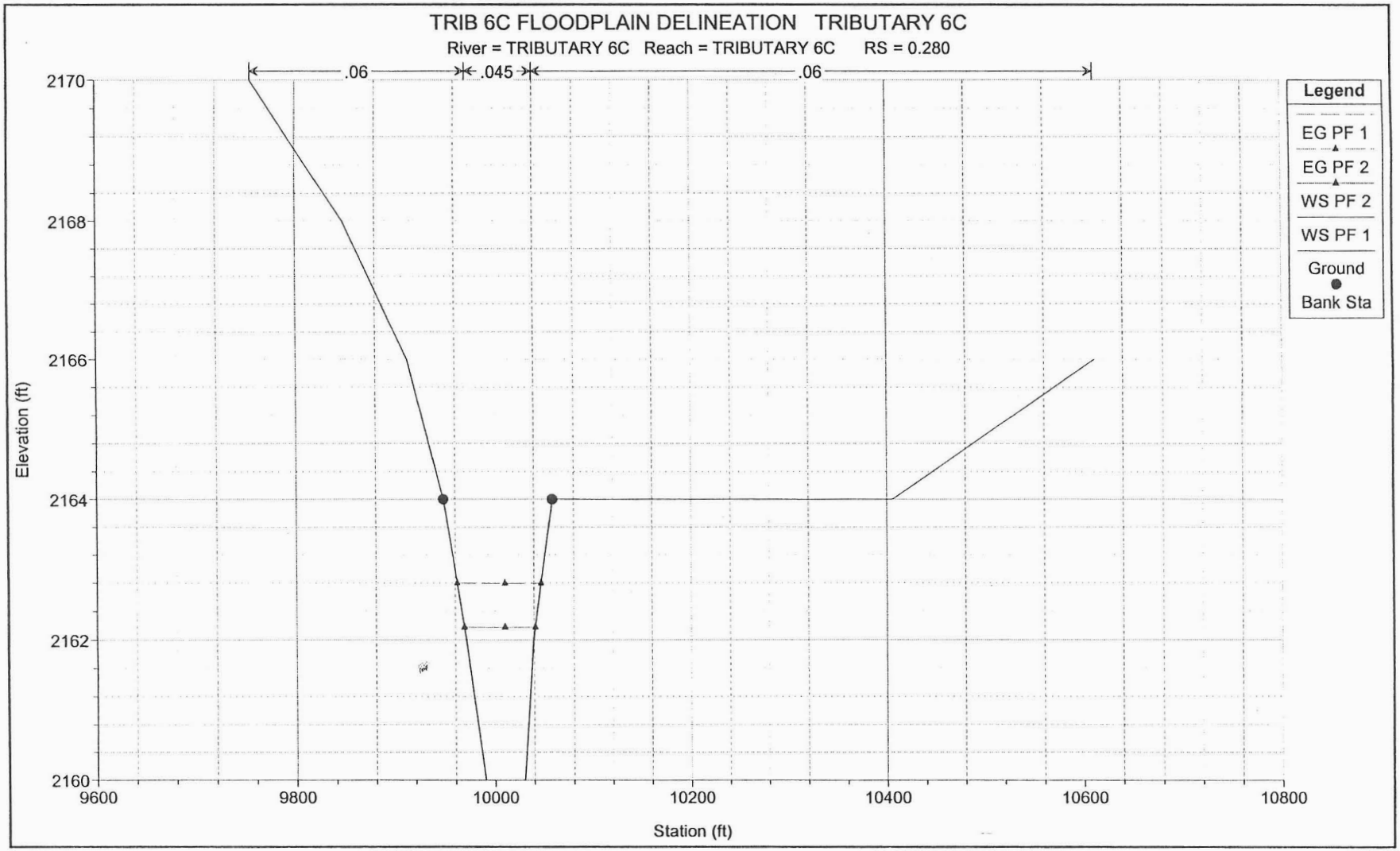

TRIB 6C FLOODPLAIN DELINEATION TRIBUTARY 6C
River = Job1 Reach = Job1 RS = 0.652
.06
.045
.06
Legend
EG PF 1
EG PF 2
Crit PF 1
WS PF 2
WS PF 1
Crit PF 2
Ground
Bank Sta
Elevation (ft)
2220
2218
2216
2214
2212
2210
2208
2206
2204
9700
9800
9900
10000
10100
10200
10300
10400
Station (ft)

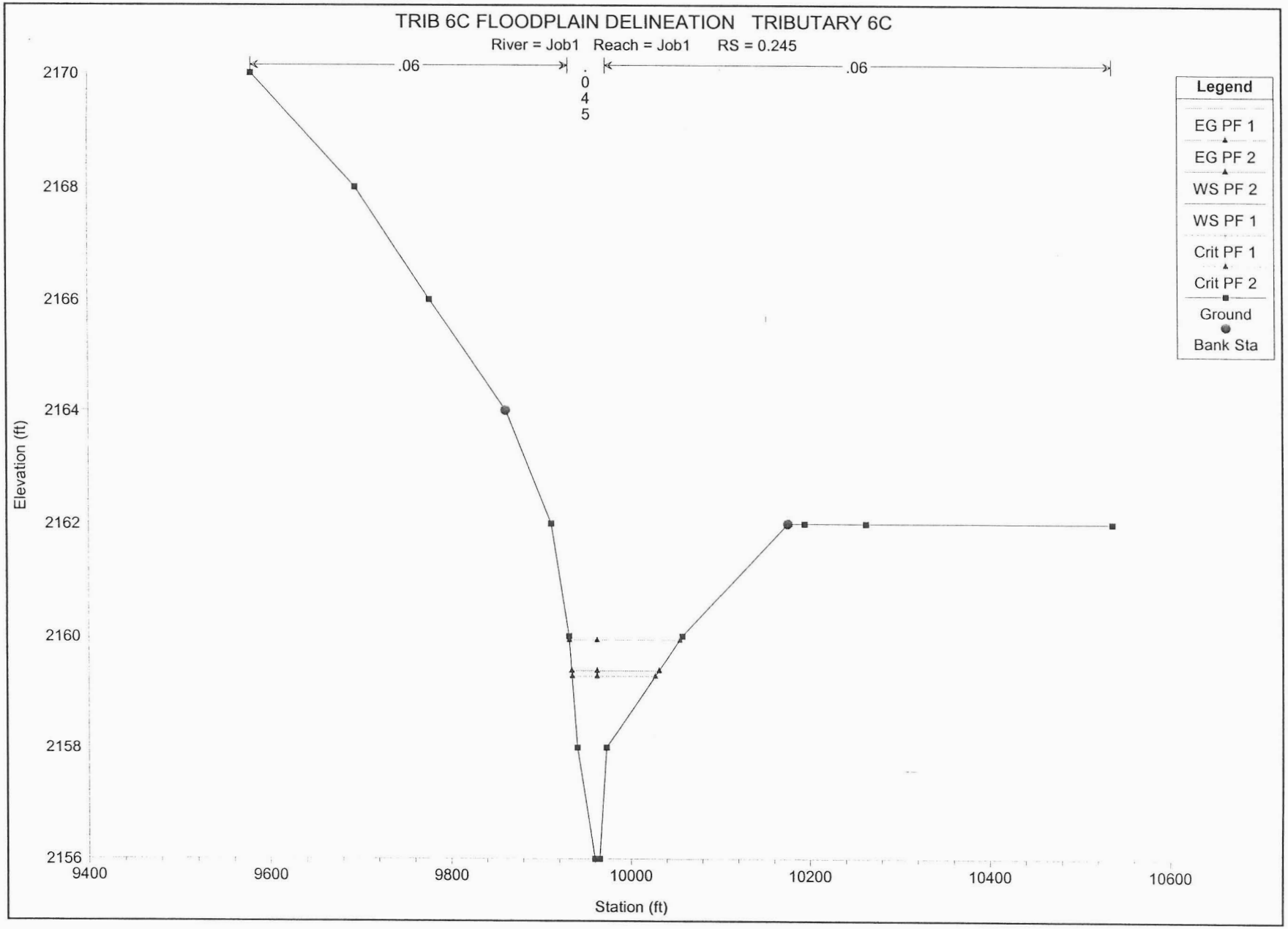

TRIB 6C FLOODPLAIN DELINEATION TRIBUTARY 6C
River = Job1 Reach = Job1 RS = 0.582
.06
.045
.06
Legend
EG PF 1
EG PF 2
WS PF 2
WS PF 1
Crit PF 1
Crit PF 2
Ground
Bank Sta
Elevation (ft)
2206
2204
2202
2200
2198
2196
2194
9700
9800
9900
10000
10100
10200
10300
10400
10500
Station (ft)

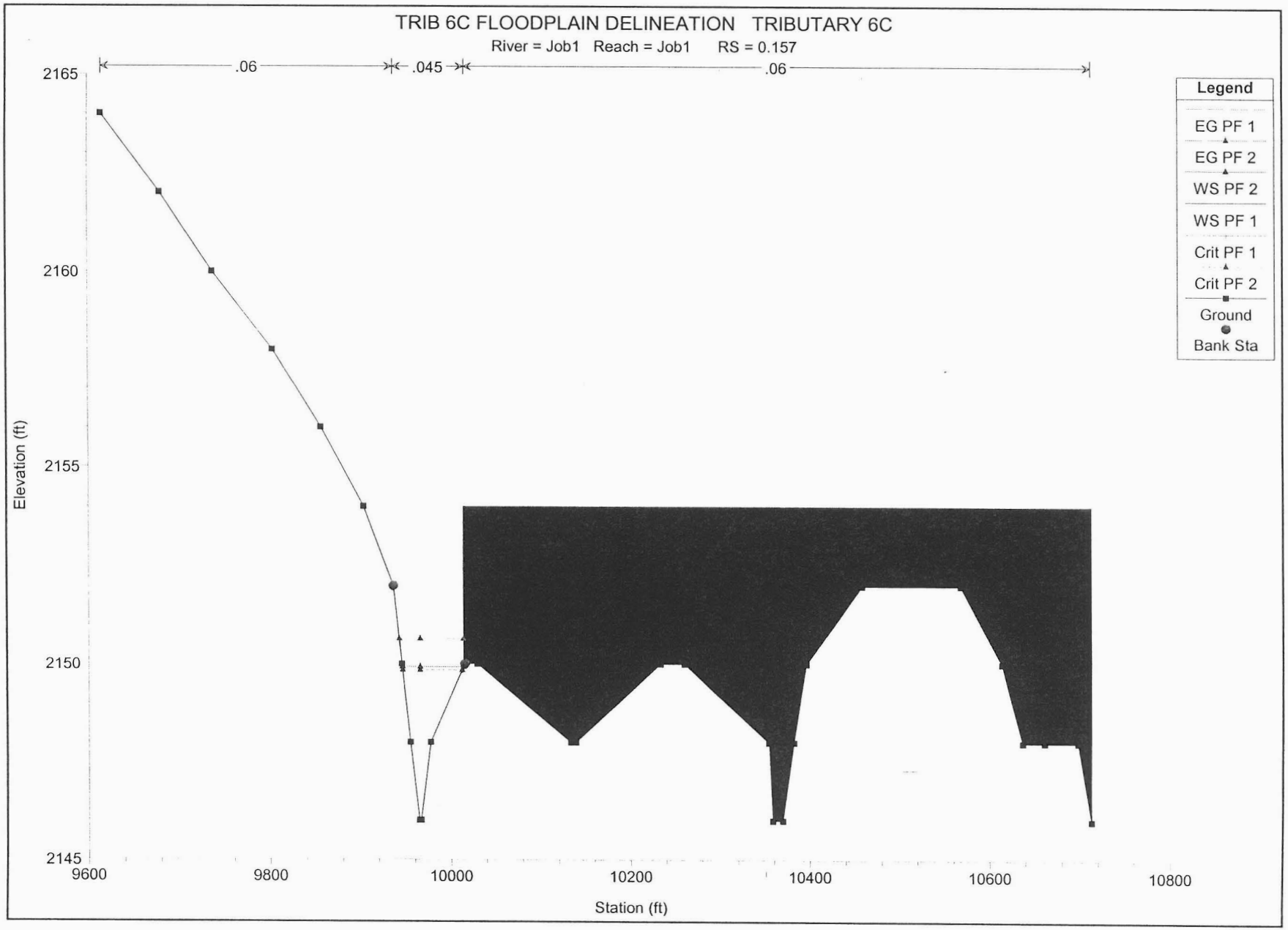

TRIB 6C FLOODPLAIN DELINEATION TRIBUTARY 6C
River = Job1 Reach = Job1 RS = 0.505
.06
.045
.06
2190
2189
2188
2187
2186
2185
2184
Elevation (ft)
9700
9800
9900
10000
10100
10200
10300
10400
10500
Station (ft)
Legend
EG PF 1
EG PF 2
Crit PF 1
WS PF 2
WS PF 1
Crit PF 2
Ground
Bank Sta

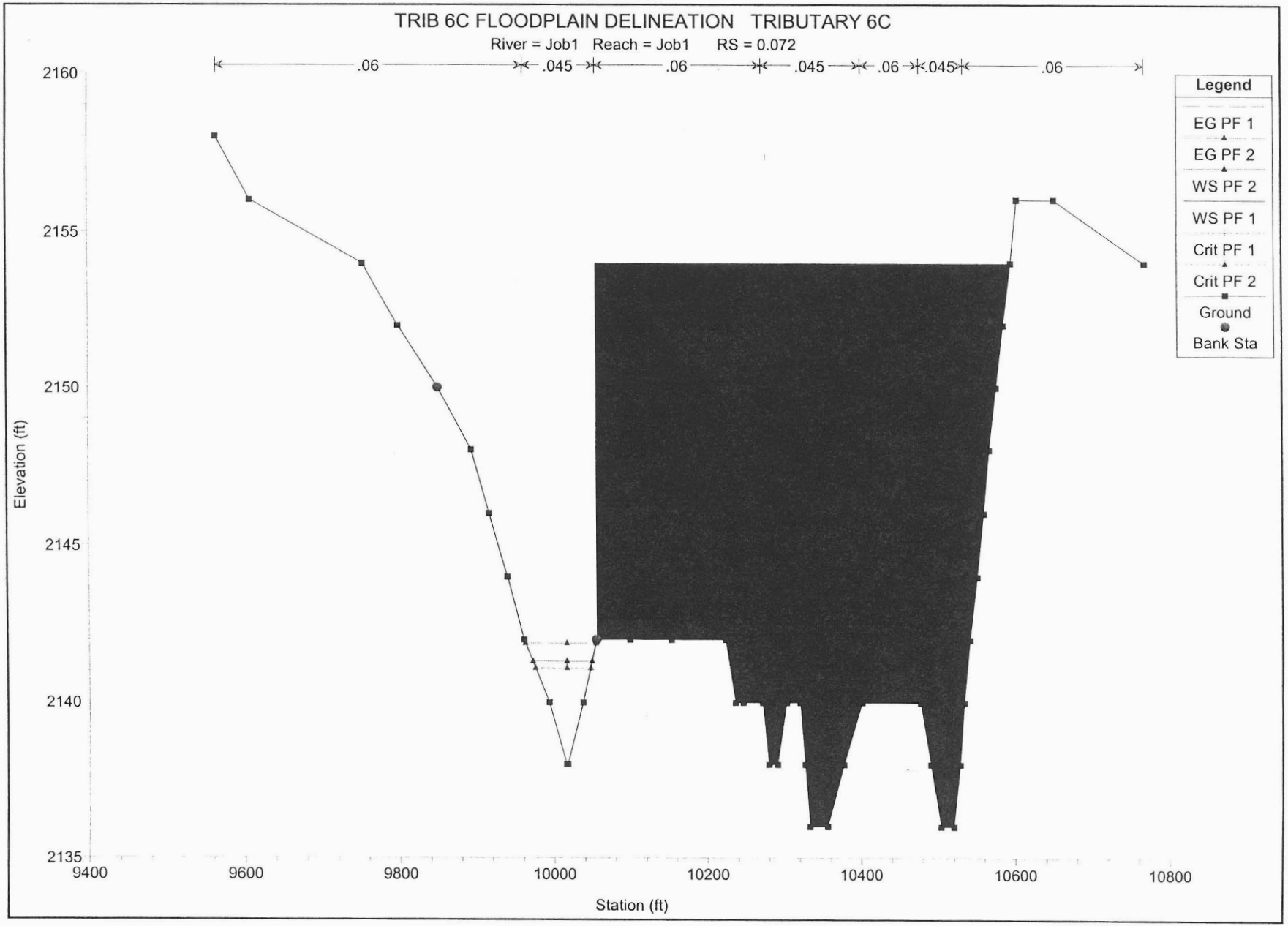

TRIB 6C FLOODPLAIN DELINEATION TRIBUTARY 6C
River = Job1 Reach = Job1 RS = 0.446
.06
.045
.06
Legend
EG PF 1
EG PF 2
WS PF 2
WS PF 1
Ground
Bank Sta
2186
2184
2182
2180
2178
2176
Elevation (ft)
9700
9800
9900
10000
10100
10200
10300
Station (ft)


TRIB 6C FLOODPLAIN DELINEATION TRIBUTARY 6C
River = Job1 Reach = Job1 RS = 0.363
.06
.045
.06
Legend
EG PF 1
EG PF 2
Crit PF 1
WS PF 2
WS PF 1
Crit PF 2
Ground
Bank Sta
Elevation (ft)
2180
2178
2176
2174
2172
2170
2168
9700
9800
9900
10000
10100
10200
10300
10400
Station (ft)


TRIB 6C FLOODPLAIN DELINEATION TRIBUTARY 6C
River = TRIBUTARY 6C Reach = TRIBUTARY 6C RS = 0.280
.06
.045
.06
Legend
EG PF 1
EG PF 2
WS PF 2
WS PF 1
Ground
Bank Sta
Elevation (ft)
2170
2168
2166
2164
2162
2160
9600
9800
10000
10200
10400
10600
10800
Station (ft)


TRIB 6C FLOODPLAIN DELINEATION TRIBUTARY 6C
River = Job1 Reach = Job1 RS = 0.245
.06
.045
.06
Legend
EG PF 1
EG PF 2
WS PF 2
WS PF 1
Crit PF 1
Crit PF 2
Ground
Bank Sta
Elevation (ft)
2170
2168
2166
2164
2162
2160
2158
2156
9400
9600
9800
10000
10200
10400
10600
Station (ft)


TRIB 6C FLOODPLAIN DELINEATION TRIBUTARY 6C
River = Job1 Reach = Job1 RS = 0.157
.06
.045
.06
Legend
EG PF 1
EG PF 2
WS PF 2
WS PF 1
Crit PF 1
Crit PF 2
Ground
Bank Sta
Elevation (ft)
2165
2160
2155
2150
2145
9600
9800
10000
10200
10400
10600
10800
Station (ft)


TRIB 6C FLOODPLAIN DELINEATION TRIBUTARY 6C
River = Job1 Reach = Job1 RS = 0.072
.06
.045
.06
.045
.06
.045
.06
Legend
EG PF 1
EG PF 2
WS PF 2
WS PF 1
Crit PF 1
Crit PF 2
Ground
Bank Sta
Elevation (ft)
2160
2155
2150
2145
2140
2135
9400
9600
9800
10000
10200
10400
10600
10800
Station (ft)

HEC-RAS September 1998 Version 2.2
U.S. Army Corp of Engineers
Hydrologic Engineering Center
609 Second Street, Suite D
Davis, California 95616-4687
(916) 756-1104

```
X     X  XXXXXX    XXXX        XXXX       XX      XXXX
X     X  X        X    X       X   X     X  X    X
X     X  X        X            X   X    X    X   X
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PROJECT DATA
Project Title: TRIBUTARY 6B FLOODPLAIN DELINEATION
Project File : T_6B.prj
Run Date and Time: 9/6/2000 9:44:52 AM

Project in English units

Project Description:
TRIBUTARY 6B

PLAN DATA

Plan Title: New Weir Breakout
Plan File : y:\Mc-18\RAS FCD Disk\HEC-RAS\T_6B\T_6B.p01

Geometry Title: Junction
Geometry File : y:\Mc-18\RAS FCD Disk\HEC-RAS\T_6B\T_6B.g03

Flow Title : New Weir Breakout
Flow File : y:\Mc-18\RAS FCD Disk\HEC-RAS\T_6B\T_6B.f03

Plan Summary Information:
Number of: Cross Sections = 28 Mulitple Openings = 0
Culverts = 1 Inline Weirs = 0
Bridges = 0

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

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

FLOW DATA

Flow Title: New Weir Breakout
Flow File : y:\Mc-18\RAS FCD Disk\HEC-RAS\T_6B\T_6B.f03

Flow Data (cfs)

River	Reach	RS	PF 1	PF 2
Tributary 6B	Tributary 6B DS	1.665	3169	3169

T_6b

Tributary 6B	Tributary 6B DS 0.547	2288	2288
Tributary 6B	Tributary 6B DS 0.476	2031	2031
Tributary 6B	Tributary 6B DS 0.42	1864	1864
Tributary 6B	Tributary 6B DS 0.352	1306	1306
Tributary 6B	Tributary 6B DS 0.258	921	921
Tributary 6B	Tributary 6B Nor1.803	1477	1477
Tributary 6B	Tributary 6B Sou1.799	2007	2007

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
Tributary 6B	Tributary 6B DS	PF 1		Normal S = .015
Tributary 6B	Tributary 6B DS	PF 2		Normal S = .015

GEOMETRY DATA

Geometry Title: Junction
Geometry File : y:\Mc-18\RAS FCD Disk\HEC-RAS\T_6B\T_6B.g03

Reach Connection Table

River	Reach	Upstream Boundary	Downstream Boundary
Tributary 6B	Tributary 6B Nor		Junction
Tributary 6B	Tributary 6B Sou		Junction
Tributary 6B	Tributary 6B DS	Junction	

CROSS SECTION RIVER: Tributary 6B
REACH: Tributary 6B Nor RS: 1.803

INPUT
Description:
Station Elevation Data num= 13

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9920	2306	9950	2306	9960	2304	9990	2302	10000	2300
10020	2300	10035	2302	10070	2302	10150	2302	10160	2304
10170	2306	10190	2308	10200	2310				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9920	.065	9960	.035	10035	.065

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
9950	10170	430	430	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2303.62	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.56	Wt. n-Val.		0.043	
W.S. Elev (ft)	2303.06	Reach Len. (ft)	430.00	430.00	430.00
Crit W.S. (ft)	2302.97	Flow Area (sq ft)		245.05	
E.G. Slope (ft/ft)	0.018110	Area (sq ft)		245.05	
Q Total (cfs)	1477.00	Flow (cfs)		1477.00	
Top Width (ft)	181.11	Top Width (ft)		181.11	
Vel Total (ft/s)	6.03	Avg. Vel. (ft/s)		6.03	
Max Chl Dpth (ft)	3.06	Hydr. Depth (ft)		1.35	
Conv. Total (cfs)	10975.4	Conv. (cfs)		10975.4	
Length Wtd. (ft)	430.00	Wetted Per. (ft)		181.58	
Min Ch El (ft)	2300.00	Shear (lb/sq ft)		1.53	
Alpha	1.00	Stream Power (lb/ft s)		9.20	
Frctn Loss (ft)	6.75	Cum Volume (acre-ft)		4.22	
C & E Loss (ft)	0.04	Cum SA (acres)		1.64	

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

CROSS SECTION OUTPUT Profile #PF 2

E.G. Elev (ft)	2303.62	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.56	Wt. n-Val.		0.043	
W.S. Elev (ft)	2303.06	Reach Len. (ft)	430.00	430.00	430.00
Crit W.S. (ft)	2302.97	Flow Area (sq ft)		245.05	
E.G. Slope (ft/ft)	0.018110	Area (sq ft)		245.05	
Q Total (cfs)	1477.00	Flow (cfs)		1477.00	
Top Width (ft)	181.11	Top Width (ft)		181.11	
Vel Total (ft/s)	6.03	Avg. Vel. (ft/s)		6.03	
Max Chl Dpth (ft)	3.06	Hydr. Depth (ft)		1.35	
Conv. Total (cfs)	10975.4	Conv. (cfs)		10975.4	
Length Wtd. (ft)	430.00	Wetted Per. (ft)		181.58	
Min Ch El (ft)	2300.00	Shear (lb/sq ft)		1.53	
Alpha	1.00	Stream Power (lb/ft s)		9.20	
Frctn Loss (ft)	6.75	Cum Volume (acre-ft)		4.22	
C & E Loss (ft)	0.04	Cum SA (acres)		1.64	

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

FLOW DISTRIBUTION OUTPUT Profile #PF 1

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9950.00	10023.33	905.21	99.47	49.43	61.29	2.02	9.10
10023.33	10096.67	389.37	86.49	73.44	26.36	1.18	4.50
10096.67	RB 10170.00	182.41	59.09	58.72	12.35	1.01	3.09

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.

FLOW DISTRIBUTION OUTPUT Profile #PF 2

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9950.00	10023.33	905.21	99.47	49.43	61.29	2.02	9.10
10023.33	10096.67	389.37	86.49	73.44	26.36	1.18	4.50
10096.67	RB 10170.00	182.41	59.09	58.72	12.35	1.01	3.09

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

CROSS SECTION RIVER: Tributary 6B
REACH: Tributary 6B Nor RS: 1.739

INPUT
Description:
Station Elevation Data num= 11

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9860	2298	9900	2296	9960	2294	9975	2292	9990	2292
9998	2294	10010	2296	10050	2298	10070	2300	10120	2310
10160	2314								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9860	.065	9960	.035	10010	.065

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
9860	10010	170	180 190	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2296.84	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.92	Wt. n-Val.		0.038	
W.S. Elev (ft)	2295.92	Reach Len. (ft)	170.00	180.00	190.00
Crit W.S. (ft)	2295.92	Flow Area (sq ft)		192.23	
E.G. Slope (ft/ft)	0.013727	Area (sq ft)		192.23	
Q Total (cfs)	1477.00	Flow (cfs)		1477.00	
Top Width (ft)	107.09	Top Width (ft)		107.09	
Vel Total (ft/s)	7.68	Avg. Vel. (ft/s)		7.68	
Max Chl Dpth (ft)	3.92	Hydr. Depth (ft)		1.79	

Conv. Total (cfs)	12606.3	Conv. (cfs)	12606.3
Length Wtd. (ft)	180.00	Wetted Per. (ft)	107.66
Min Ch El (ft)	2292.00	Shear (lb/sq ft)	1.53
Alpha	1.00	Stream Power (lb/ft s)	11.76
Frctn Loss (ft)	1.54	Cum Volume (acre-ft)	2.06
C & E Loss (ft)	0.03	Cum SA (acres)	0.22

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

CROSS SECTION OUTPUT Profile #PF 2

E.G. Elev (ft)	2296.84	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.92	Wt. n-Val.		0.038	
W.S. Elev (ft)	2295.92	Reach Len. (ft)	170.00	180.00	190.00
Crit W.S. (ft)	2295.92	Flow Area (sq ft)		192.23	
E.G. Slope (ft/ft)	0.013727	Area (sq ft)		192.23	
Q Total (cfs)	1477.00	Flow (cfs)		1477.00	
Top Width (ft)	107.09	Top Width (ft)		107.09	
Vel Total (ft/s)	7.68	Avg. Vel. (ft/s)		7.68	
Max Chl Dpth (ft)	3.92	Hydr. Depth (ft)		1.79	
Conv. Total (cfs)	12606.3	Conv. (cfs)		12606.3	
Length Wtd. (ft)	180.00	Wetted Per. (ft)		107.66	
Min Ch El (ft)	2292.00	Shear (lb/sq ft)		1.53	
Alpha	1.00	Stream Power (lb/ft s)		11.76	
Frctn Loss (ft)	1.54	Cum Volume (acre-ft)		2.06	
C & E Loss (ft)	0.03	Cum SA (acres)		0.22	

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

FLOW DISTRIBUTION OUTPUT Profile #PF 1

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9860.00	9910.00	0.64	0.96	7.58	0.04	0.13	0.67
9910.00	9960.00	152.50	54.29	50.03	10.32	1.09	2.81
9960.00	RB 10010.00	1323.86	136.98	50.05	89.63	2.77	9.66

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

FLOW DISTRIBUTION OUTPUT Profile #PF 2

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9860.00	9910.00	0.64	0.96	7.58	0.04	0.13	0.67
9910.00	9960.00	152.50	54.29	50.03	10.32	1.09	2.81
9960.00	RB 10010.00	1323.86	136.98	50.05	89.63	2.77	9.66

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

CROSS SECTION RIVER: Tributary 6B
REACH: Tributary 6B Nor RS: 1.705

INPUT
Description:
Station Elevation Data num= 9

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9900	2296	9940	2294	9975	2292	9980	2290	9990	2288
10000	2288	10015	2290	10050	2300	10060	2310		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9900	.065	9975	.035	10050	.065

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
9900	10050	210	200	190	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2294.10	Element			
Vel Head (ft)	0.80	Wt. n-Val.		0.035	
W.S. Elev (ft)	2293.30	Reach Len. (ft)	200.00	200.00	200.00
Crit W.S. (ft)		Flow Area (sq ft)		205.54	
E.G. Slope (ft/ft)	0.005823	Area (sq ft)		205.54	
Q Total (cfs)	1477.00	Flow (cfs)		1477.00	
Top Width (ft)	74.21	Top Width (ft)		74.21	
Vel Total (ft/s)	7.19	Avg. Vel. (ft/s)		7.19	
Max Chl Dpth (ft)	5.30	Hydr. Depth (ft)		2.77	
Conv. Total (cfs)	19355.3	Conv. (cfs)		19355.3	
Length Wtd. (ft)	200.00	Wetted Per. (ft)		75.43	
Min Ch El (ft)	2288.00	Shear (lb/sq ft)		0.99	
Alpha	1.00	Stream Power (lb/ft s)		7.12	
Frctn Loss (ft)	2.02	Cum Volume (acre-ft)		0.90	
C & E Loss (ft)	0.03	Cum SA (acres)			

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

CROSS SECTION OUTPUT Profile #PF 2

			Left OB	Channel	Right OB
E.G. Elev (ft)	2294.10	Element			
Vel Head (ft)	0.80	Wt. n-Val.		0.035	
W.S. Elev (ft)	2293.30	Reach Len. (ft)	200.00	200.00	200.00
Crit W.S. (ft)		Flow Area (sq ft)		205.54	
E.G. Slope (ft/ft)	0.005823	Area (sq ft)		205.54	
Q Total (cfs)	1477.00	Flow (cfs)		1477.00	
Top Width (ft)	74.21	Top Width (ft)		74.21	
Vel Total (ft/s)	7.19	Avg. Vel. (ft/s)		7.19	
Max Chl Dpth (ft)	5.30	Hydr. Depth (ft)		2.77	
Conv. Total (cfs)	19355.3	Conv. (cfs)		19355.3	
Length Wtd. (ft)	200.00	Wetted Per. (ft)		75.43	
Min Ch El (ft)	2288.00	Shear (lb/sq ft)		0.99	
Alpha	1.00	Stream Power (lb/ft s)		7.12	
Frctn Loss (ft)	2.02	Cum Volume (acre-ft)		0.90	
C & E Loss (ft)	0.03	Cum SA (acres)			

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.

FLOW DISTRIBUTION OUTPUT Profile #PF 1

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
9950.00	10000.00	912.61	122.09	48.30	61.79	2.56	7.47
10000.00	RB 10050.00	564.39	83.45	27.13	38.21	3.14	6.76

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.

FLOW DISTRIBUTION OUTPUT Profile #PF 2

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
9950.00	10000.00	912.61	122.09	48.30	61.79	2.56	7.47
10000.00	RB 10050.00	564.39	83.45	27.13	38.21	3.14	6.76

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

CROSS SECTION RIVER: Tributary 6B
REACH: Tributary 6B Sou RS: 1.799

INPUT
Description:
Station Elevation Data num= 12

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9730	2320	9790	2310	9820	2308	9920	2308	9950	2306
9980	2304	9990	2302	10000	2300	10040	2310	10090	2308
10150	2306	10220	2304						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9730	.065	9920	.035	10040	.065

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
9790	10040	500	500	490 .1	.3

Blocked Obstructions num= 1

Sta L	Sta R	Elev
10040	10220	2315

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2307.78	Element			
Vel Head (ft)	1.33	Wt. n-Val.		0.035	
W.S. Elev (ft)	2306.45	Reach Len. (ft)	500.00	500.00	490.00
Crit W.S. (ft)	2306.45	Flow Area (sq ft)		216.96	
E.G. Slope (ft/ft)	0.013347	Area (sq ft)		216.96	
Q Total (cfs)	2007.00	Flow (cfs)		2007.00	
Top Width (ft)	82.49	Top Width (ft)		82.49	
Vel Total (ft/s)	9.25	Avg. Vel. (ft/s)		9.25	
Max Chl Dpth (ft)	6.45	Hydr. Depth (ft)		2.63	
Conv. Total (cfs)	17372.5	Conv. (cfs)		17372.5	
Length Wtd. (ft)	500.00	Wetted Per. (ft)		83.76	
Min Ch El (ft)	2300.00	Shear (lb/sq ft)		2.16	
Alpha	1.00	Stream Power (lb/ft s)		19.97	
Frctn Loss (ft)	6.09	Cum Volume (acre-ft)		4.43	
C & E Loss (ft)	0.15	Cum SA (acres)		0.48	

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

CROSS SECTION OUTPUT Profile #PF 2

			Left OB	Channel	Right OB
E.G. Elev (ft)	2307.78	Element			
Vel Head (ft)	1.33	Wt. n-Val.		0.035	

W.S. Elev (ft)	2306.45	Reach Len. (ft)	500.00	500.00	490.00
Crit W.S. (ft)	2306.45	Flow Area (sq ft)		216.96	
E.G. Slope (ft/ft)	0.013347	Area (sq ft)		216.96	
Q Total (cfs)	2007.00	Flow (cfs)		2007.00	
Top Width (ft)	82.49	Top Width (ft)		82.49	
Vel Total (ft/s)	9.25	Avg. Vel. (ft/s)		9.25	
Max Chl Dpth (ft)	6.45	Hydr. Depth (ft)		2.63	
Conv. Total (cfs)	17372.5	Conv. (cfs)		17372.5	
Length Wtd. (ft)	500.00	Wetted Per. (ft)		83.76	
Min Ch El (ft)	2300.00	Shear (lb/sq ft)		2.16	
Alpha	1.00	Stream Power (lb/ft s)		19.97	
Frctn Loss (ft)	6.09	Cum Volume (acre-ft)		4.43	
C & E Loss (ft)	0.15	Cum SA (acres)		0.48	

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

FLOW DISTRIBUTION OUTPUT Profile #PF 1

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
9873.33	9956.67	15.75	5.96	13.40	0.78	0.45	2.64
9956.67	RB 10040.00	1991.25	211.00	70.36	99.22	3.05	9.44

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

FLOW DISTRIBUTION OUTPUT Profile #PF 2

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
9873.33	9956.67	15.75	5.96	13.40	0.78	0.45	2.64
9956.67	RB 10040.00	1991.25	211.00	70.36	99.22	3.05	9.44

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

CROSS SECTION RIVER: Tributary 6B
REACH: Tributary 6B Sou RS: 1.705

INPUT
Description:
Station Elevation Data num= 16

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9700	2310	9760	2306	9810	2302	9820	2300	9830	2298
9850	2296	9890	2294	9975	2294	9980	2292	9990	2290
10005	2290	10010	2292	10015	2294	10060	2296	10150	2294
10170	2292								

Manning's n Values num= 3

T_6b

Sta	n Val	Sta	n Val	Sta	n Val
9700	.065	9980	.035	10015	.065

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
9850	10060	200	210	.1	.3

Blocked Obstructions num= 1

Sta L	Sta R	Elev
10060	10170	2305

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2295.91	Element			
Vel Head (ft)	0.82	Wt. n-Val.		0.040	
W.S. Elev (ft)	2295.09	Reach Len. (ft)	200.00	200.00	200.00
Crit W.S. (ft)	2295.09	Flow Area (sq ft)		276.01	
E.G. Slope (ft/ft)	0.011151	Area (sq ft)		276.01	
Q Total (cfs)	2007.00	Flow (cfs)		2007.00	
Top Width (ft)	171.20	Top Width (ft)		171.20	
Vel Total (ft/s)	7.27	Avg. Vel. (ft/s)		7.27	
Max Chl Dpth (ft)	5.09	Hydr. Depth (ft)		1.61	
Conv. Total (cfs)	19005.9	Conv. (cfs)		19005.9	
Length Wtd. (ft)	200.00	Wetted Per. (ft)		172.61	
Min Ch El (ft)	2290.00	Shear (lb/sq ft)		1.11	
Alpha	1.00	Stream Power (lb/ft s)		8.09	
Frctn Loss (ft)	2.55	Cum Volume (acre-ft)		1.06	
C & E Loss (ft)	0.03	Cum SA (acres)			

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

CROSS SECTION OUTPUT Profile #PF 2

			Left OB	Channel	Right OB
E.G. Elev (ft)	2295.91	Element			
Vel Head (ft)	0.82	Wt. n-Val.		0.040	
W.S. Elev (ft)	2295.09	Reach Len. (ft)	200.00	200.00	200.00
Crit W.S. (ft)	2295.09	Flow Area (sq ft)		276.01	
E.G. Slope (ft/ft)	0.011151	Area (sq ft)		276.01	
Q Total (cfs)	2007.00	Flow (cfs)		2007.00	
Top Width (ft)	171.20	Top Width (ft)		171.20	
Vel Total (ft/s)	7.27	Avg. Vel. (ft/s)		7.27	
Max Chl Dpth (ft)	5.09	Hydr. Depth (ft)		1.61	
Conv. Total (cfs)	19005.9	Conv. (cfs)		19005.9	
Length Wtd. (ft)	200.00	Wetted Per. (ft)		172.61	
Min Ch El (ft)	2290.00	Shear (lb/sq ft)		1.11	
Alpha	1.00	Stream Power (lb/ft s)		8.09	
Frctn Loss (ft)	2.55	Cum Volume (acre-ft)		1.06	
C & E Loss (ft)	0.03	Cum SA (acres)			

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

FLOW DISTRIBUTION OUTPUT Profile #PF 1

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9850.00	9920.00	96.70	44.43	51.77	4.82	0.86	2.18
9920.00	9990.00	648.61	111.10	70.58	32.32	1.59	5.84
9990.00	RB 10060.00	1261.69	120.48	50.26	62.86	2.44	10.47

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 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.

FLOW DISTRIBUTION OUTPUT Profile #PF 2

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9850.00	9920.00	96.70	44.43	51.77	4.82	0.86	2.18
9920.00	9990.00	648.61	111.10	70.58	32.32	1.59	5.84
9990.00	RB 10060.00	1261.69	120.48	50.26	62.86	2.44	10.47

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 energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION RIVER: Tributary 6B
REACH: Tributary 6B DS RS: 1.665

INPUT
Description:
Station Elevation Data num= 19

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9570	2310	9690	2300	9720	2298	9740	2296	9825	2294
9860	2292	9865	2290	9875	2288	9900	2290	9970	2290
9975	2288	9980	2286	10000	2286	10020	2286	10025	2290
10030	2300	10050	2310	10110	2320	10170	2330		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9570	.065	9860	.035	10030	.065

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
9740	10030	270	280	280	.1 .3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2292.04	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.14	Wt. n-Val.		0.035	
W.S. Elev (ft)	2290.90	Reach Len. (ft)	270.00	280.00	280.00
Crit W.S. (ft)	2290.90	Flow Area (sq ft)		369.80	
E.G. Slope (ft/ft)	0.013989	Area (sq ft)		369.80	
Q Total (cfs)	3169.00	Flow (cfs)		3169.00	
Top Width (ft)	162.69	Top Width (ft)		162.69	
Vel Total (ft/s)	8.57	Avg. Vel. (ft/s)		8.57	
Max Chl Dpth (ft)	4.90	Hydr. Depth (ft)		2.27	
Conv. Total (cfs)	26793.3	Conv. (cfs)		26793.3	
Length Wtd. (ft)	280.00	Wetted Per. (ft)		165.87	
Min Ch El (ft)	2286.00	Shear (lb/sq ft)		1.95	
Alpha	1.00	Stream Power (lb/ft s)		16.69	
Frctn Loss (ft)	6.56	Cum Volume (acre-ft)	6.93	74.20	0.31
C & E Loss (ft)	0.11	Cum SA (acres)	4.60	40.06	0.55

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

CROSS SECTION OUTPUT Profile #PF 2

E.G. Elev (ft)	2292.04	Element	Left OB	Channel	Right OB

Vel Head (ft)	1.14	Wt. n-Val.		0.035	
W.S. Elev (ft)	2290.90	Reach Len. (ft)	270.00	280.00	280.00
Crit W.S. (ft)	2290.90	Flow Area (sq ft)		369.80	
E.G. Slope (ft/ft)	0.013989	Area (sq ft)		369.80	
Q Total (cfs)	3169.00	Flow (cfs)		3169.00	
Top Width (ft)	162.69	Top Width (ft)		162.69	
Vel Total (ft/s)	8.57	Avg. Vel. (ft/s)		8.57	
Max Chl Dpth (ft)	4.90	Hydr. Depth (ft)		2.27	
Conv. Total (cfs)	26793.3	Conv. (cfs)		26793.3	
Length Wtd. (ft)	280.00	Wetted Per. (ft)		165.87	
Min Ch El (ft)	2286.00	Shear (lb/sq ft)		1.95	
Alpha	1.00	Stream Power (lb/ft s)		16.69	
Frctn Loss (ft)	6.56	Cum Volume (acre-ft)	6.93	74.20	0.31
C & E Loss (ft)	0.11	Cum SA (acres)	4.60	40.06	0.55

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

FLOW DISTRIBUTION OUTPUT Profile #PF 1

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
9836.67	9933.33	567.38	97.33	71.03	17.90	1.38	5.83
9933.33	RB 10030.00	2601.62	272.47	94.84	82.10	2.96	9.55

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

FLOW DISTRIBUTION OUTPUT Profile #PF 2

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
9836.67	9933.33	567.38	97.33	71.03	17.90	1.38	5.83
9933.33	RB 10030.00	2601.62	272.47	94.84	82.10	2.96	9.55

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

CROSS SECTION RIVER: Tributary 6B
REACH: Tributary 6B DS RS: 1.611

INPUT
Description:
Station Elevation Data num= 31

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9546	2300	9578.02	2298	9618.46	2296	9653.4	2294	9673.29	2292
9692.87	2290	9709.69	2288	9731.92	2286	9740.17	2284	9748.4	2282
9761.78	2282	9916.17	2284	9921.35	228410	000.65	228210	011.34	2280
10033.8	228010	037.95	228210	041.58	228410	043.96	2286	10046.5	2288
10049.48	229010	052.78	229210	056.18	229410	059.63	229610	067.33	2298

10080.27 230010093.47 230210105.53 230410141.86 2306 10156.1 2308
10169.41 2310

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
9546	.065	9731.92	.035	9761.78	.06510000.65		.035	10033.8	.065

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
9731.92	10041.58	319.14	364.92	378.05	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2284.91	Element			
Vel Head (ft)	0.76	Wt. n-Val.		0.060	0.065
W.S. Elev (ft)	2284.15	Reach Len. (ft)	319.14	364.92	378.05
Crit W.S. (ft)	2284.15	Flow Area (sq ft)		452.41	0.01
E.G. Slope (ft/ft)	0.047109	Area (sq ft)		452.41	0.01
Q Total (cfs)	3169.00	Flow (cfs)		3168.99	0.01
Top Width (ft)	302.22	Top Width (ft)		302.04	0.18
Vel Total (ft/s)	7.00	Avg. Vel. (ft/s)		7.00	0.74
Max Chl Dpth (ft)	4.15	Hydr. Depth (ft)		1.50	0.08
Conv. Total (cfs)	14600.6	Conv. (cfs)		14600.5	0.0
Length Wtd. (ft)	364.92	Wetted Per. (ft)		303.49	0.24
Min Ch El (ft)	2280.00	Shear (lb/sq ft)		4.38	0.17
Alpha	1.00	Stream Power (lb/ft s)		30.71	0.13
Frctn Loss (ft)	9.03	Cum Volume (acre-ft)	6.93	71.55	0.31
C & E Loss (ft)	0.02	Cum SA (acres)	4.60	38.56	0.55

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Note: Manning's n values were composited to a single value in the main channel.

CROSS SECTION OUTPUT Profile #PF 2

			Left OB	Channel	Right OB
E.G. Elev (ft)	2284.91	Element			
Vel Head (ft)	0.76	Wt. n-Val.		0.060	0.065
W.S. Elev (ft)	2284.15	Reach Len. (ft)	319.14	364.92	378.05
Crit W.S. (ft)	2284.15	Flow Area (sq ft)		452.41	0.01
E.G. Slope (ft/ft)	0.047109	Area (sq ft)		452.41	0.01
Q Total (cfs)	3169.00	Flow (cfs)		3168.99	0.01
Top Width (ft)	302.22	Top Width (ft)		302.04	0.18
Vel Total (ft/s)	7.00	Avg. Vel. (ft/s)		7.00	0.74
Max Chl Dpth (ft)	4.15	Hydr. Depth (ft)		1.50	0.08
Conv. Total (cfs)	14600.6	Conv. (cfs)		14600.5	0.0
Length Wtd. (ft)	364.92	Wetted Per. (ft)		303.49	0.24
Min Ch El (ft)	2280.00	Shear (lb/sq ft)		4.38	0.17
Alpha	1.00	Stream Power (lb/ft s)		30.71	0.13
Frctn Loss (ft)	9.03	Cum Volume (acre-ft)	6.93	71.55	0.31
C & E Loss (ft)	0.02	Cum SA (acres)	4.60	38.56	0.55

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Note: Manning's n values were composited to a single value in the main channel.

FLOW DISTRIBUTION OUTPUT Profile #PF 1

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)

LB 9731.92	9835.14	849.77	161.30	95.86	26.82	1.69	5.27
9835.14	9938.36	135.74	61.83	103.23	4.28	0.60	2.20
9938.36	RB 10041.58	2183.48	229.29	104.40	68.90	2.22	9.52
10041.58	10169.41	0.01	0.01	0.24	0.00	0.08	0.74

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Note: Manning's n values were composited to a single value in the main channel.

FLOW DISTRIBUTION OUTPUT Profile #PF 2

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9731.92	9835.14	849.77	161.30	95.86	26.82	1.69	5.27
9835.14	9938.36	135.74	61.83	103.23	4.28	0.60	2.20
9938.36	RB 10041.58	2183.48	229.29	104.40	68.90	2.22	9.52
10041.58	10169.41	0.01	0.01	0.24	0.00	0.08	0.74

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Note: Manning's n values were composited to a single value in the main channel.

CROSS SECTION RIVER: Tributary 6B
REACH: Tributary 6B DS RS: 1.53

INPUT
Description:
Station Elevation Data num= 32

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9583	2290	9606.38	2288	9618.89	2286	9643.96	2286	9656.68	2286
9691.5	2284	9763.62	2282	9768.63	2280	9861.83	2278	9875.91	2276
9890.54	2274	9898.47	2274	9898.65	2274	9925.01	2272	9962.8	2270
9990.09	2270	9996.87	227210003.85		227410008.38		227410016.61		2272
10018.67	227210049.73		227410057.11		227610064.55		227810073.33		2280
10081.01	2282	10090.9	228410096.86		228610103.31		228810108.84		2290
10118.55	229210134.11		2294						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9583	.065	9925.01	.03510049.73		.065

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
9875.9110057.11		286.92	306.31 324.52	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2275.48	Element			
Vel Head (ft)	0.93	Wt. n-Val.		0.043	
W.S. Elev (ft)	2274.56	Reach Len. (ft)	286.92	306.31	324.52
Crit W.S. (ft)		Flow Area (sq ft)		410.10	
E.G. Slope (ft/ft)	0.015224	Area (sq ft)		410.10	
Q Total (cfs)	3169.00	Flow (cfs)		3169.00	
Top Width (ft)	165.33	Top Width (ft)		165.33	
Vel Total (ft/s)	7.73	Avg. Vel. (ft/s)		7.73	
Max Chl Dpth (ft)	4.56	Hydr. Depth (ft)		2.48	
Conv. Total (cfs)	25683.5	Conv. (cfs)		25683.5	
Length Wtd. (ft)	306.31	Wetted Per. (ft)		166.44	
Min Ch El (ft)	2270.00	Shear (lb/sq ft)		2.34	

Alpha	1.00	Stream Power (lb/ft s)		18.10	
Frctn Loss (ft)	0.69	Cum Volume (acre-ft)	6.93	67.94	0.31
C & E Loss (ft)	0.25	Cum SA (acres)	4.60	36.61	0.55

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Manning's n values were composited to a single value in the main channel.

CROSS SECTION OUTPUT Profile #PF 2

E.G. Elev (ft)	2275.48	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.93	Wt. n-Val.		0.043	
W.S. Elev (ft)	2274.56	Reach Len. (ft)	286.92	306.31	324.52
Crit W.S. (ft)		Flow Area (sq ft)		410.10	
E.G. Slope (ft/ft)	0.015224	Area (sq ft)		410.10	
Q Total (cfs)	3169.00	Flow (cfs)		3169.00	
Top Width (ft)	165.33	Top Width (ft)		165.33	
Vel Total (ft/s)	7.73	Avg. Vel. (ft/s)		7.73	
Max Chl Dpth (ft)	4.56	Hydr. Depth (ft)		2.48	
Conv. Total (cfs)	25683.5	Conv. (cfs)		25683.5	
Length Wtd. (ft)	306.31	Wetted Per. (ft)		166.44	
Min Ch El (ft)	2270.00	Shear (lb/sq ft)		2.34	
Alpha	1.00	Stream Power (lb/ft s)		18.10	
Frctn Loss (ft)	0.69	Cum Volume (acre-ft)	6.93	67.94	0.31
C & E Loss (ft)	0.25	Cum SA (acres)	4.60	36.61	0.55

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Manning's n values were composited to a single value in the main channel.

FLOW DISTRIBUTION OUTPUT Profile #PF 1

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9875.91	9936.31	351.82	79.00	49.98	11.10	1.58	4.45
9936.31	9996.71	2421.22	250.25	60.72	76.40	4.14	9.68
9996.71	RB 10057.11	395.97	80.85	55.74	12.49	1.47	4.90

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Manning's n values were composited to a single value in the main channel.

FLOW DISTRIBUTION OUTPUT Profile #PF 2

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9875.91	9936.31	351.82	79.00	49.98	11.10	1.58	4.45
9936.31	9996.71	2421.22	250.25	60.72	76.40	4.14	9.68
9996.71	RB 10057.11	395.97	80.85	55.74	12.49	1.47	4.90

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Manning's n values were composited to a single value in the main channel.

CROSS SECTION RIVER: Tributary 6B
REACH: Tributary 6B DS RS: 1.486

INPUT
Description:
Station Elevation Data num= 24

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9570	2286	9592.49	2284	9611.89	2282	9623.94	2280	9649.01	2278

9664.04	2278 9668.21	2278 9741.42	2276 9840.16	2274 9884.29	2272
9913.12	2270 9945.36	2268 9955.16	2268 9964.75	2268 9989.54	2268
10006.66	226810012.62	226610030.31	2266 10036.7	226810091.73	2270
10098.33	227210103.57	227410109.13	227610115.72	2278	

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9570	.06510006.66		.035 10036.7		.065

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
9840.16	10103.57	67.19	21.93 38.47	.3	.5

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2274.54	Element			
Vel Head (ft)	0.09	Wt. n-Val.	0.065	0.054	0.065
W.S. Elev (ft)	2274.45	Reach Len. (ft)	67.19	21.93	38.47
Crit W.S. (ft)	2270.38	Flow Area (sq ft)	4.93	1305.53	0.28
E.G. Slope (ft/ft)	0.000871	Area (sq ft)	4.93	1305.53	0.28
Q Total (cfs)	3169.00	Flow (cfs)	1.23	3167.71	0.07
Top Width (ft)	286.72	Top Width (ft)	22.07	263.41	1.24
Vel Total (ft/s)	2.42	Avg. Vel. (ft/s)	0.25	2.43	0.24
Max Chl Dpth (ft)	8.45	Hydr. Depth (ft)	0.22	4.96	0.22
Conv. Total (cfs)	107403.5	Conv. (cfs)	41.5	107359.7	2.2
Length Wtd. (ft)	21.93	Wetted Per. (ft)	22.07	264.92	1.32
Min Ch El (ft)	2266.00	Shear (lb/sq ft)	0.01	0.27	0.01
Alpha	1.01	Stream Power (lb/ft s)	0.00	0.65	0.00
Frctn Loss (ft)		Cum Volume (acre-ft)	6.92	61.91	0.31
C & E Loss (ft)		Cum SA (acres)	4.53	35.10	0.54

CROSS SECTION OUTPUT Profile #PF 2

			Left OB	Channel	Right OB
E.G. Elev (ft)	2274.54	Element			
Vel Head (ft)	0.09	Wt. n-Val.	0.065	0.054	0.065
W.S. Elev (ft)	2274.45	Reach Len. (ft)	67.19	21.93	38.47
Crit W.S. (ft)	2270.38	Flow Area (sq ft)	4.93	1305.53	0.28
E.G. Slope (ft/ft)	0.000871	Area (sq ft)	4.93	1305.53	0.28
Q Total (cfs)	3169.00	Flow (cfs)	1.23	3167.71	0.07
Top Width (ft)	286.72	Top Width (ft)	22.07	263.41	1.24
Vel Total (ft/s)	2.42	Avg. Vel. (ft/s)	0.25	2.43	0.24
Max Chl Dpth (ft)	8.45	Hydr. Depth (ft)	0.22	4.96	0.22
Conv. Total (cfs)	107403.5	Conv. (cfs)	41.5	107359.7	2.2
Length Wtd. (ft)	21.93	Wetted Per. (ft)	22.07	264.92	1.32
Min Ch El (ft)	2266.00	Shear (lb/sq ft)	0.01	0.27	0.01
Alpha	1.01	Stream Power (lb/ft s)	0.00	0.65	0.00
Frctn Loss (ft)		Cum Volume (acre-ft)	6.92	61.91	0.31
C & E Loss (ft)		Cum SA (acres)	4.53	35.10	0.54

FLOW DISTRIBUTION OUTPUT Profile #PF 1

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
9570.00	9840.16	1.23	4.93	22.07	0.04	0.22	0.25
LB 9840.16	9927.96	295.74	236.08	87.95	9.33	2.69	1.25
9927.96	10015.77	1432.77	568.93	88.16	45.21	6.48	2.52
10015.77	RB 10103.57	1439.19	500.52	88.81	45.41	5.70	2.88
10103.57	10115.72	0.07	0.28	1.32	0.00	0.22	0.24

FLOW DISTRIBUTION OUTPUT Profile #PF 2

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
9570.00	9840.16	1.23	4.93	22.07	0.04	0.22	0.25
LB 9840.16	9927.96	295.74	236.08	87.95	9.33	2.69	1.25
9927.96	10015.77	1432.77	568.93	88.16	45.21	6.48	2.52
10015.77	RB 10103.57	1439.19	500.52	88.81	45.41	5.70	2.88
10103.57	10115.72	0.07	0.28	1.32	0.00	0.22	0.24

CULVERT RIVER: Tributary 6B
REACH: Tributary 6B DS RS: 1.483

```
INPUT
Description:
Distance from Upstream XS =       0
Deck/Roadway Width        =      20
Weir Coefficient          =     2.6
Bridge Deck/Roadway Skew  =
Upstream  Deck/Roadway Coordinates
    num=       2
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
    9880    2272           10100    2272

Upstream Bridge Cross Section Data
Station Elevation Data    num=      24
     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev
    9570     2286 9592.49     2284 9611.89     2282 9623.94     2280 9649.01     2278
 9664.04     2278 9668.21     2278 9741.42     2276 9840.16     2274 9884.29     2272
 9913.12     2270 9945.36     2268 9955.16     2268 9964.75     2268 9989.54     2268
10006.66     226810012.62     226610030.31     2266 10036.7     226810091.73     2270
10098.33     227210103.57     227410109.13     227610115.72     2278

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
    9570    .06510006.66    .035 10036.7    .065

Bank Sta: Left   Right    Coeff Contr.   Expan.
       9840.1610103.57             .3       .5

Downstream  Deck/Roadway Coordinates
    num=       2
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
    9880    2272           10100    2272

Downstream Bridge Cross Section Data
Station Elevation Data    num=      22
     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev
    9600     2284 9617.35     2282 9627.16     2280 9654.44     2278  9696.5     2276
 9791.86     2274 9811.95     2274 9827.87     2274 9904.16     2272 9926.04     2270
 9963.82     2268 9971.24     226610022.52     226410031.55     226410038.94     2266
10089.43     226810095.98     227010101.48     227210106.85     227410112.31     2276
10117.85     227810123.41     2280

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
    9600    .065 9963.82    .04210038.94    .065

Bank Sta: Left   Right    Coeff Contr.   Expan.
       9904.1610101.48             .3       .5

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

Number of Culverts =  1

Culvert Name      Shape      Rise    Span
Culvert #1            Box       6      10
FHWA Chart # 8 - flared wingwalls
FHWA Scale # 1 - Wingwall flared 30 to 75 deg.
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    n Value   Entrance Loss Coef   Exit Loss Coef
                20      30       .013                   .5                1
Upstream   Elevation =  2265.21
           Centerline Station =  10020
Downstream Elevation =  2264.59
           Centerline Station =  10020

CROSS SECTION          RIVER: Tributary 6B
REACH: Tributary 6B DS    RS: 1.480
```

INPUT
Description:
Station Elevation Data num= 22

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9600	2284	9617.35	2282	9627.16	2280	9654.44	2278	9696.5	2276
9791.86	2274	9811.95	2274	9827.87	2274	9904.16	2272	9926.04	2270
9963.82	2268	9971.24	226610022.52		226410031.55		226410038.94		2266
10089.43	226810095.98		227010101.48		227210106.85		227410112.31		2276
10117.85	227810123.41		2280						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9600	.065	9963.82	.04210038.94		.065

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9904.16	10101.48	186.94	178.51	196.39	.3	.5

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2269.89	Element			
Vel Head (ft)	1.12	Wt. n-Val.		0.045	
W.S. Elev (ft)	2268.77	Reach Len. (ft)	186.94	178.51	196.39
Crit W.S. (ft)		Flow Area (sq ft)		373.51	
E.G. Slope (ft/ft)	0.014460	Area (sq ft)		373.51	
Q Total (cfs)	3169.00	Flow (cfs)		3169.00	
Top Width (ft)	142.70	Top Width (ft)		142.70	
Vel Total (ft/s)	8.48	Avg. Vel. (ft/s)		8.48	
Max Chl Dpth (ft)	4.77	Hydr. Depth (ft)		2.62	
Conv. Total (cfs)	26353.2	Conv. (cfs)		26353.2	
Length Wtd. (ft)	178.51	Wetted Per. (ft)		143.45	
Min Ch El (ft)	2264.00	Shear (lb/sq ft)		2.35	
Alpha	1.00	Stream Power (lb/ft s)		19.94	
Frctn Loss (ft)	2.68	Cum Volume (acre-ft)	6.91	61.49	0.31
C & E Loss (ft)	0.00	Cum SA (acres)	4.51	35.00	0.54

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

CROSS SECTION OUTPUT Profile #PF 2

			Left OB	Channel	Right OB
E.G. Elev (ft)	2269.89	Element			
Vel Head (ft)	1.12	Wt. n-Val.		0.045	
W.S. Elev (ft)	2268.77	Reach Len. (ft)	186.94	178.51	196.39
Crit W.S. (ft)		Flow Area (sq ft)		373.51	
E.G. Slope (ft/ft)	0.014460	Area (sq ft)		373.51	
Q Total (cfs)	3169.00	Flow (cfs)		3169.00	
Top Width (ft)	142.70	Top Width (ft)		142.70	
Vel Total (ft/s)	8.48	Avg. Vel. (ft/s)		8.48	
Max Chl Dpth (ft)	4.77	Hydr. Depth (ft)		2.62	
Conv. Total (cfs)	26353.2	Conv. (cfs)		26353.2	
Length Wtd. (ft)	178.51	Wetted Per. (ft)		143.45	
Min Ch El (ft)	2264.00	Shear (lb/sq ft)		2.35	
Alpha	1.00	Stream Power (lb/ft s)		19.94	
Frctn Loss (ft)	2.68	Cum Volume (acre-ft)	6.91	61.49	0.31
C & E Loss (ft)	0.00	Cum SA (acres)	4.51	35.00	0.54

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.

FLOW DISTRIBUTION OUTPUT Profile #PF 1

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9904.16	9969.93	62.43	15.37	20.92	1.97	0.74	4.06
9969.93	10035.71	2666.35	257.36	66.01	84.14	3.91	10.36
10035.71	RB 10101.48	440.23	100.78	56.52	13.89	1.79	4.37

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.

FLOW DISTRIBUTION OUTPUT Profile #PF 2

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9904.16	9969.93	62.43	15.37	20.92	1.97	0.74	4.06
9969.93	10035.71	2666.35	257.36	66.01	84.14	3.91	10.36
10035.71	RB 10101.48	440.23	100.78	56.52	13.89	1.79	4.37

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

CROSS SECTION RIVER: Tributary 6B
REACH: Tributary 6B DS RS: 1.444

INPUT
Description:
Station Elevation Data num= 35

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9633	2280	9650.03	2278	9665.85	2276	9700.17	2274	9755.11	2272
9848.54	2270	9893.33	2270	9916.87	2270	9936.02	2268	9968.76	2266
9976.19	2264	9984.5	226210004.93		226010005.54		226010011.17		2262
10047.1	226410132.54		226610174.52		226810197.79		227010207.81		2272
10226.54	227410241.48		227610251.46		227810260.35		228010269.22		2282
10278.42	228410287.91		228610299.19		228810307.82		229010316.67		2292
10325.36	2294	10333.5	229610348.47		229810363.48		230010374.58		2302

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9633	.065	9968.76	.042	10047.1	.065

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
9936.02	10174.52	457.81	284.49 185.54	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2267.20	Element			
Vel Head (ft)	1.11	Wt. n-Val.		0.044	
W.S. Elev (ft)	2266.09	Reach Len. (ft)	457.81	284.49	185.54
Crit W.S. (ft)	2266.07	Flow Area (sq ft)		374.25	
E.G. Slope (ft/ft)	0.015651	Area (sq ft)		374.25	
Q Total (cfs)	3169.00	Flow (cfs)		3169.00	
Top Width (ft)	167.10	Top Width (ft)		167.10	
Vel Total (ft/s)	8.47	Avg. Vel. (ft/s)		8.47	
Max Chl Dpth (ft)	6.09	Hydr. Depth (ft)		2.24	
Conv. Total (cfs)	25330.6	Conv. (cfs)		25330.6	
Length Wtd. (ft)	284.49	Wetted Per. (ft)		168.13	
Min Ch El (ft)	2260.00	Shear (lb/sq ft)		2.18	
Alpha	1.00	Stream Power (lb/ft s)		18.42	
Frctn Loss (ft)	4.58	Cum Volume (acre-ft)	6.91	59.95	0.31
C & E Loss (ft)	0.07	Cum SA (acres)	4.51	34.36	0.54

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

CROSS SECTION OUTPUT Profile #PF 2

			Left OB	Channel	Right OB
E.G. Elev (ft)	2267.20	Element			
Vel Head (ft)	1.11	Wt. n-Val.		0.044	
W.S. Elev (ft)	2266.09	Reach Len. (ft)	457.81	284.49	185.54
Crit W.S. (ft)	2266.07	Flow Area (sq ft)		374.25	
E.G. Slope (ft/ft)	0.015651	Area (sq ft)		374.25	
Q Total (cfs)	3169.00	Flow (cfs)		3169.00	
Top Width (ft)	167.10	Top Width (ft)		167.10	
Vel Total (ft/s)	8.47	Avg. Vel. (ft/s)		8.47	
Max Chl Dpth (ft)	6.09	Hydr. Depth (ft)		2.24	
Conv. Total (cfs)	25330.6	Conv. (cfs)		25330.6	
Length Wtd. (ft)	284.49	Wetted Per. (ft)		168.13	
Min Ch El (ft)	2260.00	Shear (lb/sq ft)		2.18	
Alpha	1.00	Stream Power (lb/ft s)		18.42	
Frctn Loss (ft)	4.58	Cum Volume (acre-ft)	6.91	59.95	0.31
C & E Loss (ft)	0.07	Cum SA (acres)	4.51	34.36	0.54

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.

FLOW DISTRIBUTION OUTPUT Profile #PF 1

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9936.02	10015.52	2022.73	187.41	49.17	63.83	3.89	10.79
10015.52	10095.02	1110.92	166.94	79.56	35.06	2.10	6.65
10095.02	RB 10174.52	35.35	19.89	39.40	1.12	0.51	1.78

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.

FLOW DISTRIBUTION OUTPUT Profile #PF 2

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9936.02	10015.52	2022.73	187.41	49.17	63.83	3.89	10.79
10015.52	10095.02	1110.92	166.94	79.56	35.06	2.10	6.65
10095.02	RB 10174.52	35.35	19.89	39.40	1.12	0.51	1.78

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

CROSS SECTION RIVER: Tributary 6B
REACH: Tributary 6B DS RS: 1.387

INPUT
Description:
Station Elevation Data num= 39

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9511	2280	9537.32	2278	9561.57	2276	9570.79	2274	9580.11	2272
9609.39	2270	9622.91	2268	9651.58	2266	9704.33	2264	9830.27	2262
9968.67	2260	9982.47	2258	9998.28	225610009.63		225610015.35		2258
10021.17	226010068.28		226010078.29		2260	10093.3	2262	10152	2264
10181.53	226610187.24		226810191.34		227010195.58		227210199.74		2274
10203.79	227610207.97		2278	10212.1	228010216.21		2282	10220.3	2284
10224.97	2286	10233	228810242.28		229010251.89		229210261.66		2294
10273.22	229610285.49		229810299.08		2300	10313.5	2302		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9511	.065	9968.67	.04	210021.17	.065

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
9651.58	10152	365	400	410	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2262.56	Element			
Vel Head (ft)	0.89	Wt. n-Val.		0.047	
W.S. Elev (ft)	2261.66	Reach Len. (ft)	365.00	400.00	410.00
Crit W.S. (ft)	2261.66	Flow Area (sq ft)		418.11	
E.G. Slope (ft/ft)	0.016539	Area (sq ft)		418.11	
Q Total (cfs)	3169.00	Flow (cfs)		3169.00	
Top Width (ft)	237.23	Top Width (ft)		237.23	
Vel Total (ft/s)	7.58	Avg. Vel. (ft/s)		7.58	
Max Chl Dpth (ft)	5.66	Hydr. Depth (ft)		1.76	
Conv. Total (cfs)	24641.9	Conv. (cfs)		24641.9	
Length Wtd. (ft)	400.00	Wetted Per. (ft)		238.29	
Min Ch El (ft)	2256.00	Shear (lb/sq ft)		1.81	
Alpha	1.00	Stream Power (lb/ft s)		13.73	
Frctn Loss (ft)	6.14	Cum Volume (acre-ft)	6.91	57.37	0.31
C & E Loss (ft)	0.08	Cum SA (acres)	4.51	33.04	0.54

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 energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical

depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #PF 2

E.G. Elev (ft)	2262.56	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.89	Wt. n-Val.		0.047	
W.S. Elev (ft)	2261.66	Reach Len. (ft)	365.00	400.00	410.00
Crit W.S. (ft)	2261.66	Flow Area (sq ft)		418.11	
E.G. Slope (ft/ft)	0.016539	Area (sq ft)		418.11	
Q Total (cfs)	3169.00	Flow (cfs)		3169.00	
Top Width (ft)	237.23	Top Width (ft)		237.23	
Vel Total (ft/s)	7.58	Avg. Vel. (ft/s)		7.58	
Max Chl Dpth (ft)	5.66	Hydr. Depth (ft)		1.76	
Conv. Total (cfs)	24641.9	Conv. (cfs)		24641.9	
Length Wtd. (ft)	400.00	Wetted Per. (ft)		238.29	
Min Ch El (ft)	2256.00	Shear (lb/sq ft)		1.81	
Alpha	1.00	Stream Power (lb/ft s)		13.73	
Frctn Loss (ft)	6.14	Cum Volume (acre-ft)	6.91	57.37	0.31
C & E Loss (ft)	0.08	Cum SA (acres)	4.51	33.04	0.54

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 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.

FLOW DISTRIBUTION OUTPUT Profile #PF 1

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
9818.39	9985.19	666.00	142.96	131.82	21.02	1.09	4.66
9985.19	RB 10152.00	2503.00	275.15	106.47	78.98	2.61	9.10

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 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.

FLOW DISTRIBUTION OUTPUT Profile #PF 2

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
9818.39	9985.19	666.00	142.96	131.82	21.02	1.09	4.66
9985.19	RB 10152.00	2503.00	275.15	106.47	78.98	2.61	9.10

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 energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION RIVER: Tributary 6B
REACH: Tributary 6B DS RS: 1.309

INPUT
Description:
Station Elevation Data num= 20

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9530	2270	9610	2260	9625	2258	9640	2256	9655	2254
9720	2254	9750	2254	9780	2252	9790	2250	9795	2250
9805	2252	9990	2252	10010	2252	10015	2254	10020	2256
10025	2256	10105	2256	10130	2258	10135	2260	10160	2270

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9530	.065	9750	.042	10020	.065

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
9640	10020	430	450	460	.1 .3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2254.52	Element			
Vel Head (ft)	0.64	Wt. n-Val.		0.042	
W.S. Elev (ft)	2253.88	Reach Len. (ft)	430.00	450.00	460.00
Crit W.S. (ft)	2253.63	Flow Area (sq ft)		493.68	
E.G. Slope (ft/ft)	0.014271	Area (sq ft)		493.68	
Q Total (cfs)	3169.00	Flow (cfs)		3169.00	
Top Width (ft)	262.92	Top Width (ft)		262.92	
Vel Total (ft/s)	6.42	Avg. Vel. (ft/s)		6.42	
Max Chl Dpth (ft)	3.88	Hydr. Depth (ft)		1.88	
Conv. Total (cfs)	26527.7	Conv. (cfs)		26527.7	
Length Wtd. (ft)	450.00	Wetted Per. (ft)		263.74	
Min Ch El (ft)	2250.00	Shear (lb/sq ft)		1.67	
Alpha	1.00	Stream Power (lb/ft s)		10.70	
Frctn Loss (ft)	7.44	Cum Volume (acre-ft)	6.91	53.18	0.31
C & E Loss (ft)	0.02	Cum SA (acres)	4.51	30.74	0.54

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

CROSS SECTION OUTPUT Profile #PF 2

			Left OB	Channel	Right OB
E.G. Elev (ft)	2254.52	Element			
Vel Head (ft)	0.64	Wt. n-Val.		0.042	
W.S. Elev (ft)	2253.88	Reach Len. (ft)	430.00	450.00	460.00
Crit W.S. (ft)	2253.63	Flow Area (sq ft)		493.68	
E.G. Slope (ft/ft)	0.014271	Area (sq ft)		493.68	
Q Total (cfs)	3169.00	Flow (cfs)		3169.00	
Top Width (ft)	262.92	Top Width (ft)		262.92	
Vel Total (ft/s)	6.42	Avg. Vel. (ft/s)		6.42	
Max Chl Dpth (ft)	3.88	Hydr. Depth (ft)		1.88	
Conv. Total (cfs)	26527.7	Conv. (cfs)		26527.7	
Length Wtd. (ft)	450.00	Wetted Per. (ft)		263.74	
Min Ch El (ft)	2250.00	Shear (lb/sq ft)		1.67	
Alpha	1.00	Stream Power (lb/ft s)		10.70	
Frctn Loss (ft)	7.44	Cum Volume (acre-ft)	6.91	53.18	0.31
C & E Loss (ft)	0.02	Cum SA (acres)	4.51	30.74	0.54

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.

FLOW DISTRIBUTION OUTPUT Profile #PF 1

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9640.00	9766.67	19.12	7.39	14.92	0.60	0.50	2.59
9766.67	9893.33	1759.51	262.38	127.09	55.52	2.07	6.71
9893.33	RB 10020.00	1390.37	223.92	121.73	43.87	1.84	6.21

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.

FLOW DISTRIBUTION OUTPUT Profile #PF 2

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9640.00	9766.67	19.12	7.39	14.92	0.60	0.50	2.59
9766.67	9893.33	1759.51	262.38	127.09	55.52	2.07	6.71
9893.33	RB 10020.00	1390.37	223.92	121.73	43.87	1.84	6.21

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

CROSS SECTION RIVER: Tributary 6B
REACH: Tributary 6B DS RS: 1.206

INPUT
Description:
Station Elevation Data num= 27

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9705	2270	9732.81	2268	9761.4	2266	9787.62	2264	9813.18	2262
9837.07	2260	9856.36	2258	9874.55	2256	9887.92	2254	9897.66	2252
9907.54	2250	9917.46	2248	9927.49	2246	9937.22	2244	9950.28	2244
9976.82	224410045.61		224410064.01		224610087.38		224610176.26		2244
10191.53	224410197.98		224610226.71		224810252.97		224810335.53		2248
10423.4	2250	10440.4	2250						

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
9705	.065	9927.49	.04210064.01		.06510087.38		.04210197.98		.065

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
9917.46	10226.71	437.48	432.04	467.04	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2247.06	Element			
Vel Head (ft)	0.81	Wt. n-Val.		0.042	
W.S. Elev (ft)	2246.25	Reach Len. (ft)	437.48	432.04	467.04
Crit W.S. (ft)	2246.25	Flow Area (sq ft)		437.73	
E.G. Slope (ft/ft)	0.019700	Area (sq ft)		437.73	
Q Total (cfs)	3169.00	Flow (cfs)		3169.00	
Top Width (ft)	275.25	Top Width (ft)		275.25	
Vel Total (ft/s)	7.24	Avg. Vel. (ft/s)		7.24	
Max Chl Dpth (ft)	2.25	Hydr. Depth (ft)		1.59	
Conv. Total (cfs)	22578.2	Conv. (cfs)		22578.2	
Length Wtd. (ft)	432.04	Wetted Per. (ft)		275.92	
Min Ch El (ft)	2244.00	Shear (lb/sq ft)		1.95	
Alpha	1.00	Stream Power (lb/ft s)		14.13	
Frctn Loss (ft)	6.91	Cum Volume (acre-ft)	6.91	48.37	0.31
C & E Loss (ft)	0.03	Cum SA (acres)	4.51	27.96	0.54

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 energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #PF 2

			Left OB	Channel	Right OB
E.G. Elev (ft)	2247.06	Element			
Vel Head (ft)	0.81	Wt. n-Val.		0.042	
W.S. Elev (ft)	2246.25	Reach Len. (ft)	437.48	432.04	467.04
Crit W.S. (ft)	2246.25	Flow Area (sq ft)		437.73	
E.G. Slope (ft/ft)	0.019700	Area (sq ft)		437.73	
Q Total (cfs)	3169.00	Flow (cfs)		3169.00	
Top Width (ft)	275.25	Top Width (ft)		275.25	
Vel Total (ft/s)	7.24	Avg. Vel. (ft/s)		7.24	
Max Chl Dpth (ft)	2.25	Hydr. Depth (ft)		1.59	
Conv. Total (cfs)	22578.2	Conv. (cfs)		22578.2	
Length Wtd. (ft)	432.04	Wetted Per. (ft)		275.92	
Min Ch El (ft)	2244.00	Shear (lb/sq ft)		1.95	
Alpha	1.00	Stream Power (lb/ft s)		14.13	
Frctn Loss (ft)	6.91	Cum Volume (acre-ft)	6.91	48.37	0.31
C & E Loss (ft)	0.03	Cum SA (acres)	4.51	27.96	0.54

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 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.

FLOW DISTRIBUTION OUTPUT Profile #PF 1

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9917.46	10020.54	1600.51	199.36	94.51	50.51	2.11	8.03
10020.54	10123.63	664.67	108.61	103.20	20.97	1.05	6.12
10123.63	RB 10226.71	903.82	129.77	78.20	28.52	1.67	6.97

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 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.

FLOW DISTRIBUTION OUTPUT Profile #PF 2

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9917.46	10020.54	1600.51	199.36	94.51	50.51	2.11	8.03
10020.54	10123.63	664.67	108.61	103.20	20.97	1.05	6.12
10123.63	RB 10226.71	903.82	129.77	78.20	28.52	1.67	6.97

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 energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION RIVER: Tributary 6B
REACH: Tributary 6B DS RS: 1.135

INPUT
Description:
Station Elevation Data num= 30

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9625	2260	9640.41	2258	9698.06	2256	9734.46	2254	9783.27	2252
9796.96	2250	9812.59	2248	9836.61	2246	9870.06	2244	9890.12	2242
9902.88	2240	9921	2238	9933.21	2236	9949.8	2236	9973.33	2236
9991.77	223410000.29		223210003.76		223210020.45		223410026.56		2236
10054.32	2238	10153.9	223810247.44		223810271.03		224010294.91		2242
10319.46	224410364.55		224410463.32		224410495.55		224410584.89		2242

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9625	.065	9973.33	.04210054.32		.065

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
9890.12	10294.91	352.32	310.34 266.69	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2239.10	Element			
Vel Head (ft)	0.71	Wt. n-Val.		0.046	
W.S. Elev (ft)	2238.39	Reach Len. (ft)	352.32	310.34	266.69
Crit W.S. (ft)	2238.39	Flow Area (sq ft)		469.18	
E.G. Slope (ft/ft)	0.013251	Area (sq ft)		469.18	
Q Total (cfs)	3169.00	Flow (cfs)		3169.00	
Top Width (ft)	334.55	Top Width (ft)		334.55	
Vel Total (ft/s)	6.75	Avg. Vel. (ft/s)		6.75	
Max Chl Dpth (ft)	6.39	Hydr. Depth (ft)		1.40	
Conv. Total (cfs)	27529.4	Conv. (cfs)		27529.4	
Length Wtd. (ft)	310.34	Wetted Per. (ft)		335.60	
Min Ch El (ft)	2232.00	Shear (lb/sq ft)		1.16	
Alpha	1.00	Stream Power (lb/ft s)		7.81	
Frctn Loss (ft)	3.81	Cum Volume (acre-ft)	6.91	43.87	0.31
C & E Loss (ft)	0.03	Cum SA (acres)	4.51	24.94	0.54

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 energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #PF 2

E.G. Elev (ft)	2239.10	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.71	Wt. n-Val.		0.046	
W.S. Elev (ft)	2238.39	Reach Len. (ft)	352.32	310.34	266.69
Crit W.S. (ft)	2238.39	Flow Area (sq ft)		469.18	
E.G. Slope (ft/ft)	0.013251	Area (sq ft)		469.18	
Q Total (cfs)	3169.00	Flow (cfs)		3169.00	
Top Width (ft)	334.55	Top Width (ft)		334.55	
Vel Total (ft/s)	6.75	Avg. Vel. (ft/s)		6.75	
Max Chl Dpth (ft)	6.39	Hydr. Depth (ft)		1.40	
Conv. Total (cfs)	27529.4	Conv. (cfs)		27529.4	
Length Wtd. (ft)	310.34	Wetted Per. (ft)		335.60	
Min Ch El (ft)	2232.00	Shear (lb/sq ft)		1.16	
Alpha	1.00	Stream Power (lb/ft s)		7.81	
Frctn Loss (ft)	3.81	Cum Volume (acre-ft)	6.91	43.87	0.31
C & E Loss (ft)	0.03	Cum SA (acres)	4.51	24.94	0.54

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 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.

FLOW DISTRIBUTION OUTPUT Profile #PF 1

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9890.12	10025.05	2868.43	350.70	108.45	90.52	3.26	8.18
10025.05	10159.98	256.39	83.60	135.08	8.09	0.62	3.07
10159.98	RB 10294.91	44.17	34.88	92.06	1.39	0.38	1.27

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

FLOW DISTRIBUTION OUTPUT Profile #PF 2

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9890.12	10025.05	2868.43	350.70	108.45	90.52	3.26	8.18
10025.05	10159.98	256.39	83.60	135.08	8.09	0.62	3.07
10159.98	RB 10294.91	44.17	34.88	92.06	1.39	0.38	1.27

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

CROSS SECTION RIVER: Tributary 6B
REACH: Tributary 6B DS RS: 1.056

INPUT
Description:
Station Elevation Data num= 30

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9619	2250	9632.19	2248	9651.66	2246	9681.77	2244	9698.11	2242
9709.58	2240	9722.34	2238	9734.36	2236	9748.39	2234	9771.06	2232
9826.03	2230	9851.24	2230	9888.02	2232	9964.83	2232	9979.19	2230
9990.45	2228	9999.48	222	10009.37	222	10014.28	222	10018.69	2230
10023.1	223	10170.43	223	10179.12	223	10188.45	223	10208.07	2232
10269.58	223	10302.75	2236	10323.3	223	10415.65	224	10535.76	2240

Manning's n Values num= 7

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
9619	.065	9771.06	.042	9888.02	.065	9979.19	.042	10018.69	.065
10170.43	.042	10208.07	.065						

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
9748.39	10269.58	326.01	417.97	518.21	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2232.89	Element			
Vel Head (ft)	0.62	Wt. n-Val.		0.043	
W.S. Elev (ft)	2232.26	Reach Len. (ft)	326.01	417.97	518.21
Crit W.S. (ft)	2232.26	Flow Area (sq ft)		499.56	
E.G. Slope (ft/ft)	0.011414	Area (sq ft)		499.56	
Q Total (cfs)	3169.00	Flow (cfs)		3169.00	
Top Width (ft)	448.01	Top Width (ft)		448.01	
Vel Total (ft/s)	6.34	Avg. Vel. (ft/s)		6.34	
Max Chl Dpth (ft)	6.26	Hydr. Depth (ft)		1.12	
Conv. Total (cfs)	29662.3	Conv. (cfs)		29662.3	
Length Wtd. (ft)	417.97	Wetted Per. (ft)		450.23	
Min Ch El (ft)	2226.00	Shear (lb/sq ft)		0.79	
Alpha	1.00	Stream Power (lb/ft s)		5.02	
Frctn Loss (ft)	4.86	Cum Volume (acre-ft)	6.91	40.42	0.31
C & E Loss (ft)	0.09	Cum SA (acres)	4.51	22.15	0.54

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

CROSS SECTION OUTPUT Profile #PF 2

			Left OB	Channel	Right OB
E.G. Elev (ft)	2232.89	Element			
Vel Head (ft)	0.62	Wt. n-Val.		0.043	
W.S. Elev (ft)	2232.26	Reach Len. (ft)	326.01	417.97	518.21
Crit W.S. (ft)	2232.26	Flow Area (sq ft)		499.56	
E.G. Slope (ft/ft)	0.011414	Area (sq ft)		499.56	
Q Total (cfs)	3169.00	Flow (cfs)		3169.00	
Top Width (ft)	448.01	Top Width (ft)		448.01	
Vel Total (ft/s)	6.34	Avg. Vel. (ft/s)		6.34	
Max Chl Dpth (ft)	6.26	Hydr. Depth (ft)		1.12	
Conv. Total (cfs)	29662.3	Conv. (cfs)		29662.3	
Length Wtd. (ft)	417.97	Wetted Per. (ft)		450.23	
Min Ch El (ft)	2226.00	Shear (lb/sq ft)		0.79	
Alpha	1.00	Stream Power (lb/ft s)		5.02	
Frctn Loss (ft)	4.86	Cum Volume (acre-ft)	6.91	40.42	0.31
C & E Loss (ft)	0.09	Cum SA (acres)	4.51	22.15	0.54

Warning: The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.
Warning: The 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.

FLOW DISTRIBUTION OUTPUT Profile #PF 1

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9748.39	9922.12	854.58	182.02	154.12	26.97	1.18	4.70
9922.12	10095.85	2013.73	240.20	175.52	63.54	1.38	8.38
10095.85	RB 10269.58	300.69	77.34	120.59	9.49	0.64	3.89

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.

FLOW DISTRIBUTION OUTPUT Profile #PF 2

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9748.39	9922.12	854.58	182.02	154.12	26.97	1.18	4.70
9922.12	10095.85	2013.73	240.20	175.52	63.54	1.38	8.38
10095.85	RB 10269.58	300.69	77.34	120.59	9.49	0.64	3.89

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.

CROSS SECTION RIVER: Tributary 6B
REACH: Tributary 6B DS RS: 0.976

INPUT
Description:
Station Elevation Data num= 28

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9594	2244	9595.48	2244	9628.47	2242	9647.86	2240	9668.57	2238
9681.4	2236	9691.37	2234	9703.41	2232	9722.33	2230	9728.81	2228
9733.39	2226	9737.8	2224	9742.1	2222	9750.5	2222	9764.41	2224
9930.15	2224	9990.37	2222	9998.78	222010016.38		222010022.43		2222
10028.49	2224	10058.9	222610095.68		2228	10186.5	223010252.61		2232
10262.96	223210283.25		223210382.29		2232				

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
9594	.065	9733.39	.042	9764.41	.065	9990.37	.04210028.49		.065

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
9728.8110095.68		496.45	500.4 504.03	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2225.91	Element			
Vel Head (ft)	0.32	Wt. n-Val.		0.060	
W.S. Elev (ft)	2225.60	Reach Len. (ft)	496.45	500.40	504.03
Crit W.S. (ft)		Flow Area (sq ft)		701.64	
E.G. Slope (ft/ft)	0.011838	Area (sq ft)		701.64	
Q Total (cfs)	3169.00	Flow (cfs)		3169.00	
Top Width (ft)	318.50	Top Width (ft)		318.50	
Vel Total (ft/s)	4.52	Avg. Vel. (ft/s)		4.52	
Max Chl Dpth (ft)	5.60	Hydr. Depth (ft)		2.20	
Conv. Total (cfs)	29126.6	Conv. (cfs)		29126.6	
Length Wtd. (ft)	500.40	Wetted Per. (ft)		320.40	
Min Ch El (ft)	2220.00	Shear (lb/sq ft)		1.62	
Alpha	1.00	Stream Power (lb/ft s)		7.31	
Frctn Loss (ft)	8.03	Cum Volume (acre-ft)	6.91	34.66	0.31

C & E Loss (ft)	0.02	Cum SA (acres)	4.51	18.48	0.54

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Manning's n values were composited to a single value in the main channel.

CROSS SECTION OUTPUT Profile #PF 2

			Left OB	Channel	Right OB
E.G. Elev (ft)	2225.91	Element			
Vel Head (ft)	0.32	Wt. n-Val.		0.060	
W.S. Elev (ft)	2225.60	Reach Len. (ft)	496.45	500.40	504.03
Crit W.S. (ft)		Flow Area (sq ft)		701.64	
E.G. Slope (ft/ft)	0.011838	Area (sq ft)		701.64	
Q Total (cfs)	3169.00	Flow (cfs)		3169.00	
Top Width (ft)	318.50	Top Width (ft)		318.50	
Vel Total (ft/s)	4.52	Avg. Vel. (ft/s)		4.52	
Max Chl Dpth (ft)	5.60	Hydr. Depth (ft)		2.20	
Conv. Total (cfs)	29126.6	Conv. (cfs)		29126.6	
Length Wtd. (ft)	500.40	Wetted Per. (ft)		320.40	
Min Ch El (ft)	2220.00	Shear (lb/sq ft)		1.62	
Alpha	1.00	Stream Power (lb/ft s)		7.31	
Frctn Loss (ft)	8.03	Cum Volume (acre-ft)	6.91	34.66	0.31
C & E Loss (ft)	0.02	Cum SA (acres)	4.51	18.48	0.54

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Manning's n values were composited to a single value in the main channel.

FLOW DISTRIBUTION OUTPUT Profile #PF 1

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9728.81	9851.10	796.86	218.81	117.75	25.15	1.87	3.64
9851.10	9973.39	642.23	226.39	122.31	20.27	1.85	2.84
9973.39	RB 10095.68	1729.91	256.43	80.33	54.59	3.23	6.75

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Manning's n values were composited to a single value in the main channel.

FLOW DISTRIBUTION OUTPUT Profile #PF 2

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9728.81	9851.10	796.86	218.81	117.75	25.15	1.87	3.64
9851.10	9973.39	642.23	226.39	122.31	20.27	1.85	2.84
9973.39	RB 10095.68	1729.91	256.43	80.33	54.59	3.23	6.75

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Manning's n values were composited to a single value in the main channel.

CROSS SECTION RIVER: Tributary 6B
REACH: Tributary 6B DS RS: 0.881

INPUT
Description:
Station Elevation Data num= 20

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9535	2232	9547.47	2230	9566.48	2228	9586.12	2226	9605.79	2224
9622.85	2222	9642.29	2220	9680.39	2218	9912.82	2216	9934.67	2214
10008.89	2212	10035.3	221210039.81		221410044.04		221610048.13		2218
10060.72	222010085.25		2222	10106.1	222410134.74		222410236.06		2222

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9535	.065	9984.67	.04210044.04		.065

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
9680.39	10048.13	526.36	464.23 454.67	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2217.87	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.50	Wt. n-Val.		0.061	
W.S. Elev (ft)	2217.37	Reach Len. (ft)	526.36	464.23	454.67
Crit W.S. (ft)	2216.80	Flow Area (sq ft)		557.41	
E.G. Slope (ft/ft)	0.022954	Area (sq ft)		557.41	
Q Total (cfs)	3169.00	Flow (cfs)		3169.00	
Top Width (ft)	292.73	Top Width (ft)		292.73	
Vel Total (ft/s)	5.69	Avg. Vel. (ft/s)		5.69	
Max Chl Dpth (ft)	5.37	Hydr. Depth (ft)		1.90	
Conv. Total (cfs)	20916.7	Conv. (cfs)		20916.7	
Length Wtd. (ft)	464.23	Wetted Per. (ft)		294.04	
Min Ch El (ft)	2212.00	Shear (lb/sq ft)		2.72	
Alpha	1.00	Stream Power (lb/ft s)		15.44	
Frctn Loss (ft)	9.51	Cum Volume (acre-ft)	6.91	27.43	0.31
C & E Loss (ft)	0.06	Cum SA (acres)	4.51	14.96	0.54

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Manning's n values were composited to a single value in the main channel.

CROSS SECTION OUTPUT Profile #PF 2

E.G. Elev (ft)	2217.87	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.50	Wt. n-Val.		0.061	
W.S. Elev (ft)	2217.37	Reach Len. (ft)	526.36	464.23	454.67
Crit W.S. (ft)	2216.80	Flow Area (sq ft)		557.41	
E.G. Slope (ft/ft)	0.022954	Area (sq ft)		557.41	
Q Total (cfs)	3169.00	Flow (cfs)		3169.00	
Top Width (ft)	292.73	Top Width (ft)		292.73	
Vel Total (ft/s)	5.69	Avg. Vel. (ft/s)		5.69	
Max Chl Dpth (ft)	5.37	Hydr. Depth (ft)		1.90	
Conv. Total (cfs)	20916.7	Conv. (cfs)		20916.7	
Length Wtd. (ft)	464.23	Wetted Per. (ft)		294.04	
Min Ch El (ft)	2212.00	Shear (lb/sq ft)		2.72	
Alpha	1.00	Stream Power (lb/ft s)		15.44	
Frctn Loss (ft)	9.51	Cum Volume (acre-ft)	6.91	27.43	0.31
C & E Loss (ft)	0.06	Cum SA (acres)	4.51	14.96	0.54

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Manning's n values were composited to a single value in the main channel.

FLOW DISTRIBUTION OUTPUT Profile #PF 1

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9680.39	9802.97	7.26	10.27	48.87	0.23	0.21	0.71
9802.97	9925.55	229.17	117.74	122.59	7.23	0.96	1.95
9925.55	RB 10048.13	2932.56	429.38	122.58	92.54	3.54	6.83

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Manning's n values were composited to a single value in the main channel.

FLOW DISTRIBUTION OUTPUT Profile #PF 2

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9680.39	9802.97	7.26	10.27	48.87	0.23	0.21	0.71
9802.97	9925.55	229.17	117.74	122.59	7.23	0.96	1.95
9925.55	RB 10048.13	2932.56	429.38	122.58	92.54	3.54	6.83

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Manning's n values were composited to a single value in the main channel.

CROSS SECTION RIVER: Tributary 6B
REACH: Tributary 6B DS RS: 0.793

INPUT
Description:
Station Elevation Data num= 28

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9565	2224	9579.02	2222	9595.92	2220	9614.05	2218	9633.46	2216
9652.1	2214	9668.15	2212	9684.63	2210	9702.54	2208	9717.31	2206
9727.73	2204	9741.18	2204	9745.43	2204	9752.61	2204	9819.46	2206
9859.34	2208	9952.64	2208	9974.11	2206	9980.69	220410002.83		2204
10008.02	220610013.28		220810018.39		221010031.69		221210102.73		2214
10133.57	2214	10143	221410273.27		2214				

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
9565	.065	9717.31	.042	9819.46	.065	9952.64	.04210018.39		.065

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
9668.1510031.69		431.87	387.26 384.58	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2208.30	Element		0.042	
Vel Head (ft)	1.05	Wt. n-Val.			
W.S. Elev (ft)	2207.25	Reach Len. (ft)	431.87	387.26	384.58
Crit W.S. (ft)	2207.25	Flow Area (sq ft)		385.49	
E.G. Slope (ft/ft)	0.018517	Area (sq ft)		385.49	
Q Total (cfs)	3169.00	Flow (cfs)		3169.00	
Top Width (ft)	187.04	Top Width (ft)		187.04	
Vel Total (ft/s)	8.22	Avg. Vel. (ft/s)		8.22	
Max Chl Dpth (ft)	3.25	Hydr. Depth (ft)		2.06	
Conv. Total (cfs)	23288.2	Conv. (cfs)		23288.2	
Length Wtd. (ft)	387.26	Wetted Per. (ft)		188.34	
Min Ch El (ft)	2204.00	Shear (lb/sq ft)		2.37	
Alpha	1.00	Stream Power (lb/ft s)		19.45	
Frctn Loss (ft)	5.94	Cum Volume (acre-ft)	6.91	22.40	0.31
C & E Loss (ft)	0.13	Cum SA (acres)	4.51	12.41	0.54

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

CROSS SECTION OUTPUT Profile #PF 2

			Left OB	Channel	Right OB
E.G. Elev (ft)	2208.30	Element		0.042	
Vel Head (ft)	1.05	Wt. n-Val.			
W.S. Elev (ft)	2207.25	Reach Len. (ft)	431.87	387.26	384.58
Crit W.S. (ft)	2207.25	Flow Area (sq ft)		385.49	
E.G. Slope (ft/ft)	0.018517	Area (sq ft)		385.49	
Q Total (cfs)	3169.00	Flow (cfs)		3169.00	
Top Width (ft)	187.04	Top Width (ft)		187.04	
Vel Total (ft/s)	8.22	Avg. Vel. (ft/s)		8.22	
Max Chl Dpth (ft)	3.25	Hydr. Depth (ft)		2.06	
Conv. Total (cfs)	23288.2	Conv. (cfs)		23288.2	
Length Wtd. (ft)	387.26	Wetted Per. (ft)		188.34	
Min Ch El (ft)	2204.00	Shear (lb/sq ft)		2.37	
Alpha	1.00	Stream Power (lb/ft s)		19.45	
Frctn Loss (ft)	5.94	Cum Volume (acre-ft)	6.91	22.40	0.31
C & E Loss (ft)	0.13	Cum SA (acres)	4.51	12.41	0.54

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

FLOW DISTRIBUTION OUTPUT Profile #PF 1

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9668.15	9789.33	1937.70	209.48	81.56	61.15	2.58	9.25
9789.33	9910.51	381.55	66.98	55.16	12.04	1.22	5.70
9910.51	RB 10031.69	849.75	109.03	51.61	26.81	2.15	7.79

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

FLOW DISTRIBUTION OUTPUT Profile #PF 2

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9668.15	9789.33	1937.70	209.48	81.56	61.15	2.58	9.25
9789.33	9910.51	381.55	66.98	55.16	12.04	1.22	5.70
9910.51	RB 10031.69	849.75	109.03	51.61	26.81	2.15	7.79

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

CROSS SECTION RIVER: Tributary 6B
REACH: Tributary 6B DS RS: 0.703

INPUT
Description:
Station Elevation Data num= 27

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9353	2214	9377.75	2212	9398.54	2210	9422.04	2208	9458.39	2206
9532.34	2204	9633.11	2202	9677.15	2202	9703.23	2202	9742.21	2200
9765.84	2198	9777.46	2196	9781.97	2196	9801.66	2198	9857.32	2200
9896	2200	9954.12	2200	9995.38	220010002.32		219810009.69		2196
10015.98	219610032.22		219810045.29		2200	10064.4	220210097.06		2204
10292.93	220410358.95		2202						

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
9353	.065	9742.21	.042	9857.32	.065	9995.38	.04	210045.29	.065

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
9532.34	10097.06	497.04	472.58 505.64	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2201.24	Element			
Vel Head (ft)	0.63	Wt. n-Val.		0.043	
W.S. Elev (ft)	2200.61	Reach Len. (ft)	497.04	472.58	505.64
Crit W.S. (ft)		Flow Area (sq ft)		497.26	
E.G. Slope (ft/ft)	0.012925	Area (sq ft)		497.26	

Q Total (cfs)	3169.00	Flow (cfs)		3169.00	
Top Width (ft)	320.77	Top Width (ft)		320.77	
Vel Total (ft/s)	6.37	Avg. Vel. (ft/s)		6.37	
Max Chl Dpth (ft)	4.61	Hydr. Depth (ft)		1.55	
Conv. Total (cfs)	27874.6	Conv. (cfs)		27874.6	
Length Wtd. (ft)	472.85	Wetted Per. (ft)		322.04	
Min Ch El (ft)	2196.00	Shear (lb/sq ft)		1.25	
Alpha	1.00	Stream Power (lb/ft s)		7.94	
Frctn Loss (ft)	6.72	Cum Volume (acre-ft)	6.91	18.48	0.31
C & E Loss (ft)	0.07	Cum SA (acres)	4.51	10.15	0.54

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

CROSS SECTION OUTPUT Profile #PF 2

E.G. Elev (ft)	2201.24	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.63	Wt. n-Val.		0.043	
W.S. Elev (ft)	2200.61	Reach Len. (ft)	497.04	472.58	505.64
Crit W.S. (ft)		Flow Area (sq ft)		497.26	
E.G. Slope (ft/ft)	0.012925	Area (sq ft)		497.26	
Q Total (cfs)	3169.00	Flow (cfs)		3169.00	
Top Width (ft)	320.77	Top Width (ft)		320.77	
Vel Total (ft/s)	6.37	Avg. Vel. (ft/s)		6.37	
Max Chl Dpth (ft)	4.61	Hydr. Depth (ft)		1.55	
Conv. Total (cfs)	27874.6	Conv. (cfs)		27874.6	
Length Wtd. (ft)	472.85	Wetted Per. (ft)		322.04	
Min Ch El (ft)	2196.00	Shear (lb/sq ft)		1.25	
Alpha	1.00	Stream Power (lb/ft s)		7.94	
Frctn Loss (ft)	6.72	Cum Volume (acre-ft)	6.91	18.48	0.31
C & E Loss (ft)	0.07	Cum SA (acres)	4.51	10.15	0.54

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.

FLOW DISTRIBUTION OUTPUT Profile #PF 1

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
9720.58	9908.82	1874.92	296.36	178.89	59.16	1.66	6.33
9908.82	RB 10097.06	1294.08	200.90	143.15	40.84	1.41	6.44

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

FLOW DISTRIBUTION OUTPUT Profile #PF 2

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
9720.58	9908.82	1874.92	296.36	178.89	59.16	1.66	6.33
9908.82	RB 10097.06	1294.08	200.90	143.15	40.84	1.41	6.44

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

CROSS SECTION RIVER: Tributary 6B
REACH: Tributary 6B DS RS: 0.629

INPUT
Description:
Station Elevation Data num= 37

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev

9304	2200 9341.82	2198 9390.81	2196 9447.73	2194 9603.96	2194
9753.5	2196 9878.21	2196 9929.41	2194 9932.6	2192 9935.84	2190
9939.54	2188 9945.3	2188 9959.65	2190 9992.99	219010023.64	2190
10034.03	2192 10080	219310249.11	2192 10468.8	219010501.34	2188
10544.01	218610579.98	218410611.22	218410652.07	218410655.94	2182
10659.59	218010682.87	218010704.98	218210721.05	218410811.63	2184
10815.5	218210826.47	218210855.16	218410872.55	218610901.37	2188
10938.25	219010955.92	2192			

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9304	.065	9935.84	.04	10023.64	.065

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
9878.21	10034.03	541.07	431 431.38	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev
9304	9805	2196

Blocked Obstructions num= 1

Sta L	Sta R	Elev
1008010955.92		2196

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2194.45	Element			
Vel Head (ft)	1.38	Wt. n-Val.		0.043	0.065
W.S. Elev (ft)	2193.07	Reach Len. (ft)	541.07	431.00	431.38
Crit W.S. (ft)	2193.07	Flow Area (sq ft)		328.60	26.36
E.G. Slope (ft/ft)	0.015690	Area (sq ft)		328.60	26.36
Q Total (cfs)	3169.00	Flow (cfs)		3116.96	52.04
Top Width (ft)	149.11	Top Width (ft)		103.14	45.97
Vel Total (ft/s)	8.93	Avg. Vel. (ft/s)		9.49	1.97
Max Chl Dpth (ft)	5.07	Hydr. Depth (ft)		3.19	0.57
Conv. Total (cfs)	25299.6	Conv. (cfs)		24884.1	415.5
Length Wtd. (ft)		Wetted Per. (ft)		104.85	46.05
Min Ch El (ft)	2188.00	Shear (lb/sq ft)		3.07	0.56
Alpha	1.11	Stream Power (lb/ft s)		29.12	1.11
Frctn Loss (ft)		Cum Volume (acre-ft)	6.91	14.00	0.16
C & E Loss (ft)		Cum SA (acres)	4.51	7.85	0.27

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #PF 2

			Left OB	Channel	Right OB
E.G. Elev (ft)	2194.45	Element			
Vel Head (ft)	1.38	Wt. n-Val.		0.043	0.065
W.S. Elev (ft)	2193.07	Reach Len. (ft)	541.07	431.00	431.38
Crit W.S. (ft)	2193.07	Flow Area (sq ft)		328.60	26.36
E.G. Slope (ft/ft)	0.015690	Area (sq ft)		328.60	26.36
Q Total (cfs)	3169.00	Flow (cfs)		3116.96	52.04
Top Width (ft)	149.11	Top Width (ft)		103.14	45.97
Vel Total (ft/s)	8.93	Avg. Vel. (ft/s)		9.49	1.97
Max Chl Dpth (ft)	5.07	Hydr. Depth (ft)		3.19	0.57
Conv. Total (cfs)	25299.6	Conv. (cfs)		24884.1	415.5
Length Wtd. (ft)		Wetted Per. (ft)		104.85	46.05
Min Ch El (ft)	2188.00	Shear (lb/sq ft)		3.07	0.56
Alpha	1.11	Stream Power (lb/ft s)		29.12	1.11
Frctn Loss (ft)		Cum Volume (acre-ft)	6.91	14.00	0.16
C & E Loss (ft)		Cum SA (acres)	4.51	7.85	0.27

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

FLOW DISTRIBUTION OUTPUT Profile #PF 1

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
9930.15	9982.09	1826.73	179.36	52.72	57.64	3.50	10.18
9982.09	RB 10034.03	1290.23	149.25	52.13	40.71	2.87	8.64
10034.03	10955.92	52.04	26.36	46.05	1.64	0.57	1.97

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

FLOW DISTRIBUTION OUTPUT Profile #PF 2

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
9930.15	9982.09	1826.73	179.36	52.72	57.64	3.50	10.18
9982.09	RB 10034.03	1290.23	149.25	52.13	40.71	2.87	8.64
10034.03	10955.92	52.04	26.36	46.05	1.64	0.57	1.97

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Tributary 6B
REACH: Tributary 6B DS RS: 0.547

INPUT
Description:
Station Elevation Data num= 27

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9520	2188	9561.6	2186	9589.78	2184	9638.02	2182	9638.73	2182
9689.5	2184	9769.3	2186	9801.02	2186	9882.79	2184	9887.04	2184
9900.67	2186	9977.32	2186	9988.55	218410016.98		218210022.67		2182
10057	218410066.47		2186	10120	2186	10135	2184	10175	2184
10330	2184	10350	2186	10415	2186	10490	2186	10510	2184
10530	2186	10660	2186						

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
9520	.065	9589.78	.042	9638.73	.065	9977.32	.042	10057	.065

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
9977.32	10066.47	390	310	310	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev
9520	9910	2190

Blocked Obstructions num= 1

Sta L	Sta R	Elev
10067	10660	2190

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2187.47	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.15	Wt. n-Val.	0.065	0.045	0.065
W.S. Elev (ft)	2186.32	Reach Len. (ft)	390.00	310.00	310.00
Crit W.S. (ft)	2186.32	Flow Area (sq ft)	21.70	260.47	0.17
E.G. Slope (ft/ft)	0.016445	Area (sq ft)	646.80	260.47	0.17
Q Total (cfs)	2288.00	Flow (cfs)	29.89	2257.93	0.17
Top Width (ft)	512.10	Top Width (ft)	422.42	89.15	0.53
Vel Total (ft/s)	8.10	Avg. Vel. (ft/s)	1.38	8.67	1.00
Max Chl Dpth (ft)	4.32	Hydr. Depth (ft)	0.32	2.92	0.32
Conv. Total (cfs)	17842.0	Conv. (cfs)	233.1	17607.6	1.3
Length Wtd. (ft)	310.55	Wetted Per. (ft)	67.32	89.66	0.85
Min Ch El (ft)	2182.00	Shear (lb/sq ft)	0.33	2.98	0.21
Alpha	1.13	Stream Power (lb/ft s)	0.46	25.85	0.21

Frctn Loss (ft)	4.18	Cum Volume (acre-ft)	2.90	11.08	0.03
C & E Loss (ft)	0.13	Cum SA (acres)	1.89	6.90	0.04

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 energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Note: Manning's n values were composited to a single value in the main channel.

CROSS SECTION OUTPUT Profile #PF 2

			Left OB	Channel	Right OB
E.G. Elev (ft)	2187.47	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.15	Wt. n-Val.	0.065	0.045	0.065
W.S. Elev (ft)	2186.32	Reach Len. (ft)	390.00	310.00	310.00
Crit W.S. (ft)	2186.32	Flow Area (sq ft)	21.70	260.47	0.17
E.G. Slope (ft/ft)	0.016445	Area (sq ft)	646.80	260.47	0.17
Q Total (cfs)	2288.00	Flow (cfs)	29.89	2257.93	0.17
Top Width (ft)	512.10	Top Width (ft)	422.42	89.15	0.53
Vel Total (ft/s)	8.10	Avg. Vel. (ft/s)	1.38	8.67	1.00
Max Chl Dpth (ft)	4.32	Hydr. Depth (ft)	0.32	2.92	0.32
Conv. Total (cfs)	17842.0	Conv. (cfs)	233.1	17607.6	1.3
Length Wtd. (ft)	310.55	Wetted Per. (ft)	67.32	89.66	0.85
Min Ch El (ft)	2182.00	Shear (lb/sq ft)	0.33	2.98	0.21
Alpha	1.13	Stream Power (lb/ft s)	0.46	25.85	0.21
Frctn Loss (ft)	4.18	Cum Volume (acre-ft)	2.90	11.08	0.03
C & E Loss (ft)	0.13	Cum SA (acres)	1.89	6.90	0.04

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 energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Note: Manning's n values were composited to a single value in the main channel.

FLOW DISTRIBUTION OUTPUT Profile #PF 1

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
9520.00	9977.32	29.90	21.70	67.32	1.31	0.32	1.38
LB 9977.32	10007.04	501.15	69.80	29.94	21.90	2.35	7.18
10007.04	10036.75	1227.18	119.18	29.76	53.64	4.01	10.30
10036.75	RB 10066.47	529.60	71.48	29.96	23.15	2.41	7.41
10066.47	10660.00	0.17	0.17	0.85	0.01	0.32	1.00

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 energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Note: Manning's n values were composited to a single value in the main channel.

FLOW DISTRIBUTION OUTPUT Profile #PF 2

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
9520.00	9977.32	29.90	21.70	67.32	1.31	0.32	1.38
LB 9977.32	10007.04	501.15	69.80	29.94	21.90	2.35	7.18
10007.04	10036.75	1227.18	119.18	29.76	53.64	4.01	10.30
10036.75	RB 10066.47	529.60	71.48	29.96	23.15	2.41	7.41
10066.47	10660.00	0.17	0.17	0.85	0.01	0.32	1.00

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 energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Note: Manning's n values were composited to a single value in the main channel.

CROSS SECTION RIVER: Tributary 6B
REACH: Tributary 6B DS RS: 0.476

INPUT
Description:
Station Elevation Data num= 26

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9643	2190	9684.46	2188	9735.69	2186	9791.16	2184	9834.98	2182
9862.07	2180	9871.97	2178	9884.83	2178	9970.54	217810016.11		2178
10026.63	2180	10100	2180	10425	2180	10540	2178	10545	2176
10555	2178	10565	2180	10575	2182	10590	2184	10640	2182
10655	2180	10660	2178	10690	2176	10740	2176	10750	2178
10770	2180								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9643	.06	9862.07	.04210026.63		.06

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
9791.161	0026.63	267.07 279.58	279.89	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev
9643	9910	2182

Blocked Obstructions num= 1

Sta L	Sta R	Elev
10029	10770	2182

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2181.35	Element			
Vel Head (ft)	0.73	Wt. n-Val.		0.042	0.060
W.S. Elev (ft)	2180.62	Reach Len. (ft)	267.07	279.58	279.89
Crit W.S. (ft)	2180.20	Flow Area (sq ft)		295.09	1.47
E.G. Slope (ft/ft)	0.010975	Area (sq ft)		413.39	1.47
Q Total (cfs)	2031.00	Flow (cfs)		2028.62	2.38
Top Width (ft)	175.33	Top Width (ft)		172.96	2.37
Vel Total (ft/s)	6.85	Avg. Vel. (ft/s)		6.87	1.62
Max Chl Dpth (ft)	2.62	Hydr. Depth (ft)		2.53	0.62
Conv. Total (cfs)	19387.0	Conv. (cfs)		19364.4	22.7
Length Wtd. (ft)	279.58	Wetted Per. (ft)		116.82	2.99
Min Ch El (ft)	2178.00	Shear (lb/sq ft)		1.73	0.34
Alpha	1.01	Stream Power (lb/ft s)		11.90	0.54
Frctn Loss (ft)	3.92	Cum Volume (acre-ft)		8.69	0.02
C & E Loss (ft)	0.04	Cum SA (acres)		5.97	0.03

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

CROSS SECTION OUTPUT Profile #PF 2

			Left OB	Channel	Right OB
E.G. Elev (ft)	2181.35	Element			
Vel Head (ft)	0.73	Wt. n-Val.		0.042	0.060
W.S. Elev (ft)	2180.62	Reach Len. (ft)	267.07	279.58	279.89
Crit W.S. (ft)	2180.20	Flow Area (sq ft)		295.09	1.47
E.G. Slope (ft/ft)	0.010975	Area (sq ft)		413.39	1.47
Q Total (cfs)	2031.00	Flow (cfs)		2028.62	2.38
Top Width (ft)	175.33	Top Width (ft)		172.96	2.37
Vel Total (ft/s)	6.85	Avg. Vel. (ft/s)		6.87	1.62
Max Chl Dpth (ft)	2.62	Hydr. Depth (ft)		2.53	0.62
Conv. Total (cfs)	19387.0	Conv. (cfs)		19364.4	22.7
Length Wtd. (ft)	279.58	Wetted Per. (ft)		116.82	2.99
Min Ch El (ft)	2178.00	Shear (lb/sq ft)		1.73	0.34
Alpha	1.01	Stream Power (lb/ft s)		11.90	0.54
Frctn Loss (ft)	3.92	Cum Volume (acre-ft)		8.69	0.02

C & E Loss (ft)	0.04	Cum SA (acres)	5.97	0.03

Warning: The conveyance ratio (upstream 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.

FLOW DISTRIBUTION OUTPUT Profile #PF 1

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
9869.65	9948.14	703.76	99.94	38.14	34.65	2.62	7.04
9948.14	RB 10026.63	1324.86	195.15	78.68	65.23	2.49	6.79
10026.63	10770.00	2.38	1.47	2.99	0.12	0.62	1.62

Warning: The conveyance ratio (upstream 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.

FLOW DISTRIBUTION OUTPUT Profile #PF 2

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
9869.65	9948.14	703.76	99.94	38.14	34.65	2.62	7.04
9948.14	RB 10026.63	1324.86	195.15	78.68	65.23	2.49	6.79
10026.63	10770.00	2.38	1.47	2.99	0.12	0.62	1.62

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

CROSS SECTION RIVER: Tributary 6B
REACH: Tributary 6B DS RS: 0.420

INPUT
Description:
Station Elevation Data num= 25

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9615	2184	9694.8	2182	9765.15	2180	9883.86	2178	9930.1	2176
9944.18	2174	9946.53	2174	9975.28	2174	9982.86	2172	9999.52	2172
10010.32	217410	175.19	217410	209.77	217410	262.57	217410	339.79	2172
10349.22	217010	360.56	217010	508.89	217010	531.48	216810	555.73	2168
10561.26	2170	10577.7	217210	585.63	2174	10594.4	217610	604.72	2178

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9615	.06	9975.28	.04	210010.32	.06

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
9883.86	10010.32	330.3	326.08	340.82	.1	.3

Blocked Obstructions num= 1

Sta L	Sta R	Elev
1001010604.72		2180

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2177.38	Element			
Vel Head (ft)	1.17	Wt. n-Val.		0.046	
W.S. Elev (ft)	2176.21	Reach Len. (ft)	330.30	326.08	340.82
Crit W.S. (ft)	2176.12	Flow Area (sq ft)		214.43	
E.G. Slope (ft/ft)	0.019403	Area (sq ft)		214.43	
Q Total (cfs)	1864.00	Flow (cfs)		1864.00	
Top Width (ft)	84.68	Top Width (ft)		84.68	
Vel Total (ft/s)	8.69	Avg. Vel. (ft/s)		8.69	
Max Chl Dpth (ft)	4.21	Hydr. Depth (ft)		2.53	
Conv. Total (cfs)	13381.6	Conv. (cfs)		13381.6	
Length Wtd. (ft)	326.09	Wetted Per. (ft)		87.53	
Min Ch El (ft)	2172.00	Shear (lb/sq ft)		2.97	
Alpha	1.00	Stream Power (lb/ft s)		25.80	

Frctn Loss (ft)	6.17	Cum Volume (acre-ft)	6.67	0.01
C & E Loss (ft)	0.22	Cum SA (acres)	5.14	0.03

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

CROSS SECTION OUTPUT Profile #PF 2

			Left OB	Channel	Right OB
E.G. Elev (ft)	2177.38	Element			
Vel Head (ft)	1.17	Wt. n-Val.		0.046	
W.S. Elev (ft)	2176.21	Reach Len. (ft)	330.30	326.08	340.82
Crit W.S. (ft)	2176.12	Flow Area (sq ft)		214.43	
E.G. Slope (ft/ft)	0.019403	Area (sq ft)		214.43	
Q Total (cfs)	1864.00	Flow (cfs)		1864.00	
Top Width (ft)	84.68	Top Width (ft)		84.68	
Vel Total (ft/s)	8.69	Avg. Vel. (ft/s)		8.69	
Max Chl Dpth (ft)	4.21	Hydr. Depth (ft)		2.53	
Conv. Total (cfs)	13381.6	Conv. (cfs)		13381.6	
Length Wtd. (ft)	326.09	Wetted Per. (ft)		87.53	
Min Ch El (ft)	2172.00	Shear (lb/sq ft)		2.97	
Alpha	1.00	Stream Power (lb/ft s)		25.80	
Frctn Loss (ft)	6.17	Cum Volume (acre-ft)		6.67	0.01
C & E Loss (ft)	0.22	Cum SA (acres)		5.14	0.03

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.

FLOW DISTRIBUTION OUTPUT Profile #PF 1

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9883.86	9926.01	0.00	0.01	0.70	0.00	0.02	0.21
9926.01	9968.17	339.94	70.41	42.30	18.24	1.67	4.83
9968.17	RB 10010.32	1524.06	144.01	44.54	81.76	3.44	10.58

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.

FLOW DISTRIBUTION OUTPUT Profile #PF 2

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9883.86	9926.01	0.00	0.01	0.70	0.00	0.02	0.21
9926.01	9968.17	339.94	70.41	42.30	18.24	1.67	4.83
9968.17	RB 10010.32	1524.06	144.01	44.54	81.76	3.44	10.58

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

CROSS SECTION RIVER: Tributary 6B
REACH: Tributary 6B DS RS: 0.352

INPUT
Description:
Station Elevation Data num= 31

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9629	2174	9895.97	2172	9938.32	2170	9955.58	217010055.25		2170
10069.83	216810073.37		216810082.74		217010092.31		217010123.14		2168
10143.46	2168	10160.6	217010204.88		217010296.56		2168	10375.8	2166
10397.33	216610442.42		216610474.02		216610562.52		216610570.66		2164
10601.02	216410624.64		216610632.35		216810660.02		217010671.08		2172
10687.94	217410707.15		217610725.29		217810737.61		218010749.28		2182

10761.59 2184

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9629	.06	10055.25	.042	10143.46	.06

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
9895.97 10160.6 550.41 583.61 628.98 .1 .3

Blocked Obstructions num= 1

Sta L	Sta R	Elev
10163	10761.59	2176

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2170.99	Element			
Vel Head (ft)	0.43	Wt. n-Val.		0.046	0.060
W.S. Elev (ft)	2170.55	Reach Len. (ft)	550.41	583.61	628.98
Crit W.S. (ft)		Flow Area (sq ft)		246.25	1.33
E.G. Slope (ft/ft)	0.018259	Area (sq ft)		246.25	1.33
Q Total (cfs)	1306.00	Flow (cfs)		1303.38	2.62
Top Width (ft)	236.43	Top Width (ft)		234.03	2.40
Vel Total (ft/s)	5.27	Avg. Vel. (ft/s)		5.29	1.97
Max Chl Dpth (ft)	2.55	Hydr. Depth (ft)		1.05	0.55
Conv. Total (cfs)	9664.9	Conv. (cfs)		9645.6	19.4
Length Wtd. (ft)	583.66	Wetted Per. (ft)		234.57	2.96
Min Ch El (ft)	2168.00	Shear (lb/sq ft)		1.20	0.51
Alpha	1.01	Stream Power (lb/ft s)		6.33	1.01
Frctn Loss (ft)	9.66	Cum Volume (acre-ft)		4.95	0.01
C & E Loss (ft)	0.02	Cum SA (acres)		3.95	0.02

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

CROSS SECTION OUTPUT Profile #PF 2

			Left OB	Channel	Right OB
E.G. Elev (ft)	2170.99	Element			
Vel Head (ft)	0.43	Wt. n-Val.		0.046	0.060
W.S. Elev (ft)	2170.55	Reach Len. (ft)	550.41	583.61	628.98
Crit W.S. (ft)		Flow Area (sq ft)		246.25	1.33
E.G. Slope (ft/ft)	0.018259	Area (sq ft)		246.25	1.33
Q Total (cfs)	1306.00	Flow (cfs)		1303.38	2.62
Top Width (ft)	236.43	Top Width (ft)		234.03	2.40
Vel Total (ft/s)	5.27	Avg. Vel. (ft/s)		5.29	1.97
Max Chl Dpth (ft)	2.55	Hydr. Depth (ft)		1.05	0.55
Conv. Total (cfs)	9664.9	Conv. (cfs)		9645.6	19.4
Length Wtd. (ft)	583.66	Wetted Per. (ft)		234.57	2.96
Min Ch El (ft)	2168.00	Shear (lb/sq ft)		1.20	0.51
Alpha	1.01	Stream Power (lb/ft s)		6.33	1.01
Frctn Loss (ft)	9.66	Cum Volume (acre-ft)		4.95	0.01
C & E Loss (ft)	0.02	Cum SA (acres)		3.95	0.02

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.

FLOW DISTRIBUTION OUTPUT Profile #PF 1

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9895.97	9984.18	60.37	28.71	57.62	4.62	0.50	2.10
9984.18	10072.39	287.27	68.65	88.35	22.00	0.78	4.18
10072.39	RB 10160.60	955.75	148.89	88.60	73.18	1.69	6.42
10160.60	10761.59	2.62	1.33	2.96	0.20	0.55	1.97

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.

FLOW DISTRIBUTION OUTPUT Profile #PF 2

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9895.97	9984.18	60.37	28.71	57.62	4.62	0.50	2.10

9984.18	10072.39	287.27	68.65	88.35	22.00	0.78	4.18
10072.39	RB 10160.60	955.75	148.89	88.60	73.18	1.69	6.42
10160.60	10761.59	2.62	1.33	2.96	0.20	0.55	1.97

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

CROSS SECTION RIVER: Tributary 6B
REACH: Tributary 6B DS RS: 0.258

INPUT
Description:
Station Elevation Data num= 25

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9688	2164	9946.93	2162	9990.55	216010013.19		215810034.06		2158
10059.18	216010084.56		216210165.17		216210214.14		216010327.33		2160
10379.13	2160	10480.7	215810542.11		215810550.46		215810565.52		2158
10627.07	215810646.67		215610659.53		215610676.16		215610708.26		2156
10712.17	215810716.15		216010720.49		216210724.81		216410737.56		2166

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9688	.06	9990.55	.04	210059.18	.06

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
9946.93	10084.56	556.58	519.32	528.8	.1 .3

Blocked Obstructions num= 1

Sta L	Sta R	Elev
1008410737.56		2165

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2161.31	Element			
Vel Head (ft)	0.64	Wt. n-Val.		0.042	
W.S. Elev (ft)	2160.67	Reach Len. (ft)	556.58	519.32	528.80
Crit W.S. (ft)		Flow Area (sq ft)		143.62	
E.G. Slope (ft/ft)	0.014487	Area (sq ft)		143.62	
Q Total (cfs)	921.00	Flow (cfs)		921.00	
Top Width (ft)	91.89	Top Width (ft)		91.89	
Vel Total (ft/s)	6.41	Avg. Vel. (ft/s)		6.41	
Max Chl Dpth (ft)	2.67	Hydr. Depth (ft)		1.56	
Conv. Total (cfs)	7652.0	Conv. (cfs)		7652.0	
Length Wtd. (ft)	519.32	Wetted Per. (ft)		92.10	
Min Ch El (ft)	2158.00	Shear (lb/sq ft)		1.41	
Alpha	1.00	Stream Power (lb/ft s)		9.04	
Frctn Loss (ft)	7.53	Cum Volume (acre-ft)		2.34	
C & E Loss (ft)	0.02	Cum SA (acres)		1.76	

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

CROSS SECTION OUTPUT Profile #PF 2

			Left OB	Channel	Right OB
E.G. Elev (ft)	2161.31	Element			
Vel Head (ft)	0.64	Wt. n-Val.		0.042	
W.S. Elev (ft)	2160.67	Reach Len. (ft)	556.58	519.32	528.80
Crit W.S. (ft)		Flow Area (sq ft)		143.62	
E.G. Slope (ft/ft)	0.014487	Area (sq ft)		143.62	
Q Total (cfs)	921.00	Flow (cfs)		921.00	
Top Width (ft)	91.89	Top Width (ft)		91.89	
Vel Total (ft/s)	6.41	Avg. Vel. (ft/s)		6.41	
Max Chl Dpth (ft)	2.67	Hydr. Depth (ft)		1.56	
Conv. Total (cfs)	7652.0	Conv. (cfs)		7652.0	
Length Wtd. (ft)	519.32	Wetted Per. (ft)		92.10	
Min Ch El (ft)	2158.00	Shear (lb/sq ft)		1.41	
Alpha	1.00	Stream Power (lb/ft s)		9.04	
Frctn Loss (ft)	7.53	Cum Volume (acre-ft)		2.34	
C & E Loss (ft)	0.02	Cum SA (acres)		1.76	

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.

FLOW DISTRIBUTION OUTPUT Profile #PF 1

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9946.93	9992.81	13.09	6.71	16.99	1.42	0.40	1.95
9992.81	10038.68	738.61	103.48	45.97	80.20	2.26	7.14
10038.68	RB 10084.56	169.31	33.43	29.15	18.38	1.15	5.06

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.

FLOW DISTRIBUTION OUTPUT Profile #PF 2

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9946.93	9992.81	13.09	6.71	16.99	1.42	0.40	1.95
9992.81	10038.68	738.61	103.48	45.97	80.20	2.26	7.14
10038.68	RB 10084.56	169.31	33.43	29.15	18.38	1.15	5.06

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

CROSS SECTION RIVER: Tributary 6B
REACH: Tributary 6B DS RS: 0.164

INPUT
Description:
Station Elevation Data num= 23

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9748	2154	9780.13	2152	9799.16	2152	9950	2154	9965.59	2152
9972.12	2150	9987.27	2150	10005.1	215210	130.58	215410	256.45	2154
10296.87	215210	362.64	215010	396.89	215010	541.16	215010	542.01	2150
10565.91	215210	587.76	215210	613.89	215010	648.62	215010	661.41	2152
10709.36	215410	758.51	215410	970.63	2152				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9748	.06	9965.59	.042	10005.1	.06

Bank Sta: Left	Right	Lengths: Left Channel	Right	Coeff Contr.	Expan.
9748	10130.58	140	145	150	.1	.3

Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
9748	9950	2156	10134	10970.63	2156

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	2153.76	Element			
Vel Head (ft)	0.57	Wt. n-Val.		0.044	
W.S. Elev (ft)	2153.19	Reach Len. (ft)	140.00	145.00	150.00
Crit W.S. (ft)	2153.15	Flow Area (sq ft)		152.18	
E.G. Slope (ft/ft)	0.014639	Area (sq ft)		152.18	
Q Total (cfs)	921.00	Flow (cfs)		921.00	
Top Width (ft)	123.77	Top Width (ft)		123.77	
Vel Total (ft/s)	6.05	Avg. Vel. (ft/s)		6.05	
Max Chl Dpth (ft)	3.19	Hydr. Depth (ft)		1.23	
Conv. Total (cfs)	7612.0	Conv. (cfs)		7612.0	
Length Wtd. (ft)	145.00	Wetted Per. (ft)		124.27	
Min Ch El (ft)	2150.00	Shear (lb/sq ft)		1.12	
Alpha	1.00	Stream Power (lb/ft s)		6.77	
Frctn Loss (ft)	2.13	Cum Volume (acre-ft)		0.57	
C & E Loss (ft)	0.06	Cum SA (acres)		0.48	

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

CROSS SECTION OUTPUT Profile #PF 2

			Left OB	Channel	Right OB
E.G. Elev (ft)	2153.76	Element			
Vel Head (ft)	0.57	Wt. n-Val.		0.044	

W.S. Elev (ft)	2153.19	Reach Len. (ft)	140.00	145.00	150.00
Crit W.S. (ft)	2153.15	Flow Area (sq ft)		152.18	
E.G. Slope (ft/ft)	0.014639	Area (sq ft)		152.18	
Q Total (cfs)	921.00	Flow (cfs)		921.00	
Top Width (ft)	123.77	Top Width (ft)		123.77	
Vel Total (ft/s)	6.05	Avg. Vel. (ft/s)		6.05	
Max Chl Dpth (ft)	3.19	Hydr. Depth (ft)		1.23	
Conv. Total (cfs)	7612.0	Conv. (cfs)		7612.0	
Length Wtd. (ft)	145.00	Wetted Per. (ft)		124.27	
Min Ch El (ft)	2150.00	Shear (lb/sq ft)		1.12	
Alpha	1.00	Stream Power (lb/ft s)		6.77	
Frctn Loss (ft)	2.13	Cum Volume (acre-ft)		0.57	
C & E Loss (ft)	0.06	Cum SA (acres)		0.48	

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.

FLOW DISTRIBUTION OUTPUT Profile #PF 1

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
9875.53	10003.05	812.94	104.74	47.25	88.27	2.24	7.76
10003.05	RB 10130.58	108.06	47.44	77.02	11.73	0.62	2.28

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.

FLOW DISTRIBUTION OUTPUT Profile #PF 2

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
9875.53	10003.05	812.94	104.74	47.25	88.27	2.24	7.76
10003.05	RB 10130.58	108.06	47.44	77.02	11.73	0.62	2.28

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

CROSS SECTION RIVER: Tributary 6B
REACH: Tributary 6B DS RS: 0.137

INPUT
Description:
Station Elevation Data num= 21

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9733	2150	9780	2150	9900	2151	10018	2150	10033	2148
10050	2148	10058	2150	10068	2152	10118	2154	10200	2154
10220	2152	10250	2150	10385	2148	10405	2148	10450	2150
10520	2150	10550	2160	10680	2160	10700	2158	10720	2156
10750	2154								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9733	.06	9900	.042	10068	.06

Bank Sta: Left Right Coeff Contr. Expan.
9900 10068 .1 .3
Blocked Obstructions num= 2

Sta L	Sta R	Elev	Sta L	Sta R	Elev
9733	9900	2160	10118	10750	2160

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	2151.56	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.36	Wt. n-Val.		0.042	
W.S. Elev (ft)	2151.20	Reach Len. (ft)			
Crit W.S. (ft)	2151.02	Flow Area (sq ft)		191.91	
E.G. Slope (ft/ft)	0.015010	Area (sq ft)		191.91	
Q Total (cfs)	921.00	Flow (cfs)		921.00	
Top Width (ft)	164.02	Top Width (ft)		164.02	
Vel Total (ft/s)	4.80	Avg. Vel. (ft/s)		4.80	
Max Chl Dpth (ft)	3.20	Hydr. Depth (ft)		1.17	

Conv. Total (cfs)	7517.5	Conv. (cfs)	7517.5
Length Wtd. (ft)		Wetted Per. (ft)	164.73
Min Ch El (ft)	2148.00	Shear (lb/sq ft)	1.09
Alpha	1.00	Stream Power (lb/ft s)	5.24
Frctn Loss (ft)		Cum Volume (acre-ft)	
C & E Loss (ft)		Cum SA (acres)	

CROSS SECTION OUTPUT Profile #PF 2

			Left OB	Channel	Right OB
E.G. Elev (ft)	2151.56	Element			
Vel Head (ft)	0.36	Wt. n-Val.		0.042	
W.S. Elev (ft)	2151.20	Reach Len. (ft)			
Crit W.S. (ft)	2151.02	Flow Area (sq ft)		191.91	
E.G. Slope (ft/ft)	0.015010	Area (sq ft)		191.91	
Q Total (cfs)	921.00	Flow (cfs)		921.00	
Top Width (ft)	164.02	Top Width (ft)		164.02	
Vel Total (ft/s)	4.80	Avg. Vel. (ft/s)		4.80	
Max Chl Dpth (ft)	3.20	Hydr. Depth (ft)		1.17	
Conv. Total (cfs)	7517.5	Conv. (cfs)		7517.5	
Length Wtd. (ft)		Wetted Per. (ft)		164.73	
Min Ch El (ft)	2148.00	Shear (lb/sq ft)		1.09	
Alpha	1.00	Stream Power (lb/ft s)		5.24	
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

FLOW DISTRIBUTION OUTPUT Profile #PF 1

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9900.00	9956.00	50.86	24.73	56.21	5.52	0.44	2.06
9956.00	10012.00	172.06	51.31	56.00	18.68	0.92	3.35
10012.00	RB 10068.00	698.07	115.87	52.52	75.80	2.23	6.02

FLOW DISTRIBUTION OUTPUT Profile #PF 2

Left Sta (ft)	Right Sta (ft)	Flow (cfs)	Area (sq ft)	W.P. (ft)	% Conv.	Hydr D. (ft)	Velocity (ft/s)
LB 9900.00	9956.00	50.86	24.73	56.21	5.52	0.44	2.06
9956.00	10012.00	172.06	51.31	56.00	18.68	0.92	3.35
10012.00	RB 10068.00	698.07	115.87	52.52	75.80	2.23	6.02

SUMMARY OF MANNING'S N VALUES

River:Tributary 6B

Reach	River Sta.	n1	n2	n3	n4	n5	n6	n7
Tributary 6B Nor	1.803	.065	.035	.065				
Tributary 6B Nor	1.739	.065	.035	.065				
Tributary 6B Nor	1.705	.065	.035	.065				
Tributary 6B Sou	1.799	.065	.035	.065				
Tributary 6B Sou	1.705	.065	.035	.065				
Tributary 6B DS	1.665	.065	.035	.065				
Tributary 6B DS	1.611	.065	.035	.065	.035	.065		
Tributary 6B DS	1.53	.065	.035	.065				
Tributary 6B DS	1.486	.065	.035	.065				
Tributary 6B DS	1.483	Culvert						
Tributary 6B DS	1.480	.065	.042	.065				
Tributary 6B DS	1.444	.065	.042	.065				
Tributary 6B DS	1.387	.065	.042	.065				
Tributary 6B DS	1.309	.065	.042	.065				
Tributary 6B DS	1.206	.065	.042	.065	.042	.065		
Tributary 6B DS	1.135	.065	.042	.065				
Tributary 6B DS	1.056	.065	.042	.065	.042	.065	.042	.065
Tributary 6B DS	0.976	.065	.042	.065	.042	.065		
Tributary 6B DS	0.881	.065	.042	.065				
Tributary 6B DS	0.793	.065	.042	.065	.042	.065		
Tributary 6B DS	0.703	.065	.042	.065	.042	.065		

			T_6b			
Tributary 6B DS	0.629	.065	.042	.065		
Tributary 6B DS	0.547	.065	.042	.065	.042	.065
Tributary 6B DS	0.476	.06	.042	.06		
Tributary 6B DS	0.420	.06	.042	.06		
Tributary 6B DS	0.352	.06	.042	.06		
Tributary 6B DS	0.258	.06	.042	.06		
Tributary 6B DS	0.164	.06	.042	.06		
Tributary 6B DS	0.137	.06	.042	.06		

SUMMARY OF REACH LENGTHS

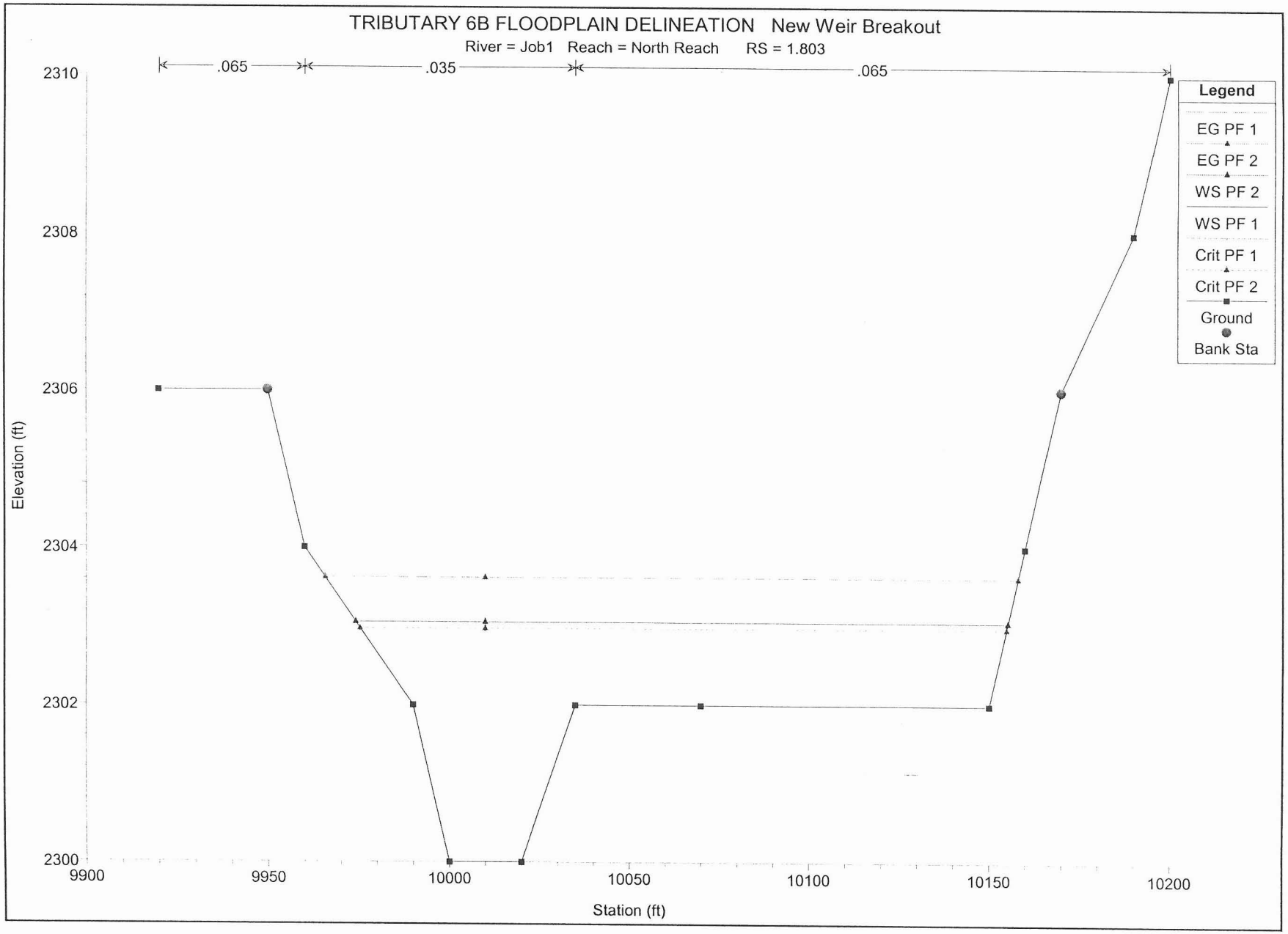
River: Tributary 6B

Reach	River Sta.	Left	Channel	Right
Tributary 6B Nor	1.803	430	430	430
Tributary 6B Nor	1.739	170	180	190
Tributary 6B Nor	1.705	210	200	190
Tributary 6B Sou	1.799	500	500	490
Tributary 6B Sou	1.705	200	210	210
Tributary 6B DS	1.665	270	280	280
Tributary 6B DS	1.611	319.14	364.92	378.05
Tributary 6B DS	1.53	286.92	306.31	324.52
Tributary 6B DS	1.486	67.19	21.93	38.47
Tributary 6B DS	1.483	Culvert		
Tributary 6B DS	1.480	186.94	178.51	196.39
Tributary 6B DS	1.444	457.81	284.49	185.54
Tributary 6B DS	1.387	365	400	410
Tributary 6B DS	1.309	430	450	460
Tributary 6B DS	1.206	437.48	432.04	467.04
Tributary 6B DS	1.135	352.32	310.34	266.69
Tributary 6B DS	1.056	326.01	417.97	518.21
Tributary 6B DS	0.976	496.45	500.4	504.03
Tributary 6B DS	0.881	526.36	464.23	454.67
Tributary 6B DS	0.793	431.87	387.26	384.58
Tributary 6B DS	0.703	497.04	472.58	505.64
Tributary 6B DS	0.629	541.07	431	431.38
Tributary 6B DS	0.547	390	310	310
Tributary 6B DS	0.476	267.07	279.58	279.89
Tributary 6B DS	0.420	330.3	326.08	340.82
Tributary 6B DS	0.352	550.41	583.61	628.98
Tributary 6B DS	0.258	556.58	519.32	528.8
Tributary 6B DS	0.164	140	145	150
Tributary 6B DS	0.137			

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: Tributary 6B

Reach	River Sta.	Contr.	Expan.
Tributary 6B Nor	1.803	.1	.3
Tributary 6B Nor	1.739	.1	.3
Tributary 6B Nor	1.705	.1	.3
Tributary 6B Sou	1.799	.1	.3
Tributary 6B Sou	1.705	.1	.3
Tributary 6B DS	1.665	.1	.3
Tributary 6B DS	1.611	.1	.3
Tributary 6B DS	1.53	.1	.3
Tributary 6B DS	1.486	.3	.5
Tributary 6B DS	1.483	Culvert	
Tributary 6B DS	1.480	.3	.5
Tributary 6B DS	1.444	.1	.3
Tributary 6B DS	1.387	.1	.3
Tributary 6B DS	1.309	.1	.3
Tributary 6B DS	1.206	.1	.3
Tributary 6B DS	1.135	.1	.3
Tributary 6B DS	1.056	.1	.3

			T_6b
Tributary 6B DS	0.976	.1	.3
Tributary 6B DS	0.881	.1	.3
Tributary 6B DS	0.793	.1	.3
Tributary 6B DS	0.703	.1	.3
Tributary 6B DS	0.629	.1	.3
Tributary 6B DS	0.547	.1	.3
Tributary 6B DS	0.476	.1	.3
Tributary 6B DS	0.420	.1	.3
Tributary 6B DS	0.352	.1	.3
Tributary 6B DS	0.258	.1	.3
Tributary 6B DS	0.164	.1	.3
Tributary 6B DS	0.137	.1	.3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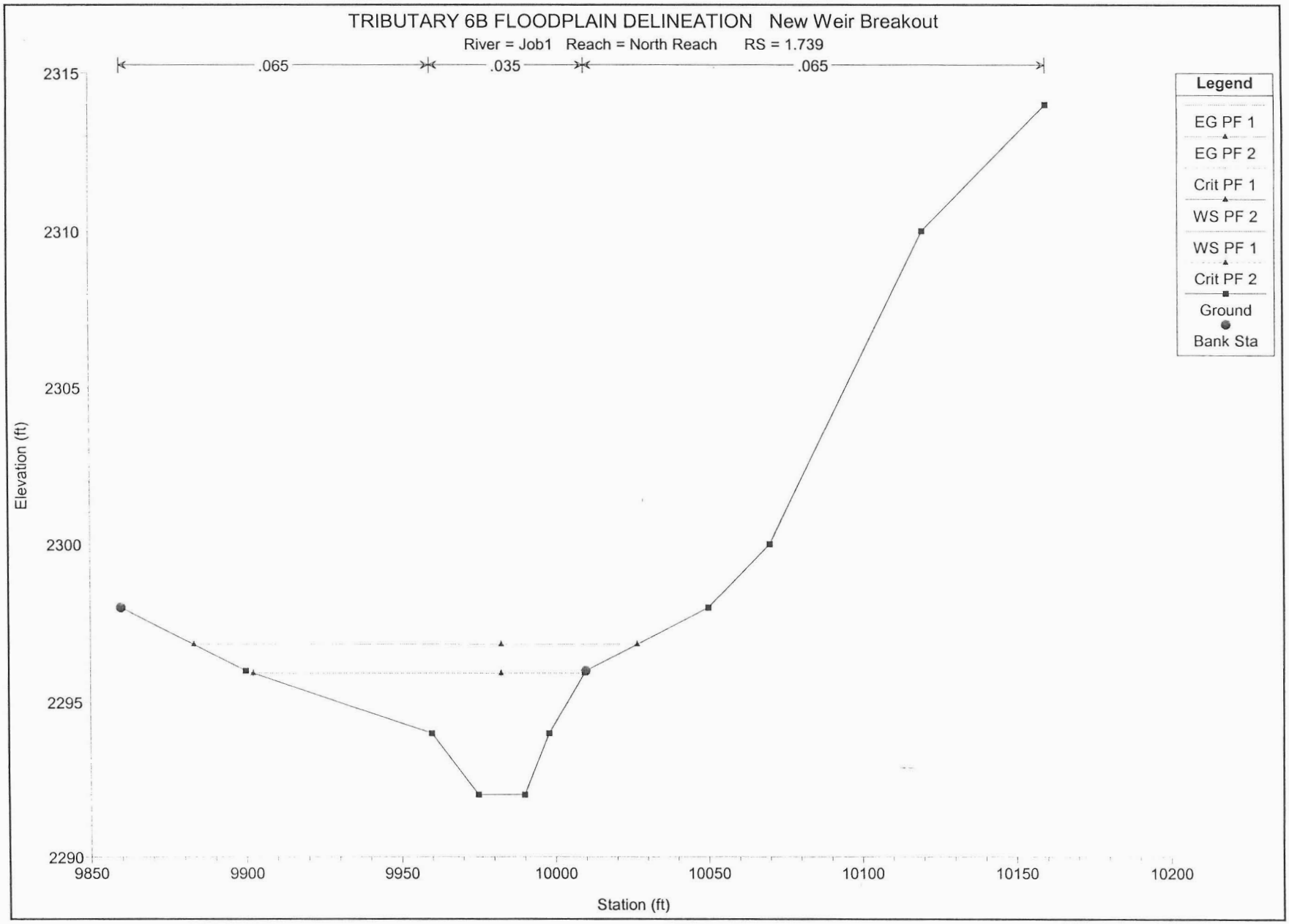
River = Job1 Reach = North Reach RS = 1.803
.065
.035
.065
2310
2308
2306
2304
2302
2300
Elevation (ft)
9900
9950
10000
10050
10100
10150
10200
Station (ft)
Legend
EG PF 1
EG PF 2
WS PF 2
WS PF 1
Crit PF 1
Crit PF 2
Ground
Bank Sta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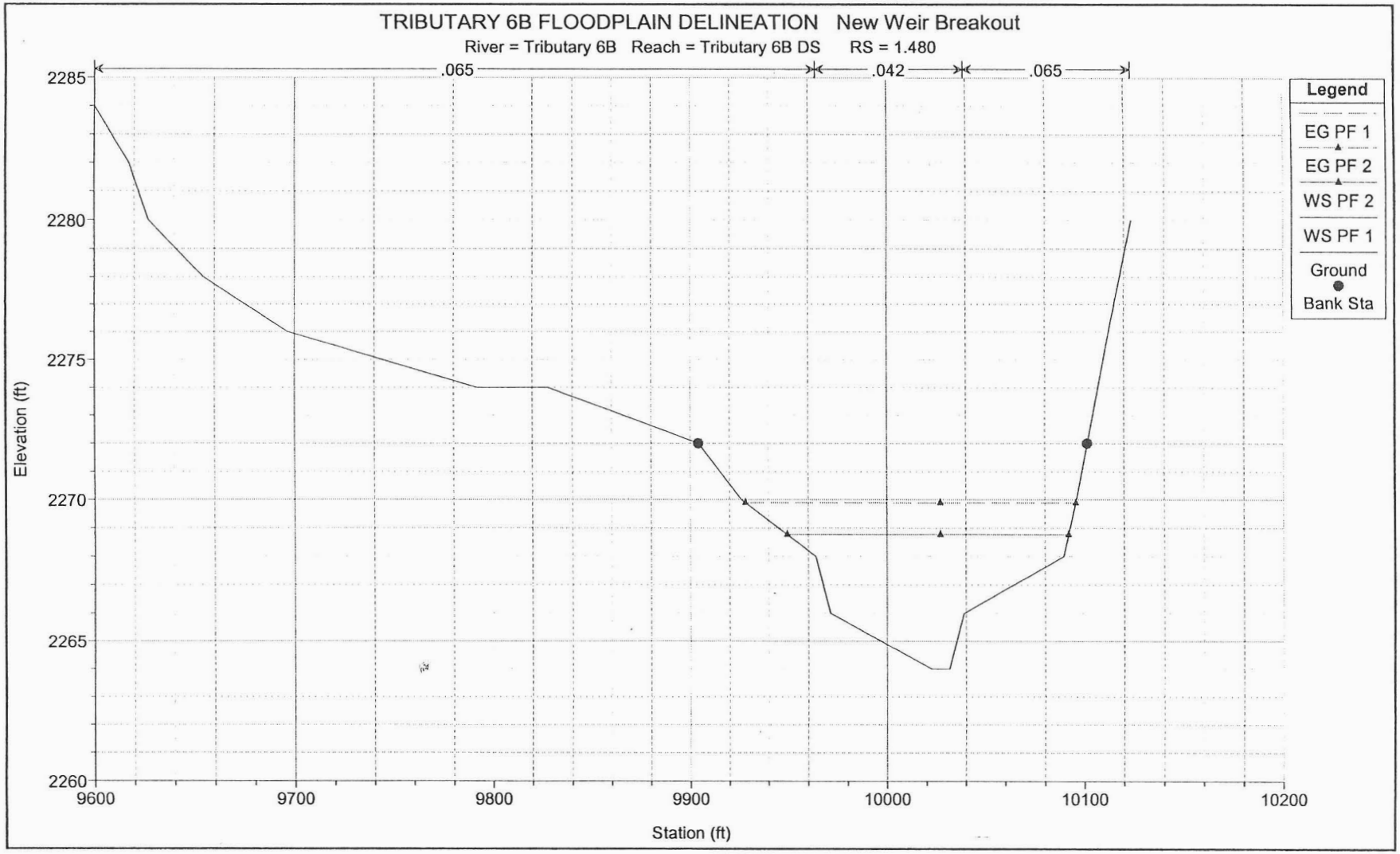
River = Job1 Reach = North Reach RS = 1.739
.065
.035
.065
Legend
EG PF 1
EG PF 2
Crit PF 1
WS PF 2
WS PF 1
Crit PF 2
Ground
Bank Sta
2315
2310
2305
2300
2295
2290
Elevation (ft)
9850
9900
9950
10000
10050
10100
10150
10200
Station (ft)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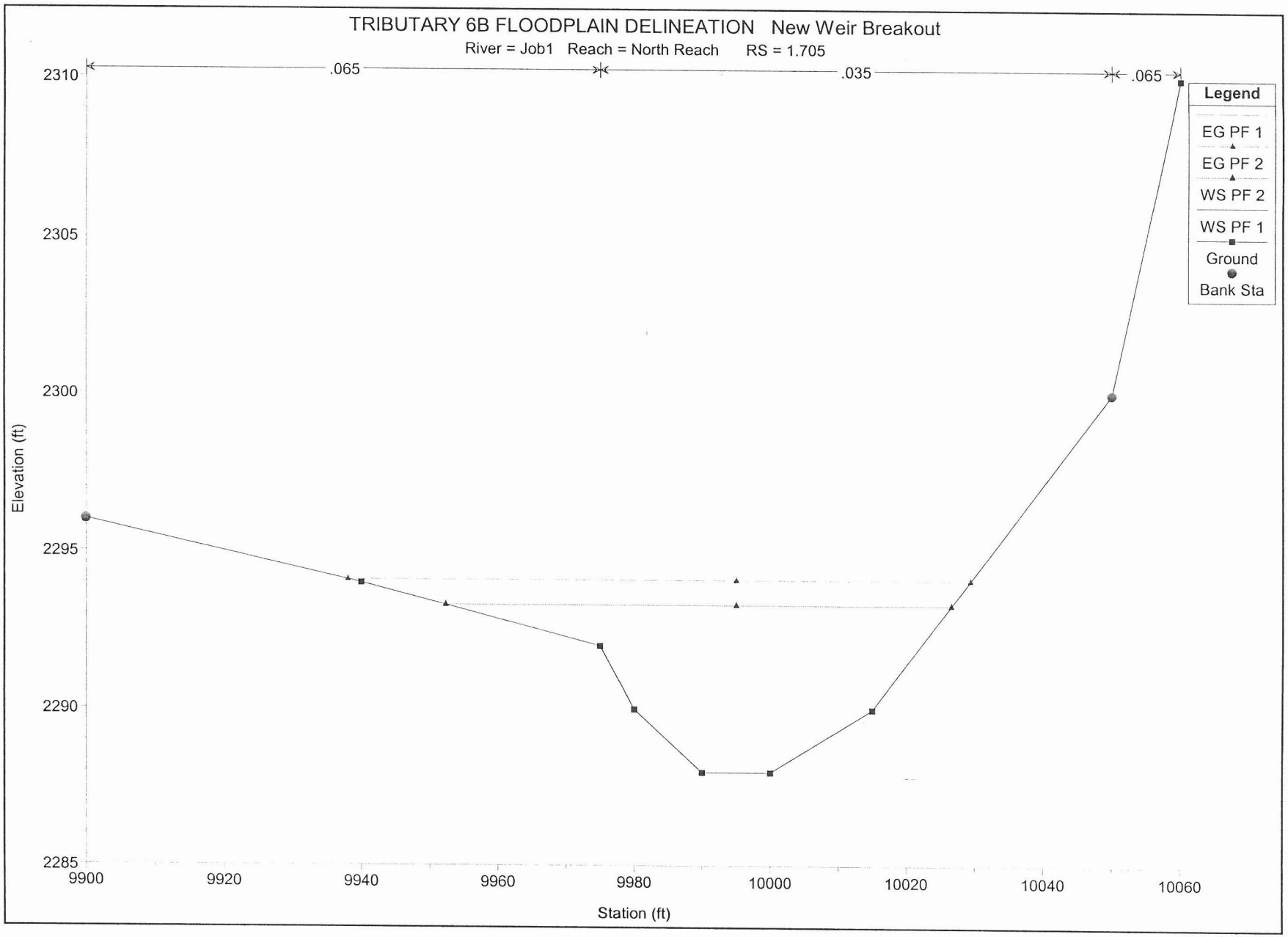
.065
.042
.065
Legend
EG PF 1
EG PF 2
WS PF 2
WS PF 1
Ground
Bank Sta
Elevation (ft)
2285
2280
2275
2270
2265
2260
9600
9700
9800
9900
10000
10100
10200
Station (ft)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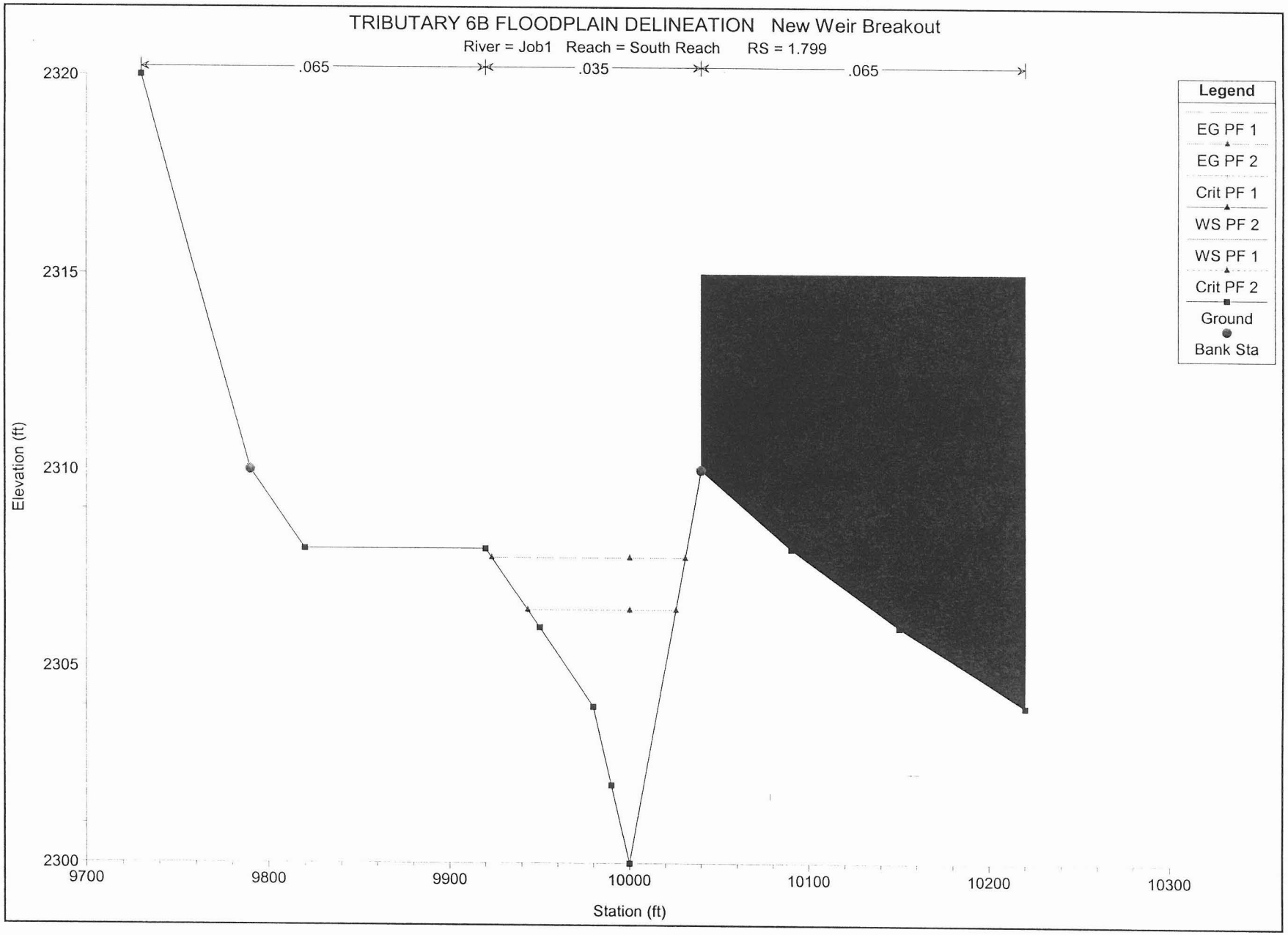
River = Job1 Reach = North Reach RS = 1.705
.065
.035
.065
Legend
EG PF 1
EG PF 2
WS PF 2
WS PF 1
Ground
Bank Sta
Elevation (ft)
2310
2305
2300
2295
2290
2285
9900
9920
9940
9960
9980
10000
10020
10040
10060
Station (ft)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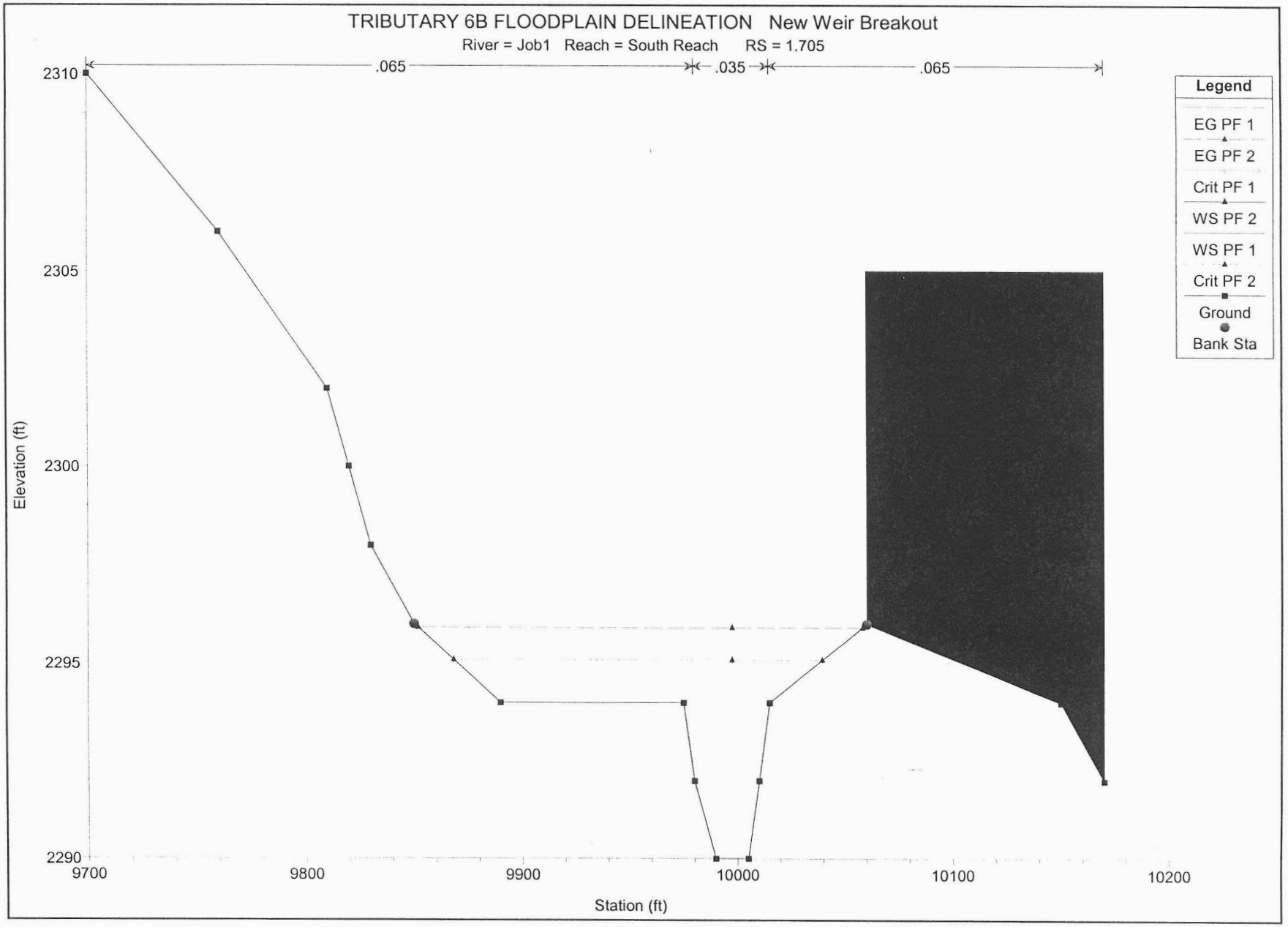
.065
.035
.065
Legend
EG PF 1
EG PF 2
Crit PF 1
WS PF 2
WS PF 1
Crit PF 2
Ground
Bank Sta
Elevation (ft)
2320
2315
2310
2305
2300
9700
9800
9900
10000
10100
10200
10300
Station (ft)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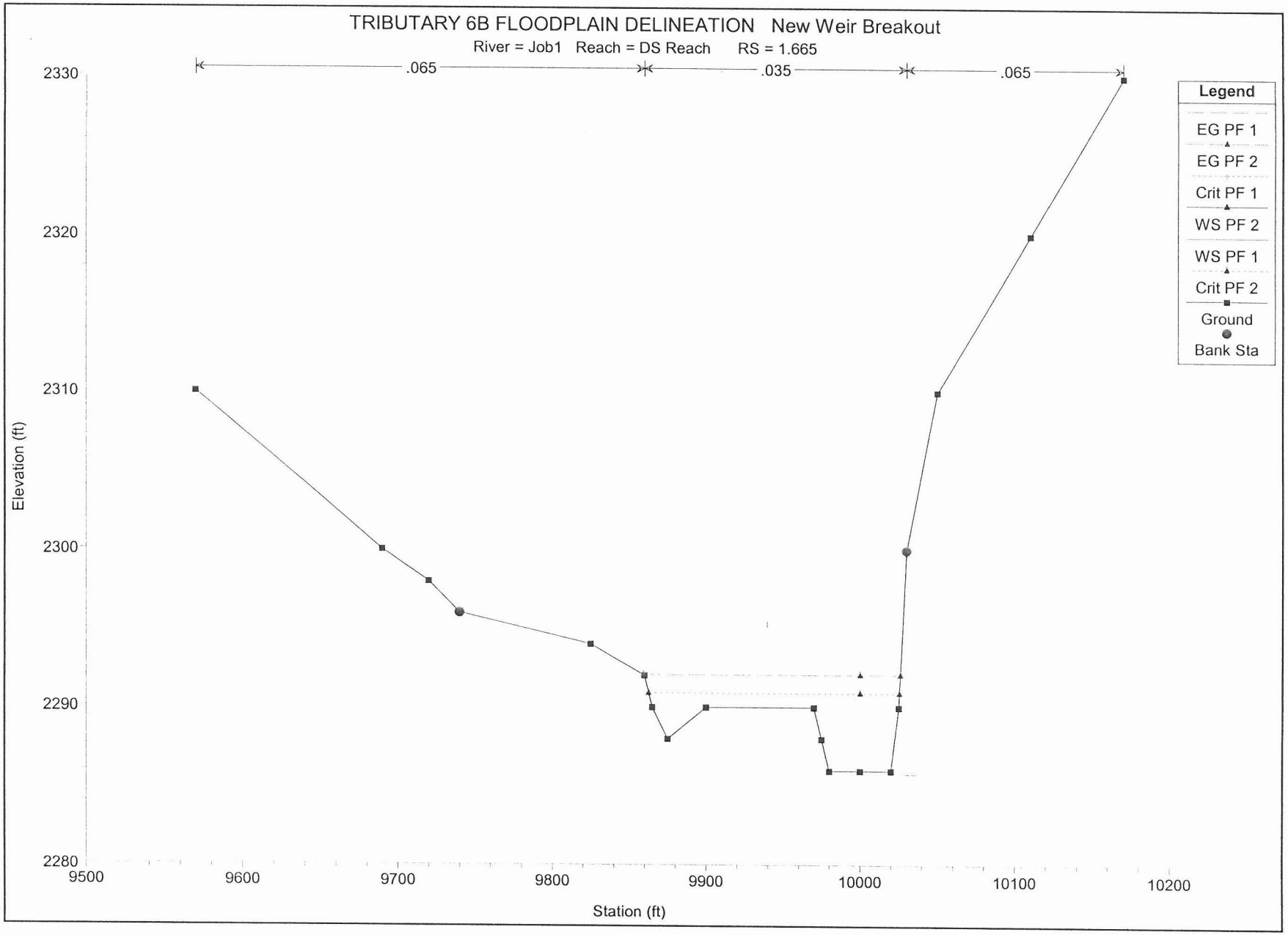
.065
.035
.065
2310
2305
2300
2295
2290
Elevation (ft)
9700
9800
9900
10000
10100
10200
Station (ft)
Legend
EG PF 1
EG PF 2
Crit PF 1
WS PF 2
WS PF 1
Crit PF 2
Ground
Bank Sta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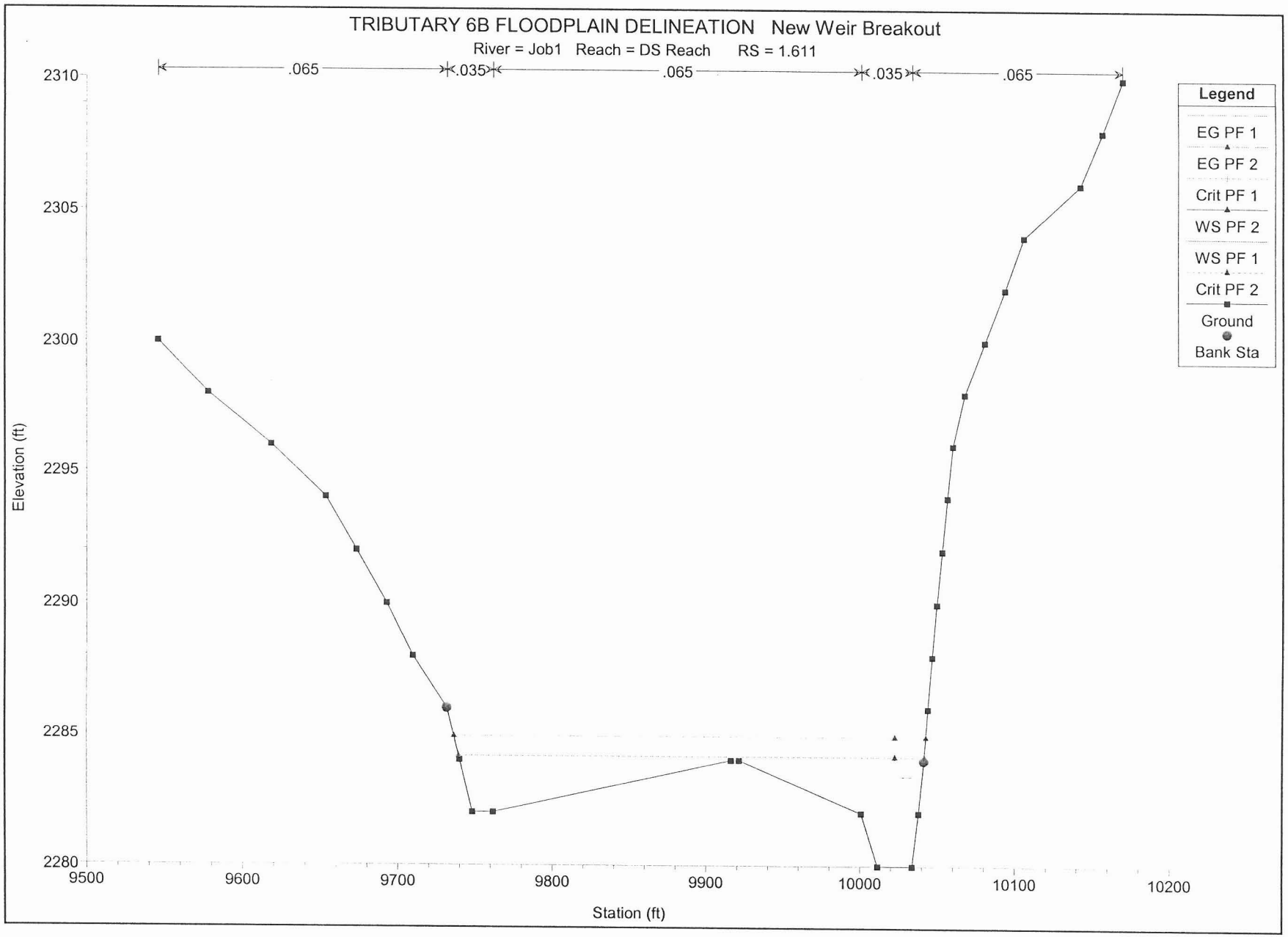
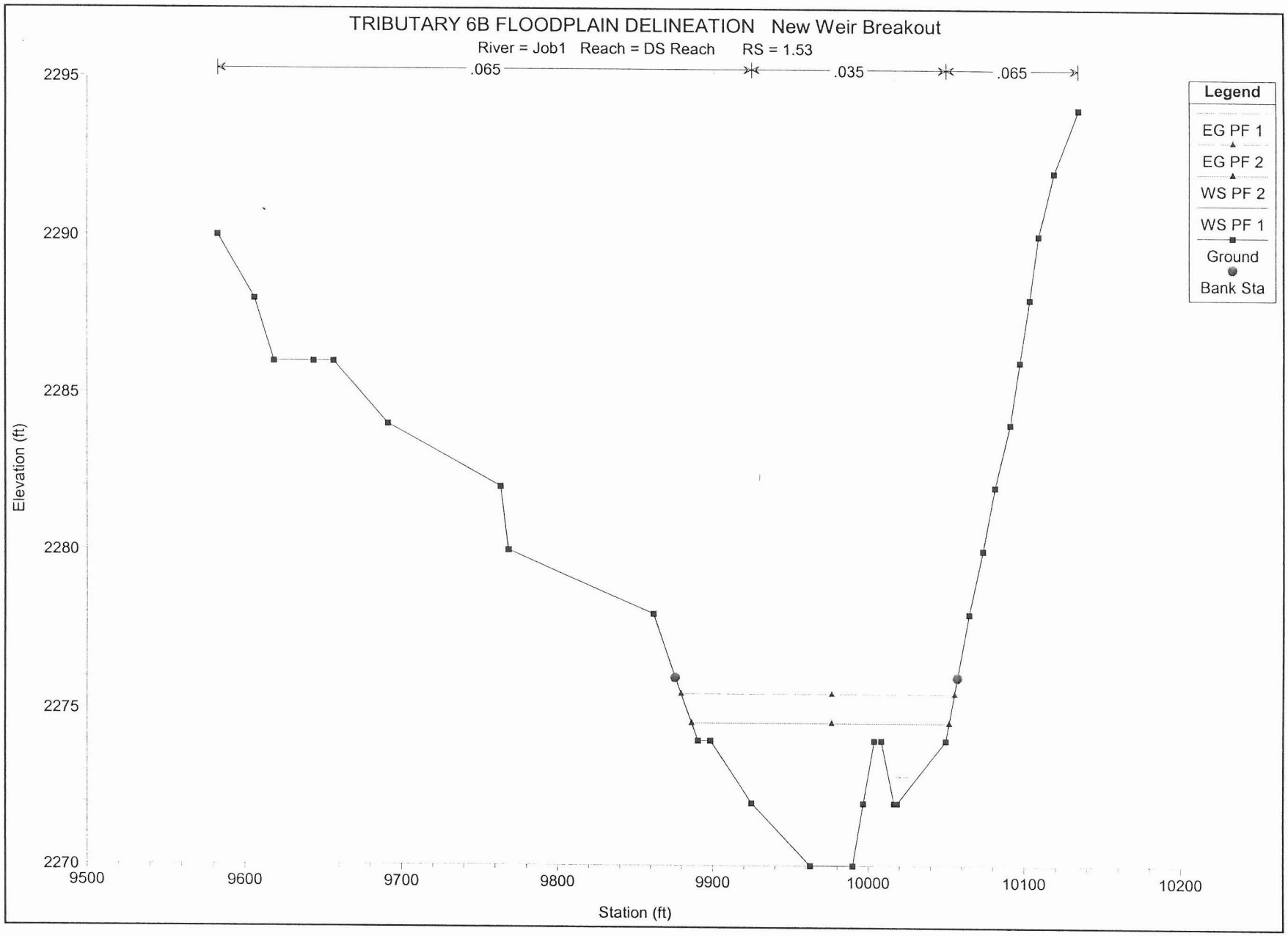
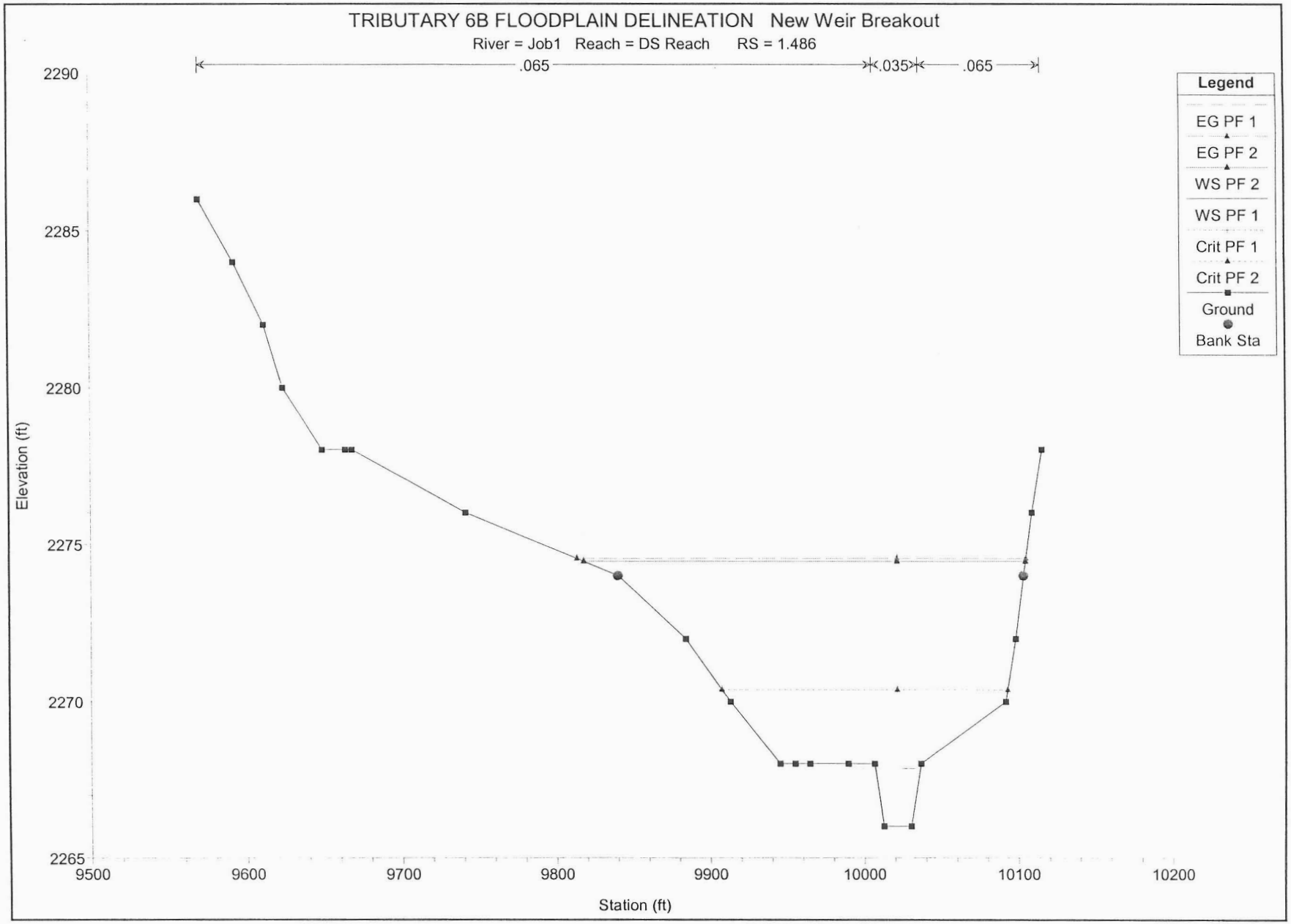
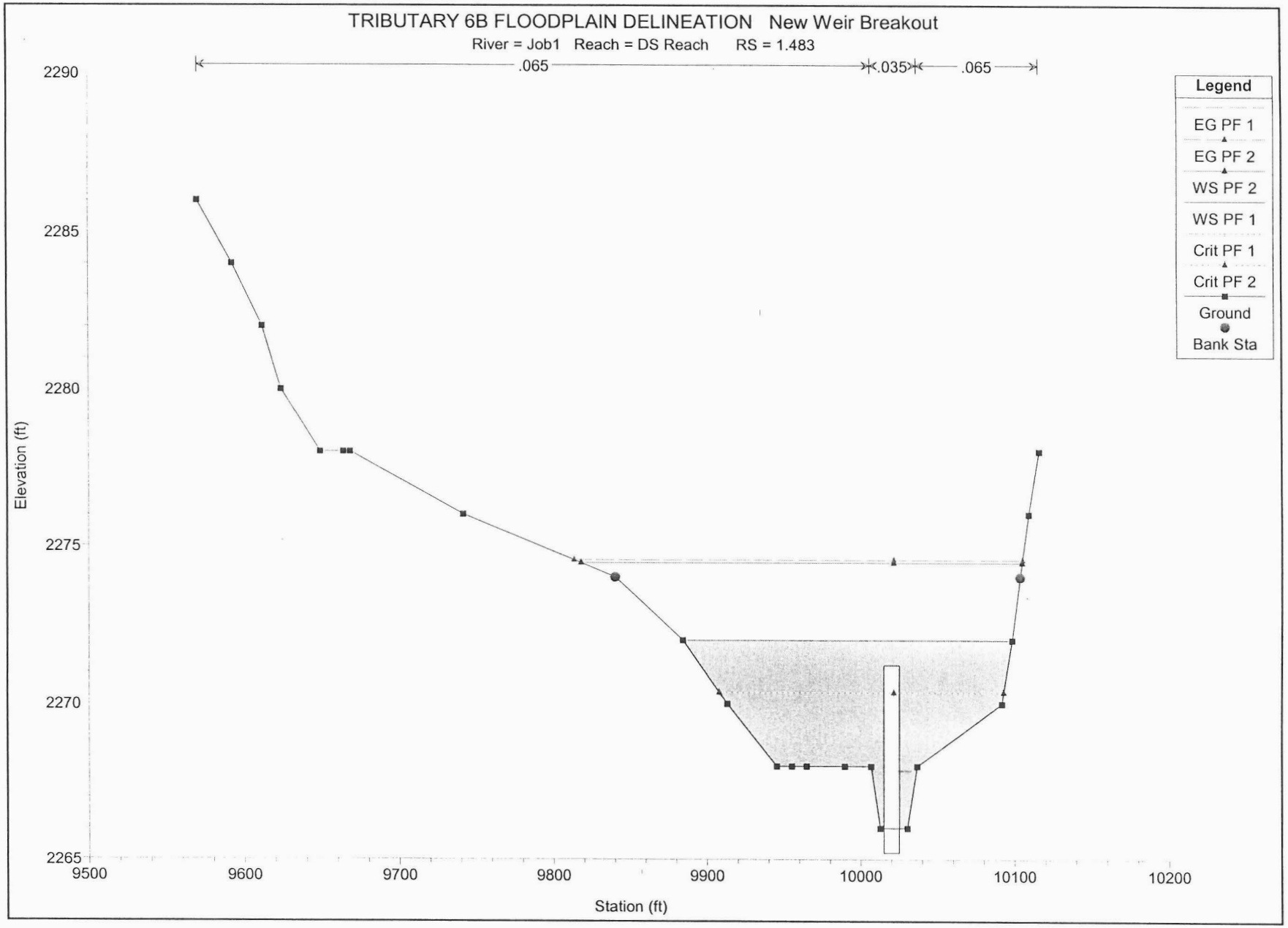
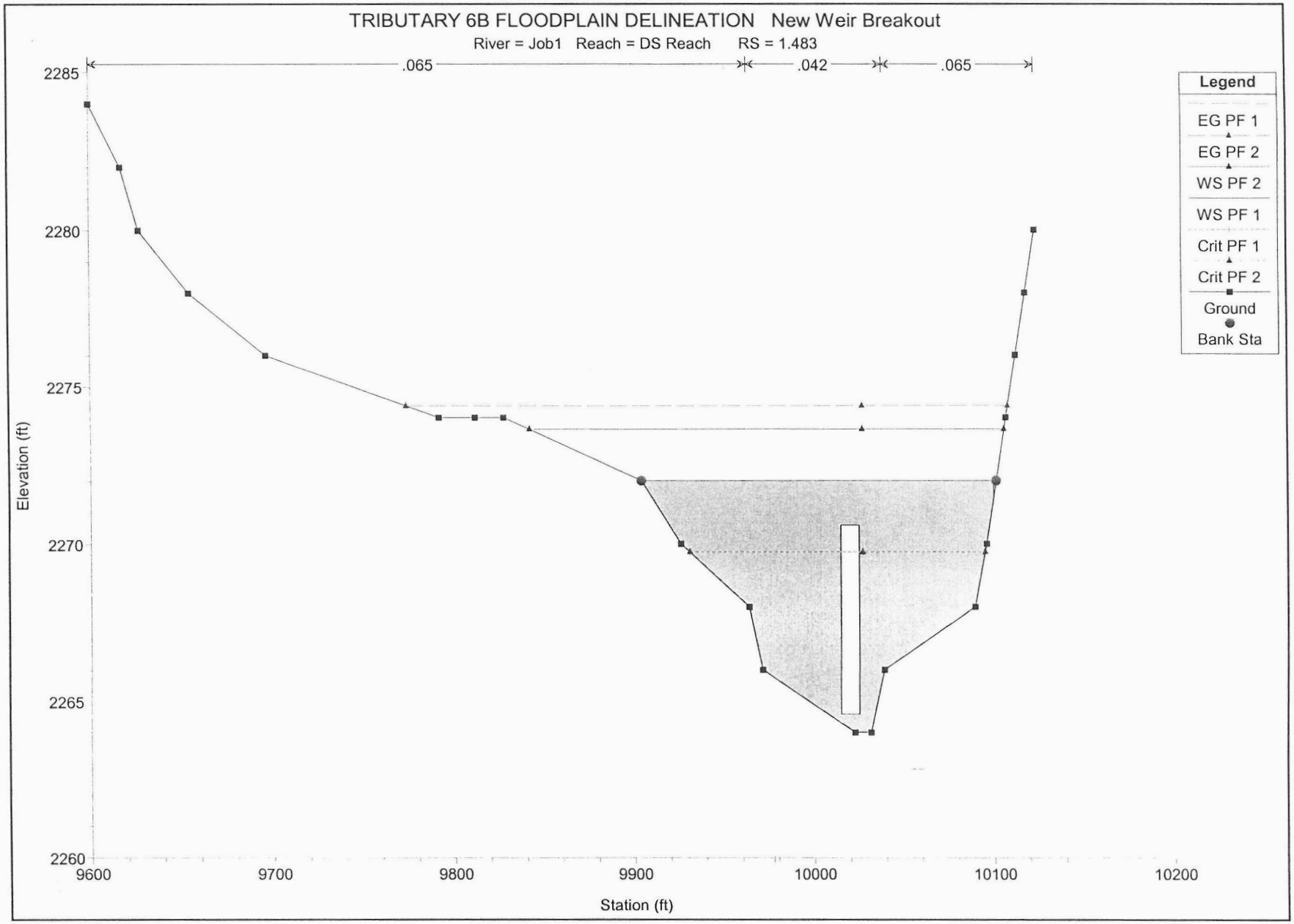
.065
.035
.065
Legend
EG PF 1
EG PF 2
Crit PF 1
WS PF 2
WS PF 1
Crit PF 2
Ground
Bank Sta
Elevation (ft)
2330
2320
2310
2300
2290
2280
9500
9600
9700
9800
9900
10000
10100
10200
Station (ft)

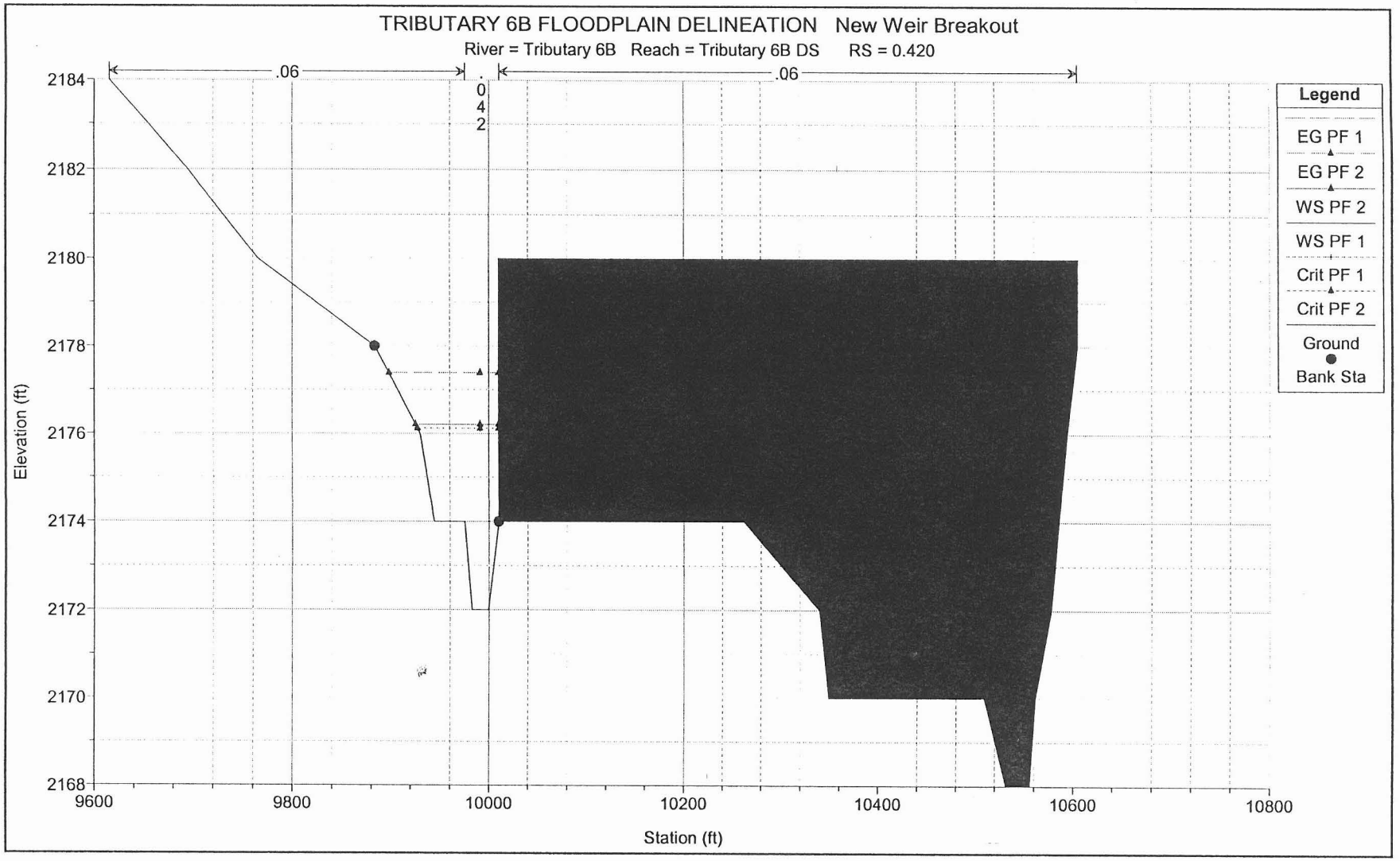

TRIBUTARY 6B FLOODPLAIN DELINEATION New Weir Breakout
River = Job1 Reach = DS Reach RS = 1.611
.065
.035
.065
.035
.065
Legend
EG PF 1
EG PF 2
Crit PF 1
WS PF 2
WS PF 1
Crit PF 2
Ground
Bank Sta
Elevation (ft)
2310
2305
2300
2295
2290
2285
2280
9500
9600
9700
9800
9900
10000
10100
10200
Station (ft)

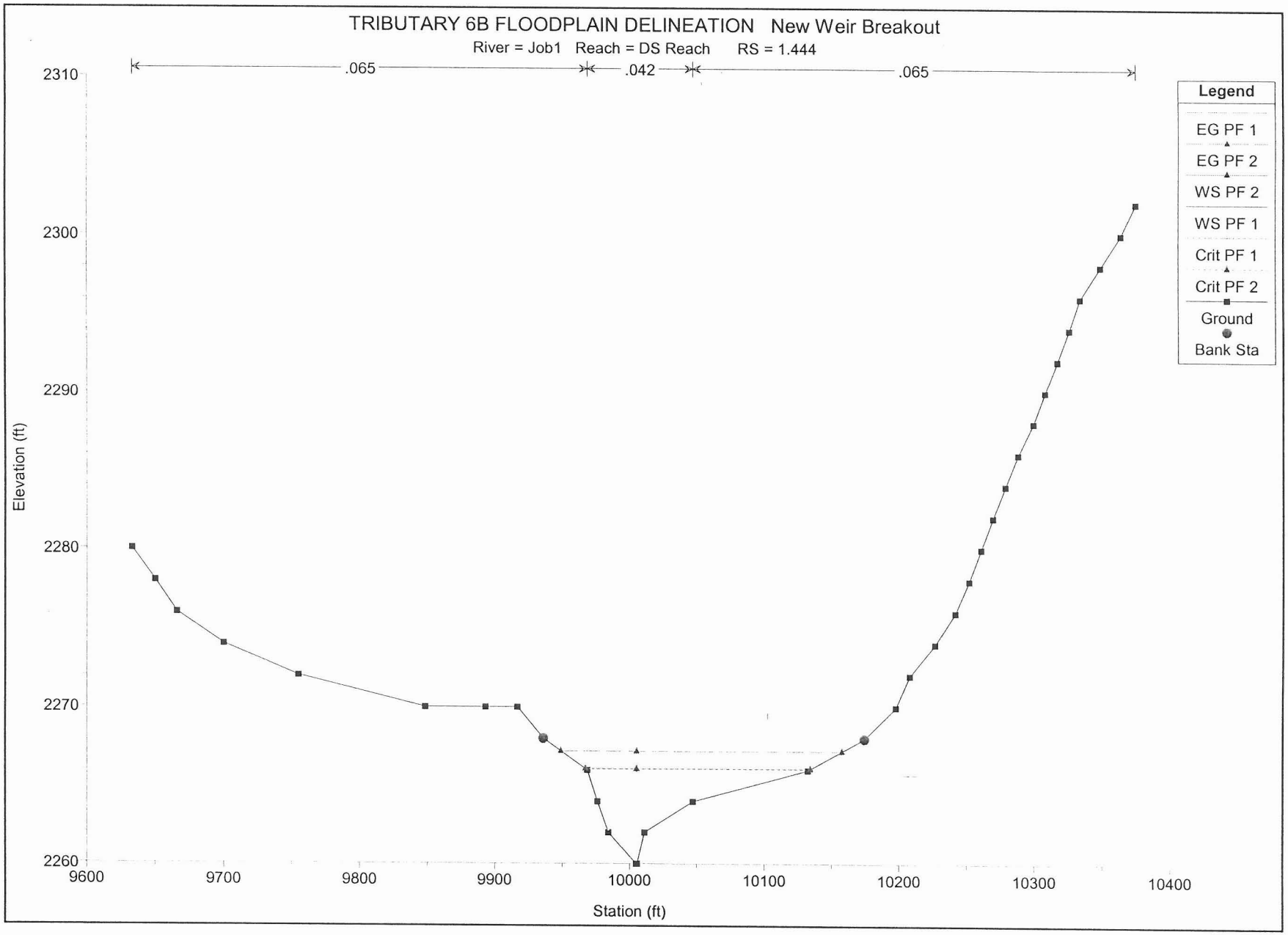

TRIBUTARY 6B FLOODPLAIN DELINEATION New Weir Breakout
River = Job1 Reach = DS Reach RS = 1.53
.065
.035
.065
Legend
EG PF 1
EG PF 2
WS PF 2
WS PF 1
Ground
Bank Sta
Elevation (ft)
2295
2290
2285
2280
2275
2270
9500
9600
9700
9800
9900
10000
10100
10200
Station (ft)

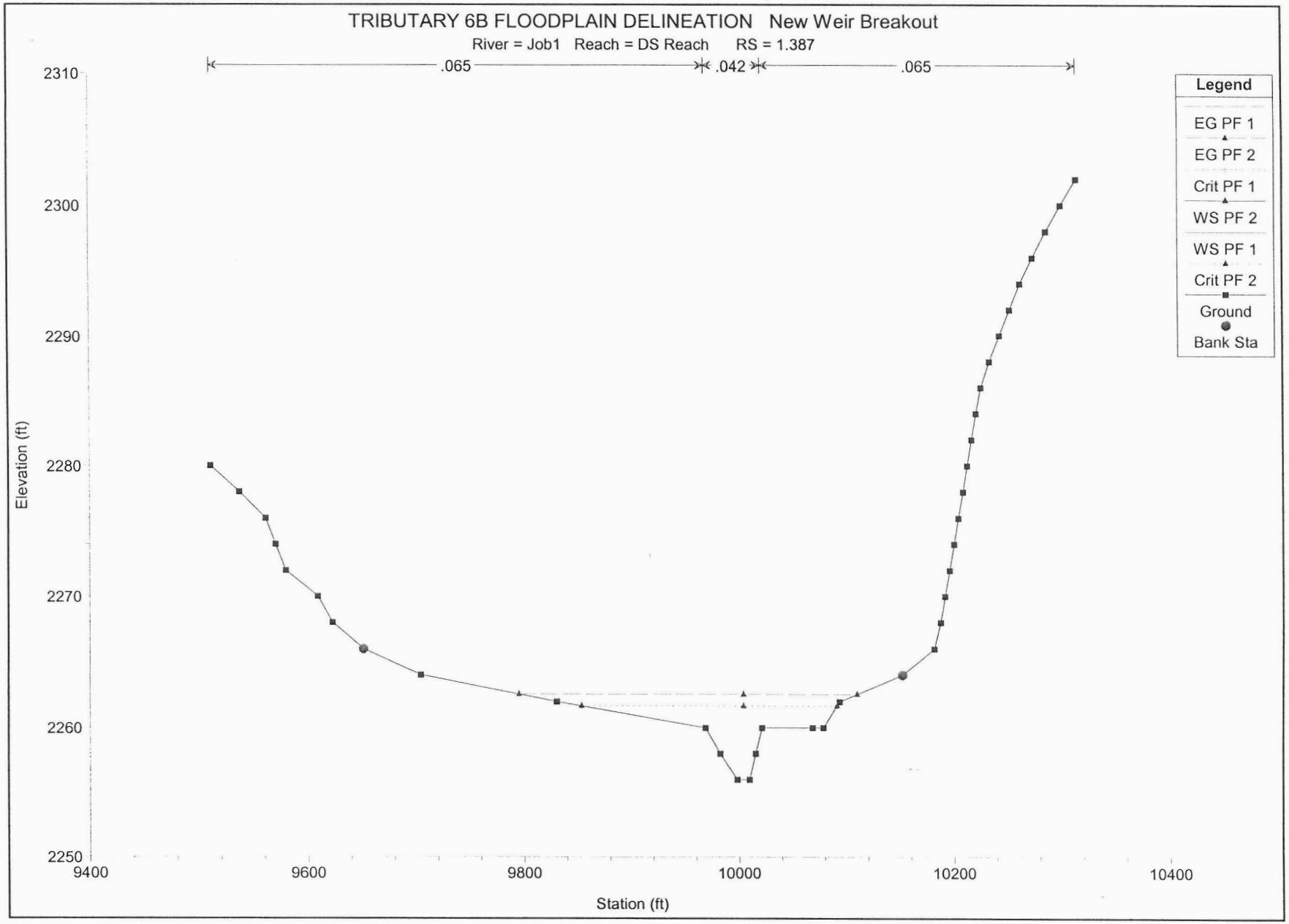

TRIBUTARY 6B FLOODPLAIN DELINEATION New Weir Breakout
River = Job1 Reach = DS Reach RS = 1.486
.065
.035
.065
Legend
EG PF 1
EG PF 2
WS PF 2
WS PF 1
Crit PF 1
Crit PF 2
Ground
Bank Sta
Elevation (ft)
2290
2285
2280
2275
2270
2265
9500
9600
9700
9800
9900
10000
10100
10200
Station (ft)

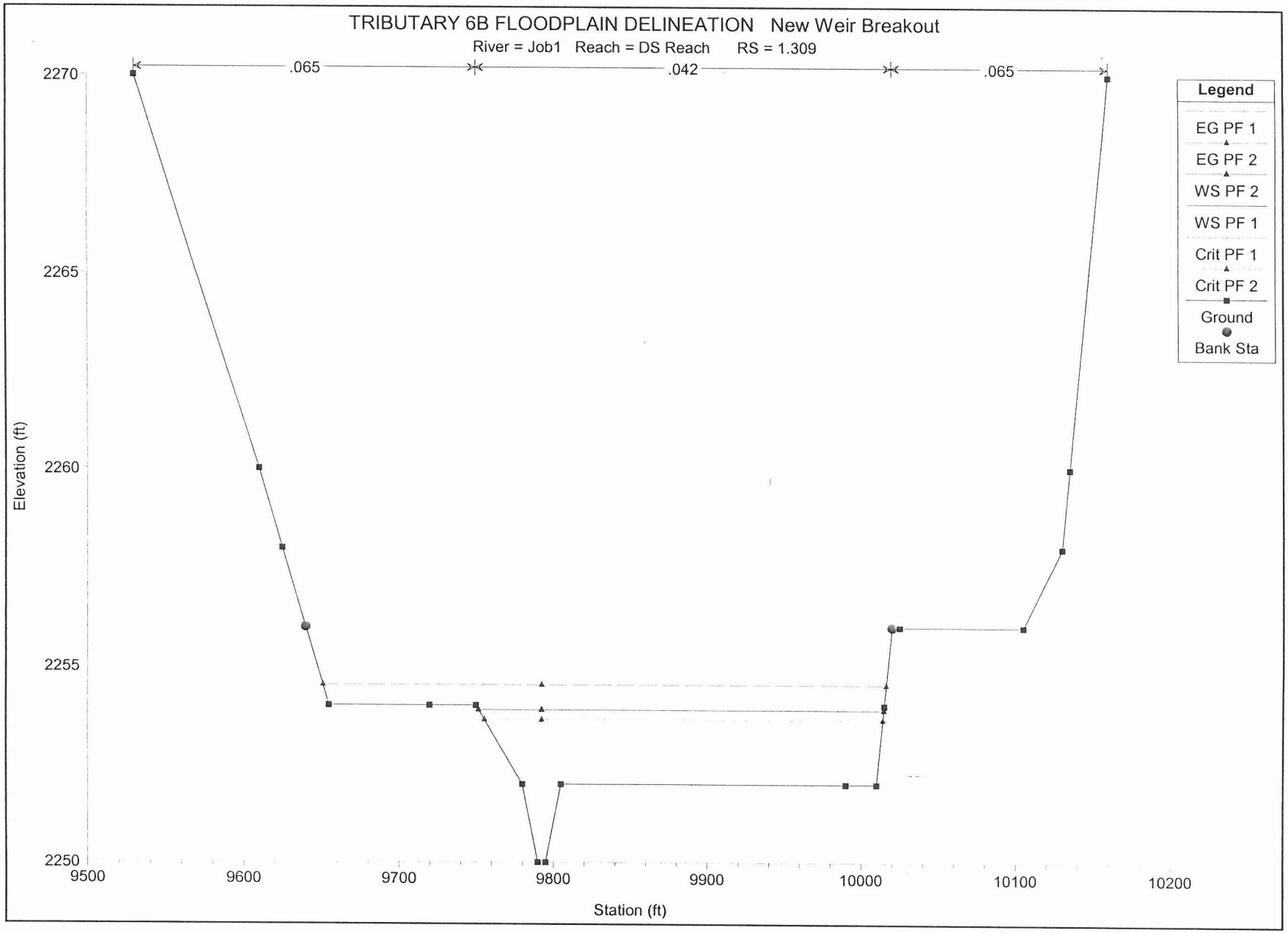

TRIBUTARY 6B FLOODPLAIN DELINEATION New Weir Breakout
River = Job1 Reach = DS Reach RS = 1.483
.065
.035
.065
Legend
EG PF 1
EG PF 2
WS PF 2
WS PF 1
Crit PF 1
Crit PF 2
Ground
Bank Sta
Elevation (ft)
2290
2285
2280
2275
2270
2265
9500
9600
9700
9800
9900
10000
10100
10200
Station (ft)

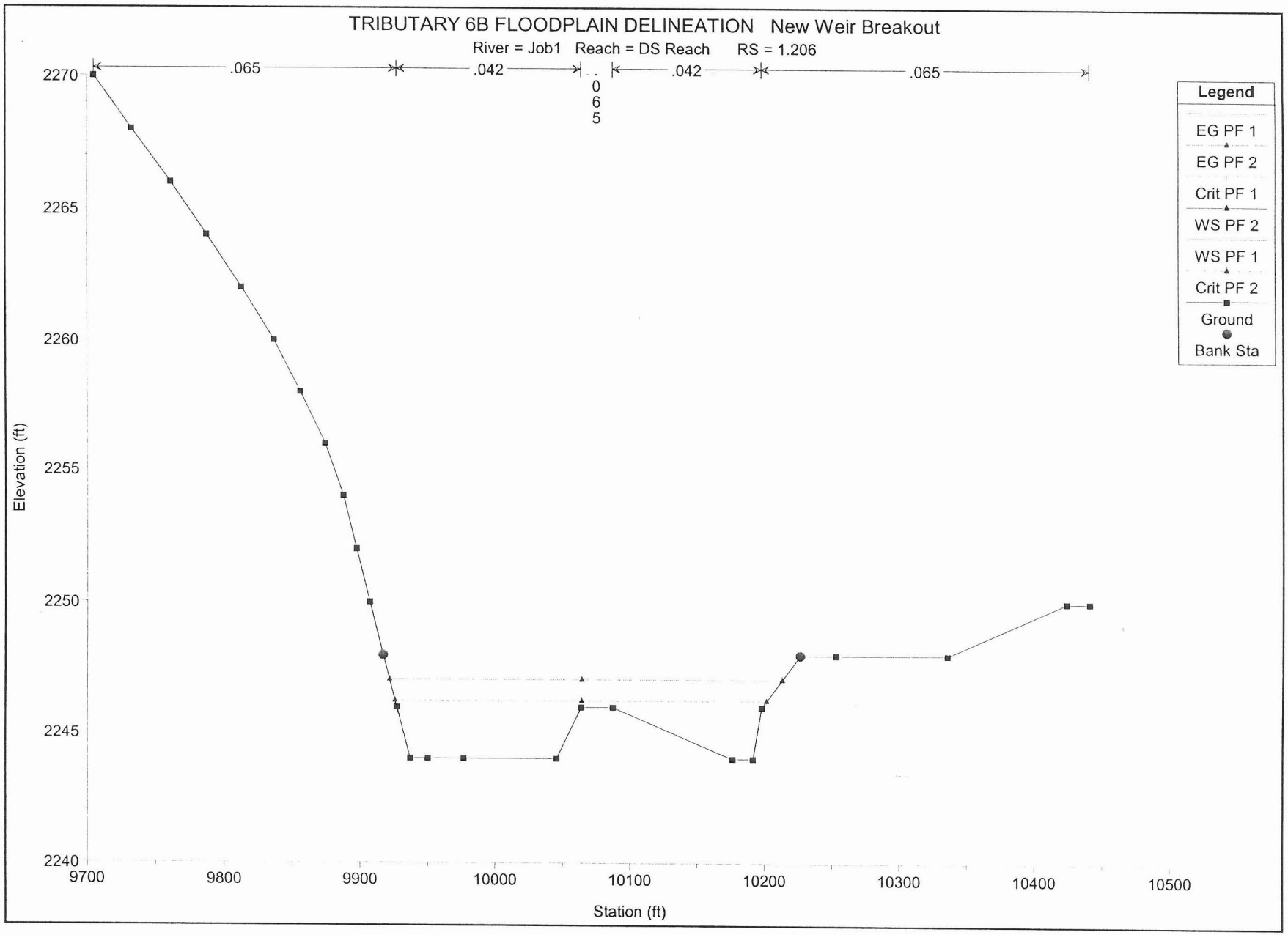

TRIBUTARY 6B FLOODPLAIN DELINEATION New Weir Breakout
River = Job1 Reach = DS Reach RS = 1.483
.065
.042
.065
Legend
EG PF 1
EG PF 2
WS PF 2
WS PF 1
Crit PF 1
Crit PF 2
Ground
Bank Sta
Elevation (ft)
2285
2280
2275
2270
2265
2260
9600
9700
9800
9900
10000
10100
10200
Station (ft)

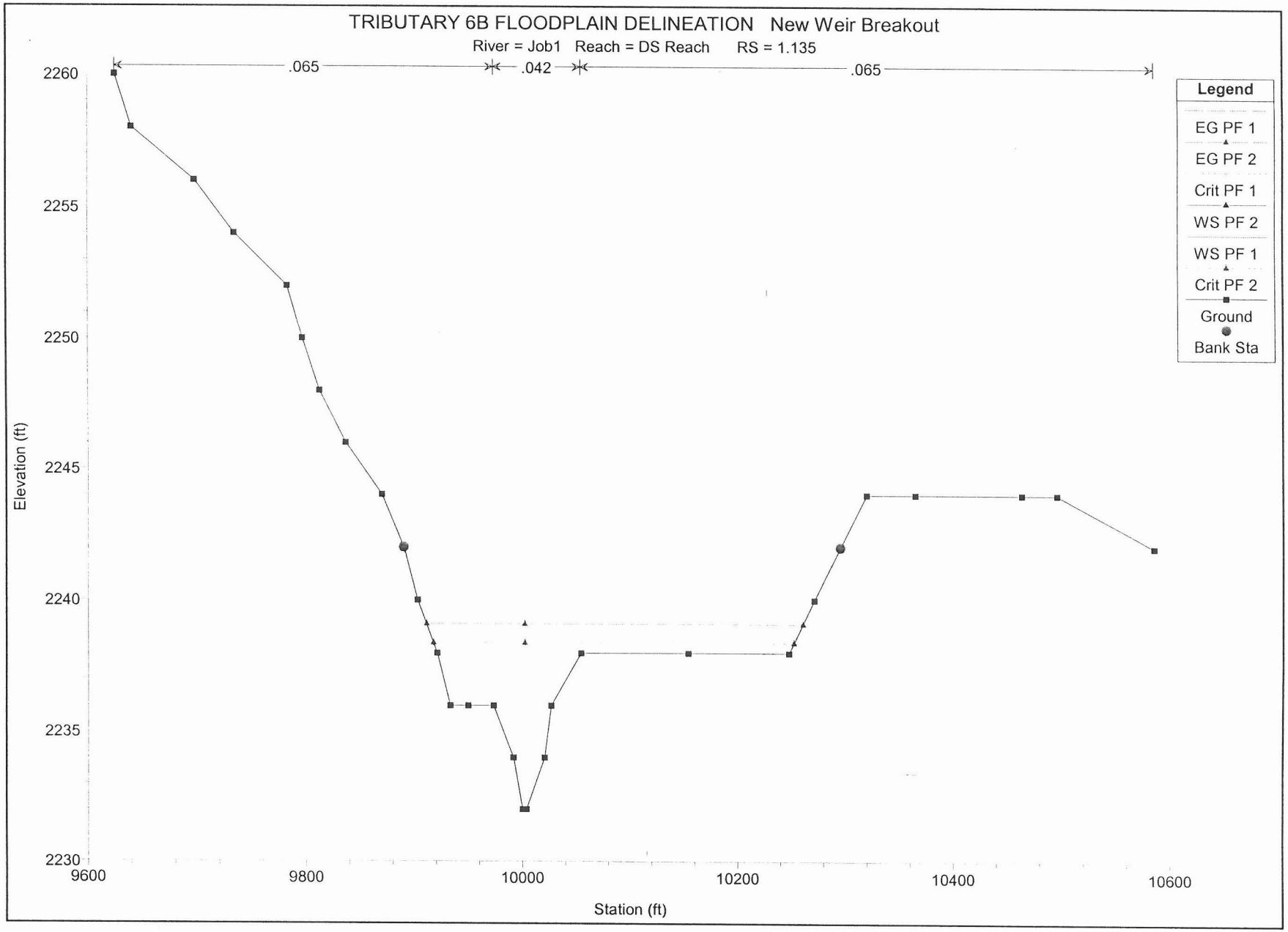

TRIBUTARY 6B FLOODPLAIN DELINEATION New Weir Breakout
River = Tributary 6B Reach = Tributary 6B DS RS = 0.420
.06
.042
.06
Legend
EG PF 1
EG PF 2
WS PF 2
WS PF 1
Crit PF 1
Crit PF 2
Ground
Bank Sta
Elevation (ft)
2184
2182
2180
2178
2176
2174
2172
2170
2168
9600
9800
10000
10200
10400
10600
10800
Station (ft)

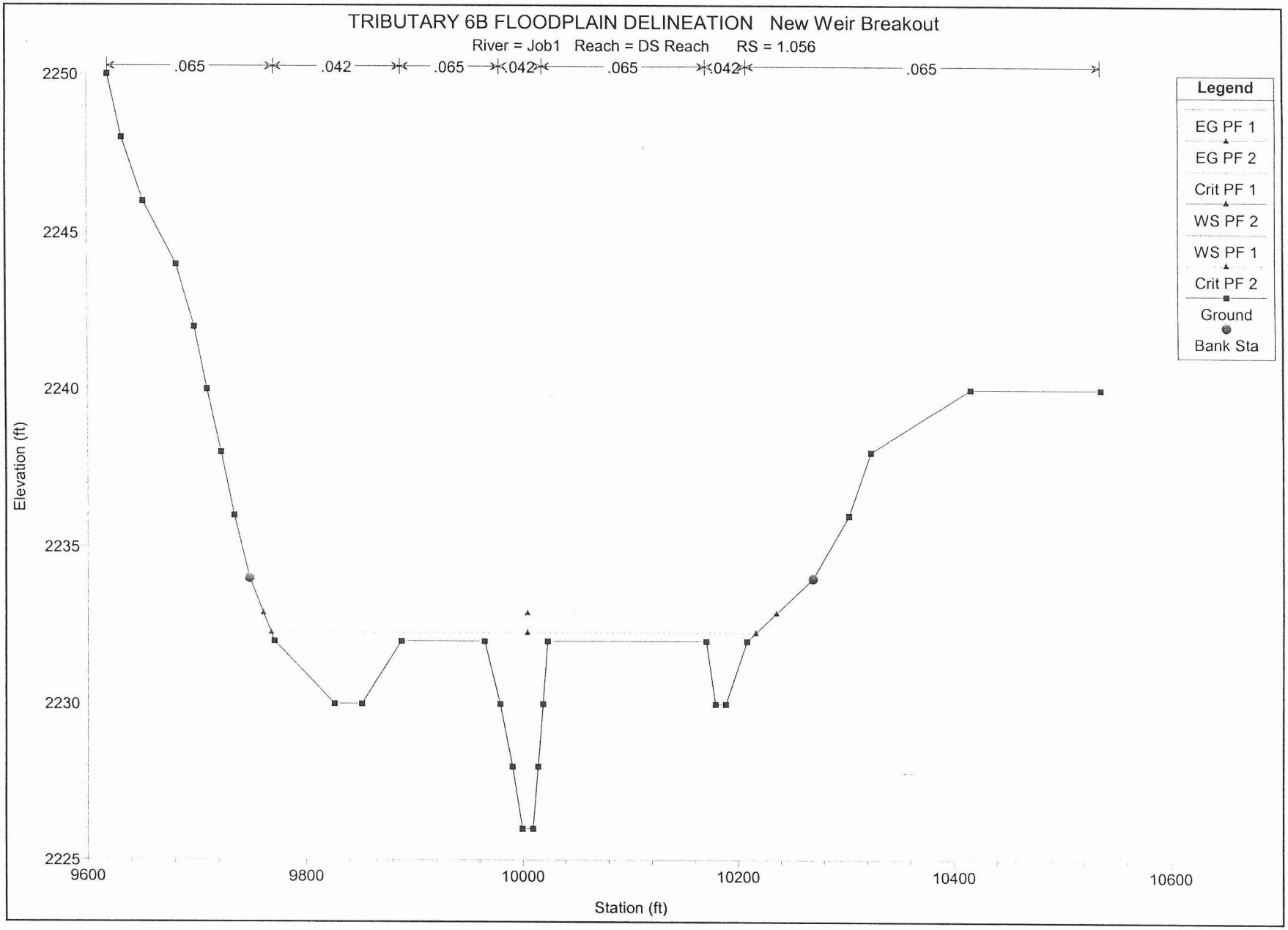

TRIBUTARY 6B FLOODPLAIN DELINEATION New Weir Breakout
River = Job1 Reach = DS Reach RS = 1.444
.065
.042
.065
Legend
EG PF 1
EG PF 2
WS PF 2
WS PF 1
Crit PF 1
Crit PF 2
Ground
Bank Sta
Elevation (ft)
2310
2300
2290
2280
2270
2260
9600
9700
9800
9900
10000
10100
10200
10300
10400
Station (ft)

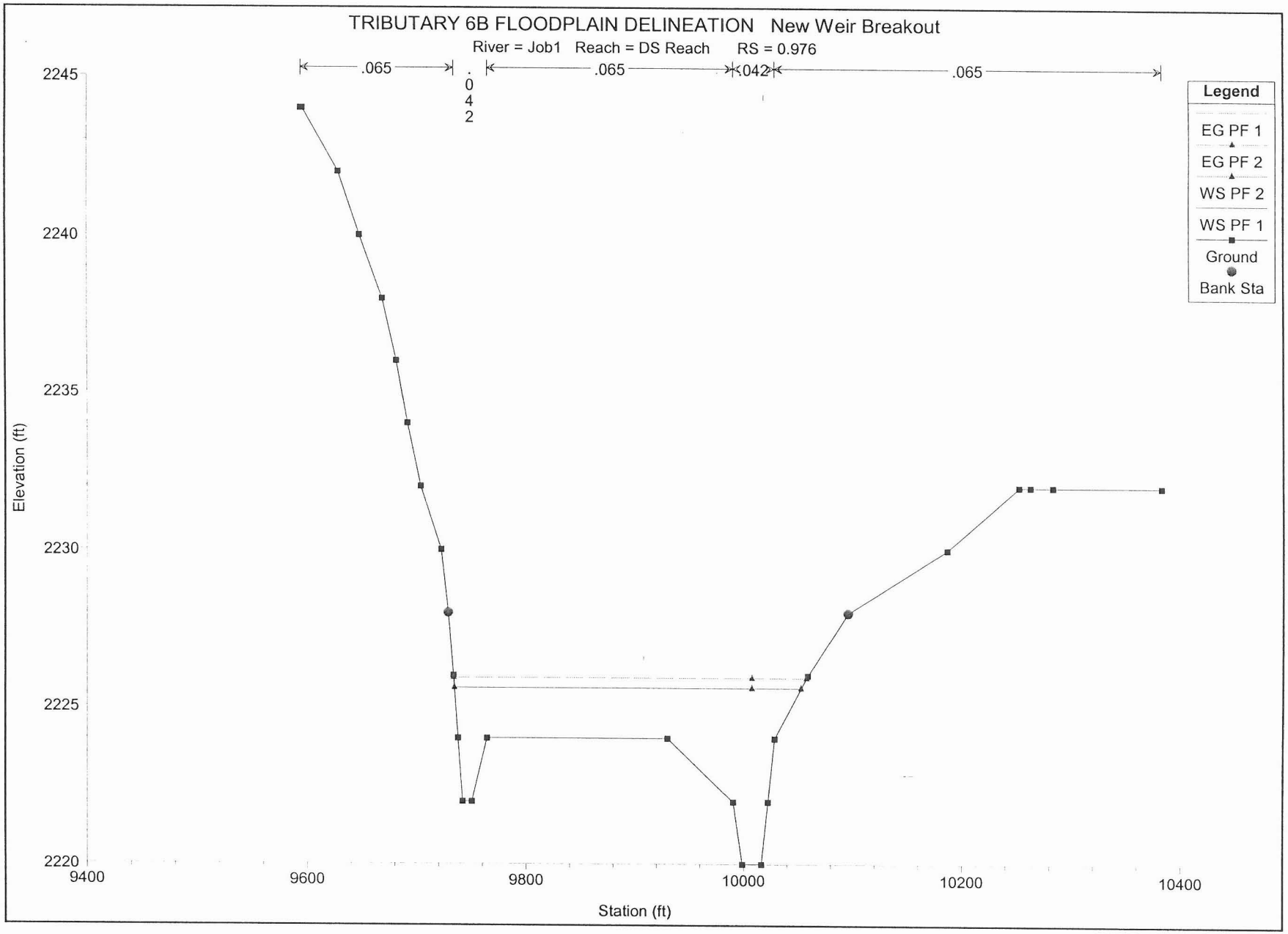

TRIBUTARY 6B FLOODPLAIN DELINEATION New Weir Breakout
River = Job1 Reach = DS Reach RS = 1.387
.065
.042
.065
Legend
EG PF 1
EG PF 2
Crit PF 1
WS PF 2
WS PF 1
Crit PF 2
Ground
Bank Sta
Elevation (ft)
2310
2300
2290
2280
2270
2260
2250
9400
9600
9800
10000
10200
10400
Station (ft)

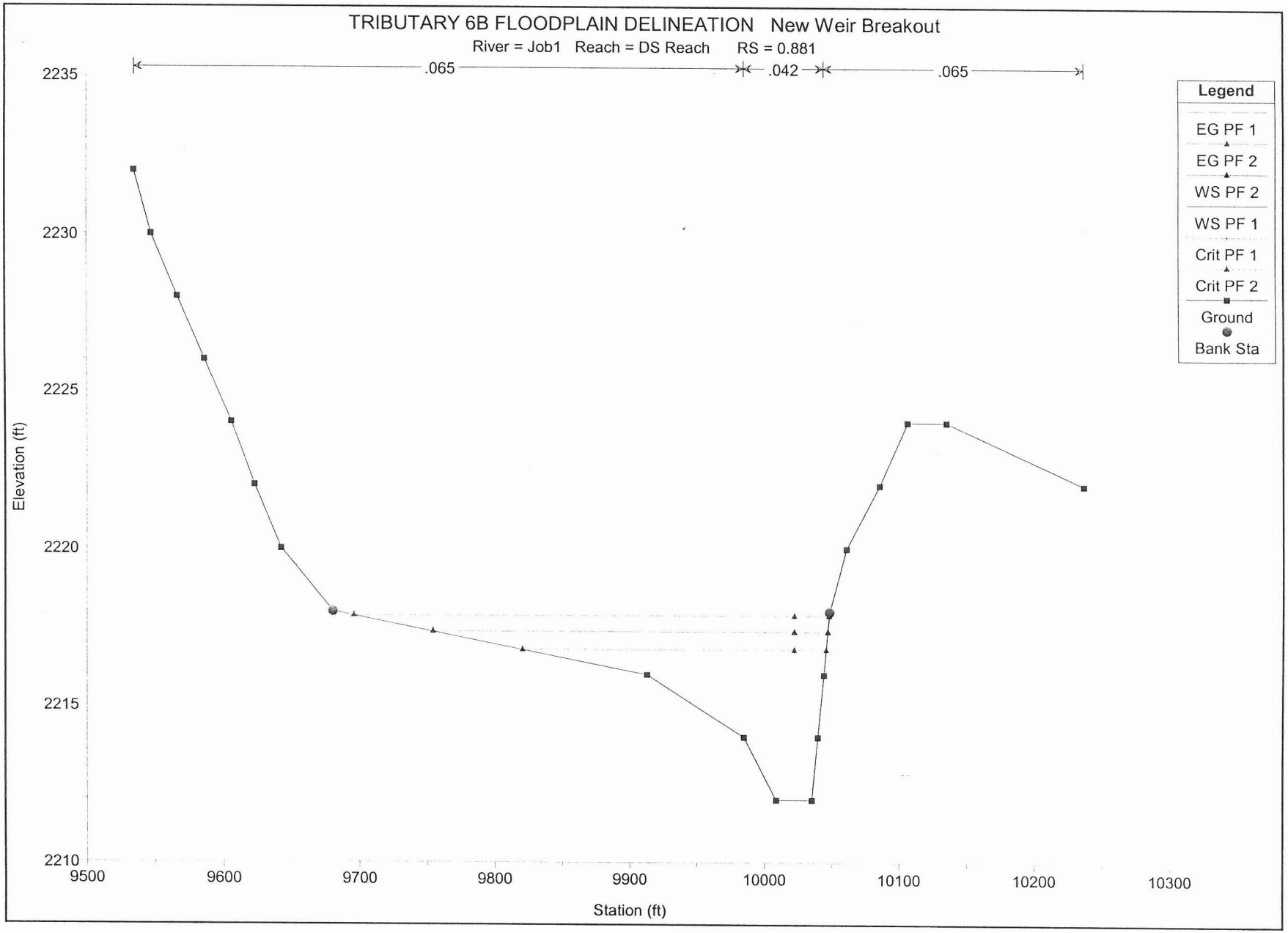

TRIBUTARY 6B FLOODPLAIN DELINEATION New Weir Breakout
River = Job1 Reach = DS Reach RS = 1.309
.065
.042
.065
Legend
EG PF 1
EG PF 2
WS PF 2
WS PF 1
Crit PF 1
Crit PF 2
Ground
Bank Sta
Elevation (ft)
2270
2265
2260
2255
2250
9500
9600
9700
9800
9900
10000
10100
10200
Station (ft)

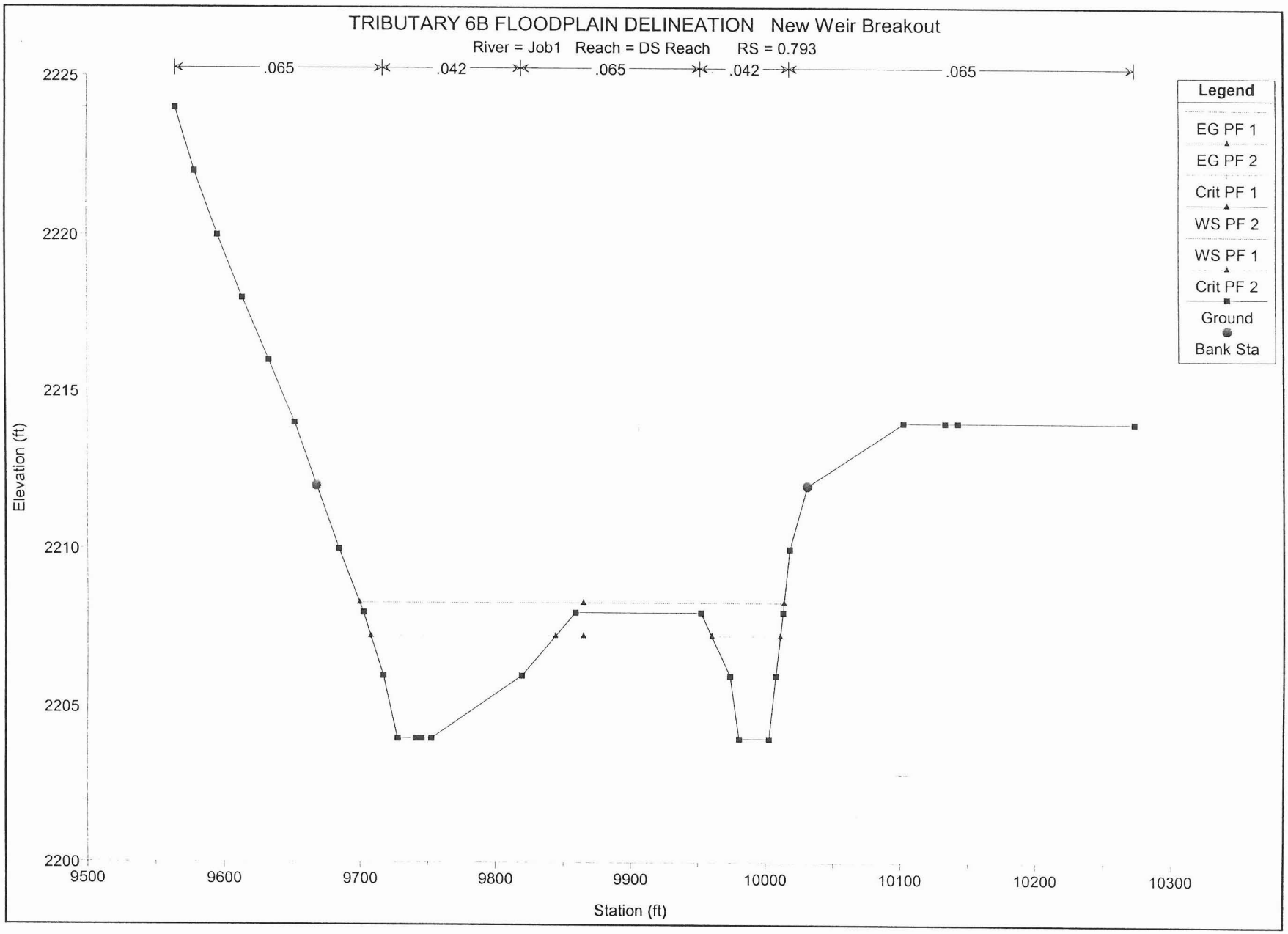

TRIBUTARY 6B FLOODPLAIN DELINEATION New Weir Breakout
River = Job1 Reach = DS Reach RS = 1.206
.065
.042
.065
.042
.065
Legend
EG PF 1
EG PF 2
Crit PF 1
WS PF 2
WS PF 1
Crit PF 2
Ground
Bank Sta
Elevation (ft)
2270
2265
2260
2255
2250
2245
2240
9700
9800
9900
10000
10100
10200
10300
10400
10500
Station (ft)

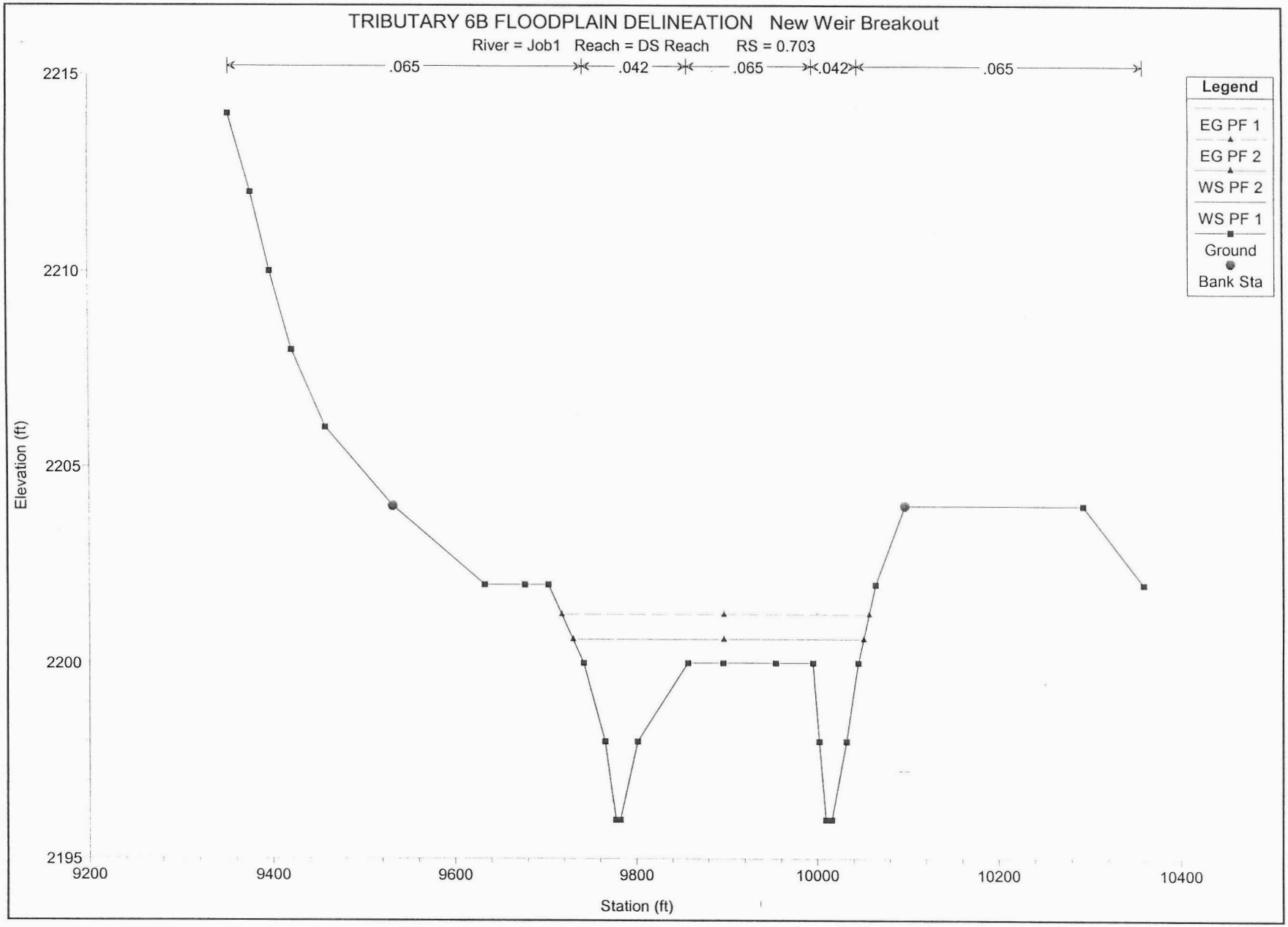

TRIBUTARY 6B FLOODPLAIN DELINEATION New Weir Breakout
River = Job1 Reach = DS Reach RS = 1.135
.065
.042
.065
Legend
EG PF 1
EG PF 2
Crit PF 1
WS PF 2
WS PF 1
Crit PF 2
Ground
Bank Sta
Elevation (ft)
2260
2255
2250
2245
2240
2235
2230
9600
9800
10000
10200
10400
10600
Station (ft)

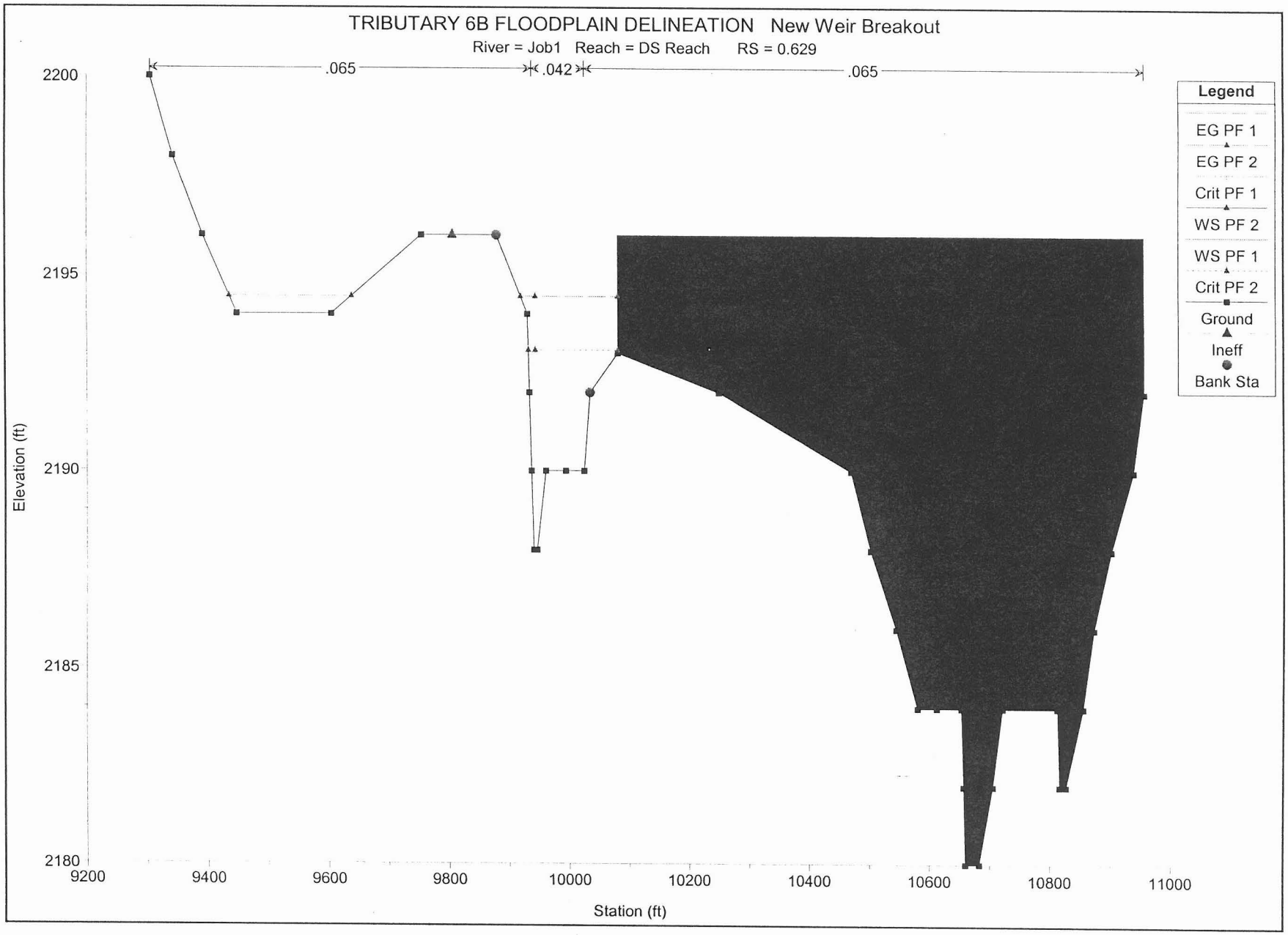

TRIBUTARY 6B FLOODPLAIN DELINEATION New Weir Breakout
River = Job1 Reach = DS Reach RS = 1.056
.065
.042
.065
.042
.065
.042
.065
2250
2245
2240
2235
2230
2225
Elevation (ft)
9600
9800
10000
10200
10400
10600
Station (ft)
Legend
EG PF 1
EG PF 2
Crit PF 1
WS PF 2
WS PF 1
Crit PF 2
Ground
Bank Sta

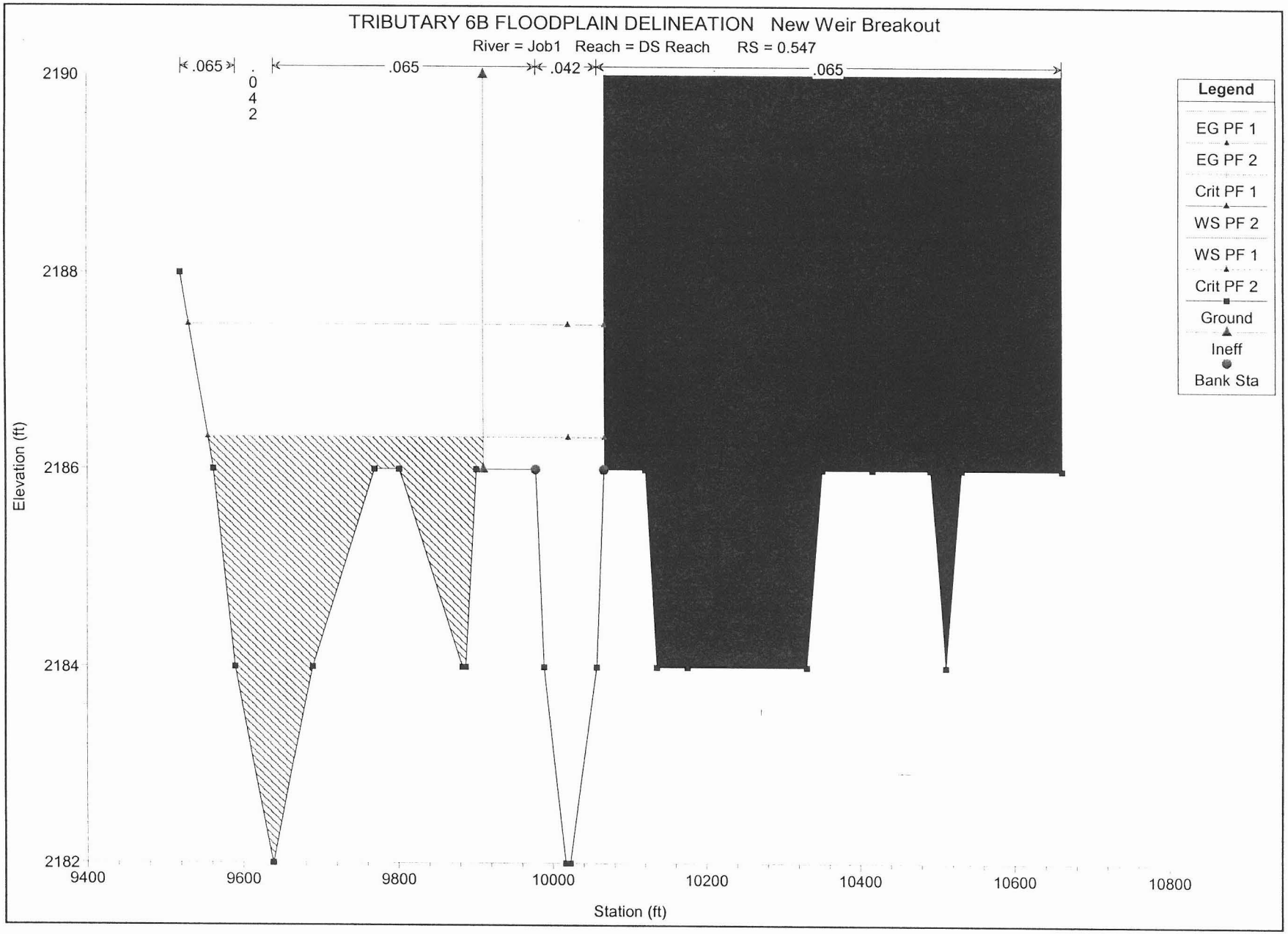

TRIBUTARY 6B FLOODPLAIN DELINEATION New Weir Breakout
River = Job1 Reach = DS Reach RS = 0.976
.065
.042
.065
.065
Legend
EG PF 1
EG PF 2
WS PF 2
WS PF 1
Ground
Bank Sta
Elevation (ft)
2245
2240
2235
2230
2225
2220
9400
9600
9800
10000
10200
10400
Station (ft)

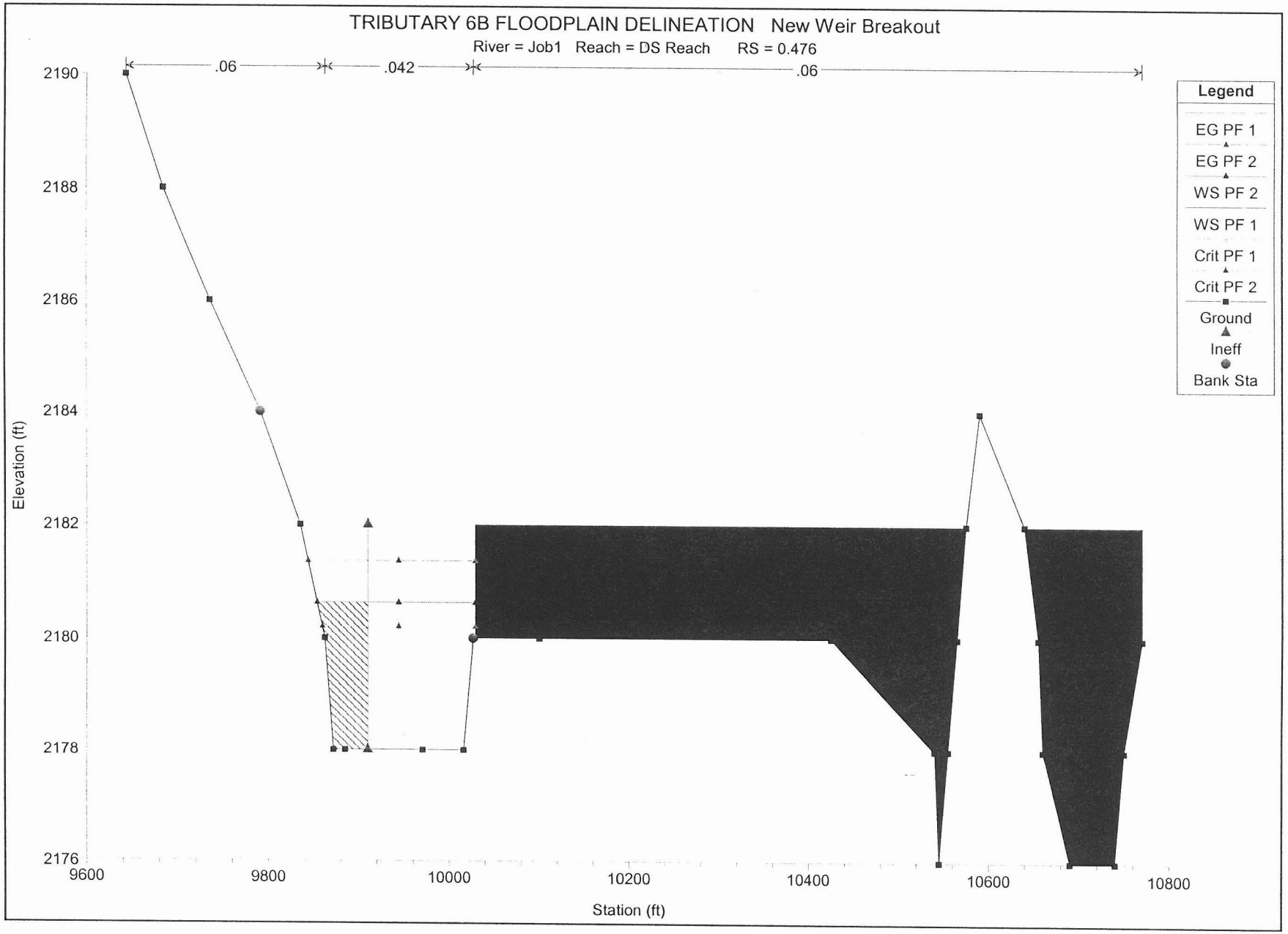

TRIBUTARY 6B FLOODPLAIN DELINEATION New Weir Breakout
River = Job1 Reach = DS Reach RS = 0.881
.065
.042
.065
Legend
EG PF 1
EG PF 2
WS PF 2
WS PF 1
Crit PF 1
Crit PF 2
Ground
Bank Sta
Elevation (ft)
2235
2230
2225
2220
2215
2210
9500
9600
9700
9800
9900
10000
10100
10200
10300
Station (ft)

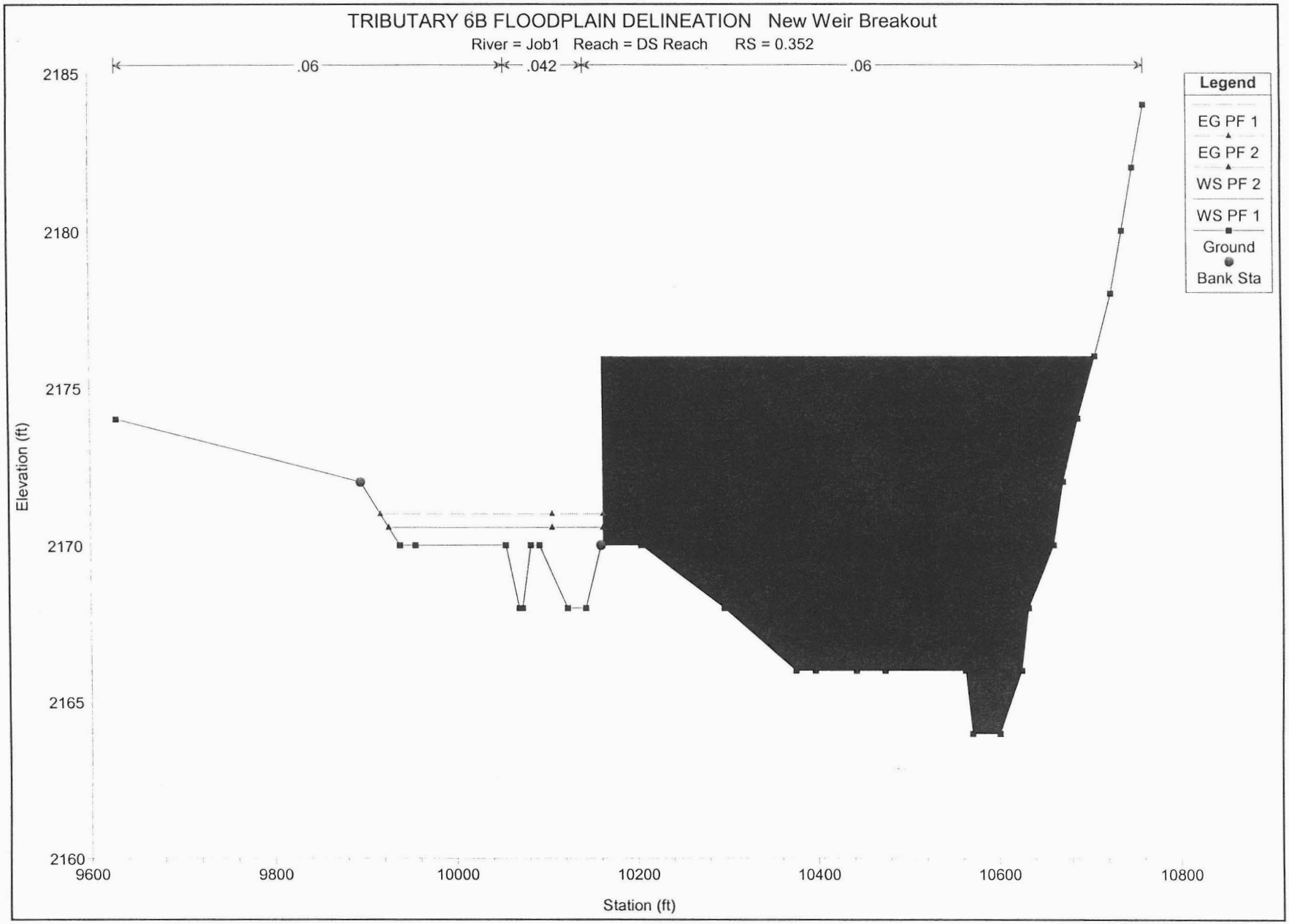

TRIBUTARY 6B FLOODPLAIN DELINEATION New Weir Breakout
River = Job1 Reach = DS Reach RS = 0.793
.065
.042
.065
.042
.065
Legend
EG PF 1
EG PF 2
Crit PF 1
WS PF 2
WS PF 1
Crit PF 2
Ground
Bank Sta
Elevation (ft)
2225
2220
2215
2210
2205
2200
9500
9600
9700
9800
9900
10000
10100
10200
10300
Station (ft)

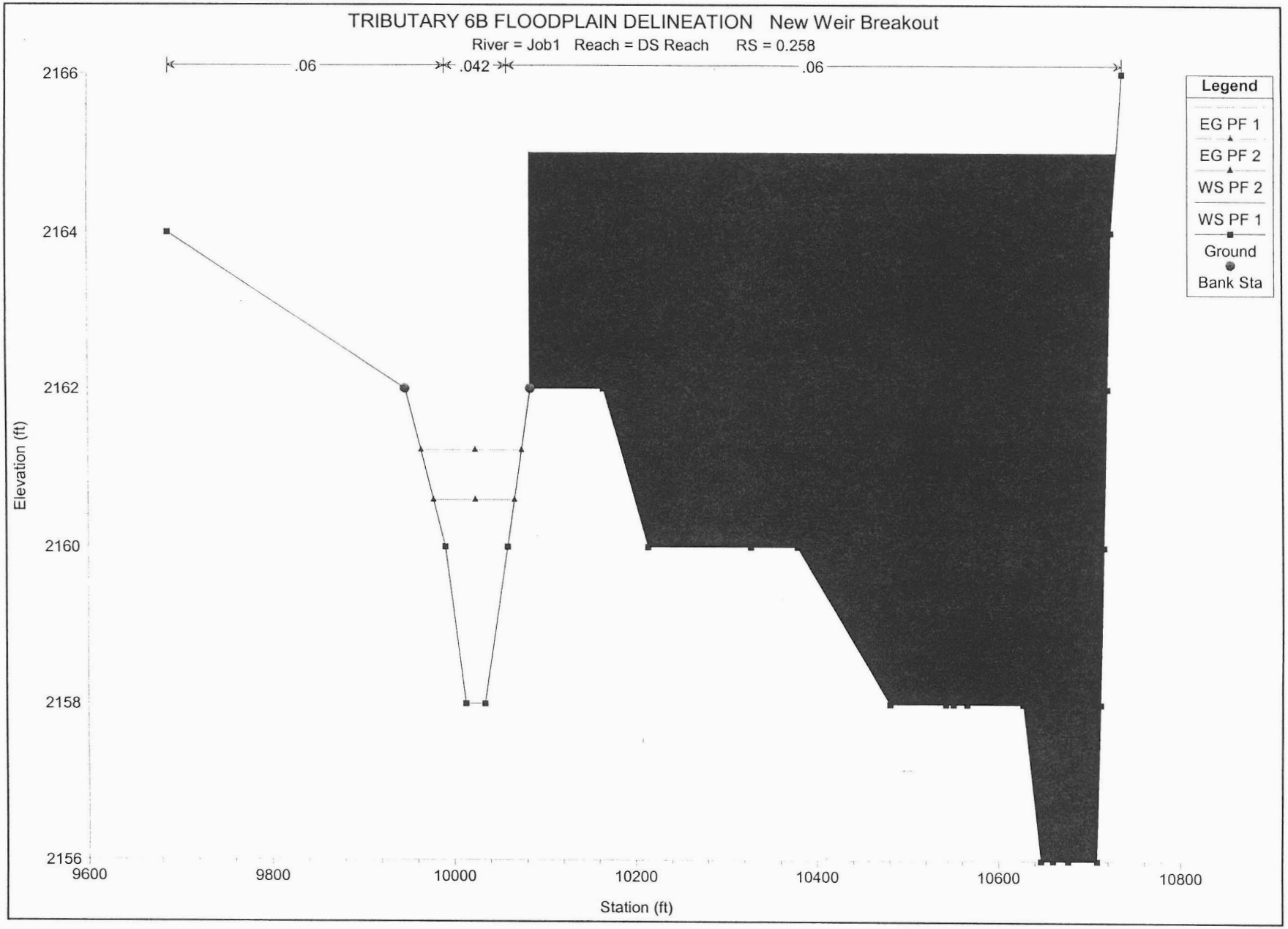

TRIBUTARY 6B FLOODPLAIN DELINEATION New Weir Breakout
River = Job1 Reach = DS Reach RS = 0.703
.065
.042
.065
.042
.065
Legend
EG PF 1
EG PF 2
WS PF 2
WS PF 1
Ground
Bank Sta
Elevation (ft)
2215
2210
2205
2200
2195
9200
9400
9600
9800
10000
10200
10400
Station (ft)

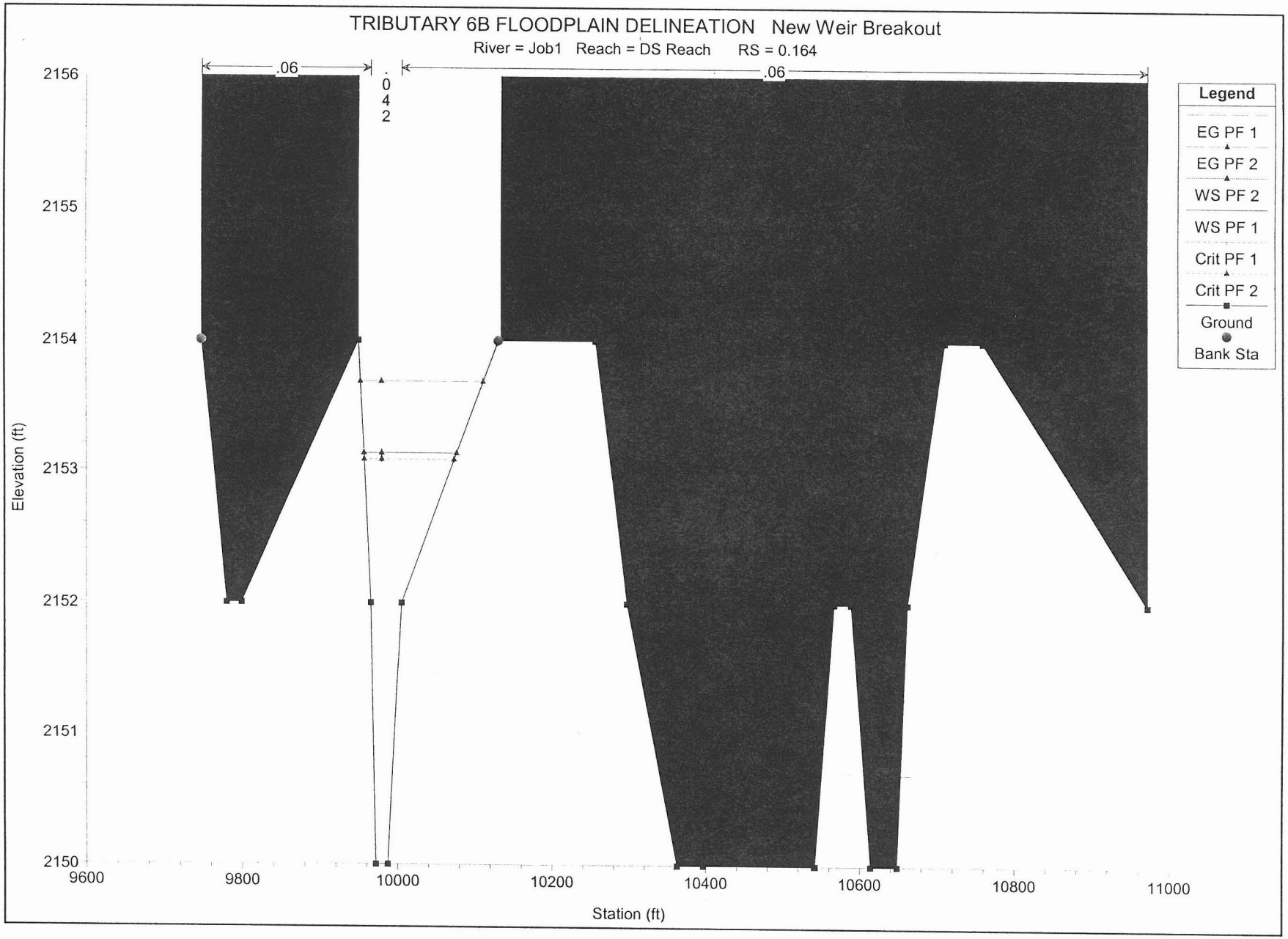

TRIBUTARY 6B FLOODPLAIN DELINEATION New Weir Breakout
River = Job1 Reach = DS Reach RS = 0.629
.065
.042
.065
2200
2195
2190
2185
2180
Elevation (ft)
9200
9400
9600
9800
10000
10200
10400
10600
10800
11000
Station (ft)
Legend
EG PF 1
EG PF 2
Crit PF 1
WS PF 2
WS PF 1
Crit PF 2
Ground
Ineff
Bank Sta

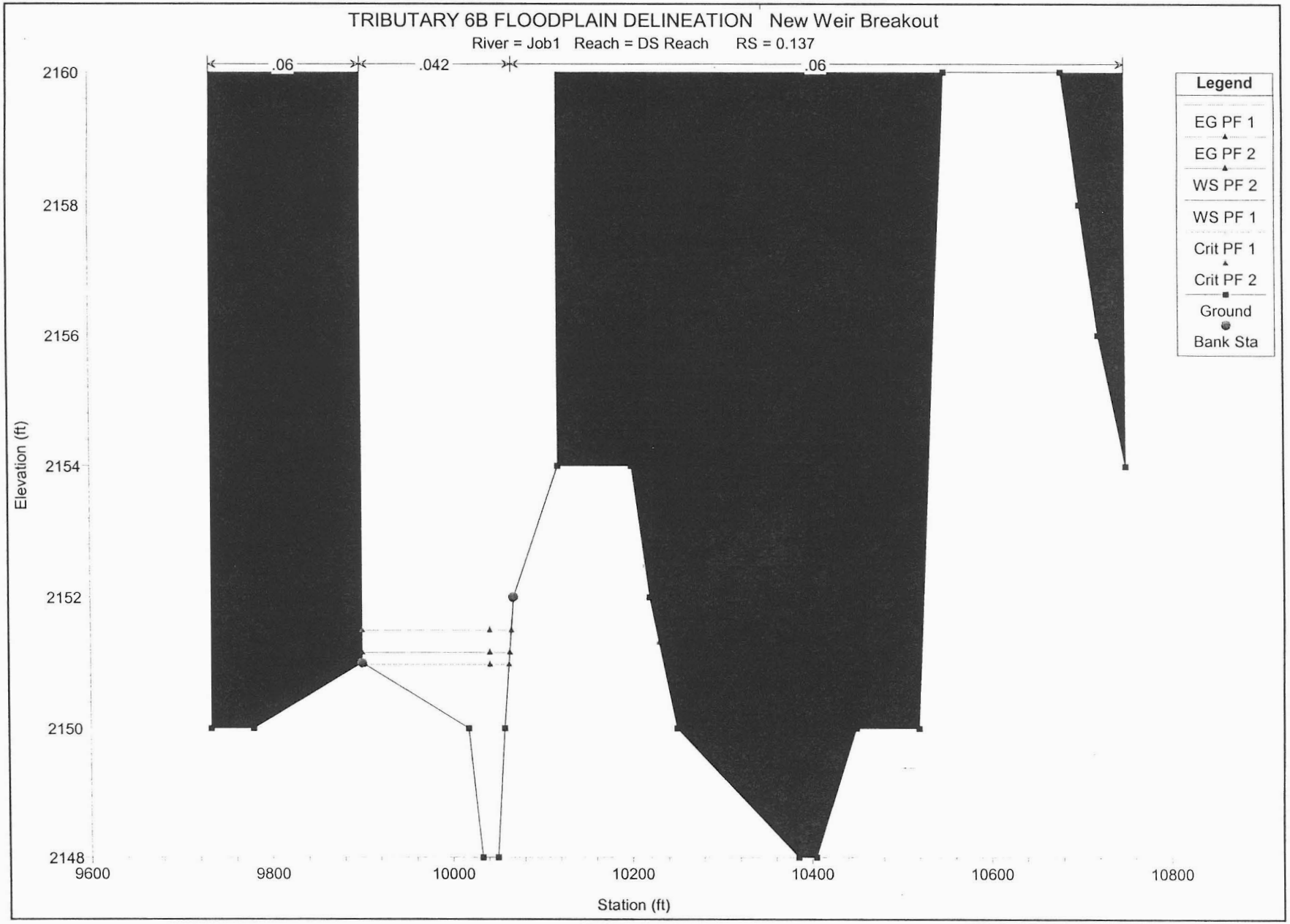

TRIBUTARY 6B FLOODPLAIN DELINEATION New Weir Breakout
River = Job1 Reach = DS Reach RS = 0.547
.065
.042
.065
.065
Legend
EG PF 1
EG PF 2
Crit PF 1
WS PF 2
WS PF 1
Crit PF 2
Ground
Ineff
Bank Sta
Elevation (ft)
2190
2188
2186
2184
2182
9400
9600
9800
10000
10200
10400
10600
10800
Station (ft)


TRIBUTARY 6B FLOODPLAIN DELINEATION New Weir Breakout
River = Job1 Reach = DS Reach RS = 0.476
.06
.042
.06
Legend
EG PF 1
EG PF 2
WS PF 2
WS PF 1
Crit PF 1
Crit PF 2
Ground
Ineff
Bank Sta
Elevation (ft)
2190
2188
2186
2184
2182
2180
2178
2176
9600
9800
10000
10200
10400
10600
10800
Station (ft)


TRIBUTARY 6B FLOODPLAIN DELINEATION New Weir Breakout
River = Job1 Reach = DS Reach RS = 0.352
.06
.042
.06
Legend
EG PF 1
EG PF 2
WS PF 2
WS PF 1
Ground
Bank Sta
2185
2180
2175
2170
2165
2160
Elevation (ft)
9600
9800
10000
10200
10400
10600
10800
Station (ft)


TRIBUTARY 6B FLOODPLAIN DELINEATION New Weir Breakout
River = Job1 Reach = DS Reach RS = 0.258
.06
.042
.06
Legend
EG PF 1
EG PF 2
WS PF 2
WS PF 1
Ground
Bank Sta
2166
2164
2162
2160
2158
2156
Elevation (ft)
9600
9800
10000
10200
10400
10600
10800
Station (ft)


TRIBUTARY 6B FLOODPLAIN DELINEATION New Weir Breakout
River = Job1 Reach = DS Reach RS = 0.164
.06
.042
.06
Legend
EG PF 1
EG PF 2
WS PF 2
WS PF 1
Crit PF 1
Crit PF 2
Ground
Bank Sta
Elevation (ft)
2156
2155
2154
2153
2152
2151
2150
9600
9800
10000
10200
10400
10600
10800
11000
Station (ft)


TRIBUTARY 6B FLOODPLAIN DELINEATION New Weir Breakout
River = Job1 Reach = DS Reach RS = 0.137
.06
.042
.06
Legend
EG PF 1
EG PF 2
WS PF 2
WS PF 1
Crit PF 1
Crit PF 2
Ground
Bank Sta
Elevation (ft)
2160
2158
2156
2154
2152
2150
2148
9600
9800
10000
10200
10400
10600
10800
Station (ft)

```
1*****************************************
**************************************
 *  HEC-2 WATER SURFACE PROFILES          *                                    *
U.S  ARMY CORPS OF ENGINEERS       *
                                      *                                       *
 DROLOGIC ENGINEERING CENTER       *
 *  Version   4.6.2;  May 1991            *                                  *
609 SECOND STREET, SUITE D         *
 *                                    *                                      *
DAVIS, CALIFORNIA 95616-4687       *
 *  RUN DATE    28JAN00    TIME   13:31:58  *                                 *
(916) 756-1104             *
 ****************************************
**************************************
```

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

```
1
    28JAN00      13:31:58
PAGE    1
```

THIS RUN

```
EXECUTED 28JAN00    13:31:58
 ************************************
  HEC-2 WATER SURFACE PROFILES

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


 SPLIT FLOW BEING PERFORMED


 SF


 TW
 WS      8   0.629   0.703      -1       2
 WC      0    2193      40    2194     120    2196     180    2198     270    2200
 WC    380    2202     490    2204     560    2206

 TW
 WS      5   0.547   0.629      -1       2
 WC      0    2186     210    2188     320    2190     380    2192     450    2193

 TW
         4   0.476   0.547      -1       2
 WC      0  2180.5     110    2182     230    2184     315    2186

 TW
 WS      5    0.42   0.476      -1       2
 WC      0    2175      40    2176     130    2178     240    2180     280  2180.5
```

```
 TW
 WS      4   0.352     0.42       -1        2
 WC      0    2170      130     2172      280     2174      340     2175


 WS      5   0.258    0.352       -1        2
 WC      0    2162      150     2164      340     2166      410     2168      520     2170

 TW
 WS      5   0.164    0.258       -1        2
 WC      0    2156      170     2158      370     2160      450     2162      510     2162

 TW
 WS      2   0.137    0.164       -1        2
 WC      0  2154.5      155     2156
1
    28JAN00       13:31:58
PAGE     2


 T1       PAZ-MC-18
 T2       SKUNK CREEK TRIBUTARIES FLOODPLAIN DELINEATION
 T3       TRIBUTARY 6B.  USED TO CALIBRATE WITH THE HEC-MODEL

 J1   ICHECK     INQ        NINV       IDIR       STRT       METRIC     HVINS      Q          WSEL       FQ

       -10          2                0.015          0                              3169    2151.2

 J2   NPROF      IPLOT      PRFVS      XSECV      XSECH      FN         ALLDC      IBW        CHNIM
ITRACE

        1          0         -1                                                     -6


 J5   LPRNT     NUMSEC                      ********REQUESTED SECTION NUMBERS********

      -10        -10

1
    28JAN00       13:31:58
PAGE     3




                                                                                                    THIS RUN

EXECUTED 28JAN00     13:31:58
 ************************************
  HEC-2 WATER SURFACE PROFILES

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


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


 TRIBUTARY 6B.  USED TO C

 SUMMARY PRINTOUT TABLE  150

        SECNO      XLCH       ELTRD      ELLC       ELMIN        Q        CWSEL      CRIWS       EG
10*KS       VCH       AREA       .01K

         .137        .00        .00         .00    2148.00     920.62    2151.20         .00    2151.56
151.81       4.82     191.19     74.72
```

	.164	145.00	.00	.00	2150.00	920.62	2153.63	.00	2153.92
173.57	4.34	212.03	69.88						
	.258	519.32	.00	.00	2158.00	920.62	2161.05	.00	2161.45
.14	5.10	180.58	83.30						
	.352	583.61	.00	.00	2168.00	1305.71	2170.51	2170.50	2170.99
205.40	5.54	235.76	91.10						
*	.420	326.08	.00	.00	2172.00	1864.49	2176.22	2176.16	2177.46
182.40	9.07	216.01	138.05						
*	.476	279.58	.00	.00	2178.00	2031.17	2180.61	.00	2181.29
106.23	6.63	306.41	197.07						
*	.547	310.00	.00	.00	2182.00	2288.23	2186.31	2186.31	2187.47
169.32	8.69	280.79	175.85						
*	.629	431.00	.00	.00	2188.00	3165.76	2193.30	.00	2194.55
159.29	8.99	352.24	250.83						
	.703	472.58	.00	.00	2196.00	3169.00	2200.63	.00	2201.25
124.62	6.28	504.58	283.87						

TRIBUTARY 6B. USED TO C

SUMMARY PRINTOUT TABLE 150

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
	.137	920.62	2151.20	.00	.00	.00	164.00	.00
	.164	920.62	2153.63	.00	2.43	.00	154.15	145.00
	.258	920.62	2161.05	.00	7.43	.00	104.86	519.32
	.352	1305.71	2170.51	.00	9.46	.00	233.08	583.61
*	.420	1864.49	2176.22	.00	5.71	.00	85.33	326.08
*	.476	2031.17	2180.61	.00	4.39	.00	121.63	279.58
*	.547	2288.23	2186.31	.00	5.70	.00	157.00	310.00
*	.629	3165.76	2193.30	.00	6.99	.00	103.51	431.00
	.703	3169.00	2200.63	.00	7.34	.00	321.28	472.58

MARY OF ERRORS AND SPECIAL NOTES

WARNING SECNO= .420 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

WARNING SECNO= .476 PROFILE= 1 CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

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CAUTION SECNO=       .547  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=       .547  PROFILE=  1  MINIMUM SPECIFIC ENERGY

   ING SECNO=       .629  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
```

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SF
TW
WS      8    0.629    0.703       -1        2
WC      0     2193       40     2194      120     2196      180     2198      270     2200
WC    380     2202      490     2204      560     2206
TW
WS      5    0.547    0.629       -1        2
WC      0     2186      210     2188      320     2190      380     2192      450     2193
TW
WS      4    0.476    0.547       -1        2
WC      0   2180.5      110     2182      230     2184      315     2186
TW
WS      5     0.42    0.476       -1        2
WC      0     2175       40     2176      130     2178      240     2180      280   2180.5
TW
WS      4    0.352     0.42       -1        2
WC      0     2170      130     2172      280     2174      340     2175
TW
WS      5    0.258    0.352       -1        2
WC      0     2162      150     2164      340     2166      410     2168      520     2170
TW
WS      5    0.164    0.258       -1        2
WC      0     2156      170     2158      370     2160      450     2162      510     2162
TW
WS      2    0.137    0.164       -1        2
WC      0   2154.5      155     2156
EE
T1       PAZ-MC-18
T2       SKUNK CREEK TRIBUTARIES FLOODPLAIN DELINEATION
T3       TRIBUTARY 6B.  USED TO CALIBRATE WITH THE HEC-MODEL
J1    -10        2            0.015        0                      3169 2151.82
J2      1        1       -1                                        -6
J5    -10      -10
NC   0.06     0.06    0.042      0.1      0.3
NH      3     0.06     9900    0.042    10068     0.06    10118
X1 0.137        9     9900    10068
X3     10                    9900
GR  2150     9733     2150     9780     2151     9900     2150    10018     2148    10033
GR  2148    10050     2150    10058     2152    10068     2154    10118
NH      3     0.06 9965.59    0.042 10005.1     0.0610130.58
X1 0.164        9     974810130.58      140      150      145
X3     10                    9950
GR  2154     9748     2152 9780.13     2152 9799.16     2154     9950     2152 9965.59
GR  2150 9972.12     2150 9987.27     2152 10005.1     215410130.58
NH      3     0.06 9990.55    0.04210084.56     0.0610084.56
X1 0.258        7 9946.9310084.56  556.58   528.8  519.32
X3     10
GR  2164     9688     2162 9946.93     2160 9990.55     215810013.19     215810034.06
GR  216010059.18     216210084.56
NH      3     0.0610055.25    0.04210143.46     0.06 10160.6
X1 0.352       12 9895.97 10160.6  550.41  628.98  583.61
X3     10
GR  2174     9629     2172 9895.97     2170 9938.32     2170 9955.58     217010055.25
GR  216810069.83     216810073.37     217010082.74     217010092.31     216810123.14
GR  216810143.46     2170 10160.6
NH      3     0.06 9960.28     .042 9995.32      .06 9995.32
X1  0.42       11 9929.18 9995.32   330.3  340.82  326.08
X3     10
GR  2184     9600     2182  9679.8     2180 9750.15     2178 9868.86     2176  9915.1
GR  2174 9929.18 2174.01 9931.53 2174.01 9960.28     2172 9967.86     2172 9984.52
GR  2174 9995.32
NH      3     0.06 9867.07     .04210031.63      .0610031.63
X1 0.476       11 9796.1610031.63  267.07  279.89  279.58
X3     10                    9910
GR  2190     9643     2188 9689.46     2186 9740.69     2184 9796.16     2182 9839.98
GR2180.1 9867.07     2178 9876.97     2178 9889.83     2178 9975.54     217810021.11
GR  218010031.63
NH      5   0.065 9589.78    0.042 9638.73    0.065 9977.32    0.042    10057    0.065
NH 10067
X1 0.547       17 9977.32    10067      390      310      310
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X3    10                    9910
GR  2188    9520    2186  9561.6    2184 9589.78    2182 9638.02    2182 9638.73
GR  2184  9689.5    2186  9769.3    2186 9801.02    2184 9882.79    2184 9887.04
GR  2186 9900.67    2186 9977.32    2184 9988.55    218210016.98    218210022.67
GR  2184   10057    2186   10067
NH     3   0.065 9930.84   0.04210018.64   0.06510029.03
X1 0.629      16 9873.2110029.03  541.07  431.38     431
X3    10                    9845
GR  2200    9299    2198 9336.82    2196 9385.81    2194 9442.73    2194 9598.96
GR  2196  9748.5    2196 9873.21    2194 9924.41    2192  9927.6    2190 9930.84
GR  2188 9934.54    2188  9940.3    2190 9954.65    2190 9987.99    219010018.64
GR  219210029.03
NH     5   0.065 9742.21   0.042 9857.32   0.065 9995.38   0.042   10045   0.065
NH 10359
QT     1    3169
X1 0.703      27 9532.3410097.06  497.04  505.64  472.58
GR  2214    9353    2212 9377.75    2210 9398.54    2208 9422.04    2206 9458.39
GR  2204 9532.34    2202 9633.11    2202 9677.15    2202 9703.23    2200 9742.21
GR  2198 9765.84    2196 9777.46    2196 9781.97    2198 9801.66    2200 9857.32
GR  2200    9896    2200 9954.12    2200 9995.38    219810002.32    219610009.69
GR  219610015.98    219810032.22    2200   10045    2202 10064.4    220410097.06
GR  220410292.93    2202   10359
EJ

ER
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FEDERAL EMERGENCY MANAGEMENT AGENCY **REVISION REQUESTER AND COMMUNITY OFFICIAL**	O.M.B No. 3067-0148 Expires April 30, 2001

Public reporting burden for this form is estimated to average 2.13 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing and reviewing the form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden to: Information Collections Management, Federal Emergency Management Agency, 500 C Street, S.W., Washington DC 20472; and to the Office of Management and Budget, Paperwork Reduction Project (3067-0148), Washington, DC 20503.

You are not required to respond to this collection of information unless a valid OMB Control Number is displayed in the upper right corner of this form.

1. REQUESTED RESPONSE FROM FEMA

This request is for a:

☐ CLOMR A letter from FEMA commenting on whether a proposed project, if built as proposed, would justify a map revision, or proposed hydrology changes (See 44 CFR Ch. 1, Parts 60,65 & 72).

☐ LOMR A letter from FEMA officially revising the current NFIP map to show the changes to floodplains, floodway or flood elevations. LOMRs typically decrease flood hazards. (See 44 CFR Ch. 1 Parts 60 & 65.)

☒ Other Describe: Initial Study

2. OVERVIEW

1. The basis for this revision request is (are): (check all that apply)

☐ Physical Change ☐ Improved Methodology/Data ☐ Floodway Revision

☒ Other Describe: Initial Study
Note: A photograph is not required, but is very helpful during review.

2. Flooding Source: Skunk Creek Tributary 12

3. Project Name/Identifier: Topographic Mapping and Floodplain Delineation Study for Tributaries to Skunk Creek

4. FEMA zone designations affected: X
(example: A, AH, AO, A1-A30, A99, AE, V, V1-V30, VE, B, C, D, X)

5. The NFIP map panel(s) affected for all impacted communities is (are):

Community No.	Community Name	State	Map No.	Panel No.	Effective Date
Ex: 480301 480287	Katy, City Harris County	TX TX	480301 48201C	0005D 0220G	02/08/83 09/28/90
040037	Unincorporated Maricopa County	AZ	04013C	0390E	12/3/93

6. The area of revision encompasses the following types of flooding and structures. Check all that apply.

Types of Flooding	Structures
☒ Riverine	☐ Channelization
☐ Coastal	☐ Levee/Floodwall
☐ Alluvial fan	☒ Bridge/Culvert
☐ Shallow Flooding (e.g. Zones AO and AH)	☐ Dam
☐ Lakes	☐ Fill
☐ Other (describe)	☐ Other (describe)

PLEASE REFER TO THE INSTRUCTIONS FOR THE APPROPRIATE MAILING ADDRESS

4. ENCROACHMENT INFORMATION

1. Does the State have jurisdiction over the floodway or its adoption by communities participating in the NFIP?
☐ Yes ☒ No

If Yes, attach a copy of a letter notifying the appropriate State agency of the floodway revision and documentation of the approval of the revised floodway by the appropriate State agency.

2. Does the development in the floodway cause the 1% annual chance (base) elevation to increase at any location by more than 0.000 feet? ☐ Yes ☒ No ☒ N/A

3. Does the cumulative effect of all development that has occurred since the effective SFHA was originally identified cause the base flood elevation to increase at any location by more than one foot (or other increase limit if community or state has adopted more stringent criteria - even if a floodway has not been delineated by FEMA)? ☐ Yes ☐ No

If the answer to either items is Yes, please attach documentation that all requirements of Section 65.12 of the NFIP regulations have been met, regarding evaluation of alternatives, notice to individual legal property owners, concurrence of CEO, and certification that no insurable structures are impacted.

5. MAINTENANCE RESPONSIBILITY

The community is willing to assume responsibility for ☐ performing ☐ overseeing compliance with the maintenance and operation plans of the
(Name)
flood control structure. If not performed promptly by an owner other than the community, the community will provide the necessary services without cost to the Federal government.

Operation and maintenance plans are attached. ☐ **Yes** ☐ **No** ☒ **N/A**

6. REVIEW FEE

The review fee for the appropriate request category has been included. ☐ Yes Fee amount: $

OR

This request is based on a federally sponsored flood-control project where 50 percent or more of the project's cost is federally sponsored, or the request is based on detailed hydrologic and hydraulic studies conducted by Federal, State, or local agencies to replace approximate studies conducted by FEMA and shown on the effective FIRM; thus the project is fee exempt.
☐ Yes

Please see Instructions for Fee Amounts

7. SIGNATURE

Note: **I understand that my signature indicates that all information submitted in support of this request is correct**

Signature of Revision Requester

Bart S. Bergendahl P.E.
Project Manager
Printed Name and Title of Revision Requester

Tetra Tech ISG/Simons Li and Associates
Company Name

Telephone No.: 602-629-1100 Date: 7-10-00

Note: **Signature indicates that the community understands, from the revision requester, the impacts of the revision on flooding conditions in the community.**

Signature of Community Official

Michael S. Ellgood P.E.
Chief Engineer and General Manager
Printed Name and Title of Community Official

Maricopa County, AZ
Community Name

Telephone No.: 602-506-1501 Date:

CERTIFICATION BY REGISTERED PROFESSIONAL ENGINEER AND/OR LAND SURVEYOR

This certification is in accordance with 44 CFR Ch. 1, Sect 65.2

Signature

Bart S. Bergendahl P.E. Project Manager
Printed Name and Title of Revision Requester

Registr No. 28660 Expires (Date) 3/31/01 State AZ

Type of License/Expertise: Civil Engineer

Check which forms have been included with this request

Form Name and (Number)	Required if .....
☐ **Hydrologic** (3)	new or revised discharges
☒ **Hydraulic** (4)	new or revised water-surface elevations
☒ **Mapping** (5)	floodplain/floodway changes
☐ **Channelization** (6)	channel is modified
☒ **Bridge/Culvert** (7)	addition/revision of bridge/culvert
☐ **Levee/Floodwall** (8)	addition/revision of levee/floodwall
☐ **Coastal** (9)	new or revised coastal elevations
☐ **Coastal Structures** (10)	addition/revision of coastal structure
☐ **Dam** (11)	addition/revision of dam
☐ **Alluvial Fan** (12)	structures proposed on alluvial fan

FEDERAL EMERGENCY MANAGEMENT AGENCY **RIVERINE HYDRAULIC ANALYSIS**	O.M.B No. 3067-0148 Expires April 30, 2001

PUBLIC BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 2.25 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing and reviewing the form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden to: Information Collections Management, Federal Emergency Management Agency, 500 C Street, S.W., Washington DC 20472; and to the Office of Management and Budget, Paperwork Reduction Project (3067-0148), Washington, DC 20503.

You are not required to respond to this collection of information unless a valid OMB Control Number is displayed in the upper right corner of this form.

Note: Fill out one form for each flooding source studied

Community Name: Unincorporated Maricopa County, AZ

Flooding Source: Skunk Creek Tributary 12

Project Name/Identifier: Topographic Mapping and Floodplain Delineation Study for Tributaries to Skunk Creek

1. REACH TO BE REVISED

Describe the limits of the revision OR submit a copy of the FIRM with the revision area clearly highlighted.
Copy of FIRM(s) attached depicting area of the revision (highlighted, or circled)? ☒ Yes

Downstream Limit: Skunk Creek Main Stem Confluence

Upstream Limit: Tonto National Forest Boundary

2. MODELS SUBMITTED

Requirements: for areas which have detailed flooding:	**for areas which do not have detailed flooding:**
Full input and output listings along with files on diskette for each of the models listed below (items 1-4) and a summary of the source of input parameters used in the models must be provided. The summary must include a description of any changes made from model to model (e.g., Duplicate Effective model to Corrected Effective model). At a minimum, the Duplicate Effective (item 1) and the Revised or Post-Project Conditions (item 4) models must be submitted. See instructions for directions on when other models may be required.	Only the 100-year (Base) flood profile is required. A hydraulic model is not required for areas which do not have detailed flooding; however, BFEs may not be added to the revised FIRM. If a hydraulic model is developed for the area, items 3 and 4 described below must be submitted.

If hydraulic models are not developed, hydraulic analyses (including all calculations) for existing or pre-project conditions and revised or post-project conditions must be submitted.

1. Duplicate Effective Model ☐ **Natural** **File Name** _____ ☐ **Floodway** **File Name**

Copies of the hydraulic analysis used in the effective FIS, referred to as the effective models (10-, 50-, 100-, and 500-year multi-profile runs and the floodway run) must be obtained and then reproduced on the requester's equipment to produce the Duplicate Effective model. This is required to assure that the effective models input data has been transferred correctly to the requester's equipment and to assure that the revised data will be integrated into the effective data to provide a continuous FIS model upstream and downstream of the revised reach.

2. Corrected Effective Model ☐ **Natural** **File Name** _____ ☐ **Floodway** **File Name**

The Corrected Effective model is the model that corrects any errors that occur in the Duplicate Effective model, adds any additional cross sections to the Duplicate Effective model, or incorporates more detailed topographic information than that used in the currently effective model. The Corrected Effective model must not reflect any man-made physical changes since the date of the effective model. An error could be a technical error in the modeling procedures, or any construction in the floodplain that occurred prior to the date of the effective model but was not incorporated into the effective model.

3. Existing or Pre-Project Conditions Model ☒ **Natural** **File Name** T_12 PF#1 ☒ **Floodway** **File Name** T_12 PF#2

The Duplicate Effective model or Corrective Effective model is modified to produce the Existing or Pre-Project Conditions model to reflect any modifications that have occurred within the floodplain since the date of the Effective model but prior to the construction of the project for which the revision is being requested. If no modification has occurred since the date of the effective model, then this model would be identical to the Corrected Effective model or Duplicate Effective model.

4. Revised or Post-Project Conditions Model ☐ **Natural** **File Name** _____ ☐ **Floodway** **File Name**

The Existing or Pre-Project Conditions model (or Duplicate Effective model or Corrected Effective model, as appropriate) is revised to reflect revised or post-project conditions. This model must incorporate any physical changes to the floodplain since the effective model was produced as well as the effects of the project. When the request is for the proposed project this model must reflect proposed conditions.

5. Other – Please attach a sheet describing all other models submitted along with the file names. ☐ **Natural** ☐ **Floodway**

PLEASE REFER TO THE INSTRUCTIONS FOR THE APPROPRIATE MAILING ADDRESS

3. STARTING WATER-SURFACE ELEVATIONS

Explain how they were determined. Explanation Attached? ☒ Yes ☐ No

NOTE: If the effective study is an approximate study, the slope/area method is recommended. For detailed analysis studies, using a known water-surface elevation is recommended.

4. RESULTS (from the model used to revise the 100-year water surface elevations)

If the results indicate any of the following, attach an explanation - to this form, or to the hydraulic model printout- as to the reasonableness of the situation.

☐ Supercritical depth ☒ Critical Depth ☐ Drawdowns ☐ Negative Floodway Surcharges

☐ Floodway Surcharges Greater Than Maximum Allowed by Community/State

☐ Water surface elevations higher than the end points of cross sections.

☐ Floodway discharge is different than the Natural 100-year (base) flood discharge.

☐ Project causes 100-year floodplain or floodway elevations to increase (state if increases are located off the requester's property)

Explanation attached with Form ☒ **Explanation provided on attached printout** ☐

If Hydraulic model used is HEC-2, has it been checked with FEMA'S CHECK-2 computer program? ☐ **Yes** ☐ **No**
(see instructions for information on how to obtain CHECK-2)

5. REVISED FIRM/FBFM AND FLOOD PROFILES

1. Profile Transition

a. 100-Year Water-Surface Elevations - indicate the difference in water surface elevations where the project 100-year elevations tie into the existing 100-year water surface elevations at each end of the project.

Downstream End _____ within _____ (feet) Upstream End _____ within _____ (feet)
Cross-Section # *Cross-Section #*

b. Floodway Elevations - indicate the difference in water surface elevations where the project floodway elevations tie into the existing floodway water surface elevations at each end of the project.

Downstream End _____ within _____ (feet) Upstream End _____ within _____ (feet)
Cross-Section # *Cross-Section #*

c. Floodway widths - indicate the difference in floodway widths where the project floodway widths tie into the existing floodway width at each end of the project.

Downstream End _____ within _____ (feet) Upstream End _____ within _____ (feet)
Cross-Section # *Cross-Section #*

2. Profile Checklist (check box if information has been provided on profile)

The following information (unless in parentheses) must be included at the same scale as the existing profiles for this project:

☒ Stream Name ☒ Community Name ☒ Corporate Limits labeled ☒ Study limits labeled

☐ Confluences labeled ☒ Channel Stationing ☒ Streambed profiled ☒ Cross Sections labeled

☒ Horizontal/Vertical Scales indicated ☒ 100-year elevs profiled*

☒ Road Crossings ☒ Labeled ☐ Low Chord Elevations ☒ Top of Road Elevations

*All recurrence intervals in the effective study must also be profiled.

Floodway Data Table

Attach a Floodway Data Table for each cross section listed in the published Floodway Data table in the FIS report.

Floodway Data Table Attached ☒ **Yes** ☐ **Not Required**

FEDERAL EMERGENCY MANAGEMENT AGENCY **RIVERINE / COASTAL MAPPING**	O.M.B No. 3067-0148 Expires April 30, 2001

PUBLIC BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 1.5 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing and reviewing the form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden to: Information Collections Management, Federal Emergency Management Agency, 500 C Street, S.W., Washington DC 20472; and to the Office of Management and Budget, Paperwork Reduction Project (3067-0148), Washington, DC 20503.

You are not required to respond to this collection of information unless a valid OMB Control Number is displayed in the upper right corner of this form.

Note: Fill out one form for each flooding source studied

Community Name: Unicorporated Maricopa County, AZ

Flooding Source: Skunk Creek Tributary 12

Project Name/Identifier: Topographic Mapping and Floodplain Delineation Study for Tributaries to Skunk Creek

This is a ☐ Manual ☒ Digital submission. *Digital map submissions may be used to update digital FIRMs (DFIRMs). For updating DFIRMs, these submissions must be coordinated with FEMA Headquarters as far in advance as possible.*

1. MAPPING CHANGES

1. A topographic workmap must be submitted showing the following information (check N/A when not applicable):

a. Revised approximate 100-year floodplain boundaries (Zone A)	☐ Yes	☐ No	☒ N/A
b. Revised detailed 100- and 500-year floodplain boundaries.	☐ Yes	☐ No	☒ N/A
c. Revised floodway boundaries	☐ Yes	☐ No	☒ N/A
d. Location and alignment of all cross sections with stationing control indicated.	☒ Yes	☐ No	☐ N/A
e. Stream alignments, road alignments and dam alignments.	☒ Yes	☐ No	☐ N/A
f. Current community boundaries.	☒ Yes	☐ No	☐ N/A
g. Effective 100- year floodplain and floodway boundaries from FIRM/FBFM reduced or enlarged to the scale of the topographic workmap	☒ Yes	☐ No	☐ N/A
h. Tie-ins between the effective and revised 100-, 500-year and floodway boundaries	☒ Yes	☐ No	☐ N/A
i. The requester's property boundaries and community easements	☒ Yes	☐ No	☐ N/A
j. The signed certification of a registered professional engineer	☒ Yes	☐ No	☐ N/A
k. Location and description of reference marks	☒ Yes	☐ No	☐ N/A
l. Vertical datum (example: NGVD, NAVD)	☒ Yes	☐ No	☐ N/A
m. Coastal zone designations tie into adjacent areas not being revised	☐ Yes	☐ No	☒ N/A
n. Location and alignment of all coastal transects used to revise the coastal analyze	☐ Yes	☐ No	☒ N/A
o. V-zone has been delineated to extend landward to the heel of the primary frontal dune	☐ Yes	☐ No	☒ N/A

If any items are marked No or N/A please attach an explanation.

2. What is the source and date of the updated topographic information (example: orthophoto maps, July 1985; filed survey, May 1979, beach profile, June 1987 etc.)? Field and Aerial Survey 1998

3. What is the scale and contour interval of the following workmaps?

Effective FIS Scale _____ Contour Interval

Revision Request Scale _____ Contour Interval

NOTE: Revised topographic information must be of equal or greater detail than effective.

4. Attach an annotated FIRM/FBFM at the scale of the effective FIRM/FBFM showing the revised 100- and 500-year floodplain and the floodway boundaries and how they tie into those shown on the effective FIRM/FBFM downstream and upstream of the revisions or adjacent to the area of revision for coastal studies. **FIRM/FBFM attached?** ☒ **Yes** ☐ **No**

PLEASE REFER TO THE INSTRUCTIONS FOR THE APPROPRIATE MAILING ADDRESS

2. EARTH FILL PLACEMENT

1. The fill is: ☐ Existing ☐ Proposed

2. Has fill been/will be placed in the regulatory floodway? ☐ Yes ☐ No
If Yes, please attach completed Riverine Hydraulic Analysis Form (Form 4).

3. Has fill been/will be placed in floodway fringe (*area between the floodway and 100-year floodplain boundaries*)? ☐ Yes ☐ No

If Yes, then complete A, B, C, and D below.

a. Are fill slopes for granular materials steeper than one vertical on one-and-one-half horizontal? ☐ Yes ☐ No

If Yes, justify steeper slopes

b. Is adequate erosion protection provided for fill slopes exposed to moving flood waters? (*Slopes exposed to flows with velocities of up to 5 feet per second (fps) during the 100-year flood must, at a minimum, be protected by a cover of grass, vines, weeds, or similar vegetation; slopes exposed to flows with velocities greater than 5 fps during the 100-year flood must, at a minimum, be protected by stone or rock riprap.)*

☐ Yes ☐ No

If No, describe erosion protection provided

c. Has all fill placed in revised 100-year floodplain been compacted to 95 percent of the maximum density obtainable with the Standard Proctor Test Method or acceptable equivalent method? ☐ Yes ☐ No

d. Can structures conceivably be constructed on the fill at any time in the future? ☐ Yes ☐ No

If Yes, attach certification of fill compaction (item 3c. above) by the community's NFIP permit official, a registered professional engineer, or an accredited soils engineer in accordance with Subparagraph 65.5(a)(6) of the NFIP regulations.

Fill certification attached ☐ **Yes** ☐ **No**

4. Has fill been/will be placed in a V zone? ☐ Yes ☐ No

If Yes, is the fill protected from erosion by a flood control structure such as a revetment or seawall?

☐ Yes ☐ No

If Yes, attach the Coastal Structures Form (Form 10).

FEDERAL EMERGENCY MANAGEMENT AGENCY **BRIDGE/CULVERT**	O.M.B. Burden No. 3067-0148 Expires April 30, 2001

PUBLIC BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 2 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing and reviewing the form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden to: Information Collections Management, Federal Emergency Management Agency, 500 C Street, S.W., Washington, DC 20472; and to the Office of Management and Budget, Paperwork Reduction Project (3067-0148), Washington, DC 20503.

You are not required to respond to this collection of information unless a valid OMB Control Number is displayed in the upper right corner of this form.

Community Name: Unicorporated Maricopa County, AZ

Flooding Source: Skunk Creek Tributary 12

Project Name/Identifier: Topographic Mapping and Floodplain Delineation Study for Tributaries to Skunk Creek

1. IDENTIFIER

1. Name of structure (roadway, railroad, etc.): New River Road Double Barrel CMP Culvert

2. Location of bridge/culvert along flooding source (in terms of stream distance or cross-section identifier):

   0.409

3. This revision reflects (check one of the following):

   ☒ New bridge/culvert not modeled in the FIS

   ☐ Modified bridge/culvert previously modeled in the FIS

   ☐ New analysis of bridge/culvert previously modeled in the FIS

4. Hydraulic model used to analyze the structure *(e.g., HEC-2 with special bridge routine, WSPRO, HY8)*

   HEC-RAS

   If different than hydraulic analysis for the flooding source, justify why the hydraulic analysis used for the flooding source could not analyze the structure(s). *(Attach justification)*

   Justification attached ☐ **Yes** ☐ **No** ☒ **N/A**

PLEASE REFER TO THE INSTRUCTIONS FOR THE APPROPRIATE MAILING ADDRESS

2. DRAWING CHECKLIST

Attach plans of the structure(s) certified by a registered professional engineer. The plan detail and information should include the following (check the boxes if the information has been provided):

- ☒ Dimensions (height, width, span, radius, length)
- ☒ Shape (culverts only)
- ☒ Material
- ☒ Beveling or Rounding
- ☒ Wing Wall Angle
- ☐ Low Chord Elevations - Upstream and Downstream
- ☒ Top of Road Elevations - Upstream and Downstream
- ☒ Structure Invert Elevations - Upstream and Downstream
- ☒ Stream Invert Elevations - Upstream and Downstream
- ☒ Skew Angle
- ☒ Cross-Section Locations
- ☒ Distances Between Cross Sections
- ☐ Erosion Protection

3. SEDIMENT TRANSPORT CONSIDERATIONS

If there is any indication from historical records that sediment transport (including scour and deposition) can affect the 100-year (base flood) water-surface elevations; and/or based on the stream geomorphology, vegetative cover, development of the watershed and bank conditions, there is a potential for debris and sediment transport (including sewer and deposition) to affect the base flood elevations, then provide the following information **(Check the box if provided):**

- ☐ Estimated sediment load
- ☐ Method used to estimate sediment transport
- ☐ Method used to estimate scour and/or deposition
- ☐ Method used to revise hydraulic or hydrologic analysis (model) to account for sediment transport

FEDERAL EMERGENCY MANAGEMENT AGENCY **REVISION REQUESTER AND COMMUNITY OFFICIAL**	O.M.B No. 3067-0148 Expires April 30, 2001

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1. REQUESTED RESPONSE FROM FEMA

This request is for a:

☐ CLOMR A letter from FEMA commenting on whether a proposed project, if built as proposed, would justify a map revision, or proposed hydrology changes (See 44 CFR Ch. 1, Parts 60,65 & 72).

☐ LOMR A letter from FEMA officially revising the current NFIP map to show the changes to floodplains, floodway or flood elevations. LOMRs typically decrease flood hazards. (See 44 CFR Ch. 1 Parts 60 & 65.)

☒ Other Describe: Initial Study

2. OVERVIEW

1. The basis for this revision request is (are): (check all that apply)

☐ Physical Change ☐ Improved Methodology/Data ☐ Floodway Revision

☒ Other Describe: Initial Study
Note: A photograph is not required, but is very helpful during review.

2. Flooding Source: Skunk Creek Tributary 10B

3. Project Name/Identifier: Topographic Mapping and Floodplain Delineation Study for Tributaries to Skunk Creek

4. FEMA zone designations affected: X
(example: A, AH, AO, A1-A30, A99, AE, V, V1-V30, VE, B, C, D, X)

5. The NFIP map panel(s) affected for all impacted communities is (are):

Community No.	Community Name	State	Map No.	Panel No.	Effective Date
Ex: 480301 480287	Katy, City Harris County	TX TX	480301 48201C	0005D 0220G	02/08/83 09/28/90
040037	Unincorporated Maricopa County	AZ	04013C	0390E	12/3/93

6. The area of revision encompasses the following types of flooding and structures. Check all that apply.

Types of Flooding	Structures
☒ Riverine	☐ Channelization
☐ Coastal	☐ Levee/Floodwall
☐ Alluvial fan	☒ Bridge/Culvert
☐ Shallow Flooding (e.g. Zones AO and AH)	☐ Dam
☐ Lakes	☐ Fill
☐ Other (describe)	☐ Other (describe)

PLEASE REFER TO THE INSTRUCTIONS FOR THE APPROPRIATE MAILING ADDRESS

4. ENCROACHMENT INFORMATION

1. Does the State have jurisdiction over the floodway or its adoption by communities participating in the NFIP?
   ☐ Yes ☒ No

If Yes, attach a copy of a letter notifying the appropriate State agency of the floodway revision and documentation of the approval of the revised floodway by the appropriate State agency.

2. Does the development in the floodway cause the 1% annual chance (base) elevation to increase at any location by more than 0.000 feet? ☐ Yes ☐ No ☒ N/A

3. Does the cumulative effect of all development that has occurred since the effective SFHA was originally identified cause the base flood elevation to increase at any location by more than one foot (or other increase limit if community or state has adopted more stringent criteria - even if a floodway has not been delineated by FEMA)? ☐ Yes ☐ No

If the answer to either items is Yes, please attach documentation that all requirements of Section 65.12 of the NFIP regulations have been met, regarding evaluation of alternatives, notice to individual legal property owners, concurrence of CEO, and certification that no insurable structures are impacted.

5. MAINTENANCE RESPONSIBILITY

The community is willing to assume responsibility for ☐ performing ☐ overseeing compliance with the maintenance and operation plans of the

(Name)

flood control structure. If not performed promptly by an owner other than the community, the community will provide the necessary services without cost to the Federal government.

Operation and maintenance plans are attached. ☐ **Yes** ☐ **No** ☒ **N/A**

6. REVIEW FEE

The review fee for the appropriate request category has been included. ☐ Yes Fee amount: $

OR

This request is based on a federally sponsored flood-control project where 50 percent or more of the project's cost is federally sponsored, or the request is based on detailed hydrologic and hydraulic studies conducted by Federal, State, or local agencies to replace approximate studies conducted by FEMA and shown on the effective FIRM; thus the project is fee exempt.
☐ Yes

Please see Instructions for Fee Amounts

7. SIGNATURE

Note: **I understand that my signature indicates that all information submitted in support of this request is correct**

Signature of Revision Requester

Bart S. Bergendahl P.E.
Project Manager
Printed Name and Title of Revision Requester

Tetra Tech ISG/Simons Li and Associates
Company Name

Telephone No.: 602-629-1100 Date: 7-10-00

Note: **Signature indicates that the community understands, from the revision requester, the impacts of the revision on flooding conditions in the community.**

Signature of Community Official

Michael S. Ellgood P.E.
Chief Engineer and General Manager
Printed Name and Title of Community Official

Maricopa County, AZ
Community Name

Telephone No.: 602-506-1501 Date:

CERTIFICATION BY REGISTERED PROFESSIONAL ENGINEER AND/OR LAND SURVEYOR

This certification is in accordance with 44 CFR Ch. 1, Sect 65.2

Signature

Bart S. Bergendahl P.E. Project Manager
Printed Name and Title of Revision Requester

Registr No. 28660 Expires (Date) 3/31/01 State AZ

Type of License/Expertise: Civil Engineer

Check which forms have been included with this request

Form Name and (Number)	Required if .....
☐ **Hydrologic** (3)	new or revised discharges
☒ **Hydraulic** (4)	new or revised water-surface elevations
☒ **Mapping** (5)	floodplain/floodway changes
☐ **Channelization** (6)	channel is modified
☒ **Bridge/Culvert** (7)	addition/revision of bridge/culvert
☐ **Levee/Floodwall** (8)	addition/revision of levee/floodwall
☐ **Coastal** (9)	new or revised coastal elevations
☐ **Coastal Structures** (10)	addition/revision of coastal structure
☐ **Dam** (11)	addition/revision of dam
☐ **Alluvial Fan** (12)	structures proposed on alluvial fan

FEDERAL EMERGENCY MANAGEMENT AGENCY **RIVERINE HYDRAULIC ANALYSIS**	O.M.B No. 3067-0148 Expires April 30, 2001

PUBLIC BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 2.25 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing and reviewing the form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden to: Information Collections Management, Federal Emergency Management Agency, 500 C Street, S.W., Washington DC 20472; and to the Office of Management and Budget, Paperwork Reduction Project (3067-0148), Washington, DC 20503.

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Note: Fill out one form for each flooding source studied

Community Name: Unicorporated Maricopa County, AZ

Flooding Source: Skunk Creek Tributary 10B

Project Name/Identifier: Topographic Mapping and Floodplain Delineation Study for Tributaries to Skunk Creek

1. REACH TO BE REVISED

Describe the limits of the revision OR submit a copy of the FIRM with the revision area clearly highlighted.
Copy of FIRM(s) attached depicting area of the revision (highlighted, or circled)? ☒ Yes

Downstream Limit: Skunk Creek Main Stem

Upstream Limit: Tonto National Forest Boundary

2. MODELS SUBMITTED

Requirements: for areas which have detailed flooding:	**for areas which do not have detailed flooding:**
Full input and output listings along with files on diskette for each of the models listed below (items 1-4) and a summary of the source of input parameters used in the models must be provided. The summary must include a description of any changes made from model to model (e.g., Duplicate Effective model to Corrected Effective model). At a minimum, the Duplicate Effective (item 1) and the Revised or Post-Project Conditions (item 4) models must be submitted. See instructions for directions on when other models may be required.	Only the 100-year (Base) flood profile is required. A hydraulic model is not required for areas which do not have detailed flooding; however, BFEs may not be added to the revised FIRM. If a hydraulic model is developed for the area, items 3 and 4 described below must be submitted.

If hydraulic models are not developed, hydraulic analyses (including all calculations) for existing or pre-project conditions and revised or post-project conditions must be submitted.

1. Duplicate Effective Model ☐ **Natural** **File Name** _____ ☐ **Floodway** **File Name**
Copies of the hydraulic analysis used in the effective FIS, referred to as the effective models (10-, 50-, 100-, and 500-year multi-profile runs and the floodway run) must be obtained and then reproduced on the requester's equipment to produce the Duplicate Effective model. This is required to assure that the effective models input data has been transferred correctly to the requester's equipment and to assure that the revised data will be integrated into the effective data to provide a continuous FIS model upstream and downstream of the revised reach.

2. Corrected Effective Model ☐ **Natural** **File Name** _____ ☐ **Floodway** **File Name**
The Corrected Effective model is the model that corrects any errors that occur in the Duplicate Effective model, adds any additional cross sections to the Duplicate Effective model, or incorporates more detailed topographic information than that used in the currently effective model. The Corrected Effective model must not reflect any man-made physical changes since the date of the effective model. An error could be a technical error in the modeling procedures, or any construction in the floodplain that occurred prior to the date of the effective model but was not incorporated into the effective model.

3. Existing or Pre-Project Conditions Model ☒ **Natural** **File Name** T_10B PF#1 ☒ **Floodway** **File Name** T_10B PF#2
The Duplicate Effective model or Corrective Effective model is modified to produce the Existing or Pre-Project Conditions model to reflect any modifications that have occurred within the floodplain since the date of the Effective model but prior to the construction of the project for which the revision is being requested. If no modification has occurred since the date of the effective model, then this model would be identical to the Corrected Effective model or Duplicate Effective model.

4. Revised or Post-Project Conditions Model ☐ **Natural** **File Name** _____ ☐ **Floodway** **File Name**
The Existing or Pre-Project Conditions model (or Duplicate Effective model or Corrected Effective model, as appropriate) is revised to reflect revised or post-project conditions. This model must incorporate any physical changes to the floodplain since the effective model was produced as well as the effects of the project. When the request is for the proposed project this model must reflect proposed conditions.

5. Other – Please attach a sheet describing all other models submitted along with the file names. ☐ **Natural** ☐ **Floodway**

PLEASE REFER TO THE INSTRUCTIONS FOR THE APPROPRIATE MAILING ADDRESS

3. STARTING WATER-SURFACE ELEVATIONS

Explain how they were determined. Explanation Attached? ☒ Yes ☐ No

NOTE: If the effective study is an approximate study, the slope/area method is recommended. For detailed analysis studies, using a known water-surface elevation is recommended.

4. RESULTS (from the model used to revise the 100-year water surface elevations)

If the results indicate any of the following, attach an explanation - to this form, or to the hydraulic model printout- as to the reasonableness of the situation.

☐ Supercritical depth ☒ Critical Depth ☐ Drawdowns ☐ Negative Floodway Surcharges

☐ Floodway Surcharges Greater Than Maximum Allowed by Community/State

☐ Water surface elevations higher than the end points of cross sections.

☐ Floodway discharge is different than the Natural 100-year (base) flood discharge.

☐ Project causes 100-year floodplain or floodway elevations to increase (state if increases are located off the requester's property)

Explanation attached with Form ☒ **Explanation provided on attached printout** ☐

If Hydraulic model used is HEC-2, has it been checked with FEMA'S CHECK-2 computer program? ☐ **Yes** ☐ **No**
(see instructions for information on how to obtain CHECK-2)

5. REVISED FIRM/FBFM AND FLOOD PROFILES

1. Profile Transition

a. 100-Year Water-Surface Elevations - indicate the difference in water surface elevations where the project 100-year elevations tie into the existing 100-year water surface elevations at each end of the project.

Downstream End _____ within _____ (feet) Upstream End _____ within _____ (feet)
Cross-Section # *Cross-Section #*

b. Floodway Elevations - indicate the difference in water surface elevations where the project floodway elevations tie into the existing floodway water surface elevations at each end of the project.

Downstream End _____ within _____ (feet) Upstream End _____ within _____ (feet)
Cross-Section # *Cross-Section #*

c. Floodway widths - indicate the difference in floodway widths where the project floodway widths tie into the existing floodway width at each end of the project.

Downstream End _____ within _____ (feet) Upstream End _____ within _____ (feet)
Cross-Section # *Cross-Section #*

2. Profile Checklist (check box if information has been provided on profile)

The following information (unless in parentheses) must be included at the same scale as the existing profiles for this project:

☒ Stream Name ☒ Community Name ☒ Corporate Limits labeled ☒ Study limits labeled

☐ Confluences labeled ☒ Channel Stationing ☒ Streambed profiled ☒ Cross Sections labeled

☒ Horizontal/Vertical Scales indicated ☒ 100-year elevs profiled*

☒ Road Crossings ☒ Labeled ☐ Low Chord Elevations ☒ Top of Road Elevations

*All recurrence intervals in the effective study must also be profiled.

Floodway Data Table

Attach a Floodway Data Table for each cross section listed in the published Floodway Data table in the FIS report.

Floodway Data Table Attached ☒ **Yes** ☐ **Not Required**

FEDERAL EMERGENCY MANAGEMENT AGENCY **RIVERINE / COASTAL MAPPING**	O.M.B No. 3067-0148 Expires April 30, 2001

PUBLIC BURDEN DISCLOSURE NOTICE

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Note: Fill out one form for each flooding source studied

Community Name: Unicorporated Maricopa County, AZ

Flooding Source: Skunk Creek Tributary 10B

Project Name/Identifier: Topographic Mapping and Floodplain Delineation Study for Tributaries to Skunk Creek

This is a ☐ Manual ☒ Digital submission. *Digital map submissions may be used to update digital FIRMs (DFIRMs). For updating DFIRMs, these submissions must be coordinated with FEMA Headquarters as far in advance as possible.*

1. MAPPING CHANGES

1. A topographic workmap must be submitted showing the following information (check N/A when not applicable):

a. Revised approximate 100-year floodplain boundaries (Zone A)	☐ Yes	☐ No	☒ N/A
b. Revised detailed 100- and 500-year floodplain boundaries.	☐ Yes	☐ No	☒ N/A
c. Revised floodway boundaries	☐ Yes	☐ No	☒ N/A
d. Location and alignment of all cross sections with stationing control indicated.	☒ Yes	☐ No	☐ N/A
e. Stream alignments, road alignments and dam alignments.	☒ Yes	☐ No	☐ N/A
f. Current community boundaries.	☒ Yes	☐ No	☐ N/A
g. Effective 100- year floodplain and floodway boundaries from FIRM/FBFM reduced or enlarged to the scale of the topographic workmap	☒ Yes	☐ No	☐ N/A
h. Tie-ins between the effective and revised 100-, 500-year and floodway boundaries	☒ Yes	☐ No	☐ N/A
i. The requester's property boundaries and community easements	☒ Yes	☐ No	☐ N/A
j. The signed certification of a registered professional engineer	☒ Yes	☐ No	☐ N/A
k. Location and description of reference marks	☒ Yes	☐ No	☐ N/A
l. Vertical datum (example: NGVD, NAVD)	☒ Yes	☐ No	☐ N/A
m. Coastal zone designations tie into adjacent areas not being revised	☐ Yes	☐ No	☒ N/A
n. Location and alignment of all coastal transects used to revise the coastal analyze	☐ Yes	☐ No	☒ N/A
o. V-zone has been delineated to extend landward to the heel of the primary frontal dune	☐ Yes	☐ No	☒ N/A

If any items are marked No or N/A please attach an explanation.

2. What is the source and date of the updated topographic information (example: orthophoto maps, July 1985; filed survey, May 1979, beach profile, June 1987 etc.)? Field and Aerial Survey 1998

3. What is the scale and contour interval of the following workmaps?

Effective FIS Scale _____ Contour Interval

Revision Request Scale _____ Contour Interval

NOTE: Revised topographic information must be of equal or greater detail than effective.

4. Attach an annotated FIRM/FBFM at the scale of the effective FIRM/FBFM showing the revised 100- and 500-year floodplain and the floodway boundaries and how they tie into those shown on the effective FIRM/FBFM downstream and upstream of the revisions or adjacent to the area of revision for coastal studies. **FIRM/FBFM attached?** ☒ **Yes** ☐ **No**

PLEASE REFER TO THE INSTRUCTIONS FOR THE APPROPRIATE MAILING ADDRESS

2. EARTH FILL PLACEMENT

1. The fill is: ☐ Existing ☐ Proposed

2. Has fill been/will be placed in the regulatory floodway? ☐ Yes ☐ No
If Yes, please attach completed Riverine Hydraulic Analysis Form (Form 4).

3. Has fill been/will be placed in floodway fringe (*area between the floodway and 100-year floodplain boundaries*)? ☐ Yes ☐ No

If Yes, then complete A, B, C, and D below.

a. Are fill slopes for granular materials steeper than one vertical on one-and-one-half horizontal? ☐ Yes ☐ No

If Yes, justify steeper slopes

b. Is adequate erosion protection provided for fill slopes exposed to moving flood waters? (*Slopes exposed to flows with velocities of up to 5 feet per second (fps) during the 100-year flood must, at a minimum, be protected by a cover of grass, vines, weeds, or similar vegetation; slopes exposed to flows with velocities greater than 5 fps during the 100-year flood must, at a minimum, be protected by stone or rock riprap.)*

☐ Yes ☐ No

If No, describe erosion protection provided

c. Has all fill placed in revised 100-year floodplain been compacted to 95 percent of the maximum density obtainable with the Standard Proctor Test Method or acceptable equivalent method? ☐ Yes ☐ No

d. Can structures conceivably be constructed on the fill at any time in the future? ☐ Yes ☐ No

If Yes, attach certification of fill compaction (item 3c. above) by the community's NFIP permit official, a registered professional engineer, or an accredited soils engineer in accordance with Subparagraph 65.5(a)(6) of the NFIP regulations.

Fill certification attached ☐ **Yes** ☐ **No**

4. Has fill been/will be placed in a V zone? ☐ Yes ☐ No

If Yes, is the fill protected from erosion by a flood control structure such as a revetment or seawall?

☐ Yes ☐ No

If Yes, attach the Coastal Structures Form (Form 10).

FEDERAL EMERGENCY MANAGEMENT AGENCY **BRIDGE/CULVERT**	O.M.B. Burden No. 3067-0148 Expires April 30, 2001

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Community Name: Unicorporated Maricopa County, AZ

Flooding Source: Skunk Creek Tributary 10B

Project Name/Identifier: Topographic Mapping and Floodplain Delineation Study for Tributaries to Skunk Creek

1. IDENTIFIER

1. Name of structure (roadway, railroad, etc.): New River Road Double Barrel CMP Culvert

2. Location of bridge/culvert along flooding source (in terms of stream distance or cross-section identifier):

   0.11

3. This revision reflects (check one of the following):

   ☒ New bridge/culvert not modeled in the FIS

   ☐ Modified bridge/culvert previously modeled in the FIS

   ☐ New analysis of bridge/culvert previously modeled in the FIS

4. Hydraulic model used to analyze the structure *(e.g., HEC-2 with special bridge routine, WSPRO, HY8)*

   HEC-RAS

   If different than hydraulic analysis for the flooding source, justify why the hydraulic analysis used for the flooding source could not analyze the structure(s). *(Attach justification)*

   Justification attached ☐ **Yes** ☐ **No** ☒ **N/A**

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2. DRAWING CHECKLIST

Attach plans of the structure(s) certified by a registered professional engineer. The plan detail and information should include the following (check the boxes if the information has been provided):

- ☒ Dimensions (height, width, span, radius, length)
- ☒ Shape (culverts only)
- ☒ Material
- ☒ Beveling or Rounding
- ☒ Wing Wall Angle
- ☐ Low Chord Elevations - Upstream and Downstream
- ☒ Top of Road Elevations - Upstream and Downstream
- ☒ Structure Invert Elevations - Upstream and Downstream
- ☒ Stream Invert Elevations - Upstream and Downstream
- ☒ Skew Angle
- ☒ Cross-Section Locations
- ☒ Distances Between Cross Sections
- ☐ Erosion Protection

3. SEDIMENT TRANSPORT CONSIDERATIONS

If there is any indication from historical records that sediment transport (including scour and deposition) can affect the 100-year (base flood) water-surface elevations; and/or based on the stream geomorphology, vegetative cover, development of the watershed and bank conditions, there is a potential for debris and sediment transport (including sewer and deposition) to affect the base flood elevations, then provide the following information **(Check the box if provided):**

- ☐ Estimated sediment load
- ☐ Method used to estimate sediment transport
- ☐ Method used to estimate scour and/or deposition
- ☐ Method used to revise hydraulic or hydrologic analysis (model) to account for sediment transport

FEDERAL EMERGENCY MANAGEMENT AGENCY **REVISION REQUESTER AND COMMUNITY OFFICIAL**	O.M.B No. 3067-0148 Expires April 30, 2001

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1. REQUESTED RESPONSE FROM FEMA

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☐ CLOMR A letter from FEMA commenting on whether a proposed project, if built as proposed, would justify a map revision, or proposed hydrology changes (See 44 CFR Ch. 1, Parts 60,65 & 72).

☐ LOMR A letter from FEMA officially revising the current NFIP map to show the changes to floodplains, floodway or flood elevations. LOMRs typically decrease flood hazards. (See 44 CFR Ch. 1 Parts 60 & 65.)

☒ Other Describe: Initial Study

2. OVERVIEW

1. The basis for this revision request is (are): (check all that apply)

☐ Physical Change ☐ Improved Methodology/Data ☐ Floodway Revision

☒ Other Describe: Initial Study
Note: A photograph is not required, but is very helpful during review.

2. Flooding Source: Skunk Creek Tributary 10A

3. Project Name/Identifier: Topographic Mapping and Floodplain Delineation Study for Tributaries to Skunk Creek

4. FEMA zone designations affected: X
(example: A, AH, AO, A1-A30, A99, AE, V, V1-V30, VE, B, C, D, X)

5. The NFIP map panel(s) affected for all impacted communities is (are):

Community No.	Community Name	State	Map No.	Panel No.	Effective Date
Ex: 480301 480287	Katy, City Harris County	TX TX	480301 48201C	0005D 0220G	02/08/83 09/28/90
040037	Unincorporated Maricopa County	AZ	04013C	0390E	12/3/93

6. The area of revision encompasses the following types of flooding and structures. Check all that apply.

Types of Flooding	Structures
☒ Riverine	☐ Channelization
☐ Coastal	☐ Levee/Floodwall
☐ Alluvial fan	☒ Bridge/Culvert
☐ Shallow Flooding (e.g. Zones AO and AH)	☐ Dam
☐ Lakes	☐ Fill
☐ Other (describe)	☐ Other (describe)

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4. ENCROACHMENT INFORMATION

1. Does the State have jurisdiction over the floodway or its adoption by communities participating in the NFIP?
   ☐ Yes ☒ No

If Yes, attach a copy of a letter notifying the appropriate State agency of the floodway revision and documentation of the approval of the revised floodway by the appropriate State agency.

2. Does the development in the floodway cause the 1% annual chance (base) elevation to increase at any location by more than 0.000 feet? ☐ Yes ☒ No ☒ N/A

3. Does the cumulative effect of all development that has occurred since the effective SFHA was originally identified cause the base flood elevation to increase at any location by more than one foot (or other increase limit if community or state has adopted more stringent criteria - even if a floodway has not been delineated by FEMA)? ☐ Yes ☐ No

If the answer to either items is Yes, please attach documentation that all requirements of Section 65.12 of the NFIP regulations have been met, regarding evaluation of alternatives, notice to individual legal property owners, concurrence of CEO, and certification that no insurable structures are impacted.

5. MAINTENANCE RESPONSIBILITY

The community is willing to assume responsibility for ☐ performing ☐ overseeing compliance with the maintenance and operation plans of the

(Name)

flood control structure. If not performed promptly by an owner other than the community, the community will provide the necessary services without cost to the Federal government.

Operation and maintenance plans are attached. ☐ **Yes** ☐ **No** ☒ **N/A**

6. REVIEW FEE

The review fee for the appropriate request category has been included. ☐ Yes Fee amount: $

OR

This request is based on a federally sponsored flood-control project where 50 percent or more of the project's cost is federally sponsored, or the request is based on detailed hydrologic and hydraulic studies conducted by Federal, State, or local agencies to replace approximate studies conducted by FEMA and shown on the effective FIRM; thus the project is fee exempt.
☐ Yes

Please see Instructions for Fee Amounts

7. SIGNATURE

Note: **I understand that my signature indicates that all information submitted in support of this request is correct**

Signature of Revision Requester

Bart S. Bergendahl P.E.
Project Manager
Printed Name and Title of Revision Requester

Tetra Tech ISG/Simons Li and Associates
Company Name

Telephone No.: 602-629-1100 Date: 7-16-00

Note: **Signature indicates that the community understands, from the revision requester, the impacts of the revision on flooding conditions in the community.**

Signature of Community Official

Michael S. Ellgood P.E.
Chief Engineer and General Manager
Printed Name and Title of Community Official

Maricopa County, AZ
Community Name

Telephone No.: 602-506-1501 Date:

CERTIFICATION BY REGISTERED PROFESSIONAL ENGINEER AND/OR LAND SURVEYOR

This certification is in accordance with 44 CFR Ch. 1, Sect 65.2

Signature

Bart S. Bergendahl P.E. Project Manager
Printed Name and Title of Revision Requester

Registr No. 28660 Expires (Date) 3/31/01 State AZ

Type of License/Expertise: Civil Engineer

Check which forms have been included with this request

Form Name and (Number)	Required if .....
☐ **Hydrologic** (3)	new or revised discharges
☒ **Hydraulic** (4)	new or revised water-surface elevations
☒ **Mapping** (5)	floodplain/floodway changes
☐ **Channelization** (6)	channel is modified
☒ **Bridge/Culvert** (7)	addition/revision of bridge/culvert
☐ **Levee/Floodwall** (8)	addition/revision of levee/floodwall
☐ **Coastal** (9)	new or revised coastal elevations
☐ **Coastal Structures** (10)	addition/revision of coastal structure
☐ **Dam** (11)	addition/revision of dam
☐ **Alluvial Fan** (12)	structures proposed on alluvial fan

FEDERAL EMERGENCY MANAGEMENT AGENCY **RIVERINE HYDRAULIC ANALYSIS**	O.M.B No. 3067-0148 Expires April 30, 2001

PUBLIC BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 2.25 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing and reviewing the form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden to: Information Collections Management, Federal Emergency Management Agency, 500 C Street, S.W., Washington DC 20472; and to the Office of Management and Budget, Paperwork Reduction Project (3067-0148), Washington, DC 20503.

You are not required to respond to this collection of information unless a valid OMB Control Number is displayed in the upper right corner of this form.

Note: Fill out one form for each flooding source studied

Community Name: Unicorporated Maricopa County, AZ

Flooding Source: Skunk Creek Tributary 10A

Project Name/Identifier: Topographic Mapping and Floodplain Delineation Study for Tributaries to Skunk Creek

1. REACH TO BE REVISED

Describe the limits of the revision OR submit a copy of the FIRM with the revision area clearly highlighted.
Copy of FIRM(s) attached depicting area of the revision (highlighted, or circled)? ☒ Yes

Downstream Limit: Skunk Creek Main Stem

Upstream Limit: River Station 1.159

2. MODELS SUBMITTED

Requirements: for areas which have detailed flooding:	**for areas which do not have detailed flooding**:
Full input and output listings along with files on diskette for each of the models listed below (items 1-4) and a summary of the source of input parameters used in the models must be provided. The summary must include a description of any changes made from model to model (e.g., Duplicate Effective model to Corrected Effective model). At a minimum, the Duplicate Effective (item 1) and the Revised or Post-Project Conditions (item 4) models must be submitted. See instructions for directions on when other models may be required.	Only the 100-year (Base) flood profile is required. A hydraulic model is not required for areas which do not have detailed flooding; however, BFEs may not be added to the revised FIRM. If a hydraulic model is developed for the area, items 3 and 4 described below must be submitted.

If hydraulic models are not developed, hydraulic analyses (including all calculations) for existing or pre-project conditions and revised or post-project conditions must be submitted.

1. Duplicate Effective Model ☐ **Natural** **File Name** _____ ☐ **Floodway** **File Name**

Copies of the hydraulic analysis used in the effective FIS, referred to as the effective models (10-, 50-, 100-, and 500-year multi-profile runs and the floodway run) must be obtained and then reproduced on the requester's equipment to produce the Duplicate Effective model. This is required to assure that the effective models input data has been transferred correctly to the requester's equipment and to assure that the revised data will be integrated into the effective data to provide a continuous FIS model upstream and downstream of the revised reach.

2. Corrected Effective Model ☐ **Natural** **File Name** _____ ☐ **Floodway** **File Name**

The Corrected Effective model is the model that corrects any errors that occur in the Duplicate Effective model, adds any additional cross sections to the Duplicate Effective model, or incorporates more detailed topographic information than that used in the currently effective model. The Corrected Effective model must not reflect any man-made physical changes since the date of the effective model. An error could be a technical error in the modeling procedures, or any construction in the floodplain that occurred prior to the date of the effective model but was not incorporated into the effective model.

3. Existing or Pre-Project Conditions Model ☒ **Natural** **File Name** T_10A PF#1 ☒ **Floodway** **File Name** T_10A PF#2

The Duplicate Effective model or Corrective Effective model is modified to produce the Existing or Pre-Project Conditions model to reflect any modifications that have occurred within the floodplain since the date of the Effective model but prior to the construction of the project for which the revision is being requested. If no modification has occurred since the date of the effective model, then this model would be identical to the Corrected Effective model or Duplicate Effective model.

4. Revised or Post-Project Conditions Model ☐ **Natural** **File Name** _____ ☐ **Floodway** **File Name**

The Existing or Pre-Project Conditions model (or Duplicate Effective model or Corrected Effective model, as appropriate) is revised to reflect revised or post-project conditions. This model must incorporate any physical changes to the floodplain since the effective model was produced as well as the effects of the project. When the request is for the proposed project this model must reflect proposed conditions.

5. Other – Please attach a sheet describing all other models submitted along with the file names. ☐ **Natural** ☐ **Floodway**

PLEASE REFER TO THE INSTRUCTIONS FOR THE APPROPRIATE MAILING ADDRESS

3. STARTING WATER-SURFACE ELEVATIONS

Explain how they were determined. Explanation Attached? ☒ Yes ☐ No

NOTE: If the effective study is an approximate study, the slope/area method is recommended. For detailed analysis studies, using a known water-surface elevation is recommended.

4. RESULTS (from the model used to revise the 100-year water surface elevations)

If the results indicate any of the following, attach an explanation - to this form, or to the hydraulic model printout- as to the reasonableness of the situation.

☐ Supercritical depth ☒ Critical Depth ☐ Drawdowns ☐ Negative Floodway Surcharges

☐ Floodway Surcharges Greater Than Maximum Allowed by Community/State

☐ Water surface elevations higher than the end points of cross sections.

☐ Floodway discharge is different than the Natural 100-year (base) flood discharge.

☐ Project causes 100-year floodplain or floodway elevations to increase (state if increases are located off the requester's property)

Explanation attached with Form ☒ **Explanation provided on attached printout** ☐

If Hydraulic model used is HEC-2, has it been checked with FEMA'S CHECK-2 computer program? ☐ **Yes** ☐ **No**
(see instructions for information on how to obtain CHECK-2)

5. REVISED FIRM/FBFM AND FLOOD PROFILES

1. Profile Transition

a. 100-Year Water-Surface Elevations - indicate the difference in water surface elevations where the project 100-year elevations tie into the existing 100-year water surface elevations at each end of the project.

Downstream End _____ within _____ (feet) *Cross-Section #* Upstream End _____ within _____ (feet) *Cross-Section #*

b. Floodway Elevations - indicate the difference in water surface elevations where the project floodway elevations tie into the existing floodway water surface elevations at each end of the project.

Downstream End _____ within _____ (feet) *Cross-Section #* Upstream End _____ within _____ (feet) *Cross-Section #*

c. Floodway widths - indicate the difference in floodway widths where the project floodway widths tie into the existing floodway width at each end of the project.

Downstream End _____ within _____ (feet) *Cross-Section #* Upstream End _____ within _____ (feet) *Cross-Section #*

2. Profile Checklist (check box if information has been provided on profile)

The following information (unless in parentheses) must be included at the same scale as the existing profiles for this project:

☒ Stream Name ☒ Community Name ☒ Corporate Limits labeled ☒ Study limits labeled

☐ Confluences labeled ☒ Channel Stationing ☒ Streambed profiled ☒ Cross Sections labeled

☒ Horizontal/Vertical Scales indicated ☒ 100-year elevs profiled*

☒ Road Crossings ☒ Labeled ☐ Low Chord Elevations ☒ Top of Road Elevations

*All recurrence intervals in the effective study must also be profiled.

Floodway Data Table

Attach a Floodway Data Table for each cross section listed in the published Floodway Data table in the FIS report.

Floodway Data Table Attached ☒ **Yes** ☐ **Not Required**

FEDERAL EMERGENCY MANAGEMENT AGENCY **RIVERINE / COASTAL MAPPING**	O.M.B No. 3067-0148 Expires April 30, 2001

PUBLIC BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 1.5 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing and reviewing the form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden to: Information Collections Management, Federal Emergency Management Agency, 500 C Street, S.W., Washington DC 20472; and to the Office of Management and Budget, Paperwork Reduction Project (3067-0148), Washington, DC 20503.

You are not required to respond to this collection of information unless a valid OMB Control Number is displayed in the upper right corner of this form.

Note: Fill out one form for each flooding source studied

Community Name: Unicorporated Maricopa County, AZ

Flooding Source: Skunk Creek Tributary 10A

Project Name/Identifier: Topographic Mapping and Floodplain Delineation Study for Tributaries to Skunk Creek

This is a ☐ Manual ☒ Digital submission. *Digital map submissions may be used to update digital FIRMs (DFIRMs). For updating DFIRMs, these submissions must be coordinated with FEMA Headquarters as far in advance as possible.*

1. MAPPING CHANGES

1. A topographic workmap must be submitted showing the following information (check N/A when not applicable):

a. Revised approximate 100-year floodplain boundaries (Zone A)	☐ Yes	☐ No	☒ N/A
b. Revised detailed 100- and 500-year floodplain boundaries.	☐ Yes	☐ No	☒ N/A
c. Revised floodway boundaries	☐ Yes	☐ No	☒ N/A
d. Location and alignment of all cross sections with stationing control indicated.	☒ Yes	☐ No	☐ N/A
e. Stream alignments, road alignments and dam alignments.	☒ Yes	☐ No	☐ N/A
f. Current community boundaries.	☒ Yes	☐ No	☐ N/A
g. Effective 100- year floodplain and floodway boundaries from FIRM/FBFM reduced or enlarged to the scale of the topographic workmap	☒ Yes	☐ No	☐ N/A
h. Tie-ins between the effective and revised 100-, 500-year and floodway boundaries	☒ Yes	☐ No	☐ N/A
i. The requester's property boundaries and community easements	☒ Yes	☐ No	☐ N/A
j. The signed certification of a registered professional engineer	☒ Yes	☐ No	☐ N/A
k. Location and description of reference marks	☒ Yes	☐ No	☐ N/A
l. Vertical datum (example: NGVD, NAVD)	☒ Yes	☐ No	☐ N/A
m. Coastal zone designations tie into adjacent areas not being revised	☐ Yes	☐ No	☒ N/A
n. Location and alignment of all coastal transects used to revise the coastal analyze	☐ Yes	☐ No	☒ N/A
o. V-zone has been delineated to extend landward to the heel of the primary frontal dune	☐ Yes	☐ No	☒ N/A

If any items are marked No or N/A please attach an explanation.

2. What is the source and date of the updated topographic information (example: orthophoto maps, July 1985; filed survey, May 1979, beach profile, June 1987 etc.)? Field and Aerial Survey 1998

3. What is the scale and contour interval of the following workmaps?

Effective FIS Scale ____ Contour Interval

Revision Request Scale _____ Contour Interval

NOTE: Revised topographic information must be of equal or greater detail than effective.

4. Attach an annotated FIRM/FBFM at the scale of the effective FIRM/FBFM showing the revised 100- and 500-year floodplain and the floodway boundaries and how they tie into those shown on the effective FIRM/FBFM downstream and upstream of the revisions or adjacent to the area of revision for coastal studies. **FIRM/FBFM attached?** ☒ **Yes** ☐ **No**

PLEASE REFER TO THE INSTRUCTIONS FOR THE APPROPRIATE MAILING ADDRESS

2. EARTH FILL PLACEMENT

1. The fill is: ☐ Existing ☐ Proposed

2. Has fill been/will be placed in the regulatory floodway? ☐ Yes ☐ No
If Yes, please attach completed Riverine Hydraulic Analysis Form (Form 4).

3. Has fill been/will be placed in floodway fringe (*area between the floodway and 100-year floodplain boundaries*)? ☐ Yes ☐ No

If Yes, then complete A, B, C, and D below.

a. Are fill slopes for granular materials steeper than one vertical on one-and-one-half horizontal? ☐ Yes ☐ No

If Yes, justify steeper slopes

b. Is adequate erosion protection provided for fill slopes exposed to moving flood waters? (*Slopes exposed to flows with velocities of up to 5 feet per second (fps) during the 100-year flood must, at a minimum, be protected by a cover of grass, vines, weeds, or similar vegetation; slopes exposed to flows with velocities greater than 5 fps during the 100-year flood must, at a minimum, be protected by stone or rock riprap.)*

☐ Yes ☐ No

If No, describe erosion protection provided

c. Has all fill placed in revised 100-year floodplain been compacted to 95 percent of the maximum density obtainable with the Standard Proctor Test Method or acceptable equivalent method? ☐ Yes ☐ No

d. Can structures conceivably be constructed on the fill at any time in the future? ☐ Yes ☐ No

If Yes, attach certification of fill compaction (item 3c. above) by the community's NFIP permit official, a registered professional engineer, or an accredited soils engineer in accordance with Subparagraph 65.5(a)(6) of the NFIP regulations.

Fill certification attached ☐ **Yes** ☐ **No**

4. Has fill been/will be placed in a V zone? ☐ Yes ☐ No

If Yes, is the fill protected from erosion by a flood control structure such as a revetment or seawall?

☐ Yes ☐ No

If Yes, attach the Coastal Structures Form (Form 10).

FEDERAL EMERGENCY MANAGEMENT AGENCY **BRIDGE/CULVERT**	O.M.B. Burden No. 3067-0148 Expires April 30, 2001

PUBLIC BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 2 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing and reviewing the form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden to: Information Collections Management, Federal Emergency Management Agency, 500 C Street, S.W., Washington, DC 20472; and to the Office of Management and Budget, Paperwork Reduction Project (3067-0148), Washington, DC 20503.

You are not required to respond to this collection of information unless a valid OMB Control Number is displayed in the upper right corner of this form.

Community Name: Unicorporated Maricopa County, AZ

Flooding Source: Skunk Creek Tributary 10A

Project Name/Identifier: Topographic Mapping and Floodplain Delineation Study for Tributaries to Skunk Creek

1. IDENTIFIER

1. Name of structure (roadway, railroad, etc.): New River Road Double Barrel CMP Culvert

2. Location of bridge/culvert along flooding source (in terms of stream distance or cross-section identifier):

   0.082

3. This revision reflects (check one of the following):

   ☒ New bridge/culvert not modeled in the FIS

   ☐ Modified bridge/culvert previously modeled in the FIS

   ☐ New analysis of bridge/culvert previously modeled in the FIS

4. Hydraulic model used to analyze the structure *(e.g., HEC-2 with special bridge routine, WSPRO, HY8)*

   HEC-RAS

   If different than hydraulic analysis for the flooding source, justify why the hydraulic analysis used for the flooding source could not analyze the structure(s). *(Attach justification)*

   Justification attached ☐ **Yes** ☐ **No** ☒ **N/A**

PLEASE REFER TO THE INSTRUCTIONS FOR THE APPROPRIATE MAILING ADDRESS

2. DRAWING CHECKLIST

Attach plans of the structure(s) certified by a registered professional engineer. The plan detail and information should include the following (check the boxes if the information has been provided):

- ☒ Dimensions (height, width, span, radius, length)
- ☒ Shape (culverts only)
- ☒ Material
- ☒ Beveling or Rounding
- ☒ Wing Wall Angle
- ☐ Low Chord Elevations - Upstream and Downstream
- ☒ Top of Road Elevations - Upstream and Downstream
- ☒ Structure Invert Elevations - Upstream and Downstream
- ☒ Stream Invert Elevations - Upstream and Downstream
- ☒ Skew Angle
- ☒ Cross-Section Locations
- ☒ Distances Between Cross Sections
- ☐ Erosion Protection

3. SEDIMENT TRANSPORT CONSIDERATIONS

If there is any indication from historical records that sediment transport (including scour and deposition) can affect the 100-year (base flood) water-surface elevations; and/or based on the stream geomorphology, vegetative cover, development of the watershed and bank conditions, there is a potential for debris and sediment transport (including sewer and deposition) to affect the base flood elevations, then provide the following information **(Check the box if provided):**

- ☐ Estimated sediment load
- ☐ Method used to estimate sediment transport
- ☐ Method used to estimate scour and/or deposition
- ☐ Method used to revise hydraulic or hydrologic analysis (model) to account for sediment transport

FEDERAL EMERGENCY MANAGEMENT AGENCY **REVISION REQUESTER AND COMMUNITY OFFICIAL**	O.M.B No. 3067-0148 Expires April 30, 2001

Public reporting burden for this form is estimated to average 2.13 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing and reviewing the form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden to: Information Collections Management, Federal Emergency Management Agency, 500 C Street, S.W., Washington DC 20472; and to the Office of Management and Budget, Paperwork Reduction Project (3067-0148), Washington, DC 20503.

You are not required to respond to this collection of information unless a valid OMB Control Number is displayed in the upper right corner of this form.

1. REQUESTED RESPONSE FROM FEMA

This request is for a:

☐ CLOMR A letter from FEMA commenting on whether a proposed project, if built as proposed, would justify a map revision, or proposed hydrology changes (See 44 CFR Ch. 1, Parts 60,65 & 72).

☐ LOMR A letter from FEMA officially revising the current NFIP map to show the changes to floodplains, floodway or flood elevations. LOMRs typically decrease flood hazards. (See 44 CFR Ch. 1 Parts 60 & 65.)

☒ Other Describe: Initial Study

2. OVERVIEW

1. The basis for this revision request is (are): (check all that apply)

☐ Physical Change ☐ Improved Methodology/Data ☐ Floodway Revision

☒ Other Describe: Initial Study
Note: A photograph is not required, but is very helpful during review.

2. Flooding Source: Skunk Creek Tributary 6C

3. Project Name/Identifier: Topographic Mapping and Floodplain Delineation Study for Tributaries to Skunk Creek

4. FEMA zone designations affected: X
(example: A, AH, AO, A1-A30, A99, AE, V, V1-V30, VE, B, C, D, X)

5. The NFIP map panel(s) affected for all impacted communities is (are):

Community No.	Community Name	State	Map No.	Panel No.	Effective Date
Ex: 480301 480287	Katy, City Harris County	TX TX	480301 48201C	0005D 0220G	02/08/83 09/28/90
040037	Unincorporated Maricopa County	AZ	04013C	0390E	12/3/93

6. The area of revision encompasses the following types of flooding and structures. Check all that apply.

Types of Flooding	Structures
☒ Riverine	☐ Channelization
☐ Coastal	☐ Levee/Floodwall
☐ Alluvial fan	☐ Bridge/Culvert
☐ Shallow Flooding (e.g. Zones AO and AH)	☐ Dam
☐ Lakes	☐ Fill
☐ Other (describe)	☐ Other (describe)

PLEASE REFER TO THE INSTRUCTIONS FOR THE APPROPRIATE MAILING ADDRESS

4. ENCROACHMENT INFORMATION

1. Does the State have jurisdiction over the floodway or its adoption by communities participating in the NFIP?
☐ Yes ☒ No

If Yes, attach a copy of a letter notifying the appropriate State agency of the floodway revision and documentation of the approval of the revised floodway by the appropriate State agency.

2. Does the development in the floodway cause the 1% annual chance (base) elevation to increase at any location by more than 0.000 feet? ☐ Yes ☐ No ☒ N/A

3. Does the cumulative effect of all development that has occurred since the effective SFHA was originally identified cause the base flood elevation to increase at any location by more than one foot (or other increase limit if community or state has adopted more stringent criteria - even if a floodway has not been delineated by FEMA)? ☐ Yes ☐ No

If the answer to either items is Yes, please attach documentation that all requirements of Section 65.12 of the NFIP regulations have been met, regarding evaluation of alternatives, notice to individual legal property owners, concurrence of CEO, and certification that no insurable structures are impacted.

5. MAINTENANCE RESPONSIBILITY

The community is willing to assume responsibility for ☐ performing ☐ overseeing compliance with the maintenance and operation plans of the
(Name)
flood control structure. If not performed promptly by an owner other than the community, the community will provide the necessary services without cost to the Federal government.

Operation and maintenance plans are attached. ☐ **Yes** ☐ **No** ☒ **N/A**

6. REVIEW FEE

The review fee for the appropriate request category has been included. ☐ Yes Fee amount: $

OR

This request is based on a federally sponsored flood-control project where 50 percent or more of the project's cost is federally sponsored, or the request is based on detailed hydrologic and hydraulic studies conducted by Federal, State, or local agencies to replace approximate studies conducted by FEMA and shown on the effective FIRM; thus the project is fee exempt.
☐ Yes

Please see Instructions for Fee Amounts

7. SIGNATURE

Note: **I understand that my signature indicates that all information submitted in support of this request is correct**

Signature of Revision Requester

Bart S. Bergendahl P.E.
Project Manager
Printed Name and Title of Revision Requester

Tetra Tech ISG/Simons Li and Associates
Company Name

Telephone No.: 602-629-1100 Date: 7-10-00

Note: **Signature indicates that the community understands, from the revision requester, the impacts of the revision on flooding conditions in the community.**

Signature of Community Official

Michael S. Ellgood P.E.
Chief Engineer and General Manager
Printed Name and Title of Community Official

Maricopa County, AZ
Community Name

Telephone No.: 602-506-1501 Date:

CERTIFICATION BY REGISTERED PROFESSIONAL ENGINEER AND/OR LAND SURVEYOR

This certification is in accordance with 44 CFR Ch. 1, Sect 65.2

Signature

Bart S. Bergendahl P.E. Project Manager
Printed Name and Title of Revision Requester

Registr No. 28660 Expires (Date) 3/31/01 State AZ

Type of License/Expertise: Civil Engineer

Check which forms have been included with this request

Form Name and (Number)	Required if .....
☐ **Hydrologic** (3)	new or revised discharges
☒ **Hydraulic** (4)	new or revised water-surface elevations
☒ **Mapping** (5)	floodplain/floodway changes
☐ **Channelization** (6)	channel is modified
☒ **Bridge/Culvert** (7)	addition/revision of bridge/culvert
☐ **Levee/Floodwall** (8)	addition/revision of levee/floodwall
☐ **Coastal** (9)	new or revised coastal elevations
☐ **Coastal Structures** (10)	addition/revision of coastal structure
☐ **Dam** (11)	addition/revision of dam
☐ **Alluvial Fan** (12)	structures proposed on alluvial fan

FEDERAL EMERGENCY MANAGEMENT AGENCY **RIVERINE HYDRAULIC ANALYSIS**	O.M.B No. 3067-0148 Expires April 30, 2001

PUBLIC BURDEN DISCLOSURE NOTICE

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You are not required to respond to this collection of information unless a valid OMB Control Number is displayed in the upper right corner of this form.

Note: Fill out one form for each flooding source studied

Community Name: Unicorporated Maricopa County, AZ

Flooding Source: Skunk Creek Tributary 6C

Project Name/Identifier: Topographic Mapping and Floodplain Delineation Study for Tributaries to Skunk Creek

1. REACH TO BE REVISED

Describe the limits of the revision OR submit a copy of the FIRM with the revision area clearly highlighted.
Copy of FIRM(s) attached depicting area of the revision (highlighted, or circled)? ☒ Yes

Downstream Limit: Skunk Creek Main Stem Confluence

Upstream Limit: River Station 0.923

2. MODELS SUBMITTED

Requirements: for areas which have detailed flooding:	**for areas which do not have detailed flooding**:
Full input and output listings along with files on diskette for each of the models listed below (items 1-4) and a summary of the source of input parameters used in the models must be provided. The summary must include a description of any changes made from model to model (e.g., Duplicate Effective model to Corrected Effective model). At a minimum, the Duplicate Effective (item 1) and the Revised or Post-Project Conditions (item 4) models must be submitted. See instructions for directions on when other models may be required.	Only the 100-year (Base) flood profile is required. A hydraulic model is not required for areas which do not have detailed flooding; however, BFEs may not be added to the revised FIRM. If a hydraulic model is developed for the area, items 3 and 4 described below must be submitted.

If hydraulic models are not developed, hydraulic analyses (including all calculations) for existing or pre-project conditions and revised or post-project conditions must be submitted.

1. Duplicate Effective Model ☐ **Natural** **File Name** _____ ☐ **Floodway** **File Name**

Copies of the hydraulic analysis used in the effective FIS, referred to as the effective models (10-, 50-, 100-, and 500-year multi-profile runs and the floodway run) must be obtained and then reproduced on the requester's equipment to produce the Duplicate Effective model. This is required to assure that the effective models input data has been transferred correctly to the requester's equipment and to assure that the revised data will be integrated into the effective data to provide a continuous FIS model upstream and downstream of the revised reach.

2. Corrected Effective Model ☐ **Natural** **File Name** _____ ☐ **Floodway** **File Name**

The Corrected Effective model is the model that corrects any errors that occur in the Duplicate Effective model, adds any additional cross sections to the Duplicate Effective model, or incorporates more detailed topographic information than that used in the currently effective model. The Corrected Effective model must not reflect any man-made physical changes since the date of the effective model. An error could be a technical error in the modeling procedures, or any construction in the floodplain that occurred prior to the date of the effective model but was not incorporated into the effective model.

3. Existing or Pre-Project Conditions Model ☒ **Natural** **File Name** T_6C PF#1 ☒ **Floodway** **File Name** T_6C PF#2

The Duplicate Effective model or Corrective Effective model is modified to produce the Existing or Pre-Project Conditions model to reflect any modifications that have occurred within the floodplain since the date of the Effective model but prior to the construction of the project for which the revision is being requested. If no modification has occurred since the date of the effective model, then this model would be identical to the Corrected Effective model or Duplicate Effective model.

4. Revised or Post-Project Conditions Model ☐ **Natural** **File Name** _____ ☐ **Floodway** **File Name**

The Existing or Pre-Project Conditions model (or Duplicate Effective model or Corrected Effective model, as appropriate) is revised to reflect revised or post-project conditions. This model must incorporate any physical changes to the floodplain since the effective model was produced as well as the effects of the project. When the request is for the proposed project this model must reflect proposed conditions.

5. Other – Please attach a sheet describing all other models submitted along with the file names. ☐ **Natural** ☐ **Floodway**

PLEASE REFER TO THE INSTRUCTIONS FOR THE APPROPRIATE MAILING ADDRESS

3. STARTING WATER-SURFACE ELEVATIONS

Explain how they were determined. Explanation Attached? ☒ Yes ☐ No

NOTE: If the effective study is an approximate study, the slope/area method is recommended. For detailed analysis studies, using a known water-surface elevation is recommended.

4. RESULTS (from the model used to revise the 100-year water surface elevations)

If the results indicate any of the following, attach an explanation - to this form, or to the hydraulic model printout- as to the reasonableness of the situation.

☐ Supercritical depth ☒ Critical Depth ☐ Drawdowns ☐ Negative Floodway Surcharges

☐ Floodway Surcharges Greater Than Maximum Allowed by Community/State

☐ Water surface elevations higher than the end points of cross sections.

☐ Floodway discharge is different than the Natural 100-year (base) flood discharge.

☐ Project causes 100-year floodplain or floodway elevations to increase (state if increases are located off the requester's property)

Explanation attached with Form ☒ **Explanation provided on attached printout** ☐

If Hydraulic model used is HEC-2, has it been checked with FEMA'S CHECK-2 computer program? ☐ **Yes** ☐ **No**
(see instructions for information on how to obtain CHECK-2)

5. REVISED FIRM/FBFM AND FLOOD PROFILES

1. Profile Transition

a. 100-Year Water-Surface Elevations - indicate the difference in water surface elevations where the project 100-year elevations tie into the existing 100-year water surface elevations at each end of the project.

Downstream End _____ within _____ (feet) Upstream End _____ within _____ (feet)
Cross-Section # *Cross-Section #*

b. Floodway Elevations - indicate the difference in water surface elevations where the project floodway elevations tie into the existing floodway water surface elevations at each end of the project.

Downstream End _____ within _____ (feet) Upstream End _____ within _____ (feet)
Cross-Section # *Cross-Section #*

c. Floodway widths - indicate the difference in floodway widths where the project floodway widths tie into the existing floodway width at each end of the project.

Downstream End _____ within _____ (feet) Upstream End _____ within _____ (feet)
Cross-Section # *Cross-Section #*

2. Profile Checklist (check box if information has been provided on profile)

The following information (unless in parentheses) must be included at the same scale as the existing profiles for this project:

☒ Stream Name ☒ Community Name ☒ Corporate Limits labeled ☒ Study limits labeled

☒ Confluences labeled ☒ Channel Stationing ☒ Streambed profiled ☒ Cross Sections labeled

☒ Horizontal/Vertical Scales indicated ☒ 100-year elevs profiled*

☒ Road Crossings ☒ Labeled ☐ Low Chord Elevations ☒ Top of Road Elevations

*All recurrence intervals in the effective study must also be profiled.

Floodway Data Table

Attach a Floodway Data Table for each cross section listed in the published Floodway Data table in the FIS report.

Floodway Data Table Attached ☒ **Yes** ☐ **Not Required**

FEDERAL EMERGENCY MANAGEMENT AGENCY **RIVERINE / COASTAL MAPPING**	O.M.B No. 3067-0148 Expires April 30, 2001

PUBLIC BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 1.5 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing and reviewing the form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden to: Information Collections Management, Federal Emergency Management Agency, 500 C Street, S.W., Washington DC 20472; and to the Office of Management and Budget, Paperwork Reduction Project (3067-0148), Washington, DC 20503.

You are not required to respond to this collection of information unless a valid OMB Control Number is displayed in the upper right corner of this form.

Note: Fill out one form for each flooding source studied

Community Name: Unicorporated Maricopa County, AZ

Flooding Source: Skunk Creek Tributary 6C

Project Name/Identifier: Topographic Mapping and Floodplain Delineation Study for Tributaries to Skunk Creek

This is a ☐ Manual ☒ Digital submission. *Digital map submissions may be used to update digital FIRMs (DFIRMs). For updating DFIRMs, these submissions must be coordinated with FEMA Headquarters as far in advance as possible.*

1. MAPPING CHANGES

1. A topographic workmap must be submitted showing the following information (check N/A when not applicable):

a. Revised approximate 100-year floodplain boundaries (Zone A)	☐ Yes	☐ No	☒ N/A
b. Revised detailed 100- and 500-year floodplain boundaries.	☐ Yes	☐ No	☒ N/A
c. Revised floodway boundaries	☐ Yes	☐ No	☒ N/A
d. Location and alignment of all cross sections with stationing control indicated.	☒ Yes	☐ No	☐ N/A
e. Stream alignments, road alignments and dam alignments.	☒ Yes	☐ No	☐ N/A
f. Current community boundaries.	☒ Yes	☐ No	☐ N/A
g. Effective 100- year floodplain and floodway boundaries from FIRM/FBFM reduced or enlarged to the scale of the topographic workmap	☒ Yes	☐ No	☐ N/A
h. Tie-ins between the effective and revised 100-, 500-year and floodway boundaries	☒ Yes	☐ No	☐ N/A
i. The requester's property boundaries and community easements	☒ Yes	☐ No	☐ N/A
j. The signed certification of a registered professional engineer	☒ Yes	☐ No	☐ N/A
k. Location and description of reference marks	☒ Yes	☐ No	☐ N/A
l. Vertical datum (example: NGVD, NAVD)	☒ Yes	☐ No	☐ N/A
m. Coastal zone designations tie into adjacent areas not being revised	☐ Yes	☐ No	☒ N/A
n. Location and alignment of all coastal transects used to revise the coastal analyze	☐ Yes	☐ No	☒ N/A
o. V-zone has been delineated to extend landward to the heel of the primary frontal dune	☐ Yes	☐ No	☒ N/A

If any items are marked No or N/A please attach an explanation.

2. What is the source and date of the updated topographic information (example: orthophoto maps, July 1985; filed survey, May 1979, beach profile, June 1987 etc.)? Field and Aerial Survey 1998

3. What is the scale and contour interval of the following workmaps?

Effective FIS Scale _____ Contour Interval

Revision Request Scale _____ Contour Interval

NOTE: Revised topographic information must be of equal or greater detail than effective.

4. Attach an annotated FIRM/FBFM at the scale of the effective FIRM/FBFM showing the revised 100- and 500-year floodplain and the floodway boundaries and how they tie into those shown on the effective FIRM/FBFM downstream and upstream of the revisions or adjacent to the area of revision for coastal studies. **FIRM/FBFM attached?** ☒ **Yes** ☐ **No**

PLEASE REFER TO THE INSTRUCTIONS FOR THE APPROPRIATE MAILING ADDRESS

2. EARTH FILL PLACEMENT

1. The fill is: ☐ Existing ☐ Proposed

2. Has fill been/will be placed in the regulatory floodway? ☐ Yes ☐ No
If Yes, please attach completed Riverine Hydraulic Analysis Form (Form 4).

3. Has fill been/will be placed in floodway fringe (*area between the floodway and 100-year floodplain boundaries*)? ☐ Yes ☐ No

If Yes, then complete A, B, C, and D below.

a. Are fill slopes for granular materials steeper than one vertical on one-and-one-half horizontal? ☐ Yes ☐ No

If Yes, justify steeper slopes

b. Is adequate erosion protection provided for fill slopes exposed to moving flood waters? (*Slopes exposed to flows with velocities of up to 5 feet per second (fps) during the 100-year flood must, at a minimum, be protected by a cover of grass, vines, weeds, or similar vegetation; slopes exposed to flows with velocities greater than 5 fps during the 100-year flood must, at a minimum, be protected by stone or rock riprap.)*

☐ Yes ☐ No

If No, describe erosion protection provided

c. Has all fill placed in revised 100-year floodplain been compacted to 95 percent of the maximum density obtainable with the Standard Proctor Test Method or acceptable equivalent method? ☐ Yes ☐ No

d. Can structures conceivably be constructed on the fill at any time in the future? ☐ Yes ☐ No

If Yes, attach certification of fill compaction (item 3c. above) by the community's NFIP permit official, a registered professional engineer, or an accredited soils engineer in accordance with Subparagraph 65.5(a)(6) of the NFIP regulations.

Fill certification attached ☐ **Yes** ☐ **No**

4. Has fill been/will be placed in a V zone? ☐ Yes ☐ No

If Yes, is the fill protected from erosion by a flood control structure such as a revetment or seawall?

☐ Yes ☐ No

If Yes, attach the Coastal Structures Form (Form 10).

FEDERAL EMERGENCY MANAGEMENT AGENCY **REVISION REQUESTER AND COMMUNITY OFFICIAL**	O.M.B No. 3067-0148 Expires April 30, 2001

Public reporting burden for this form is estimated to average 2.13 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing and reviewing the form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden to: Information Collections Management, Federal Emergency Management Agency, 500 C Street, S.W., Washington DC 20472; and to the Office of Management and Budget, Paperwork Reduction Project (3067-0148), Washington, DC 20503.

You are not required to respond to this collection of information unless a valid OMB Control Number is displayed in the upper right corner of this form.

1. REQUESTED RESPONSE FROM FEMA

This request is for a:

☐ CLOMR A letter from FEMA commenting on whether a proposed project, if built as proposed, would justify a map revision, or proposed hydrology changes (See 44 CFR Ch. 1, Parts 60,65 & 72).

☐ LOMR A letter from FEMA officially revising the current NFIP map to show the changes to floodplains, floodway or flood elevations. LOMRs typically decrease flood hazards. (See 44 CFR Ch. 1 Parts 60 & 65.)

☒ Other Describe: Initial Study

2. OVERVIEW

1. The basis for this revision request is (are): (check all that apply)

☐ Physical Change ☐ Improved Methodology/Data ☐ Floodway Revision

☒ Other Describe: Initial Study
Note: A photograph is not required, but is very helpful during review.

2. Flooding Source: Skunk Creek Tributary 6B

3. Project Name/Identifier: Topographic Mapping and Floodplain Delineation Study for Tributaries to Skunk Creek

4. FEMA zone designations affected: X
(example: A, AH, AO, A1-A30, A99, AE, V, V1-V30, VE, B, C, D, X)

5. The NFIP map panel(s) affected for all impacted communities is (are):

Community No.	Community Name	State	Map No.	Panel No.	Effective Date
Ex: 480301 480287	Katy, City Harris County	TX TX	480301 48201C	0005D 0220G	02/08/83 09/28/90
040037	Unincorporated Maricopa County	AZ	04013C	0390E	12/3/93

6. The area of revision encompasses the following types of flooding and structures. Check all that apply.

Types of Flooding	Structures
☒ Riverine	☐ Channelization
☐ Coastal	☐ Levee/Floodwall
☐ Alluvial fan	☒ Bridge/Culvert
☐ Shallow Flooding (e.g. Zones AO and AH)	☐ Dam
☐ Lakes	☐ Fill
☐ Other (describe)	☐ Other (describe)

PLEASE REFER TO THE INSTRUCTIONS FOR THE APPROPRIATE MAILING ADDRESS

4. ENCROACHMENT INFORMATION

1. Does the State have jurisdiction over the floodway or its adoption by communities participating in the NFIP?
   ☐ Yes ☒ No

If Yes, attach a copy of a letter notifying the appropriate State agency of the floodway revision and documentation of the approval of the revised floodway by the appropriate State agency.

2. Does the development in the floodway cause the 1% annual chance (base) elevation to increase at any location by more than 0.000 feet? ☐ Yes ☐ No ☒ N/A

3. Does the cumulative effect of all development that has occurred since the effective SFHA was originally identified cause the base flood elevation to increase at any location by more than one foot (or other increase limit if community or state has adopted more stringent criteria - even if a floodway has not been delineated by FEMA)? ☐ Yes ☐ No

If the answer to either items is Yes, please attach documentation that all requirements of Section 65.12 of the NFIP regulations have been met, regarding evaluation of alternatives, notice to individual legal property owners, concurrence of CEO, and certification that no insurable structures are impacted.

5. MAINTENANCE RESPONSIBILITY

The community is willing to assume responsibility for ☐ performing ☐ overseeing compliance with the maintenance and operation plans of the
(Name)
flood control structure. If not performed promptly by an owner other than the community, the community will provide the necessary services without cost to the Federal government.

Operation and maintenance plans are attached. ☐ **Yes** ☐ **No** ☒ **N/A**

6. REVIEW FEE

The review fee for the appropriate request category has been included. ☐ Yes Fee amount: $

OR

This request is based on a federally sponsored flood-control project where 50 percent or more of the project's cost is federally sponsored, or the request is based on detailed hydrologic and hydraulic studies conducted by Federal, State, or local agencies to replace approximate studies conducted by FEMA and shown on the effective FIRM; thus the project is fee exempt.
☐ Yes

Please see Instructions for Fee Amounts

7. SIGNATURE

Note: **I understand that my signature indicates that all information submitted in support of this request is correct**

Signature of Revision Requester

Bart S. Bergendahl P.E.
Project Manager
Printed Name and Title of Revision Requester

Tetra Tech ISG/Simons Li and Associates
Company Name

Telephone No.: 602-629-1100 Date: 7-10-00

Note: **Signature indicates that the community understands, from the revision requester, the impacts of the revision on flooding conditions in the community.**

Signature of Community Official

Michael S. Ellgood P.E.
Chief Engineer and General Manager
Printed Name and Title of Community Official

Maricopa County, AZ
Community Name

Telephone No.: 602-506-1501 Date:

CERTIFICATION BY REGISTERED PROFESSIONAL ENGINEER AND/OR LAND SURVEYOR

This certification is in accordance with 44 CFR Ch. 1, Sect 65.2

Signature

Bart S. Bergendahl P.E. Project Manager
Printed Name and Title of Revision Requester

Registr No. 28660 Expires (Date) 3/31/01 State AZ

Type of License/Expertise: Civil Engineer

Check which forms have been included with this request

Form Name and (Number)	Required if .....
☐ **Hydrologic** (3)	new or revised discharges
☒ **Hydraulic** (4)	new or revised water-surface elevations
☒ **Mapping** (5)	floodplain/floodway changes
☐ **Channelization** (6)	channel is modified
☒ **Bridge/Culvert** (7)	addition/revision of bridge/culvert
☐ **Levee/Floodwall** (8)	addition/revision of levee/floodwall
☐ **Coastal** (9)	new or revised coastal elevations
☐ **Coastal Structures** (10)	addition/revision of coastal structure
☐ **Dam** (11)	addition/revision of dam
☐ **Alluvial Fan** (12)	structures proposed on alluvial fan

FEDERAL EMERGENCY MANAGEMENT AGENCY **RIVERINE HYDRAULIC ANALYSIS**	O.M.B No. 3067-0148 Expires April 30, 2001

PUBLIC BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 2.25 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing and reviewing the form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden to: Information Collections Management, Federal Emergency Management Agency, 500 C Street, S.W., Washington DC 20472; and to the Office of Management and Budget, Paperwork Reduction Project (3067-0148), Washington, DC 20503.

You are not required to respond to this collection of information unless a valid OMB Control Number is displayed in the upper right corner of this form.

Note: Fill out one form for each flooding source studied

Community Name: Unicorporated Maricopa County, AZ

Flooding Source: Skunk Creek Tributary 6B

Project Name/Identifier: Topographic Mapping and Floodplain Delineation Study for Tributaries to Skunk Creek

1. REACH TO BE REVISED

Describe the limits of the revision OR submit a copy of the FIRM with the revision area clearly highlighted.
Copy of FIRM(s) attached depicting area of the revision (highlighted, or circled)? ☒ Yes

Downstream Limit: Skunk Creek Main Stem Confluence

Upstream Limit: Tonto National Forest Property Boundary

2. MODELS SUBMITTED

Requirements: for areas which have detailed flooding:	**for areas which do not have detailed flooding:**
Full input and output listings along with files on diskette for each of the models listed below (items 1-4) and a summary of the source of input parameters used in the models must be provided. The summary must include a description of any changes made from model to model (e.g., Duplicate Effective model to Corrected Effective model). At a minimum, the Duplicate Effective (item 1) and the Revised or Post-Project Conditions (item 4) models must be submitted. See instructions for directions on when other models may be required.	Only the 100-year (Base) flood profile is required. A hydraulic model is not required for areas which do not have detailed flooding; however, BFEs may not be added to the revised FIRM. If a hydraulic model is developed for the area, items 3 and 4 described below must be submitted.

If hydraulic models are not developed, hydraulic analyses (including all calculations) for existing or pre-project conditions and revised or post-project conditions must be submitted.

1. Duplicate Effective Model ☐ **Natural** **File Name** _____ ☐ **Floodway** **File Name**
Copies of the hydraulic analysis used in the effective FIS, referred to as the effective models (10-, 50-, 100-, and 500-year multi-profile runs and the floodway run) must be obtained and then reproduced on the requester's equipment to produce the Duplicate Effective model. This is required to assure that the effective models input data has been transferred correctly to the requester's equipment and to assure that the revised data will be integrated into the effective data to provide a continuous FIS model upstream and downstream of the revised reach.

2. Corrected Effective Model ☐ **Natural** **File Name** _____ ☐ **Floodway** **File Name**
The Corrected Effective model is the model that corrects any errors that occur in the Duplicate Effective model, adds any additional cross sections to the Duplicate Effective model, or incorporates more detailed topographic information than that used in the currently effective model. The Corrected Effective model must not reflect any man-made physical changes since the date of the effective model. An error could be a technical error in the modeling procedures, or any construction in the floodplain that occurred prior to the date of the effective model but was not incorporated into the effective model.

3. Existing or Pre-Project Conditions Model ☒ **Natural** **File Name** T_6B PF#1 ☒ **Floodway** **File Name** T_6B PF#2
The Duplicate Effective model or Corrective Effective model is modified to produce the Existing or Pre-Project Conditions model to reflect any modifications that have occurred within the floodplain since the date of the Effective model but prior to the construction of the project for which the revision is being requested. If no modification has occurred since the date of the effective model, then this model would be identical to the Corrected Effective model or Duplicate Effective model.

4. Revised or Post-Project Conditions Model ☐ **Natural** **File Name** _____ ☐ **Floodway** **File Name**
The Existing or Pre-Project Conditions model (or Duplicate Effective model or Corrected Effective model, as appropriate) is revised to reflect revised or post-project conditions. This model must incorporate any physical changes to the floodplain since the effective model was produced as well as the effects of the project. When the request is for the proposed project this model must reflect proposed conditions.

5. Other – Please attach a sheet describing all other models submitted along with the file names. ☐ **Natural** ☐ **Floodway**

PLEASE REFER TO THE INSTRUCTIONS FOR THE APPROPRIATE MAILING ADDRESS

3. STARTING WATER-SURFACE ELEVATIONS

Explain how they were determined. Explanation Attached? ☒ Yes ☐ No

NOTE: If the effective study is an approximate study, the slope/area method is recommended. For detailed analysis studies, using a known water-surface elevation is recommended.

4. RESULTS (from the model used to revise the 100-year water surface elevations)

If the results indicate any of the following, attach an explanation - to this form, or to the hydraulic model printout- as to the reasonableness of the situation.

☐ Supercritical depth ☒ Critical Depth ☐ Drawdowns ☐ Negative Floodway Surcharges

☐ Floodway Surcharges Greater Than Maximum Allowed by Community/State

☐ Water surface elevations higher than the end points of cross sections.

☐ Floodway discharge is different than the Natural 100-year (base) flood discharge.

☐ Project causes 100-year floodplain or floodway elevations to increase (state if increases are located off the requester's property)

Explanation attached with Form ☒ **Explanation provided on attached printout** ☐

If Hydraulic model used is HEC-2, has it been checked with FEMA'S CHECK-2 computer program? ☐ **Yes** ☐ **No**
(see instructions for information on how to obtain CHECK-2)

5. REVISED FIRM/FBFM AND FLOOD PROFILES

1. Profile Transition

a. 100-Year Water-Surface Elevations - indicate the difference in water surface elevations where the project 100-year elevations tie into the existing 100-year water surface elevations at each end of the project.

Downstream End _____ within _____ (feet) *Cross-Section #*
Upstream End _____ within _____ (feet) *Cross-Section #*

b. Floodway Elevations - indicate the difference in water surface elevations where the project floodway elevations tie into the existing floodway water surface elevations at each end of the project.

Downstream End _____ within _____ (feet) *Cross-Section #*
Upstream End _____ within _____ (feet) *Cross-Section #*

c. Floodway widths - indicate the difference in floodway widths where the project floodway widths tie into the existing floodway width at each end of the project.

Downstream End _____ within _____ (feet) *Cross-Section #*
Upstream End _____ within _____ (feet) *Cross-Section #*

2. Profile Checklist (check box if information has been provided on profile)

The following information (unless in parentheses) must be included at the same scale as the existing profiles for this project:

☒ Stream Name ☒ Community Name ☒ Corporate Limits labeled ☒ Study limits labeled

☒ Confluences labeled ☒ Channel Stationing ☒ Streambed profiled ☒ Cross Sections labeled

☒ Horizontal/Vertical Scales indicated ☒ 100-year elevs profiled*

☒ Road Crossings ☒ Labeled ☐ Low Chord Elevations ☒ Top of Road Elevations

*All recurrence intervals in the effective study must also be profiled.

Floodway Data Table

Attach a Floodway Data Table for each cross section listed in the published Floodway Data table in the FIS report.

Floodway Data Table Attached ☒ **Yes** ☐ **Not Required**

FEDERAL EMERGENCY MANAGEMENT AGENCY **RIVERINE / COASTAL MAPPING**	O.M.B No. 3067-0148 Expires April 30, 2001

PUBLIC BURDEN DISCLOSURE NOTICE

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You are not required to respond to this collection of information unless a valid OMB Control Number is displayed in the upper right corner of this form.

Note: Fill out one form for each flooding source studied

Community Name: Unicorporated Maricopa County, AZ

Flooding Source: Skunk Creek Tributary 6B

Project Name/Identifier: Topographic Mapping and Floodplain Delineation Study for Tributaries to Skunk Creek

This is a ☐ Manual ☒ Digital submission. *Digital map submissions may be used to update digital FIRMs (DFIRMs). For updating DFIRMs, these submissions must be coordinated with FEMA Headquarters as far in advance as possible.*

1. MAPPING CHANGES

1. A topographic workmap must be submitted showing the following information (check N/A when not applicable):

a. Revised approximate 100-year floodplain boundaries (Zone A)	☐ Yes	☐ No	☒ N/A
b. Revised detailed 100- and 500-year floodplain boundaries.	☐ Yes	☐ No	☒ N/A
c. Revised floodway boundaries	☐ Yes	☐ No	☒ N/A
d. Location and alignment of all cross sections with stationing control indicated.	☒ Yes	☐ No	☐ N/A
e. Stream alignments, road alignments and dam alignments.	☒ Yes	☐ No	☐ N/A
f. Current community boundaries.	☒ Yes	☐ No	☐ N/A
g. Effective 100- year floodplain and floodway boundaries from FIRM/FBFM reduced or enlarged to the scale of the topographic workmap	☒ Yes	☐ No	☐ N/A
h. Tie-ins between the effective and revised 100-, 500-year and floodway boundaries	☒ Yes	☐ No	☐ N/A
i. The requester's property boundaries and community easements	☒ Yes	☐ No	☐ N/A
j. The signed certification of a registered professional engineer	☒ Yes	☐ No	☐ N/A
k. Location and description of reference marks	☒ Yes	☐ No	☐ N/A
l. Vertical datum (example: NGVD, NAVD)	☒ Yes	☐ No	☐ N/A
m. Coastal zone designations tie into adjacent areas not being revised	☐ Yes	☐ No	☒ N/A
n. Location and alignment of all coastal transects used to revise the coastal analyze	☐ Yes	☐ No	☒ N/A
o. V-zone has been delineated to extend landward to the heel of the primary frontal dune	☐ Yes	☐ No	☒ N/A

If any items are marked No or N/A please attach an explanation.

2. What is the source and date of the updated topographic information (example: orthophoto maps, July 1985; filed survey, May 1979, beach profile, June 1987 etc.)? Field and Aerial Survey 1998

3. What is the scale and contour interval of the following workmaps?

Effective FIS Scale _____ Contour Interval

Revision Request Scale _____ Contour Interval

NOTE: Revised topographic information must be of equal or greater detail than effective.

4. Attach an annotated FIRM/FBFM at the scale of the effective FIRM/FBFM showing the revised 100- and 500-year floodplain and the floodway boundaries and how they tie into those shown on the effective FIRM/FBFM downstream and upstream of the revisions or adjacent to the area of revision for coastal studies. **FIRM/FBFM attached?** ☒ **Yes** ☐ **No**

PLEASE REFER TO THE INSTRUCTIONS FOR THE APPROPRIATE MAILING ADDRESS

2. EARTH FILL PLACEMENT

1. The fill is: ☐ Existing ☐ Proposed

2. Has fill been/will be placed in the regulatory floodway? ☐ Yes ☐ No
If Yes, please attach completed Riverine Hydraulic Analysis Form (Form 4).

3. Has fill been/will be placed in floodway fringe (*area between the floodway and 100-year floodplain boundaries*)? ☐ Yes ☐ No

If Yes, then complete A, B, C, and D below.

a. Are fill slopes for granular materials steeper than one vertical on one-and-one-half horizontal? ☐ Yes ☐ No

If Yes, justify steeper slopes

b. Is adequate erosion protection provided for fill slopes exposed to moving flood waters? (*Slopes exposed to flows with velocities of up to 5 feet per second (fps) during the 100-year flood must, at a minimum, be protected by a cover of grass, vines, weeds, or similar vegetation; slopes exposed to flows with velocities greater than 5 fps during the 100-year flood must, at a minimum, be protected by stone or rock riprap.)*

☐ Yes ☐ No

If No, describe erosion protection provided

c. Has all fill placed in revised 100-year floodplain been compacted to 95 percent of the maximum density obtainable with the Standard Proctor Test Method or acceptable equivalent method? ☐ Yes ☐ No

d. Can structures conceivably be constructed on the fill at any time in the future? ☐ Yes ☐ No

If Yes, attach certification of fill compaction (item 3c. above) by the community's NFIP permit official, a registered professional engineer, or an accredited soils engineer in accordance with Subparagraph 65.5(a)(6) of the NFIP regulations.

Fill certification attached ☐ **Yes** ☐ **No**

4. Has fill been/will be placed in a V zone? ☐ Yes ☐ No

If Yes, is the fill protected from erosion by a flood control structure such as a revetment or seawall?

☐ Yes ☐ No

If Yes, attach the Coastal Structures Form (Form 10).

FEDERAL EMERGENCY MANAGEMENT AGENCY **BRIDGE/CULVERT**	O.M.B. Burden No. 3067-0148 Expires April 30, 2001

PUBLIC BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 2 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing and reviewing the form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden to: Information Collections Management, Federal Emergency Management Agency, 500 C Street, S.W., Washington, DC 20472; and to the Office of Management and Budget, Paperwork Reduction Project (3067-0148), Washington, DC 20503.

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Community Name: Unicorporated Maricopa County, AZ

Flooding Source: Skunk Creek Tributary 6B

Project Name/Identifier: Topographic Mapping and Floodplain Delineation Study for Tributaries to Skunk Creek

1. IDENTIFIER

1. Name of structure (roadway, railroad, etc.): Mingus Lane Concrete Box Culvert

2. Location of bridge/culvert along flooding source (in terms of stream distance or cross-section identifier):

   1.483

3. This revision reflects (check one of the following):

   ☒ New bridge/culvert not modeled in the FIS

   ☐ Modified bridge/culvert previously modeled in the FIS

   ☐ New analysis of bridge/culvert previously modeled in the FIS

4. Hydraulic model used to analyze the structure *(e.g., HEC-2 with special bridge routine, WSPRO, HY8)*

   HEC-RAS

   If different than hydraulic analysis for the flooding source, justify why the hydraulic analysis used for the flooding source could not analyze the structure(s). *(Attach justification)*

   Justification attached ☐ **Yes** ☐ **No** ☒ **N/A**

PLEASE REFER TO THE INSTRUCTIONS FOR THE APPROPRIATE MAILING ADDRESS

2. DRAWING CHECKLIST

Attach plans of the structure(s) certified by a registered professional engineer. The plan detail and information should include the following (check the boxes if the information has been provided):

- ☒ Dimensions (height, width, span, radius, length)
- ☒ Shape (culverts only)
- ☒ Material
- ☒ Beveling or Rounding
- ☒ Wing Wall Angle
- ☐ Low Chord Elevations - Upstream and Downstream
- ☒ Top of Road Elevations - Upstream and Downstream
- ☒ Structure Invert Elevations - Upstream and Downstream
- ☒ Stream Invert Elevations - Upstream and Downstream
- ☒ Skew Angle
- ☒ Cross-Section Locations
- ☒ Distances Between Cross Sections
- ☐ Erosion Protection

3. SEDIMENT TRANSPORT CONSIDERATIONS

If there is any indication from historical records that sediment transport (including scour and deposition) can affect the 100-year (base flood) water-surface elevations; and/or based on the stream geomorphology, vegetative cover, development of the watershed and bank conditions, there is a potential for debris and sediment transport (including sewer and deposition) to affect the base flood elevations, then provide the following information **(Check the box if provided):**

- ☐ Estimated sediment load
- ☐ Method used to estimate sediment transport
- ☐ Method used to estimate scour and/or deposition
- ☐ Method used to revise hydraulic or hydrologic analysis (model) to account for sediment transport