Memorandum JE Fuller/ Hydrology & Geomorphology, Inc.

DATE: November 28, 2001

TO: Joe Tram, P.E. - FCDMC

FROM: W. Scott Ogden, P.E.

RE: FCDMC On Call 2000C013 – Task 12
Detailed Floodplain Delineation
T1SR5WS17
Zone A Study Sections 5 to 30

CC: Jon Fuller, P.E. – JE Fuller

FINAL

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Registered Professional Engineer (Civil)
CERTIFICATE NO. 28857
W. SCOTT OGDEN
Date Signed 11/29/01
ARIZONA, U.S.A.

INTRODUCTION

This technical memorandum summarizes the assumptions made and procedures implemented for conducting the hydrology, hydraulics, floodplain delineation and floodplain mapping work of Task 12 of the FCDMC 2000C013 on-call contract. The purpose of Task 12 was to perform sufficient analyses, modeling, and floodplain delineation mapping to update a target reach of wash from Zone A to a Zone AE complete with base flood elevations and a jurisdictional floodway. The results of this task will be used by the Flood Control District of Maricopa County (District) to perform in-house floodplain management of the newly created Zone A floodplains.

PROJECT LOCATION

The project area is generally located within Sections 6, 7, and 8, Township 1 South, Range 5 West, Gila & Salt River Base & Meridian, Maricopa County, Arizona. The specific study area is in Unincorporated Maricopa County and is generally north or the Southern Pacific Railroad, south of Baseline Road, east of 353rd Avenue and west of 345th Avenue. A recent FCDMC floodplain delineation contract entitled; *Zone A – Floodplain Delineation of Watershed "PP", Luke Wash* [1] (herein referred to as the Zone A Study), has delineated and mapped several unnumbered A zone flood hazard areas for Watershed "PP" using approximate methods. One of the watercourses within that study area, T1SR5WS17 is the focus of this detailed floodplain delineation analyses. More specifically, the study reach primarily lies between Sections 5 and 30, with approximately 1,600 feet of additional delineation downstream of Section 5. Pertinent excerpts from the Zone A Study are provided in Appendix A for reference.

PROJECT MAPPING

Base topographic mapping, orthophotography, and mass point files for this project were provided by the District and were originally developed as a part of the Zone A Study. The topographic mapping is based on LIDAR technology, which is capable of producing an extremely dense network of individual elevation points. The contour mapping

[1] Entellus, 2000, *Zone A – Floodplain Delineation of Watershed "PP", Luke Wash*, FCD 99-03, Technical Data Notebook Volumes 1 and 2.

provided, however, does not accurately depict the topography along the bottom area of the watercourse where heavy vegetation exists. This is due to LIDAR's inability to effectively remove those points that are actually shots on the tree canopy or the top of a bush, etc. These tree and bush top points tend to skew the contour mapping in the more heavily vegetated areas. Accordingly, the mass point file was loaded and the cross sections were hand-digitized using the appropriate mass spot elevations that were considered to reflect the ground surface rather than the tree canopy. The study reach was also checked during the field reconnaissance to generally verify the cross section data selections.

REACH DESCRIPTION

The study reach of River T1SR5WS17 is characterized by a broad and shallow floodplain with no significant low flow wash or main low flow conveyance. Small rill cuts that are typically less than one foot deep and three feet wide begin and end intermittently along the lowest portion of the watercourse. However, there is no continuous low flow wash. a storm with moderately heavy rainfall directly impacted the study area. The lowest portion of the conveyance area is typically heavily vegetated. The density of vegetation significantly reduces in the areas that begin to elevate above the low areas.

On a larger scale, watercourse is generally situated within the alluvial plain of the piedmont with a shallow ridge and valley formation that defines the watercourse. The valley slope is generally less than 0.5 percent. The valley width is approximately 1,000 to 1,500 feet wide and is flanked on either side by defining ridges that rise 15 to 20 feet above the valley floor.

A field visit to the study area and reach of watercourse to be delineated was conducted on July 14, 2001. According to FCDMC gage data for the area, a moderately sized storm occurred on July 6, 2001 with almost 1.5 inches of rainfall falling within a period of approximately four hours. The resultant flooding within the study reach was photographed and noted during the field reconnaissance. Copies of those photographs are included in Appendix B. Evidence of flooding could be seen along almost the entire valley floor area.

HYDROLOGY

The peak 100-year discharge estimated in the Zone A Study for cross sections 5 to 30 was reported as 4,900 cfs. An interim point of concentration was added at the Dobbins Road alignment to refine the discharge used to delineate the reach upstream of Dobbins Road. Using the methods and discharge relation established in the Zone A Study, an intermediate peak discharge of 4,590 cfs was determined at Dobbins Road. Supporting calculations and maps are provided in Appendix C.

HECRAS HYDRAULIC MODELING

HECRAS version 3.0 was used to hydraulically model the study reach for this task. The following discussions briefly summarize the procedures used to develop the modeling parameters and geometry.

Reach Geometry – there is a single river and reach modeled in this task. The river designations follow the Zone A Study naming convention. The reaches are named to correspond to the reach between the Zone A Study cross section numbers. Cross section numbers are derived by adding the distance in river miles that the cross section is located upstream of the last Zone A Study cross section location. For example, cross section 5.125 is located 0.125 miles upstream of the Zone A Study Cross Section 5, and cross section 20.125 is located 0.125 miles upstream of the Zone A Study Cross Section 20.

Roughness Coefficients – the Manning's n values used in the Zone A Study are generally adopted for this study with only minor adjustments to the main channel and overbank values to compensate for difference in bank station locations. The selected values are summarized in the HECRAS output provided in Appendix D.

C & E Coefficients – all C&E coefficients are set to 0.1 and 0.3, since the overall floodplain limits appear to change gradually.

Cross Sections – the cross sections for this task were generated using the LIDAR mass point files and notes made during the field visit. A baseline station of 100+00 (10,000) is set for all of the cross sections at the thalweg line. The cross sections are oriented to be perpendicular to the 100-year floodplain and not necessarily to the thalweg line. Left and right bank stations were set to bracket the lowest portion of the watercourse and to allow for the development of a floodway.

A water storage pond or stock tank of some kind currently exists in the northwest corner of. The tank is rimmed with a concrete curb and is apparently filled using well water. The rim of the tank is elevated approximately 2 to 3 feet above the surrounding grade, the effect of which is to block the overbank flows and force them around the tank. Similarly, a residential structure exists in the northeast corner of Dobbins Road and 351st Avenue (left overbank area at cross sections 2.060 and 2.067). The combined affect of the two structures forces most of the runoff into the gap between them, concentrating and accelerating the flows as they continue southerly. Some of the flows will pass to east of the residence as well. This condition poses a significant flooding hazard to both motorists and the residence.

It should be noted that the bank stations are not equivalent to those used in the Zone A Study cross sections. Cross section plots are included Appendix E.

Boundary Conditions – the upstream starting water surface conditions were set to start with normal depth. The approximate energy slope was set equal to the slope used in the Zone A Study for those reaches (see Plate 3 in the Zone A Study). The downstream starting water surface elevation was set to 865.00 feet based on the overtopping analyses performed in the Zone A Study for the Southern Pacific Railroad crossing. Pertinent excerpts from the Zone A Study are provided in Appendix A.

Floodway Encroachments – with the exception of Sections 1.247 and 1.313, initial encroachment stations were estimated using floodway Method 4 (equal conveyance reduction) and a target value of 1.0 foot. Once the encroachment limits were acceptable and the rise in water surface was less than 1.0 foot, the Method 4 results were then converted to Method 1 (user defined values). Sections 1.247 and 1.313 were not encroached to produce the one foot rise due to the resulting floodway width being too narrow.

FINAL RESULTS

The HECRAS floodplain and floodway modeling results are summarized in a tabular format similar to the typical FIS study data tables and provided in Appendix F. General output from the HECRAS model are provided in Appendix D. The floodplain and floodway limits, along with base flood and surcharged elevations, are indicated on Exhibit 1 in Appendix G and on Plate 1 which is included in a pocket in Appendix H. A diskette with the HECRAS files is provided in Appendix I.

The HECRAS modeling results indicate that a total of **seven** residential structures exist within the floodplain, with **three** structures in the floodway and **four** structures within the floodway fringe.

APPENDIX A

Flood Control District of Maricopa County

ZONE A - FLOOPLAIN DELINEATION OF WATERSHED "PP" LUKE WASH F.C.D. CONTRACT NO. 99-03

Technical Data Notebook

Volume 1 of 2

Prepared by:

Intelligent Engineering
Environmental *Solutions*

Entellus™

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October, 2000

Table D.2
Flow Calculations

(listed from south to north, west to east)

Wash	Basin ID No.	Conc. Point	Location	Area [sqmls]	100 yr Flow [cfs]
T1S-R5W-S29	44,43,42,41,40	44	Arlington Canal	6.349	2990
T1S-R5W-S29W	42,41	43L	Ray Rd. Align.	1.706	1250
	42,41,44,43	43C	Ray Rd. Align.	5.590	2750
T1S-R5W-S29E	44	42	Southern Pac R/R	2.354	1550
	44.43	43R	Extension	3.884	2160
	44,43,42,41	43C	Extension	5.590	2750
T1S-R5W-S17	10,12,48	45L	Van Buren	3.722	2100
	10,12,48,47A,16	45C	Van Buren	5.112	2590
	10,12,48,47,16	46	Lower Buckeye	6.910	3160
	10,12,48,47,16,46	47	Salome Highway	8.474	3620
	10,12,48,47,16,46,45	48	Southern Pac R/R	13.391	4900
T2N-R6W-S35	10	25	Indian School Rd	1.190	990
	10,12	26	I-10	3.096	1860
T1N-R6W-S11	16	63	I-10	0.313	410
	16,47A	45R	Van Buren	1.391	1090
T2N-R6W-S36	4	21	Glendale Ave	1.144	960
	4,8	22	Bethany Home Rd.	1.685	1240
	4,8,11	23	Indian School Rd	2.097	1430
	4,8,11,15A	24L	I-10	2.946	1800
	4,8,11,15(15A,15B)	24	I-10	3.488	2010
	4,8,11,15,55B	55L	McDowell	3.591	2050
T2N-R6W-S36W	15B	24R	I-10	0.542	590
T1S-R5W-S32	Phillips,59	59C	Broadway Align.	18.537	6930
(LUKE WASH)	Phillips,59,51B	50R	Salome Highway	22.216	7650
	Phillips,59,51	50C	Salome Highway	23.388	7880
	Phillips,59,51,50	49	Southern Pac R/R	26.091	8390
T1N-R5W-S32	51A	50L	Salome Highway	1.172	980
T1N-R6W-S12	53A	54L	Van Buren	0.644	660
T1S-R6W-S13	1,2,5,9,7,17	20	I-10	7.944	3470
(PHILLIPS SOUTH)	1,2,5,9,7,17,55A	55R	McDowell	8.030	3490
	1,2,5,9,7,17,55A,(4,8,11,15,55B)	55C	McDowell	11.621	4460
	1,2,5,9,7,17,55A,(4,8,11,15,55B),54	54R	Van Buren	12.182	4600
	1,2,5,9,7,17,4,8,11,15,55,54,53A	54C	Van Buren	12.826	4760
	1,2,5,9,7,17,4,8,11,15,55,54,53	53L	Lower Buckeye	13.591	4950
	1,2,5,9,7,17,4,8,11,15,55,54,53,Dickey	53C	Confluenc Dickey	19.398	6260
	1,2,5,9,7,17,4,8,11,15,55,54,53,Dickey,52	59L	Broadway Align.	19.712	6330
T2N-R5W-S31W	1	6L	Dunlap	0.908	820
(PHIILLIPS NORTH)	1,2	6	Dunlap	2.050	1410
	1,2,5	17	Glendale Ave	2.583	1650
	1,2,5,9A	18L	Bethany Home Rd.	3.457	2000
	1,2,5,9A,9B	18	Bethany Home Rd.	3.770	2120
	1,2,5,9(9A,9B,9C)	19R	Indian School Rd	4.809	2490
	1,2,5,9,7	19C	Indian School Rd	7.174	3240
	1,2,5,9,7,17	20	I-10	7.944	3470
T2N-R5W-S19	7	19L	Indian School Rd	2.366	1550
T2N-R5W-S08	9B	18R	Bethany Home Rd.	0.313	410

Appendix E-4: Culvert Calculations
Zone A Delineation of Watershed "PP"
Luke Wash FCD 99-03

Concentration Point 48: Railroad Culvert Crossing

	Culvert 1		Culvert 2		Culvert 3	
	Left	Right	Left	Right	Left	Right
Top El [ft]	860.14	860.24	860.24	860.29	860.29	860.36
Bottom El [ft]	856.77	852.08	852.08	852.16	852.16	857.63
height [ft]	5.765		8.145		5.43	
width [ft]	13		14		13	

Weir Flow Over RailRoad

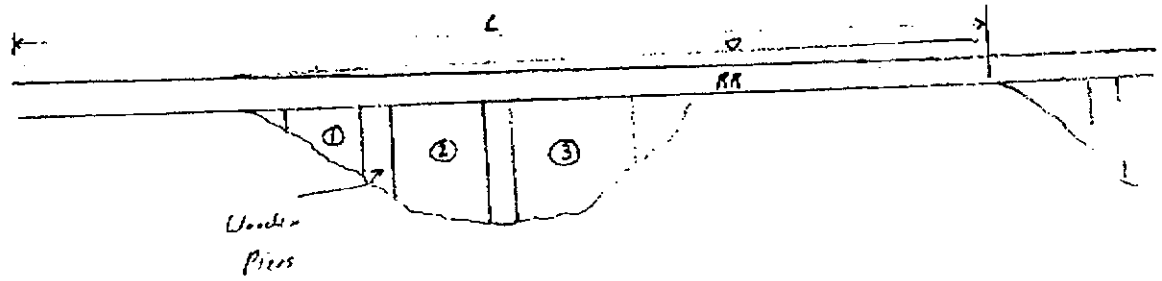
w/s elevation [ft]	H [ft]	L [ft]	Q_3 [cfs]	HW/D [ft/ft]	Q/B_1 [cfs/ft]	Q [cfs]	HW/D [ft/ft]	Q/B_1 [cfs/ft]	Q [cfs]	HW/D [ft/ft]	Q/B_1 [cfs/ft]	Q [cfs]	Q Total [cfs]
864	0	45	0	1.66	62	806	1.46	96	1344	1.68	57	741	2891
866	2	1500	11455.1	2.01	78	1014	1.70	110	1540	2.05	68	884	14893
884.5	0.5	1250	1193.24	1.75	66	884	1.52	100	1400	1.77	58	754	4231
885	1	1300	3510	1.83	70	910	1.58	100	1400	1.86	63	819	6639
Top Of Structure Elevation [ft]						864							

Overtopping Capacity

Target Q = 4900
w/s = 864.6

[1] From Chart 8

[2] From $Q=CLH^{3/2}$, C = 2.7



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Fax # 480-839-2193		Phone # 602-506-4605	
		Fax #	

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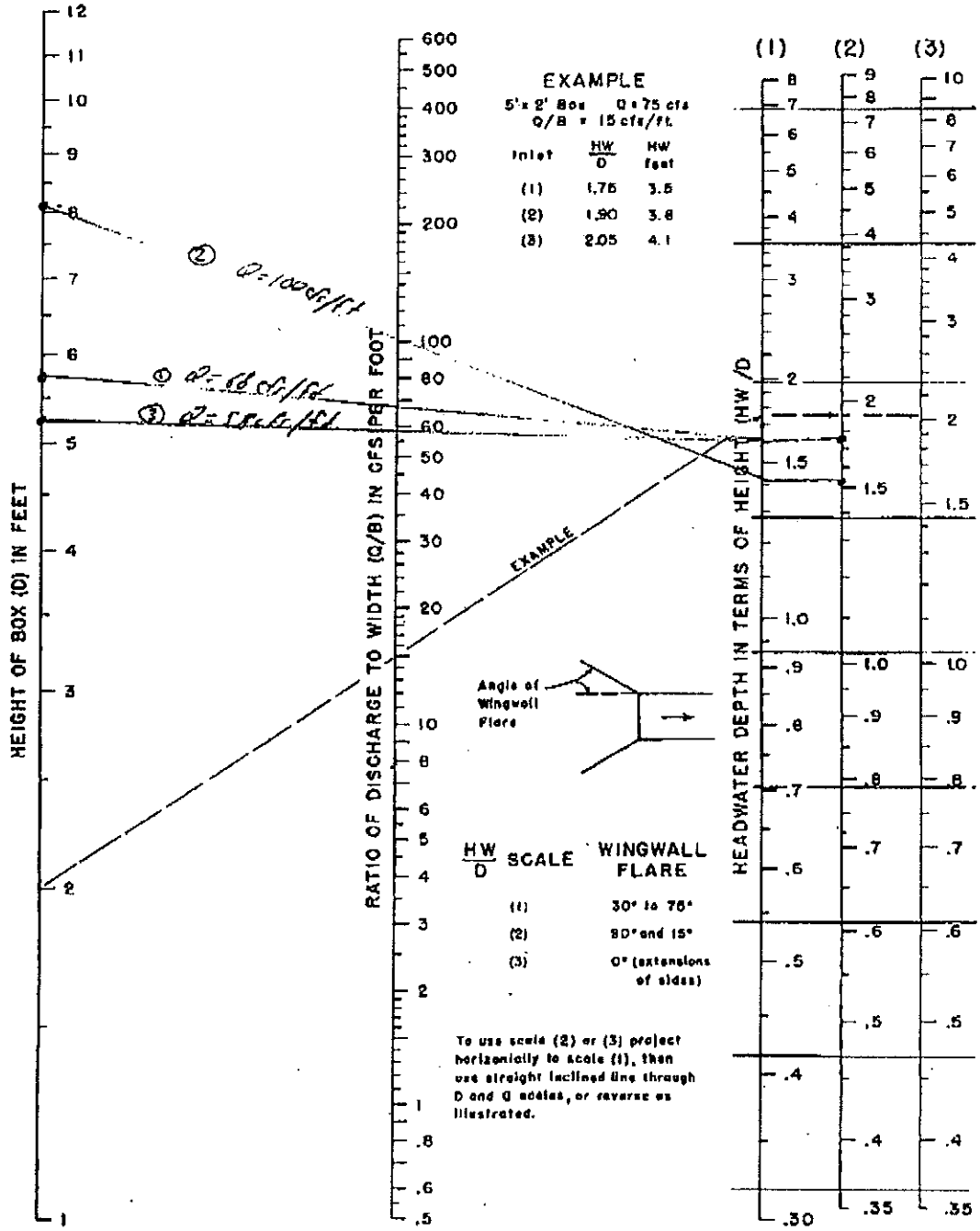
W/S = 864.5, CP48

CHART 8



HEADWATER DEPTH FOR BOX CULVERTS WITH INLET CONTROL

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Appendix E-4: Culvert Calculations
Zone A Delineation of Watershed "PP"
Luke Wash FCD 99-03

Concentration Point 49: Railroad Culvert Crossing

	Culvert 1			Culvert 2			Culvert 3			Culvert 4			Culvert 5		
		Left	Right		Left	Right		Left	Right		Left	Right		Left	Right
	Top El [ft]	859.85	859.88	Top El [ft]	859.89	859.92	Top El [ft]	859.82	859.87	Top El [ft]	859.87	859.93	Top El [ft]	859.83	859.97
	Bottom El [ft]	859.03	857.64	Bottom El [ft]	857.54	858.93	Bottom El [ft]	856.93	856.82	Bottom El [ft]	856.82	856.82	Bottom El [ft]	858.82	859.52
	height [ft]	1.535		height [ft]	2.57		height [ft]	3.07		height [ft]	3.28		height [ft]	1.88	
	width [ft]	13.2		width [ft]	13.9		width [ft]	14		width [ft]	13		width [ft]	13	

Weir Flow Over RailRoad

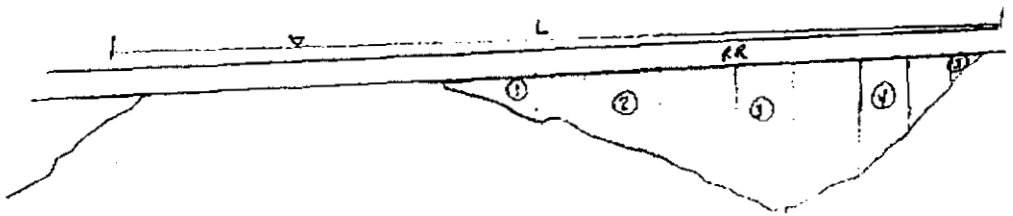
w/s elevation [ft]	H [ft]	L [ft]	Q_T [cfs]	HW/D [ft/ft]	Q/B_1 [cfs/ft]	Q [cfs]	HW/D [ft/ft]	Q/B_2 [cfs/ft]	Q [cfs]	HW/D [ft/ft]	Q/B_3 [cfs/ft]	Q [cfs]	HW/D [ft/ft]	Q/B_4 [cfs/ft]	Q [cfs]	HW/D [ft/ft]	Q/B_5 [cfs/ft]	Q [cfs]	Q Total [cfs]
864	0	45	0	3.69	17	224.4	2.61	29	403.1	2.35	33	452	2.26	40	520	3.15	19	247	1356.5
865	1	1200	3240	4.34	29	264	3.00	30	417	2.68	35	499	2.55	40	520	3.58	22	286	5217
865.4	1.4	1280	5769.6	4.60	29	264	3.15	30	417	2.81	37	518	2.65	40	520	3.90	22	286	7774.8
Top Of Structure Elevation [ft]						864													

Overtopping Capacity

Target Q = 7620
reached when
w/s = 865.4

, From Chart 8

, From $Q=CLH^{3/2}$, C = 2.7



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CHECK _____ DATE _____

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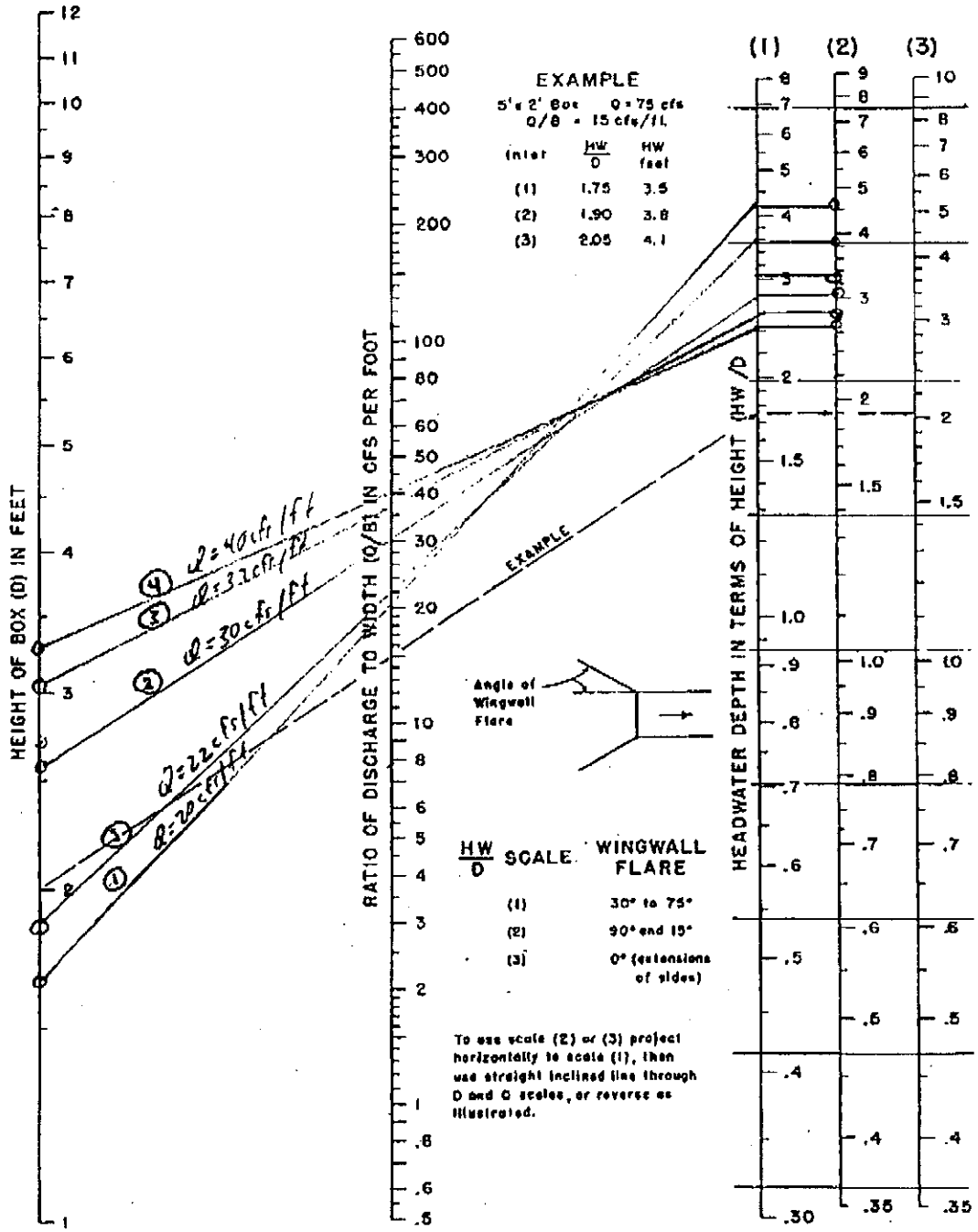
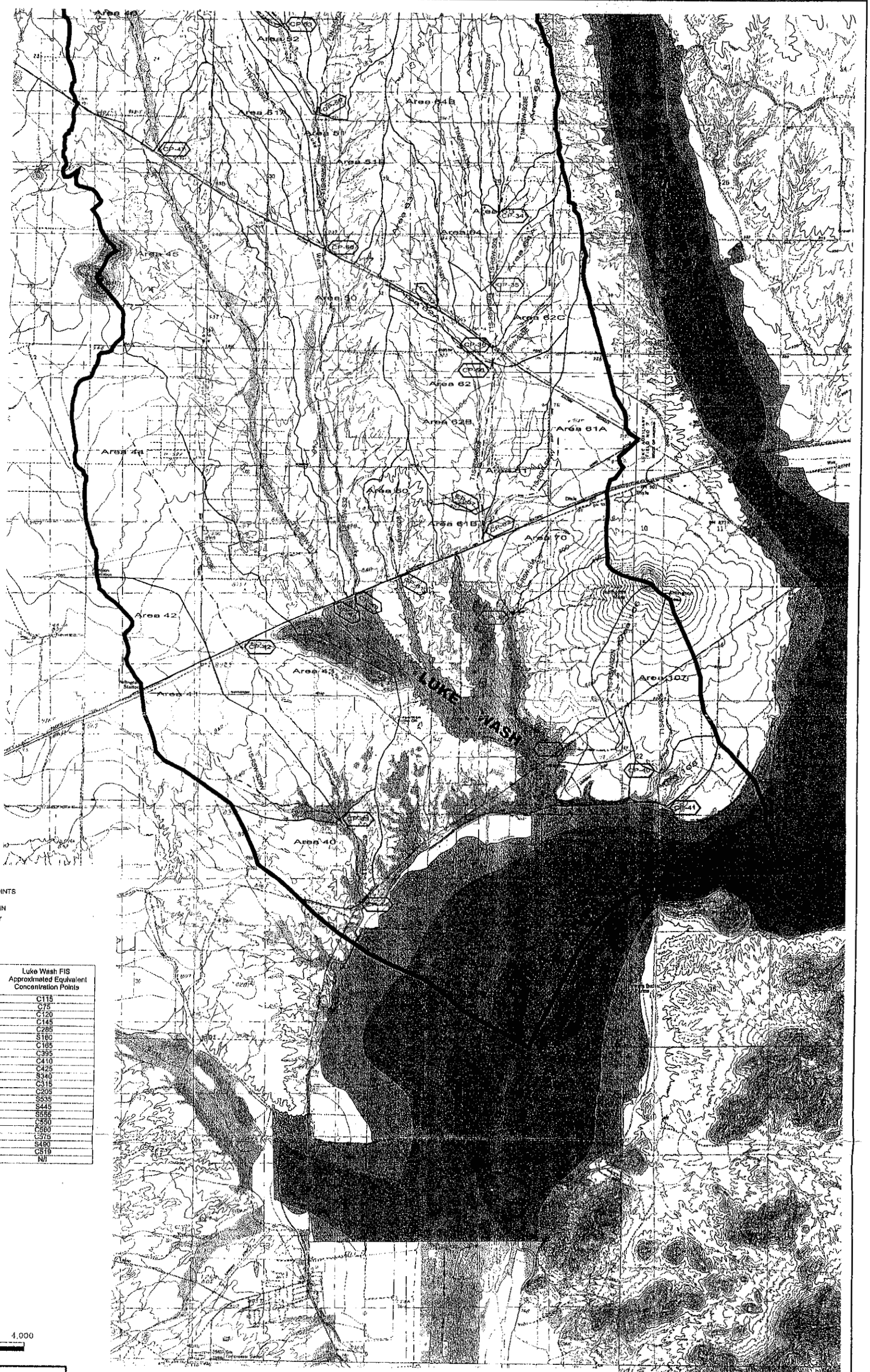
CHART 8

w/s=865.4, CP47



HEADWATER DEPTH FOR BOX CULVERTS WITH INLET CONTROL

BUREAU OF PUBLIC ROADS JAN. 1963



LEGEND

- WASH BASELINE
- T2N-R5W-S04 WASH I.D. LABEL
- PROJECT LIMITS
- BASIN BOUNDARIES
- Area 100 BASIN NUMBER
- CP-1 CONCENTRATION POINTS
- EXISTING FLOODPLAIN
- EXISTING FLOODWAY
- EXISTING ZONE A

Zone - A floodplain Delineation of Watershed "PP" Luke Wash	Luke Wash FIS Approximated Equivalent Concentration Points
CP-53R	C115
CP-53L	C75
CP-53C	C120
CP-59	C145
CP-47	C285
CP-50L	S160
CP-50C	C165
CP-36	C395
CP-56	C410
CP-62	C425
CP-61	S340
CP-48	C315
CP-49	C205
CP-42	S535
CP-38	S445
CP-43L	S555
CP-43R	C550
CP-43C	C560
CP-44	C375
CP39	S490
CP-41	C519
Others	N/I

2,000 0 2,000 4,000

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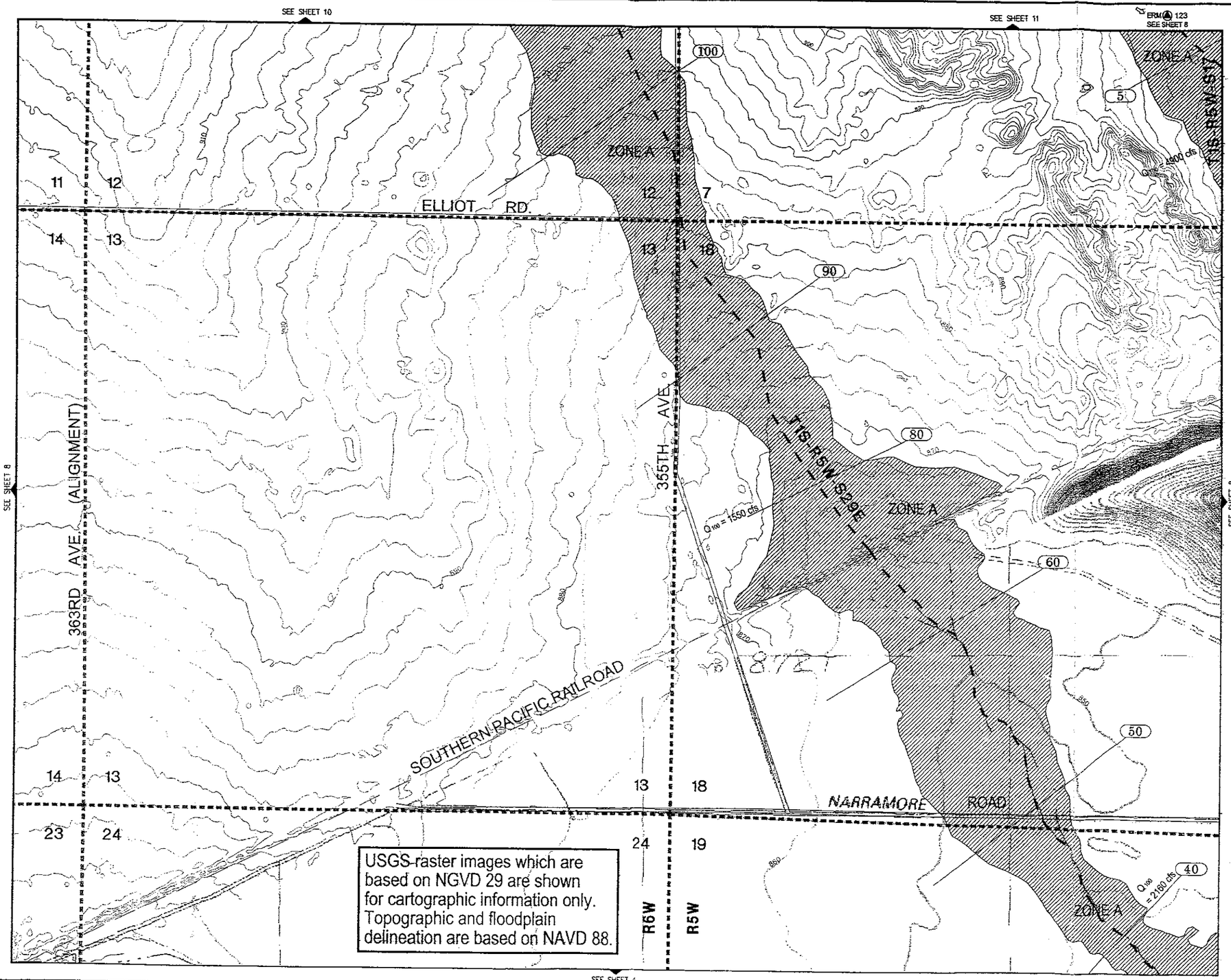
FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY

PLATE 2

HYDROLOGY MAP

LUKE WASH
T1S-R5W-S16
S= 0.0080
T1S-R5W-S09W
S= 0.0066
T1S-R5W-S09
S= 0.0055
T1S-R5W-S08
S= 0.0070
T1S-R5W-S32
S= 0.0043
T1S-R5W-S17
S= 0.0041
T1S-R5W-S29E
S= 0.0058
T1S-R5W-S29W
S= 0.0057
T1N-R5W-S33E
S= 0.0082
T1N-R5W-S28E
S= 0.0058
T1N-R5W-S
S= 0.0061
T1S-R5W-S09
S= 0.0055
T1N-R5W-S33N
T1N-R5W-S33W
S= 0.0067
T1S-R5W-S32
S= 0.0043
T1N-R5W-S32
S= 0.0062
S= 0.0047
T1S-R5W-S17



FILE: 310\J10010s\Drw\050_Plan_07.Dwg DATE: 03/07/2001

USGS 7.5 MINUTES QUADRANGLE TOPOGRAPHIC MAPPING SUPPLEMENTED W/ LIDAR MAPPING – EAGLE SCAN NOVEMBER 1999

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

ZONE A DELINEATION OF WATERSHED "PP" LUKE WASH

F.C.D. CONTRACT NO. 99–03

LEGEND

100–YR APPROXIMATED ZONE A FLOODPLAIN BOUNDARY	
HYDRAULIC BASE LINE	
CROSS SECTION	30
ELEVATION REFERENCE MARK	ERM 6
ZONE DESIGNATIONS	ZONE A
CORPORATE LIMITS	Corporate Limits
LIMITS OF STUDY	Limits of Study
SECTION LINES	
SECTION CORNER	29 28 / 32 33
WASH I.D. LABEL	T1S-R5W-S22N
EXISTING ZONE A	
EXISTING FLOOD PLAIN	
EXISTING FLOODWAY	
FLOW AT DOWNSTREAM CONC. POINT	Q_{100} = 850 cfs

ELEVATION REFERENCE MARKS

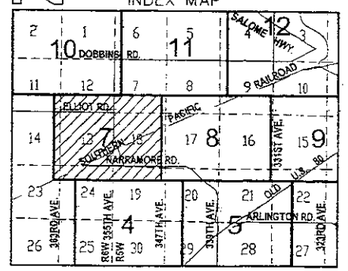
NOTE: ALL ELEVATIONS ARE BASED ON NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88)

I.D. NUMBER	ELEV. (FT)	DESCRIPTION/LOCATION
123	859.68	United States Geological Survey Brass Cap, +/– 100' south of Southern Pacific Railroad tracks, +/– 3 miles southwesterly of Salome Highway, stamped " M 10" (See Sheet 8)

NOTES

NGVD 29 + 1.97 FEET = NAVD 88

INDEX MAP



400' 0' 400' 800'

SCALE: 1"= 400'

CONTOUR INTERVAL = 10 – 20 FEET

SUPPLEMENTAL LIDAR MAPPING CI. = 2 FEET

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	BY	DATE
DESIGN	HAA/JCS	03/2001
DESIGN CHK.	SEK	03/2001
PLANS	CLT/RCS	03/2001
PLANS CHK.	HAA	03/2001

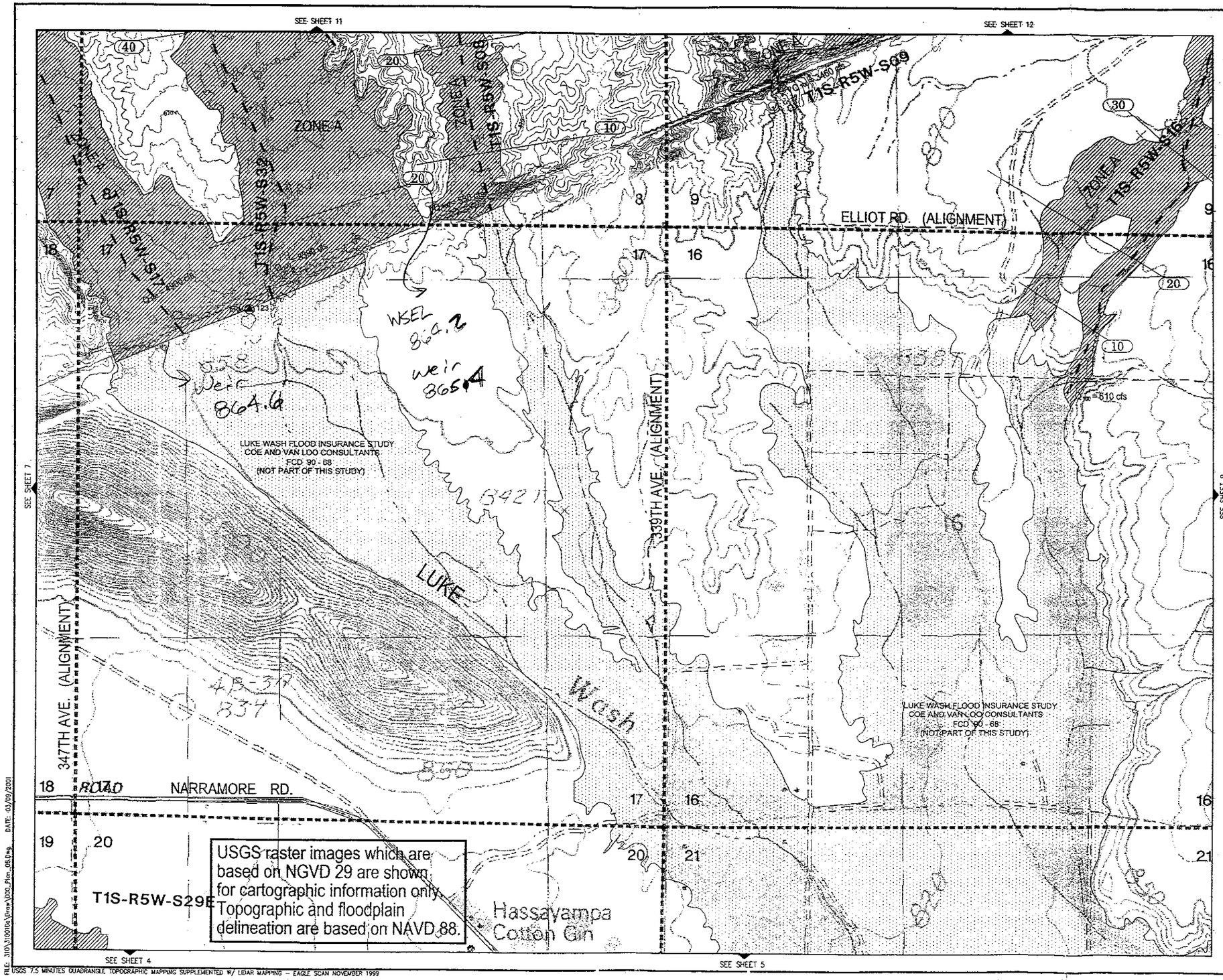
SUBMITTED BY: DATE:

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

RECOMMENDED BY: DATE

APPROVED BY: DATE

CHIEF ENGINEER AND GENERAL MANAGER



FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

ZONE A
DELINEATION OF WATERSHED "PP"
LUKE WASH

F.C.D. CONTRACT NO. 99–03

LEGEND

100–YR. APPROXIMATED ZONE A FLOODPLAIN BOUNDARY	
HYDRAULIC BASE LINE	
CROSS SECTION	30
ELEVATION REFERENCE MARK	ERM 6
ZONE DESIGNATIONS	ZONE A
CORPORATE LIMITS	Corporate Limits
LIMITS OF STUDY	Limits of Study
SECTION LINES	
SECTION CORNER	29 28 / 32 33
WASH I.D. LABEL	T1S-R5W-S22N
EXISTING ZONE A	
EXISTING FLOOD PLAIN	
EXISTING FLOODWAY	
FLOW AT DOWNSTREAM CONC. POINT	Q_{100} = 850 cfs

ELEVATION REFERENCE MARKS

NOTE: ALL ELEVATIONS ARE BASED ON NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88)

I.D. NUMBER	ELEV. (FT)	DESCRIPTION/LOCATION
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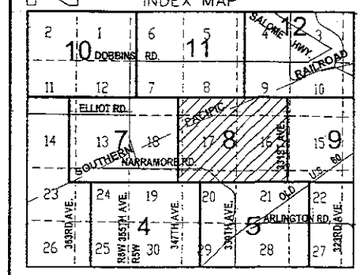
NOTES

NGVD 29 + 1.97 FEET = NAVD 88

INDEX MAP



400' 0' 400' 800'

SCALE: 1" = 400'
CONTOUR INTERVAL = 10 – 20 FEET
SUPPLEMENTAL LIDAR MAPPING CI. = 2 FEET

Entellus
2355 N. 44th Street, Suite 125
Phoenix, AZ 85008-2279
Tel 602.244.8565
Fax 602.244.8945
E-mail www.entellus.com

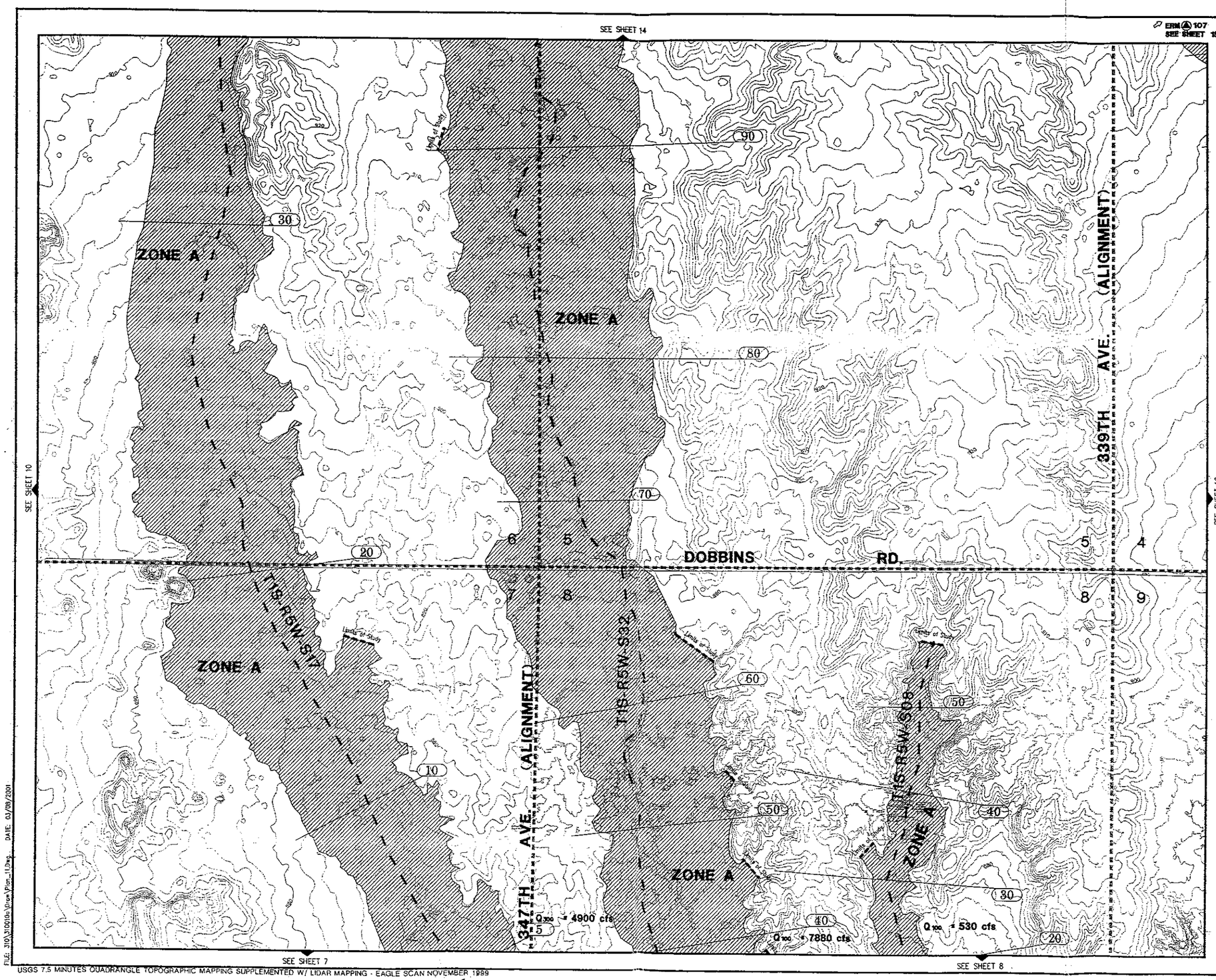
	BY	DATE
DESIGN	HAA/JCS	03/2001
DESIGN CHK.	SEK	03/2001
PLANS	GLT/RCS	03/2001
PLANS CHK.	HAA	03/2001

SUBMITTED BY: DATE:

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

RECOMMENDED BY: DATE
APPROVED BY: DATE
CHIEF ENGINEER AND GENERAL MANAGER

SHEET 8 OF 38



USGS 7.5 MINUTES QUADRANGLE TOPOGRAPHIC MAPPING SUPPLEMENTED W/ LIDAR MAPPING - EAGLE SCAN NOVEMBER 1999

FILE: 310\310010\Draw\Plan_11.Dwg DATE: 03/09/2001

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

ZONE A DELINEATION OF WATERSHED "PP" LUKE WASH

F.C.D. CONTRACT NO. 99-03

LEGEND

100-YR. APPROXIMATED ZONE A FLOODPLAIN BOUNDARY	
HYDRAULIC BASE LINE	
CROSS SECTION	30
ELEVATION REFERENCE MARK	ERM 6
ZONE DESIGNATIONS	ZONE A
CORPORATE LIMITS	Corporate Limits
LIMITS OF STUDY	Limits of Study
SECTION LINES	
SECTION CORNER	29 28 / 32 33
WASH I.D. LABEL	T1S-R5W-S22N
EXISTING ZONE A	
EXISTING FLOOD PLAIN	
EXISTING FLOODWAY	
FLOW AT DOWNSTREAM CONC. POINT	Q_{100} = 850 cfs

ELEVATION REFERENCE MARKS

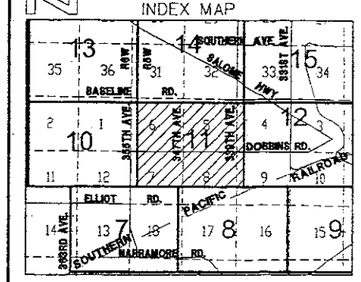
NOTE: ALL ELEVATIONS ARE BASED ON NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88)

I.D. NUMBER	ELEV. (FT)	DESCRIPTION/LOCATION
107	910.88	Maricopa County Highway Department Brass Cap Flush W/ Pavement @ Intersection of Baseline Rd. and Salome Hwy. (See Sheet 15)

NOTES

NGVD 29 + 1.97 FEET = NAVD 88

INDEX MAP

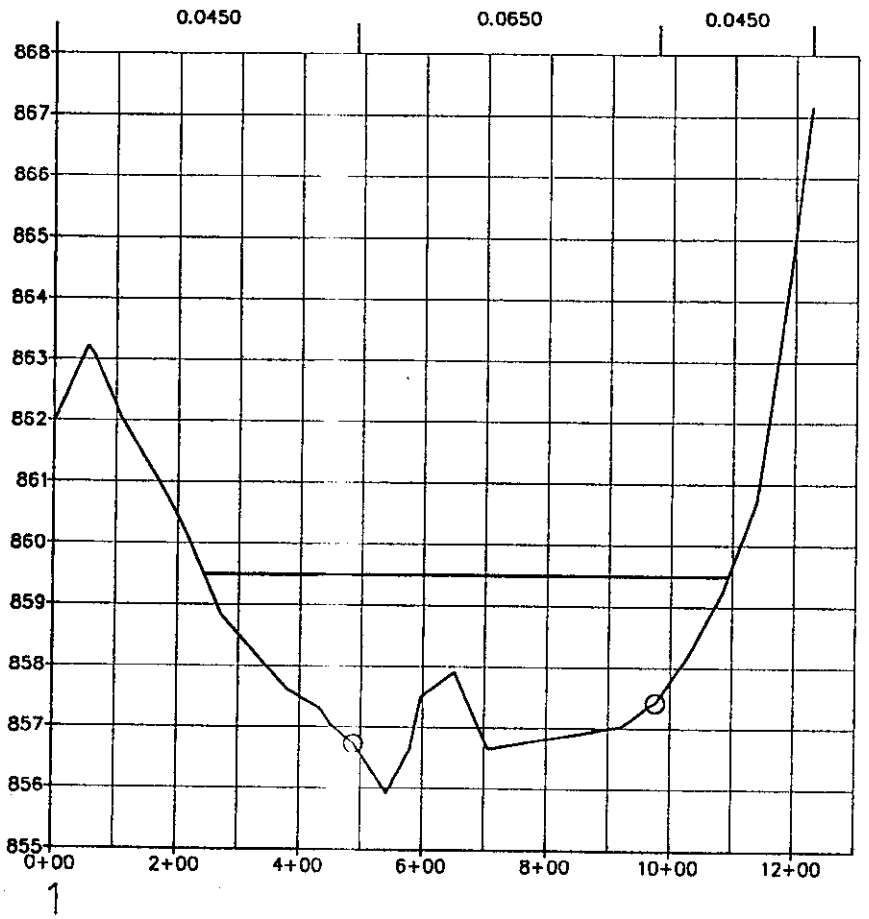


400' 0' 400' 800'

SCALE: 1" = 400'

Entellus
2256 N. 44th Street, Suite 125
Phoenix, AZ 85008-3279
Tel 602.344.2586
Fax 602.344.3947
E-mail www.entellus.com

	BY	DATE	
DESIGN	HAA/JCS	03/2001	FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
DESIGN CHK.	SEK	03/2001	RECOMMENDED BY: DATE
PLANS	GLT/RCS	03/2001	APPROVED BY: DATE
PLANS CHK.	HAA	03/2001	CHIEF ENGINEER AND GENERAL MANAGER
SUBMITTED BY:		DATE:	SHEET 11 OF 38



Normal Depth Results

Cross-Section:	1	
Elevation:	859.50	ft MSL
Depth:	3.59	ft
Discharge:	4900.00	cfs
Energy Gradient:	0.0041	ft/ft
Froude Number:	0.2565	
Flow Regime:	Subcritical	
Flow Area:	1777.79	sq ft
Average Velocity:	2.75	ft/s
Maximum Velocity:	2.91	ft/s
Composite n:	0.0569	
Hydraulic Radius:	2.09	ft
Wetted Perimeter:	850.69	ft
Wetted Top Width:	850.60	ft
Critical Slope:	0.063	ft/ft

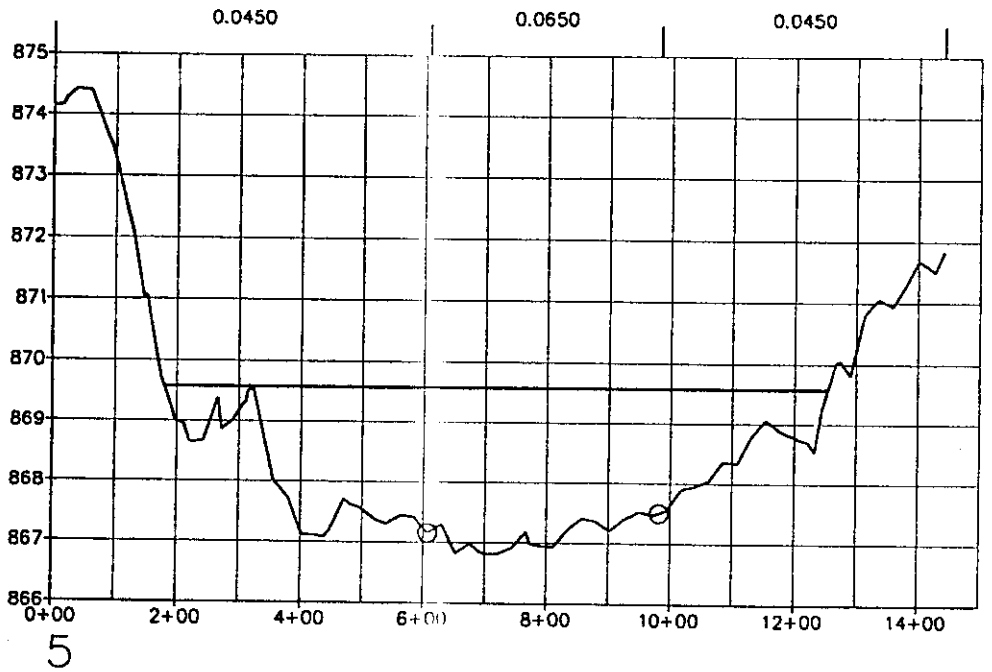
Note: X-section not used for delineation

ZONE A - DELINEATION OF WATERSHED "PP"
LUKE WASH FCD 99-03

FIGURE E2 – WASH: T1S-R5W-S17-1

Entellus™

File: WASH-T1S-R5W-S17-B_X-SECTION-R14.dwg Date: 9/29/00



Normal Depth Results

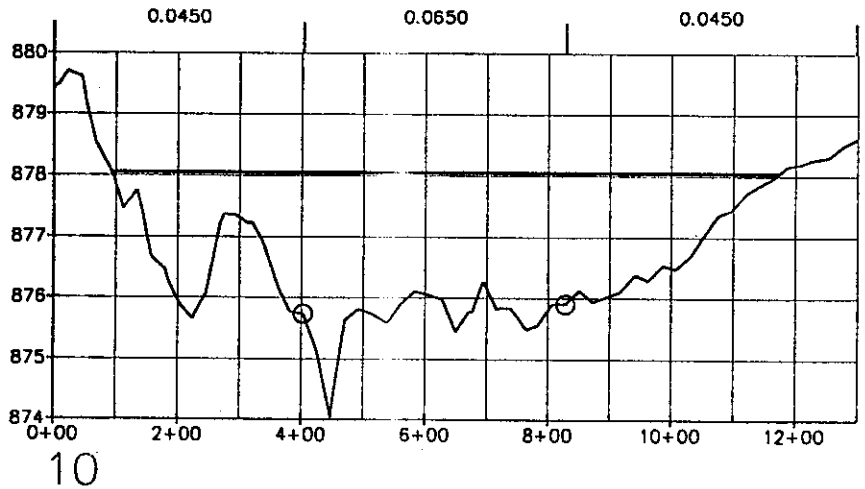
Cross-Section:	5	
Elevation:	869.57	ft MSL
Depth:	2.76	ft
Discharge:	4900.00	cfs
Energy Gradient:	0.0041	ft/ft
Froude Number:	0.2787	
Flow Regime:	Subcritical	
Flow Area:	1865.04	sq ft
Average Velocity:	2.64	ft/s
Maximum Velocity:	2.79	ft/s
Composite n:	0.0524	
Hydraulic Radius:	1.73	ft
Wetted Perimeter:	1075.28	ft
Wetted Top Width:	1075.11	ft
Critical Slope:	0.0527	ft/ft

ZONE A - DELINEATION OF WATERSHED "PP"
LUKE WASH FCD 99-03

FIGURE E2 – WASH: T1S–R5W–S17–5

Entellus™

File: WASH-T1S-R5W-S17-B_X-SECTION-R14.dwg Date: 9/29/00



Normal Depth Results

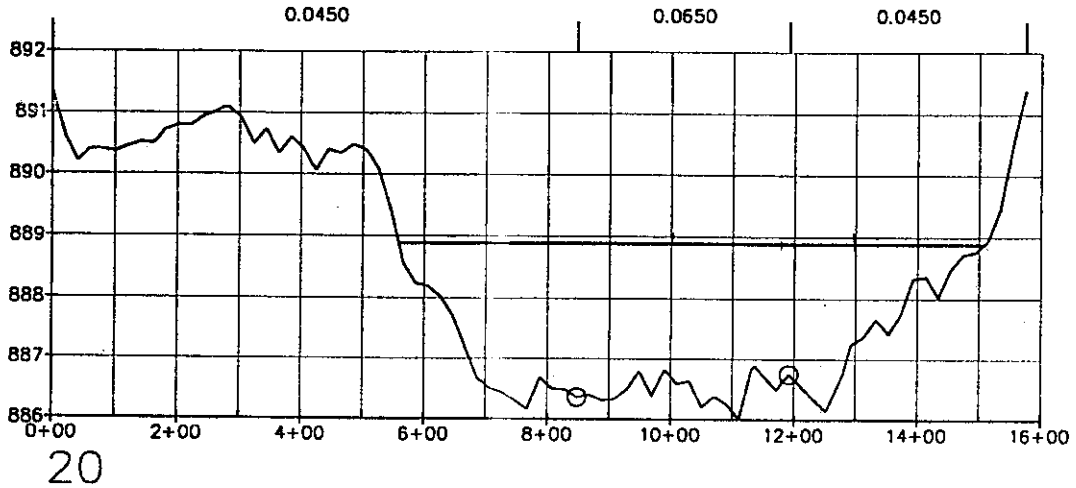
Cross-Section:	10	
Elevation:	878.05	ft MSL
Depth:	4.01	ft
Discharge:	4900.00	cfs
Energy Gradient:	0.0041	ft/ft
Froude Number:	0.229	
Flow Regime:	Subcritical	
Flow Area:	1882.45	sq ft
Average Velocity:	2.59	ft/s
Maximum Velocity:	2.62	ft/s
Composite n:	0.0533	
Hydraulic Radius:	1.74	ft
Wetted Perimeter:	1082.17	ft
Wetted Top Width:	1081.94	ft
Critical Slope:	0.079	ft/ft

ZONE A - DELINEATION OF WATERSHED "PP"
LUKE WASH FCD 99-03

FIGURE E2 – WASH: T1S–R5W–S17–10

Entellus™

File: WASH-T1S-R5W-S17-B_X-SECTION-R14.dwg Date: 9/29/00



Normal Depth Results

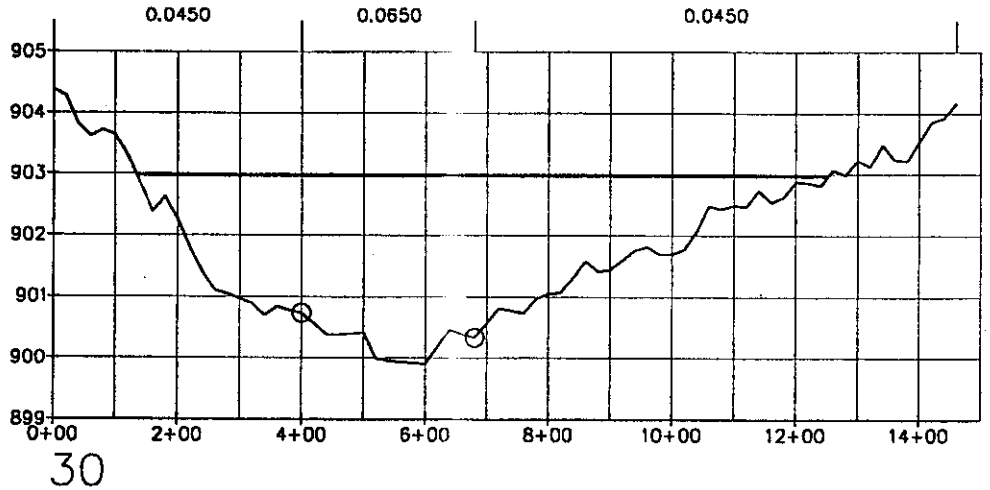
Cross-Section:	20	
Elevation:	888.89	ft MSL
Depth:	2.89	ft
Discharge:	4900.00	cfs
Energy Gradient:	0.0041	ft/ft
Froude Number:	0.2866	
Flow Regime:	Subcritical	
Flow Area:	1771.83	sq ft
Average Velocity:	2.77	ft/s
Maximum Velocity:	3.15	ft/s
Composite n:	0.0526	
Hydraulic Radius:	1.86	ft
Wetted Perimeter:	950.32	ft
Wetted Top Width:	950.20	ft
Critical Slope:	0.0506	ft/ft

ZONE A - DELINEATION OF WATERSHED "PP"
LUKE WASH FCD 99-03

FIGURE E2 – WASH: T1S–R5W–S17–20

Entellus™

File: WASH–T1S–R5W–S17–B_X–SECTION–R14.dwg Date: 9/29/00



Normal Depth Results

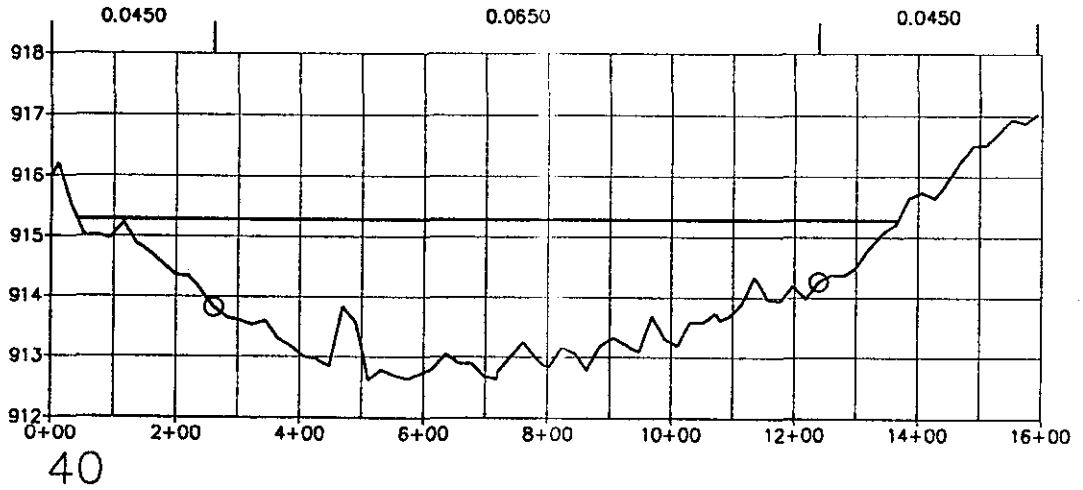
Cross-Section:	30	
Elevation:	902.97	ft MSL
Depth:	3.07	ft
Discharge:	4900.00	cfs
Energy Gradient:	0.0041	ft/ft
Froude Number:	0.2672	
Flow Regime:	Subcritical	
Flow Area:	1845.43	sq ft
Average Velocity:	2.67	ft/s
Maximum Velocity:	2.87	ft/s
Composite n:	0.0503	
Hydraulic Radius:	1.65	ft
Wetted Perimeter:	1118.13	ft
Wetted Top Width:	1118.08	ft
Critical Slope:	0.0578	ft/ft

ZONE A - DELINEATION OF WATERSHED "PP"
LUKE WASH FCD 99-03

FIGURE E2 – WASH: T1S–R5W–S17–30

Entellus™

File: WASH-T1S-R5W-S17-B_X-SECTION-R14.dwg Date: 9/29/00



Normal Depth Results

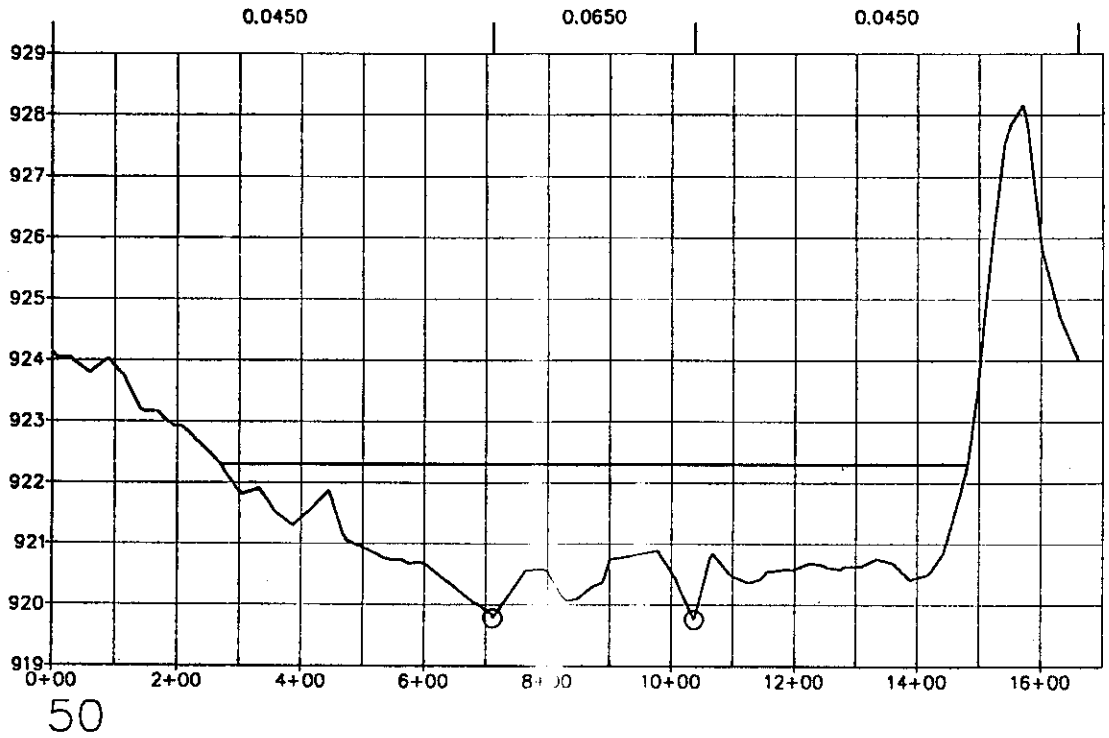
Cross-Section:	40	
Elevation:	915.29	ft MSL
Depth:	2.68	ft
Discharge:	4900.00	cfs
Energy Gradient:	0.0041	ft/ft
Froude Number:	0.2434	
Flow Regime:	Subcritical	
Flow Area:	2169.00	sq ft
Average Velocity:	2.25	ft/s
Maximum Velocity:	2.33	ft/s
Composite n:	0.06	
Hydraulic Radius:	1.63	ft
Wetted Perimeter:	1327.00	ft
Wetted Top Width:	1326.86	ft
Critical Slope:	0.0727	ft/ft

File: WASH-T1S-R5W-S17-B_X-SECTION-R14.dwg Date: 9/29/00

ZONE A - DELINEATION OF WATERSHED "PP"
LUKE WASH FCD 99-03

FIGURE E2 – WASH: T1S-R5W-S17-40

Entellus™



Normal Depth Results

Cross-Section:	50	
Elevation:	922.31	ft MSL
Depth:	2.55	ft
Discharge:	4900.00	cfs
Energy Gradient:	0.0041	ft/ft
Froude Number:	0.2853	
Flow Regime:	Subcritical	
Flow Area:	1897.80	sq ft
Average Velocity:	2.58	ft/s
Maximum Velocity:	2.97	ft/s
Composite n:	0.0507	
Hydraulic Radius:	1.57	ft
Wetted Perimeter:	1212.31	ft
Wetted Top Width:	1212.20	ft
Critical Slope:	0.0522	ft/ft

ZONE A - DELINEATION OF WATERSHED "PP"
LUKE WASH FCD 99-03

FIGURE E2 – WASH: T1S–R5W–S17–50

Entellus™

File: WASH-T1S-R5W-S17-B_X-SECTION-R14.dwg Date: 9/29/00

APPENDIX B

Photo 1 (P4) – Looking west at 351st Ave & Dobbins Rd intersection

Photo 2 (P5) – Looking upstream (north) from Dobbins just east of 351st Ave.

Photo 3 (P6) – Looking upstream (northwesterly) from Dobbins just east of 351st Ave.

Photo 4 (P7) – Looking downstream (southeasterly) from Dobbins just east of 351st Ave.

Photo 5 (P8) – Looking downstream (south) from Dobbins just east of 351st Ave.

Photo 6 (P9) – Looking upstream (north) along 351st Ave.
from La Mirada Drive alignment

Photo 7 (P10) – Looking downstream (south) along 351st.
Truck is at La Mirada Drive alignment.

Photo 8 (P11) – Looking upstream (north) along 351st.
Picture is taken standing at same location as Photo 7.

Photo 9 (P12) – Looking downstream (southeasterly) from 351st & Piedmont.
Scour depths were measured at 1 to 2.5 feet.

Photo 10 (P13) – Looking southwesterly across floodplain crossing of Piedmont Drive.
Number 1 picture in a 3 picture panorama from SE to S.

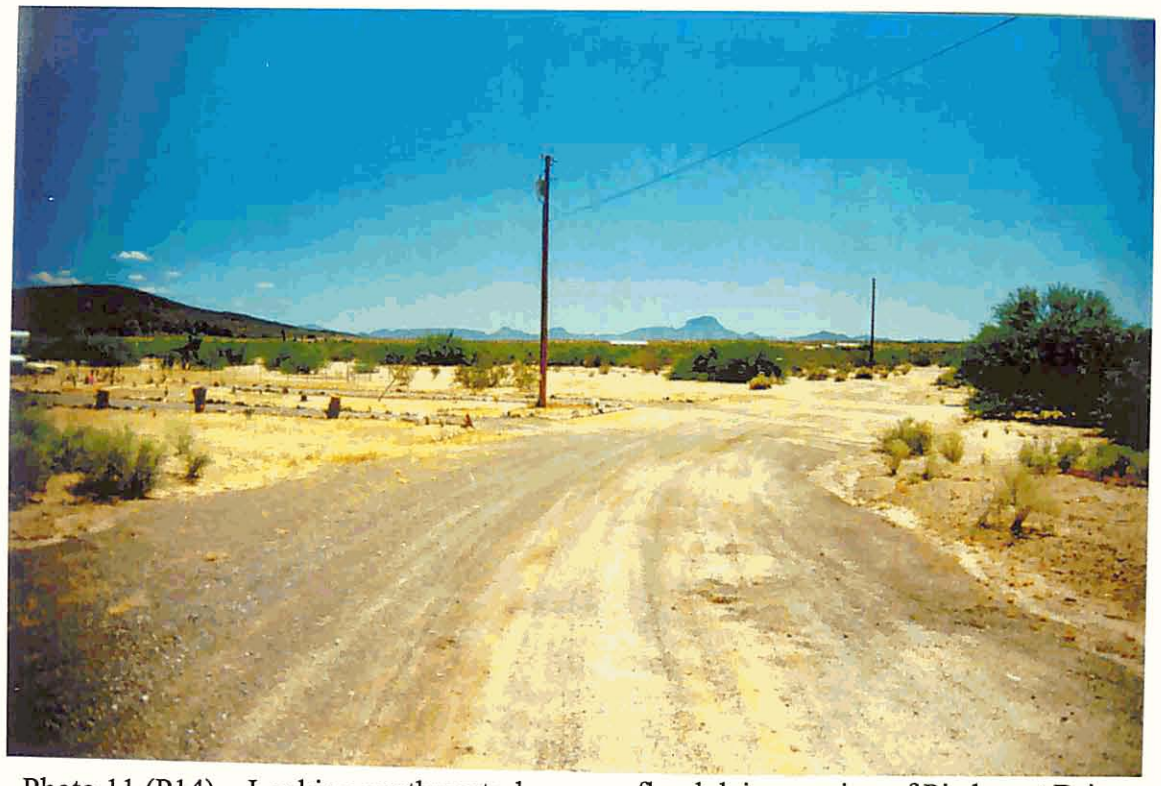


Photo 11 (P14) – Looking southwesterly across floodplain crossing of Piedmont Drive.
Number 2 picture in a 3 picture panorama from SW to S.

Photo 12 (P15) – Looking southerly across floodplain crossing of Piedmont Drive.
Number 3 picture in a 3 picture panorama from SE to S.

Photo 13 (P16) – Looking upstream (northerly) across Piedmont Drive at right side of floodplain. Note the cuts along hedge embankment where flows came through area.

Photo 14 (P17) – Looking west across floodplain crossing of McNeil Street. Note the width of flood flows is nearly 700 feet.

Photo 15 (P18) – Looking south across floodplain crossing of 349th Ave, just downstream of McNeil Street.

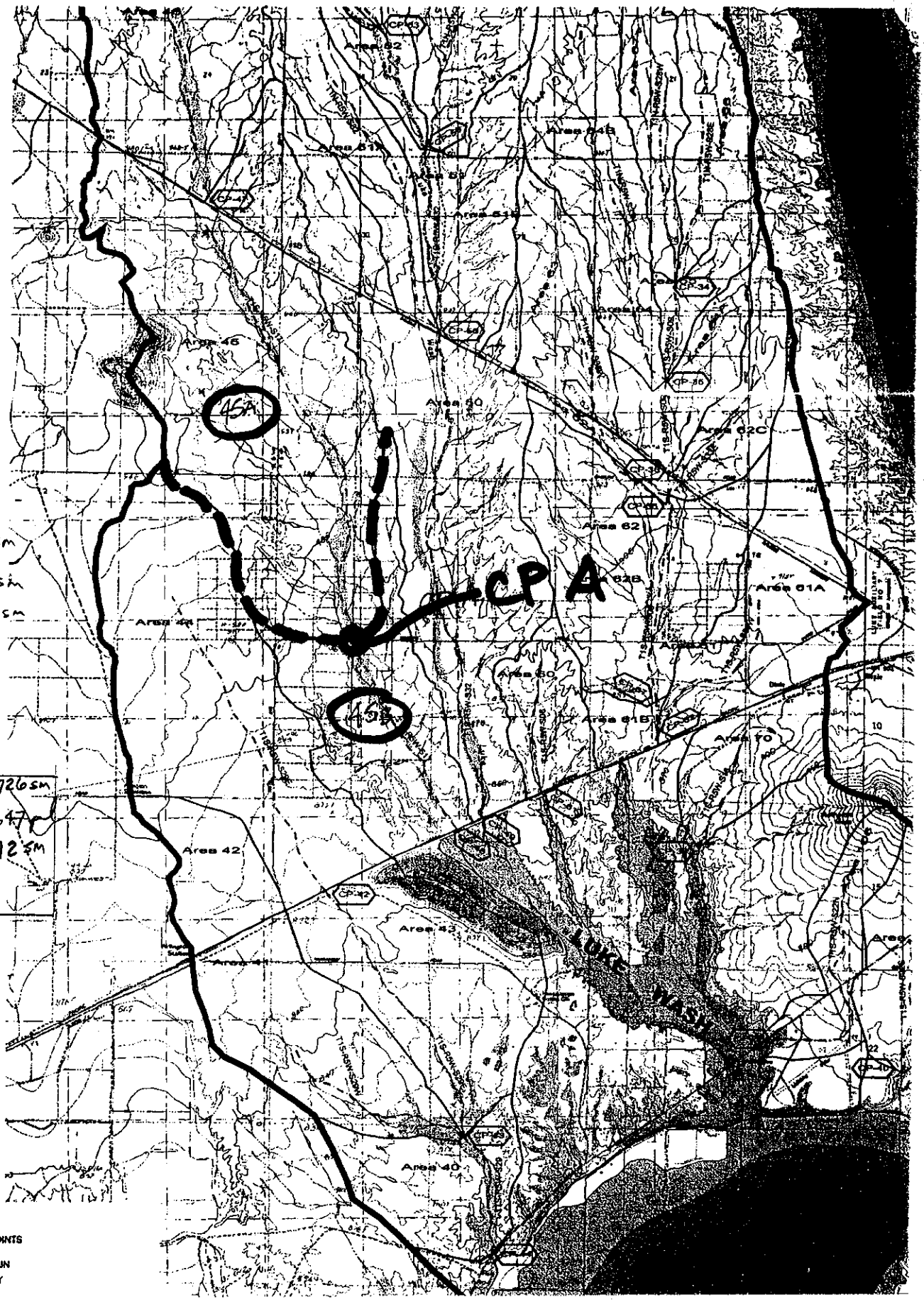
Photo 16 (P19) – Looking southwesterly across dry tank/storage-pond located at the northwest corner of Dobbins & 351st Ave. Note the elevated concrete border.

APPENDIX C

FCD 2000C013 - Task 12					
T1SR5WS17 - Sections 5 to 30					
Supporting Hydrology Calculations					
Wash	**Basin ID No.**	**Conc. Pt.**	**Location**	**Area**	**100-year Flow**
				sq miles	**cfs**
T1SR5WS17	10, 12, 48, 47, 16, 46	47	Salome Highway	8.474	3620
	10, 12, 48, 47, 16, 46, 45A	A	Dobbins Road	12.149	4590
	10, 12, 48, 47, 16, 46, 45A, 45B	48	Southern Pacific RR	13.391	4900

1" ≅ 4,500'

1" = 1.99/3 pl



45 = 4.918 sm

45A = 3.675 sm

45B = 1.243 sm

1" = 0.726 sm

1" = 0.647 pl

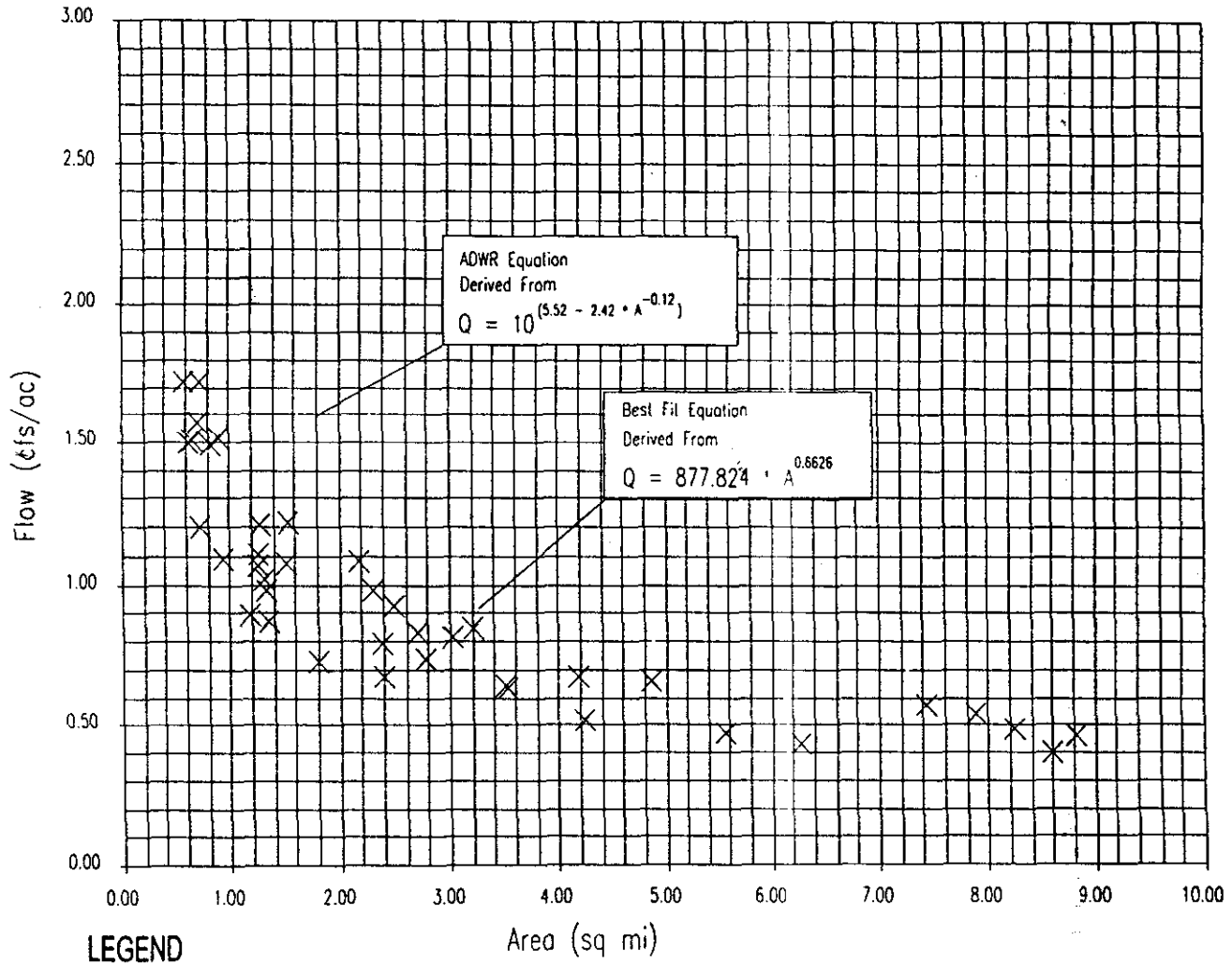
1 pl = 1.12 sm

45B = 1.11 pl

45B = 1.243 sm

LEGEND

- WASH BASELINE
- R5W-S04 WASH I.D. LABEL
- PROJECT LIMITS
- BASIN BOUNDARIES
- Area 100 BASIN NUMBER
- CP-1 CONCENTRATION POINTS
- EXISTING FLOODPLAIN
- EXISTING FLOODWAY
- EXISTING ZONE A



LEGEND

ADWR Region 13 Equation

Best-Fit Equation for HEC-1 Results

× Results from Arlington ADMS

A = Area (sq mi)

Q = 100-yrt Peak Flow (cfs)

FIGURE 2
Relationship Between Watershed Area and Peak Flow

APPENDIX D

```
                    HEC-RAS Version 3.0.1  Mar 2001
                      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: T1SR5WS17 - Reach 5 to 30
Project File : t1sr5ws17_5to30.prj
Run Date and Time: 8/2/2001 2:39:09 PM

Project in English units

Project Description:
FCD 2000C013 - Task 12
Detailed Floodplain Delineation
Wash T1SR5WS17 between
Sections 5 and 30
Original Zone A Delineation per Watershed "PP" (FCD 99-03)


PLAN DATA

Plan Title: Floodplain and Floodway Model
Plan File : x:\projects\Agency\FCDMC\2000c013\DetailFP\Task12\HECRAS\t1sr5ws17_5to30.p02

          Geometry Title: Existing Condition Geometry
          Geometry File : x:\projects\Agency\FCDMC\2000c013\DetailFP\Task12\HECRAS\t1sr5ws17_5to30.g01

          Flow Title    : Existing Condition 100-year Q - FP/FW
          Flow File     : x:\projects\Agency\FCDMC\2000c013\DetailFP\Task12\HECRAS\t1sr5ws17_5to30.f02

Plan Description:
Floodplain and Floodway Model


Plan Summary Information:
Number of:  Cross Sections =   32    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

Encroachment Data
   Equal Conveyance = True
   Left Offset      =        0
   Right Offset     =        0

River = T1SR5WS17        Reach = Section 5 to 30
RS      Profile           Method  Value1  Value2
30.000  PF 2                   1 9777.0510111.79
20.547  PF 2                   1 9813.8210246.65
20.481  PF 2                   1  9859.210223.41
20.416  PF 2                   1  9832.710129.24
20.328  PF 2                   1 9771.37 10174.3
20.245  PF 2                   1 9882.2710223.17
20.189  PF 2                   1  9886.310181.15
20.126  PF 2                   1  9876.410197.12
20.067  PF 2                   1 9755.3210129.55
20.060  PF 2                   1 9698.27   10113
20.036  PF 2                   1    970910178.34
20.000  PF 2                   1 9692.6810050.94
10.444  PF 2                   1 9692.7910072.44
10.409  PF 2                   1 9622.52 10042.8
10.368  PF 2                   1 9687.04 10050.2
10.338  PF 2                   1 9669.57 10073.1
10.289  PF 2                   1 9803.58 10157.3
10.246  PF 2                   1  9864.710228.75
```

9449.6	.045	9859.2	.065	10099.3	.05

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9859.2	10099.3	345	345	345	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	900.07	Element			
Vel Head (ft)	0.11	Wt. n-Val.	0.045	0.065	0.050
W.S. Elev (ft)	899.97	Reach Len. (ft)	345.00	345.00	345.00
Crit W.S. (ft)		Flow Area (sq ft)	321.66	655.58	796.73
E.G. Slope (ft/ft)	0.003776	Area (sq ft)	321.66	655.58	796.73
Q Total (cfs)	4590.00	Flow (cfs)	956.58	1799.08	1834.34
Top Width (ft)	984.22	Top Width (ft)	181.27	240.10	562.84
Vel Total (ft/s)	2.59	Avg. Vel. (ft/s)	2.97	2.74	2.30
Max Chl Dpth (ft)	3.07	Hydr. Depth (ft)	1.77	2.73	1.42
Conv. Total (cfs)	74693.1	Conv. (cfs)	15566.4	29276.5	29850.3
Length Wtd. (ft)	345.00	Wetted Per. (ft)	181.30	240.10	562.85
Min Ch El (ft)	896.90	Shear (lb/sq ft)	0.42	0.64	0.33
Alpha	1.03	Stream Power (lb/ft s)	1.24	1.77	0.77
Frctn Loss (ft)	1.66	Cum Volume (acre-ft)	98.48	137.25	112.67
C & E Loss (ft)	0.01	Cum SA (acres)	61.38	50.99	80.05

Warning: The energy loss was 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)	901.15	Element			
Vel Head (ft)	0.20	Wt. n-Val.		0.065	0.050
W.S. Elev (ft)	900.96	Reach Len. (ft)	345.00	345.00	345.00
Crit W.S. (ft)		Flow Area (sq ft)		893.71	414.91
E.G. Slope (ft/ft)	0.003680	Area (sq ft)		893.71	414.91
Q Total (cfs)	4590.00	Flow (cfs)		2946.02	1643.98
Top Width (ft)	364.21	Top Width (ft)		240.10	124.11
Vel Total (ft/s)	3.51	Avg. Vel. (ft/s)		3.30	3.96
Max Chl Dpth (ft)	4.06	Hydr. Depth (ft)		3.72	3.34
Conv. Total (cfs)	75663.9	Conv. (cfs)		48563.7	27100.2
Length Wtd. (ft)	345.00	Wetted Per. (ft)		243.86	127.34
Min Ch El (ft)	896.90	Shear (lb/sq ft)		0.84	0.75
Alpha	1.02	Stream Power (lb/ft s)		2.78	2.97
Frctn Loss (ft)	1.65	Cum Volume (acre-ft)	25.80	182.63	34.69
C & E Loss (ft)	0.01	Cum SA (acres)	7.62	50.99	11.05

Warning: The energy loss was 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: T1SR5WS17
REACH: Section 5 to 30 RS: 20.416

INPUT
Description: Section is 0.416 miles upstream of Zone A Section 20.
Station Elevation Data num= 18

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9581.3	899.44	9619	899.08	9681.9	898.5	9715.8	898	9737.8	897
9768.4	896.5	9805.8	895.9	9832.7	895.8	10000	895.4	10061.1	895.5
10096.6	896.1	10181.6	896.23	10285.2	897	10394.3	897.5	10488.8	897.94
10563	897.9	10651.6	898.3	10776.4	898.9				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9581.3	.045	9832.7	.065	10096.6	.045

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9832.7	10096.6	420	455	490	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	898.41	Element			
Vel Head (ft)	0.16	Wt. n-Val.	0.045	0.065	0.045
W.S. Elev (ft)	898.25	Reach Len. (ft)	420.00	455.00	490.00
Crit W.S. (ft)		Flow Area (sq ft)	205.93	701.75	544.58
E.G. Slope (ft/ft)	0.006298	Area (sq ft)	205.93	701.75	544.58
Q Total (cfs)	4590.00	Flow (cfs)	718.73	2443.58	1427.70
Top Width (ft)	942.07	Top Width (ft)	133.94	263.90	544.22
Vel Total (ft/s)	3.16	Avg. Vel. (ft/s)	3.49	3.48	2.62
Max Chl Dpth (ft)	2.85	Hydr. Depth (ft)	1.54	2.66	1.00
Conv. Total (cfs)	57837.4	Conv. (cfs)	9056.5	30790.9	17990.0
Length Wtd. (ft)	457.18	Wetted Per. (ft)	133.98	263.91	544.23
Min Ch El (ft)	895.40	Shear (lb/sq ft)	0.60	1.05	0.39
Alpha	1.05	Stream Power (lb/ft s)	2.11	3.64	1.03
Frctn Loss (ft)	2.02	Cum Volume (acre-ft)	96.39	131.88	107.36
C & E Loss (ft)	0.02	Cum SA (acres)	60.13	49.00	75.66

Warning: The energy loss was 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)	899.49	Element			
Vel Head (ft)	0.30	Wt. n-Val.		0.065	0.045
W.S. Elev (ft)	899.18	Reach Len. (ft)	420.00	455.00	490.00

Crit W.S. (ft)		Flow Area (sq ft)		947.88	99.85
E.G. Slope (ft/ft)	0.006498	Area (sq ft)		947.88	99.85
Q Total (cfs)	4590.00	Flow (cfs)		4062.13	527.87
Top Width (ft)	296.54	Top Width (ft)		263.90	32.64
Vel Total (ft/s)	4.38	Avg. Vel. (ft/s)		4.29	5.29
Max Chl Dpth (ft)	3.78	Hydr. Depth (ft)		3.59	3.06
Conv. Total (cfs)	56939.3	Conv. (cfs)		50391.1	6548.2
Length Wtd. (ft)	457.17	Wetted Per. (ft)		267.29	35.67
Min Ch El (ft)	895.40	Shear (lb/sq ft)		1.44	1.14
Alpha	1.01	Stream Power (lb/ft s)		6.17	6.00
Frctn Loss (ft)	2.01	Cum Volume (acre-ft)	25.80	175.33	32.65
C & E Loss (ft)	0.04	Cum SA (acres)	7.62	49.00	10.43

Warning: The conveyance ratio (upstream 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: T1SR5WS17
REACH: Section 5 to 30 RS: 20.328

INPUT
Description: Section is 0.328 miles upstream of Zone A Section 20.
Station Elevation Data num= 29

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9212.9	898	9279.8	897.2	9386.7	897	9437.2	896.33	9467.5	896.1
9514.9	895.1	9541.3	894.8	9636.7	894.53	9652.9	894.36	9710.6	894.2
9753.8	894	9850.1	894	9877	893.84	9944	893.6	9987	893.1
10000	893	10035.7	893.4	10084.2	893.97	10104.2	893.9	10127.1	894.04
10178.4	894.2	10235.8	894.3	10269.9	894.5	10322.2	894.79	10391.1	895.2
10420	896	10507.5	896.54	10537.9	896.67	10753.1	897.95		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9212.9	.055	9850.1	.065	10104.2	.045

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9850.1	10104.2	410	405	400	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	896.38	Element			
Vel Head (ft)	0.09	Wt. n-Val.	0.055	0.065	0.045
W.S. Elev (ft)	896.29	Reach Len. (ft)	410.00	405.00	400.00
Crit W.S. (ft)		Flow Area (sq ft)	684.86	687.23	546.56
E.G. Slope (ft/ft)	0.003258	Area (sq ft)	684.86	687.23	546.56
Q Total (cfs)	4590.00	Flow (cfs)	1493.88	1740.71	1355.42
Top Width (ft)	1023.35	Top Width (ft)	407.10	254.10	362.15
Vel Total (ft/s)	2.39	Avg. Vel. (ft/s)	2.18	2.53	2.48
Max Chl Dpth (ft)	3.29	Hydr. Depth (ft)	1.68	2.70	1.51
Conv. Total (cfs)	80411.9	Conv. (cfs)	26171.1	30495.4	23745.5
Length Wtd. (ft)	404.83	Wetted Per. (ft)	407.12	254.11	362.16
Min Ch El (ft)	893.00	Shear (lb/sq ft)	0.34	0.55	0.31
Alpha	1.01	Stream Power (lb/ft s)	0.75	1.39	0.76
Frctn Loss (ft)	1.68	Cum Volume (acre-ft)	92.09	124.63	101.22
C & E Loss (ft)	0.01	Cum SA (acres)	57.52	46.29	70.57

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

			Left OB	Channel	Right OB
E.G. Elev (ft)	897.43	Element			
Vel Head (ft)	0.17	Wt. n-Val.	0.055	0.065	0.045
W.S. Elev (ft)	897.26	Reach Len. (ft)	410.00	405.00	400.00
Crit W.S. (ft)		Flow Area (sq ft)	256.69	934.81	223.88
E.G. Slope (ft/ft)	0.003184	Area (sq ft)	256.69	934.81	223.88
Q Total (cfs)	4590.00	Flow (cfs)	837.41	2873.50	879.09
Top Width (ft)	402.93	Top Width (ft)	78.73	254.10	70.10
Vel Total (ft/s)	3.24	Avg. Vel. (ft/s)	3.26	3.07	3.93
Max Chl Dpth (ft)	4.26	Hydr. Depth (ft)	3.26	3.68	3.19
Conv. Total (cfs)	81347.2	Conv. (cfs)	14841.2	50926.3	15579.8
Length Wtd. (ft)	404.24	Wetted Per. (ft)	81.99	254.11	73.17
Min Ch El (ft)	893.00	Shear (lb/sq ft)	0.62	0.73	0.61
Alpha	1.03	Stream Power (lb/ft s)	2.03	2.25	2.39
Frctn Loss (ft)	1.64	Cum Volume (acre-ft)	24.56	165.50	30.83
C & E Loss (ft)	0.01	Cum SA (acres)	7.24	46.29	9.85

Warning: The energy loss was 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: T1SR5WS17
REACH: Section 5 to 30 RS: 20.245

INPUT
Description: Section is 0.245 miles upstream of Zone A Section 20.
Station Elevation Data num= 32

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9498.9	897.3	9535.7	896.4	9595.7	895.97	9647.3	895.28	9685.8	894.5
9719.3	893.77	9742.5	893.3	9771.1	892.8	9801.3	892.2	9886.1	892.2
9941.1	891.8	9993.4	892.07	10000	892	10006.2	892.04	10055.4	892.2
10117.2	892.8	10138.2	892.3	10200.1	891.9	10253.4	892.8	10295.6	893.03

10335	892.4	10389.1	893.52	10407	893.46	10460	894.08	10492.2	894.24
10529.8	894.47	10576.2	894.77	10603.3	894	10675.9	894.7	10732.3	895
10821.1	895.53	10878.5	896.1						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9498.9	.045	9886.1	.065	10138.2	.05

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9886.1	10138.2	285	290	320	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	894.69	Element			
Vel Head (ft)	0.14	Wt. n-Val.	0.045	0.065	0.050
W.S. Elev (ft)	894.54	Reach Len. (ft)	285.00	290.00	320.00
Crit W.S. (ft)		Flow Area (sq ft)	340.30	595.93	594.86
E.G. Slope (ft/ft)	0.005493	Area (sq ft)	340.30	595.93	594.86
Q Total (cfs)	4590.00	Flow (cfs)	1177.31	1791.69	1621.00
Top Width (ft)	933.04	Top Width (ft)	202.45	252.10	478.49
Vel Total (ft/s)	3.00	Avg. Vel. (ft/s)	3.46	3.01	2.73
Max Chl Dpth (ft)	2.74	Hydr. Depth (ft)	1.68	2.36	1.24
Conv. Total (cfs)	61928.9	Conv. (cfs)	15884.4	24173.7	21870.8
Length Wtd. (ft)	300.80	Wetted Per. (ft)	202.47	252.11	478.53
Min Ch El (ft)	891.80	Shear (lb/sq ft)	0.58	0.81	0.43
Alpha	1.03	Stream Power (lb/ft s)	1.99	2.44	1.16
Frctn Loss (ft)	1.43	Cum Volume (acre-ft)	87.27	118.66	95.98
C & E Loss (ft)	0.00	Cum SA (acres)	54.66	43.94	66.71

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)	895.78	Element			
Vel Head (ft)	0.26	Wt. n-Val.	0.045	0.065	0.050
W.S. Elev (ft)	895.51	Reach Len. (ft)	285.00	290.00	320.00
Crit W.S. (ft)		Flow Area (sq ft)	12.69	840.55	290.20
E.G. Slope (ft/ft)	0.005380	Area (sq ft)	12.69	840.55	290.20
Q Total (cfs)	4590.00	Flow (cfs)	45.10	3145.50	1399.40
Top Width (ft)	340.90	Top Width (ft)	3.83	252.10	84.97
Vel Total (ft/s)	4.01	Avg. Vel. (ft/s)	3.55	3.74	4.82
Max Chl Dpth (ft)	3.71	Hydr. Depth (ft)	3.31	3.33	3.42
Conv. Total (cfs)	62577.1	Conv. (cfs)	614.8	42883.8	19078.5
Length Wtd. (ft)	297.12	Wetted Per. (ft)	7.14	252.11	88.20
Min Ch El (ft)	891.80	Shear (lb/sq ft)	0.60	1.12	1.11
Alpha	1.04	Stream Power (lb/ft s)	2.12	4.19	5.33
Frctn Loss (ft)	1.43	Cum Volume (acre-ft)	23.30	157.25	28.47
C & E Loss (ft)	0.01	Cum SA (acres)	6.85	43.94	9.14

Warning: The energy loss was 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: T1SR5WS17
REACH: Section 5 to 30 RS: 20.189

INPUT
Description: Section is 0.189 miles upstream of Zone A Section 20.
Station Elevation Data num= 25

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9624.4	894.9	9693.5	893.91	9706.5	894.07	9735.1	893.8	9807.2	892.43
9826.6	891.4	9849.8	891.2	9869.1	891.4	9886.3	890.3	9929.5	890.01
10000	890.6	10082.1	890.76	10126.2	890.8	10172	890.9	10209.9	890.93
10296.5	891.03	10357.7	891.42	10426.2	891.82	10457.3	891.59	10512.3	892.5
10612.7	892.97	10678.4	893.3	10743.4	893.69	10798.5	894.09	10871.3	894.61

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9624.4	.045	9886.3	.05	10126.2	.045

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9886.3	10126.2	325	335	335	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	893.25	Element			
Vel Head (ft)	0.16	Wt. n-Val.	0.045	0.050	0.045
W.S. Elev (ft)	893.10	Reach Len. (ft)	325.00	335.00	335.00
Crit W.S. (ft)		Flow Area (sq ft)	149.57	624.35	723.37
E.G. Slope (ft/ft)	0.004167	Area (sq ft)	149.57	624.35	723.37
Q Total (cfs)	4590.00	Flow (cfs)	381.55	2266.16	1942.29
Top Width (ft)	865.69	Top Width (ft)	114.16	239.90	511.63
Vel Total (ft/s)	3.07	Avg. Vel. (ft/s)	2.55	3.63	2.69
Max Chl Dpth (ft)	3.09	Hydr. Depth (ft)	1.31	2.60	1.41
Conv. Total (cfs)	71106.0	Conv. (cfs)	5910.8	35106.3	30089.0
Length Wtd. (ft)	333.54	Wetted Per. (ft)	114.23	239.90	511.64
Min Ch El (ft)	890.01	Shear (lb/sq ft)	0.34	0.68	0.37
Alpha	1.07	Stream Power (lb/ft s)	0.87	2.46	0.99
Frctn Loss (ft)	1.30	Cum Volume (acre-ft)	85.66	114.60	91.14
C & E Loss (ft)	0.01	Cum SA (acres)	53.62	42.30	63.07

Warning: The energy loss was 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)	894.34	Element			
Vel Head (ft)	0.31	Wt. n-Val.		0.050	0.045
W.S. Elev (ft)	894.03	Reach Len. (ft)	325.00	335.00	335.00
Crit W.S. (ft)		Flow Area (sq ft)		847.91	174.14
E.G. Slope (ft/ft)	0.004321	Area (sq ft)		847.91	174.14
Q Total (cfs)	4590.00	Flow (cfs)		3803.97	786.03
Top Width (ft)	294.85	Top Width (ft)		239.90	54.95
Vel Total (ft/s)	4.49	Avg. Vel. (ft/s)		4.49	4.51
Max Chl Dpth (ft)	4.02	Hydr. Depth (ft)		3.53	3.17
Conv. Total (cfs)	69828.2	Conv. (cfs)		57870.2	11958.0
Length Wtd. (ft)	334.94	Wetted Per. (ft)		243.63	58.07
Min Ch El (ft)	890.01	Shear (lb/sq ft)		0.94	0.81
Alpha	1.00	Stream Power (lb/ft s)		4.21	3.65
Frctn Loss (ft)	1.35	Cum Volume (acre-ft)	23.26	151.63	26.76
C & E Loss (ft)	0.02	Cum SA (acres)	6.84	42.30	8.62

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.

CROSS SECTION RIVER: T1SR5WS17
REACH: Section 5 to 30 RS: 20.126

INPUT
Description: Section is 0.126 miles upstream of Zone A Section 20.
Station Elevation Data num= 34

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9412.9	895.35	9463.3	894.8	9490.6	894	9511.2	893.45	9531.3	893.15
9571.8	892.4	9590.3	892	9613.7	891.1	9644.9	891.42	9694.8	890.6
9742.8	890.43	9785.7	890.1	9853.4	889.58	9881.8	889.4	9919.3	889.2
9952.2	888.7	9963	888.11	10000	888	10056	889.26	10105.5	889.4
10168.7	890.04	10268	890.01	10294.4	890.18	10318.9	889.8	10350.5	890.1
10392.4	890.51	10506.5	891.43	10600.2	891.99	10618.2	892.2	10630.5	892.2
10645.3	891.9	10654.7	891.8	10710.4	892.65	10809.8	892.97		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9412.9	.045	9881.8	.055	10105.5	.05

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9881.8	10105.5	280	310	325	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	891.94	Element			
Vel Head (ft)	0.13	Wt. n-Val.	0.045	0.055	0.050
W.S. Elev (ft)	891.81	Reach Len. (ft)	280.00	310.00	325.00
Crit W.S. (ft)		Flow Area (sq ft)	392.03	665.31	630.11
E.G. Slope (ft/ft)	0.003643	Area (sq ft)	392.03	665.31	630.11
Q Total (cfs)	4590.00	Flow (cfs)	962.66	2243.39	1383.95
Top Width (ft)	977.30	Top Width (ft)	286.62	223.70	466.98
Vel Total (ft/s)	2.72	Avg. Vel. (ft/s)	2.46	3.37	2.20
Max Chl Dpth (ft)	3.81	Hydr. Depth (ft)	1.37	2.97	1.35
Conv. Total (cfs)	76048.9	Conv. (cfs)	15949.7	37169.4	22929.9
Length Wtd. (ft)	304.31	Wetted Per. (ft)	286.65	223.74	466.99
Min Ch El (ft)	888.00	Shear (lb/sq ft)	0.31	0.68	0.31
Alpha	1.12	Stream Power (lb/ft s)	0.76	2.28	0.67
Frctn Loss (ft)	1.02	Cum Volume (acre-ft)	83.64	109.64	85.94
C & E Loss (ft)	0.01	Cum SA (acres)	52.12	40.52	59.31

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)	892.98	Element			
Vel Head (ft)	0.25	Wt. n-Val.	0.045	0.055	0.050
W.S. Elev (ft)	892.73	Reach Len. (ft)	280.00	310.00	325.00
Crit W.S. (ft)		Flow Area (sq ft)	17.88	870.28	266.69
E.G. Slope (ft/ft)	0.003750	Area (sq ft)	17.88	870.28	266.69
Q Total (cfs)	4590.00	Flow (cfs)	58.47	3561.10	970.43
Top Width (ft)	320.72	Top Width (ft)	5.40	223.70	91.62
Vel Total (ft/s)	3.97	Avg. Vel. (ft/s)	3.27	4.09	3.64
Max Chl Dpth (ft)	4.73	Hydr. Depth (ft)	3.31	3.89	2.91
Conv. Total (cfs)	74955.4	Conv. (cfs)	954.8	58153.3	15847.2
Length Wtd. (ft)	307.07	Wetted Per. (ft)	8.69	223.74	94.32
Min Ch El (ft)	888.00	Shear (lb/sq ft)	0.48	0.91	0.66
Alpha	1.01	Stream Power (lb/ft s)	1.57	3.73	2.41
Frctn Loss (ft)	1.16	Cum Volume (acre-ft)	23.19	145.02	25.07
C & E Loss (ft)	0.00	Cum SA (acres)	6.82	40.52	8.06

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: T1SR5WS17
REACH: Section 5 to 30 RS: 20.067

INPUT
Description: Section is 0.067 miles upstream of Zone A Section 20.

Station Elevation Data num= 32

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9398.9	894.4	9451.6	894	9485.9	892	9518	890.93	9585.4	889.35
9612.8	888.6	9647.2	888.2	9663.9	888.34	9726.2	888.11	9802.6	888.3
9882.1	888.3	9891	888.4	9951.5	888.24	9974.6	888.1	9990.1	887.2
10000	887	10017.3	888.05	10048.3	888.2	10090.5	888.5	10105.4	890.5
10137.6	889.82	10172.7	888.9	10220.1	889.2	10240.9	888.87	10280.6	888.64
10308.2	889.3	10353.6	889.56	10385.3	890.15	10433.1	890.09	10457.7	890.28
10500.3	893.6	10527.5	896.12						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9398.9	.055	9891	.05	10048.3	.055

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9891	10048.3	105	100	90	.3	.5

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	890.92	Element			
Vel Head (ft)	0.11	Wt. n-Val.	0.055	0.050	0.055
W.S. Elev (ft)	890.81	Reach Len. (ft)	105.00	100.00	90.00
Crit W.S. (ft)		Flow Area (sq ft)	803.47	437.79	591.96
E.G. Slope (ft/ft)	0.003096	Area (sq ft)	803.47	437.79	591.96
Q Total (cfs)	4590.00	Flow (cfs)	2032.83	1432.06	1125.11
Top Width (ft)	941.52	Top Width (ft)	367.99	157.30	416.23
Vel Total (ft/s)	2.50	Avg. Vel. (ft/s)	2.53	3.27	1.90
Max Chl Dpth (ft)	3.81	Hydr. Depth (ft)	2.18	2.78	1.42
Conv. Total (cfs)	82486.7	Conv. (cfs)	36531.9	25735.5	20219.3
Length Wtd. (ft)	100.77	Wetted Per. (ft)	368.02	157.36	416.43
Min Ch El (ft)	887.00	Shear (lb/sq ft)	0.42	0.54	0.27
Alpha	1.13	Stream Power (lb/ft s)	1.07	1.76	0.52
Frctn Loss (ft)	0.64	Cum Volume (acre-ft)	79.80	105.71	81.38
C & E Loss (ft)	0.12	Cum SA (acres)	50.02	39.16	56.01

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

CROSS SECTION OUTPUT Profile #PF 2

			Left OB	Channel	Right OB
E.G. Elev (ft)	891.81	Element			
Vel Head (ft)	0.24	Wt. n-Val.	0.055	0.050	0.055
W.S. Elev (ft)	891.57	Reach Len. (ft)	105.00	100.00	90.00
Crit W.S. (ft)		Flow Area (sq ft)	446.19	557.16	198.84
E.G. Slope (ft/ft)	0.003816	Area (sq ft)	446.19	557.16	198.84
Q Total (cfs)	4590.00	Flow (cfs)	1619.79	2375.99	594.22
Top Width (ft)	374.23	Top Width (ft)	135.68	157.30	81.25
Vel Total (ft/s)	3.82	Avg. Vel. (ft/s)	3.63	4.26	2.99
Max Chl Dpth (ft)	4.57	Hydr. Depth (ft)	3.29	3.54	2.45
Conv. Total (cfs)	74307.7	Conv. (cfs)	26222.9	38465.0	9619.9
Length Wtd. (ft)	100.29	Wetted Per. (ft)	139.07	157.36	82.97
Min Ch El (ft)	887.00	Shear (lb/sq ft)	0.76	0.84	0.57
Alpha	1.04	Stream Power (lb/ft s)	2.77	3.60	1.71
Frctn Loss (ft)	0.63	Cum Volume (acre-ft)	21.70	139.94	23.33
C & E Loss (ft)	0.11	Cum SA (acres)	6.37	39.16	7.41

Warning: The conveyance ratio (upstream 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: T1SR5WS17
REACH: Section 5 to 30 RS: 20.060

INPUT
Description: Section is 0.060 miles upstream of Zone A Section 20.

Station Elevation Data num= 33

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9389	894.5	9404.3	894	9419.7	893.2	9452.5	891.55	9462.8	892.27
9483.6	890.9	9506.6	890	9551.7	888.24	9586.9	887.7	9616.7	887.6
9638.3	888.01	9658.8	888.1	9682.4	887.6	9721.5	887.85	9751.2	887.8
9753.5	902	9859.8	902	9861	888.2	9886.8	888.2	9909.3	888
9925.9	887.6	9973.4	887.42	10000	886.9	10012.5	887.7	10044.4	887.8
10072.4	888.51	10093.9	889.1	10112	890.5	10257.8	890.5	10294.8	889.13
10326.4	889.37	10361	890	10419.1	892.35				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9389	.055	9886.8	.05	10044.4	.055

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9886.8	10044.4	130	120	105	.3	.5

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	890.16	Element			
Vel Head (ft)	0.52	Wt. n-Val.	0.055	0.050	0.055
W.S. Elev (ft)	889.64	Reach Len. (ft)	130.00	120.00	105.00
Crit W.S. (ft)		Flow Area (sq ft)	423.94	321.92	79.29
E.G. Slope (ft/ft)	0.019258	Area (sq ft)	423.94	321.92	79.29
Q Total (cfs)	4590.00	Flow (cfs)	2179.74	2137.02	273.23
Top Width (ft)	535.91	Top Width (ft)	261.60	157.60	116.71
Vel Total (ft/s)	5.56	Avg. Vel. (ft/s)	5.14	6.64	3.45

Max Chl Dpth (ft)	2.74	Hydr. Depth (ft)	1.62	2.04	0.68
Conv. Total (cfs)	33075.2	Conv. (cfs)	15707.1	15399.3	1968.9
Length Wtd. (ft)	121.17	Wetted Per. (ft)	264.53	157.64	116.76
Min Ch El (ft)	886.90	Shear (lb/sq ft)	1.93	2.46	0.82
Alpha	1.09	Stream Power (lb/ft s)	9.91	16.30	2.81
Frctn Loss (ft)	0.55	Cum Volume (acre-ft)	78.32	104.84	80.68
C & E Loss (ft)	0.22	Cum SA (acres)	49.26	38.80	55.46

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

CROSS SECTION OUTPUT Profile #PF 2

			Left OB	Channel	Right OB
E.G. Elev (ft)	891.08	Element			
Vel Head (ft)	0.59	Wt. n-Val.	0.055	0.050	0.055
W.S. Elev (ft)	890.49	Reach Len. (ft)	130.00	120.00	105.00
Crit W.S. (ft)		Flow Area (sq ft)	202.03	455.69	114.03
E.G. Slope (ft/ft)	0.012245	Area (sq ft)	202.03	455.69	114.03
Q Total (cfs)	4590.00	Flow (cfs)	1065.52	3041.03	483.45
Top Width (ft)	304.42	Top Width (ft)	79.37	157.60	67.46
Vel Total (ft/s)	5.95	Avg. Vel. (ft/s)	5.27	6.67	4.24
Max Chl Dpth (ft)	3.59	Hydr. Depth (ft)	2.55	2.89	1.69
Conv. Total (cfs)	41479.5	Conv. (cfs)	9629.0	27481.6	4368.9
Length Wtd. (ft)	120.50	Wetted Per. (ft)	86.54	157.64	67.53
Min Ch El (ft)	886.90	Shear (lb/sq ft)	1.78	2.21	1.29
Alpha	1.07	Stream Power (lb/ft s)	9.41	14.75	5.47
Frctn Loss (ft)	0.43	Cum Volume (acre-ft)	20.92	138.78	23.01
C & E Loss (ft)	0.23	Cum SA (acres)	6.11	38.80	7.26

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

CROSS SECTION RIVER: T1SR5WS17
REACH: Section 5 to 30 RS: 20.036

INPUT
Description: Section is 0.036 miles upstream of Zone A Section 20.
Station Elevation Data num= 21

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9406.2	892.1	9445.1	890.63	9462.6	889.98	9561.2	887.52	9601.5	887.1
9681.2	887.23	9709	886.9	9744.6	887.3	9788	887.65	9834.7	887.6
9889.4	887.2	9940.6	886.8	9954.8	887.4	9972.1	887.2	10000	886.41
10112.4	886.01	10220	886.18	10319	887.63	10374	889.9	10427	891.53
10472.3	892								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9406.2	.045	9889.4	.05	10112.4	.05

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9889.4	10112.4	210	185	185	.3	.5

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	889.39	Element			
Vel Head (ft)	0.09	Wt. n-Val.	0.045	0.050	0.050
W.S. Elev (ft)	889.30	Reach Len. (ft)	210.00	185.00	185.00
Crit W.S. (ft)		Flow Area (sq ft)	716.68	601.10	616.38
E.G. Slope (ft/ft)	0.001978	Area (sq ft)	716.68	601.10	616.38
Q Total (cfs)	4590.00	Flow (cfs)	1553.38	1538.56	1498.06
Top Width (ft)	869.77	Top Width (ft)	399.65	223.00	247.12
Vel Total (ft/s)	2.37	Avg. Vel. (ft/s)	2.17	2.56	2.43
Max Chl Dpth (ft)	3.29	Hydr. Depth (ft)	1.79	2.70	2.49
Conv. Total (cfs)	103210.6	Conv. (cfs)	34929.2	34596.1	33685.4
Length Wtd. (ft)	195.96	Wetted Per. (ft)	399.68	223.03	247.17
Min Ch El (ft)	886.01	Shear (lb/sq ft)	0.22	0.33	0.31
Alpha	1.01	Stream Power (lb/ft s)	0.48	0.85	0.75
Frctn Loss (ft)	0.58	Cum Volume (acre-ft)	76.62	103.57	79.85
C & E Loss (ft)	0.02	Cum SA (acres)	48.27	38.28	55.02

Warning: The conveyance ratio (upstream 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)	890.41	Element			
Vel Head (ft)	0.13	Wt. n-Val.	0.045	0.050	0.050
W.S. Elev (ft)	890.29	Reach Len. (ft)	210.00	185.00	185.00
Crit W.S. (ft)		Flow Area (sq ft)	517.71	820.60	278.58
E.G. Slope (ft/ft)	0.001650	Area (sq ft)	517.71	820.60	278.58
Q Total (cfs)	4590.00	Flow (cfs)	1385.14	2361.15	843.71
Top Width (ft)	469.34	Top Width (ft)	180.40	223.00	65.94
Vel Total (ft/s)	2.84	Avg. Vel. (ft/s)	2.68	2.88	3.03
Max Chl Dpth (ft)	4.28	Hydr. Depth (ft)	2.87	3.68	4.22
Conv. Total (cfs)	112986.6	Conv. (cfs)	34096.3	58121.6	20768.7
Length Wtd. (ft)	195.19	Wetted Per. (ft)	183.79	223.03	70.11
Min Ch El (ft)	886.01	Shear (lb/sq ft)	0.29	0.38	0.41
Alpha	1.01	Stream Power (lb/ft s)	0.78	1.09	1.24
Frctn Loss (ft)	0.52	Cum Volume (acre-ft)	19.84	137.02	22.53
C & E Loss (ft)	0.05	Cum SA (acres)	5.72	38.28	7.10

Warning: The conveyance ratio (upstream 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: T1SR5WS17
REACH: Section 5 to 30 RS: 20.000

INPUT
Description: Section is Zone A Section 20.
Station Elevation Data num= 23

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
8886.6	891.2	8984	890.27	9107.6	891.4	9288.6	890.37	9410.8	890.17
9429.6	889.26	9494.8	888	9568.2	886.63	9662.6	885.9	9701.9	886.57
9781.7	886.2	9833.2	886.61	9878.7	886.5	9966.4	886.35	9982.4	886.05
10000	885.8	10017.7	886.4	10044.7	886.7	10107.9	886.74	10247.1	887.73
10314.9	887.8	10387.3	888.71	10414.5	890				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
8886.6	.05	9878.7	.05	10044.7	.05

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9878.7	10044.7	235	255	260	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	888.79	Element			
Vel Head (ft)	0.16	Wt. n-Val.	0.050	0.050	0.050
W.S. Elev (ft)	888.64	Reach Len. (ft)	235.00	255.00	260.00
Crit W.S. (ft)		Flow Area (sq ft)	814.48	381.67	402.70
E.G. Slope (ft/ft)	0.004753	Area (sq ft)	814.48	381.67	402.70
Q Total (cfs)	4900.00	Flow (cfs)	2608.23	1362.09	929.68
Top Width (ft)	919.42	Top Width (ft)	416.77	166.00	336.65
Vel Total (ft/s)	3.06	Avg. Vel. (ft/s)	3.20	3.57	2.31
Max Chl Dpth (ft)	2.84	Hydr. Depth (ft)	1.95	2.30	1.20
Conv. Total (cfs)	71076.8	Conv. (cfs)	37833.5	19757.8	13485.5
Length Wtd. (ft)	245.29	Wetted Per. (ft)	416.80	166.02	336.66
Min Ch El (ft)	885.80	Shear (lb/sq ft)	0.58	0.68	0.35
Alpha	1.07	Stream Power (lb/ft s)	1.86	2.43	0.82
Frctn Loss (ft)	0.90	Cum Volume (acre-ft)	72.93	101.48	77.68
C & E Loss (ft)	0.01	Cum SA (acres)	46.31	37.45	53.78

CROSS SECTION OUTPUT Profile #PF 2

			Left OB	Channel	Right OB
E.G. Elev (ft)	889.83	Element			
Vel Head (ft)	0.29	Wt. n-Val.	0.050	0.050	0.050
W.S. Elev (ft)	889.54	Reach Len. (ft)	235.00	255.00	260.00
Crit W.S. (ft)		Flow Area (sq ft)	577.12	531.84	17.71
E.G. Slope (ft/ft)	0.004730	Area (sq ft)	577.12	531.84	17.71
Q Total (cfs)	4900.00	Flow (cfs)	2481.30	2362.19	56.51
Top Width (ft)	358.26	Top Width (ft)	186.02	166.00	6.24
Vel Total (ft/s)	4.35	Avg. Vel. (ft/s)	4.30	4.44	3.19
Max Chl Dpth (ft)	3.74	Hydr. Depth (ft)	3.10	3.20	2.84
Conv. Total (cfs)	71249.3	Conv. (cfs)	36079.8	34347.8	821.8
Length Wtd. (ft)	244.72	Wetted Per. (ft)	189.15	166.02	9.08
Min Ch El (ft)	885.80	Shear (lb/sq ft)	0.90	0.95	0.58
Alpha	1.00	Stream Power (lb/ft s)	3.87	4.20	1.84
Frctn Loss (ft)	0.86	Cum Volume (acre-ft)	17.20	134.15	21.90
C & E Loss (ft)	0.03	Cum SA (acres)	4.84	37.45	6.95

CROSS SECTION RIVER: T1SR5WS17
REACH: Section 5 to 30 RS: 10.444

INPUT
Description: Section is 0.444 miles upstream of Zone A Section 10.
Station Elevation Data num= 24

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9270	890.05	9383.4	888.6	9444.8	888.7	9472.5	887.6	9501.9	887.1
9511.6	886.51	9536.3	886	9611.7	885.36	9724.6	884.97	9748.7	884.6
9839.8	885.26	9885.2	885.4	9942.4	885.59	9964.2	885	10000	884.9
10030.7	885.4	10049.2	885.37	10137.2	885.5	10196.6	885.9	10245.5	886.35
10335.1	887.37	10407.1	888	10463.4	888.62	10547.3	889.01		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9270	.05	9885.2	.05	10049.2	.05

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9885.2	10049.2	165	175	180	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	887.88	Element			
Vel Head (ft)	0.11	Wt. n-Val.	0.050	0.050	0.050
W.S. Elev (ft)	887.76	Reach Len. (ft)	165.00	175.00	180.00
Crit W.S. (ft)		Flow Area (sq ft)	949.33	408.30	496.94
E.G. Slope (ft/ft)	0.002932	Area (sq ft)	949.33	408.30	496.94
Q Total (cfs)	4900.00	Flow (cfs)	2644.26	1206.75	1048.99
Top Width (ft)	911.49	Top Width (ft)	416.78	164.00	330.71
Vel Total (ft/s)	2.64	Avg. Vel. (ft/s)	2.79	2.96	2.11
Max Chl Dpth (ft)	3.16	Hydr. Depth (ft)	2.28	2.49	1.50
Conv. Total (cfs)	90499.0	Conv. (cfs)	48837.3	22287.7	19374.0

Length Wtd. (ft)	170.40	Wetted Per. (ft)	416.82	164.01	330.72
Min Ch El (ft)	884.90	Shear (lb/sq ft)	0.42	0.46	0.28
Alpha	1.04	Stream Power (lb/ft s)	1.16	1.35	0.58
Frctn Loss (ft)	0.64	Cum Volume (acre-ft)	68.17	99.17	75.00
C & E Loss (ft)	0.01	Cum SA (acres)	44.06	36.49	51.79

CROSS SECTION OUTPUT Profile #PF 2

E.G. Elev (ft)	888.95	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.20	Wt. n-Val.	0.050	0.050	0.050
W.S. Elev (ft)	888.75	Reach Len. (ft)	165.00	175.00	180.00
Crit W.S. (ft)		Flow Area (sq ft)	717.52	570.48	78.18
E.G. Slope (ft/ft)	0.002699	Area (sq ft)	717.52	570.48	78.18
Q Total (cfs)	4900.00	Flow (cfs)	2630.42	2021.87	247.71
Top Width (ft)	379.65	Top Width (ft)	192.41	164.00	23.24
Vel Total (ft/s)	3.59	Avg. Vel. (ft/s)	3.67	3.54	3.17
Max Chl Dpth (ft)	4.15	Hydr. Depth (ft)	3.73	3.48	3.36
Conv. Total (cfs)	94324.2	Conv. (cfs)	50635.1	38920.7	4768.4
Length Wtd. (ft)	170.54	Wetted Per. (ft)	196.09	164.01	26.59
Min Ch El (ft)	884.90	Shear (lb/sq ft)	0.62	0.59	0.50
Alpha	1.00	Stream Power (lb/ft s)	2.26	2.08	1.57
Frctn Loss (ft)	0.61	Cum Volume (acre-ft)	13.71	130.92	21.62
C & E Loss (ft)	0.02	Cum SA (acres)	3.81	36.49	6.86

CROSS SECTION RIVER: T1SR5WS17
REACH: Section 5 to 30 RS: 10.409

INPUT
Description: Section is 0.409 miles upstream of Zone A Section 10.
Station Elevation Data num= 31

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9225.3	889.1	9289.8	888	9323.9	886.7	9394.6	886.41	9418.5	886
9468.7	884.64	9529.1	884.8	9608.5	884.5	9643.1	884.2	9726.3	884.4
9728.5	899	9857.2	899	9858.2	884.74	9861.4	884.4	9898.7	884.6
9951.8	884.5	9973.9	884	10000	883.8	10018.5	885.11	10042.8	885
10098.4	885.37	10182.5	886.35	10259	886.98	10342	886.98	10406.7	887.93
10429	887.7	10451.4	886.2	10507.4	888.39	10564	888.49	10635	888.89
10664.2	889.77								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9225.3	.05	9861.4	.05	10042.8	.05

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9861.4	10042.8	190	210	220	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	887.23	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.18	Wt. n-Val.	0.050	0.050	0.050
W.S. Elev (ft)	887.04	Reach Len. (ft)	190.00	210.00	220.00
Crit W.S. (ft)		Flow Area (sq ft)	802.08	466.82	250.80
E.G. Slope (ft/ft)	0.005048	Area (sq ft)	802.08	466.82	250.80
Q Total (cfs)	4900.00	Flow (cfs)	2609.58	1850.55	439.87
Top Width (ft)	933.93	Top Width (ft)	415.10	181.40	337.42
Vel Total (ft/s)	3.22	Avg. Vel. (ft/s)	3.25	3.96	1.75
Max Chl Dpth (ft)	3.24	Hydr. Depth (ft)	1.93	2.57	0.74
Conv. Total (cfs)	68968.9	Conv. (cfs)	36730.6	26047.1	6191.3
Length Wtd. (ft)	199.52	Wetted Per. (ft)	419.57	181.45	337.48
Min Ch El (ft)	883.80	Shear (lb/sq ft)	0.60	0.81	0.23
Alpha	1.14	Stream Power (lb/ft s)	1.96	3.21	0.41
Frctn Loss (ft)	0.97	Cum Volume (acre-ft)	64.85	97.41	73.45
C & E Loss (ft)	0.01	Cum SA (acres)	42.48	35.79	50.41

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT Profile #PF 2

E.G. Elev (ft)	888.33	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.35	Wt. n-Val.	0.050	0.050	
W.S. Elev (ft)	887.98	Reach Len. (ft)	190.00	210.00	220.00
Crit W.S. (ft)		Flow Area (sq ft)	393.96	636.45	
E.G. Slope (ft/ft)	0.004952	Area (sq ft)	393.96	636.45	
Q Total (cfs)	4900.00	Flow (cfs)	1860.63	3039.37	
Top Width (ft)	289.15	Top Width (ft)	107.75	181.40	
Vel Total (ft/s)	4.76	Avg. Vel. (ft/s)	4.72	4.78	
Max Chl Dpth (ft)	4.18	Hydr. Depth (ft)	3.66	3.51	
Conv. Total (cfs)	69633.9	Conv. (cfs)	26441.4	43192.5	
Length Wtd. (ft)	202.62	Wetted Per. (ft)	117.45	184.43	
Min Ch El (ft)	883.80	Shear (lb/sq ft)	1.04	1.07	
Alpha	1.00	Stream Power (lb/ft s)	4.90	5.09	
Frctn Loss (ft)	0.98	Cum Volume (acre-ft)	11.61	128.50	21.46
C & E Loss (ft)	0.02	Cum SA (acres)	3.25	35.79	6.81

Warning: Divided flow computed for this cross-section.

CROSS SECTION RIVER: T1SR5WS17
REACH: Section 5 to 30 RS: 10.368

INPUT
Description: Section is 0.368 miles upstream of Zone A Section 10.

Station Elevation Data num= 37

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9147.6	887.91	9259.5	886.38	9332.7	886.44	9383.6	885.17	9412.2	885
9426.4	884.2	9461.6	883.9	9490.3	883.7	9500.3	884.1	9521.3	883.95
9583.4	883.95	9628.5	884	9666	884	9703.6	883.5	9778.3	883.63
9799.4	883.9	9813	884.2	9850.9	884.6	9878.1	884.1	9893.6	883.53
9928.2	884	10000	883.8	10024.8	884.15	10050.2	884.5	10081.4	884.78
10136	885.01	10194.8	885.7	10255.8	885.6	10326.2	886.39	10377.5	886.42
10445.5	886.29	10522.2	886.59	10590.9	886.99	10649.2	887.22	10737.2	887.61
10789.5	888.01	10851.6	888.66						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9147.6	.05	9799.4	.05	10050.2	.05

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9799.4	10050.2	155	150	150	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	886.25	Element			
Vel Head (ft)	0.15	Wt. n-Val.	0.050	0.050	0.050
W.S. Elev (ft)	886.09	Reach Len. (ft)	155.00	150.00	150.00
Crit W.S. (ft)		Flow Area (sq ft)	903.67	510.30	192.18
E.G. Slope (ft/ft)	0.004669	Area (sq ft)	903.67	510.30	192.18
Q Total (cfs)	4900.00	Flow (cfs)	2908.46	1663.73	327.81
Top Width (ft)	953.22	Top Width (ft)	452.82	250.80	249.60
Vel Total (ft/s)	3.05	Avg. Vel. (ft/s)	3.22	3.26	1.71
Max Chl Dpth (ft)	2.59	Hydr. Depth (ft)	2.00	2.03	0.77
Conv. Total (cfs)	71711.7	Conv. (cfs)	42565.4	24348.8	4797.6
Length Wtd. (ft)	152.71	Wetted Per. (ft)	452.87	250.83	249.61
Min Ch El (ft)	883.53	Shear (lb/sq ft)	0.58	0.59	0.22
Alpha	1.07	Stream Power (lb/ft s)	1.87	1.93	0.38
Frctn Loss (ft)	0.57	Cum Volume (acre-ft)	61.13	95.06	72.33
C & E Loss (ft)	0.01	Cum SA (acres)	40.59	34.75	48.93

CROSS SECTION OUTPUT Profile #PF 2

			Left OB	Channel	Right OB
E.G. Elev (ft)	887.33	Element			
Vel Head (ft)	0.29	Wt. n-Val.	0.050	0.050	
W.S. Elev (ft)	887.03	Reach Len. (ft)	155.00	150.00	150.00
Crit W.S. (ft)		Flow Area (sq ft)	384.91	746.34	
E.G. Slope (ft/ft)	0.004753	Area (sq ft)	384.91	746.34	
Q Total (cfs)	4900.00	Flow (cfs)	1757.72	3142.28	
Top Width (ft)	363.16	Top Width (ft)	112.36	250.80	
Vel Total (ft/s)	4.33	Avg. Vel. (ft/s)	4.57	4.21	
Max Chl Dpth (ft)	3.53	Hydr. Depth (ft)	3.43	2.98	
Conv. Total (cfs)	71073.5	Conv. (cfs)	25495.4	45578.1	
Length Wtd. (ft)	151.73	Wetted Per. (ft)	115.68	253.36	
Min Ch El (ft)	883.53	Shear (lb/sq ft)	0.99	0.87	
Alpha	1.00	Stream Power (lb/ft s)	4.51	3.68	
Frctn Loss (ft)	0.56	Cum Volume (acre-ft)	9.91	125.16	21.46
C & E Loss (ft)	0.03	Cum SA (acres)	2.77	34.75	6.81

CROSS SECTION RIVER: T1SR5WS17
REACH: Section 5 to 30 RS: 10.338

INPUT
Description: Section is 0.338 miles upstream of Zone A Section 10.
Station Elevation Data num= 29

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9241.8	887.3	9310.7	886	9328.9	885.76	9369	885	9391.2	884.8
9435.7	884.2	9522.5	883.36	9569.3	882.8	9643.1	883.07	9771.2	883.07
9785.4	882.8	9796.5	882.7	9894	883.37	10000	883.2	10030.1	883.24
10073.1	883.9	10135.1	884.13	10154.7	884.36	10198.6	884.55	10298.6	884.42
10373.6	884.95	10439.5	885	10441	900	10520.1	900	10521.4	885
10565.7	885.97	10625	886.17	10757.4	887.32	10852	888.17		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9241.8	.05	9796.5	.05	10073.1	.05

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9796.5	10073.1	180	185	195	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	885.67	Element			
Vel Head (ft)	0.11	Wt. n-Val.	0.050	0.050	0.050
W.S. Elev (ft)	885.56	Reach Len. (ft)	180.00	185.00	195.00
Crit W.S. (ft)		Flow Area (sq ft)	922.13	643.52	389.20
E.G. Slope (ft/ft)	0.003026	Area (sq ft)	922.13	643.52	389.20
Q Total (cfs)	4900.00	Flow (cfs)	2406.62	1846.99	646.39
Top Width (ft)	1125.79	Top Width (ft)	457.08	276.60	392.11
Vel Total (ft/s)	2.51	Avg. Vel. (ft/s)	2.61	2.87	1.66
Max Chl Dpth (ft)	2.86	Hydr. Depth (ft)	2.02	2.33	0.99
Conv. Total (cfs)	89082.0	Conv. (cfs)	43752.4	33578.3	11751.4
Length Wtd. (ft)	184.83	Wetted Per. (ft)	457.10	276.61	393.14
Min Ch El (ft)	882.70	Shear (lb/sq ft)	0.38	0.44	0.19
Alpha	1.08	Stream Power (lb/ft s)	0.99	1.26	0.31
Frctn Loss (ft)	0.62	Cum Volume (acre-ft)	57.89	93.07	71.33
C & E Loss (ft)	0.00	Cum SA (acres)	38.97	33.84	47.82

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT Profile #PF 2

E.G. Elev (ft)	886.74	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.20	Wt. n-Val.	0.050	0.050	
W.S. Elev (ft)	886.54	Reach Len. (ft)	180.00	185.00	195.00
Crit W.S. (ft)		Flow Area (sq ft)	445.28	913.03	
E.G. Slope (ft/ft)	0.002979	Area (sq ft)	445.28	913.03	
Q Total (cfs)	4900.00	Flow (cfs)	1637.74	3262.27	
Top Width (ft)	403.53	Top Width (ft)	126.93	276.60	
Vel Total (ft/s)	3.61	Avg. Vel. (ft/s)	3.68	3.57	
Max Chl Dpth (ft)	3.84	Hydr. Depth (ft)	3.51	3.30	
Conv. Total (cfs)	89782.7	Conv. (cfs)	30008.2	59774.5	
Length Wtd. (ft)	184.02	Wetted Per. (ft)	130.40	279.24	
Min Ch El (ft)	882.70	Shear (lb/sq ft)	0.63	0.61	
Alpha	1.00	Stream Power (lb/ft s)	2.34	2.17	
Frctn Loss (ft)	0.60	Cum Volume (acre-ft)	8.43	122.31	21.46
C & E Loss (ft)	0.00	Cum SA (acres)	2.34	33.84	6.81

CROSS SECTION RIVER: T1SR5WS17
REACH: Section 5 to 30 RS: 10.289

INPUT
Description: Section is 0.289 miles upstream of Zone A Section 10.
Station Elevation Data num= 42

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
8836.3	886.34	8922.9	885.32	8940.1	885.2	8941.8	900	8992.3	900
8993.9	885.42	9075.1	883.72	9092.3	884	9116.4	884	9125	884.3
9141.4	884	9158.6	883.52	9227.5	885.13	9308.9	884.5	9383.4	884.97
9440.7	885.79	9556.6	884.15	9558.3	900	9670.1	900	9671.2	884
9701.1	882.6	9785.3	882	9824.3	882.1	10000	882	10063.8	882.6
10130	882.7	10157.3	882.9	10236.6	883.11	10306.5	883.24	10354.5	883.87
10416.5	883.7	10473.7	884.16	10534.6	884.3	10582.4	884.69	10625.8	885
10627.3	900	10683	900	10685.3	885.08	10721.7	885.87	10782.7	885.55
10818.3	886	10916.3	886.73						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
8836.3	.055	9824.3	.055	10157.3	.055

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9824.3	10157.3	150	190	220	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
888	F		

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	885.05	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.13	Wt. n-Val.	0.055	0.055	0.055
W.S. Elev (ft)	884.92	Reach Len. (ft)	150.00	190.00	220.00
Crit W.S. (ft)	883.78	Flow Area (sq ft)	401.54	878.85	531.41
E.G. Slope (ft/ft)	0.003722	Area (sq ft)	582.16	878.85	531.41
Q Total (cfs)	4900.00	Flow (cfs)	1164.88	2766.53	968.60
Top Width (ft)	1318.27	Top Width (ft)	528.27	333.00	457.00
Vel Total (ft/s)	2.70	Avg. Vel. (ft/s)	2.90	3.15	1.82
Max Chl Dpth (ft)	2.92	Hydr. Depth (ft)	1.94	2.64	1.16
Conv. Total (cfs)	80313.1	Conv. (cfs)	19092.9	45344.6	15875.7
Length Wtd. (ft)	190.34	Wetted Per. (ft)	209.09	333.00	457.01
Min Ch El (ft)	882.00	Shear (lb/sq ft)	0.45	0.61	0.27
Alpha	1.13	Stream Power (lb/ft s)	1.29	1.93	0.49
Frctn Loss (ft)	0.86	Cum Volume (acre-ft)	54.78	89.84	69.27
C & E Loss (ft)	0.00	Cum SA (acres)	36.94	32.55	45.92

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT Profile #PF 2

E.G. Elev (ft)	886.13	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.23	Wt. n-Val.	0.055	0.055	
W.S. Elev (ft)	885.91	Reach Len. (ft)	150.00	190.00	220.00
Crit W.S. (ft)	884.07	Flow Area (sq ft)	79.42	1208.09	
E.G. Slope (ft/ft)	0.003633	Area (sq ft)	79.42	1208.09	
Q Total (cfs)	4900.00	Flow (cfs)	282.69	4617.31	
Top Width (ft)	353.72	Top Width (ft)	20.72	333.00	
Vel Total (ft/s)	3.81	Avg. Vel. (ft/s)	3.56	3.82	
Max Chl Dpth (ft)	3.91	Hydr. Depth (ft)	3.83	3.63	
Conv. Total (cfs)	81290.0	Conv. (cfs)	4689.7	76600.2	
Length Wtd. (ft)	192.30	Wetted Per. (ft)	24.58	336.01	
Min Ch El (ft)	882.00	Shear (lb/sq ft)	0.73	0.82	
Alpha	1.00	Stream Power (lb/ft s)	2.61	3.12	
Frctn Loss (ft)	0.87	Cum Volume (acre-ft)	7.35	117.80	21.46
C & E Loss (ft)	0.01	Cum SA (acres)	2.04	32.55	6.81

CROSS SECTION RIVER: T1SR5WS17
REACH: Section 5 to 30 RS: 10.246

INPUT
Description: Section is 0.246 miles upstream of Zone A Section 10.
Station Elevation Data num= 42

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9019.3	885.36	9100.8	884.86	9187.3	884.31	9279.6	884.08	9306.6	883.06
9338.3	883.2	9357.1	884	9444.4	883.82	9458.2	883.82	9519.8	884
9571.2	884.5	9668.2	884	9670.9	898	9718.5	898	9719.8	883
9730.2	882.97	9776.8	882	9813.7	881.99	9864.7	881.23	9946.7	881.47
10000	881.4	10080.6	881.57	10100.2	883.6	10116.5	883.5	10153.3	882.29
10192.7	882	10230.3	882	10248	881.5	10267.7	881.4	10278.3	882
10323.1	882.26	10403.7	882.46	10458	882.62	10532.5	882.98	10563	883.44
10607.2	883.64	10653	883.84	10694.6	884.07	10737	884.37	10786.2	884.89
10816.3	886	10856	886.6						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9019.3	.055	9864.7	.055	10116.5	.055

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9864.7	10116.5	145	155	155	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
888	F		

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	884.17	Element			
Vel Head (ft)	0.15	Wt. n-Val.	0.055	0.055	0.055
W.S. Elev (ft)	884.02	Reach Len. (ft)	145.00	155.00	155.00
Crit W.S. (ft)	883.17	Flow Area (sq ft)	280.16	597.08	758.59
E.G. Slope (ft/ft)	0.005651	Area (sq ft)	347.87	597.08	758.59
Q Total (cfs)	4900.00	Flow (cfs)	878.66	2155.73	1865.61
Top Width (ft)	1210.90	Top Width (ft)	389.86	251.80	569.23
Vel Total (ft/s)	3.00	Avg. Vel. (ft/s)	3.14	3.61	2.46
Max Chl Dpth (ft)	2.79	Hydr. Depth (ft)	1.88	2.37	1.33
Conv. Total (cfs)	65182.4	Conv. (cfs)	11688.4	28676.6	24817.4
Length Wtd. (ft)	153.71	Wetted Per. (ft)	150.04	251.91	569.29
Min Ch El (ft)	881.23	Shear (lb/sq ft)	0.66	0.84	0.47
Alpha	1.09	Stream Power (lb/ft s)	2.07	3.02	1.16
Frctn Loss (ft)	0.84	Cum Volume (acre-ft)	53.18	86.62	66.01
C & E Loss (ft)	0.00	Cum SA (acres)	35.35	31.27	43.33

Warning: Divided flow computed for this cross-section.

CROSS SECTION OUTPUT Profile #PF 2

			Left OB	Channel	Right OB
E.G. Elev (ft)	885.26	Element			
Vel Head (ft)	0.30	Wt. n-Val.		0.055	0.055
W.S. Elev (ft)	884.97	Reach Len. (ft)	145.00	155.00	155.00
Crit W.S. (ft)	883.67	Flow Area (sq ft)		834.83	294.20
E.G. Slope (ft/ft)	0.005773	Area (sq ft)		834.83	294.20
Q Total (cfs)	4900.00	Flow (cfs)		3771.96	1128.04
Top Width (ft)	364.05	Top Width (ft)		251.80	112.25
Vel Total (ft/s)	4.34	Avg. Vel. (ft/s)		4.52	3.83
Max Chl Dpth (ft)	3.74	Hydr. Depth (ft)		3.32	2.62
Conv. Total (cfs)	64492.2	Conv. (cfs)		49645.3	14846.9
Length Wtd. (ft)	155.00	Wetted Per. (ft)		255.64	115.24
Min Ch El (ft)	881.23	Shear (lb/sq ft)		1.18	0.92
Alpha	1.01	Stream Power (lb/ft s)		5.32	3.53
Frctn Loss (ft)	0.90	Cum Volume (acre-ft)	7.21	113.35	20.71
C & E Loss (ft)	0.00	Cum SA (acres)	2.00	31.27	6.53

CROSS SECTION RIVER: T1SR5WS17
REACH: Section 5 to 30 RS: 10.215

INPUT
Description: Section is 0.215 miles upstream of Zone A Section 10.
Station Elevation Data num= 32

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9201.2	883.13	9254.5	883.8	9257.2	898	9374.5	898	9376.3	883.8
9407.6	883.29	9506.7	883	9625.1	882.67	9693.1	883.9	9789.9	882.71
9830.3	881	9874.2	880.8	9942.6	880.28	10000	880.1	10086.8	880.9
10146.3	880.9	10147.2	895	10237.6	895	10238.8	881.4	10293.5	880.9
10361	880.8	10462.3	881.77	10533.5	881.57	10577.9	881.77	10598.7	882.52
10648.4	882.62	10686.5	883.18	10728.8	883.61	10809.5	883.61	10847.4	883.77
10890	884.27	10993.9	884.63						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9201.2	.055	9874.2	.055	10086.8	.055

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9874.2	10086.8	175	165	160	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
888	F		

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	883.34	Element			
Vel Head (ft)	0.17	Wt. n-Val.	0.055	0.055	0.055
W.S. Elev (ft)	883.17	Reach Len. (ft)	175.00	165.00	160.00
Crit W.S. (ft)	882.22	Flow Area (sq ft)	161.43	582.77	828.41
E.G. Slope (ft/ft)	0.005304	Area (sq ft)	213.08	582.77	828.41
Q Total (cfs)	4900.00	Flow (cfs)	383.26	2245.84	2270.91
Top Width (ft)	1048.68	Top Width (ft)	329.23	212.60	506.84

Vel Total (ft/s)	3.12	Avg. Vel. (ft/s)	2.37	3.85	2.74
Max Chl Dpth (ft)	3.07	Hydr. Depth (ft)	1.33	2.74	1.63
Conv. Total (cfs)	67282.1	Conv. (cfs)	5262.6	30837.7	31181.9
Length Wtd. (ft)	163.24	Wetted Per. (ft)	121.78	212.61	510.61
Min Ch El (ft)	880.10	Shear (lb/sq ft)	0.44	0.91	0.54
Alpha	1.11	Stream Power (lb/ft s)	1.04	3.50	1.47
Frctn Loss (ft)	0.93	Cum Volume (acre-ft)	52.24	84.52	63.19
C & E Loss (ft)	0.00	Cum SA (acres)	34.16	30.45	41.42

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

CROSS SECTION OUTPUT Profile #PF 2

			Left OB	Channel	Right OB
E.G. Elev (ft)	884.36	Element			
Vel Head (ft)	0.34	Wt. n-Val.		0.055	0.055
W.S. Elev (ft)	884.02	Reach Len. (ft)	175.00	165.00	160.00
Crit W.S. (ft)	882.61	Flow Area (sq ft)		764.23	296.21
E.G. Slope (ft/ft)	0.005902	Area (sq ft)		764.23	296.21
Q Total (cfs)	4900.00	Flow (cfs)		3685.07	1214.93
Top Width (ft)	311.68	Top Width (ft)		212.60	99.08
Vel Total (ft/s)	4.62	Avg. Vel. (ft/s)		4.82	4.10
Max Chl Dpth (ft)	3.92	Hydr. Depth (ft)		3.59	2.99
Conv. Total (cfs)	63779.7	Conv. (cfs)		47965.8	15813.8
Length Wtd. (ft)	163.60	Wetted Per. (ft)		215.83	107.39
Min Ch El (ft)	880.10	Shear (lb/sq ft)		1.30	1.02
Alpha	1.01	Stream Power (lb/ft s)		6.29	4.17
Frctn Loss (ft)	0.93	Cum Volume (acre-ft)	7.21	110.50	19.66
C & E Loss (ft)	0.01	Cum SA (acres)	2.00	30.45	6.15

Warning: Divided flow computed for this cross-section.

CROSS SECTION RIVER: T1SR5WS17
REACH: Section 5 to 30 RS: 10.184

INPUT
Description: Section is 0.184 miles upstream of Zone A Section 10.
Station Elevation Data num= 43

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9274.5	883	9328.5	882.48	9341.6	881	9343.4	881.2	9367.8	881.3
9369	881.5	9393.2	879.98	9481.9	879.19	9513.4	880.2	9558.7	881.1
9715.6	881.69	9725.5	882.05	9744.6	882.4	9778.7	882.5	9801	882
9846.7	880	9864.4	879.7	9871.8	880	9888.4	880	9904.1	879.9
9916.3	880	9931.7	880	9962.1	879.4	10000	879.3	10048.8	879.5
10075	880.32	10083	880.5	10116.3	880.55	10150.7	880.55	10197.8	880.25
10268.4	879.86	10302.3	879.37	10342.9	880.45	10379.3	880.32	10492.5	881.08
10560.8	881.38	10634.5	881.61	10667.4	882.07	10711.2	882.1	10780.6	882.53
10851.3	882.92	10958.6	883.42	11057.5	884.04				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9274.5	.055	9864.4	.055	10083	.055

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9864.4	10083	220	235	245	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
888	F		

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	882.40	Element			
Vel Head (ft)	0.17	Wt. n-Val.	0.055	0.055	0.055
W.S. Elev (ft)	882.23	Reach Len. (ft)	220.00	235.00	245.00
Crit W.S. (ft)	881.37	Flow Area (sq ft)	99.66	552.52	921.78
E.G. Slope (ft/ft)	0.006159	Area (sq ft)	691.64	552.52	921.78
Q Total (cfs)	4900.00	Flow (cfs)	258.18	2173.58	2468.24
Top Width (ft)	1346.57	Top Width (ft)	478.48	218.60	649.50
Vel Total (ft/s)	3.11	Avg. Vel. (ft/s)	2.59	3.93	2.68
Max Chl Dpth (ft)	3.04	Hydr. Depth (ft)	1.35	2.53	1.42
Conv. Total (cfs)	62434.6	Conv. (cfs)	3289.7	27695.2	31449.7
Length Wtd. (ft)	237.48	Wetted Per. (ft)	73.79	218.63	649.52
Min Ch El (ft)	879.30	Shear (lb/sq ft)	0.52	0.97	0.55
Alpha	1.12	Stream Power (lb/ft s)	1.35	3.82	1.46
Frctn Loss (ft)	1.29	Cum Volume (acre-ft)	50.43	82.37	59.98
C & E Loss (ft)	0.02	Cum SA (acres)	32.54	29.63	39.29

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)	883.42	Element			
Vel Head (ft)	0.29	Wt. n-Val.		0.055	0.055
W.S. Elev (ft)	883.13	Reach Len. (ft)	220.00	235.00	245.00
Crit W.S. (ft)	881.79	Flow Area (sq ft)		748.26	399.30
E.G. Slope (ft/ft)	0.005487	Area (sq ft)		748.26	399.30
Q Total (cfs)	4900.00	Flow (cfs)		3365.60	1534.40
Top Width (ft)	365.60	Top Width (ft)		218.60	147.00
Vel Total (ft/s)	4.27	Avg. Vel. (ft/s)		4.50	3.84
Max Chl Dpth (ft)	3.83	Hydr. Depth (ft)		3.42	2.72

Conv. Total (cfs)	66152.6	Conv. (cfs)			45437.5	20715.2
Length Wtd. (ft)	238.24	Wetted Per. (ft)			222.06	150.06
Min Ch El (ft)	879.30	Shear (lb/sq ft)			1.15	0.91
Alpha	1.02	Stream Power (lb/ft s)			5.19	3.50
Frctn Loss (ft)	1.23	Cum Volume (acre-ft)		7.21	107.64	18.39
C & E Loss (ft)	0.01	Cum SA (acres)		2.00	29.63	5.70

Warning: The energy loss was 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: T1SR5WS17
REACH: Section 5 to 30 RS: 10.139

INPUT
Description: Section is 0.139 miles upstream of Zone A Section 10.
Station Elevation Data num= 35

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9322.9	882.64	9392.5	882.18	9399.9	881.29	9461.9	881.07	9476.6	879.99
9553.4	878.64	9597.3	879.66	9661.6	879.2	9730.6	879.92	9746	880.4
9763.4	880.78	9778	880.7	9840.4	879.13	9852.4	879.2	9931	878.61
10000	878.94	10033.2	878.71	10081.3	878.8	10123.3	878.72	10156	878.49
10184.6	879.11	10224.1	878.85	10254.4	878.85	10349	878.88	10414	879.24
10470.9	879.74	10501	879.97	10536.4	880.79	10595.4	880.69	10666.7	881.08
10726.4	881.81	10755.7	882.01	10848.8	881.91	10885.5	882.27	10949.3	882.8

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9322.9	.055	9852.4	.055	10081.3	.055

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9852.4	10081.3	320	315	315	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	881.09	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.11	Wt. n-Val.	0.055	0.055	0.055
W.S. Elev (ft)	880.98	Reach Len. (ft)	320.00	315.00	315.00
Crit W.S. (ft)		Flow Area (sq ft)	523.60	493.76	863.29
E.G. Slope (ft/ft)	0.004849	Area (sq ft)	523.60	493.76	863.29
Q Total (cfs)	4900.00	Flow (cfs)	1200.07	1550.75	2149.18
Top Width (ft)	1185.25	Top Width (ft)	389.27	228.90	567.08
Vel Total (ft/s)	2.61	Avg. Vel. (ft/s)	2.29	3.14	2.49
Max Chl Dpth (ft)	2.49	Hydr. Depth (ft)	1.35	2.16	1.52
Conv. Total (cfs)	70368.6	Conv. (cfs)	17234.1	22270.3	30864.2
Length Wtd. (ft)	316.21	Wetted Per. (ft)	389.37	228.90	567.10
Min Ch El (ft)	878.61	Shear (lb/sq ft)	0.41	0.65	0.46
Alpha	1.05	Stream Power (lb/ft s)	0.93	2.05	1.15
Frctn Loss (ft)	1.37	Cum Volume (acre-ft)	47.36	79.55	54.96
C & E Loss (ft)	0.00	Cum SA (acres)	30.34	28.42	35.87

Warning: The energy loss was 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)	882.17	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.25	Wt. n-Val.	0.055	0.055	0.055
W.S. Elev (ft)	881.92	Reach Len. (ft)	320.00	315.00	315.00
Crit W.S. (ft)		Flow Area (sq ft)	49.02	709.50	473.27
E.G. Slope (ft/ft)	0.004888	Area (sq ft)	49.02	709.50	473.27
Q Total (cfs)	4900.00	Flow (cfs)	165.53	2848.93	1885.55
Top Width (ft)	398.17	Top Width (ft)	17.86	228.90	151.41
Vel Total (ft/s)	3.98	Avg. Vel. (ft/s)	3.38	4.02	3.98
Max Chl Dpth (ft)	3.43	Hydr. Depth (ft)	2.74	3.10	3.13
Conv. Total (cfs)	70086.3	Conv. (cfs)	2367.6	40749.1	26969.6
Length Wtd. (ft)	315.08	Wetted Per. (ft)	20.51	228.90	154.49
Min Ch El (ft)	878.61	Shear (lb/sq ft)	0.73	0.95	0.93
Alpha	1.00	Stream Power (lb/ft s)	2.46	3.80	3.72
Frctn Loss (ft)	1.36	Cum Volume (acre-ft)	7.08	103.71	15.93
C & E Loss (ft)	0.01	Cum SA (acres)	1.95	28.42	4.86

Warning: The energy loss was 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: T1SR5WS17
REACH: Section 5 to 30 RS: 10.079

INPUT
Description: Section is 0.079 miles upstream of Zone A Section 10.
Station Elevation Data num= 36

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9392	881.69	9429.6	880.94	9490.4	880.61	9523.2	879.79	9555.8	879.39
9572.2	877.88	9584.9	878.9	9609.4	878.6	9642.7	878.38	9657.8	878.09
9682.4	877.86	9721.9	877.73	9762	877.73	9819.8	878.22	9850.1	877.53
9888.2	877.7	9918.3	877.24	9946.9	877.33	9980.2	876.88	10000	876.2
10076.3	877.5	10149.1	877.76	10156.2	877.6	10212.6	877.6	10271.2	877.6
10340.6	877.44	10402.4	877.57	10436	877.9	10467.2	877.97	10503.4	878.23
10541	878.76	10638.5	878.98	10703.8	879.15	10776.4	879.74	10859	880.79
10930.9	880.99								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val

9392 .055 9888.2 .055 10156.2 .055

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
9888.2 10156.2 390 400 400 .1 .3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	879.72	Element			
Vel Head (ft)	0.10	Wt. n-Val.	0.055	0.055	0.055
W.S. Elev (ft)	879.62	Reach Len. (ft)	390.00	400.00	400.00
Crit W.S. (ft)		Flow Area (sq ft)	526.11	645.95	844.31
E.G. Slope (ft/ft)	0.003901	Area (sq ft)	526.11	645.95	844.31
Q Total (cfs)	4900.00	Flow (cfs)	1162.29	1959.20	1778.52
Top Width (ft)	1224.37	Top Width (ft)	351.06	268.00	605.31
Vel Total (ft/s)	2.43	Avg. Vel. (ft/s)	2.21	3.03	2.11
Max Chl Dpth (ft)	3.42	Hydr. Depth (ft)	1.50	2.41	1.39
Conv. Total (cfs)	78454.7	Conv. (cfs)	18609.6	31369.0	28476.1
Length Wtd. (ft)	397.65	Wetted Per. (ft)	351.19	268.03	605.31
Min Ch El (ft)	876.20	Shear (lb/sq ft)	0.36	0.59	0.34
Alpha	1.09	Stream Power (lb/ft s)	0.81	1.78	0.72
Frctn Loss (ft)	2.04	Cum Volume (acre-ft)	43.50	75.43	48.78
C & E Loss (ft)	0.01	Cum SA (acres)	27.62	26.62	31.63

Warning: The energy loss was 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)	880.80	Element			
Vel Head (ft)	0.21	Wt. n-Val.		0.055	0.055
W.S. Elev (ft)	880.59	Reach Len. (ft)	390.00	400.00	400.00
Crit W.S. (ft)		Flow Area (sq ft)		905.82	435.89
E.G. Slope (ft/ft)	0.003861	Area (sq ft)		905.82	435.89
Q Total (cfs)	4900.00	Flow (cfs)		3400.16	1499.84
Top Width (ft)	413.49	Top Width (ft)		268.00	145.49
Vel Total (ft/s)	3.65	Avg. Vel. (ft/s)		3.75	3.44
Max Chl Dpth (ft)	4.39	Hydr. Depth (ft)		3.38	3.00
Conv. Total (cfs)	78855.9	Conv. (cfs)		54719.0	24136.9
Length Wtd. (ft)	400.00	Wetted Per. (ft)		270.92	148.55
Min Ch El (ft)	876.20	Shear (lb/sq ft)		0.81	0.71
Alpha	1.00	Stream Power (lb/ft s)		3.03	2.43
Frctn Loss (ft)	2.15	Cum Volume (acre-ft)	6.90	97.86	12.64
C & E Loss (ft)	0.01	Cum SA (acres)	1.89	26.62	3.79

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.
Warning: The energy loss was 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: T1SR5WS17
REACH: Section 5 to 30 RS: 10.000

INPUT
Description: Section is Zone A Section 10.
Station Elevation Data num= 34

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9353.4	879.66	9387.8	879.4	9430.1	878.12	9458.3	877.33	9499.1	876.58
9535	875.53	9554	875.4	9578	875.76	9636.5	876.94	9676	876.19
9703.9	877.3	9746.2	875.4	9757.3	874.6	9787.8	874.1	9814.5	874.81
9859	875.7	9896.2	875.93	9949.9	876	10000	874.9	10055.3	875.8
10082.6	875.63	10115.2	875.73	10136.3	875.8	10196.9	876.26	10232	875.93
10270.5	876.23	10311.2	876.16	10350	876.26	10421.2	877.09	10502.3	877.45
10539.8	877.74	10580.1	877.87	10654.4	878.24	10683.8	878.73		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9353.4	.045	9757.3	.06	10136.3	.045

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
9757.3 10136.3 240 245 250 .1 .3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	877.68	Element			
Vel Head (ft)	0.16	Wt. n-Val.	0.045	0.060	0.045
W.S. Elev (ft)	877.51	Reach Len. (ft)	240.00	245.00	250.00
Crit W.S. (ft)		Flow Area (sq ft)	365.53	794.24	379.28
E.G. Slope (ft/ft)	0.007031	Area (sq ft)	365.53	794.24	379.28
Q Total (cfs)	4900.00	Flow (cfs)	1140.05	2700.67	1059.28
Top Width (ft)	1058.96	Top Width (ft)	305.59	379.00	374.37
Vel Total (ft/s)	3.18	Avg. Vel. (ft/s)	3.12	3.40	2.79
Max Chl Dpth (ft)	3.41	Hydr. Depth (ft)	1.20	2.10	1.01
Conv. Total (cfs)	58437.7	Conv. (cfs)	13596.3	32208.3	12633.1
Length Wtd. (ft)	244.93	Wetted Per. (ft)	305.73	379.04	374.38
Min Ch El (ft)	874.10	Shear (lb/sq ft)	0.52	0.92	0.44
Alpha	1.02	Stream Power (lb/ft s)	1.64	3.13	1.24
Frctn Loss (ft)	1.56	Cum Volume (acre-ft)	39.51	68.82	43.16
C & E Loss (ft)	0.00	Cum SA (acres)	24.69	23.65	27.13

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)	878.63	Element			
Vel Head (ft)	0.31	Wt. n-Val.		0.060	
W.S. Elev (ft)	878.32	Reach Len. (ft)	240.00	245.00	250.00
Crit W.S. (ft)		Flow Area (sq ft)		1098.15	
E.G. Slope (ft/ft)	0.008033	Area (sq ft)		1098.15	
Q Total (cfs)	4900.00	Flow (cfs)		4900.00	
Top Width (ft)	379.00	Top Width (ft)		379.00	
Vel Total (ft/s)	4.46	Avg. Vel. (ft/s)		4.46	
Max Chl Dpth (ft)	4.22	Hydr. Depth (ft)		2.90	
Conv. Total (cfs)	54672.0	Conv. (cfs)		54672.0	
Length Wtd. (ft)	245.00	Wetted Per. (ft)		385.28	
Min Ch El (ft)	874.10	Shear (lb/sq ft)		1.43	
Alpha	1.00	Stream Power (lb/ft s)		6.38	
Frctn Loss (ft)	1.53	Cum Volume (acre-ft)	6.90	88.66	10.64
C & E Loss (ft)	0.02	Cum SA (acres)	1.89	23.65	3.12

Warning: The energy loss was 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: T1SR5WS17
REACH: Section 5 to 30 RS: 5.296

INPUT
Description: Section is 0.296 miles upstream of Zone A Section 5.
Station Elevation Data num= 42

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9183.7	879.69	9221.3	879.82	9265.2	877.86	9303.5	876.84	9343.1	874.41
9382.2	875.59	9423.8	876.51	9455.5	875.2	9499.4	874.77	9529.7	875.14
9574.3	876.15	9607.7	876.9	9660.7	876	9688.7	874	9728.1	873.3
9740.6	873.3	9785	872.32	9818.6	872.71	9844.7	872.58	9880.7	872.85
9939.6	872.52	9973.1	874.8	10000	874.4	10020.5	874.75	10057.2	874.95
10085.8	874.55	10131.1	874.4	10155.8	874.29	10198	874.49	10233.9	874.55
10269.9	874.72	10307.9	874.69	10341	874.95	10380.1	875.44	10416.8	875.87
10457.9	875.8	10498.2	876.14	10533.7	876.89	10609	877.19	10645.5	877.61
10688.9	877.81	10724.2	877.85						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9183.7	.045	9740.6	.06	10131.1	.045

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9740.6	10131.1	405	395	395	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	876.12	Element			
Vel Head (ft)	0.15	Wt. n-Val.	0.045	0.060	0.045
W.S. Elev (ft)	875.96	Reach Len. (ft)	405.00	395.00	395.00
Crit W.S. (ft)		Flow Area (sq ft)	306.47	936.52	338.76
E.G. Slope (ft/ft)	0.005782	Area (sq ft)	306.47	936.52	338.76
Q Total (cfs)	4900.00	Flow (cfs)	901.82	3159.20	838.98
Top Width (ft)	1025.52	Top Width (ft)	289.24	390.50	345.78
Vel Total (ft/s)	3.10	Avg. Vel. (ft/s)	2.94	3.37	2.48
Max Chl Dpth (ft)	3.64	Hydr. Depth (ft)	1.06	2.40	0.98
Conv. Total (cfs)	64442.0	Conv. (cfs)	11860.2	41548.0	11033.8
Length Wtd. (ft)	396.78	Wetted Per. (ft)	289.41	390.60	345.78
Min Ch El (ft)	872.32	Shear (lb/sq ft)	0.38	0.87	0.35
Alpha	1.04	Stream Power (lb/ft s)	1.12	2.92	0.88
Frctn Loss (ft)	1.80	Cum Volume (acre-ft)	37.66	63.95	41.10
C & E Loss (ft)	0.01	Cum SA (acres)	23.05	21.49	25.07

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)	877.07	Element			
Vel Head (ft)	0.23	Wt. n-Val.		0.060	
W.S. Elev (ft)	876.84	Reach Len. (ft)	405.00	395.00	395.00
Crit W.S. (ft)		Flow Area (sq ft)		1280.62	
E.G. Slope (ft/ft)	0.005001	Area (sq ft)		1280.62	
Q Total (cfs)	4900.00	Flow (cfs)		4900.00	
Top Width (ft)	390.50	Top Width (ft)		390.50	
Vel Total (ft/s)	3.83	Avg. Vel. (ft/s)		3.83	
Max Chl Dpth (ft)	4.52	Hydr. Depth (ft)		3.28	
Conv. Total (cfs)	69287.0	Conv. (cfs)		69287.0	
Length Wtd. (ft)	395.00	Wetted Per. (ft)		396.58	
Min Ch El (ft)	872.32	Shear (lb/sq ft)		1.01	
Alpha	1.00	Stream Power (lb/ft s)		3.86	
Frctn Loss (ft)	1.68	Cum Volume (acre-ft)	6.90	81.97	10.64
C & E Loss (ft)	0.00	Cum SA (acres)	1.89	21.49	3.12

Warning: The energy loss was 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: T1SR5WS17
REACH: Section 5 to 30 RS: 5.218

INPUT

Description: Section is 0.218 miles upstream of Zone A Section 5.
Station Elevation Data num= 36

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9392.6	877.04	9443.2	877.07	9487.6	876.88	9525.2	876.05	9569.6	874.91
9613.6	872.81	9650.1	872.81	9689.2	872.84	9736.7	872.78	9783.6	873.57
9824.4	872.55	9856.3	871.3	9869.2	871.24	9907.6	871.3	9976.7	871.1
9991.3	871.24	10000	871.2	10031.9	871.66	10074	871.73	10115.8	871.77
10154.9	871.34	10198.7	871.08	10232.9	871.54	10272.4	871.67	10301.7	872.26
10343.4	872.46	10389	873.77	10431.2	873.8	10478.2	874.23	10521.2	874.76
10563.2	875.05	10600	875.28	10643.1	875.84	10687.5	876.04	10778.7	876.7
10826.4	877.39								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9392.6	.045	9856.3	.06	10115.8	.045

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9856.3	10115.8	440	435	430	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	874.32	Element			
Vel Head (ft)	0.13	Wt. n-Val.	0.045	0.060	0.045
W.S. Elev (ft)	874.19	Reach Len. (ft)	440.00	435.00	430.00
Crit W.S. (ft)		Flow Area (sq ft)	354.95	721.18	649.76
E.G. Slope (ft/ft)	0.003638	Area (sq ft)	354.95	721.18	649.76
Q Total (cfs)	4900.00	Flow (cfs)	844.92	2129.42	1925.67
Top Width (ft)	889.03	Top Width (ft)	271.60	259.50	357.93
Vel Total (ft/s)	2.84	Avg. Vel. (ft/s)	2.38	2.95	2.96
Max Chl Dpth (ft)	3.11	Hydr. Depth (ft)	1.31	2.78	1.82
Conv. Total (cfs)	81237.0	Conv. (cfs)	14007.8	35303.5	31925.6
Length Wtd. (ft)	433.85	Wetted Per. (ft)	271.67	259.50	357.96
Min Ch El (ft)	871.10	Shear (lb/sq ft)	0.30	0.63	0.41
Alpha	1.02	Stream Power (lb/ft s)	0.71	1.86	1.22
Frctn Loss (ft)	1.65	Cum Volume (acre-ft)	34.58	56.43	36.62
C & E Loss (ft)	0.00	Cum SA (acres)	20.44	18.54	21.88

Warning: The energy loss was 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)	875.39	Element			
Vel Head (ft)	0.24	Wt. n-Val.		0.060	0.045
W.S. Elev (ft)	875.15	Reach Len. (ft)	440.00	435.00	430.00
Crit W.S. (ft)		Flow Area (sq ft)		969.29	305.92
E.G. Slope (ft/ft)	0.003669	Area (sq ft)		969.29	305.92
Q Total (cfs)	4900.00	Flow (cfs)		3466.17	1433.83
Top Width (ft)	340.72	Top Width (ft)		259.50	81.22
Vel Total (ft/s)	3.84	Avg. Vel. (ft/s)		3.58	4.69
Max Chl Dpth (ft)	4.06	Hydr. Depth (ft)		3.74	3.77
Conv. Total (cfs)	80895.5	Conv. (cfs)		57224.0	23671.5
Length Wtd. (ft)	433.67	Wetted Per. (ft)		263.35	85.28
Min Ch El (ft)	871.10	Shear (lb/sq ft)		0.84	0.82
Alpha	1.05	Stream Power (lb/ft s)		3.01	3.85
Frctn Loss (ft)	1.64	Cum Volume (acre-ft)	6.90	71.77	9.26
C & E Loss (ft)	0.01	Cum SA (acres)	1.89	18.54	2.75

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: T1SR5WS17
REACH: Section 5 to 30 RS: 5.138

INPUT
Description: Section is 0.138 miles upstream of Zone A Section 5.
Station Elevation Data num= 25

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9550	874.78	9595.5	873.89	9646.5	872.09	9692.2	871.83	9733.3	871.3
9761	870.5	9806.5	869.9	9836.8	870.2	9869.4	870.09	9907.5	870.19
9992.9	869.96	10000	868.7	10078.2	869.47	10122.5	869.9	10180.8	870.29
10213	869.8	10260.7	870.03	10310.1	870.39	10350	871.02	10441.6	871.61
10485.3	872.6	10531.8	872.86	10572.2	872.99	10631.1	874.5	10685	874.89

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9550	.05	9836.8	.065	10122.5	.05

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9836.8	10122.5	405	410	415	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	872.66	Element			
Vel Head (ft)	0.12	Wt. n-Val.	0.050	0.065	0.050
W.S. Elev (ft)	872.54	Reach Len. (ft)	405.00	410.00	415.00
Crit W.S. (ft)		Flow Area (sq ft)	297.67	800.71	669.26
E.G. Slope (ft/ft)	0.003963	Area (sq ft)	297.67	800.71	669.26
Q Total (cfs)	4900.00	Flow (cfs)	718.29	2289.94	1891.77
Top Width (ft)	849.21	Top Width (ft)	203.17	285.70	360.34
Vel Total (ft/s)	2.77	Avg. Vel. (ft/s)	2.41	2.86	2.83
Max Chl Dpth (ft)	3.84	Hydr. Depth (ft)	1.47	2.80	1.86
Conv. Total (cfs)	77836.7	Conv. (cfs)	11410.1	36375.7	30050.9

Length Wtd. (ft)	410.88	Wetted Per. (ft)	203.20	285.82	360.37
Min Ch El (ft)	868.70	Shear (lb/sq ft)	0.36	0.69	0.46
Alpha	1.01	Stream Power (lb/ft s)	0.87	1.98	1.30
Frctn Loss (ft)	1.81	Cum Volume (acre-ft)	31.29	48.83	30.11
C & E Loss (ft)	0.00	Cum SA (acres)	18.04	15.82	18.33

Warning: The energy loss was 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)	873.72	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.20	Wt. n-Val.		0.065	0.050
W.S. Elev (ft)	873.52	Reach Len. (ft)	405.00	410.00	415.00
Crit W.S. (ft)		Flow Area (sq ft)		1079.55	287.45
E.G. Slope (ft/ft)	0.003920	Area (sq ft)		1079.55	287.45
Q Total (cfs)	4900.00	Flow (cfs)		3718.51	1181.49
Top Width (ft)	369.62	Top Width (ft)		285.70	83.92
Vel Total (ft/s)	3.58	Avg. Vel. (ft/s)		3.44	4.11
Max Chl Dpth (ft)	4.82	Hydr. Depth (ft)		3.78	3.43
Conv. Total (cfs)	78267.2	Conv. (cfs)		59395.4	18871.8
Length Wtd. (ft)	410.71	Wetted Per. (ft)		289.14	87.54
Min Ch El (ft)	868.70	Shear (lb/sq ft)		0.91	0.80
Alpha	1.02	Stream Power (lb/ft s)		3.15	3.30
Frctn Loss (ft)	1.78	Cum Volume (acre-ft)	6.90	61.54	6.33
C & E Loss (ft)	0.01	Cum SA (acres)	1.89	15.82	1.94

Warning: The energy loss was 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: T1SR5WS17
REACH: Section 5 to 30 RS: 5.058

INPUT
Description: Section is 0.058 miles upstream of Zone A Section 5.
Station Elevation Data num= 32

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9328.3	873.04	9404	870.74	9481	870.35	9530.4	870.02	9543.8	870.3
9573.8	870.02	9623.8	869.5	9636.5	870.2	9647.7	870.2	9695.2	869.57
9779.8	868.65	9826.6	868.78	9855.4	868.2	9908.8	868.26	9961.2	867.96
10000	868.1	10056.3	868.2	10093.8	868.46	10122.6	868.4	10173.5	868.85
10228.3	868.7	10309.3	869.09	10358.4	868.96	10393	869.32	10449.2	869.68
10493.2	870.5	10539.8	870.99	10633.2	871.71	10679.7	872.7	10714.2	873.45
10753.4	873.46	10768.8	874						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9328.3	.045	9855.4	.06	10122.6	.05

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9855.4	10122.6	295	305	305	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	870.84	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.13	Wt. n-Val.	0.045	0.060	0.050
W.S. Elev (ft)	870.71	Reach Len. (ft)	295.00	305.00	305.00
Crit W.S. (ft)		Flow Area (sq ft)	460.44	672.81	595.24
E.G. Slope (ft/ft)	0.004932	Area (sq ft)	460.44	672.81	595.24
Q Total (cfs)	4900.00	Flow (cfs)	1090.11	2165.80	1644.08
Top Width (ft)	1104.47	Top Width (ft)	446.30	267.20	390.97
Vel Total (ft/s)	2.83	Avg. Vel. (ft/s)	2.37	3.22	2.76
Max Chl Dpth (ft)	2.75	Hydr. Depth (ft)	1.03	2.52	1.52
Conv. Total (cfs)	69772.0	Conv. (cfs)	15522.3	30839.3	23410.4
Length Wtd. (ft)	302.19	Wetted Per. (ft)	446.35	267.20	390.98
Min Ch El (ft)	867.96	Shear (lb/sq ft)	0.32	0.78	0.47
Alpha	1.04	Stream Power (lb/ft s)	0.75	2.50	1.29
Frctn Loss (ft)	1.28	Cum Volume (acre-ft)	27.76	41.90	24.09
C & E Loss (ft)	0.01	Cum SA (acres)	15.02	13.22	14.75

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 OUTPUT Profile #PF 2

E.G. Elev (ft)	871.94	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.26	Wt. n-Val.	0.045	0.060	0.050
W.S. Elev (ft)	871.68	Reach Len. (ft)	295.00	305.00	305.00
Crit W.S. (ft)		Flow Area (sq ft)	108.31	931.66	168.91
E.G. Slope (ft/ft)	0.004829	Area (sq ft)	108.31	931.66	168.91
Q Total (cfs)	4900.00	Flow (cfs)	505.46	3686.60	707.94
Top Width (ft)	357.19	Top Width (ft)	34.42	267.20	55.57
Vel Total (ft/s)	4.05	Avg. Vel. (ft/s)	4.67	3.96	4.19
Max Chl Dpth (ft)	3.72	Hydr. Depth (ft)	3.15	3.49	3.04
Conv. Total (cfs)	70515.1	Conv. (cfs)	7274.0	53053.3	10187.8
Length Wtd. (ft)	303.48	Wetted Per. (ft)	37.34	267.20	58.42
Min Ch El (ft)	867.96	Shear (lb/sq ft)	0.87	1.05	0.87
Alpha	1.01	Stream Power (lb/ft s)	4.08	4.16	3.65
Frctn Loss (ft)	1.28	Cum Volume (acre-ft)	6.40	52.08	4.15
C & E Loss (ft)	0.01	Cum SA (acres)	1.73	13.22	1.27

Warning: The energy loss was 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: T1SR5WS17
REACH: Section 5 to 30 RS: 5.000

INPUT
Description: Section is Zone A Section 5.
Station Elevation Data num= 29

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9329.9	873.99	9369.7	873.27	9417.8	871.86	9461.3	870.29	9494.6	868.88
9547.4	868.65	9591.4	868.45	9643.8	867.67	9679.4	867.44	9731.3	867.21
9825.5	867.41	9865.3	867.4	9933.4	867.05	9964.7	866.85	10000	866.7
10052.6	866.85	10097.2	866.85	10144.4	867.18	10183.4	867.11	10233.4	867.64
10277.6	867.67	10325.4	868	10411.6	868.5	10454	868.83	10507.7	868.6
10584.8	870.04	10637.6	871.1	10678.5	871.42	10740.1	872.24		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9329.9	.045	9865.3	.06	10144.4	.045

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9865.3	10144.4	425	420	415	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	869.56	Element			
Vel Head (ft)	0.11	Wt. n-Val.	0.045	0.060	0.045
W.S. Elev (ft)	869.45	Reach Len. (ft)	425.00	420.00	415.00
Crit W.S. (ft)		Flow Area (sq ft)	611.84	694.83	544.30
E.G. Slope (ft/ft)	0.003667	Area (sq ft)	611.84	694.83	544.30
Q Total (cfs)	4900.00	Flow (cfs)	1668.55	1913.95	1317.50
Top Width (ft)	1071.81	Top Width (ft)	384.08	279.10	408.63
Vel Total (ft/s)	2.65	Avg. Vel. (ft/s)	2.73	2.75	2.42
Max Chl Dpth (ft)	2.75	Hydr. Depth (ft)	1.59	2.49	1.33
Conv. Total (cfs)	80922.0	Conv. (cfs)	27555.6	31608.3	21758.0
Length Wtd. (ft)	420.18	Wetted Per. (ft)	384.10	279.10	408.64
Min Ch El (ft)	866.70	Shear (lb/sq ft)	0.36	0.57	0.30
Alpha	1.01	Stream Power (lb/ft s)	0.99	1.57	0.74
Frctn Loss (ft)	1.66	Cum Volume (acre-ft)	24.13	37.11	20.10
C & E Loss (ft)	0.00	Cum SA (acres)	12.21	11.31	11.95

Warning: The energy loss was 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)	870.65	Element			
Vel Head (ft)	0.21	Wt. n-Val.	0.045	0.060	0.045
W.S. Elev (ft)	870.43	Reach Len. (ft)	425.00	420.00	415.00
Crit W.S. (ft)		Flow Area (sq ft)	239.51	970.00	129.31
E.G. Slope (ft/ft)	0.003728	Area (sq ft)	239.51	970.00	129.31
Q Total (cfs)	4900.00	Flow (cfs)	988.68	3365.22	546.10
Top Width (ft)	397.08	Top Width (ft)	78.65	279.10	39.33
Vel Total (ft/s)	3.66	Avg. Vel. (ft/s)	4.13	3.47	4.22
Max Chl Dpth (ft)	3.73	Hydr. Depth (ft)	3.05	3.48	3.29
Conv. Total (cfs)	80254.2	Conv. (cfs)	16193.0	55117.0	8944.2
Length Wtd. (ft)	420.15	Wetted Per. (ft)	81.75	279.10	42.65
Min Ch El (ft)	866.70	Shear (lb/sq ft)	0.68	0.81	0.71
Alpha	1.02	Stream Power (lb/ft s)	2.81	2.81	2.98
Frctn Loss (ft)	1.71	Cum Volume (acre-ft)	5.22	45.42	3.11
C & E Loss (ft)	0.00	Cum SA (acres)	1.35	11.31	0.94

Warning: The energy loss was 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: T1SR5WS17
REACH: Section 5 to 30 RS: 1.491

INPUT
Description: Section is 0.491 miles upstream of Zone A Section 1.
Section 1 is
assumed to be at the railroad crossing
Station Elevation Data num= 28

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9435.3	870.5	9458.9	869.5	9500.6	867.96	9551.3	867.67	9630.5	866.65
9688.1	866.57	9730.5	865.44	9815.9	865.04	9836.9	864.8	9857.3	864.36
9911.9	864.36	9960.1	865.21	10000	865	10092.6	865.71	10145.3	865.5
10192.8	865.71	10238.8	865.8	10282.5	866.04	10340.2	866.66	10385.8	866.69
10481.3	867.05	10526.3	867.88	10582.3	868.17	10672.9	869.26	10736.8	870
10767.1	870.18	10812.4	871.52	10873.1	873.59				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9435.3	.05	9836.9	.065	10145.3	.05

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9836.9	10145.3	475	455	425	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	867.89	Element			
Vel Head (ft)	0.11	Wt. n-Val.	0.050	0.065	0.050

W.S. Elev (ft)	867.78	Reach Len. (ft)	475.00	455.00	425.00
Crit W.S. (ft)		Flow Area (sq ft)	469.07	841.55	511.11
E.G. Slope (ft/ft)	0.004289	Area (sq ft)	469.07	841.55	511.11
Q Total (cfs)	4900.00	Flow (cfs)	1217.88	2460.24	1221.88
Top Width (ft)	988.27	Top Width (ft)	304.42	308.40	375.45
Vel Total (ft/s)	2.69	Avg. Vel. (ft/s)	2.60	2.92	2.39
Max Chl Dpth (ft)	3.42	Hydr. Depth (ft)	1.54	2.73	1.36
Conv. Total (cfs)	74819.1	Conv. (cfs)	18596.1	37565.9	18657.1
Length Wtd. (ft)	453.62	Wetted Per. (ft)	304.45	308.42	375.46
Min Ch El (ft)	864.36	Shear (lb/sq ft)	0.41	0.73	0.36
Alpha	1.02	Stream Power (lb/ft s)	1.07	2.14	0.87
Frctn Loss (ft)	1.76	Cum Volume (acre-ft)	18.86	29.70	15.07
C & E Loss (ft)	0.00	Cum SA (acres)	8.85	8.47	8.22

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 OUTPUT Profile #PF 2

E.G. Elev (ft)	868.94	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.21	Wt. n-Val.	0.050	0.065	0.050
W.S. Elev (ft)	868.72	Reach Len. (ft)	475.00	455.00	425.00
Crit W.S. (ft)		Flow Area (sq ft)	73.15	1132.56	117.23
E.G. Slope (ft/ft)	0.004453	Area (sq ft)	73.15	1132.56	117.23
Q Total (cfs)	4900.00	Flow (cfs)	314.68	4112.39	472.93
Top Width (ft)	364.94	Top Width (ft)	19.19	308.40	37.35
Vel Total (ft/s)	3.70	Avg. Vel. (ft/s)	4.30	3.63	4.03
Max Chl Dpth (ft)	4.36	Hydr. Depth (ft)	3.81	3.67	3.14
Conv. Total (cfs)	73428.0	Conv. (cfs)	4715.6	61625.4	7086.9
Length Wtd. (ft)	454.11	Wetted Per. (ft)	22.89	308.42	40.41
Min Ch El (ft)	864.36	Shear (lb/sq ft)	0.89	1.02	0.81
Alpha	1.01	Stream Power (lb/ft s)	3.82	3.71	3.25
Frctn Loss (ft)	1.80	Cum Volume (acre-ft)	3.70	35.28	1.94
C & E Loss (ft)	0.01	Cum SA (acres)	0.87	8.47	0.57

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: T1SR5WS17
REACH: Section 5 to 30 RS: 1.403

INPUT
Description: Section is 0.403 miles upstream of Zone A Section 1.
Section 1 is
assumed to be at the railroad crossing
Station Elevation Data num= 25

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9291.9	870.9	9339.6	870	9399.3	868	9526.5	866	9566	865.5
9636.5	864.8	9684.5	864	9739.7	863.5	9778.6	863	9822.1	862.8
9903.1	862.9	9956.1	862.8	10000	861.6	10040.4	863.8	10099.4	863.6
10127.6	863.72	10188.7	864	10258.8	864.3	10318.3	864.8	10376.6	865.5
10407.3	866	10496	866.7	10562.4	868	10634.3	870	10666.9	872

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9291.9	.05	9822.1	.065	10127.6	.05

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9822.1	10127.6	420	465	490	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	866.13	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.11	Wt. n-Val.	0.050	0.065	0.050
W.S. Elev (ft)	866.02	Reach Len. (ft)	420.00	465.00	490.00
Crit W.S. (ft)		Flow Area (sq ft)	517.18	928.63	408.26
E.G. Slope (ft/ft)	0.003541	Area (sq ft)	517.18	928.63	408.26
Q Total (cfs)	4900.00	Flow (cfs)	1324.98	2650.32	924.70
Top Width (ft)	883.73	Top Width (ft)	296.58	305.50	281.65
Vel Total (ft/s)	2.64	Avg. Vel. (ft/s)	2.56	2.85	2.26
Max Chl Dpth (ft)	4.42	Hydr. Depth (ft)	1.74	3.04	1.45
Conv. Total (cfs)	82344.9	Conv. (cfs)	22266.3	44538.9	15539.7
Length Wtd. (ft)	456.38	Wetted Per. (ft)	296.60	305.58	281.66
Min Ch El (ft)	861.60	Shear (lb/sq ft)	0.39	0.67	0.32
Alpha	1.02	Stream Power (lb/ft s)	0.99	1.92	0.73
Frctn Loss (ft)	0.84	Cum Volume (acre-ft)	13.48	20.46	10.59
C & E Loss (ft)	0.01	Cum SA (acres)	5.57	5.27	5.01

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

CROSS SECTION OUTPUT Profile #PF 2

E.G. Elev (ft)	867.13	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.19	Wt. n-Val.	0.050	0.065	0.050
W.S. Elev (ft)	866.94	Reach Len. (ft)	420.00	465.00	490.00
Crit W.S. (ft)		Flow Area (sq ft)	108.21	1211.07	91.36
E.G. Slope (ft/ft)	0.003548	Area (sq ft)	108.21	1211.07	91.36
Q Total (cfs)	4900.00	Flow (cfs)	445.11	4129.82	325.07
Top Width (ft)	361.00	Top Width (ft)	26.53	305.50	28.97
Vel Total (ft/s)	3.47	Avg. Vel. (ft/s)	4.11	3.41	3.56
Max Chl Dpth (ft)	5.34	Hydr. Depth (ft)	4.08	3.96	3.15

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9809.5	10101.3	0	0	0	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

			Left OB	Channel	Right OB
E.G. Elev (ft)	865.03	Element			
Vel Head (ft)	0.03	Wt. n-Val.	0.045	0.055	0.045
W.S. Elev (ft)	865.00	Reach Len. (ft)			
Crit W.S. (ft)	861.79	Flow Area (sq ft)	1038.24	1384.56	856.99
E.G. Slope (ft/ft)	0.000412	Area (sq ft)	1038.24	1384.56	856.99
Q Total (cfs)	4900.00	Flow (cfs)	1463.61	2144.17	1292.22
Top Width (ft)	886.12	Top Width (ft)	340.38	291.80	253.94
Vel Total (ft/s)	1.49	Avg. Vel. (ft/s)	1.41	1.55	1.51
Max Chl Dpth (ft)	4.86	Hydr. Depth (ft)	3.05	4.74	3.37
Conv. Total (cfs)	241378.0	Conv. (cfs)	72098.5	105623.6	63655.9
Length Wtd. (ft)		Wetted Per. (ft)	340.43	291.80	254.01
Min Ch El (ft)	860.14	Shear (lb/sq ft)	0.08	0.12	0.09
Alpha	1.00	Stream Power (lb/ft s)	0.11	0.19	0.13
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)	865.15	Element			
Vel Head (ft)	0.15	Wt. n-Val.	0.045	0.055	0.045
W.S. Elev (ft)	865.00	Reach Len. (ft)			
Crit W.S. (ft)	862.15	Flow Area (sq ft)	94.39	1384.56	100.56
E.G. Slope (ft/ft)	0.001631	Area (sq ft)	94.39	1384.56	100.56
Q Total (cfs)	4900.00	Flow (cfs)	306.32	4265.31	328.38
Top Width (ft)	333.71	Top Width (ft)	20.23	291.80	21.68
Vel Total (ft/s)	3.10	Avg. Vel. (ft/s)	3.25	3.08	3.27
Max Chl Dpth (ft)	4.86	Hydr. Depth (ft)	4.67	4.74	4.64
Conv. Total (cfs)	121340.8	Conv. (cfs)	7585.4	105623.6	8131.7
Length Wtd. (ft)		Wetted Per. (ft)	24.86	291.80	26.24
Min Ch El (ft)	860.14	Shear (lb/sq ft)	0.39	0.48	0.39
Alpha	1.00	Stream Power (lb/ft s)	1.25	1.49	1.27
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

SUMMARY OF MANNING'S N VALUES

River:T1SR5WS17

Reach	River Sta.	n1	n2	n3
Section 5 to 30	30.000	.045	.065	.045
Section 5 to 30	20.547	.05	.065	.05
Section 5 to 30	20.481	.045	.065	.05
Section 5 to 30	20.416	.045	.065	.045
Section 5 to 30	20.328	.055	.065	.045
Section 5 to 30	20.245	.045	.065	.05
Section 5 to 30	20.189	.045	.05	.045
Section 5 to 30	20.126	.045	.055	.05
Section 5 to 30	20.067	.055	.05	.055
Section 5 to 30	20.060	.055	.05	.055
Section 5 to 30	20.036	.045	.05	.05
Section 5 to 30	20.000	.05	.05	.05
Section 5 to 30	10.444	.05	.05	.05
Section 5 to 30	10.409	.05	.05	.05
Section 5 to 30	10.368	.05	.05	.05
Section 5 to 30	10.338	.05	.05	.05
Section 5 to 30	10.289	.055	.055	.055
Section 5 to 30	10.246	.055	.055	.055
Section 5 to 30	10.215	.055	.055	.055
Section 5 to 30	10.184	.055	.055	.055
Section 5 to 30	10.139	.055	.055	.055
Section 5 to 30	10.079	.055	.055	.055
Section 5 to 30	10.000	.045	.06	.045
Section 5 to 30	5.296	.045	.06	.045
Section 5 to 30	5.218	.045	.06	.045
Section 5 to 30	5.138	.05	.065	.05
Section 5 to 30	5.058	.045	.06	.05
Section 5 to 30	5.000	.045	.06	.045
Section 5 to 30	1.491	.05	.065	.05
Section 5 to 30	1.403	.05	.065	.05
Section 5 to 30	1.313	.045	.055	.045
Section 5 to 30	1.247	.045	.055	.045

SUMMARY OF REACH LENGTHS

River: T1SR5WS17

Reach	River Sta.	Left	Channel	Right
Section 5 to 30	30.000	440	440	440
Section 5 to 30	20.547	330	325	320
Section 5 to 30	20.481	345	345	345
Section 5 to 30	20.416	420	455	490

Section 5 to 30	20.328	410	405	400
Section 5 to 30	20.245	285	290	320
Section 5 to 30	20.189	325	335	335
Section 5 to 30	20.126	280	310	325
Section 5 to 30	20.067	105	100	90
Section 5 to 30	20.060	130	120	105
Section 5 to 30	20.036	210	185	185
Section 5 to 30	20.000	235	255	260
Section 5 to 30	10.444	165	175	180
Section 5 to 30	10.409	190	210	220
Section 5 to 30	10.368	155	150	150
Section 5 to 30	10.338	180	185	195
Section 5 to 30	10.289	150	190	220
Section 5 to 30	10.246	145	155	155
Section 5 to 30	10.215	175	165	160
Section 5 to 30	10.184	220	235	245
Section 5 to 30	10.139	320	315	315
Section 5 to 30	10.079	390	400	400
Section 5 to 30	10.000	240	245	250
Section 5 to 30	5.296	405	395	395
Section 5 to 30	5.218	440	435	430
Section 5 to 30	5.138	405	410	415
Section 5 to 30	5.058	295	305	305
Section 5 to 30	5.000	425	420	415
Section 5 to 30	1.491	475	455	425
Section 5 to 30	1.403	420	465	490
Section 5 to 30	1.313	350	350	350
Section 5 to 30	1.247	0	0	0

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: T1SR5WS17

Reach	River Sta.	Contr.	Expan.
Section 5 to 30	30.000	.1	.3
Section 5 to 30	20.547	.1	.3
Section 5 to 30	20.481	.1	.3
Section 5 to 30	20.416	.1	.3
Section 5 to 30	20.328	.1	.3
Section 5 to 30	20.245	.1	.3
Section 5 to 30	20.189	.1	.3
Section 5 to 30	20.126	.1	.3
Section 5 to 30	20.067	.3	.5
Section 5 to 30	20.060	.3	.5
Section 5 to 30	20.036	.3	.5
Section 5 to 30	20.000	.1	.3
Section 5 to 30	10.444	.1	.3
Section 5 to 30	10.409	.1	.3
Section 5 to 30	10.368	.1	.3
Section 5 to 30	10.338	.1	.3
Section 5 to 30	10.289	.1	.3
Section 5 to 30	10.246	.1	.3
Section 5 to 30	10.215	.1	.3
Section 5 to 30	10.184	.1	.3
Section 5 to 30	10.139	.1	.3
Section 5 to 30	10.079	.1	.3
Section 5 to 30	10.000	.1	.3
Section 5 to 30	5.296	.1	.3
Section 5 to 30	5.218	.1	.3
Section 5 to 30	5.138	.1	.3
Section 5 to 30	5.058	.1	.3
Section 5 to 30	5.000	.1	.3
Section 5 to 30	1.491	.1	.3
Section 5 to 30	1.403	.1	.3
Section 5 to 30	1.313	.1	.3
Section 5 to 30	1.247	.1	.3

Profile Output Table - Standard Table 1

Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Section 5 to 30	1.247	4900.00	860.14	865.00	861.79	865.03	0.000412	1.55	3279.79	886.12	0.13
Section 5 to 30	1.247	4900.00	860.14	865.00	862.15	865.15	0.001631	3.08	1579.51	333.71	0.25
Section 5 to 30	1.313	4900.00	860.73	865.20		865.27	0.001134	2.30	2336.50	827.60	0.20
Section 5 to 30	1.313	4900.00	860.73	865.64		865.83	0.002281	3.46	1382.37	309.91	0.29
Section 5 to 30	1.403	4900.00	861.60	866.02		866.13	0.003541	2.85	1854.07	883.73	0.29
Section 5 to 30	1.403	4900.00	861.60	866.94		867.13	0.003548	3.41	1410.64	361.00	0.30
Section 5 to 30	1.491	4900.00	864.36	867.78		867.89	0.004289	2.92	1821.74	988.27	0.31

Section 5 to 30	1.491	4900.00	864.36	868.72		868.94	0.004453	3.63	1322.94	364.94	0.33
Section 5 to 30	5.000	4900.00	866.70	869.45		869.56	0.003667	2.75	1850.97	1071.81	0.31
Section 5 to 30	5.000	4900.00	866.70	870.43		870.65	0.003728	3.47	1338.82	397.08	0.33
Section 5 to 30	5.058	4900.00	867.96	870.71		870.84	0.004932	3.22	1728.49	1104.47	0.36
Section 5 to 30	5.058	4900.00	867.96	871.68		871.94	0.004829	3.96	1208.88	357.19	0.37
Section 5 to 30	5.138	4900.00	868.70	872.54		872.66	0.003963	2.86	1767.64	849.21	0.30
Section 5 to 30	5.138	4900.00	868.70	873.52		873.72	0.003920	3.44	1367.01	369.62	0.31
Section 5 to 30	5.218	4900.00	871.10	874.19		874.32	0.003638	2.95	1725.89	889.03	0.31
Section 5 to 30	5.218	4900.00	871.10	875.15		875.39	0.003669	3.58	1275.21	340.72	0.33
Section 5 to 30	5.296	4900.00	872.32	875.96		876.12	0.005782	3.37	1581.75	1025.52	0.38
Section 5 to 30	5.296	4900.00	872.32	876.84		877.07	0.005001	3.83	1280.62	390.50	0.37
Section 5 to 30	10.000	4900.00	874.10	877.51		877.68	0.007031	3.40	1539.04	1058.96	0.41
Section 5 to 30	10.000	4900.00	874.10	878.32		878.63	0.008033	4.46	1098.15	379.00	0.46
Section 5 to 30	10.079	4900.00	876.20	879.62		879.72	0.003901	3.03	2016.37	1224.37	0.34
Section 5 to 30	10.079	4900.00	876.20	880.59		880.80	0.003861	3.75	1341.71	413.49	0.36
Section 5 to 30	10.139	4900.00	878.61	880.98		881.09	0.004849	3.14	1880.65	1185.25	0.38
Section 5 to 30	10.139	4900.00	878.61	881.92		882.17	0.004888	4.02	1231.79	398.17	0.40
Section 5 to 30	10.184	4900.00	879.30	882.23	881.37	882.40	0.006159	3.93	1573.96	1346.57	0.44
Section 5 to 30	10.184	4900.00	879.30	883.13	881.79	883.42	0.005487	4.50	1147.56	365.60	0.43
Section 5 to 30	10.215	4900.00	880.10	883.17	882.22	883.34	0.005304	3.85	1572.61	1048.68	0.41
Section 5 to 30	10.215	4900.00	880.10	884.02	882.61	884.36	0.005902	4.82	1060.44	311.68	0.45
Section 5 to 30	10.246	4900.00	881.23	884.02	883.17	884.17	0.005651	3.61	1635.83	1210.90	0.41
Section 5 to 30	10.246	4900.00	881.23	884.97	883.67	885.26	0.005773	4.52	1129.03	364.05	0.44
Section 5 to 30	10.289	4900.00	882.00	884.92	883.78	885.05	0.003722	3.15	1811.80	1318.27	0.34
Section 5 to 30	10.289	4900.00	882.00	885.91	884.07	886.13	0.003633	3.82	1287.51	353.72	0.35
Section 5 to 30	10.338	4900.00	882.70	885.56		885.67	0.003026	2.87	1954.86	1125.79	0.33
Section 5 to 30	10.338	4900.00	882.70	886.54		886.74	0.002979	3.57	1358.32	403.53	0.35
Section 5 to 30	10.368	4900.00	883.53	886.09		886.25	0.004669	3.26	1606.14	953.22	0.40
Section 5 to 30	10.368	4900.00	883.53	887.03		887.33	0.004753	4.21	1131.25	363.16	0.43
Section 5 to 30	10.409	4900.00	883.80	887.04		887.23	0.005048	3.96	1519.70	933.93	0.44
Section 5 to 30	10.409	4900.00	883.80	887.98		888.33	0.004952	4.78	1030.41	289.15	0.45
Section 5 to 30	10.444	4900.00	884.90	887.76		887.88	0.002932	2.96	1854.56	911.49	0.33
Section 5 to 30	10.444	4900.00	884.90	888.75		888.95	0.002699	3.54	1366.18	379.65	0.33
Section 5 to 30	20.000	4900.00	885.80	888.64		888.79	0.004753	3.57	1598.85	919.42	0.41
Section 5 to 30	20.000	4900.00	885.80	889.54		889.83	0.004730	4.44	1126.68	358.26	0.44
Section 5 to 30	20.036	4590.00	886.01	889.30		889.39	0.001978	2.56	1934.16	869.77	0.27
Section 5 to 30	20.036	4590.00	886.01	890.29		890.41	0.001650	2.88	1616.89	469.34	0.26
Section 5 to 30	20.060	4590.00	886.90	889.64		890.16	0.019258	6.64	825.15	535.91	0.82

Section 5 to 30	10.246	884.17	884.02	0.15	0.84	0.00	878.66	2155.73	1865.61	1210.90
Section 5 to 30	10.246	885.26	884.97	0.30	0.90	0.00		3771.96	1128.04	364.05
Section 5 to 30	10.289	885.05	884.92	0.13	0.86	0.00	1164.88	2766.53	968.60	1318.27
Section 5 to 30	10.289	886.13	885.91	0.23	0.87	0.01	282.69	4617.31		353.72
Section 5 to 30	10.338	885.67	885.56	0.11	0.62	0.00	2406.62	1846.99	646.39	1125.79
Section 5 to 30	10.338	886.74	886.54	0.20	0.60	0.00	1637.74	3262.27		403.53
Section 5 to 30	10.368	886.25	886.09	0.15	0.57	0.01	2908.46	1663.73	327.81	953.22
Section 5 to 30	10.368	887.33	887.03	0.29	0.56	0.03	1757.72	3142.28		363.16
Section 5 to 30	10.409	887.23	887.04	0.18	0.97	0.01	2609.58	1850.55	439.87	933.93
Section 5 to 30	10.409	888.33	887.98	0.35	0.98	0.02	1860.63	3039.37		289.15
Section 5 to 30	10.444	887.88	887.76	0.11	0.64	0.01	2644.26	1206.75	1048.99	911.49
Section 5 to 30	10.444	888.95	888.75	0.20	0.61	0.02	2630.42	2021.87	247.71	379.65
Section 5 to 30	20.000	888.79	888.64	0.16	0.90	0.01	2608.23	1362.09	929.68	919.42
Section 5 to 30	20.000	889.83	889.54	0.29	0.86	0.03	2481.30	2362.19	56.51	358.26
Section 5 to 30	20.036	889.39	889.30	0.09	0.58	0.02	1553.38	1538.56	1498.06	869.77
Section 5 to 30	20.036	890.41	890.29	0.13	0.52	0.05	1385.14	2361.15	843.71	469.34
Section 5 to 30	20.060	890.16	889.64	0.52	0.55	0.22	2179.74	2137.02	273.23	535.91
Section 5 to 30	20.060	891.08	890.49	0.59	0.43	0.23	1065.52	3041.03	483.45	304.42
Section 5 to 30	20.067	890.92	890.81	0.11	0.64	0.12	2032.83	1432.06	1125.11	941.52
Section 5 to 30	20.067	891.81	891.57	0.24	0.63	0.11	1619.79	2375.99	594.22	374.23
Section 5 to 30	20.126	891.94	891.81	0.13	1.02	0.01	962.66	2243.39	1383.95	977.30
Section 5 to 30	20.126	892.98	892.73	0.25	1.16	0.00	58.47	3561.10	970.43	320.72
Section 5 to 30	20.189	893.25	893.10	0.16	1.30	0.01	381.55	2266.16	1942.29	865.69
Section 5 to 30	20.189	894.34	894.03	0.31	1.35	0.02		3803.97	786.03	294.85
Section 5 to 30	20.245	894.69	894.54	0.14	1.43	0.00	1177.31	1791.69	1621.00	933.04
Section 5 to 30	20.245	895.78	895.51	0.26	1.43	0.01	45.10	3145.50	1399.40	340.90
Section 5 to 30	20.328	896.38	896.29	0.09	1.68	0.01	1493.88	1740.71	1355.42	1023.35
Section 5 to 30	20.328	897.43	897.26	0.17	1.64	0.01	837.41	2873.50	879.09	402.93
Section 5 to 30	20.416	898.41	898.25	0.16	2.02	0.02	718.73	2443.58	1427.70	942.07
Section 5 to 30	20.416	899.49	899.18	0.30	2.01	0.04		4062.13	527.87	296.54
Section 5 to 30	20.481	900.07	899.97	0.11	1.66	0.01	956.58	1799.08	1834.34	984.22
Section 5 to 30	20.481	901.15	900.96	0.20	1.65	0.01		2946.02	1643.98	364.21
Section 5 to 30	20.547	901.35	901.25	0.10	1.27	0.00	1664.20	1343.13	1582.67	1082.25
Section 5 to 30	20.547	902.40	902.21	0.19	1.25	0.00	841.30	2409.18	1339.52	432.83
Section 5 to 30	30.000	903.10	902.98	0.12	1.74	0.01	2196.33	1073.29	1320.38	991.50
Section 5 to 30	30.000	904.17	903.91	0.26	1.75	0.02	1828.43	1778.88	982.70	334.74

ERRORS WARNINGS AND NOTES

Errors Warnings and Notes for Plan : FP and FW

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River: T1SR5WS17  Reach: Section 5 to 30     RS: 30.000     Profile: PF 1
     Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
             the need for additional cross sections.
River: T1SR5WS17  Reach: Section 5 to 30     RS: 30.000     Profile: PF 2
     Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
             the need for additional cross sections.
River: T1SR5WS17  Reach: Section 5 to 30     RS: 20.547     Profile: PF 1
     Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
             the need for additional cross sections.
River: T1SR5WS17  Reach: Section 5 to 30     RS: 20.547     Profile: PF 2
     Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
             the need for additional cross sections.
River: T1SR5WS17  Reach: Section 5 to 30     RS: 20.481     Profile: PF 1
     Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
             the need for additional cross sections.
River: T1SR5WS17  Reach: Section 5 to 30     RS: 20.481     Profile: PF 2
     Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
             the need for additional cross sections.
River: T1SR5WS17  Reach: Section 5 to 30     RS: 20.416     Profile: PF 1
     Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
             the need for additional cross sections.
River: T1SR5WS17  Reach: Section 5 to 30     RS: 20.416     Profile: PF 2
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
     Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
             the need for additional cross sections.
River: T1SR5WS17  Reach: Section 5 to 30     RS: 20.328     Profile: PF 1
     Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
             the need for additional cross sections.
River: T1SR5WS17  Reach: Section 5 to 30     RS: 20.328     Profile: PF 2
     Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
             the need for additional cross sections.
River: T1SR5WS17  Reach: Section 5 to 30     RS: 20.245     Profile: PF 1
     Warning:Divided flow computed for this cross-section.
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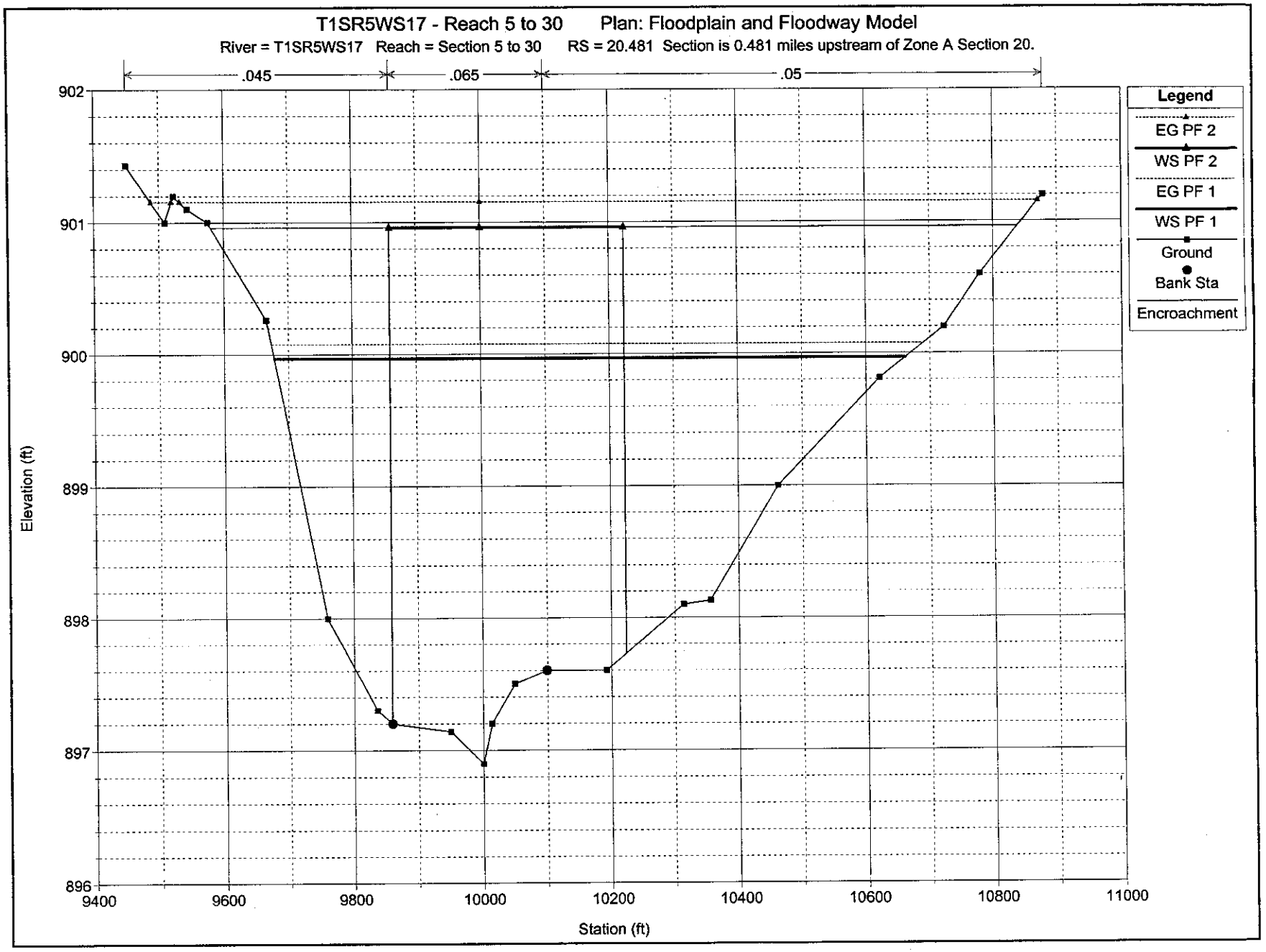
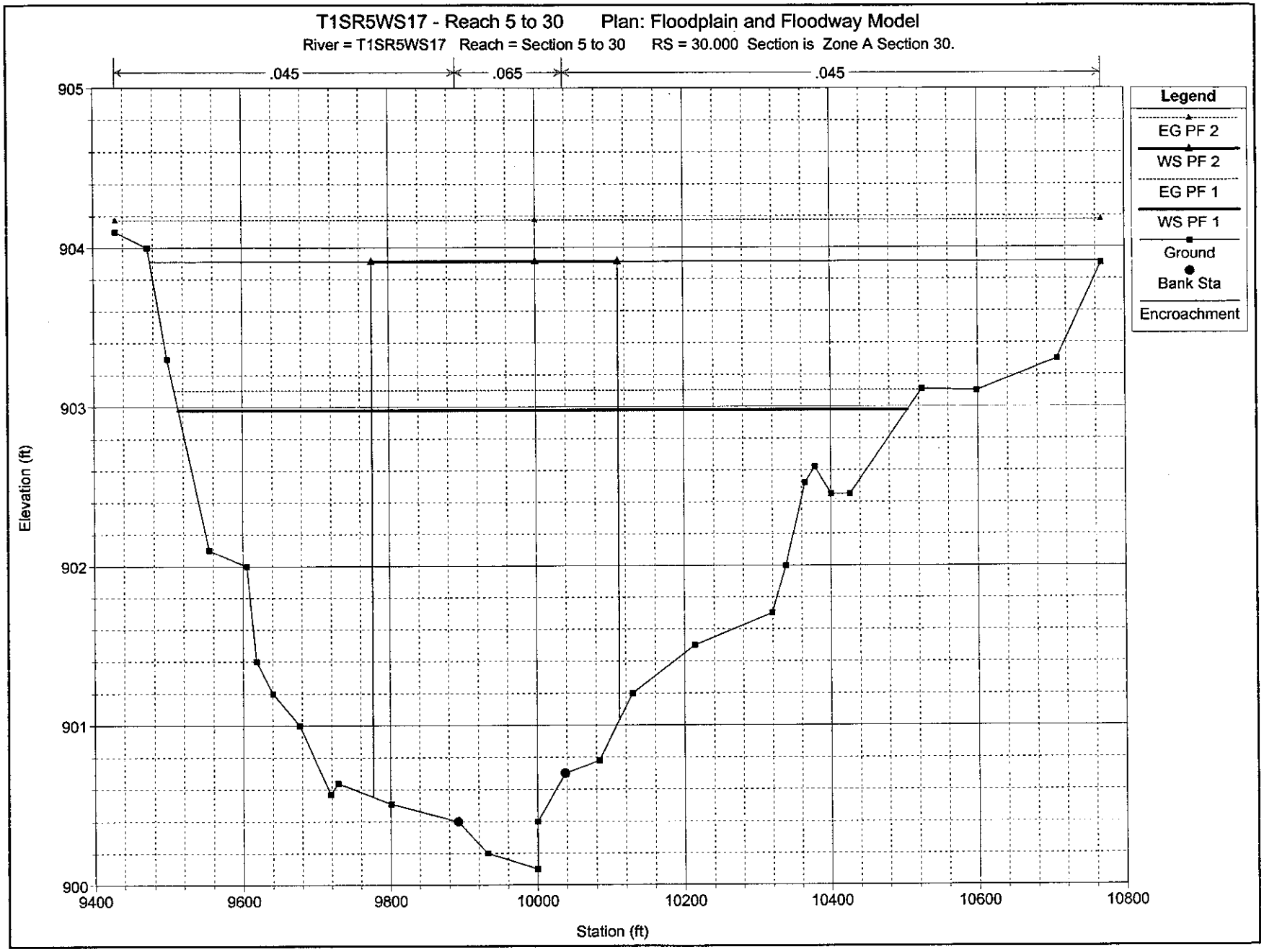
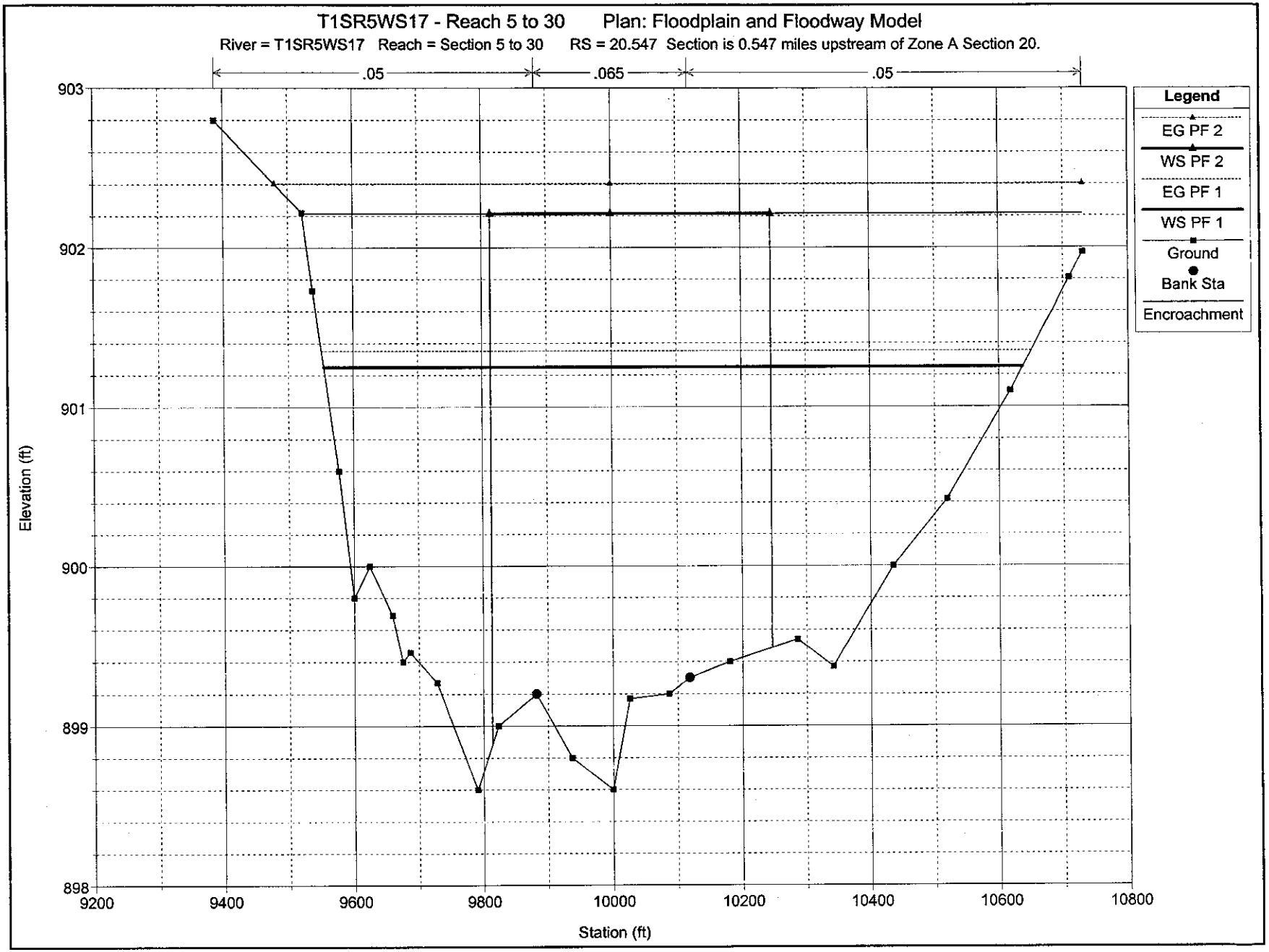
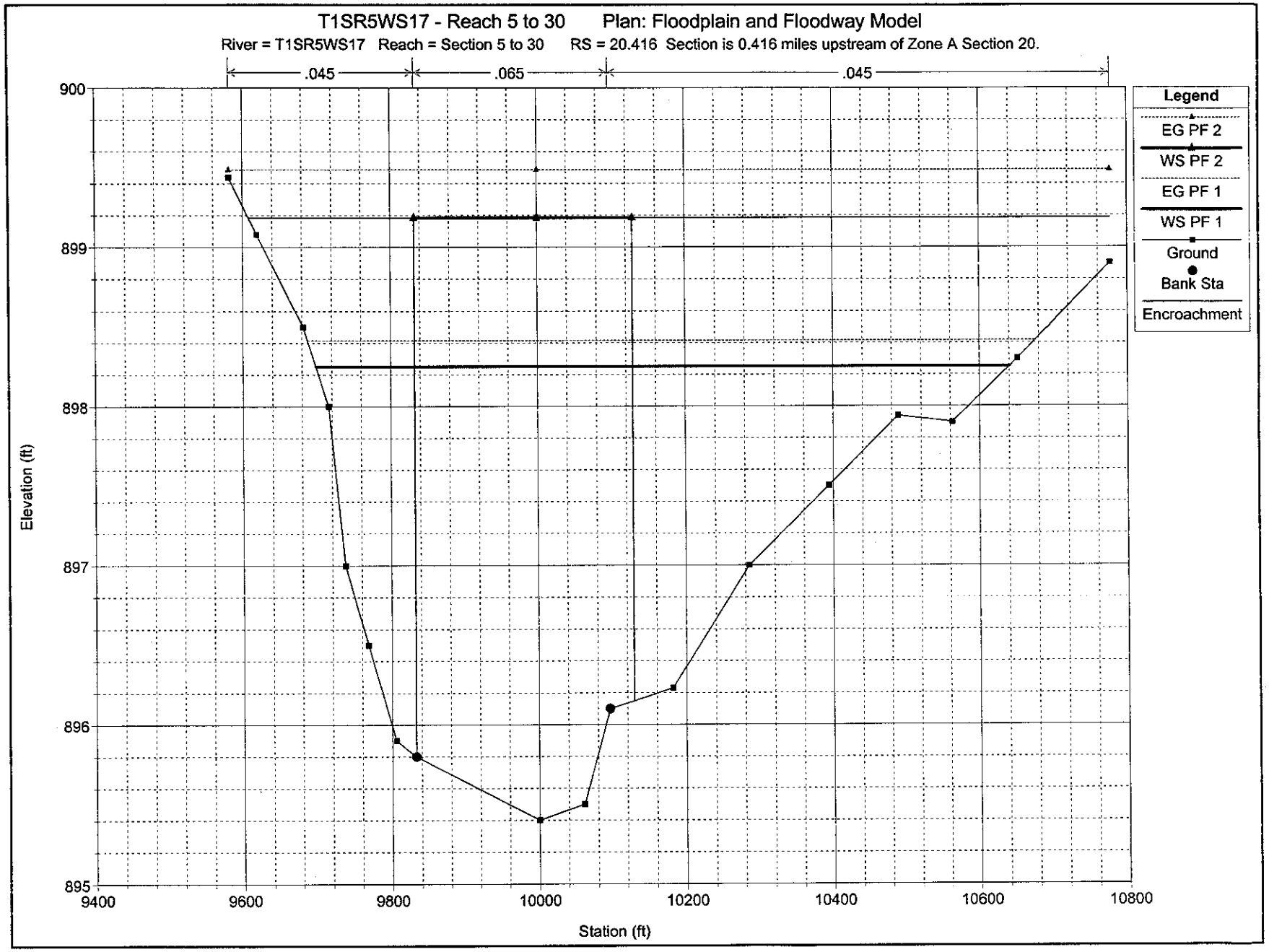
            the need for additional cross sections.
River: T1SR5WS17  Reach: Section 5 to 30     RS: 5.138     Profile: PF 2
     Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
            the need for additional cross sections.
River: T1SR5WS17  Reach: Section 5 to 30     RS: 5.058     Profile: PF 1
     Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
            the need for additional cross sections.
River: T1SR5WS17  Reach: Section 5 to 30     RS: 5.058     Profile: PF 2
     Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
            the need for additional cross sections.
River: T1SR5WS17  Reach: Section 5 to 30     RS: 5.000     Profile: PF 1
     Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
            the need for additional cross sections.
River: T1SR5WS17  Reach: Section 5 to 30     RS: 5.000     Profile: PF 2
     Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
            the need for additional cross sections.
River: T1SR5WS17  Reach: Section 5 to 30     RS: 1.491     Profile: PF 1
     Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
            the need for additional cross sections.
River: T1SR5WS17  Reach: Section 5 to 30     RS: 1.491     Profile: PF 2
     Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
            the need for additional cross sections.
River: T1SR5WS17  Reach: Section 5 to 30     RS: 1.403     Profile: PF 1
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
            This may indicate the need for additional cross sections.
River: T1SR5WS17  Reach: Section 5 to 30     RS: 1.403     Profile: PF 2
     Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
            the need for additional cross sections.
River: T1SR5WS17  Reach: Section 5 to 30     RS: 1.313     Profile: PF 1
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
            This may indicate the need for additional cross sections.
```

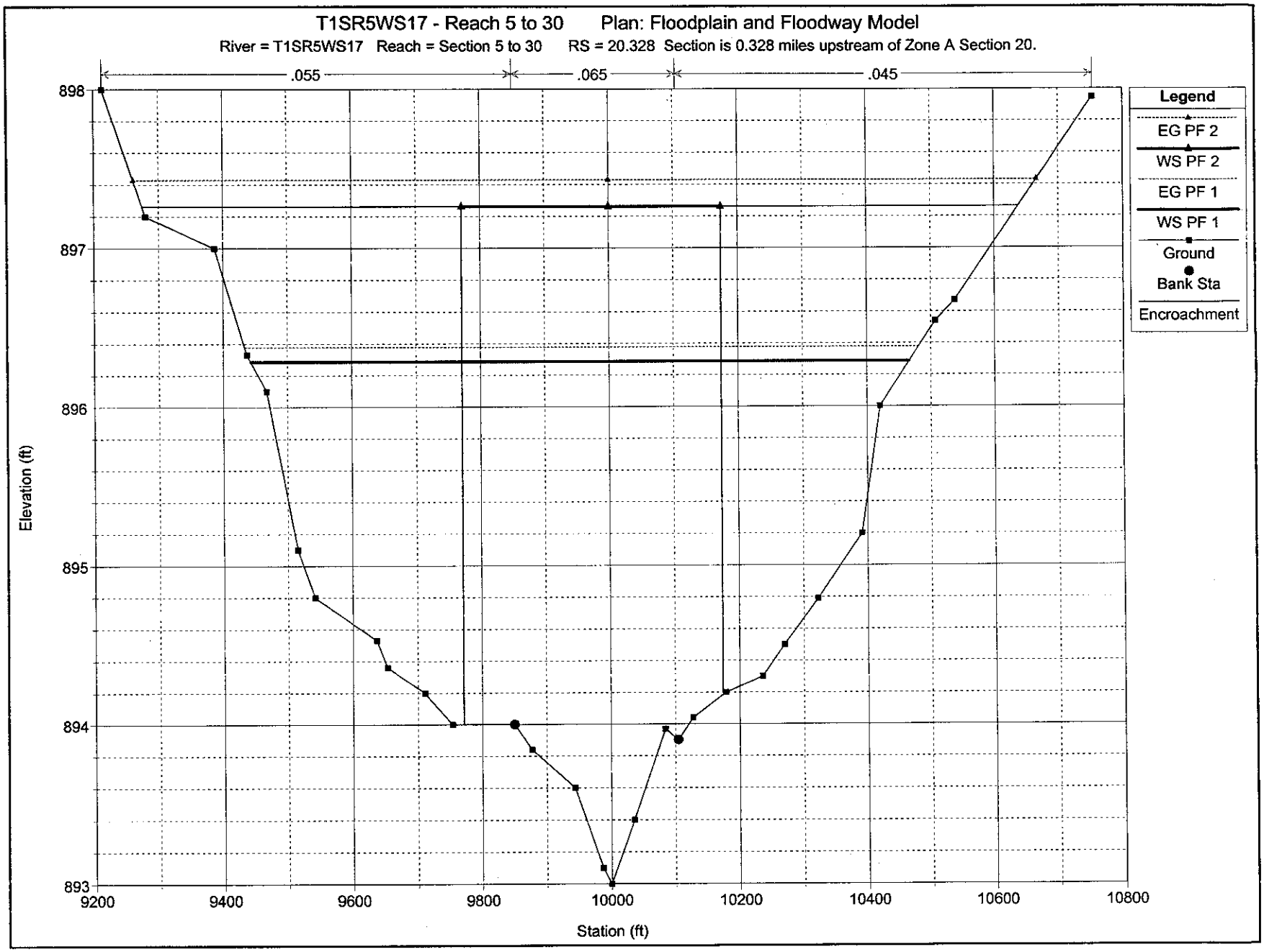
APPENDIX E

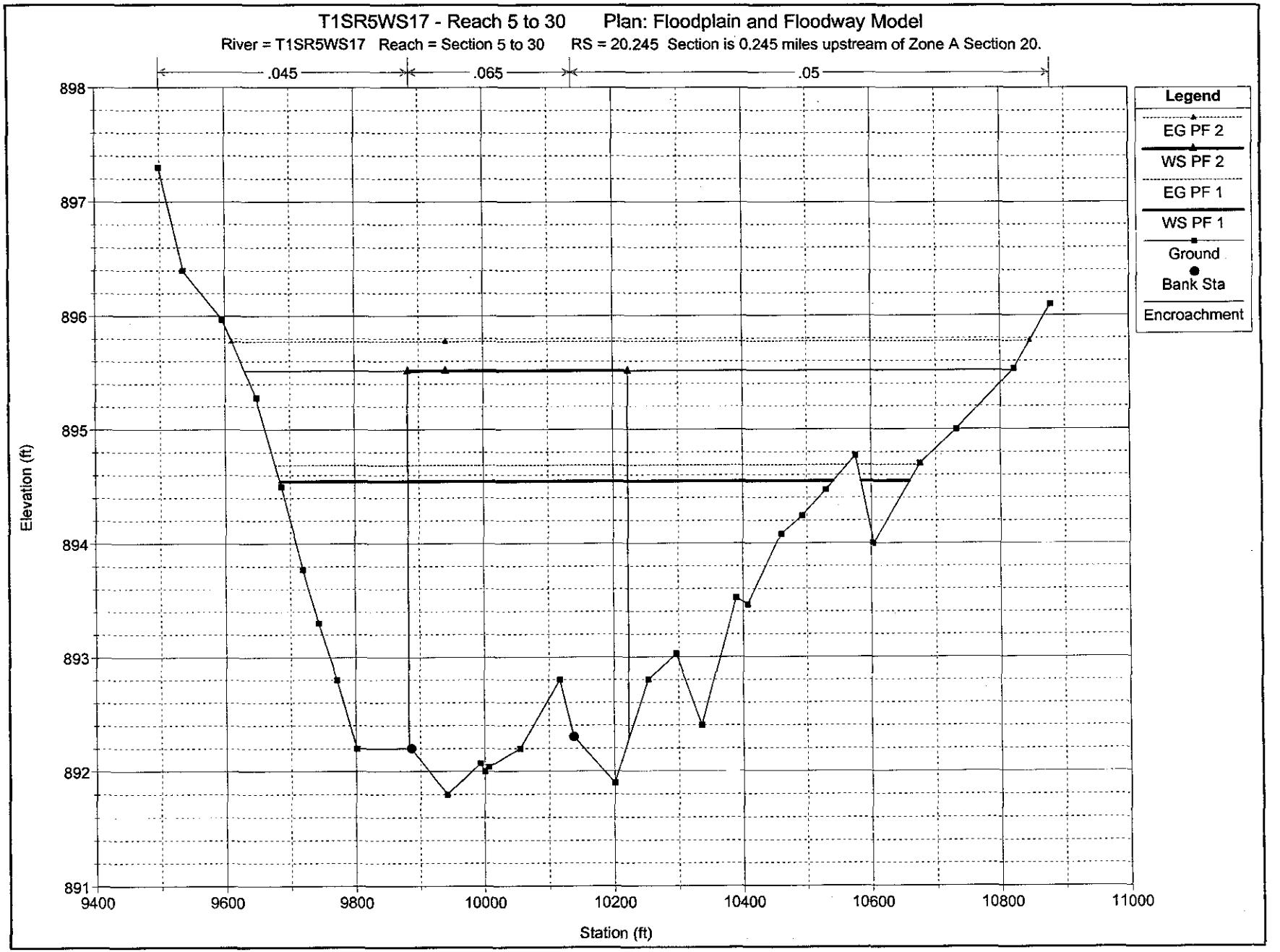

T1SR5WS17 - Reach 5 to 30 Plan: Floodplain and Floodway Model
River = T1SR5WS17 Reach = Section 5 to 30 RS = 20.481 Section is 0.481 miles upstream of Zone A Section 20.
.045
.065
.05
Legend
EG PF 2
WS PF 2
EG PF 1
WS PF 1
Ground
Bank Sta
Encroachment
Elevation (ft)
902
901
900
899
898
897
896
9400
9600
9800
10000
10200
10400
10600
10800
11000
Station (ft)

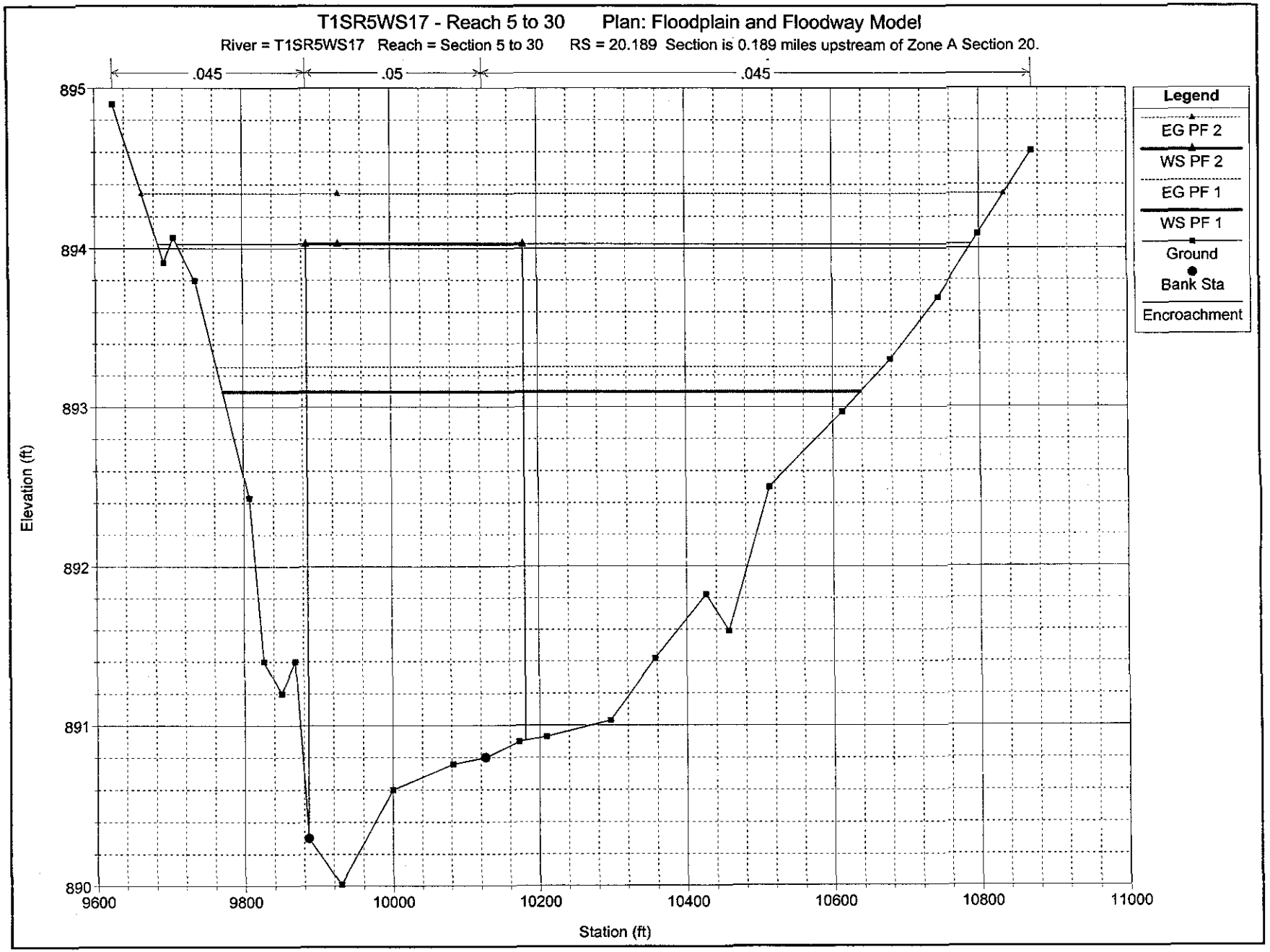

T1SR5WS17 - Reach 5 to 30 Plan: Floodplain and Floodway Model
River = T1SR5WS17 Reach = Section 5 to 30 RS = 30.000 Section is Zone A Section 30.
.045
.065
.045
905
904
903
902
901
900
Elevation (ft)
9400
9600
9800
10000
10200
10400
10600
10800
Station (ft)
Legend
EG PF 2
WS PF 2
EG PF 1
WS PF 1
Ground
Bank Sta
Encroachment

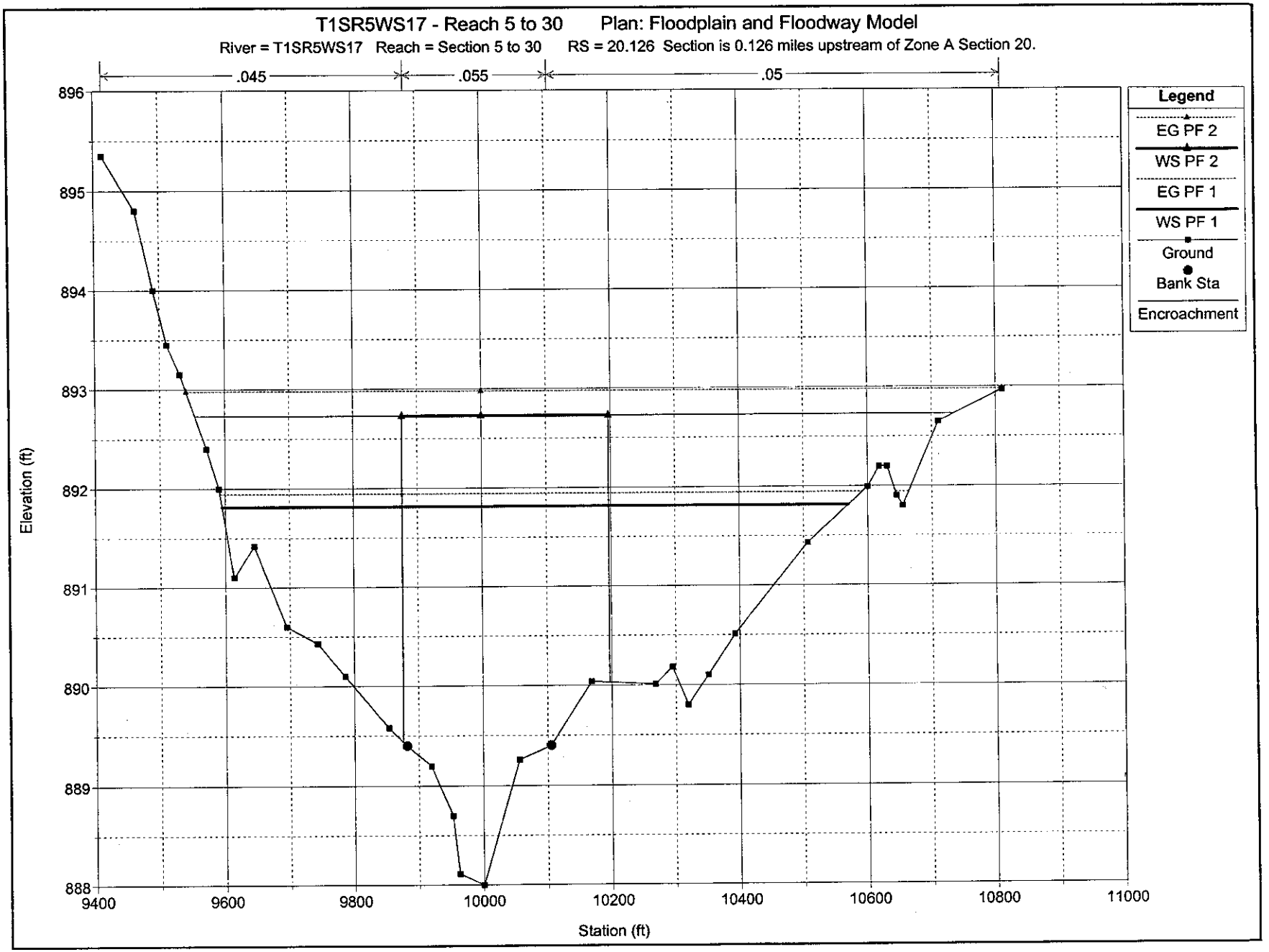

T1SR5WS17 - Reach 5 to 30 Plan: Floodplain and Floodway Model
River = T1SR5WS17 Reach = Section 5 to 30 RS = 20.547 Section is 0.547 miles upstream of Zone A Section 20.
.05
.065
.05
Legend
EG PF 2
WS PF 2
EG PF 1
WS PF 1
Ground
Bank Sta
Encroachment
Elevation (ft)
903
902
901
900
899
898
9200
9400
9600
9800
10000
10200
10400
10600
10800
Station (ft)

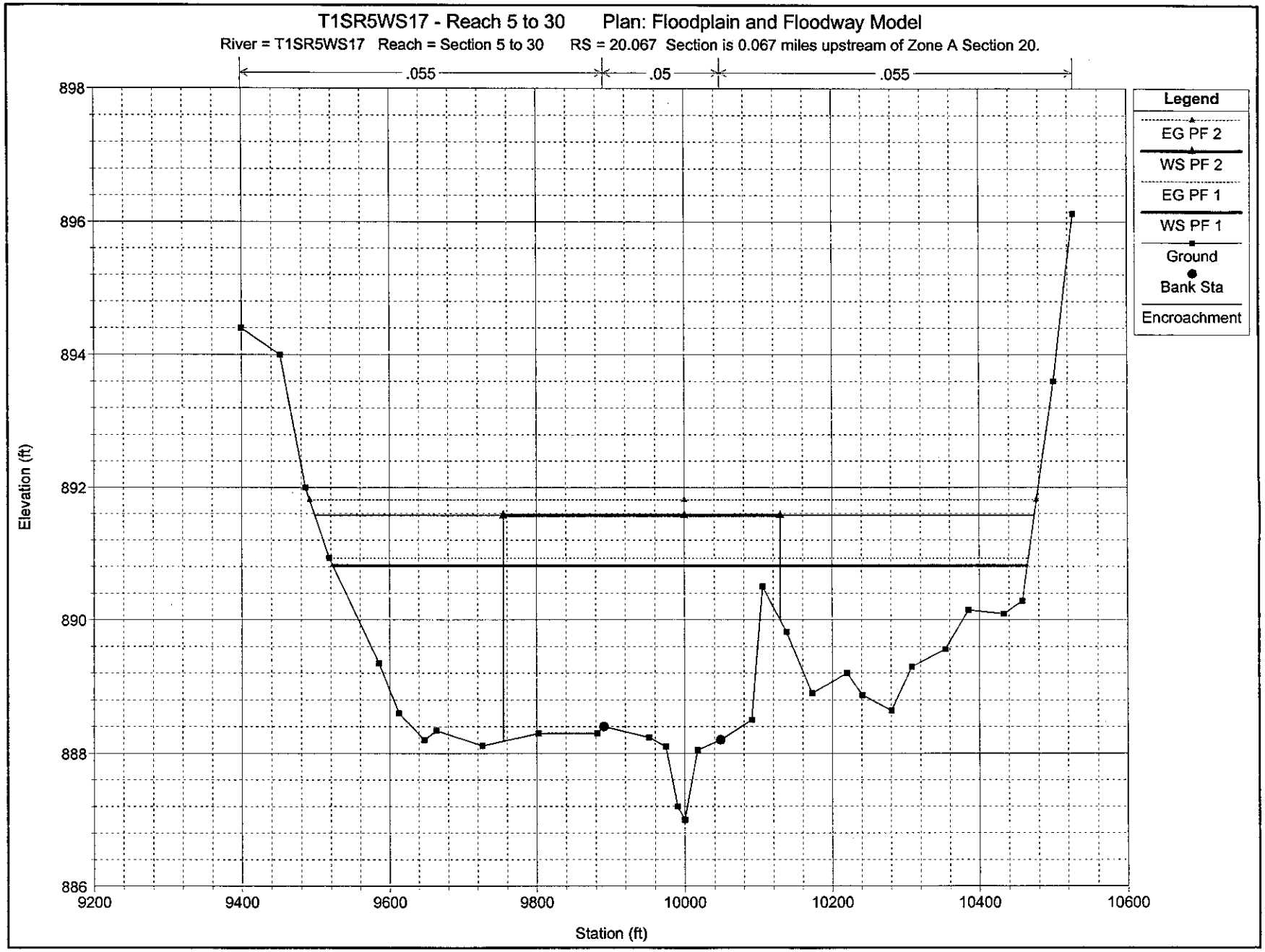

T1SR5WS17 - Reach 5 to 30 Plan: Floodplain and Floodway Model
River = T1SR5WS17 Reach = Section 5 to 30 RS = 20.416 Section is 0.416 miles upstream of Zone A Section 20.
.045
.065
.045
Legend
EG PF 2
WS PF 2
EG PF 1
WS PF 1
Ground
Bank Sta
Encroachment
Elevation (ft)
900
899
898
897
896
895
9400
9600
9800
10000
10200
10400
10600
10800
Station (ft)

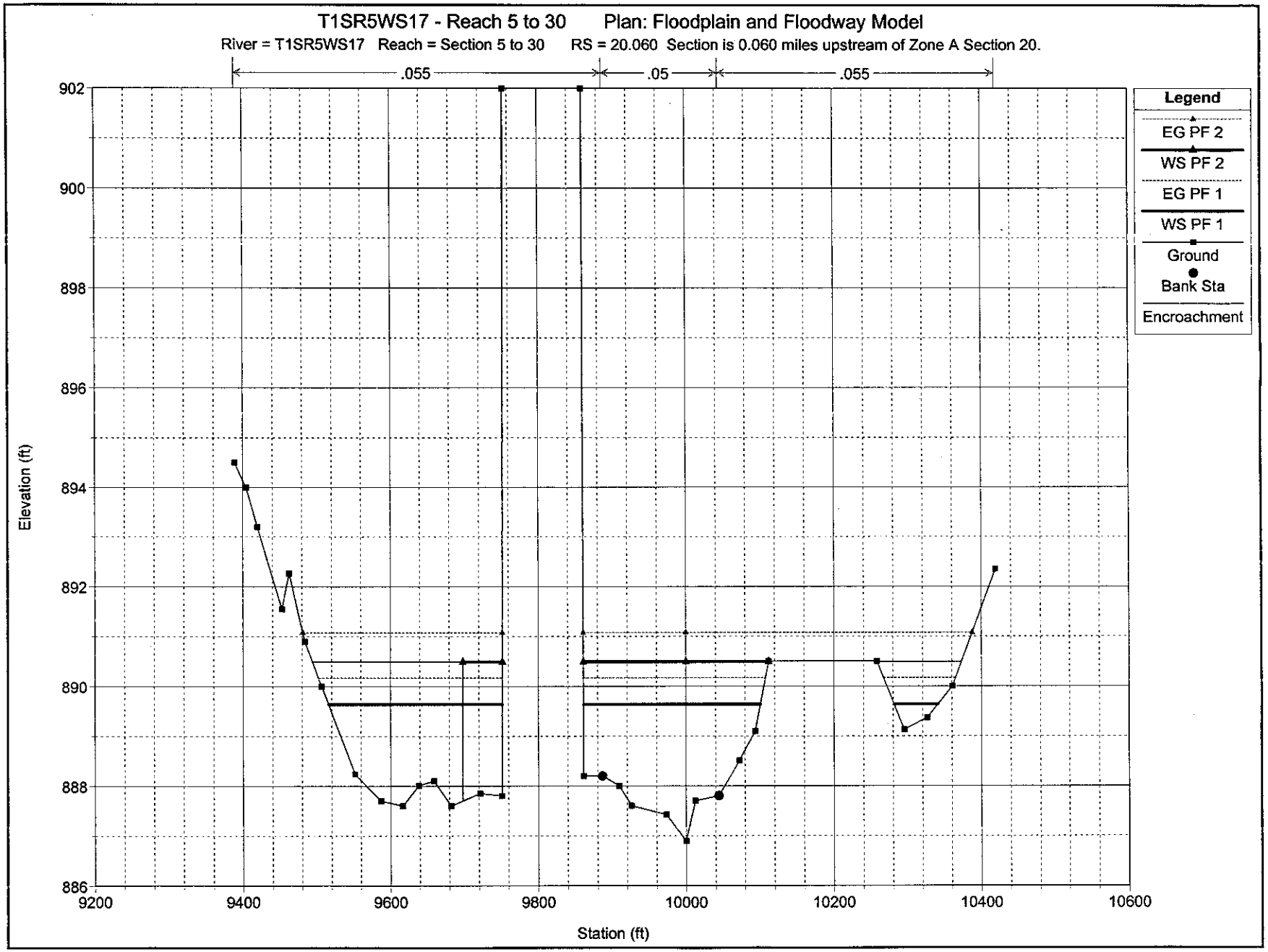

T1SR5WS17 - Reach 5 to 30 Plan: Floodplain and Floodway Model
River = T1SR5WS17 Reach = Section 5 to 30 RS = 20.328 Section is 0.328 miles upstream of Zone A Section 20.
.055
.065
.045
Legend
EG PF 2
WS PF 2
EG PF 1
WS PF 1
Ground
Bank Sta
Encroachment
Elevation (ft)
898
897
896
895
894
893
9200
9400
9600
9800
10000
10200
10400
10600
10800
Station (ft)

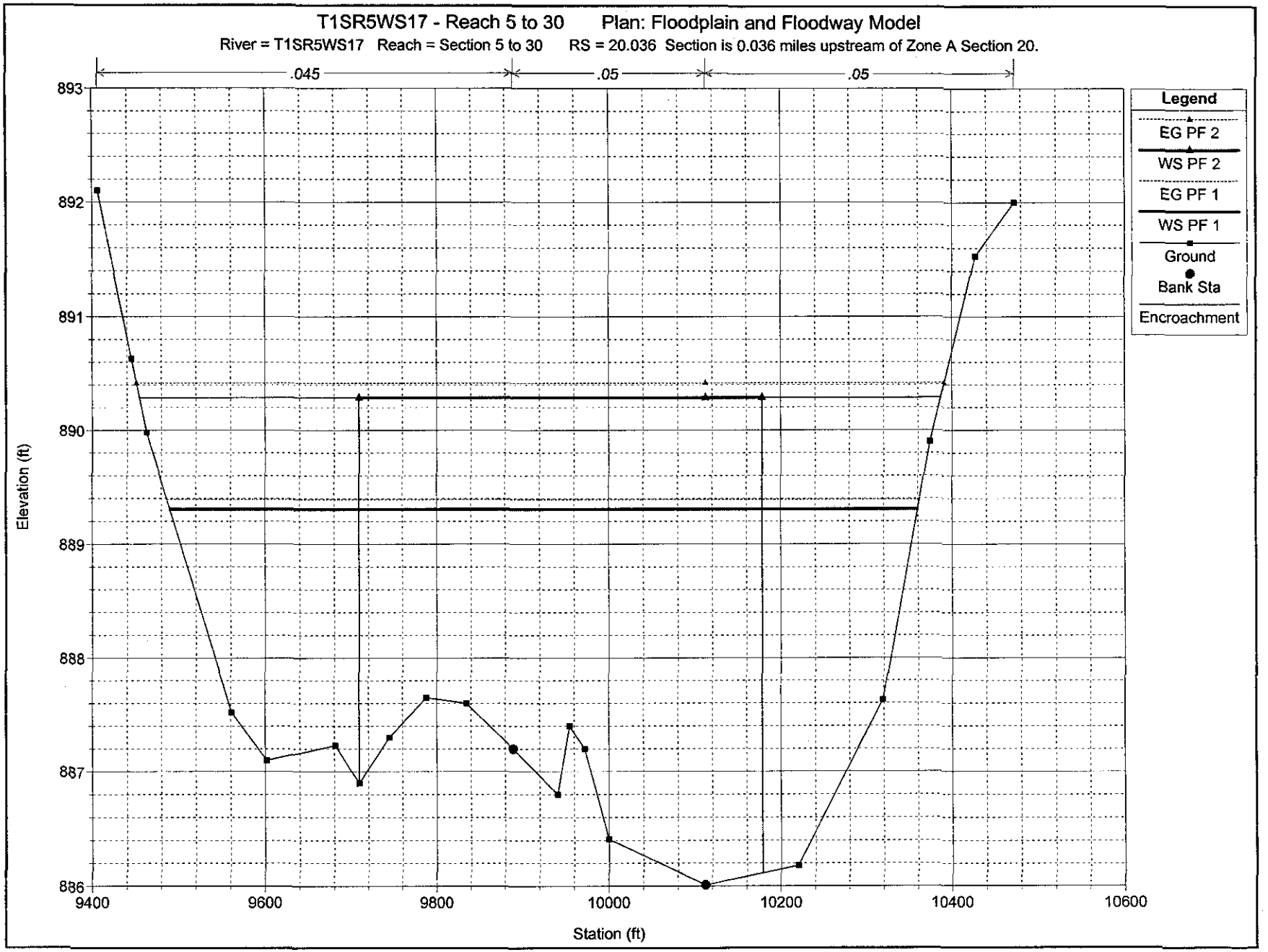

T1SR5WS17 - Reach 5 to 30 Plan: Floodplain and Floodway Model
River = T1SR5WS17 Reach = Section 5 to 30 RS = 20.245 Section is 0.245 miles upstream of Zone A Section 20.
.045
.065
.05
Legend
EG PF 2
WS PF 2
EG PF 1
WS PF 1
Ground
Bank Sta
Encroachment
Elevation (ft)
898
897
896
895
894
893
892
891
9400
9600
9800
10000
10200
10400
10600
10800
11000
Station (ft)

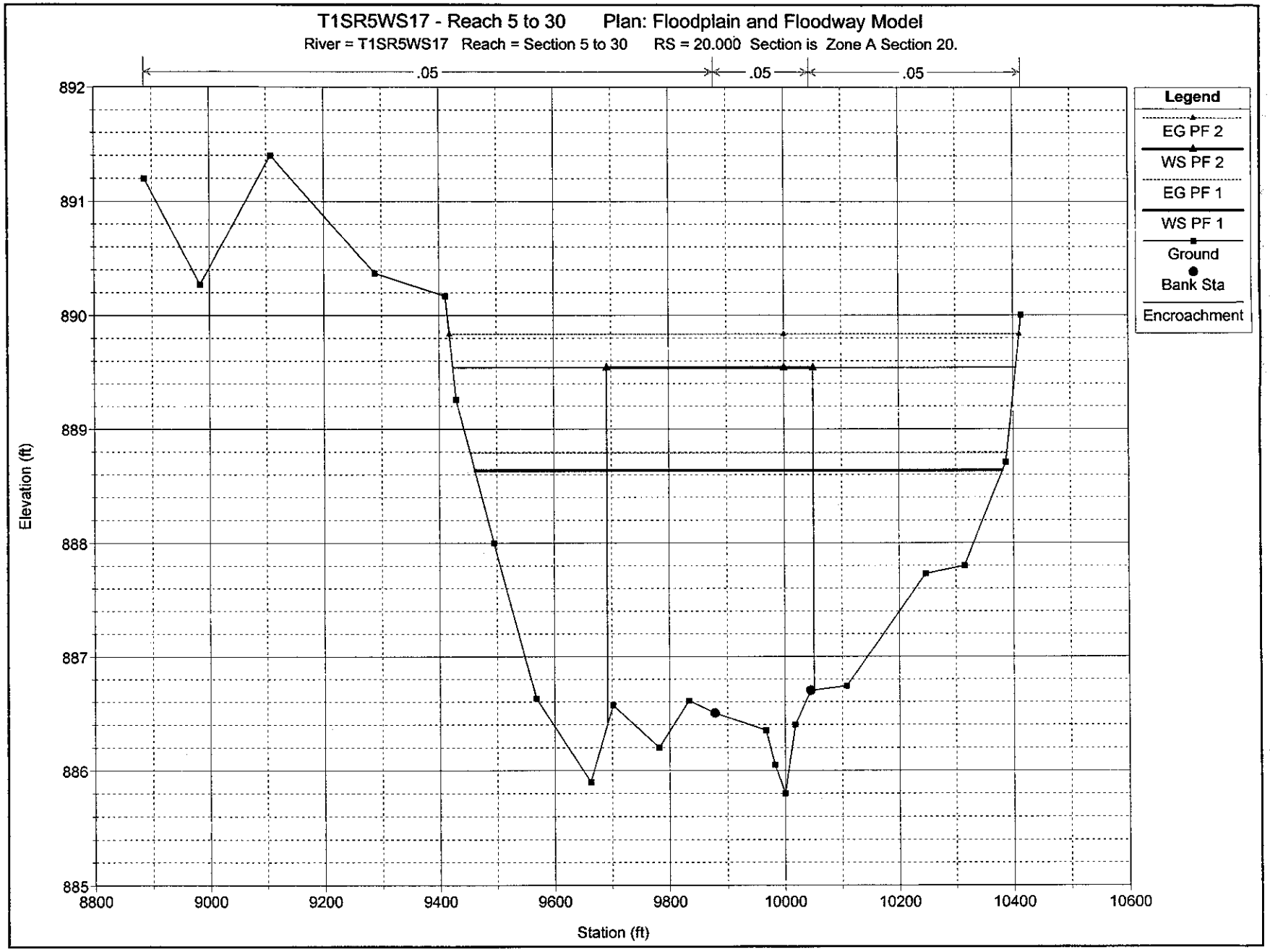

T1SR5WS17 - Reach 5 to 30 Plan: Floodplain and Floodway Model
River = T1SR5WS17 Reach = Section 5 to 30 RS = 20.189 Section is 0.189 miles upstream of Zone A Section 20.
.045
.05
.045
Legend
EG PF 2
WS PF 2
EG PF 1
WS PF 1
Ground
Bank Sta
Encroachment
Elevation (ft)
895
894
893
892
891
890
9600
9800
10000
10200
10400
10600
10800
11000
Station (ft)

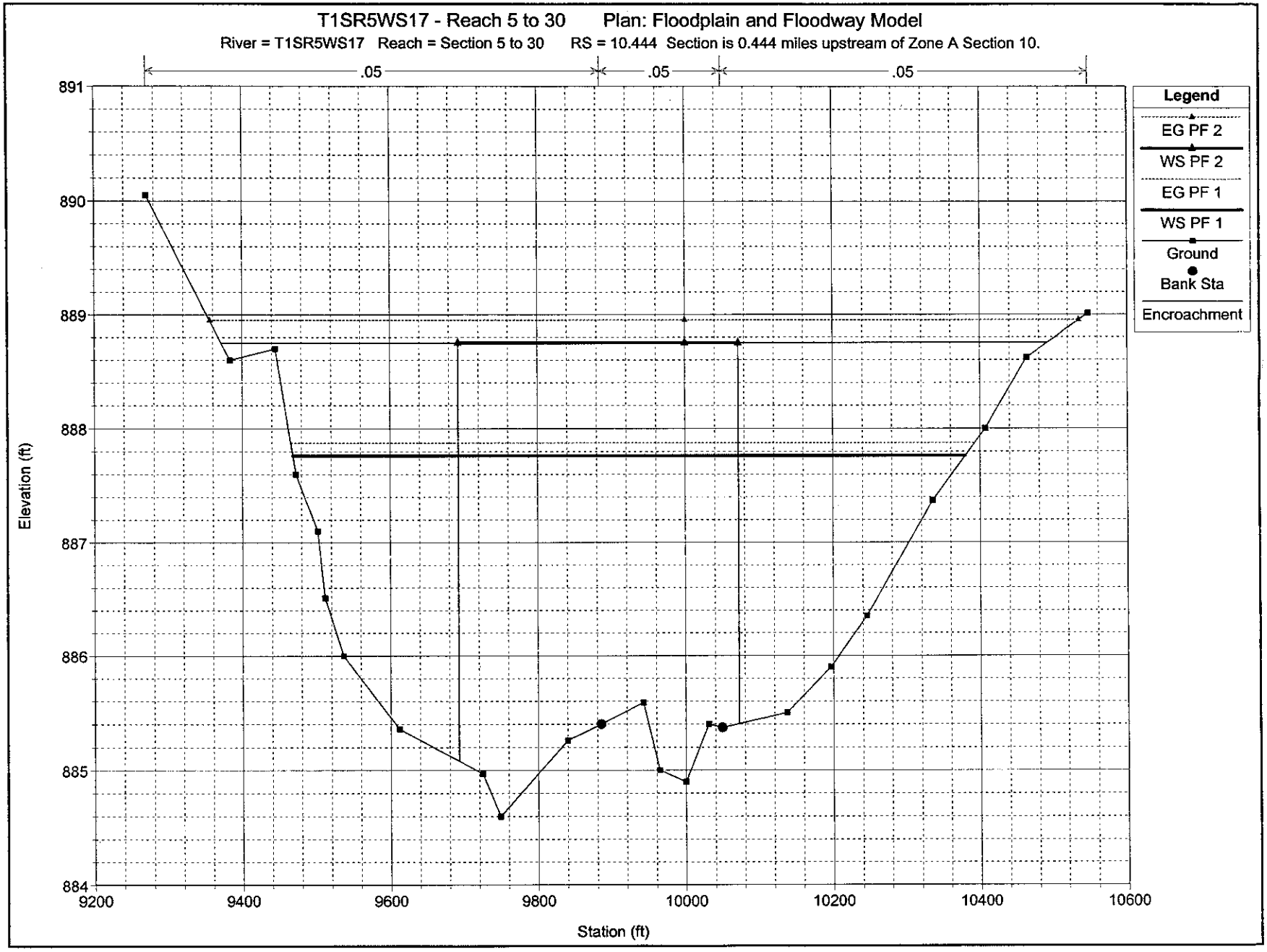

T1SR5WS17 - Reach 5 to 30 Plan: Floodplain and Floodway Model
River = T1SR5WS17 Reach = Section 5 to 30 RS = 20.126 Section is 0.126 miles upstream of Zone A Section 20.
.045
.055
.05
Legend
EG PF 2
WS PF 2
EG PF 1
WS PF 1
Ground
Bank Sta
Encroachment
Elevation (ft)
896
895
894
893
892
891
890
889
888
9400
9600
9800
10000
10200
10400
10600
10800
11000
Station (ft)

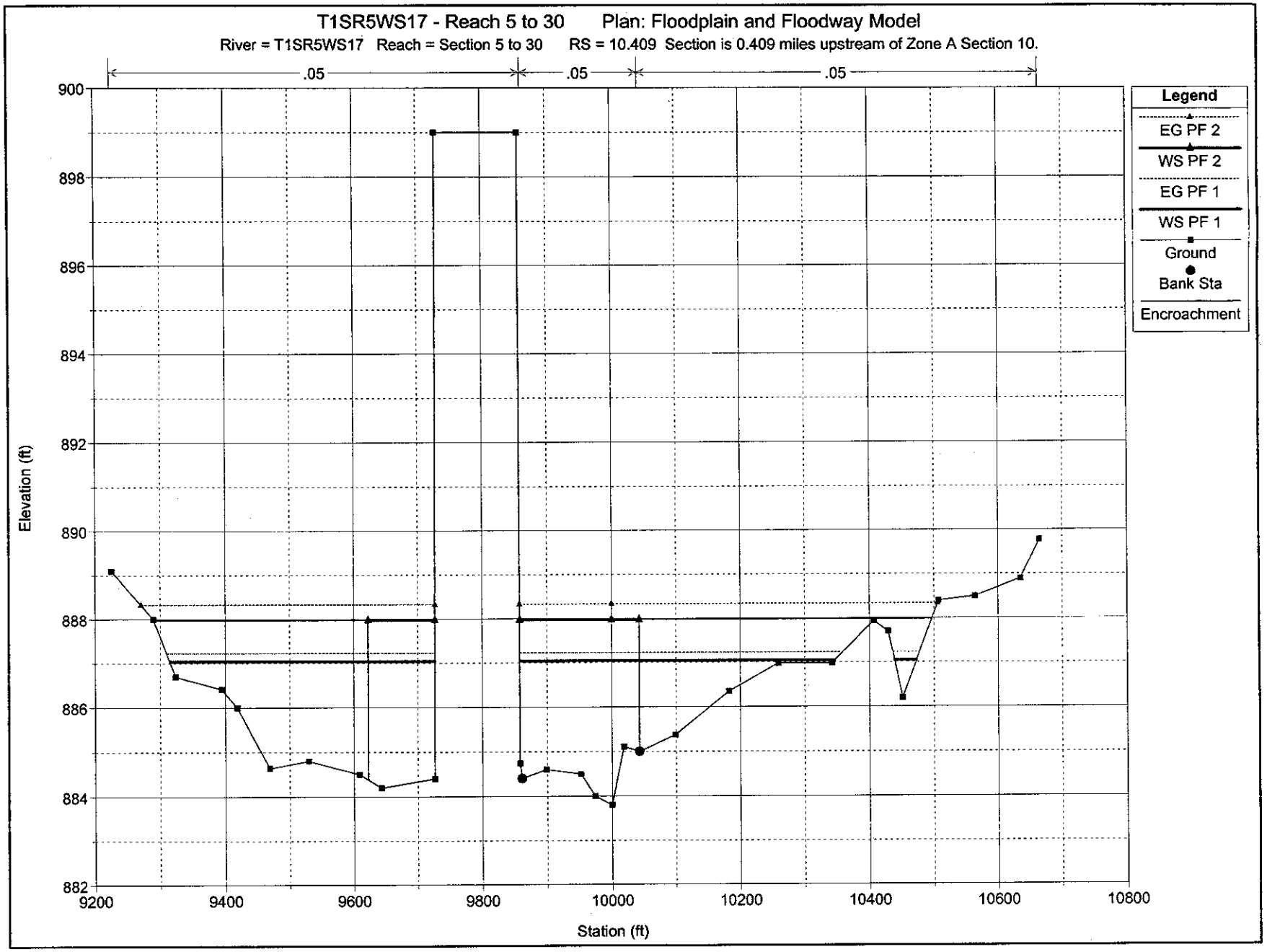

T1SR5WS17 - Reach 5 to 30 Plan: Floodplain and Floodway Model
River = T1SR5WS17 Reach = Section 5 to 30 RS = 20.067 Section is 0.067 miles upstream of Zone A Section 20.
.055
.05
.055
Legend
EG PF 2
WS PF 2
EG PF 1
WS PF 1
Ground
Bank Sta
Encroachment
Elevation (ft)
898
896
894
892
890
888
886
9200
9400
9600
9800
10000
10200
10400
10600
Station (ft)

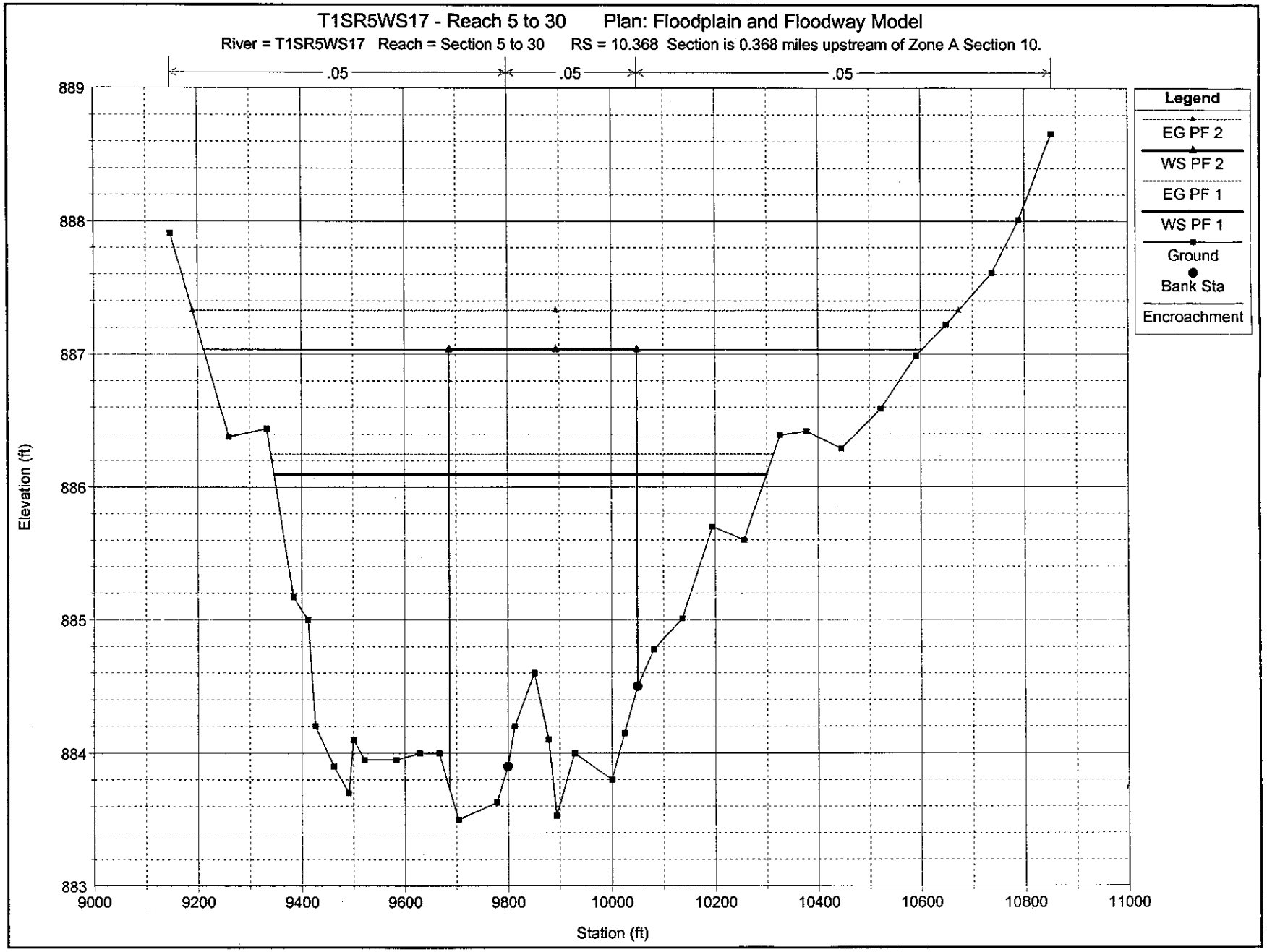

T1SR5WS17 - Reach 5 to 30 Plan: Floodplain and Floodway Model
River = T1SR5WS17 Reach = Section 5 to 30 RS = 20.060 Section is 0.060 miles upstream of Zone A Section 20.
.055
.05
.055
Legend
EG PF 2
WS PF 2
EG PF 1
WS PF 1
Ground
Bank Sta
Encroachment
Elevation (ft)
902
900
898
896
894
892
890
888
886
9200
9400
9600
9800
10000
10200
10400
10600
Station (ft)

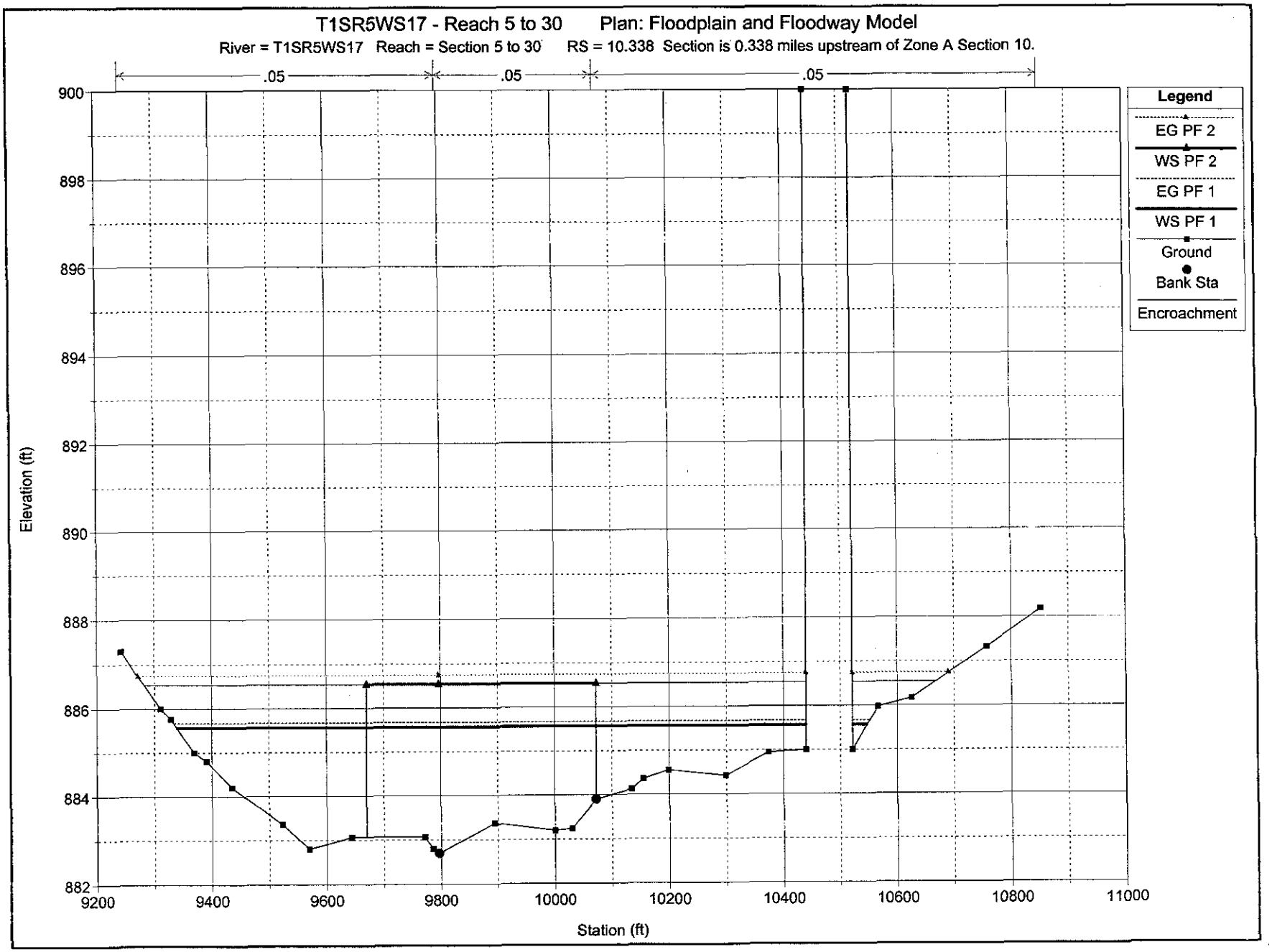

T1SR5WS17 - Reach 5 to 30 Plan: Floodplain and Floodway Model
River = T1SR5WS17 Reach = Section 5 to 30 RS = 20.036 Section is 0.036 miles upstream of Zone A Section 20.
.045
.05
.05
Legend
EG PF 2
WS PF 2
EG PF 1
WS PF 1
Ground
Bank Sta
Encroachment
Elevation (ft)
893
892
891
890
889
888
887
886
9400
9600
9800
10000
10200
10400
10600
Station (ft)

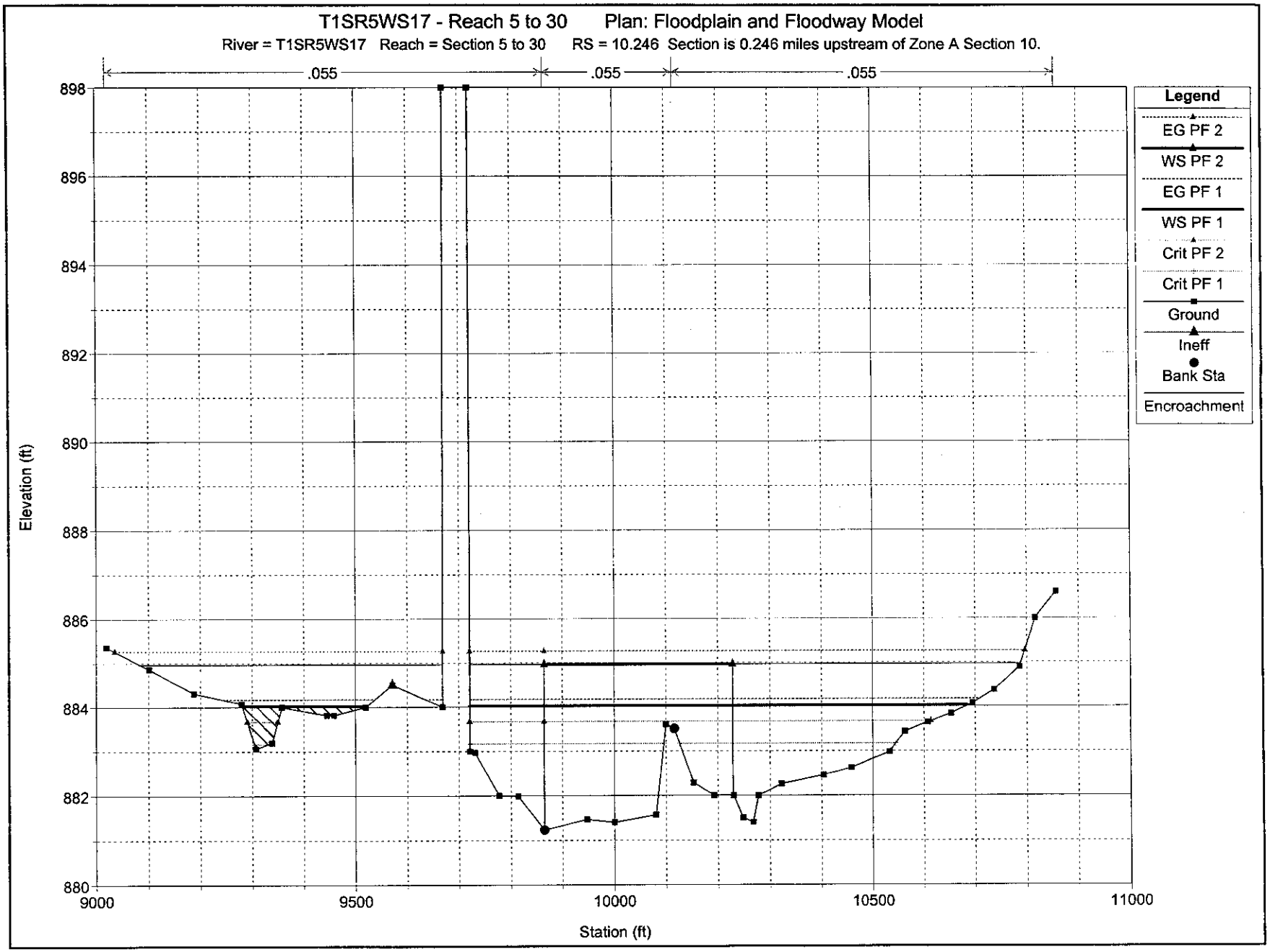

T1SR5WS17 - Reach 5 to 30 Plan: Floodplain and Floodway Model
River = T1SR5WS17 Reach = Section 5 to 30 RS = 20.000 Section is Zone A Section 20.
.05
.05
.05
Legend
EG PF 2
WS PF 2
EG PF 1
WS PF 1
Ground
Bank Sta
Encroachment
Elevation (ft)
892
891
890
889
888
887
886
885
8800
9000
9200
9400
9600
9800
10000
10200
10400
10600
Station (ft)

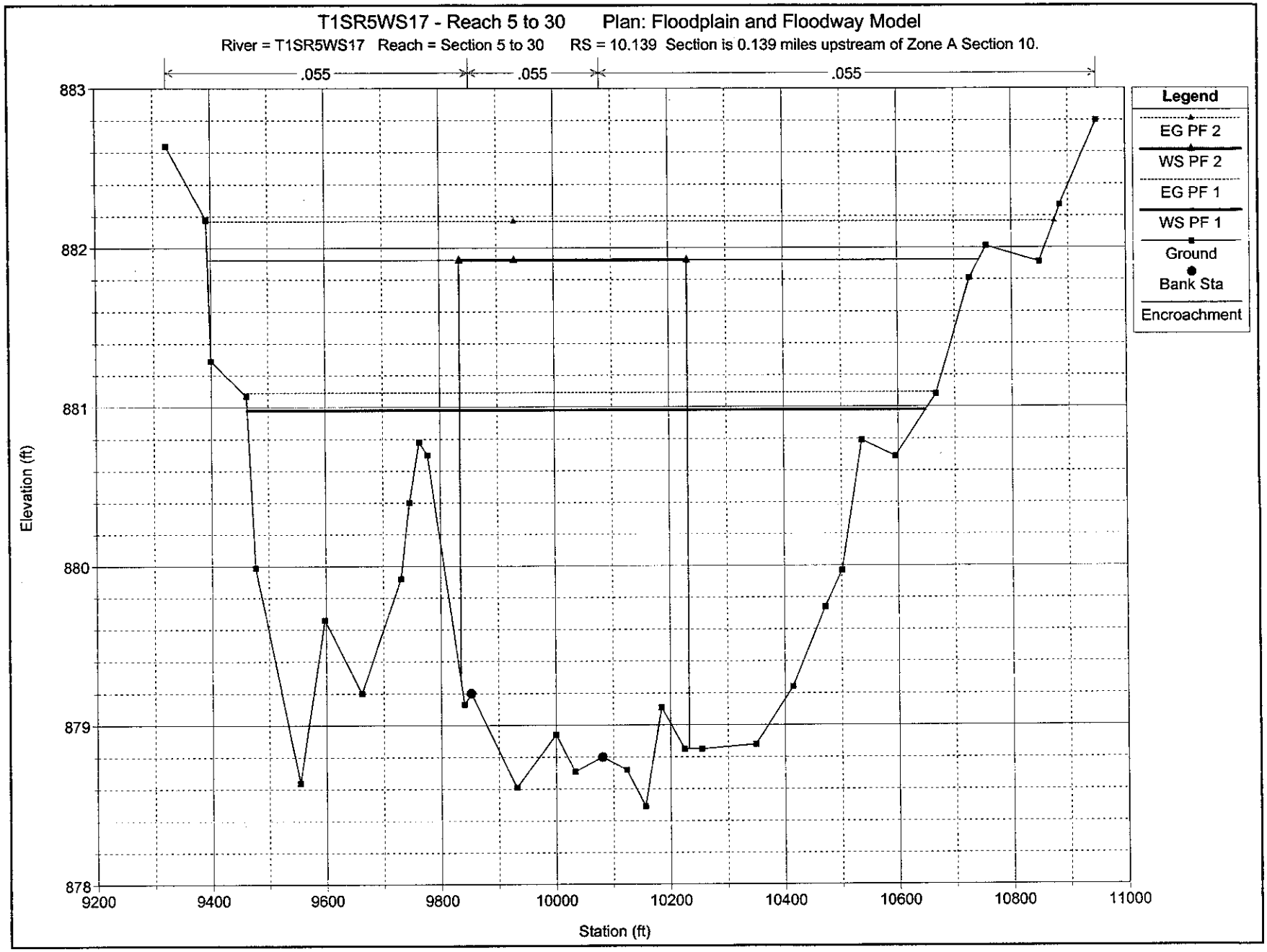

T1SR5WS17 - Reach 5 to 30 Plan: Floodplain and Floodway Model
River = T1SR5WS17 Reach = Section 5 to 30 RS = 10.444 Section is 0.444 miles upstream of Zone A Section 10.
.05
.05
.05
Legend
EG PF 2
WS PF 2
EG PF 1
WS PF 1
Ground
Bank Sta
Encroachment
Elevation (ft)
891
890
889
888
887
886
885
884
9200
9400
9600
9800
10000
10200
10400
10600
Station (ft)

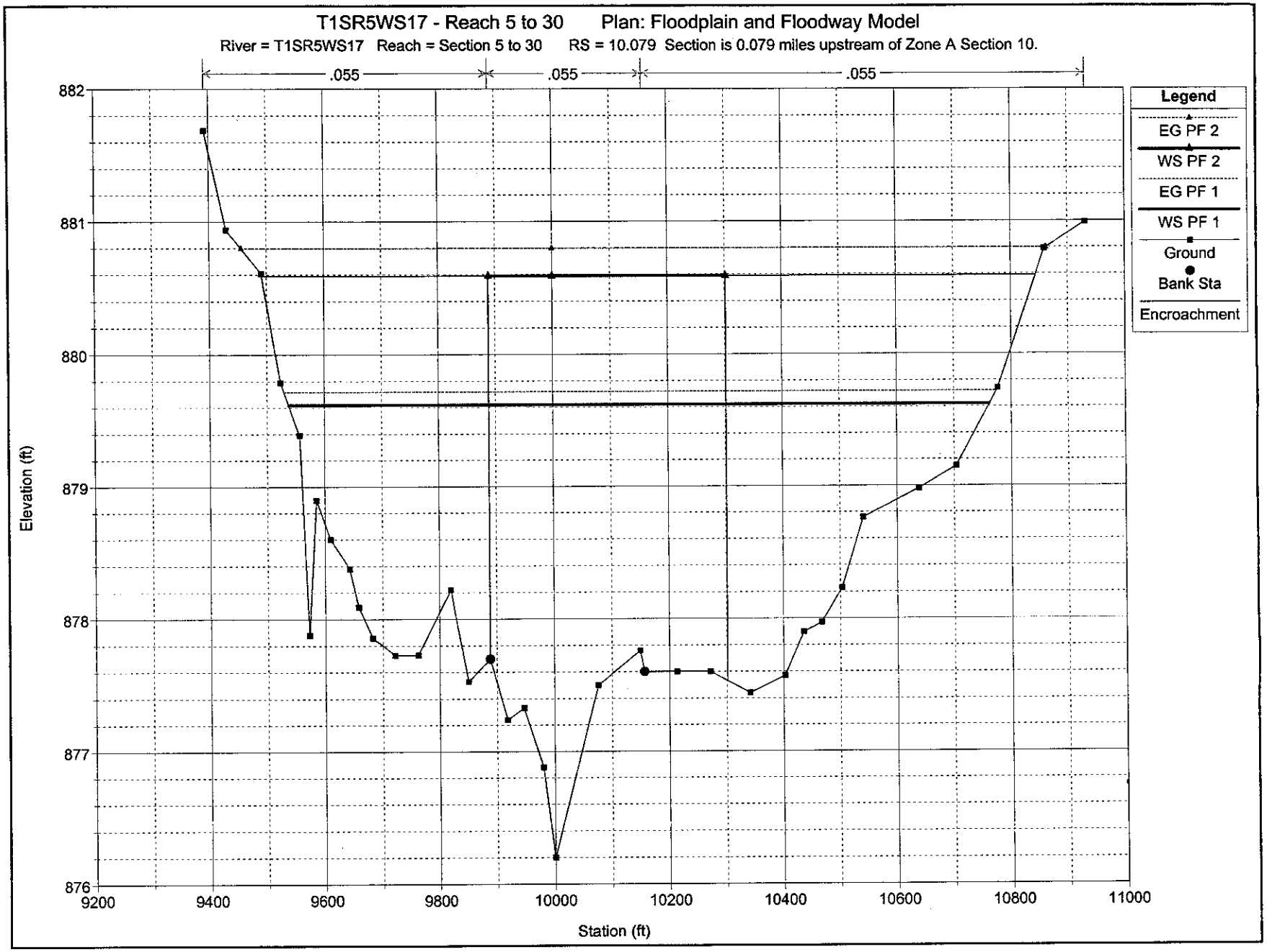

T1SR5WS17 - Reach 5 to 30 Plan: Floodplain and Floodway Model
River = T1SR5WS17 Reach = Section 5 to 30 RS = 10.409 Section is 0.409 miles upstream of Zone A Section 10.
.05
.05
.05
Legend
EG PF 2
WS PF 2
EG PF 1
WS PF 1
Ground
Bank Sta
Encroachment
Elevation (ft)
900
898
896
894
892
890
888
886
884
882
9200
9400
9600
9800
10000
10200
10400
10600
10800
Station (ft)

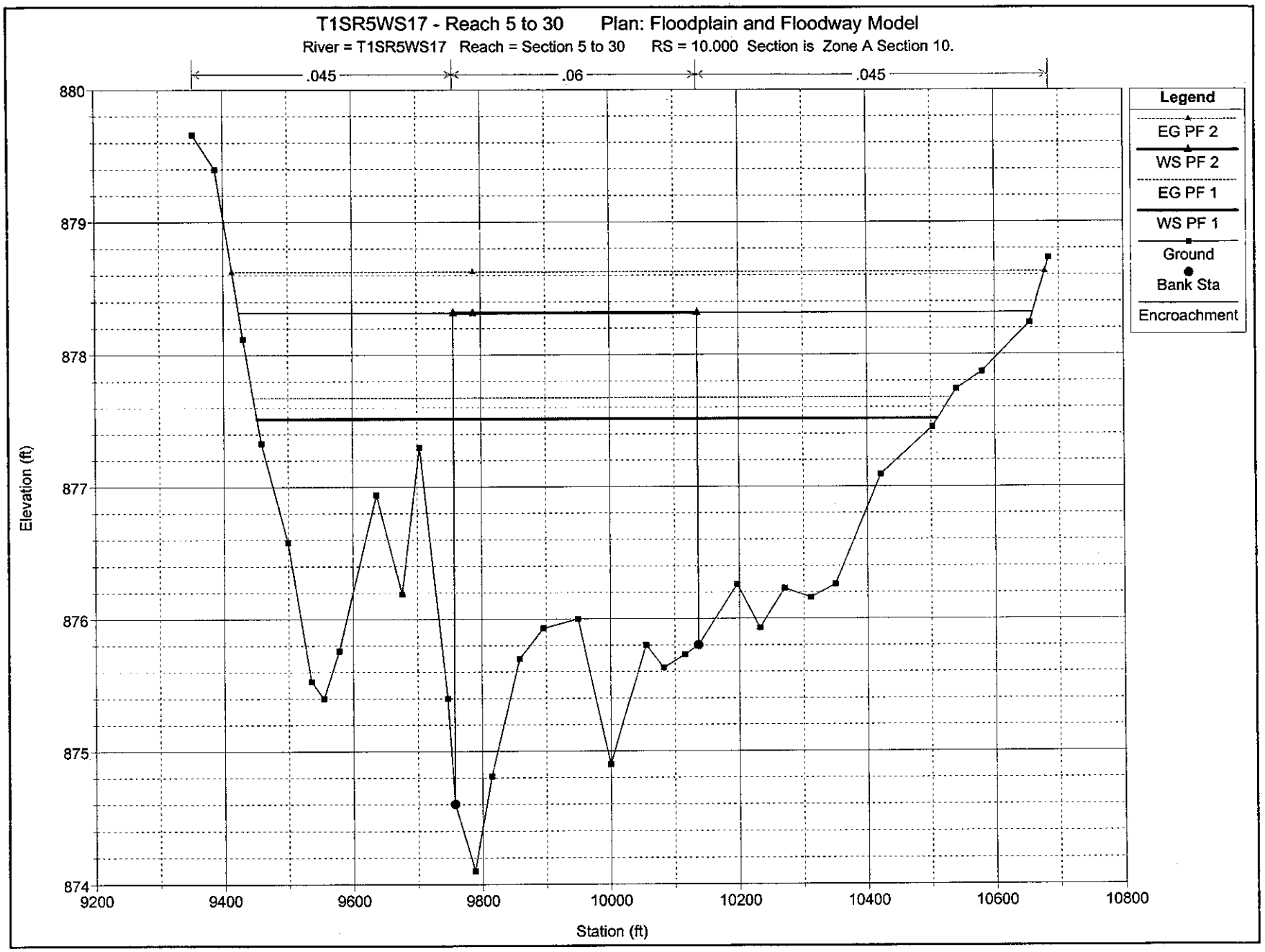

T1SR5WS17 - Reach 5 to 30 Plan: Floodplain and Floodway Model
River = T1SR5WS17 Reach = Section 5 to 30 RS = 10.368 Section is 0.368 miles upstream of Zone A Section 10.
.05
.05
.05
Legend
EG PF 2
WS PF 2
EG PF 1
WS PF 1
Ground
Bank Sta
Encroachment
Elevation (ft)
889
888
887
886
885
884
883
9000
9200
9400
9600
9800
10000
10200
10400
10600
10800
11000
Station (ft)

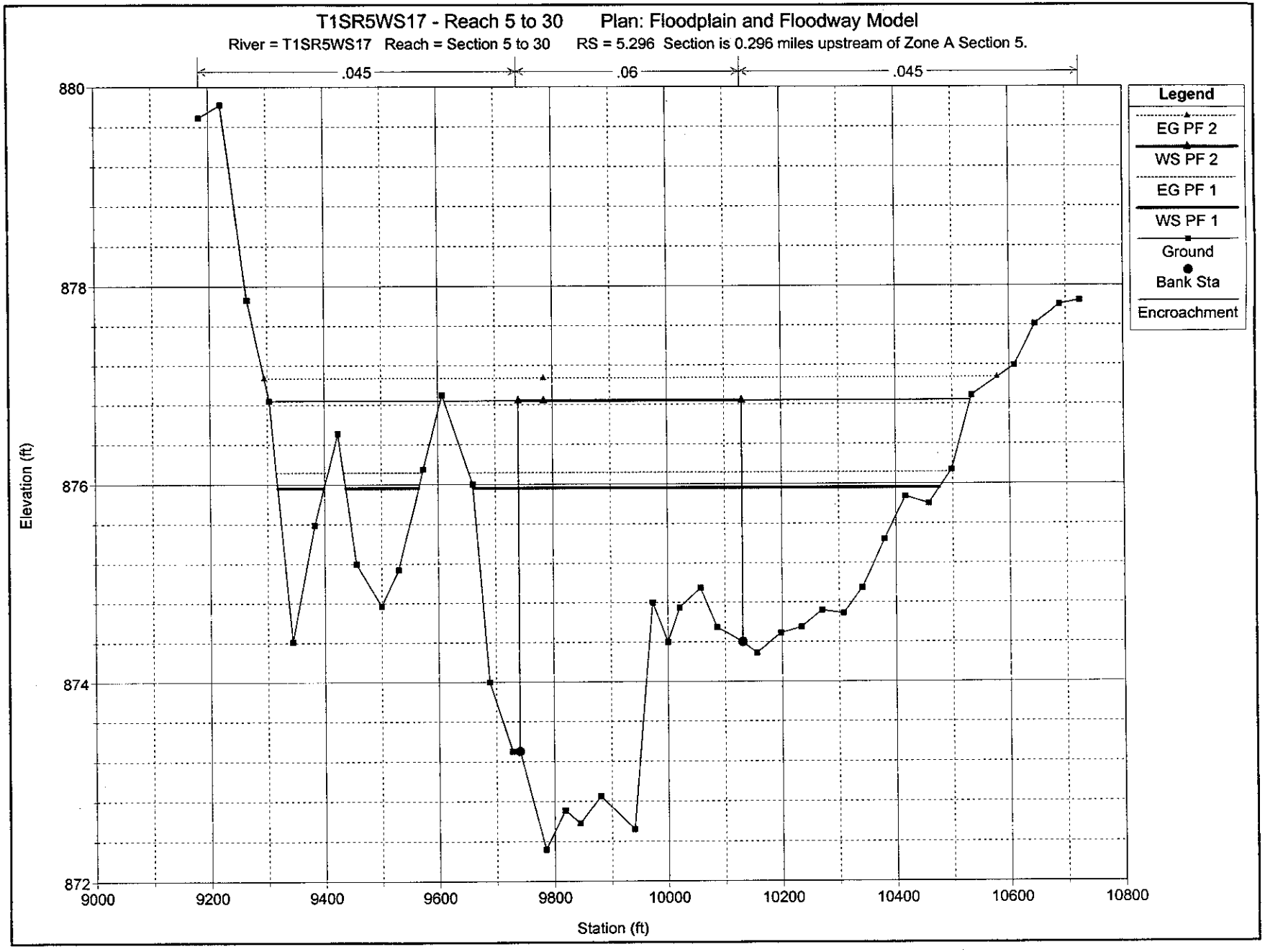

T1SR5WS17 - Reach 5 to 30 Plan: Floodplain and Floodway Model
River = T1SR5WS17 Reach = Section 5 to 30 RS = 10.338 Section is 0.338 miles upstream of Zone A Section 10.
.05
.05
.05
Legend
EG PF 2
WS PF 2
EG PF 1
WS PF 1
Ground
Bank Sta
Encroachment
Elevation (ft)
900
898
896
894
892
890
888
886
884
882
9200
9400
9600
9800
10000
10200
10400
10600
10800
11000
Station (ft)

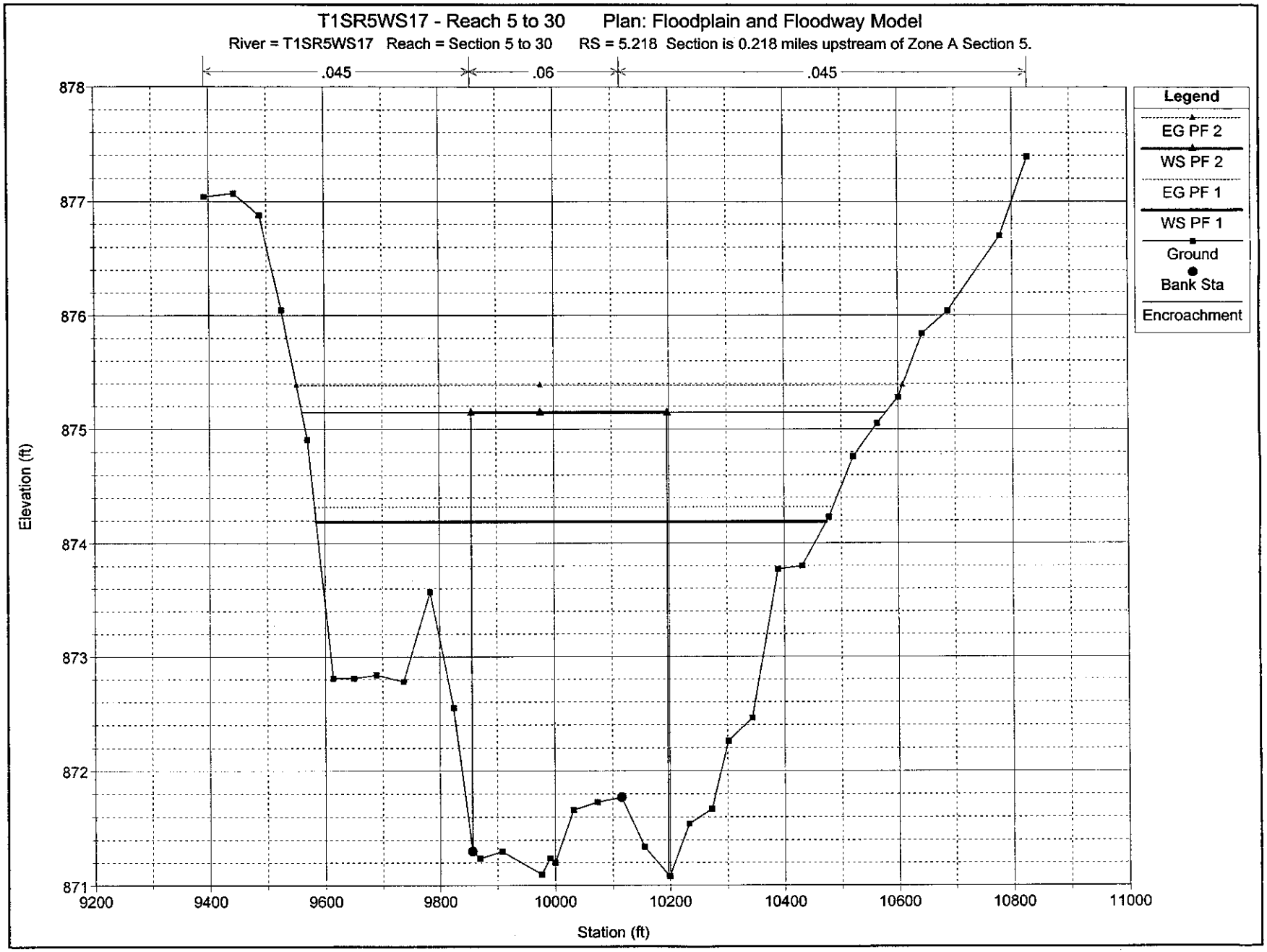

T1SR5WS17 - Reach 5 to 30 Plan: Floodplain and Floodway Model
River = T1SR5WS17 Reach = Section 5 to 30 RS = 10.246 Section is 0.246 miles upstream of Zone A Section 10.
.055
.055
.055
Legend
EG PF 2
WS PF 2
EG PF 1
WS PF 1
Crit PF 2
Crit PF 1
Ground
Ineff
Bank Sta
Encroachment
Elevation (ft)
898
896
894
892
890
888
886
884
882
880
9000
9500
10000
10500
11000
Station (ft)

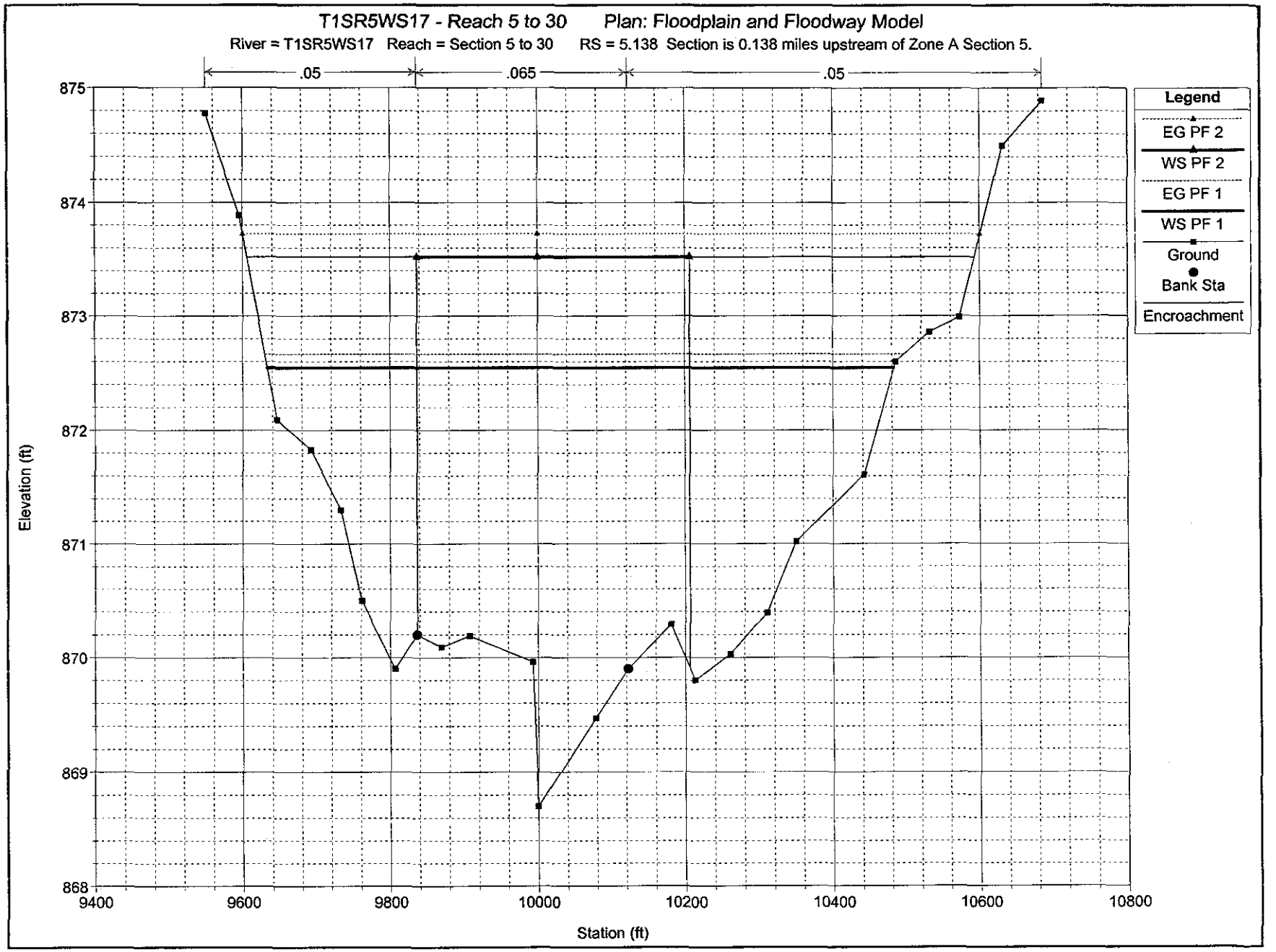

T1SR5WS17 - Reach 5 to 30 Plan: Floodplain and Floodway Model
River = T1SR5WS17 Reach = Section 5 to 30 RS = 10.139 Section is 0.139 miles upstream of Zone A Section 10.
.055
.055
.055
Legend
EG PF 2
WS PF 2
EG PF 1
WS PF 1
Ground
Bank Sta
Encroachment
Elevation (ft)
883
882
881
880
879
878
9200
9400
9600
9800
10000
10200
10400
10600
10800
11000
Station (ft)

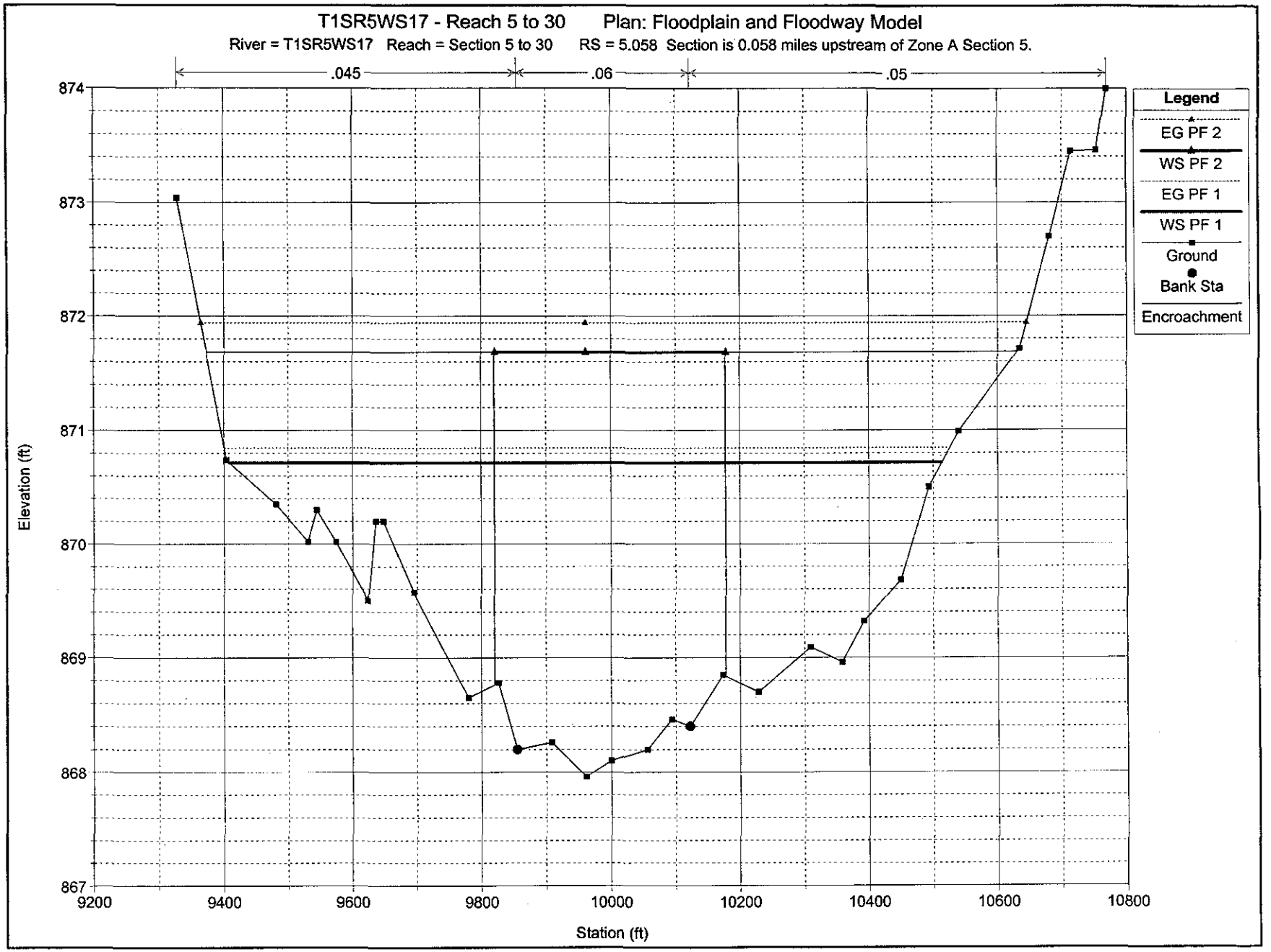

T1SR5WS17 - Reach 5 to 30 Plan: Floodplain and Floodway Model
River = T1SR5WS17 Reach = Section 5 to 30 RS = 10.079 Section is 0.079 miles upstream of Zone A Section 10.
.055
.055
.055
Legend
EG PF 2
WS PF 2
EG PF 1
WS PF 1
Ground
Bank Sta
Encroachment
Elevation (ft)
882
881
880
879
878
877
876
9200
9400
9600
9800
10000
10200
10400
10600
10800
11000
Station (ft)

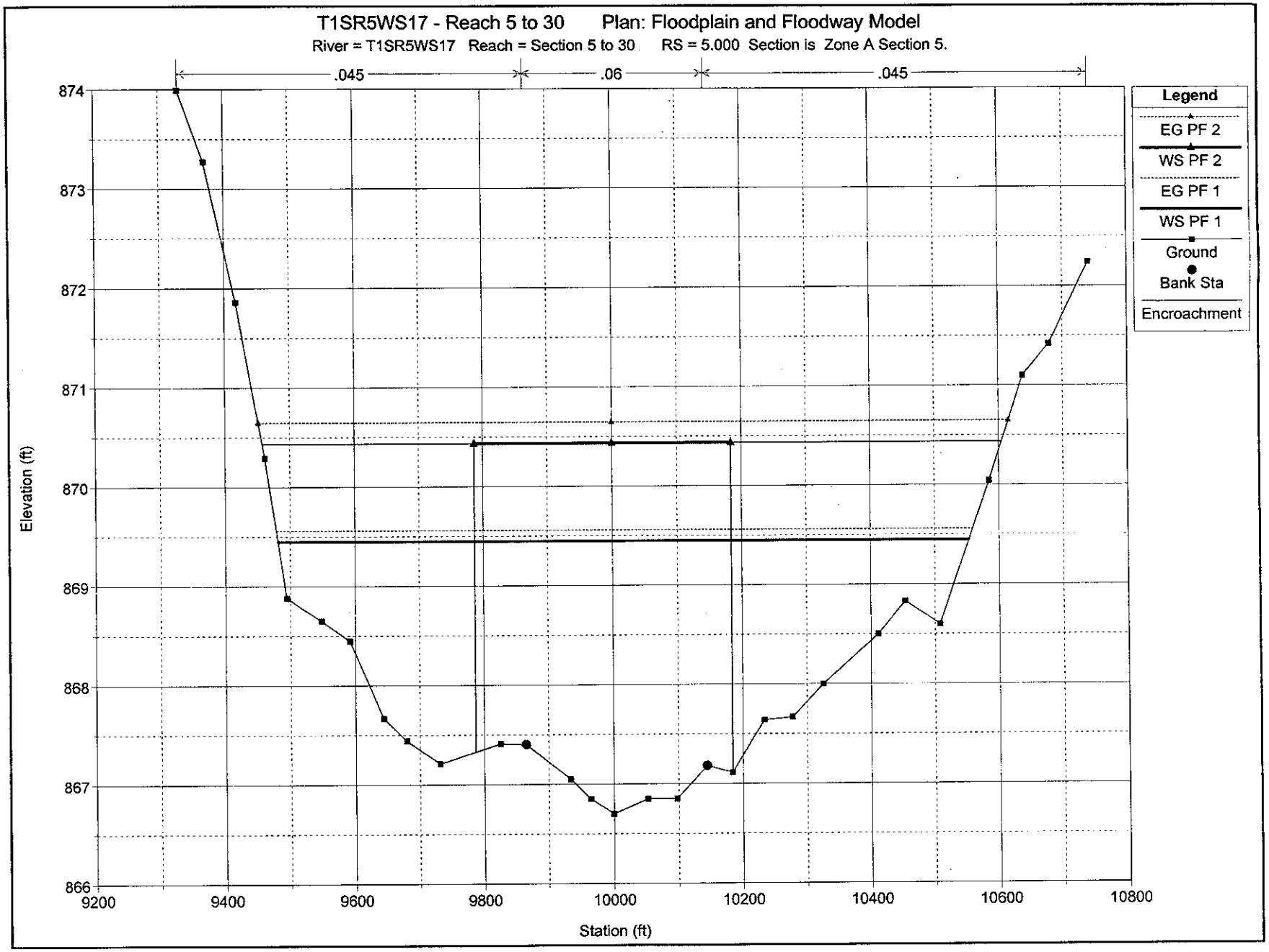

T1SR5WS17 - Reach 5 to 30 Plan: Floodplain and Floodway Model
River = T1SR5WS17 Reach = Section 5 to 30 RS = 10.000 Section is Zone A Section 10.
.045
.06
.045
Legend
EG PF 2
WS PF 2
EG PF 1
WS PF 1
Ground
Bank Sta
Encroachment
Elevation (ft)
880
879
878
877
876
875
874
9200
9400
9600
9800
10000
10200
10400
10600
10800
Station (ft)

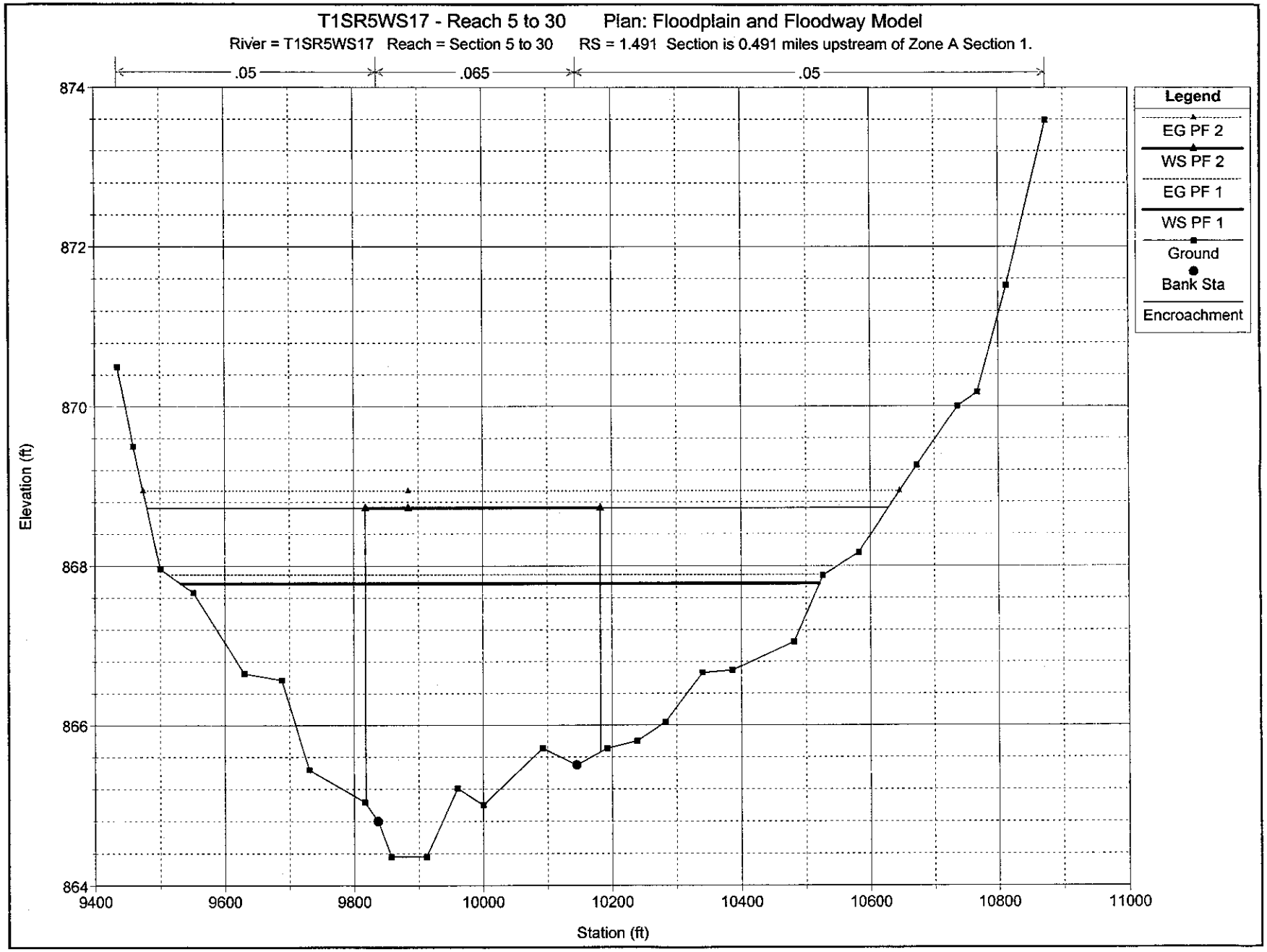

T1SR5WS17 - Reach 5 to 30 Plan: Floodplain and Floodway Model
River = T1SR5WS17 Reach = Section 5 to 30 RS = 5.296 Section is 0.296 miles upstream of Zone A Section 5.
.045
.06
.045
Legend
EG PF 2
WS PF 2
EG PF 1
WS PF 1
Ground
Bank Sta
Encroachment
Elevation (ft)
880
878
876
874
872
9000
9200
9400
9600
9800
10000
10200
10400
10600
10800
Station (ft)

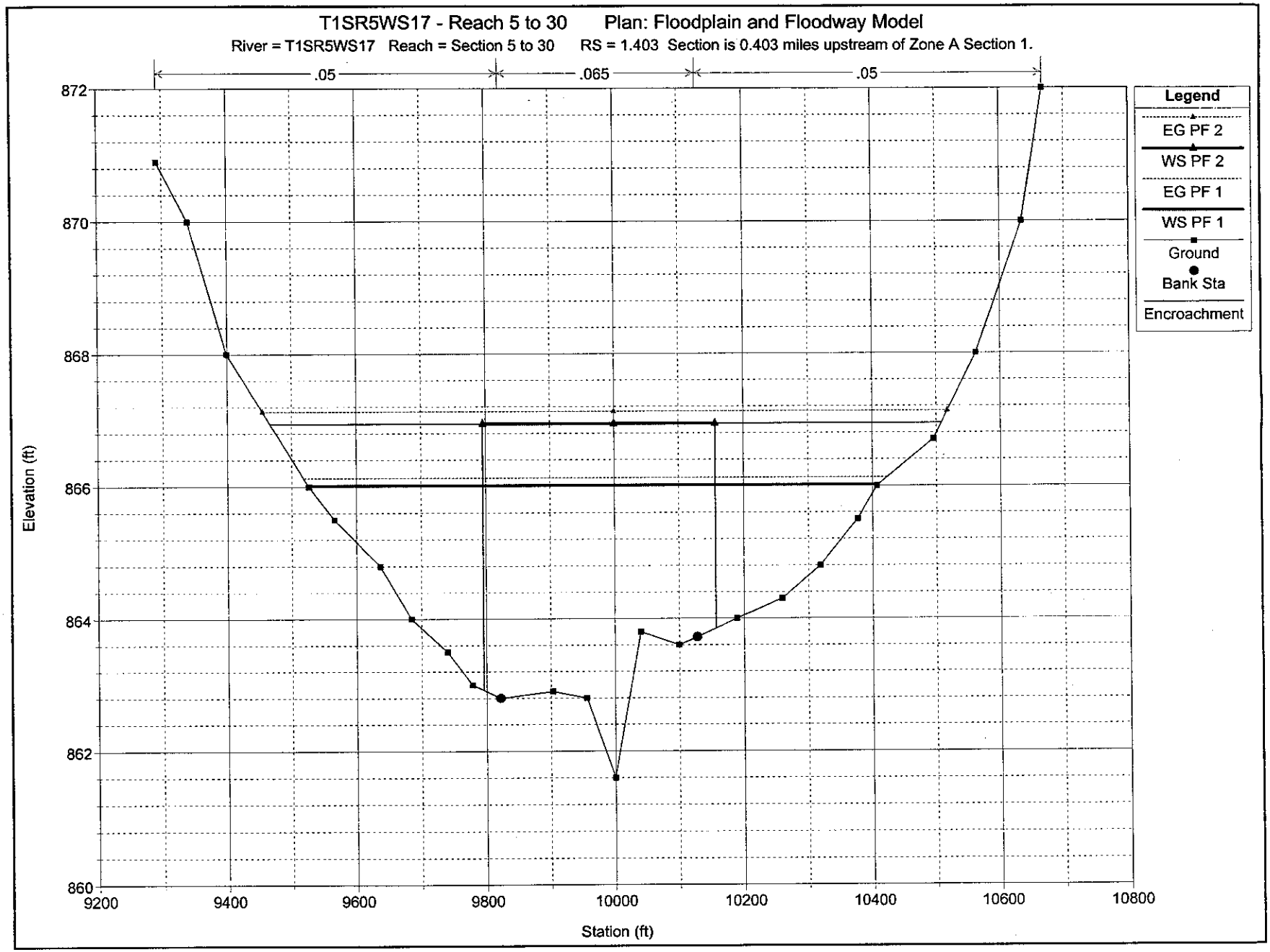

T1SR5WS17 - Reach 5 to 30 Plan: Floodplain and Floodway Model
River = T1SR5WS17 Reach = Section 5 to 30 RS = 5.218 Section is 0.218 miles upstream of Zone A Section 5.
.045
.06
.045
Legend
EG PF 2
WS PF 2
EG PF 1
WS PF 1
Ground
Bank Sta
Encroachment
Elevation (ft)
878
877
876
875
874
873
872
871
9200
9400
9600
9800
10000
10200
10400
10600
10800
11000
Station (ft)

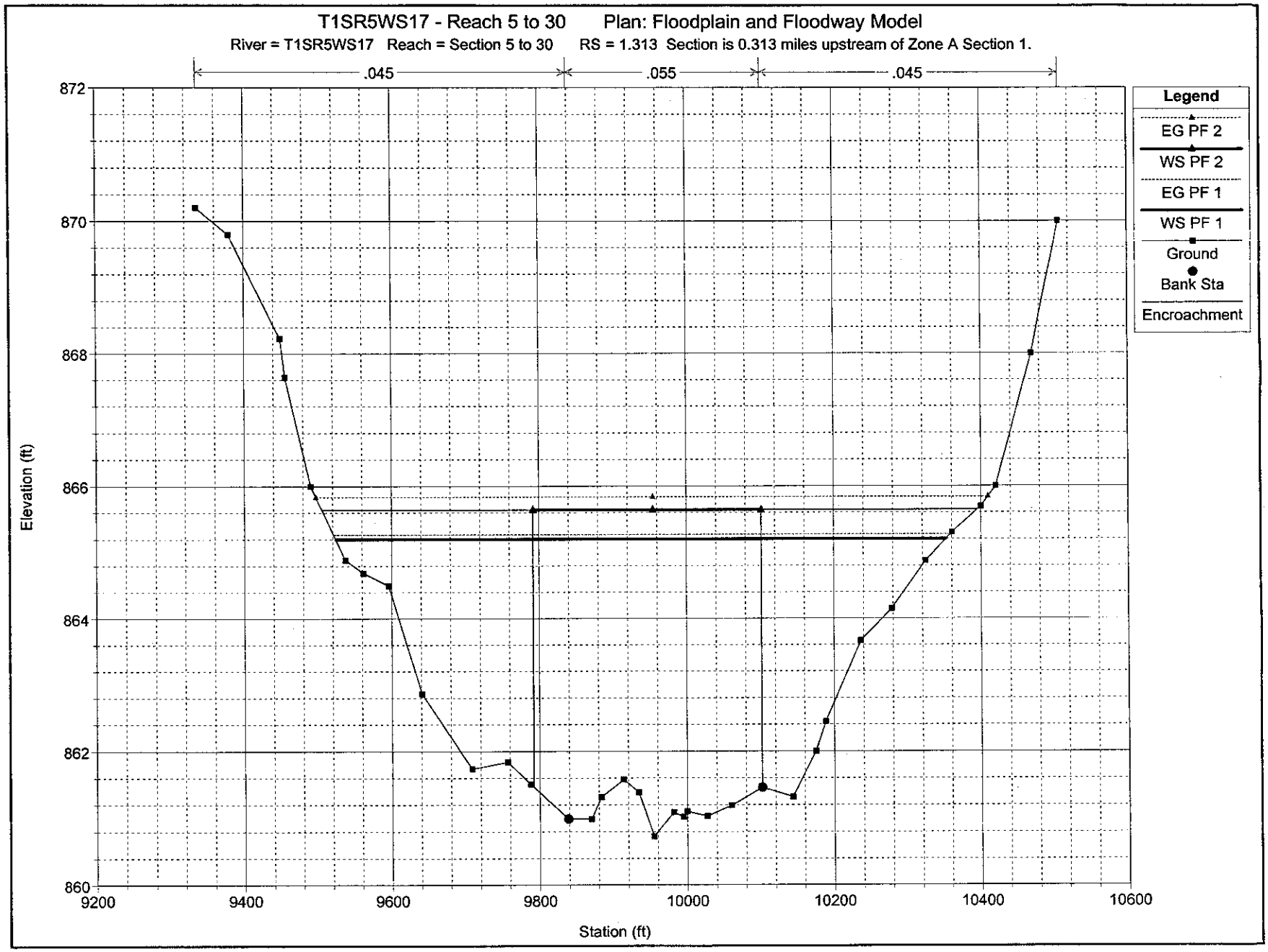

T1SR5WS17 - Reach 5 to 30 Plan: Floodplain and Floodway Model
River = T1SR5WS17 Reach = Section 5 to 30 RS = 5.138 Section is 0.138 miles upstream of Zone A Section 5.
.05
.065
.05
Legend
EG PF 2
WS PF 2
EG PF 1
WS PF 1
Ground
Bank Sta
Encroachment
Elevation (ft)
875
874
873
872
871
870
869
868
9400
9600
9800
10000
10200
10400
10600
10800
Station (ft)

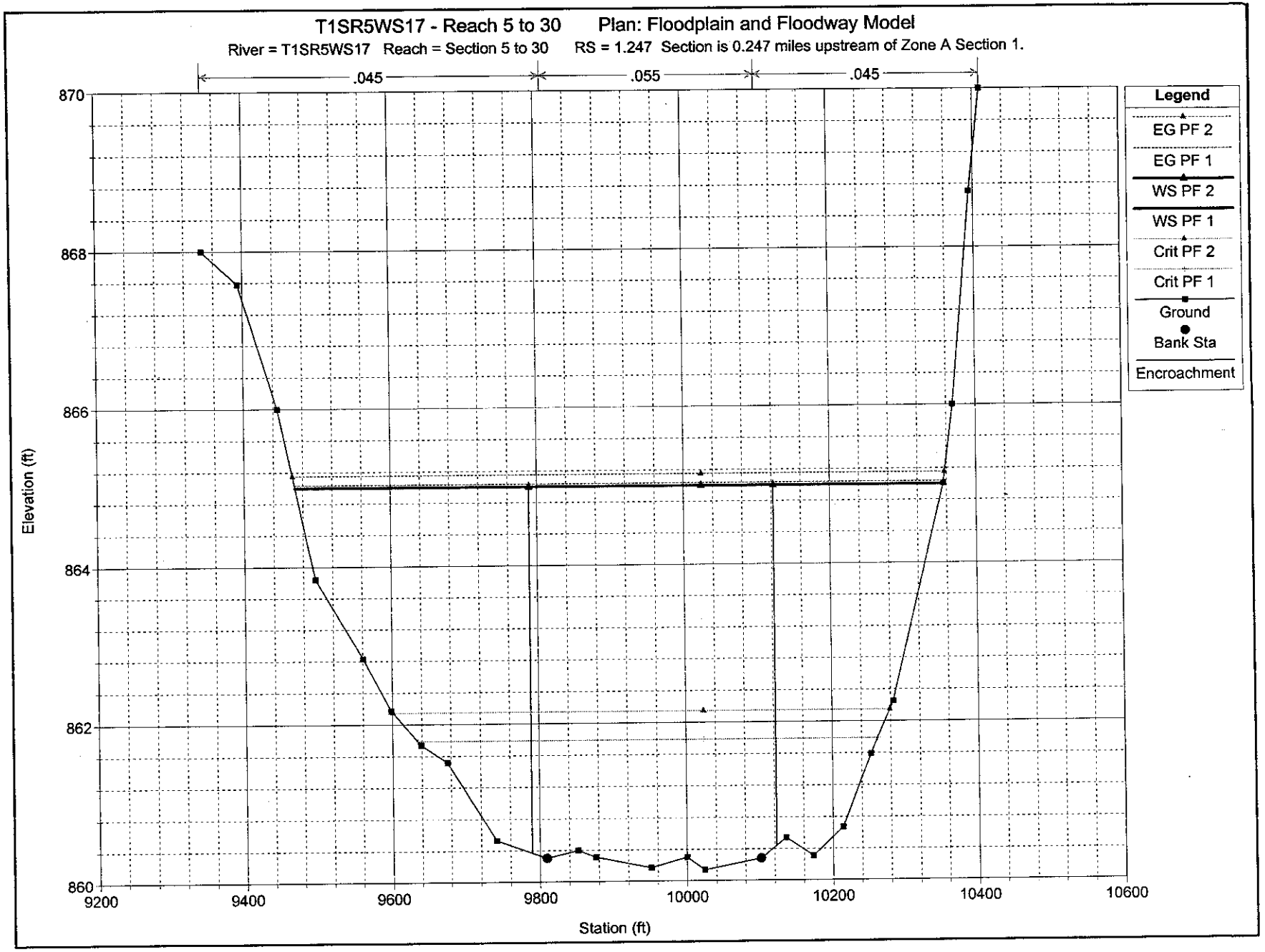

T1SR5WS17 - Reach 5 to 30 Plan: Floodplain and Floodway Model
River = T1SR5WS17 Reach = Section 5 to 30 RS = 5.058 Section is 0.058 miles upstream of Zone A Section 5.
.045
.06
.05
Legend
EG PF 2
WS PF 2
EG PF 1
WS PF 1
Ground
Bank Sta
Encroachment
Elevation (ft)
874
873
872
871
870
869
868
867
9200
9400
9600
9800
10000
10200
10400
10600
10800
Station (ft)


T1SR5WS17 - Reach 5 to 30 Plan: Floodplain and Floodway Model
River = T1SR5WS17 Reach = Section 5 to 30 RS = 5.000 Section is Zone A Section 5.
.045
.06
.045
Legend
EG PF 2
WS PF 2
EG PF 1
WS PF 1
Ground
Bank Sta
Encroachment
Elevation (ft)
874
873
872
871
870
869
868
867
866
9200
9400
9600
9800
10000
10200
10400
10600
10800
Station (ft)


T1SR5WS17 - Reach 5 to 30 Plan: Floodplain and Floodway Model
River = T1SR5WS17 Reach = Section 5 to 30 RS = 1.491 Section is 0.491 miles upstream of Zone A Section 1.
.05
.065
.05
Legend
EG PF 2
WS PF 2
EG PF 1
WS PF 1
Ground
Bank Sta
Encroachment
Elevation (ft)
874
872
870
868
866
864
9400
9600
9800
10000
10200
10400
10600
10800
11000
Station (ft)


T1SR5WS17 - Reach 5 to 30 Plan: Floodplain and Floodway Model
River = T1SR5WS17 Reach = Section 5 to 30 RS = 1.403 Section is 0.403 miles upstream of Zone A Section 1.
.05
.065
.05
Legend
EG PF 2
WS PF 2
EG PF 1
WS PF 1
Ground
Bank Sta
Encroachment
Elevation (ft)
872
870
868
866
864
862
860
9200
9400
9600
9800
10000
10200
10400
10600
10800
Station (ft)


T1SR5WS17 - Reach 5 to 30 Plan: Floodplain and Floodway Model
River = T1SR5WS17 Reach = Section 5 to 30 RS = 1.313 Section is 0.313 miles upstream of Zone A Section 1.
.045
.055
.045
Legend
EG PF 2
WS PF 2
EG PF 1
WS PF 1
Ground
Bank Sta
Encroachment
Elevation (ft)
872
870
868
866
864
862
860
9200
9400
9600
9800
10000
10200
10400
10600
Station (ft)


T1SR5WS17 - Reach 5 to 30 Plan: Floodplain and Floodway Model
River = T1SR5WS17 Reach = Section 5 to 30 RS = 1.247 Section is 0.247 miles upstream of Zone A Section 1.
.045
.055
.045
Legend
EG PF 2
EG PF 1
WS PF 2
WS PF 1
Crit PF 2
Crit PF 1
Ground
Bank Sta
Encroachment
Elevation (ft)
870
868
866
864
862
860
9200
9400
9600
9800
10000
10200
10400
10600
Station (ft)

APPENDIX F

HEC-RAS Plan: FP and FW River: T1SR5WS17 Reach: Section 5 to 30

Reach	River Sta	Top Wdth Act	Area	Vel Total	W.S. Elev	Base WS	Prof Delta WS
		(ft)	(sq ft)	(ft/s)	(ft)	(ft)	(ft)
Section 5 to 30	1.247	886.12	3279.79	1.49	865.00	865.00	
Section 5 to 30	1.247	333.71	1579.51	3.10	865.00	865.00	0.00
Section 5 to 30	1.313	827.60	2336.50	2.10	865.20	865.20	
Section 5 to 30	1.313	309.91	1382.37	3.54	865.64	865.20	0.44
Section 5 to 30	1.403	883.73	1854.07	2.64	866.02	866.02	
Section 5 to 30	1.403	361.00	1410.64	3.47	866.94	866.02	0.92
Section 5 to 30	1.491	988.27	1821.74	2.69	867.78	867.78	
Section 5 to 30	1.491	364.94	1322.94	3.70	868.72	867.78	0.94
Section 5 to 30	5.000	1071.81	1850.97	2.65	869.45	869.45	
Section 5 to 30	5.000	397.08	1338.82	3.66	870.43	869.45	0.99
Section 5 to 30	5.058	1104.47	1728.49	2.83	870.71	870.71	
Section 5 to 30	5.058	357.19	1208.88	4.05	871.68	870.71	0.97
Section 5 to 30	5.138	849.21	1767.64	2.77	872.54	872.54	
Section 5 to 30	5.138	369.62	1367.01	3.58	873.52	872.54	0.98
Section 5 to 30	5.218	889.03	1725.89	2.84	874.19	874.19	
Section 5 to 30	5.218	340.72	1275.21	3.84	875.15	874.19	0.96
Section 5 to 30	5.296	1025.52	1581.75	3.10	875.96	875.96	
Section 5 to 30	5.296	390.50	1280.62	3.83	876.84	875.96	0.88
Section 5 to 30	10.000	1058.96	1539.04	3.18	877.51	877.51	
Section 5 to 30	10.000	379.00	1098.15	4.46	878.32	877.51	0.80
Section 5 to 30	10.079	1224.37	2016.37	2.43	879.62	879.62	
Section 5 to 30	10.079	413.49	1341.71	3.65	880.59	879.62	0.97
Section 5 to 30	10.139	1185.25	1880.65	2.61	880.98	880.98	
Section 5 to 30	10.139	398.17	1231.79	3.98	881.92	880.98	0.94
Section 5 to 30	10.184	941.84	2165.94	3.11	882.23	882.23	
Section 5 to 30	10.184	365.60	1147.56	4.27	883.13	882.23	0.90
Section 5 to 30	10.215	841.19	1624.26	3.12	883.17	883.17	
Section 5 to 30	10.215	311.68	1060.44	4.62	884.02	883.17	0.85
Section 5 to 30	10.246	970.10	1703.54	3.00	884.02	884.02	
Section 5 to 30	10.246	364.05	1129.03	4.34	884.97	884.02	0.94
Section 5 to 30	10.289	997.51	1992.42	2.70	884.92	884.92	
Section 5 to 30	10.289	353.72	1287.51	3.81	885.91	884.92	0.99
Section 5 to 30	10.338	1125.79	1954.86	2.51	885.56	885.56	
Section 5 to 30	10.338	403.53	1358.32	3.61	886.54	885.56	0.97

HEC-RAS Plan: FP and FW River: T1SR5WS17 Reach: Section 5 to 30 (Continued)

Reach	River Sta	Top Wdth Act	Area	Vel Total	W.S. Elev	Base WS	Prof Delta WS
		(ft)	(sq ft)	(ft/s)	(ft)	(ft)	(ft)
Section 5 to 30	10.368	953.22	1606.14	3.05	886.09	886.09	
Section 5 to 30	10.368	363.16	1131.25	4.33	887.03	886.09	0.94
Section 5 to 30	10.409	933.93	1519.70	3.22	887.04	887.04	
Section 5 to 30	10.409	289.15	1030.41	4.76	887.98	887.04	0.94
Section 5 to 30	10.444	911.49	1854.56	2.64	887.76	887.76	
Section 5 to 30	10.444	379.65	1366.18	3.59	888.75	887.76	0.99
Section 5 to 30	20.000	919.42	1598.85	3.06	888.64	888.64	
Section 5 to 30	20.000	358.26	1126.68	4.35	889.54	888.64	0.90
Section 5 to 30	20.036	869.77	1934.16	2.37	889.30	889.30	
Section 5 to 30	20.036	469.34	1616.89	2.84	890.29	889.30	0.98
Section 5 to 30	20.060	535.91	825.15	5.56	889.64	889.64	
Section 5 to 30	20.060	304.42	771.76	5.95	890.49	889.64	0.85
Section 5 to 30	20.067	941.52	1833.22	2.50	890.81	890.81	
Section 5 to 30	20.067	374.23	1202.19	3.82	891.57	890.81	0.76
Section 5 to 30	20.126	977.30	1687.46	2.72	891.81	891.81	
Section 5 to 30	20.126	320.72	1154.85	3.97	892.73	891.81	0.92
Section 5 to 30	20.189	865.69	1497.29	3.07	893.10	893.10	
Section 5 to 30	20.189	294.85	1022.06	4.49	894.03	893.10	0.93
Section 5 to 30	20.245	933.04	1531.09	3.00	894.54	894.54	
Section 5 to 30	20.245	340.90	1143.44	4.01	895.51	894.54	0.97
Section 5 to 30	20.328	1023.35	1918.65	2.39	896.29	896.29	
Section 5 to 30	20.328	402.93	1415.38	3.24	897.26	896.29	0.97
Section 5 to 30	20.416	942.07	1452.26	3.16	898.25	898.25	
Section 5 to 30	20.416	296.54	1047.74	4.38	899.18	898.25	0.93
Section 5 to 30	20.481	984.22	1773.97	2.59	899.97	899.97	
Section 5 to 30	20.481	364.21	1308.62	3.51	900.96	899.97	0.99
Section 5 to 30	20.547	1082.25	1813.59	2.53	901.25	901.25	
Section 5 to 30	20.547	432.83	1337.41	3.43	902.21	901.25	0.96
Section 5 to 30	30.000	991.50	1665.67	2.76	902.98	902.98	
Section 5 to 30	30.000	334.74	1152.79	3.98	903.91	902.98	0.93

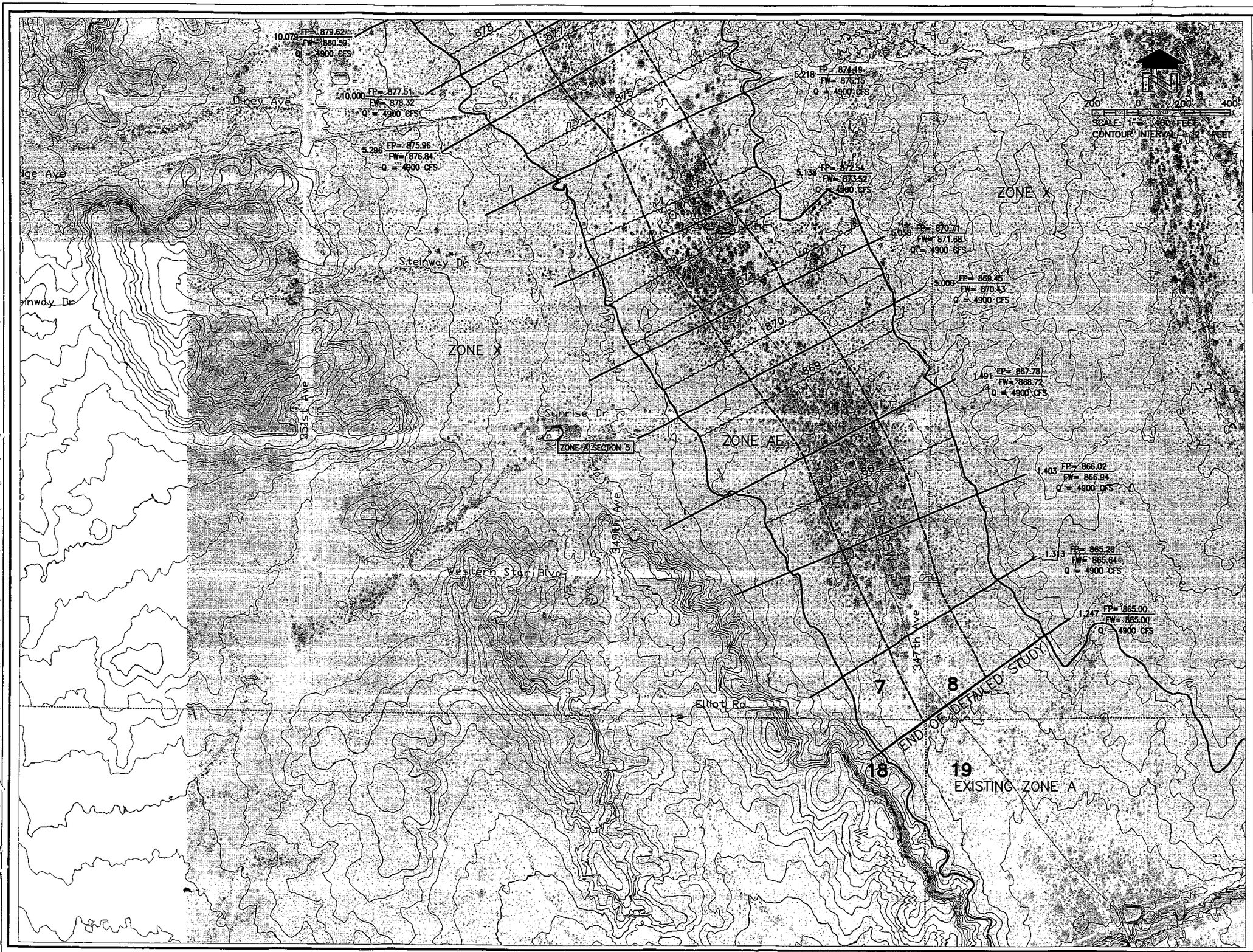
HEC-RAS Plan: FP and FW River: T1SR5WS17 Reach: Section 5 to 30

Reach	River Sta	W.S. Elev	Prof Delta WS	E.G. Elev	Top Wdth Act	Q Left	Q Channel	Q Right	Enc Sta L	Ch Sta L	Ch Sta R	Enc Sta R
		(ft)	(ft)	(ft)	(ft)	(cfs)	(cfs)	(cfs)	(ft)	(ft)	(ft)	(ft)
Section 5 to 30	1.247	865.00		865.03	886.12	1463.61	2144.17	1292.22		9809.50	10101.30	
Section 5 to 30	1.247	865.00	0.00	865.15	333.71	306.32	4265.31	328.38	9789.27	9809.50	10101.30	10122.98
Section 5 to 30	1.313	865.20		865.27	827.60	1560.69	2448.70	890.60		9838.60	10102.10	
Section 5 to 30	1.313	865.64	0.44	865.83	309.91	819.40	4080.60		9792.19	9838.60	10102.10	10102.10
Section 5 to 30	1.403	866.02		866.13	883.73	1324.98	2650.32	924.70		9822.10	10127.60	
Section 5 to 30	1.403	866.94	0.92	867.13	361.00	445.11	4129.82	325.07	9795.57	9822.10	10127.60	10156.57
Section 5 to 30	1.491	867.78		867.89	988.27	1217.88	2460.24	1221.88		9836.90	10145.30	
Section 5 to 30	1.491	868.72	0.94	868.94	364.94	314.68	4112.39	472.93	9817.71	9836.90	10145.30	10182.65
Section 5 to 30	5.000	869.45		869.56	1071.81	1668.55	1913.95	1317.50		9865.30	10144.40	
Section 5 to 30	5.000	870.43	0.99	870.65	397.08	988.68	3365.22	546.10	9786.65	9865.30	10144.40	10183.73
Section 5 to 30	5.058	870.71		870.84	1104.47	1090.11	2165.80	1644.08		9855.40	10122.60	
Section 5 to 30	5.058	871.68	0.97	871.94	357.19	505.46	3686.60	707.94	9820.98	9855.40	10122.60	10178.17
Section 5 to 30	5.138	872.54		872.66	849.21	718.29	2289.84	1691.77		9836.80	10122.50	
Section 5 to 30	5.138	873.52	0.98	873.72	369.62		3718.51	1181.49	9836.80	9836.80	10122.50	10206.42
Section 5 to 30	5.218	874.19		874.32	889.03	844.92	2129.42	1925.67		9856.30	10115.80	
Section 5 to 30	5.218	875.15	0.96	875.39	340.72		3466.17	1433.83	9856.30	9856.30	10115.80	10197.02
Section 5 to 30	5.296	875.96		876.12	1025.52	901.82	3159.20	838.98		9740.60	10131.10	
Section 5 to 30	5.296	876.84	0.88	877.07	390.50		4900.00		9740.60	9740.60	10131.10	10131.10
Section 5 to 30	10.000	877.51		877.68	1058.96	1140.05	2700.67	1059.28		9757.30	10136.30	
Section 5 to 30	10.000	878.32	0.80	878.63	379.00		4900.00		9757.30	9757.30	10136.30	10136.30
Section 5 to 30	10.079	879.62		879.72	1224.37	1162.29	1959.20	1778.52		9888.20	10156.20	
Section 5 to 30	10.079	880.59	0.97	880.80	413.49		3400.16	1499.84	9888.20	9888.20	10156.20	10301.69
Section 5 to 30	10.139	880.98		881.09	1185.25	1200.07	1550.75	2149.18		9852.40	10081.30	
Section 5 to 30	10.139	881.92	0.94	882.17	398.17	165.53	2848.93	1885.55	9834.54	9852.40	10081.30	10232.71
Section 5 to 30	10.184	882.23		882.40	941.84	258.18	2173.58	2468.24		9864.40	10083.00	
Section 5 to 30	10.184	883.13	0.90	883.42	365.60		3365.60	1534.40	9864.40	9864.40	10083.00	10230.00
Section 5 to 30	10.215	883.17		883.34	841.19	383.26	2245.84	2270.91		9874.20	10086.80	
Section 5 to 30	10.215	884.02	0.85	884.36	311.68		3685.07	1214.93	9874.20	9874.20	10086.80	10277.95
Section 5 to 30	10.246	884.02		884.17	970.10	878.66	2155.73	1865.61		9864.70	10116.50	
Section 5 to 30	10.246	884.97	0.94	885.26	364.05		3771.96	1128.04	9864.70	9864.70	10116.50	10228.75
Section 5 to 30	10.289	884.92		885.05	997.51	1164.88	2766.53	968.60		9824.30	10157.30	
Section 5 to 30	10.289	885.91	0.99	886.13	353.72	282.69	4617.31		9803.58	9824.30	10157.30	10157.30
Section 5 to 30	10.338	885.56		885.67	1125.79	2406.62	1846.99	646.39		9796.50	10073.10	
Section 5 to 30	10.338	886.54	0.97	886.74	403.53	1637.74	3262.27		9669.57	9796.50	10073.10	10073.10
Section 5 to 30	10.368	886.09		886.25	953.22	2908.46	1663.73	327.81		9799.40	10050.20	
Section 5 to 30	10.368	887.03	0.94	887.33	363.16	1757.72	3142.28		9687.04	9799.40	10050.20	10050.20
Section 5 to 30	10.409	887.04		887.23	933.93	2609.58	1850.55	439.87		9861.40	10042.80	
Section 5 to 30	10.409	887.98	0.94	888.33	289.15	1860.63	3039.37		9622.52	9861.40	10042.80	10042.80
Section 5 to 30	10.444	887.76		887.88	911.49	2644.26	1206.75	1048.99		9885.20	10049.20	
Section 5 to 30	10.444	888.75	0.99	888.95	379.65	2630.42	2021.87	247.71	9692.79	9885.20	10049.20	10072.44
Section 5 to 30	20.000	888.64		888.79	919.42	2608.23	1362.09	929.68		9878.70	10044.70	
Section 5 to 30	20.000	889.54	0.90	889.83	358.26	2481.30	2362.19	56.51	9692.68	9878.70	10044.70	10050.94
Section 5 to 30	20.036	889.30		889.39	869.77	1553.38	1538.56	1498.06		9889.40	10112.40	
Section 5 to 30	20.036	890.29	0.98	890.41	469.34	1385.14	2361.15	843.71	9709.00	9889.40	10112.40	10178.34
Section 5 to 30	20.060	889.64		890.16	535.91	2179.74	2137.02	273.23		9886.80	10044.40	
Section 5 to 30	20.060	890.49	0.85	891.08	304.42	1065.52	3041.03	483.45	9698.27	9886.80	10044.40	10113.00
Section 5 to 30	20.087	890.81		890.92	941.52	2032.83	1432.06	1125.11		9891.00	10048.30	
Section 5 to 30	20.087	891.57	0.76	891.81	374.23	1619.79	2375.99	594.22	9755.32	9891.00	10048.30	10129.55
Section 5 to 30	20.126	891.81		891.94	977.30	962.66	2243.39	1383.95		9881.80	10105.50	
Section 5 to 30	20.126	892.73	0.92	892.98	320.72	58.47	3561.10	970.43	9876.40	9881.80	10105.50	10197.12
Section 5 to 30	20.189	893.10		893.25	865.69	381.55	2266.16	1942.29		9886.30	10126.20	
Section 5 to 30	20.189	894.03	0.93	894.34	294.85		3803.97	786.03	9886.30	9886.30	10126.20	10181.15
Section 5 to 30	20.245	894.54		894.69	933.04	1177.31	1791.69	1621.00		9886.10	10138.20	
Section 5 to 30	20.245	895.51	0.97	895.78	340.90	45.10	3145.50	1399.40	9882.27	9886.10	10138.20	10223.17
Section 5 to 30	20.328	896.29		896.38	1023.35	1493.88	1740.71	1355.42		9850.10	10104.20	

HEC-RAS Plan: FP and FW River: T1SR5WS17 Reach: Section 5 to 30 (Continued)

Reach	River Sta	W.S. Elev	Prof Delta WS	E.G. Elev	Top Wdth Act	Q Left	Q Channel	Q Right	Enc Sta L	Ch Sta L	Ch Sta R	Enc Sta R
		(ft)	(ft)	(ft)	(ft)	(cfs)	(cfs)	(cfs)	(ft)	(ft)	(ft)	(ft)
Section 5 to 30	20.328	897.26	0.97	897.43	402.93	837.41	2873.50	879.09	9771.37	9850.10	10104.20	10174.30
Section 5 to 30	20.416	898.25		898.41	942.07	718.73	2443.58	1427.70		9832.70	10096.60	
Section 5 to 30	20.416	899.18	0.93	899.49	296.54		4062.13	527.87	9832.70	9832.70	10096.60	10129.24
Section 5 to 30	20.481	899.97		900.07	984.22	956.58	1799.08	1834.34		9859.20	10099.30	
Section 5 to 30	20.481	900.96	0.99	901.15	364.21		2946.02	1643.98	9859.20	9859.20	10099.30	10223.41
Section 5 to 30	20.547	901.25		901.35	1082.25	1664.20	1343.13	1582.67		9882.40	10116.30	
Section 5 to 30	20.547	902.21	0.96	902.40	432.83	841.30	2409.18	1339.52	9813.82	9882.40	10116.30	10246.65
Section 5 to 30	30.000	902.98		903.10	991.50	2196.33	1073.29	1320.38		9892.10	10038.10	
Section 5 to 30	30.000	903.91	0.93	904.17	334.74	1828.43	1778.88	982.70	9777.05	9892.10	10038.10	10111.79

APPENDIX G



FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

T1S–R5W–S17
SECTIONS 5 TO 30

FLOOD DELINEATION STUDY OF
FCD NO. 2000C013–TASK12

LEGEND

100–YR FLOODPLAIN BOUNDARY	
FLOODWAY BOUNDARY	
CROSS SECTION	0.10 FP= 1888.74 (FLOODPLAIN WATER SURFACE ELEVATION) FW= 1889.54 (ENCROACHED WATER SURFACE ELEVATION) Q = xxx CFS (100 YEAR DISCHARGE); CROSS SECTION DESIGNATION NUMBER
TEMPORARY BENCH MARK	TBM XXX
BASE FLOOD ELEVATIONS	1221
ZONE DESIGNATIONS	ZONE AE
SECTION LINE	
SECTION CORNER	6 5 / 7 8

TEMPORARY BENCH MARKS (TBM)

NOTE: ALL ELEVATIONS ARE BASED ON NORTH AMERICAN VERTICAL DATUM OF 1988.

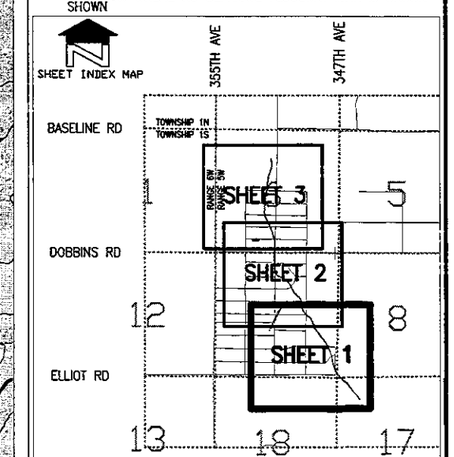
NGVD29 + 1.97 FEET = NAVD88

I.D. NUMBER	ELEVATION (FT)	DESCRIPTION/LOCATION
TBM #1 (See Sheet 2)	891.19	No.5 rebar exposed .40' at apparent NW corner corner of Lot 229, Block 506 of Phx Valley West, Unit One. N: 861307.67 E: 427326.50

NOTES

1– THE HYDRAULIC BASE LINE IS THE THALWEG AND IS SET AT STATION 10,000 UNLESS NOTED OTHERWISE.

2– FLOODPLAIN AND FLOODWAY SHARE A COMMON BOUNDARY WHERE NO SEPARATE FLOODWAY LINE IS SHOWN SHOWN



JE FULLER
HYDROLOGY & GEOMORPHOLOGY, INC.
6101 SOUTH RURAL RD, STE 110, TEMPE, AZ 85283 PHN: 480–752–2124, FAX: 480–839–2193

EXHIBIT 1

	BY	DATE
DESIGN	–	–
DESIGN CHK.	–	–
PLANS	–	–
PLANS CHK.	–	–

SHEET 1 OF 3

SEE FCD CONTRACT NO. 99–03 FOR SURVEY CONTROL AND AERIAL MAPPING DATA. BASE MAPPING FOR THIS MAP IS PER THAT STUDY

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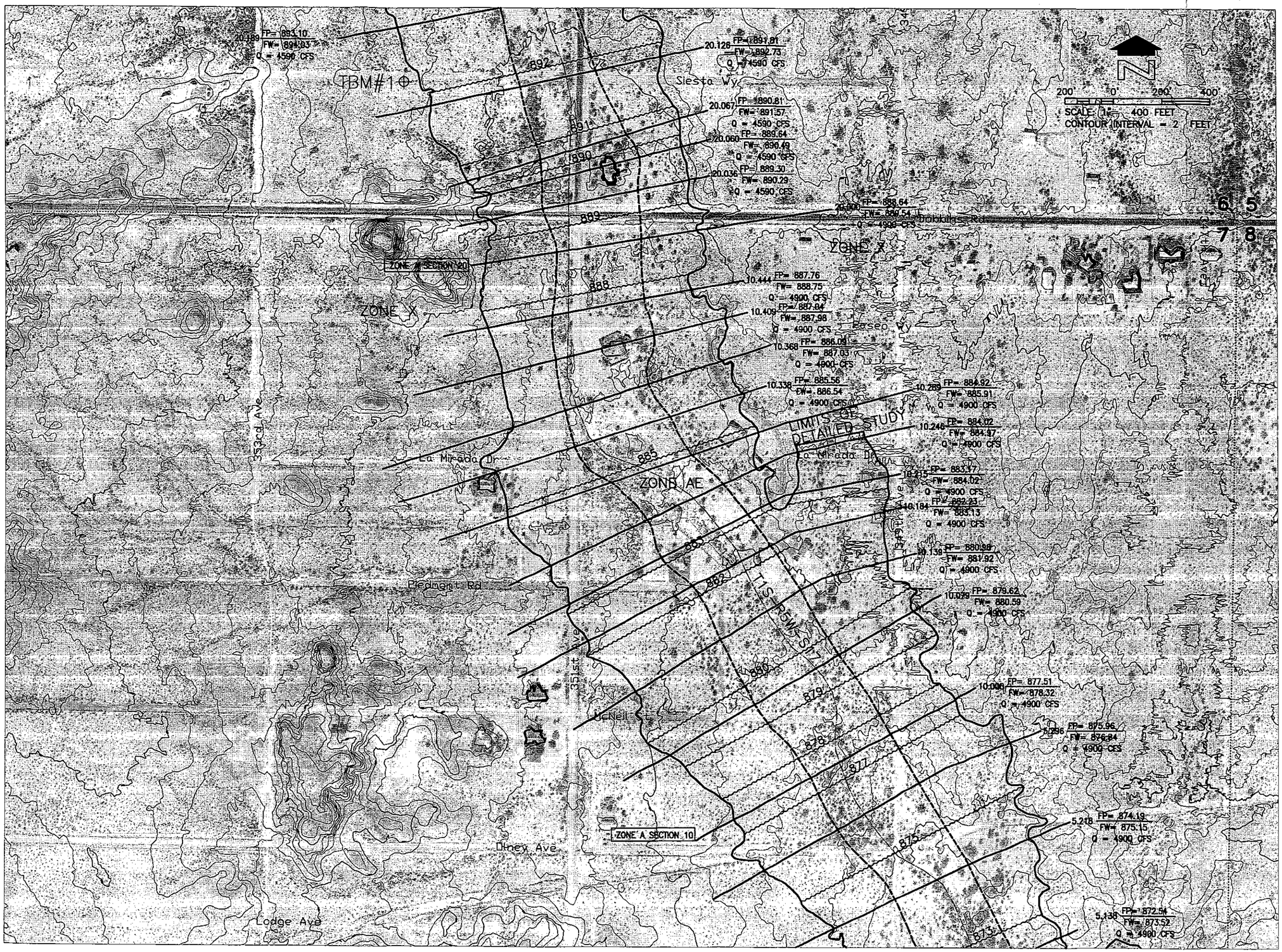


FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

T1S–R5W–S17
SECTIONS 5 TO 30

FLOOD DELINEATION STUDY OF
FCD NO. 2000C013–TASK12

LEGEND

100-YR FLOODPLAIN BOUNDARY	
FLOODWAY BOUNDARY	
CROSS SECTION	0.10 FP= 1888.74 (FLOODING WITH SURFACE ELEVATION); FW= 1889.54 (ENCROACHED WATER SURFACE ELEVATION); Q = xxx CFS (100 YEAR DISCHARGE); CROSS SECTION IDENTIFICATION NUMBER
TEMPORARY BENCH MARK	TBM XXX
BASE FLOOD ELEVATIONS	1221
ZONE DESIGNATIONS	ZONE AE
SECTION LINE	
SECTION CORNER	6 5 / 7 8

TEMPORARY BENCH MARKS (TBM)

NOTE: ALL ELEVATIONS ARE BASED ON NORTH AMERICAN VERTICAL DATUM OF 1988.

NGVD29 + 1.97 FEET = NAVD88

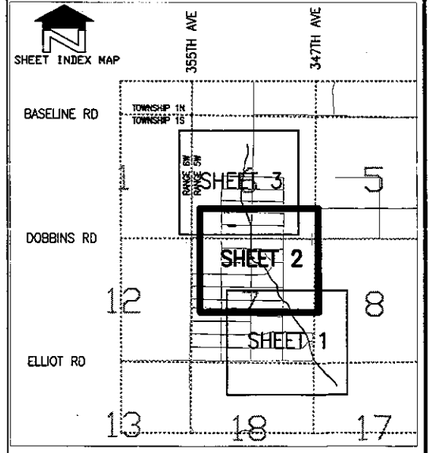
I.D. NUMBER	ELEVATION (FT)	DESCRIPTION/LOCATION
TBM #1	891.19	No.5 rebar exposed .40' at apparent NW corner corner of Lot 229, Block 506 of Phx Valley West, Unit One. N: 861307.67 E: 427326.50

NOTES

1– THE HYDRAULIC BASE LINE IS THE THALWEG AND IS SET AT STATION 10,000 UNLESS NOTED OTHERWISE.

2– FLOODPLAIN AND FLOODWAY SHARE A COMMON BOUNDARY WHERE NO SEPARATE FLOODWAY LINE IS SHOWN

SHEET INDEX MAP



JE FULLER
HYDROLOGY & GEOMORPHOLOGY, INC
6101 SOUTH RURAL RD, STE 110, TEMPE, AZ 85283 PHN: 480-752-2124, FAX: 480-839-2193

EXHIBIT 1

	BY	DATE
DESIGN	–	–
DESIGN CHK.	–	–
PLANS	–	–
PLANS CHK.	–	–

SHEET 2 OF 3

SEE FCD CONTRACT NO. 99-03 FOR SURVEY CONTROL AND AERIAL MAPPING DATA. BASE MAPPING FOR THIS MAP IS PER THAT STUDY

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FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

T1S–R5W–S17
SECTIONS 5 TO 30

FLOOD DELINEATION STUDY OF
FCD NO. 2000C013–TASK12

LEGEND

100–YR FLOODPLAIN BOUNDARY	
FLOODWAY BOUNDARY	
CROSS SECTION	0.10 FP= 1888.74 (FLOODPLAIN WATER SURFACE ELEVATION) FW= 1889.54 (ENCROACHED WATER SURFACE ELEVATION) Q = xxx CFS (100 YEAR DISCHARGE); CROSS SECTION IDENTIFICATION NUMBER
TEMPORARY BENCH MARK	TBM XXX
BASE FLOOD ELEVATIONS	1221
ZONE DESIGNATIONS	ZONE AE
SECTION LINE	
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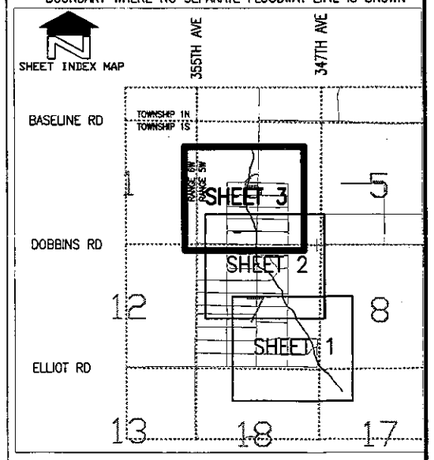

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SHEET 3 OF 3

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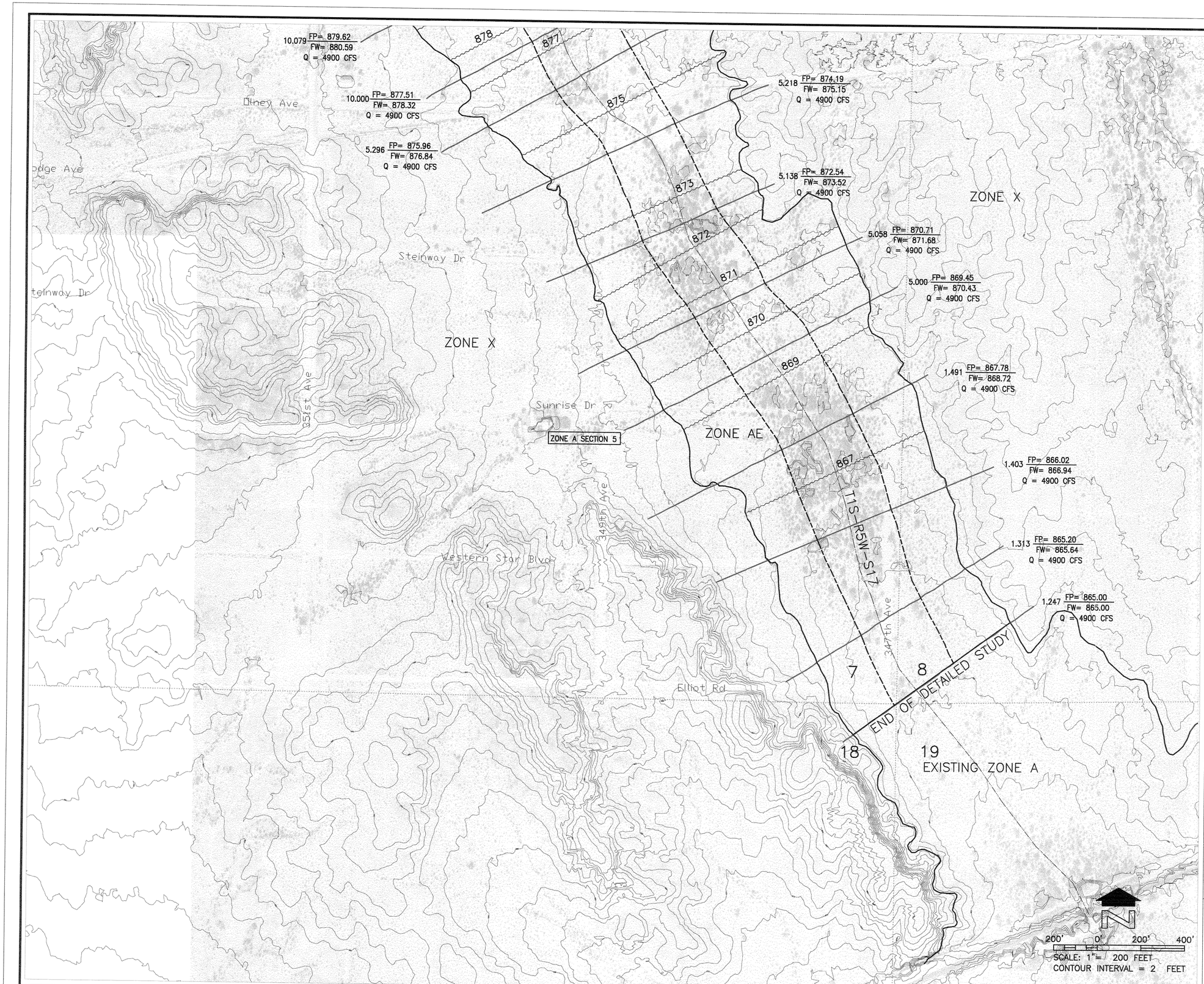

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

T1S–R5W–S17
SECTIONS 5 TO 30

FLOOD DELINEATION STUDY OF
FCD NO. 2000C013–TASK12

LEGEND

100–YR FLOODPLAIN BOUNDARY

FLOODWAY BOUNDARY

CROSS SECTION — 0.10 (CROSS SECTION IDENTIFICATION NUMBER) FP= 1888.74 (FLOODPLAIN WATER SURFACE ELEVATION) / FW= 1889.54 (ENCROACHED WATER SURFACE ELEVATION) Q = xxx CFS (100 YEAR DISCHARGE)

TEMPORARY BENCH MARK — TBM XXX

BASE FLOOD ELEVATIONS — 1221

ZONE DESIGNATIONS — ZONE AE

SECTION LINE

SECTION CORNER — 6 5 / 7 8

TEMPORARY BENCH MARKS (TBM)

NOTE: ALL ELEVATIONS ARE BASED ON NORTH AMERICAN VERTICAL DATUM OF 1988.
NGVD29 + 1.97 FEET = NAVD88

I.D. NUMBER	ELEVATION (FT)	DESCRIPTION/LOCATION
TBM #1 (See Sheet 2)	891.19	No.5 rebar exposed .40' at apparent NW corner corner of Lot 229, Block 506 of Phx Valley West, Unit One. N: 861307.67 E: 427326.50

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SHEET INDEX MAP

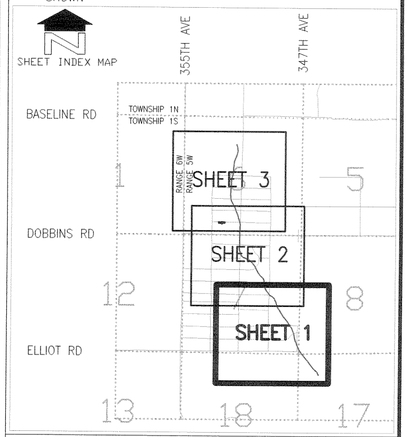

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PLATE 1

	BY	DATE
DESIGN	—	—
DESIGN CHK.	—	—
PLANS	—	—
PLANS CHK.	—	—

SHEET 1 OF 3

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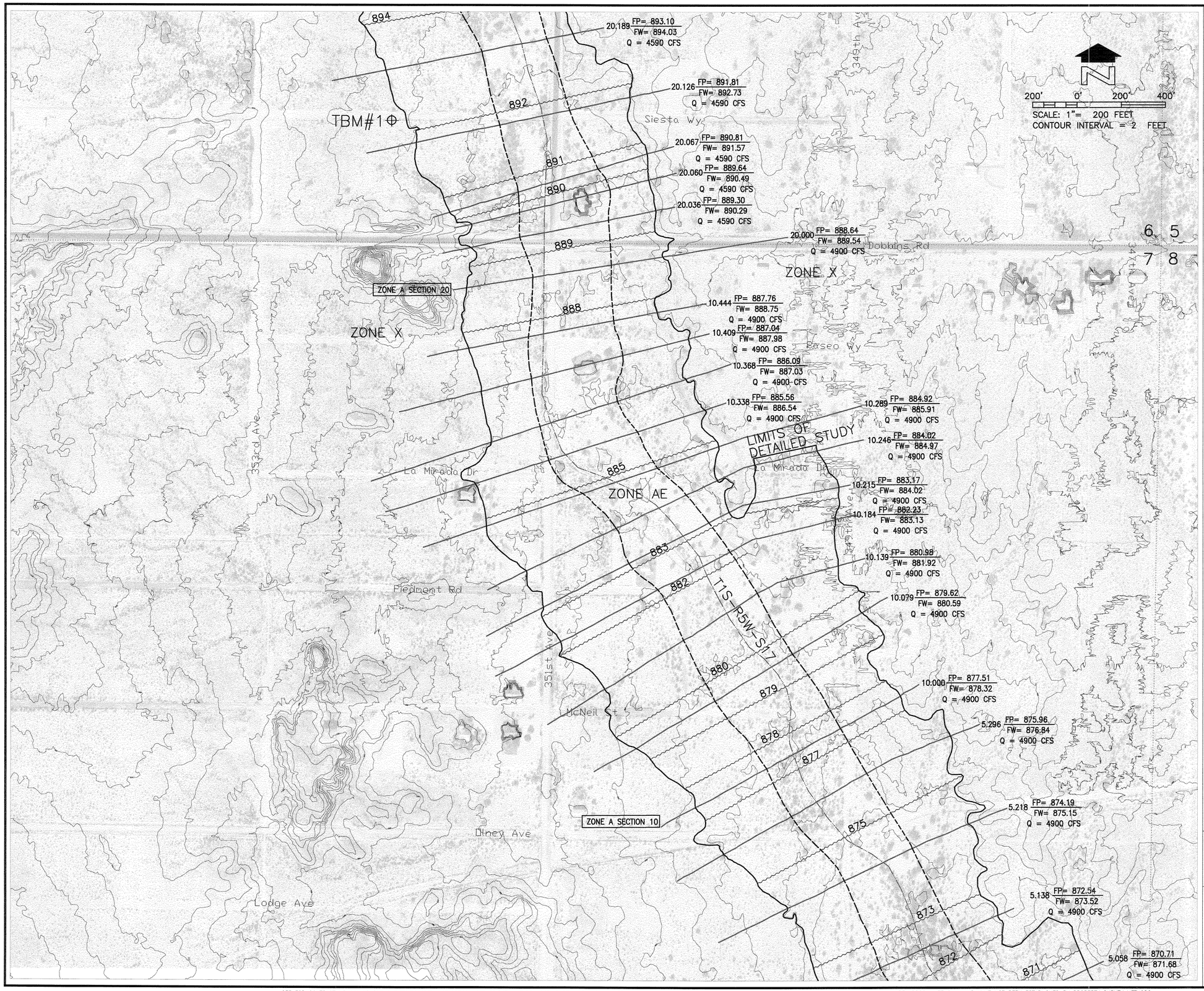

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

T1S–R5W–S17
SECTIONS 5 TO 30

FLOOD DELINEATION STUDY OF
FCD NO. 2000C013–TASK12

LEGEND

100–YR FLOODPLAIN BOUNDARY

FLOODWAY BOUNDARY

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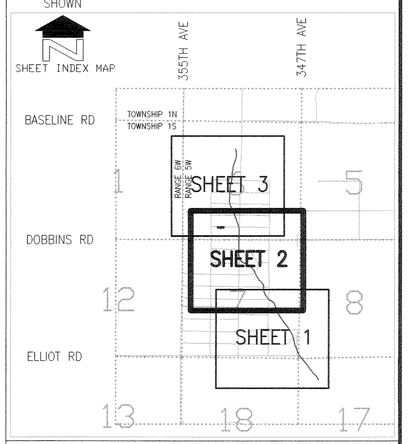

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PLATE 1

	BY	DATE
DESIGN	–	–
DESIGN CHK.	–	–
PLANS	–	–
PLANS CHK.	–	–

SHEET 2 OF 3

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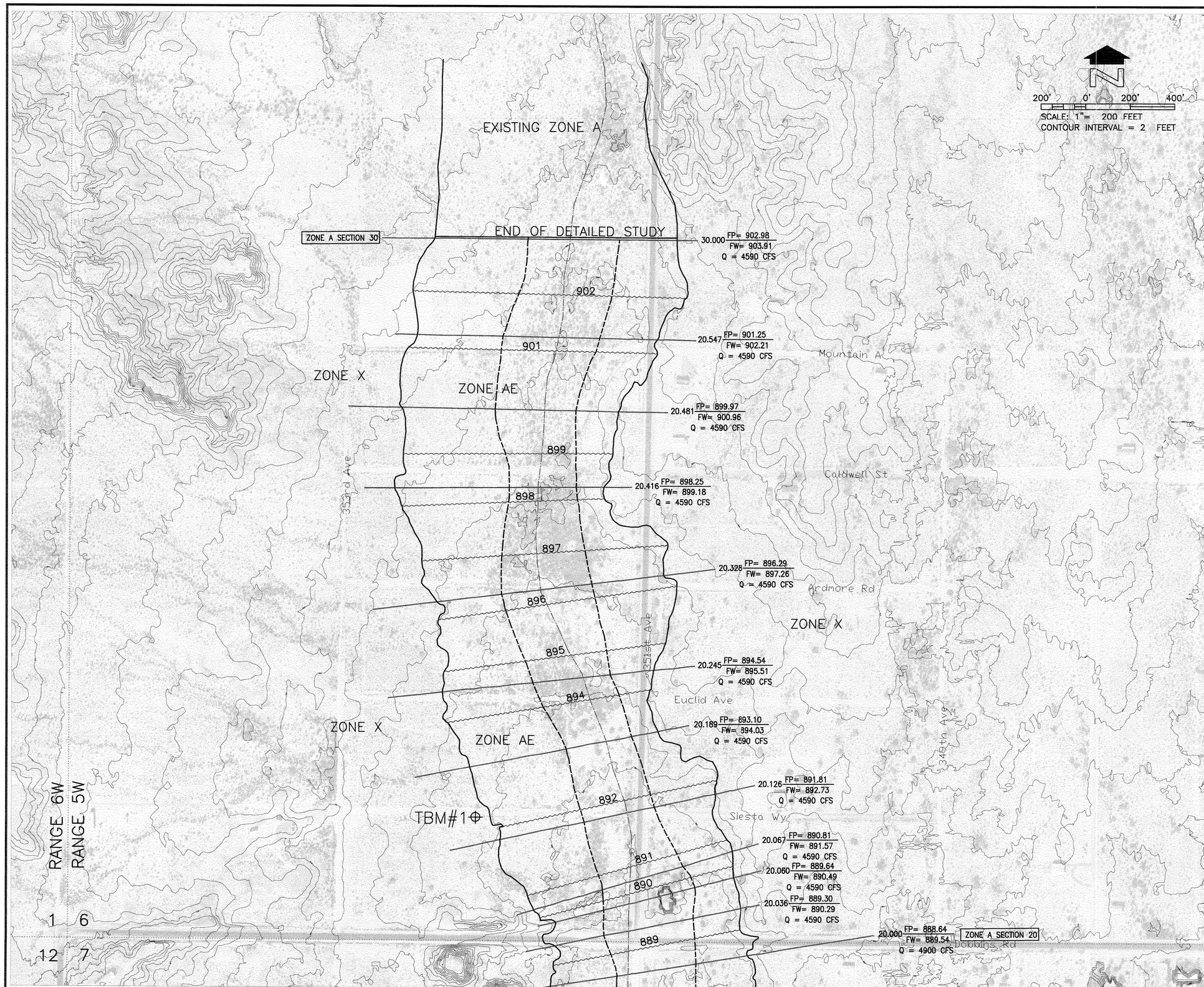

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

T1S–R5W–S17

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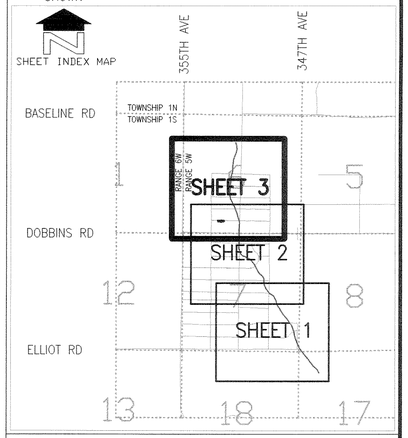

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APPENDIX I