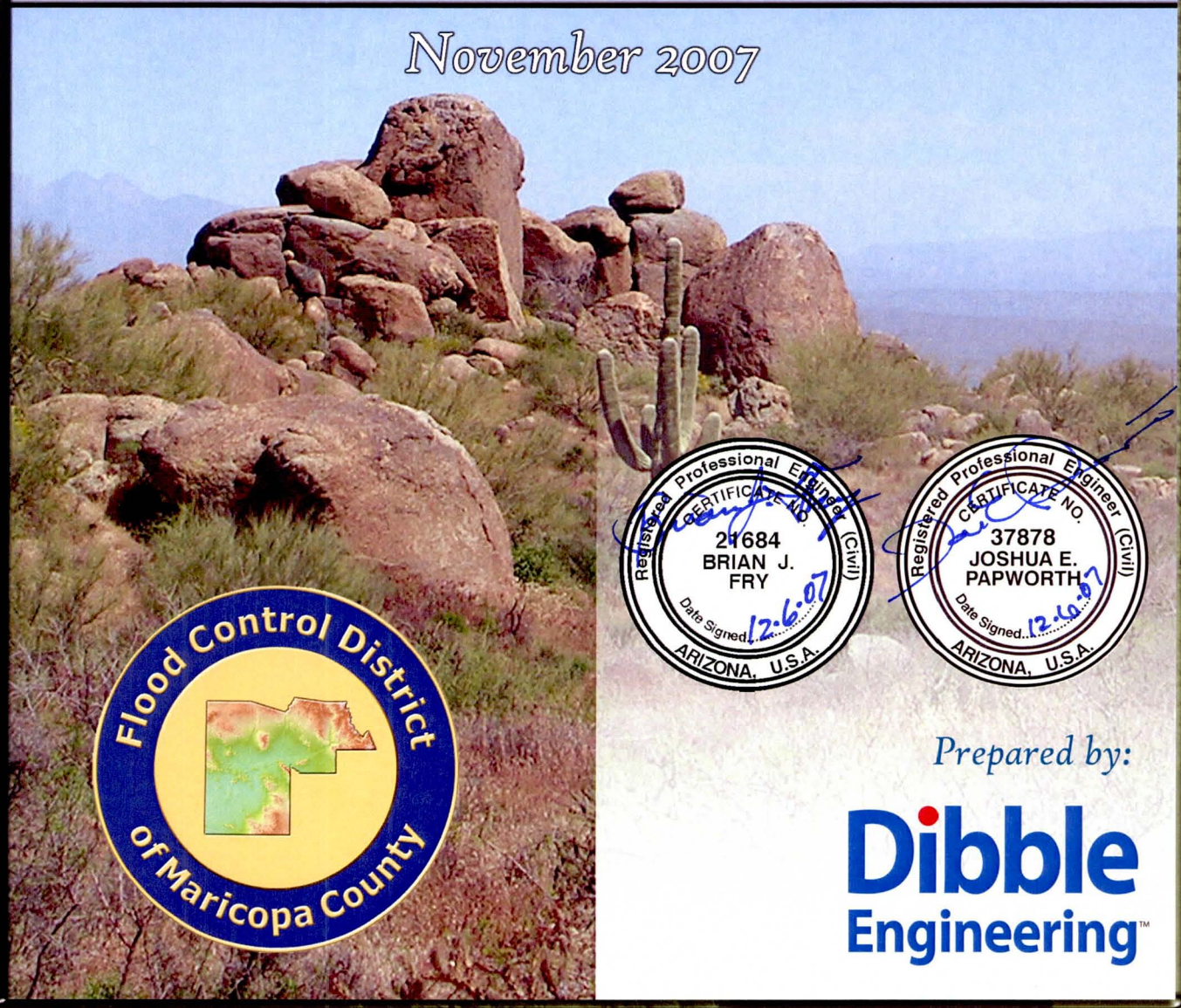
Rio Verde Area Drainage Master Plan
Floodplain Delineation
FCD 2001C056

Volume 5
1-Dimensional Hydraulics
Technical Data Notebook

November 2007



Prepared by:

Dibble Engineering™

RIO VERDE AREA DRAINAGE MASTER PLAN
FLOODPLAIN DELINEATION

FCD Contract No.: 2001C056

Volume 5
1-DIMENSIONAL HYDRAULICS
TECHNICAL DATA NOTEBOOK

November 2007

Prepared for:

FLOOD CONTROL DISTRICT
OF
MARICOPA COUNTY

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PHOENIX, AZ 85009

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FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
FLOODPLAIN DELINEATION OF THE RIO VERDE ADMP

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FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
FLOODPLAIN DELINEATION OF THE RIO VERDE ADMP

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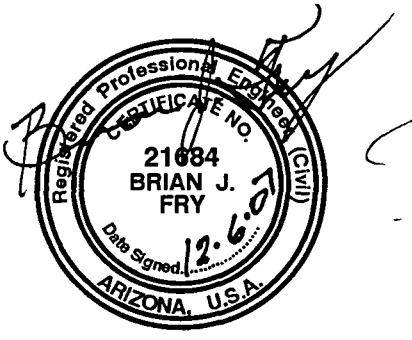
Floodplain Work Maps, 1 in. = 200 ft.



FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
FLOODPLAIN DELINEATION OF THE RIO VERDE ADMP

Section 1.0: Introduction

This volume of the Rio Verde ADMP Floodplain Delineation Final Report and Technical Data Notebook contains supporting documentation for 1-Dimensional floodplain hydraulic modeling. The location of documentation related to other areas of analysis included in this study can be found in the Master Volume. These areas include **Section 1.1 Purpose of Study, Section 1.2 Authority for Study, Section 1.3 Location of Study, Section 1.5 Coordination and Acknowledgments, Section 3.0 Survey and Mapping, Section 4.0 Hydrology**, and **Appendix A References.**

1.4 Summary of Methodology

Figure 1.4.2 provides 100-year floodplain alignments with wash names. The one-dimensional study area is the subject of this section of the floodplain delineation study.

Floodplain areas are delineated using the HEC-RAS Version 3.1.3 computer model. A geomorphologic study of the subject washes has been performed to supplement hydraulic modeling data. Starting water surface data is based on 2-dimensional study results (FLO-2D) or normal depth if there is no downstream study. Rainfall-runoff methodology (HEC-1) was utilized for the project hydrology, as explained in Section 4. Using HEC-RAS, water surface elevations are calculated for natural floodplains and the resulting floodplain is delineated.

1.6 Study Results

Base flood elevations are established by detailed methods for 31.9 miles of study washes. Full-size floodplain work maps are contained in the map pocket. Flood Insurance Rate Maps (FIRM's) have been annotated based on the results of the HEC-RAS modeling. HEC-RAS results are provided in **Appendix E.3**. HEC-RAS results suggest that many floodplains run at or near critical depth under peak flow conditions, consistent with the steep slope of the watershed. Many areas show signs of distributary flow patterns, making application of a one-dimension hydraulic model a challenge. Where flow patterns are quite complex, conservative measures are taken to delineate the floodplain boundaries.

The floodplain hydraulic analyses for this study are based on the existing condition of the subject washes and updated flow rates as described in this report. Water surface elevations would be affected by wash modifications or modifications to crossing roadways.

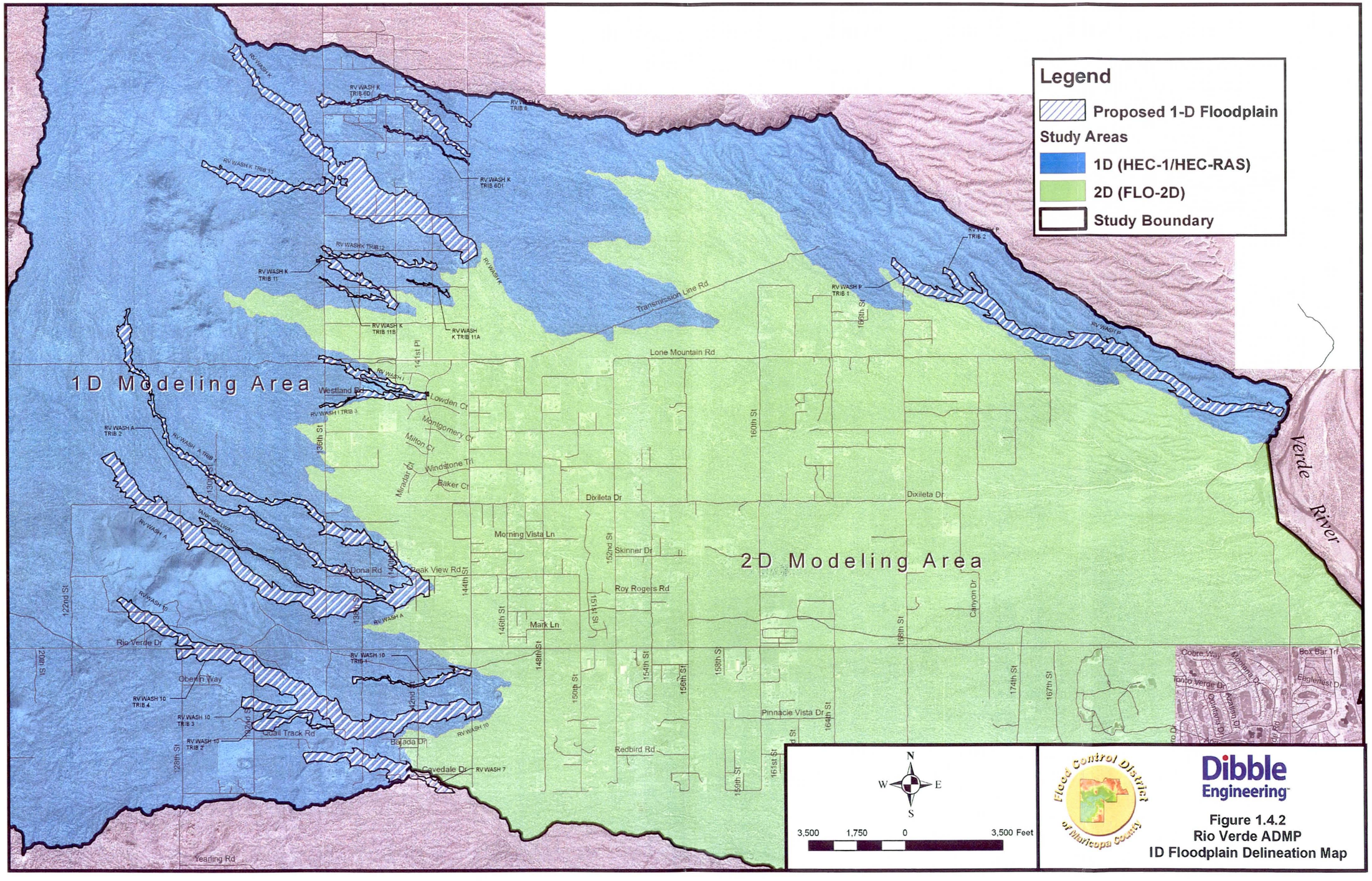


Figure 1.4.2
Rio Verde ADMP
ID Floodplain Delineation Map

Section 2.0: ADWR and FEMA Abstracts

FEMA MT-2 Forms can be found in Appendix H.1.

STUDY DOCUMENTATION ABSTRACT									
INITIAL STUDY	x	RESTUDY		LOMR		CLOMR		OTHER	

Section 2.1. Study Documentation Abstract for FEMA Submittals		
2.1.1	Date Study Accepted	
2.1.2	Study Contractor: Contacts Address Phone Internal Reference No. Subconsultants	Dibble & Associates Brian Fry, P.E. 7500 North Dreamy Draw, Suite 200 Phoenix, AZ 85020-4660 (602) 957-1155 Dibble Job No. 10-0203 Consultant Engineering, Inc. JE Fuller Hydrology & Geomorphology, Inc.
2.1.3	FEMA Technical Review Contractor Address Phone Internal Reference Number	**Pending**
2.1.4	FEMA Regional Reviewer Phone	**Pending**
2.1.5	State Technical Reviewer Phone	(ADWR nor ADEM no longer provide technical review)
2.1.6	Local Technical Reviewer Phone	Kathryn Gross, Senior Hydrologist Flood Control District of Maricopa County (602) 506-1501
2.1.7	Reach Description	a. RV Wash P Approximately 2.65 miles *FIRM Panels*: 04013C0870F,0413C0865F b. RV Wash P Trib 2 Approximately 0.38 miles *FIRM Panels*: 0413C0865F c. RV Wash P Trib 1 Approximately 0.96 miles *FIRM Panels*: 04013C0865F

		d. RV Wash K Trib 6 Approximately 0.61 miles *FIRM Panels*: 04013C0845F e. RV Wash K Trib 6D Approximately 1.24 miles *FIRM Panels*: 04013C0845F f. RV Wash K Trib 6D1 Approximately 0.79 miles *FIRM Panels*: 04013C0845F g. RV Wash K Approximately 2.36 miles *FIRM Panels*: 04013C0845F h. RV Wash K Trib 13 Approximately 1.94 miles *FIRM Panels*: 04013C0845F i. RV Wash K Trib 12 Approximately 0.89 miles *FIRM Panels*: 04013C0845F j. RV Wash K Split 4 Approximately 0.57 miles *FIRM Panels*: 04013C0845F k. RV Wash K Trib 11A Approximately 0.36 miles *FIRM Panels*: 04013C0845F l. RV Wash K Trib 11 Approximately 0.70 miles *FIRM Panels*: 04013C0845F m. RV Wash K Trib 11B Approximately 0.62 miles *FIRM Panels*: 04013C0845F n. RV Wash I Approximately 0.84 miles *FIRM Panels*: 04013C0845F

		o. RV Wash I Trib 3 Approximately 0.80 miles *FIRM Panels*: 04013C0845F p. RV Wash A Trib 1 Approximately 3.41 miles *FIRM Panels*: 04013C0845F, 04013C1260F q. RV Wash A Approximately 2.78 miles *FIRM Panels*: 04013C0845F, 04013C1260F r. RV Wash A Tank Spillway Approximately 1.46 miles *FIRM Panels*: 04013C0845F, 04013C1260F s. RV Wash A Trib 2 Approximately 1.92 miles *FIRM Panels*: 04013C0845F, 04013C1260F t. RV Wash 10 Trib 1 Approximately 0.92 miles *FIRM Panels*: 04013C1260F u. RV Wash 10 Trib 3 Approximately 0.62 miles *FIRM Panels*: 04013C1260F v. RV Wash 10 Trib 2 Approximately 0.844 miles *FIRM Panels*: 04013C1260F w. RV Wash 10 Trib 2 Split 1 Approximately 0.19 miles *FIRM Panels*: 04013C1260F x. RV Wash 10 Approximately 2.99 miles *FIRM Panels*: 04013C1260F y. RV Wash 10 Trib 4 Approximately 0.37 miles *FIRM Panels*:

		04013C1260F z. RV Wash 7 Approximately 1.01 miles *FIRM Panels*: 04013C1260F
2.1.8	USGS Quadrangle Sheets	Bartlett Dam, Arizona, 7.5 minute, 40' C.I. Photo Date: 1964 Wildcat Hill, Arizona, 7.5 min, 20' C.I. Photo Date: 1956 McDowell Peak, Arizona, 7.5 min, 20' C.I. Photo Date: 1965 Latest Photorevision Date: 1982
2.1.9	Unique Conditions and Problems	None.
2.1.10	Coordination of Discharges (Agency, Date, Comments)	Local agency approval – See 2.1.6 above

Study Documentation Abstract for Local Government and ADWR Submittals		
Section 2.1: General Information		
2.1.1	Community	City of Scottsdale, Arizona Maricopa County (Unincorporated), Arizona
2.1.2	Community Number(s)	#045012 (City of Scottsdale) #040037 (Unincorporated Maricopa County)
2.1.3	County	Maricopa
2.1.4	State	Arizona
2.1.5	Date Study Accepted	**Pending**
2.1.6	Study Contractor: Contacts Address Phone Internal Reference No. Subconsultants:	Dibble & Associates Brian Fry, P.E. 7500 North Dreamy Draw, Suite 200 Phoenix, AZ 85020-4660 (602) 957-1155 Dibble Job No. 10-0203 Consultant Engineering, Inc. JE Fuller Hydrology & Geomorphology, Inc.
2.1.7	State Technical Reviewer Phone	(ADWR nor ADEM no longer provide technical review)
2.1.8	Local Technical Reviewer Phone	Kathryn Gross, Senior Hydrologist Flood Control District of Maricopa County (602) 506-1501
2.1.9	River or Stream Name	RV Wash P, RV Wash P Trib 2, RV Wash P Trib 1, RV Wash K Trib 6, RV Wash K Trib 6D, RV Wash K Trib 6D1, RV Wash K, RV Wash K Trib 13, RV Wash K Trib 12, RV Wash K Split 4, RV Wash K Trib 11A, RV Wash K Trib 11, RV Wash K Trib 11B, RV Wash I, RV Wash I Trib 3, RV Wash 10, RV Wash A Trib 1, RV Wash A, RV Wash A Tank Spillway, RV Wash A Trib 2, RV Wash 10 Trib 1, RV Wash 10 Trib 2, RV Wash 10 Trib 3, RV Wash 10 Trib 2 Split 1, RV Wash 10 Trib 4, RV Wash 7
2.1.10	Reach Description	**Identical to 2.1.7 on Page 6.**
2.1.11	Study Type	100-Year Floodplain
Section 2.2: Mapping Information		
2.2.1	USGS Quadrangle Sheets	Bartlett Dam, Arizona, 7.5 minute, 40' C.I. Photo Date: 1964

		Wildcat Hill, Arizona, 7.5 min, 20' C.I. Photo Date: 1956 McDowell Peak, Arizona, 7.5 min, 20' C.I. Photo Date: 1965 Latest Photorevision Date: 1982
2.2.2	Mapping for Hydrologic Study 1. Type/Source: Scale: Date: 2. Type/Source: Scale: Date: 3. Type/Source: Scale: Date:	 City of Scottsdale Aerial Photography - (IGA #93-07): Mapper: Michael Baker Jr., Inc. Surveyor: Michael Baker Jr., Inc. 1" = 200', 2 ft. Contour interval December 22, 1993 (Flight Date) FCDMC Aerial Photography - Rio Verde North Extension Floodplain Delineation Study (FCD #98-21): Mapper: Cooper Aerial, Inc. Surveyor: David Evans & Assoc. 1" = 200', 2 ft. Contour interval December 4,1998 (Flight Date) January 11, 1999 (Flight Date) FCDMC Aerial Photography - Rio Verde Mapping (FCD #01-52): Mapper: Wilson & Company Surveyor: Wilson & Company 1" = 200', 2 ft. Contour interval April 5, 2002 (Flight Date)
2.2.3	Mapping for Hydraulic Study	**Identical to Section 2.2.2 above.**

Section 2.3: Hydrology		
2.3.1	Model or Method Used	U.S. Army Corps of Engineer's HEC-1 computer program (Version: 4.1, Release Date: July 1997) and the Drainage Design Management System for Windows (DDMSW) program (Version: 2.1.0, Release Date: September 9, 2002), a model development tool for HEC-1 developed for the Flood Control District of Maricopa County to automate the input of model parameters for various methodologies.
2.3.2	Storm Duration	24-Hour and 6-Hour
2.3.3	Hydrograph Type	S-graph
2.3.4	Frequencies Determined	100-Year
2.3.5	List of Gages Used in Frequency Analysis or Calibration	No stream gages in the study area.
2.3.6	Rainfall Amounts and Reference	North-North Basin: 4.65 in (24hr, 100yr); 3.48 (6hr, 100yr) North-South Basin: 4.63 in (24hr, 100yr); 3.48 (6hr, 100yr) South Basin: 4.58 in (24hr, 100yr); 3.44 (6hr, 100yr) NOAA Atlas II, Volume III, presented in Drainage Design Manual for Maricopa County, Volume I (1995)
2.3.7	Unique Conditions and Problems	None.
2.3.8	Coordination of Discharge Estimates	Peak flows reviewed by FCDMC.
Section 2.4: Hydraulics		
2.4.1	Model or Method Used	HEC-RAS Version 3.1.3 (May. 2004)
2.4.2	Regime	Subcritical
2.4.3	Frequencies for Which Flood Limits Computed	100-year
2.4.4	Method of Floodway Calculation	Not Applicable
2.4.5	Unique Conditions and Problems	None.

Section 5.0: Hydraulics

5.1 Method Description

Floodplain areas are delineated using the Hydrologic Engineering Center *HEC-RAS River Analysis System* computer model. Riverine flow, i.e. flow governed by backwater effects, controls the floodplain water surface elevations. HEC-RAS computes water surfaces based on the solution of the one-dimensional energy equation. Energy losses are evaluated by friction (Manning's equation) and contraction/expansion (coefficient multiplied by the change in velocity head).

Starting water surface elevations are obtained using normal depth computations at natural grade except where floodplains tie into downstream washes delineated using 2-dimensional modeling techniques.

Starting water surface elevations at 2-dimensional modeling tie -ins is obtained from output from FLO-2D modeling of the downstream floodplains. FLO-2D work is performed by FCDMC and documented in the companion volume *2-Dimensional Modeling Report & Technical Data Notebook.* The methodology for obtaining water surface elevations at the tie in point of each wash is as follows: 1-dimensional and 2-dimensional modeling techniques have an overlapping area on each wash-modeled with both methods; Dibble and FCDMC determined the best tie in point within each overlapping section considering similarity of results between the two models; a starting cross section was created at the selected point; an average water surface elevation was determined from the FLO-2D results at each grid point along the selected cross section; this water surface elevation is then used as the known water surface elevation for the subcritical flow regime calculations in HEC-RAS. The following is a list of known water surface elevations obtained from FLO-2D and used in the HEC-RAS floodplain delineations.

Table 5.1.1 1-D to 2-D Tie-In Water Surface Elevations

Flooding Source	River Mile Station	Starting WSE (FLO-2D Average)
RV Wash 10 Trib 1	0.288	2355.44
RV Wash 10	6.697	2344.66
RV Wash A	7.050	2410.20
RV Wash I	6.423	2456.11
RV Wash K Trib 11A	0.138	2456.90
RV Wash K Trib 11/11B	0.808	2503.35
RV Wash K Trib 12	0.324	2478.65
RV Wash K	6.384	2448.50

Where tributary washes join main-line washes HEC-RAS uses the energy equation to perform backwater computations across the junction for each contributing reach, using the water surface in the main-line as the starting water surface elevation.

5.2 Work Study Maps

Half size work study maps are contained in **Appendix H.3**. A full size set of work study maps are provided separately.

5.3 Parameter Estimation

5.3.1 Roughness Coefficients

Manning's roughness coefficients, or "n"-values, are determined using procedures adopted by the USGS. The following supporting materials are used in this analysis:

- Aerial Photographs: 2005 flight date; provided by FCDMC and used for workmap backgrounds.
- Ground Photographs: Color photographs taken during field reconnaissance trips.
- Field Data: Information gathered during field reconnaissance trips.

The Manning's "n"-value is affected by many factors including bed material, cross section irregularities, depth of flow, vegetation, channel alignment, channel shape, obstructions, suspended material and bed-load. The typical USGS procedure consists of selection of a base "n"-value and the addition of several adjustment factors to determine a total roughness coefficient for each channel sub-section (main channel and overbanks).

The base "n"-value accounts for roughness due to the bed material (Thomsen, 1991, Table 1). Where bank armor is utilized, the Arizona Department of Water Resources Manual for Engineering Analysis of Fluvial Systems provides an equation for calculating a "n"-value based on the size of bed material.

$$n_b = 0.0395 \times D_{50}^{(1/6)}$$

Where D_{50} = Diameter, in feet, in which 50% of the particles (by weight) are smaller.

This equation yields a base Manning's n-value of 0.035 for the bank armor sections. However, as stated above, the actual "n"-value is affected by many factors. Further refinements to the n-value are made based on, *Estimated Manning's Roughness Coefficients for Stream Channels and Flood Plains in Maricopa County, Arizona.* From this publication, it is found that the primary factors affecting the n-value are surface

irregularities, obstructions and vegetation with consideration also given for depth and meander. Based on the primary factors, the n-value is estimated from the equation;

$$n = (n_b + n_1 + n_2 + n_3) f_m$$

Where;

nb = base Manning's value for a straight uniform channel
n1 = value for surface irregularities
n2 = value for obstructions
n3 = value for vegetation
fm = factor for meander

Appendix E.1 contains a reproduction of the *Floodplain Delineation of the Rio Verde Area Drainage Master Plan Field Reconnaissance Report.* This report contains existing floodplain data for the Rio Verde ADMP obtained during field reconnaissance between October 2002 and April 2005. The "Roughness Value Map" included with the *Field Reconnaissance Report* in **Appendix E.1** shows the reach limits, the location of photographs, and the Manning's roughness values for a reach.

Roughness coefficients range from 0.035 to 0.065 for the channel area and from 0.045 to 0.085 for the overbank areas. The study washes drain a piedmont, at a longitudinal slope of around 2 to 3 %, draining to the Verde River. In general, the Upper Sonoran plant community covers the study area. The density of vegetation has significant impact on the roughness coefficient and has been considered in the n values. Vegetation within the floodplain has been identified to include the following:

- Brittle Bush
- Cactus – Barrel, Teddy Bear Cholla, Prickly Pear, Saguaro
- Catclaw
- Creosote Brush
- Desert Broom
- Mesquite
- Native Grasses
- Ocotillo
- Little Leaf Palo Verde Tree
- Jojoba
- Mormon Tea
- Brittle Bush
- Hackberry

For the most part, these desert washes do not contain much vegetation on the channel bottom. The left and right overbank stations are placed at the edge of the low flow channel. Low flow channels range from 6 inches to 18 inches in depth for the majority, with some washes incised 2 to 4 feet. The widths on the low flow channels vary from 4 feet to 18 feet or so. The overbank areas and sand/gravel deposit bars for braided washes are more heavily vegetated. The roughness coefficient values generally reflect this variation in roughness, although some of the channel bottom edges contain vegetation and other roughness factors, tending to drive up the channel bottom coefficients. The channel bed sediments are typically coarse sub-angular sands and angular gravels. Some cobbles were observed in a few of the study washes.

5.3.2 Expansion and Contraction Coefficients

Expansion coefficients are set at 0.3 while contraction coefficients are set at 0.1 to account for normal variations in the channel flow hydraulics. At the existing culvert on RV Wash I, the expansion coefficient is increased to 0.5 while the contraction coefficient is increased to 0.3.

5.4 Cross Section Description

HEC-RAS cross sections are generally spaced at 500-foot intervals, except where a more detailed modeling of the terrain is necessary or in the exceptional case of RV Wash 10 and Wash 10 Trib 1. This exception is discussed below. Generally, additional cross sections are added immediately upstream and downstream of roadways in order to accurately describe the limits of the roadway Manning's n value. Additional cross sections are added in areas requiring flow split analysis. Cross section data are obtained from the digital terrain model provided for each mapping product and extracted using Inroads design software. These are checked against the aerial photography, mapping contours, and field reconnaissance data to ensure uniformity.

The floodplain associated with RV Wash 10 and Wash 10 Trib 1 was delineated prior to this study as part of a private development entitled the "Scottsdale National." This study was performed by CMX, Inc. in 2001. The floodplain is re-delineated with this study using the Rio Verde ADMP project mapping and hydrology; however, cross section locations are identical to the original Scottsdale National delineation.

Cross section stationing is controlled (Station=10,000) at the approximate location of the wash bottom centerline. Longitudinal stationing is reported in miles. Starting river mile stations were provided by FCDMC.

At many flow combines analysis shows that floodplains commingle at cross sections upstream of the confluence of the individual wash thalwegs. At these locations the total combined flow of both washes is applied to the combined cross section of both

washes in both wash's HEC-RAS models. The higher resulting water surface from the two washes is delineated on the work maps. However, the cross section data on the work maps report the direct HEC-RAS output for each wash.

5.5 Modeling Considerations

5.5.1 Hydraulic Jump and Drop Analysis

No hydraulic jumps are modeled in the study area. No drop structures exist in the project area.

5.5.2 Bridges and Culverts

A single culvert exists within the study limits. This culvert is located at 142nd Street, River Mile Station 6.439 of RV Wash I, workmap sheet 20. It is a six barrel, 8' x 4' box culvert. This culvert contains the 100-year peak flow and is modeled within HEC-RAS using Federal Highway Administration (FHWA) standard equations from the publication *Hydraulic Design of Highway Culverts*.

5.5.3 Levees and Dikes

No levees or dikes are modeled in the study area. No levees or dikes exist in the areas mapped by detailed methods.

5.5.4 Islands and Flow Splits

One island is modeled within the study area. This occurs at RV Wash I-RM 6.898. Because this island is short and any split flow is recombined downstream, the water surfaces of the separated flow paths are assumed to be hydraulically connected, i.e. a flow split analysis is not performed at these locations and the water surface elevations on either side of the island at a given cross section are equal.

Flow splits occur throughout the study area. Computations at flow spits and lateral weirs are performed within HEC-RAS using an iterative solution called split flow optimization: the program will calculate a water surface profile based on the first assumed flows; from the computed profile, new flow rates are calculated and the profile is rerun; this continues until the assumed and calculated flows match within a given tolerance.

5.5.5 Ineffective Flow Areas

Ineffective flow is modeled throughout the study area. An area within a cross section is modeled as ineffective if the area does not contribute to flow conveyance. For the Rio Verde washes this occurs at sharp bends and constrictions. In general, 3:1 expansion boundaries are used to define ineffective flow immediately downstream of bends and constrictions; 1:1 contraction boundaries are used to define ineffective flow immediately upstream of constrictions.

5.5.6 Supercritical Flow

The Rio Verde 1-D watershed is relatively steep, resulting in most floodplains and floodways running at or near critical depth. HEC-RAS defaults to critical depth at many locations (the model is run in subcritical flow regime).

5.6 Floodway Modeling

Floodways are not modeled for this project.

5.7 Problems Encountered During the Study

5.7.1 Special Problems and Solutions

5.7.1.1 Shaded Zone X Floodplains

A Shaded Zone X label is also selected where there is a possibility that shallow sheet flooding may occur in an area of slightly raised ground adjacent to the Zone AE floodplain, despite that HEC-RAS shows these areas as dry. This occurs at the following locations: RV Wash 10 Trib 2 Split 1 on workmap sheet 16; and the island modeled on RV Wash I on workmap sheet 20.

5.7.1.2 Black Hills Tank

A large stock tank exists at RV Wash A, RM 8.893. It is an Arizona Department of Water Resources (ADWR) jurisdictional tank. This tank significantly affects the flow of water on RV Wash A, storing it and diverting it from the historic wash path by way of a spillway. The storage capacity of the tank and the discharge characteristics of the spillway are modeled into the hydrology of the project. After discussions with FCDMC it was decided that the floodplain workmaps will show both the case in which the tank is in place, and the case in which the tank may be breached in the future. Based on this, an additional HEC-1 model was developed for the case in which the tank is breached. The flow rates from these two models are then used in HEC-RAS to model the two cases. It should be kept clear that because the two resulting floodplains, along RV Wash A and along RV Wash A Tank Spillway, represent two mutually exclusive cases they will never occur at the same time. Additionally, RV Wash A Tank Spillway is an independent hydraulic model, using normal depth as its downstream boundary condition.

At the tank, RM 8.893, the model represents the case in which the tank is breached. However, the floodplain at cross section 8.893 is drawn to match the elevation of RM 1.378 of 7B Spill Wash as if the stock tank is in place-this is a more conservative floodplain boundary.

At the downstream end of RV Wash A Tank Spillway, the case that results in the widest floodplain is used to delineate the floodplain on the workmap. With the exception of Tank Spillway RM 0.098, RV Wash A (the breached case) governs the floodplain limits in this area.

Downstream of the geographical "confluence" of the two washes, the larger flow rate developed from the HEC-1 model in which the tank is breached is used for floodplain modeling. This is approximately 2090 cfs.

5.7.1.3 Lateral Weir at Rio Verde Drive

A roadway dip crossing exists along Rio Verde Drive where it crosses RV Wash 10 (see workmap sheet 17); however, because RV Wash 10 meets the roadway at a skew, some flow passes over the elevated portion of the roadway before reaching the lowest point of the dip. Additional flow generated in subbasin 511D traveling parallel to and just south of Rio Verde Drive is added to the floodplain on the south side of this dip crossing—this is RV Wash Trib 4. After discussing the area with FCDMC the following modeling methodology was used:

1) RV Wash 10 Trib 4 is modeled with the combined flow of the two watersheds and with cross sections that extend north over Rio Verde Drive. The area north of Rio Verde Drive is modeled as ineffective.
2) RV Wash 10 is modeled with only the flow of its contributing watershed (before combining with Trib 4 watershed (subbasin 511D)) and with a lateral weir along Rio Verde Drive. This weir extends from RM 9.176 to RM 8.826.
3) The wider of the floodplains from the two models is used for the floodplain boundary north of Rio Verde Drive; and RV Wash 10 Trib 4 will be used for the floodplain boundary south of Rio Verde Drive.

5.7.1.4 RV Wash K Split 4

Just east of 136th Street, along RV Wash K, the floodplain exhibits multidirectional flow characteristics combined with some distributary topography. This area presents a modeling challenge; a number of flow splits at lateral weirs in conjunction with field reconnaissance data are used to provide as accurate a delineation as possible. This area is on workmap sheet 6.

The first split occurs at RV Wash K RM 7.671. Approximately 1170cfs continues on RV Wash K, and approximately 750cfs splits off on to RV Wash K Split 4. On Split 4, just after the first split, the topography suggests that flow may split laterally to the east as

weir flow. A lateral weir is modeled between RM 0.497 and RM 0.443. Approximately 430cfs passes over this weir, rejoining RV Wash K.

A junction and flow split occur at the confluence of RV Wash K Trib 13 and RV Wash K Split 4. At this location the combined flow of the two washes is approximately 1770cfs. A split flow analysis then occurs at RM 0.865. Approximately 640cfs is directed to RV Wash K Trib 12, approximately 1130cfs is directed to RV Wash K Split 4.

The three parallel washes then enter an area of increased distributary topography; much of the area is shallow, parallel wash braids. While HEC-RAS shows in many places a dry area between the floodplains associated with each of these three washes, there are also signs of many potential split flow locations. These splits could carry water between and among the three main conveyances. Due to the uncertainty of flow characteristics through this area the entire area has been labeled as floodplain Zone AE. This is the area between RV Wash K RM 7.504 and RM 6.818.

5.7.2 Modeling Warning and Error Messages

Messages printed in the HEC-RAS output file include:

- Critical Depth
    - During standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
    - Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
    - Slope too steep for slope area to converge during supercritical flow calculations (normal depth is below critical depth.) Water surface set to critical depth.
- Velocity Head
    - The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
- Energy Equation
    - The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.
    - The energy loss was greater than 1.0 ft (0.3 m) between the current and previous cross section. This may indicate the need for additional cross sections.
- Conveyance Ratio
    - The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
- Manning's n Values

- Manning's n values were composited to a single value in the main channel.

These warning messages are typical of steep washes running at or near critical depth. Resulting water surfaces appear to be reasonable and consistent with field observation and standard methodology.

5.8 Calibration

No known water surface elevations, historical flood records, or previous detailed studies are available from which to calibrate the hydraulic models or 100-year floodplain limits

5.9 Final Results

5.9.1 Hydraulic Analysis Results

The HEC-RAS summary tables in **Appendix E.3** summarize the results of the hydraulic analyses modeled in the HEC-RAS computer program. The final water surface elevations are also reported on the floodplain delineation map.

5.9.2 Verification of Results

The input parameters for each HEC-RAS model were applied in a manner consistent with standard engineering practices for floodplain delineation studies. The floodplain results appear to be reasonable for flooding sources of this nature. There is no reason to doubt the accuracy or validity of the floodplains delineated in this study.

Section 7: Draft FIS Report Data

7.1 Summary of Discharges

The following table presents the 100-year peak flow at selected locations within the study area.

Table 7.1.1 Summary of Discharges

Flooding Source and Location	Drainage Area (Square Miles)	100-year Peak Flow (cfs)
RV Wash P at Verde River	2.10	1490
RV Wash P at Approximately 2900' East of SE CRNR SEC13	1.75	1440
RV Wash P at Confluence with RV Wash P Trib 1	1.14	1040
RV Wash P Trib 1 at 168th Street	0.56	510
RV Wash P Trib 2 at 172nd Street	0.42	510
RV Wash K at Approximately 1400' East of 144th Street	4.91	4190
RV Wash K at Confluence with RV Wash K Trib 12	4.13	3520
RV Wash K at Dove Valley Road	3.68	3300
RV Wash K at Approximately 300' South of Black Mtn. Road	2.05	1960
RV Wash K at Approximately 350' North of Black Mtn. Road	1.48	1530
RV Wash K Trib 11 at Confluence with Trib 11B	0.49	650
RV Wash K Trib 11 at 136th Street	0.16	330
RV Wash K Trib 11A	0.11	180
RV Wash K Trib 11B at Confluence with Trib 11	0.49	650
RV Wash K Trib 11B at 136th Street	0.16	310
RV Wash K Trib 12 at 136th Street	0.34	400
RV Wash K Trib 13 at 136th Street	1.08	1450
RV Wash K Trib 13 at Approximately 400' East of 128th Street	0.69	990
RV Wash K Trib 6 at 140th Street	0.10	150
RV Wash K Trib 6D at 140th Street	0.35	460
RV Wash K Trib 6D at Approximately 500' East of 136th Street	0.25	350
RV Wash K Trib 6D at 136th Street	0.13	210
RV Wash K Trib 6D1 at 140th Street	0.12	150
RV Wash I at Confluence with Trib3	0.81	1110
RV Wash I at Lone Mountain Road	0.32	600
RV Wash I at 136th Street	0.20	360
RV Wash I Trib 3 at Confluence with RV Wash I	0.81	1110
RV Wash I Trib 3 at 300' East of 136th Street	0.37	500
RV Wash I Trib 3 at 136th Street	0.28	430

Table 7.1.1 Summary of Discharges (continued)

Flooding Source and Location	Drainage Area (Square Miles)	100-year Peak Flow (cfs)
RV Wash A at Confluence with Trib 1	4.44	2820
RV Wash A at Confluence with Trib 2	3.02	2260
RV Wash A at 128th Street	1.91	2090
RV Wash A at 850' North of Dixileta Drive	1.26	1550
RV Wash A Tank Spillway	1.91	760
RV Wash A Trib 1 at Dixileta Drive	0.92	620
RV Wash A Trib 1 at Approximately 900' North of Lone Mtn. Road	0.49	790
RV Wash A Trib 2 at Confluence with RV Wash A	3.02	2260
RV Wash A Trib 2 at 136th Street	0.61	510
RV Wash A Trib 2 at 128th Street	0.37	400
RV Wash 10 at Approximately 700' East of 144th Street	4.93	3610
RV Wash 10 at 138th Street	3.76	3150
RV Wash 10 at 136th Street	3.57	2710
RV Wash 10 at Rio Verde Drive	2.00	1890
RV Wash 10 at 2300' Upstream of Rio Verde Drive	0.81	870
RV Wash 10 at 3500' Upstream of Rio Verde Drive	0.58	620
RV Wash 10 Trib 1 at 144th Street	0.86	980
RV Wash 10 Trib 1 at 138th Street	0.47	590
RV Wash 10 Trib 2 at 132nd Street	0.64	630
RV Wash 10 Trib 3 at 132nd Street	0.92	660
RV Wash 10 Trib 4 at 128th Street	0.77	820
RV Wash 7 at 400' West of 136th Street	0.55	670

7.2 Floodway Data

Floodways are not modeled for this project.

7.3 Annotated Flood Insurance Rate Map

Annotated effective FIRM's are contained in **Volume 6, 2-Dimensional Hydrology and Hydraulics Technical Data Notebook.** FEMA currently has the following effective FIRM panels for the study area: 04013C0870F, 04013C1260F.

7.4 Flood Profiles

Flood profiles are included in **Appendix H.2.**

Appendix B: General Documentation and Correspondence

- B.1 Special Problem Reports (none)
- B.2 Contact (telephone) Reports (none)
- B.3 Meeting Minutes or Reports
- B.4 General Correspondence
  - B.4.1 General
  - B.4.2 Copy of Public Notices
- B.5 Contract Documents (Scope of Work)

B.1 Special Problem Reports (none)

B.2 Contact (telephone) Reports (none)

B.3 Meeting Minutes or Reports

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MEETING NOTES

CIVIL ENGINEERING ■ Transportation ■ Airports ■ Drainage/Flood Control ■ Water Resources ■ Land Development ■ Surveying

Project: *RIO VERDE ADMP: Progress Meeting*
Venue: *FCDMC*
Date: *6 March 2006, 1:30 PM*
Present:

Felicia Terry, FCDMC
Tom Loomis, FCDMC
Kathryn Gross, FCDMC
Brian Fry, Dibble
Josh Papworth, Dibble
Carlos Carriaga, Dibble

The purpose of this meeting was to review the project status. The conclusions reached at the meeting are summarized as follows:

A. Brian provided a list of task items remaining in the project, which formed the agenda for the meeting.

B. Carlos gave an update on FLO-2D runs (Task 6.2). Phase B run is complete with improvement alternatives coded in. Carlos will report on the results—differences in downstream flow rates between model without improvements vs. with improvements. The run time was roughly 3x the run time without improvement alternatives. Carlos will check computer specs (clock speed, front side bus, etc.) and report back to Tom. Tom will look at the completed model as well.

C. Phase A FLO-2D run is underway (Task 6.2).

D. Other items remaining in Task 6.2:

- Conceptual Design of three (3) Alternatives
  - Conveyance Alternative
  - Detention Alternative
  - Regulatory Alternative
- Landscape Concepts for two (2) Alternatives
  - Conveyance Alternative
  - Detention Alternative
- ADMP Report

E. Task 7.0 Public Involvement. Public work group meetings are not scheduled.

F. Task 9.1 Drainage Guidelines. Felicia said that a meeting with P&D is scheduled on Wednesday, March 8 to discuss Rules of Development on a county wide basis. This may provide further direction on the development guidelines task for this project. The current draft drainage guidelines are the best available; however, Planning and Development lacks the mechanisms, legal and manpower, to enforce the guidelines. Dibble was directed to prepare the guidelines according to what we would want to have enforced by P&D if we could.

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G. Task 9.3 Floodplain Delineations. Josh reviewed the issue of new ERM's. FEMA no longer accepts elevation reference marks to be shown on DFIRM's due to their level of accuracy and instability. Felicia directed Dibble and CEI to go ahead with ERM placement using brass caps supplied by FCD. "Bluebook" standards are not necessary for the ERM's intended use. CEI should locate control used for the mapping and set ERM's based on these. CEI will use MAG standards for monument placement.

H. Tom Loomis expects there to be 4-6 elevation certificates in the 2-D area (Task 9.3). He will provide these locations once the floodway is finalized.

I. Kathryn gave a summary of Floodway review comments generated so far (Task 9.3). Josh will provide Kathryn missing floodway models ASAP. Kathryn will provide written review comments when completed.

J. Other items remaining in Task 9.3:
   Technical Data Notebook

K. White Paper- A draft white paper was reviewed and discussed which summarizes the conflicting issues of public protection vs. private property rights which have pulled at the project team throughout the project. The intent is to develop a concise statement of the issue as a basis for discussions with District management and County leadership in request of clarification and direction on how to respond to the issues within the context of this ADMP project. Brian will revise the document based on the discussions and forward a revised draft to Felicia. The next step will be to discuss the paper with Tim Murphy, Amir Motamedi, and Lynn Thomas.

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MEETING NOTES

CIVIL ENGINEERING ■ Transportation ■ Airports ■ Drainage/Flood Control ■ Water Resources ■ Land Development ■ Surveying

Project: *RIO VERDE ADMP: Coordination Meeting with City of Scottsdale*
Venue: *City of Scottsdale*
Date: *9 June 2005, 10:00 AM*
Present:

Felicia Terry, FCDMC
William Hass, COS
Bill Erickson, COS
Brian Fry, Dibble
Frank Brown, Dibble
Dan Frank, Dibble

The purpose of this meeting is to coordinate the ADMP with the City of Scottsdale. A record of attendance sheet is found at the end of these notes. The following discussions were made:

A. Review – Frank B. gave a brief overview of the results of the floodplain delineation within the City of Scottsdale (COS).

B. Black Hills Tank – Frank B. explained that since the Black Hills Tank is going to be breached, the modeling is being conducted both with and without the tank. Part of the tank is in the Sonoran Mountain Preserve and according to Bill E., the COS may just abandon the tank and not do anything to it.

C. Floodplain Delineation – Zone AE will be delineated everywhere except upstream and downstream of the Black Hills Tank. State Land and Preserve Land should be delineated as Zone A. W. Hass requested that preliminary results be sent to him ASAP so he can pass the information on to developers.

D. Rio Verde Drive Improvements – Improvements to Rio Verde Drive within the COS are not planned until 2012.

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MEETING NOTES

CIVIL ENGINEERING ■ Transportation ■ Airports ■ Drainage/Flood Control ■ Water Resources ■ Land Development ■ Surveying

Project: *RIO VERDE ADMP: Coordination Mtg with Maricopa County Planning & Development*
Venue: *Maricopa County Planning & Development*
Date: *8 June 2005, 3:00 PM*
Present:

Felicia Terry, FCDMC
Lynn Favour, MCP&D
Matt Holm, MCP&D
Peter Davidse, MCP&D
Bill Poppe, MCP&D
Jon O'Leary, MCP&D
Brian Fry, Dibble
Dan Frank, Dibble

The purpose of this meeting is to coordinate the ADMP with the Maricopa County Planning & Development Department. A record of attendance sheet is found at the end of these notes. The following discussions were made:

A. Review – Felicia T. gave a brief overview of the project and the current results from the the FLO-2D modeling. B. Fry gave an overview of the flooding issues caused by development.

B. Individual Lot Development – Lynn F. stated how much of a problem it is to control the drainage for the individual lot development because of the lot splitting.

C. Development Guidelines – Brian F. presented the draft development guidelines. Lynn F. expressed her concern that the guidelines are not enforceable and that there need to be something to regulate to. She also posed the question as to what happens when lots are "unbuildable"? Also, what if there is a conflict with the zoning ordinance? It was agreed that building pads should be elevated 18-inches above adjacent ground.

D. Walls – Building permits for walls are also an issue since the walls redirect flow and cause flooding problems.

E. Coordination with Board of Supervisors – It was the consensus of the group that a meeting should be held with the County Board of Supervisors to work out the zoning and drainage issues.

F. P&D review of Guidelines – P&D will review the presented guidelines and provide comments in two weeks. A meeting will be held to discuss the guidelines and gather comments from P&D.

G. One-Stop Shop – The One-Stop Shop holds monthly meetings to discuss development issues if there are enough items to discuss. The Rio Verde drainage issues may be a good agenda item for on of those meeting.

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MEETING NOTES

CIVIL ENGINEERING ■ Transportation ■ Airports ■ Drainage/Flood Control ■ Water Resources ■ Land Development ■ Surveying

Project: *RIO VERDE ADMP: Floodplain Strategy Meetings: Meeting No. 2*
Venue: *FCDMC McMicken Conference Room*
Date: *10 May 2005, 1:00 PM*
Present:

Felicia Terry, FCDMC
Tom Loomis, FCDMC
Kathryn Gross, FCDMC
Amir Motamedi, FCDMC
Lynn Thomas, FCDMC
Kenneth de Roulhac, FCDMC
Ted Lehman, JE Fuller
Brian Fry, Dibble
Frank Brown, Dibble

The purpose of Meeting No. 2 is to identify 1 to 3 viable floodplain management approaches, and to discuss the definition for Administrative Floodway. The meeting handouts and a record of attendance sheet are found at the end of these notes. The following discussions were made:

A. Review – Brian F. made some introductory and review comments. A slide presentation with spreadsheet was presented to the group, with edits made as agreed by the group.

B. Purpose Statement – The group agreed the meeting purpose is still valid: "To adopt an approach to establishing and managing floodplains in the Rio Verde ADMP study area".

C. Objectives – A list of objectives were reviewed, discussed and edited. They were previously weighted on a scale of one to five, with five being the most important. Added objectives are "Identify flood hazards to prevent flooding of homes" and "Implement FP Mgmt approach in a reasonable timeframe."

D. Issues and Constraints – Five new issues and constraints were added. They are items 13 through 17 in the enclosed Excel spreadsheet document.

E. Administrative Floodway – Lynn T. gave a presentation on Administrative Floodway, refer to the enclosed slides printout. Definitions were given for FEMA Regulatory Floodway and FCDMC Administrative Floodway. New insights were discussed concerning conventional floodways, such as the FEMA definition does not state the designated height or that equal conveyance encroachment is required. Agreement was made that the FEMA floodway definition of equal conveyance encroachment with one foot of rise will not work in the two-dimensional model area.

F. General discussion – The discussion progressed to floodplain management approaches. It was agreed that the following approach will be adopted.

- FEMA Floodplains will be delineated using Zone AE (except for west of 136th Street where Zone A is planned).
- The FLO-2D Model will be used in 2-D flow areas and HEC-RAS in 1-D flow areas.
- Floodways will be delineated using a conveyance approach. The exact approach is yet to be determined, however, it will not be the FEMA standard equal

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conveyance reduction approach. It is desirable for the selected approach to address both sediment and discharge continuity.

- Existing conditions hydrology will be used for floodplain delineations and floodway delineations.
- The standard FEMA floodway designation will initially be sought. If FEMA will not accept the non-standard floodway method, an administrative floodway will be delineated instead.
- The standard FEMA Letter of Map Revision (LOMR) process will be used to change floodplains that have already been processed through FEMA to the selected approach.
- Future LOMR's to the floodways would be required to follow the same conveyance approach adopted for the original delineation in order to get FCDMC concurrence.

G. Questions asked during the discussion (and answers shown if discussed):

1. Will the 2D model supersede the Rio Verde North extension Floodplain Delineation?
2. Could a BFE number appear below ground level? Yes, because the grid elevation is the average elevation for that particular grid.
3. Are there any other conveyance corridors in Maricopa County? Yes, but they are also an Administrative Floodway. If we use any designation other than those shown on a FIRM panel, an act of Congress is required.
4. What are the flood insurance requirements? The FCDMC rules promote the removal of flood insurance requirements, so this must be considered.
5. Can we determine which areas carry the majority of flows (as in 90% of the volume)? The 2D model can output the duration per depth.
6. How will stock tanks be handled? Not applicable to these meetings means it must be modeled as with and without stock tank for the worst-case scenario.
7. Will future conditions flow be determined?

H. Schedule – The next meeting will be scheduled after Tom L. has a chance to run a 2D model and prepare some graphics for discussion. It is anticipated that the Floodplain Strategy Meeting No. 3 will be the last meeting, culminating in a firm decision for the floodplain management approach and the delineation of floodways for submittal to FEMA.

I. Assignments for next meeting –

- Tom L. will prepare graphic displays from the FLO-2D model per the following list.

a. Sandy bottom washes within floodplain (Geomorphology Significant Flow Corridors, already in GIS)
b. 10-year discharge area (will require a new FLO-2D run)
c. Q100 > 50-cfs per grid
d. Velocity for Q100 > 5 fps
e. Threshold value of total Volume for 100-yr event (Who determines threshold volume??)
f. Floodplain based on meeting both a velocity threshold and depth threshold (Who determines thresholds?, 5 fps and 1 foot per items d & g?)
g. Depth for Q100 > 1 foot

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MEETING NOTES

CIVIL ENGINEERING ■ Transportation ■ Airports ■ Drainage/Flood Control ■ Water Resources ■ Land Development ■ Surveying

Project: *RIO VERDE ADMP: Floodplain Strategy Meetings: Meeting No. 1*
Venue: *FCDMC McMicken Conference Room*
Time: *1:00 PM*
Present:

Felicia Terry, FCDMC
Tom Loomis, FCDMC
Kathryn Gross, FCDMC
Amir Motamedi, FCDMC
Lynn Thomas, FCDMC
Kenneth de Roulhac, FCDMC
Ted Lehman, JE Fuller
Brian Fry, Dibble
Frank Brown, Dibble

The purpose of the floodplain strategy meetings is to strategize on the delineation of floodplains and floodways within the Rio Verde ADMP study area. This is a group decision-making process intended to guide the approach to managing the floodplains within the Rio Verde area. The approach should address the varied issues and hazards within the study area. It is paramount that decisions made at each meeting not be changed later (unless very important items were overlooked or become known) in order to conclude quickly. The purpose of Meeting No. 1 is Problem Definition. The meeting handouts and a record of attendance sheet are found at the end of these notes. The following discussions were made:

A. Introductions and Overview – after self-introductions, Felicia T. turned the meeting over to Brian F. who gave a brief overview of the floodplain strategy meetings. Each participant was asked for consistent attendance and active participation throughout the meeting process. Any assignments must be completed between meetings. The ground rules, group dynamics and general schedule were discussed. A slide presentation with spreadsheet was presented to the group, with edits made as agreed by the group.

B. Purpose Statement – "To adopt an approach to establishing and managing floodplains in the Rio Verde ADMP study area".

C. Phase 1 review – The Part 2 Report: the four Alternatives Formulation recommendations were reviewed, e.g., Drainage Guidelines, FEMA Floodplains & Floodways, Conveyance Corridors, and Flood & Erosion Hazard Mapping. The project is proceeding in Phase 2 & 3 with these recommendations. Each was discussed, with advantages and disadvantages noted. Shade structures are about the only structure allowed within a floodway. Depth and velocity criteria are needed for the two-dimensional flow areas. Words can be added to any FIRM panel, such as a conveyance corridor with no stated flow rate. The county's Planning and Development Division rules apply in areas outside of the mapped floodplain.

D. Objectives – A list of objectives were discussed and edited. They were weighted on a scale of one to five, with five being the most important. At a minimum, there must some path for sediment and runoff to make its way to the Verde River. The future condition must be considered. The FLO-2D model uses a 1 foot rise from the inside out (rather than outside in), which may not work for FEMA. The project could submit a 2D floodplain and floodway to FEMA, and revise it to an administrative floodway if FEMA balks.

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E. Issues and Constraints - A list of 12 Issues and constraints was developed. The issues and constraints do not bind us to do or not do something. The objectives, issues and constraints are shown on the enclosed document. The issues and constraints are numbered numerically and not ranked. The steep longitudinal slopes would be a large problem if AO Zones were designated.

F. Questions and Answers – 1. Does FCD have the same enforcement rights for administrative floodways? This type of floodway is only defined for alluvial fans, but regulations are forthcoming to allow the same enforcement authority. 2. Do substantial damage rules apply to administrative floodways? Yes. 3. Will houses be allowed on dry islands? This is not preferred, but there is great development pressure to do so. Public welfare and safety includes people crossing flooded areas to get to houses, automobiles, domestic animals on the dry island. 4. Could the homeowner stabilize the dry island? Yes, but conveyance must be maintained.

G. General discussion – Some District staff want no buildings of any type within floodways. Through FEMA, any floodway can be modified with channelization. FEMA will place an administrative floodway on the map without technical review.

H. Hazard Indices – The handout on Hazard Indices was discussed by Amir M. (refer to enclosed document). The conveyance corridor concept would allow elevated structures within the floodplain, while a traditional floodway delineation would preclude buildings (except for shade structures). A conveyance corridor does not address the hazard to people, only to structures. A 25-year no-build flow path could be identified.

I. Flood Danger for Houses – A chart (see enclosed) from USBR was presented, defining the danger zones for houses based on depth and velocity.

J. Schedule – The next meeting was tentatively scheduled for later in April, which has since been revised to May 10 from 1 to 5 PM in the McMicken Room. One topic will be a list of FEMA requirements for delineation, floodplain modifications and flood insurance associated with each zone. Evaluation ideas for floodplain and floodway/conveyance corridor concepts should be written down prior to the meeting. Wording for administrative floodways would help Lynn T.

K. Assignments for next meeting –
- Everyone will prepare a definition of an administrative floodway.
- Lynn T. will prepare a rules briefing concerning administrative floodways. She will define what criteria FEMA will accept for floodway criteria, and define the revision process.
- Everyone: Review and update Issues and Constraints list.
- Everyone: Identify potential approaches to floodplain management and list the pros and cons of each.
- Everyone: Write down evaluation ideas for floodplain and floodway/conveyance corridor concepts.

Floodplain Strategy Meetings

Rio Verde ADMP
Meeting Process

MEETING NO. 1 — *PROBLEM DEFINITION*

1 Introductions
2 Review meeting process, ground rules, and schedule
3 Develop group **PURPOSE STATEMENT** for meetings **(Group)**
4 Review ***PART 2 - Alternatives Formulation*** report recommendations
5 Identify **OBJECTIVES** for measurement of approaches **(Group)**
    Assign weighting factors
6 Brainstorm project **ISSUES & CONSTRAINTS** impacting FP Mgmt **(Group)**
7 Review key FEMA regulations, procedures, requirements, FH Zones **(FCDMC)**
8 Use of Administrative vs. FEMA Floodways
9 Meeting No. 2: 1:00-3:00PM, Tuesday April 26, 2005

Assignment for Mtg No 2:

A. Review and update Issues & Constraints list
B. Identify potential approaches to FP Mgmt
    List pros and cons of each
C. Prepare & distribute meeting minutes
D.

MEETING NO. 2 — *ALTERNATIVE IDENTIFICATION & SCREENING*

1 Review Purpose and Objectives
2 Review and update Issues and Constraints list
3 Identify potential alternative approaches to FP Mgmt
    List pros and cons
    Initial screening - Does it meet the objectives??
4 Alternative Screening
    Assign scores based on objectives / expand with weighting factors
    Select top 2 or 3 "most promising" alternatives for further evaluation

Assignment for Mtg No 3:

A. Preliminary analysis of impacts from screened alternatives
B. Prepare & distribute meeting minutes
C. Other items resulting from discussion??

MEETING NO. 3 — *ALTERNATIVE SELECTION*

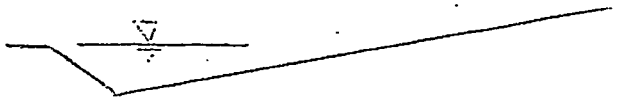
1 Report results of preliminary analysis
2 Select Preferred Approach
    Obvious choice? ==> We're done
    Otherwise, Re-assign scores based on objectives and analysis results
    Or, vote??
3 Review selected alternative
    Does it meet the objectives??
    Any fatal flaws??
4 Identify next steps for implementation
A. Prepare & distribute meeting minutes
B.
C.

	Objectives:		Issues & Constraints:
5	Identify flood hazards	1	FEMA approval/revisions of FLO-2D model results for floodplains
5	Hazards show up on FEMA maps	2	Shallow, extensive floodplains
3	Enforce ***realistic*** hazard limits	3	How to designate reasonable floodway limits (how & why)
3	Clarify & expedite District permitting process (for District and customer)	4	Complexity of flow paths
3	Minimize cumulative adverse impacts of area wide development.	5	Availability of FLO-2D modeling tools/expertise in engineering community
2	Include erosion hazards directly or indirectly	6	Regulation of non-standard floodways
2	Prevent ***future*** adverse impacts - future vs exist conditions analysis	7	Drainage (P&D) vs floodplain (FCD) regulation authority
5	Preserve natural and beneficial functions of the floodplain (e.g., conveyance, watershed storage, sediment & discharge continuity)	8	Steep longitudinal slopes (high sediment transport rates, elevation changes across a structure)
4	Prevent irresponsible development	9	Lot splits (hard to regulate)
3	Results to be technically defensible with sound methodology and documentation	10	Existing FEMA delineations
		11	Stock tanks
		12	Future roads & emergency access (culverts & road grading, potential flow diversions)
6	Consistent review by P&D - enforce Development Guidelines		

Hazard Indices

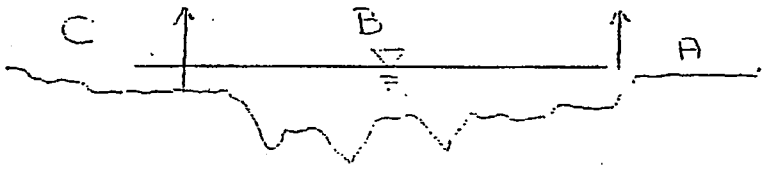
14 April 2005

1/2



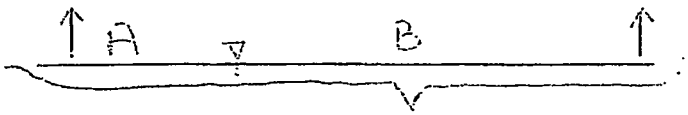
8-10 ft/sec, 2" deep

Road x-section, Fountain hills



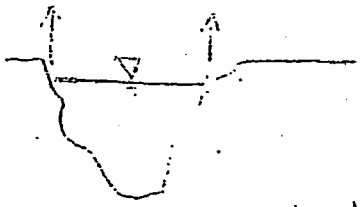
Zone A = 2 ft/sec, 1' deep
Zone B = 5-10 ft/sec, 8-10'
Zone C = 2-3 ft/sec, 3' deep

Gila River



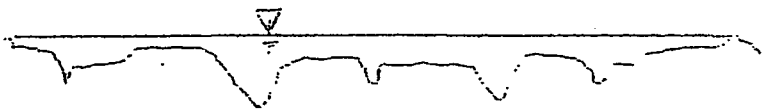
Zone A = 2 ft/sec, 2' deep
Zone B = 4 ft/sec, 4' deep

Luke wash



10-12 ft/sec, 7' deep

wash in Wickenburg



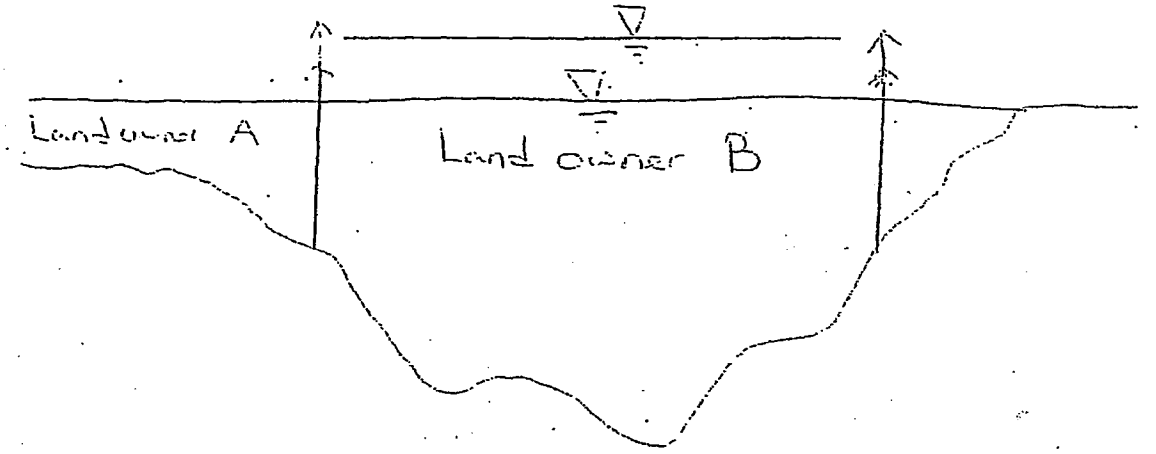
5-10 ft/sec, 6"-2' deep

Rio Verde

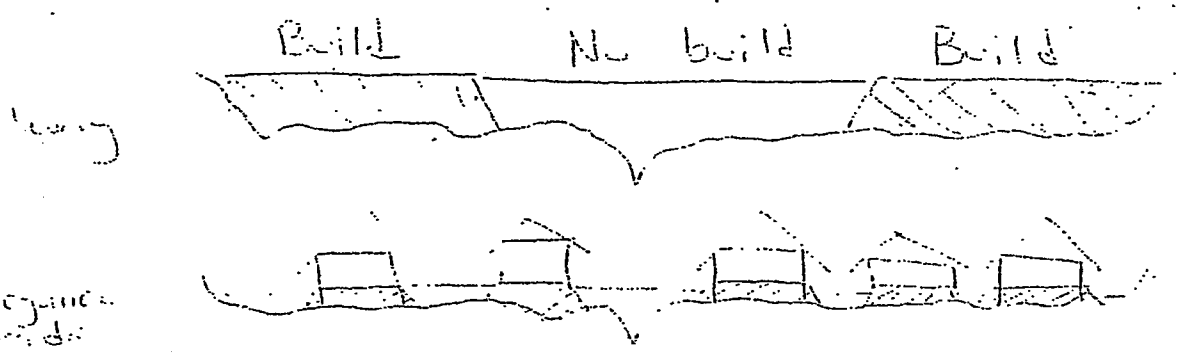
Floodway Concept

Hazard → Engineered Solution
if none, do not build
regardless of location

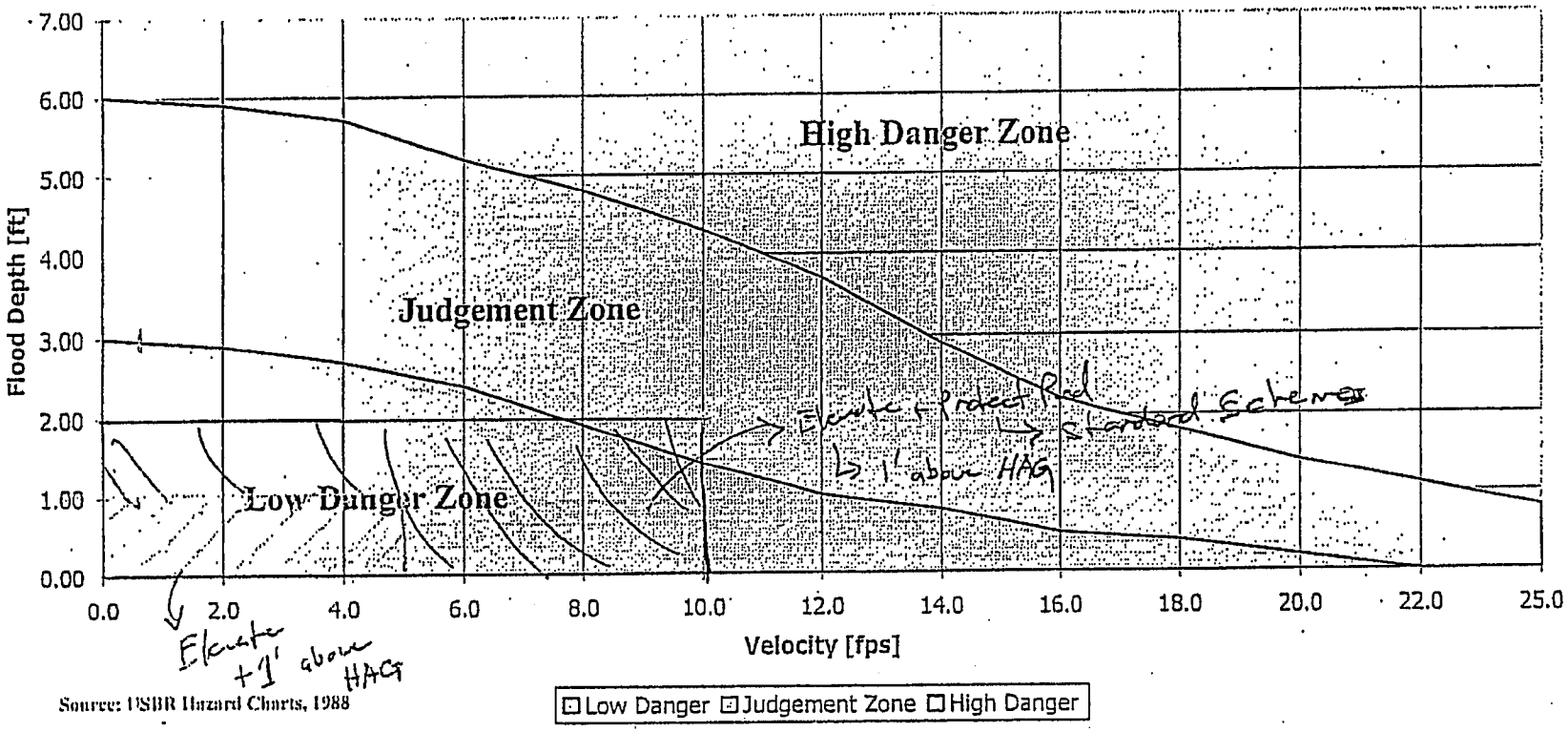
Floodway → Management tool
minimum area needed
for conveyance



Floodway concept. Take water from owner A,
put it into Land owner B's Land: i.e. adverse impact



Flood Danger for Houses



Source: USBR Hazard Charts, 1988

1 of 1

RIO VERDE ADMP

FLOODPLAIN STRATEGY MTG. 1
APRIL 14, 2005

SOME THOUGHTS ON GROUP DYNAMICS

1. We are a team and are collectively responsible to fully participate and work through the process and reach a conclusion. We're in this together!
2. We certainly won't all get the outcome that we individually desire, but hopefully we can all support the group decision.
3. These are challenging issues with no easy or perfect answers. We must avoid endless "logic loops" and as much as possible stick to a logical decision sequence

MEETING PROCESS

MEETING 1 – PROBLEM DEFINITION

1. Develop group PURPOSE STATEMENT for meetings
2. Review PART 2 - Alternatives Formulation report recommendations
3. Identify OBJECTIVES for measurement of approaches
   - Assign weighting factors
4. Brainstorm project ISSUES & CONSTRAINTS impacting Floodplain Management
5. Review key FEMA regulations, procedures, requirements, and flood hazard zones
6. Use of Administrative vs. FEMA Floodways
7. Assignment
8. Meeting No. 2: 1:00-3:00PM, Tuesday April 26, 2005

MTG 2–ALTERNATIVE IDENTIFICATION

1. Review Purpose and Objectives
2. Review and update Issues and Constraints
3. Identify potential alternative approaches to FP management
   - List pros and cons
4. Alternative Screening
5. Assignment
6. Schedule Meeting No. 3

MEETING PURPOSE STATEMENT

MTG 3 – ALTERNATIVE SELECTION

1. Report results of preliminary analysis
2. Select preferred approach
3. Review selected alternative
   - Does it meet the objectives?
   - Any fatal flaws?
4. Identify next steps for implementation

REGULATORY ALTERNATIVES REVIEW

PART 2 – Alternatives Formulation

Four Management Approaches:

- No-Action
- Structural Conveyance
- Structural Detention
- Regulatory

R-1 Drainage Guidelines

Advantages

- The guidelines would promote good development practice.
- The cost of implementing the guidelines would be borne by development. The only cost to taxpayers would be the cost of enforcement.

Potential Regulatory Alternatives

- R-1 Drainage Guidelines
- R-2 FEMA Floodplains & Floodways
- R-3 Conveyance Corridors
- R-4 Flood & Erosion Hazard Mapping

R-1 Drainage Guidelines

Disadvantages

- Enforcement has been difficult in the past. Additional inspectors may be required to ensure that the guidelines are adhered to.
- The guidelines would need to be adopted by the County Board of Supervisors to be enforceable.

R-2 FEMA Floodplains & Floodways

Advantages

- Other than gaining acceptance of the FLO-2D modeling, the process for enforcement is standardized and well established. County staff, engineers, and residents will be able to anticipate the development requirements.
- Construction of structures within floodways is not allowed. This tool would provide a stronger protection for critical flow corridors.

R-3 Conveyance Corridors

Advantages

- Factors other than flow depth, such as erosion or lateral migration potential could be included in developing the corridors.

Disadvantages

- Conveyance corridors are not consistent with standard FEMA methods. The force of the floodplain regulation and nationwide standardization of FEMA floodplains could result in difficulty in enforcement and public acceptance.

R-2 FEMA Floodplains & Floodways

Disadvantages

- To meet the FEMA criteria for the 1-percent flooded area, an excessively large portion of the watershed may need to be designated as floodplain, which could overstate the actual hazard and impose costly requirements on the resident community with minimal actual benefit.
- Some lots will be unsuitable for residential structures
- There is less flexibility for District staff to accommodate special situations within floodways

R-4 Flood & Erosion Hazard Mapping

Advantages

- The criteria and approach could be customized to address the specific hazard conditions within the Rio Verde area.
- Could allow areas with shallow flooding to be excluded from the hazard area.

R-4 Flood & Erosion Hazard Mapping

Disadvantages

- The methodology may not be applicable outside the Rio Verde area.
- A non-standard approach would cost more to develop and to maintain.
- This type of mapping is not consistent with standard FEMA methods. The force of the floodplain regulation and nationwide standardization of FEMA floodplains could result in difficulty in enforcement and public acceptance

OBJECTIVES

Screened Regulatory Alternative

- 1-D Area: FEMA floodplains / floodways.
- 2-D Area: Administrative floodways based on a relationship of depth & velocity.
- No Floodplain Area: Drainage Guidelines.

ISSUES & CONSTRAINTS

FEMA REQUIREMENTS & FLOOD HAZARD ZONES

ASSIGNMENT FOR MEETING 2

- ☐ Review Issues & Constraints List
- ☐ Identify potential approaches to floodplain management
- ☐ List pros and cons of each.

ADMINISTRATIVE VS. FEMA FLOODWAYS

Floodplain Strategy Meeting No. 1

14 April 2005, Thursday, McMicken Room

	Name	email initials	Representing
1	Amir Motamedi	AMM	Flood Control, Reg.
2	Tom Loomis	TRL	FCD, Engineering
3	Lynn Thomas	LMT	FCDMC
4	Kenneth de Routhing	KGD	FCDMC
5	Kathryn Gross	KAG	FCDMC
6	Ted Lehman		JEF
7	Felicia Terry	FET	
8	Brian Fry		
9	Frank Brown		Dibble

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MEETING NOTES

CIVIL ENGINEERING ■ Transportation ■ Airports ■ Drainage/Flood Control ■ Water Resources ■ Land Development ■ Surveying

Project: *RIO VERDE ADMP*
Venue: *FCDMC Alert Conference Room*
Date: *March 30, 2005*
Time: *9:00 AM*
Present:

Felicia Terry, FCDMC
Tom Loomis, FCDMC
Kathryn Gross, FCDMC
Theresa Pinto, FCDMC
Doug Hauth, FCDMC
Ted Lehman, JE Fuller
Brian Fry, Dibble
Carlos Carriaga, Dibble
Frank Brown, Dibble
Dan Frank, Dibble
Diane McCloskey, McCloskey Peltz

The purpose of the meeting was to serve as the phase-2 and phase-3 kick-off meeting. The following decisions were made:

A. Overview – Felicia gave a brief overview of the project to date. She also pointed out that we need to further evaluate a structural alternative. This would include a good cost and a schematic exhibit showing the channel alignments, cross-section data, and approximate ROW requirements.

B. Planning & Development Coordination – Coordination with Planning and Zoning will be required to further develop the drainage guidelines with the goal to make them enforceable. Floodplains would be easier for FCDMC to enforce. Currently, there are 30+ permit reviews per week from the Rio Verde area. Getting the floodplains done is the top priority. The FCDMC is advertising that they are doing a floodplain study in the Rio Verde area.

C. Survey – The survey work for the study is underway by CEI and is being directed by Frank Brown. Frank stated that the control has been set and the culverts are being surveyed. It is important to get Tom Loomis the survey data as soon as possible with the exhibits to follow at a later date.

D. Hydrology – Carlos will check the date of the model printout to ensure it matches the digital model. Also, the model should be revised to remove the Black Hills Tank since the City of Scottsdale intends to breach the tank. Dibble will also include isopluvials in the TDN.

E. Hydraulics – The new topo has been incorporated into both FLO-2D models by the District including a total of 1700 structures (walls and houses). The new models also incorporated the new aerial photo and updated RTIMP's to reflect new asphalt. The new modeling is done with the Black Hills tank being ineffective. All tanks will be removed in the future runs. The FCDMC is currently using the results of the model to check against building permit requests. We should keep the wash names as they are for now and plan to meet with the City of Scottsdale to discuss the floodplain zones that we have currently delineated.

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For the FLO-2D modeling, we will perform two iterations

F. Guidelines – Coordination will be required with MCDOT and the Rio Verde Horseman's Association (RVHA). The RVHA doesn't want dip crossings but MCDOT requires them for sight distance purposes. Dibble will set up a meeting with Dick Wallace at MCDOT to coordinate.

G. Public Meeting – A public meeting will be held at some point in the future. It will be in the format of an "open-house".

H. Schedule – Brian presented the project schedule. The schedule shows the project being completed in January. The District will evaluate their scheduled reviews to see if the schedule can be shortened such that the project is completed before the end of the year.

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MEETING NOTES

CIVIL ENGINEERING ■ Transportation ■ Airports ■ Drainage/Flood Control ■ Water Resources ■ Land Development ■ Surveying

Project: *RIO VERDE ADMP*
Venue: *FCDMC Engineering Conference Room*
Date: *August 25, 2003*
Time: *2:00 PM*
Present:

Felicia Terry, FCDMC	*Brian Fry, DIBBLE*
Tom Loomis, FCDMC	*Carlos Carriaga, DIBBLE*
John Hathaway, FCDMC	*Frank Brown, DIBBLE*
Kathryn Gross, FCDMC	*Ted Lehman, JE FULLER*

The purpose of the meeting was to discuss the approach and assumptions for modeling the "most probable future scenario" which would be expected to occur if no changes are made to existing development practices or regulations. This will be the baseline "do-nothing" alternative and will be the basis of comparison for any recommended plan including development guidelines or structural measures. The following items were discussed:

(1) Excluded areas – Areas that will be assumed to remain in their current natural state and will not be altered by future development.

a. Scottsdale McDowell Sonoran Preserve lands.
b. Tonto National Forest lands.
c. McDowell Mountain Regional Park lands.

Felicia indicated that we should confirm with Scottsdale that the McDowell Sonoran Preserve lands are still expected to be acquired from the Arizona State Land Department (ASLD).

(2) Hydrology Parameters – The following hydrology parameters were reviewed to determine required changes to model the future conditions:

a. Rainfall – no change
b. Losses – assume future development occurs at 1-acre per lot for the entire developable area. Dibble to recommend Green-Ampt parameters for "do-nothing" scenario and for conditions if the proposed development guidelines are followed.
c. S-graph – Adjustment of basin Kn value
d. Channel routing – no change

(3) Sediment Impacts Analysis – Various approaches were discussed to identify and present the sediment impacts and associated risks resulting from the anticipated future development. Ted will review and make recommendations for critical sediment variables that can be used to create GIS coverages showing high risk areas.

(4) Next Steps

a. Develop preliminary future conditions modeling parameters for the "do-nothing" and "with guidelines" scenarios.

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b. Schedule a future meeting to finalize the modeling parameters prior to proceeding with the modeling.

(5) Action Items:

a. Felicia.

i. Provide a JPG file showing the Scottsdale McDowell Sonoran Preserve boundary.

ii. Set-up a meeting with ASLD to confirm the status of preserve lands.

b. Tom.

i. Provide phase A ArcView FLO-2D results coverages to Ted.

ii. Provide sample FLO-2D data output file to Carlos.

iii. Meet with Carlos to review land feature results on a photo basis.

c. Ted

i. Prepare a memo describing and recommending erosion impacts variables.

ii. Coordinate with Carlos to develop recommended Green-Ampt parameters for future conditions.

d. Carlos

i. Develop Green-Ampt parameters for future conditions with assistance from Ted and Tom.

ii. Review the Skunk Creek Attachment 3 for assistance in Green-Ampt parameter assessment.

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CIVIL ENGINEERING ■ Transportation ■ Airports ■ Drainage/Flood Control ■ Water Resources ■ Land Development ■ Surveying

MEETING NOTES

Project:	*RIO VERDE ADMP*
Venue:	*Conference Room No. 2, Dibble & Associates Office*
Date:	*April 25, 2003*
Time:	*Starting Time: 9:30 AM*
Present:	*Kathryn Gross, FCDMC* *Carlos Carriaga, DIBBLE*

The purpose of the meeting was to address the review comments presented by FCDMC on the hydrologic models developed for the three watersheds: north-north, north-south, and south watersheds.

North-North Watershed:

A response prepared by DIBBLE submitted to FCDMC on April 3, 2003 regarding the review comments for the north-north watershed was used in the meeting discussions.

(1) Under Item A(2), plots of the sub-basins noted to have problems were presented during the meeting to justify the lengths used for the flow-paths and Lca's.

(2) For Items A(3) & A(4), the resolution of the soil parameters is dependent on the missing soils map that will be provided by FCDMC.

(3) For Item A(5), it is agreed to use soil code 61 instead of 121 after verifying the soils map.

(4) For Item A(6), a re-evaluation of the rock outcrop percentages associated with soil unit 63 should be done through visual examination of the aerial photographs. See attached "SUPPLEMENTARY DATA" sheet [Item A.1] for the re-evaluated rock outcrop percentages.

(5) For Item A(7), it is agreed that the land use naming convention and the parameter data employed by Primatech will be used. No "Desert – Burned Area", however, will be modeled.

(6) For Item A(8), "Water" was replaced by "Desert" land use.

(7) For item A(9), DIBBLE will provide plots of new routing reach sections and the section data to FCDMC. See attached "SUPPLEMENTARY DATA" sheet [Item A.2] for the section information defining the routing sections. See FIGURES A.1, A.2 and A.3 for the location plots of the routing sections.

(8) For Items A.(10) and A(11), the data used by Primatech will be adopted.

(9) For Items B(1), the "DUMMY" issue on the HEC-1 Schematic is resolved by "zeroing out" the discharges.

(10) For Item B(2), Sub-basin B1W5 was regrouped within the W5 hydrographs.

(11) For Item B(3), it is recommended that the same rainfall data used by Primatech is used for the existing condition being developed for the north-north watershed. In theory, the total drainage area has not changed; however, the entire watershed is being modeled into two

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MEETING NOTES

Project: RIO VERDE ADMP
Venue: White Tanks Conference Room, FCDMC
Date: March 26, 2003
Time: 8:00 AM
Present: Felicia Terry, FCDMC
Kathryn Gross, FCDMC
Tom Loomis, FCDMC
Tim Philips, FCDMC
Sally Stewart, FCDMC
Melissa Lempke, FCDMC
Brian Fry, DIBBLE
Frank Brown, DIBBLE
Rebecca Timmer, DIBBLE
Carlos Carriaga, DIBBLE

The purpose of the meeting was to update the District on the progress of work regarding the Rio Verde ADMP Project. As a guide, DIBBLE prepared an Agenda Sheet that lists all the items to be covered. The following items below were the important items covered in the discussion:

(1) The Project Report will be published in PDF format and will be Internet-deployed (or Web-Based). Brian showed the outline of the Report that lists the important components of the project report. Brian will format the report in 8.5" x11" landscape orientation.

(2) The status of the Interim Development Guidelines (IDG) developed under Alternative Formulation has been discussed. The IDG is being prepared for mailing to the residents after securing approval and clearance from the County's Attorney for release and dissemination.

(3) The allocated Field Survey budget has not been used to date. Utilization of this budget will be made later for field verification and survey of the project site.

(4) For the hydrologic analysis, the review comments of the existing condition models provided by the District through Kathryn Gross were being addressed by DIBBLE. Kathryn will provide DIBBLE the digital soil map of the missing section of the north-north watershed. There is a need to meet, discuss, and resolve important issues regarding land use, soils, and precipitation data. Developed condition (or the probable future condition) models will be made once the existing condition models are finalized and accepted by the District.

(5) For the hydraulic analysis, Zone "A" map will be delineated from the results of the HEC-RAS modeling involving a number of large washes that have been identified. The HEC-RAS modeling work cannot be fully completed until the hydrologic analysis task is complete and accepted by the District.

(6) The District requested DIBBLE to submit the HEC-RAS geometric cross-section data (in digital file) for review purposes.

(7) On the missing topographic data in the south watershed, the GIS Department of the District is currently checking and verifying the accuracy and reliability of the developed topographic map with the survey data. The District said that the map should be available to DIBBLE in about 2 weeks.

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(2) Topographic map for the south watershed as mentioned in Items (22) and (32) above.

(3) Split flow example as mentioned in Item (34) to be used as a guide in the development of discharge rating data for the split flow.

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(22) For Item (2), the resolution will be from the new topographic map to be provided by FCDMC.

(23) Item (3) was resolved by extending the flow path.

(24) For Items (5) and (6), re-evaluation of the rock outcrop percentages associated with soil units 63 and 72 should be done by visual examination of the aerial photographs. See attached "SUPPLEMENTARY DATA" sheet [Items C.1 and C.2] for the re-evaluated rock outcrop percentages for soil units 63 and 72 from visual inspection of the aerial photographs.

(25) For Items (7), it was accepted to use soil unit 6 to replace soil unit "W".

(26) For Items (8) and (9), the recommended land use classifications were accepted. However, recommended parameter values need to be further validated against those parameters used by MKE.

(27) For Item (10), the delineations performed within the sub-basins for developed properties need to be revisited to include only the areas around those properties.

(28) The "Water" feature in Item (11) should be replaced by "Desert".

(29) The response for Item (12) was accepted.

(30) For Items (14) and (15), the response provided was accepted.

(31) For Items (16) to (23), DIBBLE will provide plots of new routing reach sections and the section data to FCDMC. See attached "SUPPLEMENTARY DATA" sheet [Item C.3] for the section information defining the routing sections. See FIGURES C.1, C.2, C.3, and C.4 for the location plots of the routing sections.

(32) Items (24), (25), (26), and (27) were accepted.

(33) For Item (28), DIBBLE will provide the plot of new routing reach section and the section data to FCDMC. See attached "SUPPLEMENTARY DATA" sheet [Item C.3] for the section information defining the routing section. See FIGURES C.3 for the location plot of the routing section RTE4A2..

(34) For Item (29), FCDMC did not accept the approach used to develop the split flow data. FCDMC will provide an example to DIBBLE to develop the discharge rating data for the split flow.

(35) For Item (31), it was discussed that a separate model for the south watershed is very likely considering the following justifications: (a) floodplains have already been delineated and accepted by FEMA using the flows generated from the hydrologic model; (b) some of the analytical approaches used are unique to the south watershed (for example, the areal reduction approach using JD card); and (c) the 6-hour storm event predominantly controls the hydrology of the watershed in contrast to 24-hour storm events for the north-north and north-south watersheds.

Action Items for FCDMC:

(1) Missing digital soils map for the north-north watershed as mentioned in Item (2) above.

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separate sub-areas: the upstream watershed areas by one-dimensional HEC-1 program, and the downstream watershed areas by the two-dimensional FLO-2D model.

North-South Watershed:

A response prepared by DIBBLE submitted to FCDMC on April 3, 2003 regarding the review comments for the north-south watershed was used in the meeting discussions.

(12) For Items (2) and (3), the answers provided were accepted.

(13) For Items (4) and (5), a re-evaluation of the rock outcrop percentages associated with soil units 63 and 72 should be done by visual examination of the aerial photographs. See attached "SUPPLEMENTARY DATA" sheet [Items B.1 and B.2] for the re-evaluated rock outcrop percentages from visual inspection of the aerial photographs.

(14) For Items (7) and (8), recommendations to adopt land use classifications used in DEA's model were acceptable. This indicates that the data to be used for the model will be identical to the ones used by DEA.

(15) For Item (8), re-visitation of delineation made on the new existing residential properties on the 2002 aerial photographs will be provided.

(16) Items (11) to (19) were acceptable.

(17) For Items (20) to (22), DIBBLE will provide plots of new routing reach sections and the section data to FCDMC. See attached "SUPPLEMENTARY DATA" sheet [Item B.3] for the section information defining the routing sections. See FIGURES B.1 and B.2 for the location plots of the routing sections.

(18) Items (23) to (28) were accepted.

(19) For Items (29) to (30), DIBBLE will provide plots of new routing reach sections and the section data to FCDMC. See attached "SUPPLEMENTARY DATA" sheet [Item B.3] for the section information defining the routing section. See FIGURES B.3 and B.4 for the location plots of the routing sections.

(20) Items (31) to (34) were accepted.

(21) For Item (35), it is recommended that the same rainfall data used by DEA is used for the existing condition being developed for the north-south watershed. In theory, the total drainage area has not changed; however, the entire watershed is being modeled into two separate approaches. The upstream watershed areas are modeled by one-dimensional approach using HEC-1, while the downstream watershed areas are modeled by the two-dimensional FLO-2D model.

South Watershed:

The response prepared by DIBBLE regarding the review comments for the south watershed was used in the meeting discussions.

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(8) Regarding the FLO-2D modeling, the grid size to use is 25 feet (per recommendation of Tom Loomis with input from Dr. O'Brien). With this grid size, the Phase A modeling area will comprise of about 300,000 grid elements, which may take approximately 5 days to execute. Three separate 2D models are anticipated for the Phase I Study Area. The scheduled time frame for the completion of Phase I of the project is May 2003.

(9) No items were discussed on the Geomorphic Analysis.

(10) For the development of the Hazard Criteria, it was reiterated that this could only be done after all modeling analyses are complete.

(11) The next Public Meeting is scheduled during the month of May. The suggested items to be covered during the meeting are the Interim Development Guidelines and a visual presentation of FLO-2D modeling analysis results that show impacts of the development guidelines not being followed or implemented. Two weeks before the scheduled Public Meeting, the Interim Development Guidelines should be mailed to the residents.

(12) The existing ADMP Work Group comprising of interested individuals and residents in the Rio Verde area will be tapped as facilitators for the Public Meeting. Each member of the Work Group will be encouraged to play key responsibilities for the successful conduct of the Public Meeting. Felicia Terry will coordinate with the ADMP Work Group how this goal will be accomplished.

Action Items for FCDMC:

a. Identification and determination of sub-basins that need re-delineation by Kathryn Gross.

b. Soils map of the missing region in the north-north watershed.

c. Topographic mapping data for the missing section in the south watershed.

d. Mailing of the Interim Development Guidelines to residents.

e. Preparation of the ADMP Work Group to serve as facilitators for the May Public Meeting.

Action Items for DIBBLE:

f. Submit to FCDMC the HEC-RAS geometric cross-section data.

g. Respond to the review comments for the three hydrologic models.

h. Meet with FCDMC to discuss and resolve data issues involving land use, soils, and precipitation.

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MEETING NOTES

Project: RIO VERDE ADMP
Venue: DIBBLE Conference Room
Date: September 25, 2002
Time: 1:30 PM
Present: Felicia Terry, FCDMC
Kathryn Gross, FCDMC
Frank Brown, DIBBLE
Brian Fry, DIBBLE

The purpose for the meeting was to discuss the District's review comments on the refined subbasin boundaries and the proposed one-dimensional floodplain delineation reaches. The following items were discussed:

(1) Six sheets of subbasin plots at 1 inch = 800 feet scale were prepared by the District, which shows the 2D model area, the subbasin boundaries and the 1D wash lengths on an aerial photograph base with contours. Dibble asks that this information be sent by e-mail to Carlos.

(2) A review memorandum dated 13 September 2002 from Kathryn Gross to Felicia Terry was presented and discussed. Valuable hydrology hours should not be spent on minor revisions to the subbasin boundaries.

(3) Tom Loomis with the District recommends some revisions to the 2D model boundary, which Dibble will take into consideration.

(4) The District will send to Dibble the electronic file of the recent 2002 aerial photograph of the study area. The 1998 aerial contact prints are available upon special request from Kathryn.

(5) The District will request the Rio Verde North Extension contractor supply the surveyed culvert locations prior to GIS submittal to the District. This may not be needed now, due to discussion on delaying the culvert survey until later in the ADMP project, after it becomes apparent that a particular culvert requires survey.

(6) The County will supply Record Drawings for recently paved roads within the ADMP.

(7) The 1D wash locations need revision to add a parallel channel downstream of Black Hill Tank, and to match the revised 2D boundary locations. The Scope of Work notes 15 miles to be modeled with RAS and an additional 7 miles (total of 22 miles) to be analyzed with normal depth calculations. Dip crossings without known flow depths should be analyzed as a substitute for the normal depth floodplain areas, if the full 22 miles do not require floodplain delineation.

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(8) The District should approve the mapping for the infill areas in about one month.

(9) The next meeting date for the ADMP Work Group will be decided soon. The Interim Development Guidelines will be prepared without the benefit of the 1D and 2D models, since the study is about 4 months behind schedule due to mapping delays.

(10) The drainage report for the Scottsdale National Subdivision will be given to Dibble. The recently delineated floodplains should be used, with no new delineations.

(11) A revised quarterly payment projection should be submitted next week to the District, without the benefit of a revised schedule.

(12) The rainstorm on 10 September was discussed and the Dibble notebook containing the Fountain Hills Times newspaper clippings was viewed. A school bus got stuck on 144th Street at Lone Mountain due to sediment in the roadway from previous storms.

Action Items for FCDMC to give to DIBBLE:

a. The 2002 aerial photograph file.
b. The Rio Verde North Extension surveyed culvert locations
c. Record Drawings for recently paved roads.
d. The drainage report for the Scottsdale National Subdivision.

Action Items for DIBBLE:

e. Submit the meeting notes for the 3 September 2002 meeting.
f. Submit the revised quarterly payment projection next week.
g. Schedule the next Work Group Meeting.

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MEETING NOTES

Project:	*RIO VERDE ADMP*	
Venue:	*FCDMC Conference Room*	
Date:	*September 3, 2002*	
Time:	*10:00 AM*	
Present:	*Felicia Terry, FCDMC*	*Cathy Regester, FCDMC*
	Tom Loomis, FCDMC	*Frank Brown, DIBBLE*
	Tim Phillips, FCDMC	*Carlos Carriaga, DIBBLE*
	Kathryn Gross, FCDMC	*Brian Fry, DIBBLE*

The purpose for the meeting was to present the refined subbasin boundaries and the proposed one-dimensional floodplain delineation reaches. The following items were discussed:

(1) The new topographic mapping for the missing pieces of the watershed is not complete, but should be delivered soon. The mapping for the Rio Verde South Extension (FCD No. 97-13) area will be completely revised and tie into adjacent mapping. Mapping by the USGS should be used for the missing piece at the watershed's northwest corner.

(2) Subbasin boundaries generally should be straight lines at roadways to plan for the placement of future culverts.

(3) The 1D and 2D delineation map prepared by the geomorphology subconsultant was revised to follow hydrologic concentration points. Dibble considered setting the upstream 2D limit at 144th Street, where culverts are designed for Q_{100} without overtopping the roadway, and this is unworkable from a hydrologic viewpoint. The 2D model area was extended downstream to the Verde River, except at the developed portions of Tonto Verde and Rio Verde, where the 2D model ends at the west edge of development.

(4) The proposed one-dimensional floodplain model reach lengths were presented. There are 9 (8 stated at the meeting) separate washes that meet the criteria of at least 500 cfs Q_{100} and at least one mile in stream length before entering the 2D model area.

(5) FCDMC will direct DIBBLE on whether or not to delineate floodplains within the National Forest, State Trust Land, Scottsdale Preservation Land or the McDowell Mountain Park. These areas may be conducive to normal depth computations, as stated in the Scope of Work.

(6) Nine sheets of subbasin plots at approximately 1 inch = 500 feet scale were submitted. The District requested that the same information plus the proposed 1-Dimesional model lengths be sent by e-mail to Felicia and Tom, or posted to the District's FTP site with an explanatory e-mail.

(7) Action Items:

a. Dibble to submit the 1D reach lengths and subbasins electronically to the District.

b. Schedule a joint DIBBLE-FCDMC site visit for a field review of the 1D-2D interface.

c. FCDMC should complete their review within two weeks.

Rio Verde Area Drainage Master Plan
Public Involvement Meeting
Minutes
August 6th, 2002

6:00 pm – 8:00 pm
Presentation: 6:30 pm – 7:30 pm

Location: Tonto Verde Country Club
18401 El Circulo Drive
Rio Verde, Arizona 85263

FCDMC/County Team Attendees:
- Felicia Terry, P.E. – Project Manager
- Tim Phillips, P.E. – Regional Project Manager - East Valley
- Angeline Fowler – Public Information Officer
- Melissa Lempke – Public Information Coordinator
- Tim Murphy
- Kathryn Gross
- Mark Mayer

DIBBLE Team Attendees:
- Brian Fry, P.E. – Consultant Project Manager
- Rich Perry, P.E. – Consultant Project Principal
- Debra Thompson – Consultant Public Involvement Manager
- Rebecca Timmer – Consultant Public Involvement
- Frank Brown, P.E. – Consultant, Floodplain Hydraulics Manager

Public Members: 116 people attended

Presentation Boards from DIBBLE Included:

1. Welcome
2. Survey Results
3. Study Area/with Map
4. Project Schedule
5. Project Overview Board

County provided several Boards, including project specific and Flood Control 101 boards.

Miscellaneous:

- Public began arriving at 5:40 pm.
- Presentation 6:30 pm – 7:30 pm
- Questions & Answers
  Questions and answers as documented by Angeline and Debra are included as attachments herein. Questions are in bold, answers are not.
- Closed meeting 8:00 pm

Rio Verde Area Drainage Master Plan
Survey Results

312 people in the Rio Verde Area Drainage Master Plan study area returned their surveys to the Flood Control District.
The results and comments broke down as follows:

1. How long have you lived at your current house in the study area?

1 year or less	29	9%
1- 5 years	102	33%
5 – 10 years	54	17%
10-20 years	10	3%
20 plus years	12	4%
Own property with no house	33	11%
No response	72	23%

2. Have you experienced flooding in the area?

No	196	63.5%
House	1	0.5%
Roads	50	16%
Isolated by flood water	7	2%
Other residents flooded	7	2%
No response	51	16%

3. Do you use the washes and river for recreation?

Yes	116	37%
No	118	38%
No response	78	25%

Of those that specified how, this is the breakdown:

Hiking	20	18%
Mountain Biking	7	7%
Picnicking	6	5%
Viewing Wildlife	6	5%
Horseback Riding	27	24%
ATV	19	17%
Walking	9	8%
Fishing	13	12%
Other	5	4%

4. Do you prefer the washes to stay natural or be channelized?

Natural	172	55%
Channelized	18	6%
Combination	15	4%
Don't know	30	10%
No response	77	25%

Comments

Flooding

- We back up to a large, developed wash separating the Rio Verde from Tonto Verde. We have no flooding in the immediate or adjacent streets. In the past, we have had over-flowing washes crossing both Rio Verde Drive and McDowell Mountain Road preventing access in and out of Rio Verde a few hours to a couple of days

- There has been no rain since we moved in (8/28/01). Our lot on 152 Peakview was not buildable due to floods, so we moved to 146 Dale Lane. Dynamite has two areas that flood during heavy rains – by Dynamite 125.

- No flooding, because I live in the well planned Rio Verde Country Club area. You need new flood maps, with all the new development to the west, it has changed the flow of the water.

- My concern is the building to the west of me, which is uphill from my home. With the re-channeling of washes, non-compliant builders, and new road construction, who knows where water will end up. For example, when the county grades the roads they do not go back and open up the washes that crossed the road, so what ends up happening is they turn the roads into rivers and dam up the washes normal flow.

- I have been isolated by flood water when McDowell Road washes could not be crossed.

- Since there has been no significant problems with flooding/drainage problems in this sparsely populated area, if County gives approval for what many of us deem subdivision type development out in the area which in turn creates a flooding/drainage problem because of bending to the wishes of developers/builders, then I guess some of the homeowners will be seeking some answers as to why this was allowed and approved.

- Civil Engineer specified culverts to small to handle flow. Depending on conditions, washes can carry more water than would appear.

- We've seen typical runoff after storms. I have 5 acres, the rear of my property is a sand wash, which floods during heavy rain

- We live at the bottom of the hill and are very concerned as more and more people above us come in and strip their land and divert their washes. We have lived here during heavy rain and seen water in our wash and the "main" one North of us. It flowed well and drained right off. 168th St has many small washes and as people have planned and graded they are all screwed up and will be a mess when it ever does rain.

- I own an undeveloped 5 acre parcel and was told by the broker that flooding is not a problem in this area as long as washes are undisturbed.

- No water problems, even with an intense downpour. Washes are handling this water just fine.

- 160th Street and Lone Mountain – Rushing waters proving to be difficult to cross. Very dangerous when heavy rains occur.

- Road flooding occurs after graders block the washes

- Washes flooded roads between Rio Verde and Fountain Hills- just short term flooding

- Raising 144th Street above the natural grade and cutting such a huge path through the area was one of the worst things that has happened to this area. It should have been paved the same as 136th Street.

- I would hope that the current and future residents can enjoy Rio Verde without fear of flood or reclassification which financially damages the homeowner. Your flood approach makes sense. Corrections need to be made if required. Communication is needed.

- Our land has a gentle slope with one major wash and water drainage is not a problem.

- I've had to wait about 10 minutes several times for the washes to subside to get my Corvette through, never for my pickup

- We are very concerned that the various subdivisions coming into the area will conform and not disturb the desert. Their flood control (culverts, etc) should be closely monitored. Wise decisions are a must to keep Rio Verde from developing into high density, poorly planned flood controls.

- No problems, however, we are kind of in a drought period. I have seen dramatic wash-outs in years prior. There has not been a heavy rain since some

development has taken place. However, the area is worthy of your study. I feel, any development should be per the "lay of the land." Redirecting washes and raising building pads should be approached with caution. I am sensitive to this area and feel that the District's approach should be such as to maintain some kind of natural approach to grading and drainage issues.

- What's the big deal? Even the heaviest monsoon seems to be handled by our washes.

- Rain runoff from adjacent lot has flooded the back of my property and caused damage to the pool and significant clean up problems. Has happened three times.

- There is no problem now, please don't make one. No one has ever been flooded. I have been on this property for over 25 years.

- The large dip on Avenida Del Ray has been flooded but not since I've lived here.

- Late December, Dixetta Street caved in causing water to run rapidly in one wash. Large horse facilities have stripped their land, northing to stop the flow of water. We have numerous horse facilities in one area. All of which have, most likely, filed agriculture exempt, which allows them to do almost anything to their properties without permits or consulting flood control. The first thing they do is strip their land. They don't worry about the people downstream from them and they don't worry about the outcome of what might happen when we get rain. We've lived here for years and seen what can happen.

- Occasionally the roads flood when we have heavy rains. They need to be paved with culverts to avoid flooding

- The corner of McDonald Drive and Hayden used to flood before Indian Bend Wash was created.

- Our friend on the corner of Dixileta and 152nd Street had water in the house until they built an earthen barrier around the house

- There are some areas of street/wash crossings that need to be studied: 152nd Street about 300' north of Rio Verde Drive

- There have been no flood problems that I have been aware of. The washes only run a few inches deep even during major monsoon rainfall. The current flood study has put a lot of good property in the floodplain – this is nonsense.

- The only heavy water flow problem with rain occurs around development paved parking lots and if housing becomes too dense. Sandy bottom washes fill the roads in some places during heavy rains, but warning signs are posted.

- Minor washout of dirt and sand which covered the patio but did not enter the house. Developer seems to have corrected problem with recontouring.

- Big wash on Avenida Del Ray floods once a year. This is a modified wash.

- Rio Verde Road and Forest have had temporary flooding during heavy rains. Water should flow under roads, not over.

- Running water over the roads during rain.

- We live in a desert, it never rains

- I have been told by friends and neighbors that local river beds can become treacherous at times.

- When it rains, the water runs in the natural washes just like it has for hundreds of years. Problems are caused by allowing subdivisions to change the natural flow

- Once in 11 years the wash south of us was flooded over the road to 5-6 feet deep. We were not home when this occurred.

- There is occasional water over the road in the wash area between Fountain Hills and Rio Verde. No problem with the flooding on Rio Verde Drive

- What was allowed to be don on 144th Street was a crime. All the character of the road is gone and in it's place is the Bonneville Salt Flats. If we do get substantial rain, I'm not sure what would happen to all the property east of 144th Street. Developers should not have free rain in this area.

- Two times during summer the wash between Arroyo Way and Horseshoe Bend on Avenida Del Ray gushed with water coming from McDowell Mountain Park . I could not drive though it to get to my home. There is now a small bridge leading to Tonto Verde from the north end of Avenida Del Ray. It is supposedly there for golf cart use. I was told that in time of emergency I could drive over it. I would hesitate to try it though. All residents north of the first Horeshoe Bend turnoff could be affected by flooding of the above mentioned wash on Avenida Del Ray.

- Our primary concern is improper damage to existing washes because washes are being moved and/or filled. Another concern is the large subdivisions that

are disturbing the natural flow of washes and removing important vegetation that would help prevent flooding.

- With the Army Corps of Engineers involved in all the planning, etc. of Rio and Tonto Verde – do they not know what they are doing? Isn't all building sites in this area pre-approved by someone from the County? If so, this should prevent future problems from ever existing.

- 152nd Street will run after a good rain but I've never been home bound due to the washes running out of control.

-

Natural v Channelized Washes & Rivers

- Combination based on cost and what is practical for best land usage

- Obviously some channeling has already occurred in housing developments, but where possible, we prefer the natural landscape

- Natural, but need to be cleaned and have banks refurbished

- I want to be able to utilize my property and build on the property that I purchased before flood maps/restrictions were altered. I like the water channelized in to existing washes, that way we know where the water will be. If you leave it to merely "sheet flood" the water can go anywhere.

- Natural in most areas, channelized in large washes

- What are the advantages and disadvantages of natural vs. channelized washes and rivers?

- I imagine that closer to the river, people might need some formal channeling

- The river should be kept natural. Washes, however, may have to be channelized to make home construction possible at some locations.

- Natural is always better for the scenic environment. On 144th Street under the road, obviously concrete piping was required. I think a combination to protect homes and home values.

- Washes can be channelized to accommodate land owners, but must be done right

- The developer of Rio Verde and Tonto Verde seems to have done a wonderful job of keeping the washes natural and supporting possible wash out areas. Our concern is what is happening west of us (where water comes from) and to not let it change the natural flow and absorption (causing unnatural runoff)

- Stay natural for the river, channel some washes

- With the other development and the North-South roadways, water flow can be channelized for most effective drainage

- Natural and stop letting horse ranches scalp and strip (10-20 acres) to bare dirt

- Please allow the area to remain as-is – natural washes and natural desert are beautiful and should stay that way.

- Keep it natural – the intentional channeling of washes can have serious implications further "downstream"

- Protecting people and property should be a priority

- The natural beauty of this area is what I found so attractive. Let mother nature do her thing. To attempt to "harness" the water in washes will be an ecological disaster.

- I feel that the washes look better natural but if it would help a flooding problem and retain property values I would support channels

- Channelize. The area has a lot of wildcat subdivisions and needs a drainage master plan.

- We should make every effort to leave the desert in its natural state. Some form of happy medium can be reached by homeowners and naturalists.

- Why build houses right on a wash anyway? Just build elsewhere and leave at least some of the desert natural and untouched by Man's greedy little hands.

- I feel that flood control would be improved if man gave "mother nature" a little help by channelizing small and large washes. Surface erosion can and should be controlled by man.

- Washes as they cross roads should be channelized or culverts should be allowed

- Stay natural. It seems that the changes out here so far have not improved anything.

- Prefer to stay natural but its more important to improve flood control

- Flooding is not a problem until a walled community destroys the natural flow

- Whatever is best for the majority of the homeowners in the area

- Stay natural for the most part but to avoid severe problems the main drainages should be controlled by channels. The river should remain natural.

- Keep everything natural. Don't touch a thing. Limit homes to no smaller than 2.5-acre lots. No subdivisions. Make people upstream responsible for changes to the natural water flow.

- Natural – no channel can improve on mother nature – no plants or trees to prevent erosion, no water being absorbed to replenish water tables. More restrictions need to be placed on development in the area. More large lot subdivisions, no more golf courses. Limit the number of wells drilled.

- With all the development in the surrounding areas unless it is absolutely necessary to change the wash areas for drainage reasons they should be left as natural as possible so as to protect the integrity of the desert and the wildlife habitat

Miscellaneous

- Will this study stop us from developing on this land in two years? Will this study preclude us from doing engineering studies/obtaining building permits?

- I believe it is important to keep trash out of the rivers. There is a great deal of trash accumulating in the natural forest near the river. Coordinating clean up will continue to keep water clean and flowing, perhaps regular clean ups and signs and occasional volunteer groups to help curtail trash in and around the river

- I hate to see too much development. I 'm worried about enough water for everyone. Also worried about septic tank runoff.

- Natural, unless this would cause serious flooding of homes on roadways. We believe that this study is an excellent idea. Hopefully it will provide solutions to any current problems, provide guidance for future land developments to avoid flooding developing as new projects are planned, engineered, and implemented.

- The developers should be stopped from building houses to close together and disturbing natural washes.

- We have concerns that our properties will be deemed worthless and that we will not be to sell our properties if you determine the property "floodway" when we all have gotten permits to build and have put everything we own into our homes.

- We believe that the issue has been addressed by Tonto Verde- washes have been channelized and the information has been given to the Flood Control District for map revision. However, the revised LOMA's have not been issued –making it extremely difficult for us –creating an unnecessary cost for flood insurance.

- I first bought property in this drainage area in 1972 and have never seen a problem until the county started given permits to people who block and build in washes. I can show you a lot of blocked washes. One that is 50-60 feet across was filled in with dirt and reduced to three 24 inch culverts. Another has a block wall to divert the water at a 90 degree turn. We now have standing water in the road way because the county permitted this fence and diversion wall.

- Rio Verde (town) and Tonto Verde have excellent drainage using natural washes which was a key part of the original planning. In seven years I have witnessed only minor problems in the community under the most severe storms

- We feel the development out here in this area has no concern for the flood and drainage impact. There is much distruction of the desert vegetation and grading over and through the washes. There are master planned developments that need to be scrutinized thoroughly.

- The county needs to do a better job of grading and maintaining 160-164-168 Streets. There is a wash board effect on all roads. Need grading and drainage ditches constructed.

- Flood insurance is the biggest rip-off I've ever heard of. We live in the desert, hasn't rained for over a year and I pay $700 a year in flood insurance.

- On 144th, just north of Windstone Trail, a facility houses cattle in a low drainage area and doesn't take care of clean up. When it rains the debris will be washed down the wash to some other residence.

-

- Subdivisions should not be allowed to dig wells four times deeper than their neighbors to supply their subdivision. Also they are allowed to supply other

subdivisions in the area, thereby pulling the water level below their neighbors forcing them to let water brokers prey on them for water.

Flood Control District of Maricopa County
Rio Verde Work Group
Meeting Minutes

RECEIVED
AUG 29 2002
DIBBLE & ASSOC.

Meeting Date: Tuesday, July 30, 2002

Location: La Mirada Desert Community Center

Project: Rio Verde Area Drainage Master Plan

Subject: Work Group

Attendees:

Bob Thomas
Richard Hollabaugh
John Shy
Bren Riesinger
Alan Burgess
Shirl Anderson
Luther Troen
Fred Fleet
Gary Lane
Dorothy Sacks

Felicia Terry, District
Brian Fry, Dibble
Tim Phillips, District
Ted Lehman, JE Fuller
Angeline Fowler, District
Debra Thompson, Dibble
Melissa Lempke, District

- Angeline Fowler opened the meeting at 5:10 p.m:
  - Welcome & Introductions,
  - Review of Work Groups role on the project,
  - Review of evenings agenda,
  - Distribution of Work Group Handbooks

- Felicia Terry, District Project Manager, makes a Powerpoint presentation
  - Overview of District's Mission and Purpose
  - Discusses: What is an ADMP?
  - Overview of Rio Verde ADMP
  - Project history of Rio Verde Area
  - Project schedule

- Felicia introduces Brian Fry, Consultant Project Manager who continues with the Powerpoint Presentation
  - Rainfall/ Runoff Description
  - Floodplains and Floodways Definition
  - Overview of the Computer Modeling to be used in the study

- Brian introduces Ted Lehman who continues with the Powerpoint Presentation

Fluvial Geomorphology and soil characteristics in the Rio Verde area

- Ted re-introduces Brian who continues with the Powerpoint Presentation
  Management Tools: ways that can help manager flooding on the watershed
  Structural Alternatives
  Floodplain management
  Development guidelines

- Brian re-introduces Felicia who opens up the meeting to questions and discussion

- Bob Thomas:
  What is the District going to do now – not in 2 years. 2 years is too long. Also, what are you going to do about the clearing of vegetation. Land is being cleared now – it shouldn't be allowed.

- Bren Riesinger
  Why aren't regulations being enforced? It seems as though there is no enforcement and no penalties. People do the damage without a permit. Then they say "sorry" but nothing happens. There are no consequences. We need to tighten regulations and enforcement.

- Fred Fleet
  Stop lot splits. These are causing the problems because they avoid the plan review process. We need the same regulations and rules as for subdivisions. With the subdivision process, the District holds the engineer's feet to the fire. If you do it right the first time, it works right.

- Gary Lane
  If people are upset about what is happening in the community, there is a process to make changes. The public does have power.

- Fred Fleet
  Subdivisions have to detain or retain water. Scottsdale has environmentally sensitive open space areas. There are methods that Scottsdale and Phoenix have that the County doesn't have.

- Gary Lane
  In Scottsdale, you have to preserve 30-35 percent of your land. It's difficult to tell 1-acre lot owners to retain so much water.

- Richard Hollabaugh
  Who pays for the District?

- Tim Phillips

A secondary property tax funds the Flood Control District. The District prioritizes areas and watersheds for study and planning. Rio Verde is the first foothills area in the County being studied.

- Richard Hollabaugh
  Does all the water end up in the Verde River? Why? Can't we build a facility big enough to store it? What about the possibility of underground reclamation?

- Tim Phillips
  Ideally, we want to leave everything as is- in the natural process. It is important for us to minimize flood control expenditures. The District is responsible for flood control in the whole county. It is our directive to keep people and property out and away from flooding.

- Bob Thomas
  We should be looking at controlled growth not the Wild West.

- Richard Hollabaugh
  We need to stop the damage now and hold the current situation at status quo.

- Tim Phillips
  We need to balance "controlling for the future" v "damage control now." We are planning on developing Interim Development Guidelines by the end of the Data Collection Phase. We will have the first cut of the guidelines to the Work Group in 90 days, by the next meeting and next time we'll bring the County Regulatory and Enforcement staff to the meeting.

- Richard Hollabaugh
  We need to look at immediate mitigation measures – ways to slow the water down, acquifer replenishment, etc.

- Tim Phillips
  Our challenge is where is the best place to slow it down and how much of our funding should be spent on small, interim fixes versus the end solution.

- Felicia Terry
  Talked about the August 6 public meeting at Tonto Verde Country Club
  Asked the Work Group to report to various resident groups and their neighbors
  Asked the Group to bring feedback and questions to the next Work Group meeting

Rio Verde Work Group
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MEETING NOTES

Project:	*RIO VERDE ADMP*
Venue:	*Main Conference Room, DIBBLE & Associates Office*
Date:	*July 9, 2002*
Time:	*2:00 PM*
Present:	*Brian Fry, DIBBLE*
	Tom R. Loomis, FCDMC
	Kathryn Gross, FCDMC
	Frank Brown, DIBBLE
	Carlos Carriaga, DIBBLE

The following items were discussed during the meeting:

(1) The topographic data for the watershed is not complete. A mapping company retained by FCDMC is currently working on the missing section in the southern part of the watershed. The delay is due to a vertical discrepancy found, which is as much as 6.0 ft. The delivery of this topographic information from the mapping company is not known.

(2) Although the FCDMC 2D Modeling Team has been testing and running the FLO-2D model, the team awaits the missing topographic data before FCDMC's modeling efforts for the project formally start. Also, the contract for FCDMC's on-call consultant (Dr. O'Brien) for 2D modeling does not begin until August.

(3) The 1D and 2D delineation map prepared by JE Fuller Hydrology & Geomorphology (JEF) was presented to show the areas appropriate for one-dimensional and two-dimensional modeling and analysis. Refinement of the delineation will be made and coordinated between Carlos and Tom based on the grid size to be used for the 2D modeling efforts. No decision has been made yet as to the grid size. The 2D model area will be extended downstream to the Verde River, except at the developed portions of Tonto Verde and Rio Verde, where the 2D model will end at the west edge of development. Dibble will consider setting the upstream 2D limit at 144th Street, where culverts are designed for Q_{100} without overtopping the roadway.

(4) Dibble recommended that the entire 1D area be modeled with a single HEC-1 model rather than maintaining the three distinct HEC-1 models developed in the past.

(5) The hydrology team, headed by Carlos, is currently making adjustments to the sub-basin delineations in the watershed based on the topographic data provided by FCDMC and to fit better with the 2D model boundary. Kathryn will review the finished work together with the evaluated parameters associated with the new sub-basin delineations.

(6) FCDMC requested a digital copy, in GIS format, of the 2D model area boundary and the identified flow split locations. Carlos will e-mail the files to Tom.

B.4.1 General Correspondence: General

Flood Control District
of Maricopa County

INTEROFFICE MEMORANDUM

Date: April 10, 2007

To: Felicia Terry, P.E., Project Manager, PPM Division

From: Kathryn Gross, Floodplain Delineation Reviewer, PPM Division KAG

Subject: Update - Rio Verde ADMP Proposed Starting Water Surface Elevations for RAS at FLO-2D tie-in points (added RV Wash K information 4/10/07)

I have completed the analysis determining the water surface elevations at the FLO-2D tie-in points. Below is a table summarizing those values. Attached are reduced size work maps showing the cross-sections being used as the tie-in points and the FLO-2D water surface elevations; and corresponding worksheets used to determine the average water surface elevation along each cross-section. 24x36 work maps are available in my office.

RIVER	X-SEC	AVE WSEL (feet)	RIVER	X-SEC	AVE WSEL (feet)
RV Wash 10 Trib 1	0.288	2355.44	RV Wash K Trib 11A	0.138	2456.90
RV Wash 10	6.697	2344.66	RV Wash K Trib 11/11B	0.808	2503.35
RV Wash A	7.050	2410.20	RV Wash K Trib 12	0.234	2478.65
RV Wash I	6.423	2456.11	RV Wash K	TBD	2448.5

Let me know if you have any questions.

2801 West Durango Street Phoenix, Arizona 85009 Phone: 602-506-1501 Fax: 602-506-4601

Rio Verde ADMP

Starting Water Surface Elevation Analysis for RAS model

Wash Name: RV Wash K

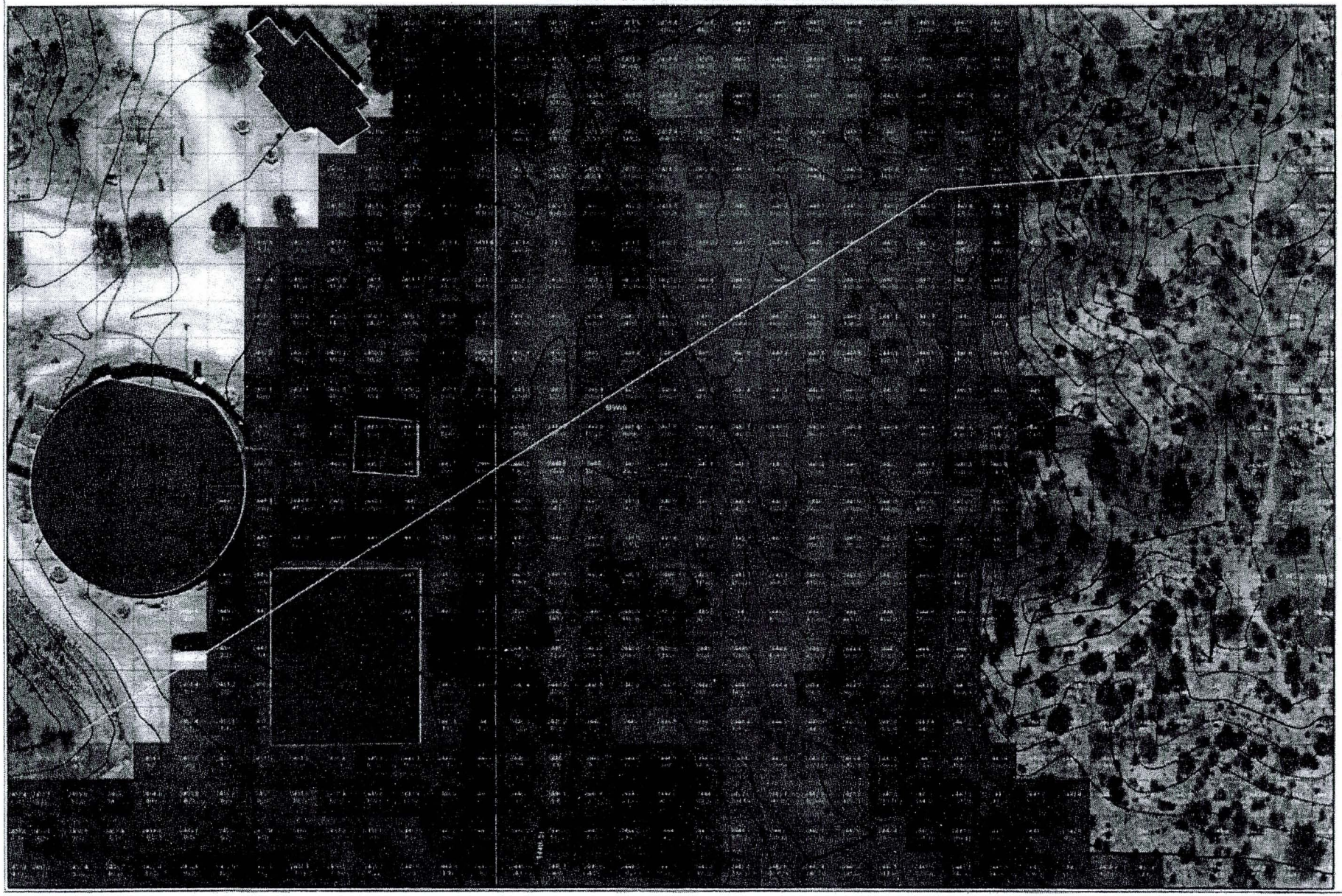
X-sec ID:

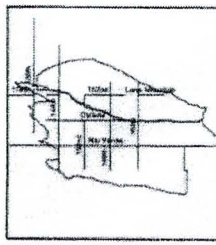
Elevations Taken Along Cross-section from left to right
Method Used: Interpolation using only the main flow corridor

Grid Info:	Elev 1	Elev 2	Elev 3	Ave cells?	Ave (if necessary)	Elevations along x-sec
1	2447.6					2447.6
2	2447.7					2447.7
3	2447.7					2447.7
4	2448					2448
5	2448					2448
6	2448.2					2448.2
7	2448.7					2448.7
8	2449					2449
9	2449.1					2449.1
10	2449.2					2449.2
11	2449					2449
12	2449.2					2449.2

Resulting Final Averaged Water Surface Elevation: 2448.45

Rio Verde ADMP
FLO-2D 100-year Preliminary Maximum Peak Discharge Results
Maximum of Results for FLO2D Model with and without Effects of Stock Tanks
Rio Verde FLO-2D-RAS Potential Tie-in Location RV Wash K





3/3

1/16

Flood Control District
of Maricopa County

INTEROFFICE MEMORANDUM

Date: March 22, 2007

To: Felicia Terry, P.E., Project Manager, PPM Division

From: Kathryn Gross, Floodplain Delineation Reviewer, PPM Division KAG

Subject: Rio Verde ADMP Proposed Starting Water Surface Elevations for RAS at FLO-2D tie-in points

I have completed the analysis determining the water surface elevations at the FLO-2D tie-in points. Below is a table summarizing those values. Attached are reduced size work maps showing the cross-sections being used as the tie-in points and the FLO-2D water surface elevations; and corresponding worksheets used to determine the average water surface elevation along each cross-section. 24x36 work maps are available in my office.

RIVER	X-SEC	AVE WSEL (feet)	RIVER	X-SEC	AVE WSEL (feet)
RV Wash 10 Trib 1	0.288	2355.44	RV Wash K Trib 11A	0.138	2456.90
RV Wash 10	6.697	2344.66	RV Wash K Trib 11/11B	0.808	2503.35
RV Wash A	7.050	2410.20	RV Wash K Trib 12	0.234	2478.65
RV Wash I	6.423	2456.11	RV Wash K	TBD	TBD

Let me know if you have any questions.

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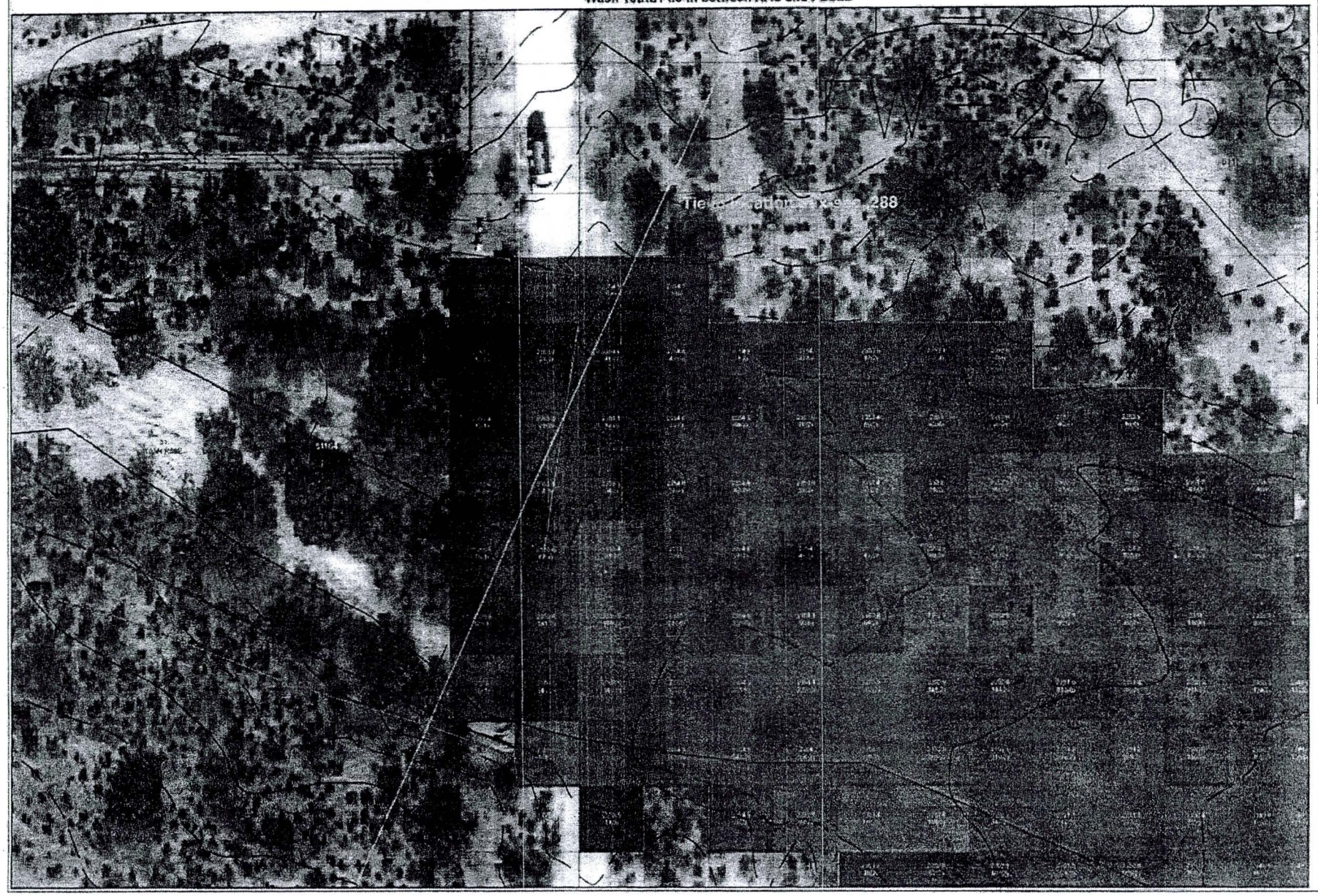
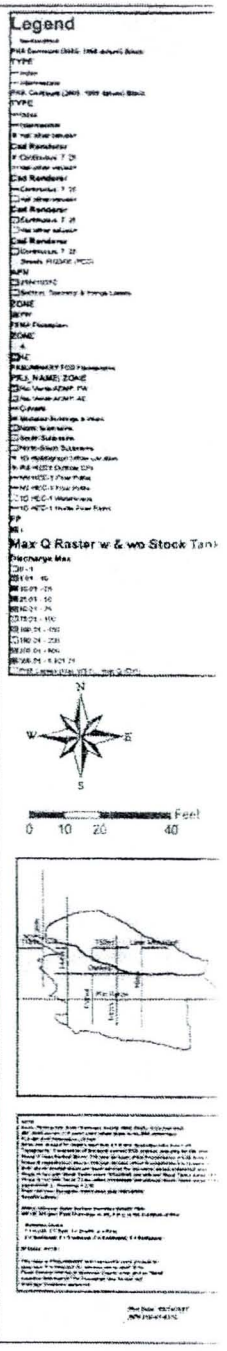
Rio Verde ADMP
FLO-2D 100-year Preliminary Maximum Peak Discharge Results
Maximum of Results for FLO2D Model with and without Effects of Stock Tanks
Wash 10trib1 tie-in between RAS and FLO2D





2/16

Rio Verde ADMP

Starting Water Surface Elevation Analysis for RAS model

Wash Name: RV Wash 10 Trib 1

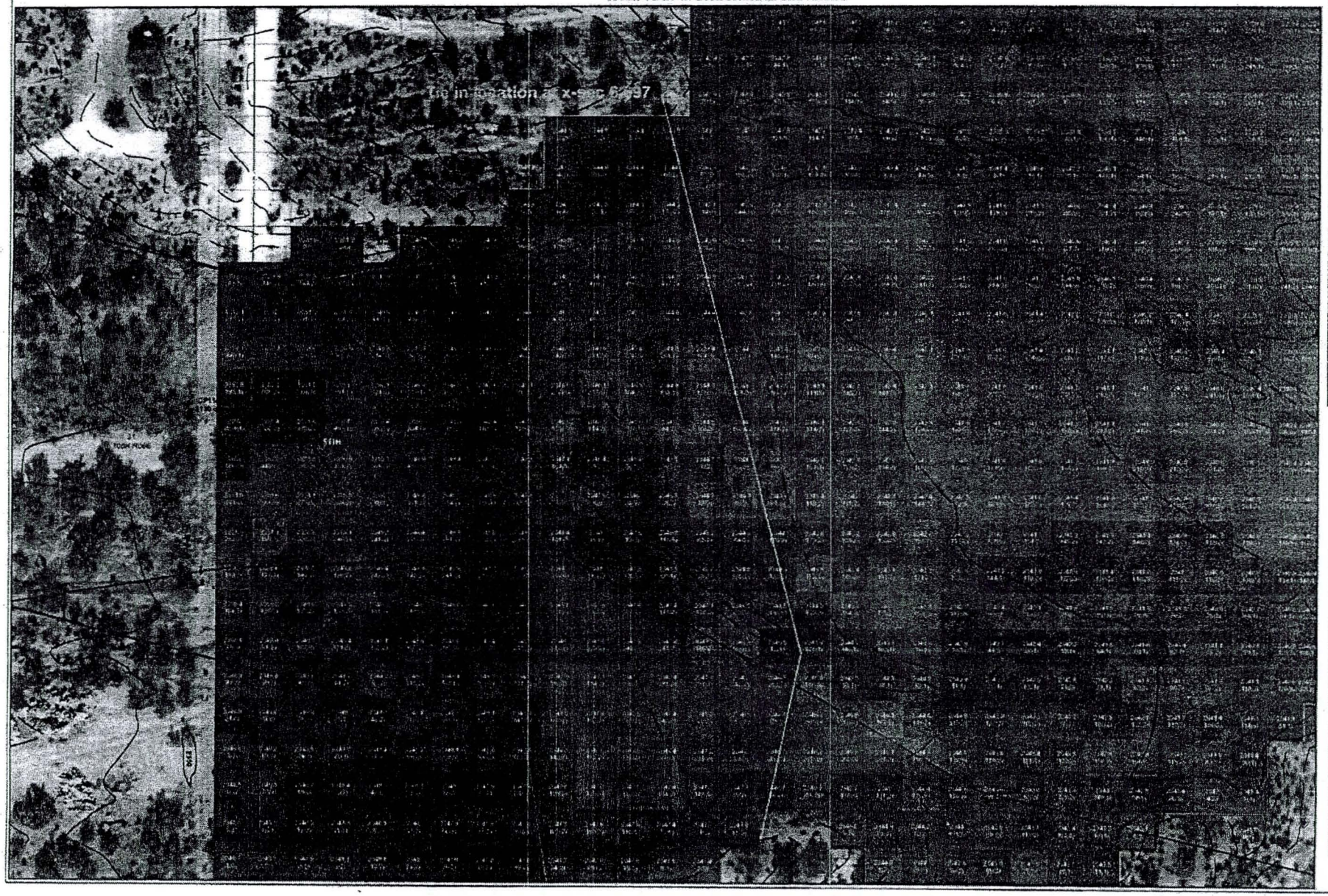
X-sec ID: 0.288

Elevations Taken Along Cross-section from left to right
Method Used: Mathematical Average

Grid Info:	Elevation 1	Elevation 2	Average Cells?	Ave.(if necessary)	Elevations along x-sec
1	2354.9				2354.9
2	2354.8	2355.2	No		2354.8
3	2355.3				2355.3
4	2355.5				2355.5
5	2355.8	2355.6	Yes	2355.7	2355.7
6	2355.9				2355.9
7	2356				2356

Resulting Final Averaged Water Surface Elevation: 2355.44
Present HEC-RAS WSEL: 2355.28

Rio Verde ADMP
FLO-2D 100-year Preliminary Maximum Peak Discharge Results
Maximum of Results for FLO2D Model with and without Effects of Stock Tanks
Wash 10 tie-in between RAS and FLO2D

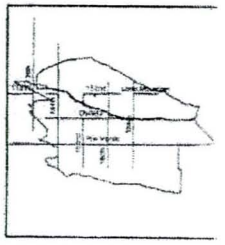


Legend

Max Q Raster w & wo Stock Tanks

N
W
E
S

Feet
0 15 30 60



4/16

Rio Verde ADMP

Starting Water Surface Elevation Analysis for RAS model

Wash Name: RV Wash 10

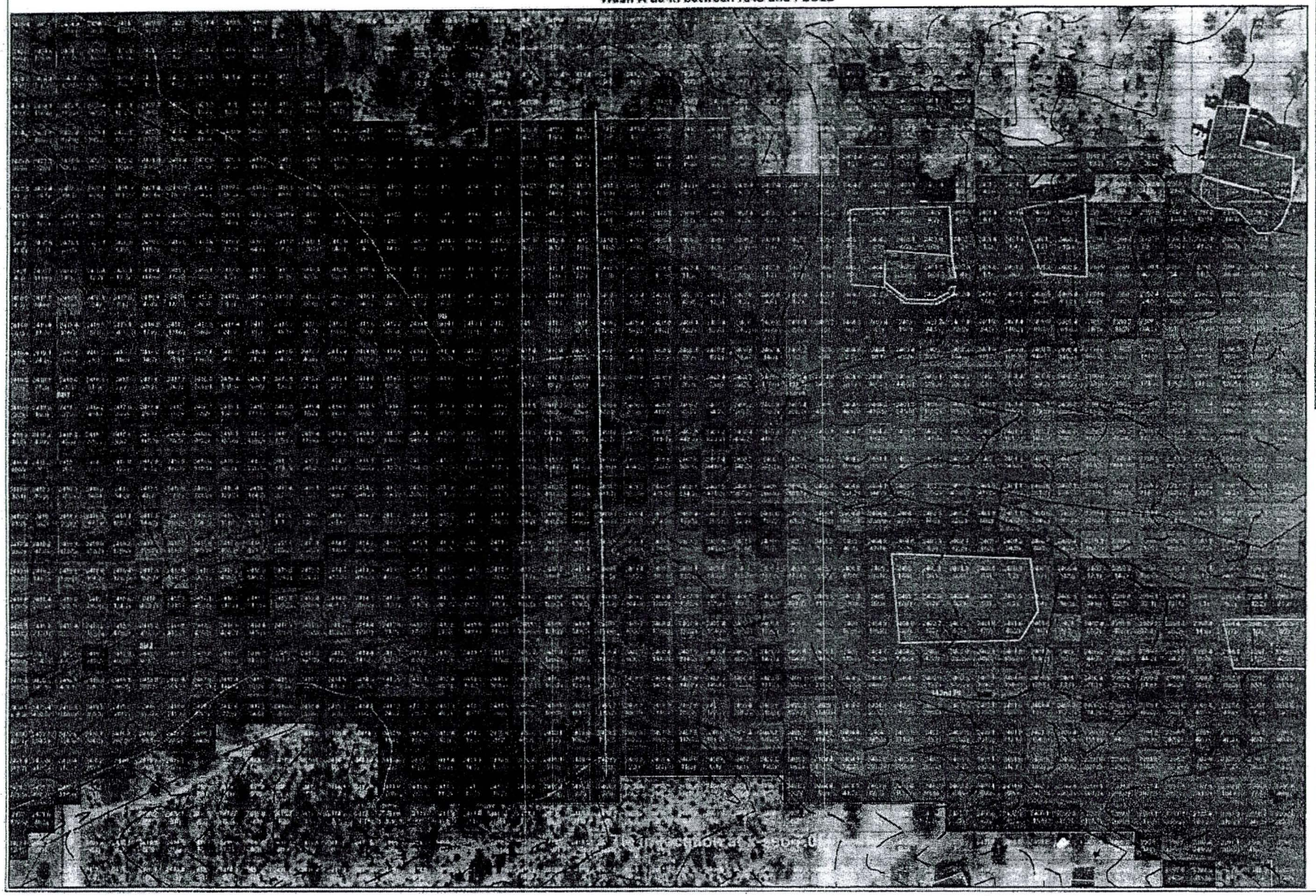
X-sec ID: 6.697

Elevations Taken Along Cross-section from left to right
Method Used: Interpolation

Grid Info:	Elev 1	Elev 2	Elev 3	Ave Cells?	Interp Elev	Elevations along x-sec
1	2343.9				2343.9	2343.9
2	2344				2343.9	2343.9
3	2344.3	2343.8		Y	2344.1	2344.1
4	2343.9	2344.6			2344.2	2344.2
5	2344.1				2344.1	2344.1
6	2344.4	2343.8		Y	2344.3	2344.3
7	2344.4	2344		Y	2344.2	2344.2
8	2344				2344.1	2344.1
9	2344				2344	2344
10	2344				2343.9	2343.9
11	2344.1	2343.7		Y	2343.9	2343.9
12	2344				2344.1	2344.1
13	2344.3				2344.3	2344.3
14	2344.8	2344.2	2343.9	N	2344.6	2344.6
15	2346.5	2345.4		Y	2346	2346
16	2346.7	2346.2		Y	2346.2	2346.2
17	2346.7				2346.3	2346.3
18	2346.7				2346.3	2346.3
19	2346.7				2346.2	2346.2

Resulting Final Averaged Water Surface Elevation: 2344.66
Present HEC-RAS WSEL: 2344.81

Rio Verde ADMP
FLO-2D 100-year Preliminary Maximum Peak Discharge Results
Maximum of Results for FLO2D Model with and without Effects of Stock Tanks
Wash A tie-in between RAS and FLO2D



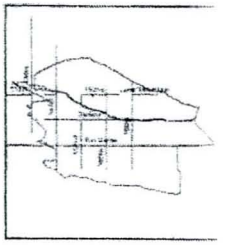
Legend

Max Q Raster w & wo Stock Tanks

Discharge Max

N
W E
S

Feet
0 20 40 80



6/6

Rio Verde ADMP

Starting Water Surface Elevation Analysis for RAS model

Wash Name: RV Wash A

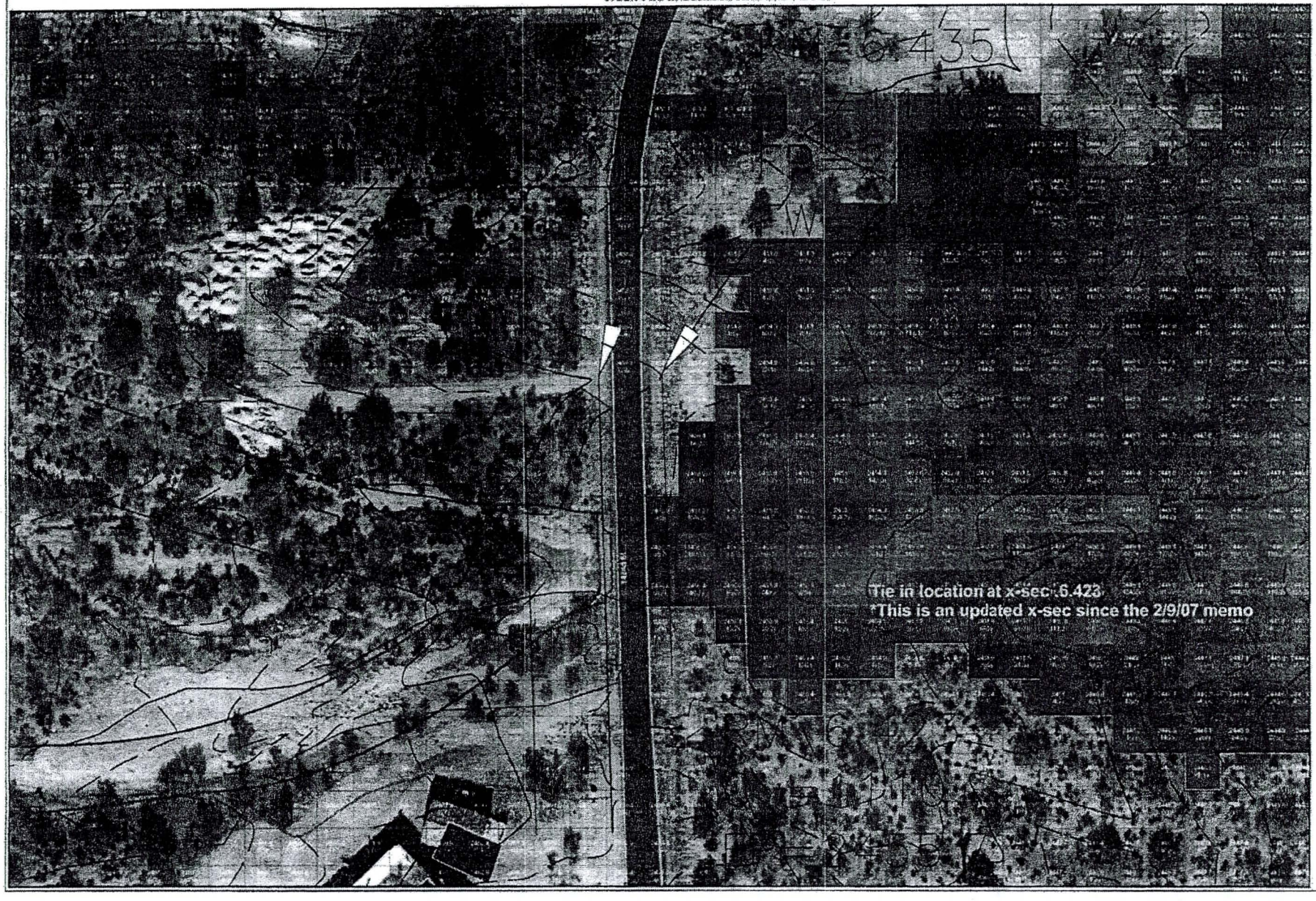
X-sec ID: 7.05

Elevations Taken Along Cross-section from left to right
Method Used: Mathematical Average

Grid Info:	Elev 1	Elev 2	Elev 3	Ave Cells?	Ave (if necessary)	Elevations along x-sec
1	2412.1	2411.7		Y	2411.9	2411.9
2	2412.1	2411.7		Y	2411.9	2411.9
3	2412.1	2411.9		Y	2412	2412
4	2411.2	2410.5		Y	2410.85	2410.85
5	2412	2410.5		Y	2411.25	2411.25
6	2411.6	2410.3		Y	2410.95	2410.95
7	2411.5	2409.9		Y	2410.7	2410.7
8	2411	2409.7		Y	2410.35	2410.35
9	2409.9	2409.7	2409.6	Y	2409.73	2409.73
10	2409.9	2409.6		Y	2409.75	2409.75
11	2410	2409.6		Y	2409.8	2409.8
12	2410.2	2409.6		Y	2409.9	2409.9
13	2410.2	2409.7		Y	2409.95	2409.95
14	2410.2	2409.8		Y	2410	2410
15	2410.2					2410.2
16	2409.9					2409.9
17	2409.9					2409.9
18	2409.8					2409.8
19	2409.6					2409.6
20	2409.4					2409.4
21	2409.2					2409.2
22	2409.2					2409.2
23	2409.2					2409.2
24	2409.9					2409.9
25	2409.7					2409.7

Resulting Final Averaged Water Surface Elevation: 2410.20
Present HEC-RAS WSEL 2408.86

Rio Verde ADMP
FLO-2D 100-year Preliminary Maximum Peak Discharge Results
Maximum of Results for FLO2D Model with and without Effects of Stock Tanks
Wash Tie-in between RAS and FLO2D

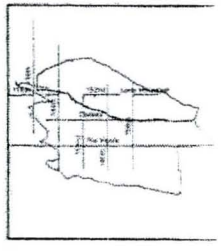


Legend

Max Q Raster w & wo Stock Tanks

N
W
E
S

Feet
0 15 30 60



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Rio Verde ADMP

Starting Water Surface Elevation Analysis for RAS model

Wash Name: RV Wash I

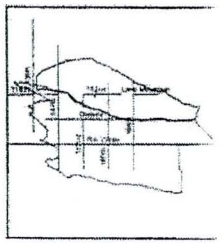
X-sec ID: 6.423

Elevations Taken Along Cross-section from left to right
Methods Used:Mathematical Average

Grid Info:	Elev 1	Elev 2	Elev 3	Ave Cells?	Ave (if necessary)	Elevations along x-sec
1	2455.9					2455.9
2	2455.9					2455.9
3	2456.1					2456.1
4	2456.3					2456.3
5	2456.3					2456.3
6	2456.2					2456.2
7	2456.1					2456.1

Resulting Final Averaged Water Surface Elevation: 2456.11
Present HEC-RAS WSEL 2455.71

Rio Verde ADMP
FLO-2D 100-year Preliminary Maximum Peak Discharge Results
Maximum of Results for FLO2D Model with and without Effects of Stock Tanks
Wash K Trib 11A tie-in between RAS and FLO2D



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Rio Verde ADMP

Starting Water Surface Elevation Analysis for RAS model

Wash Name: RV Wash K Trib 11A

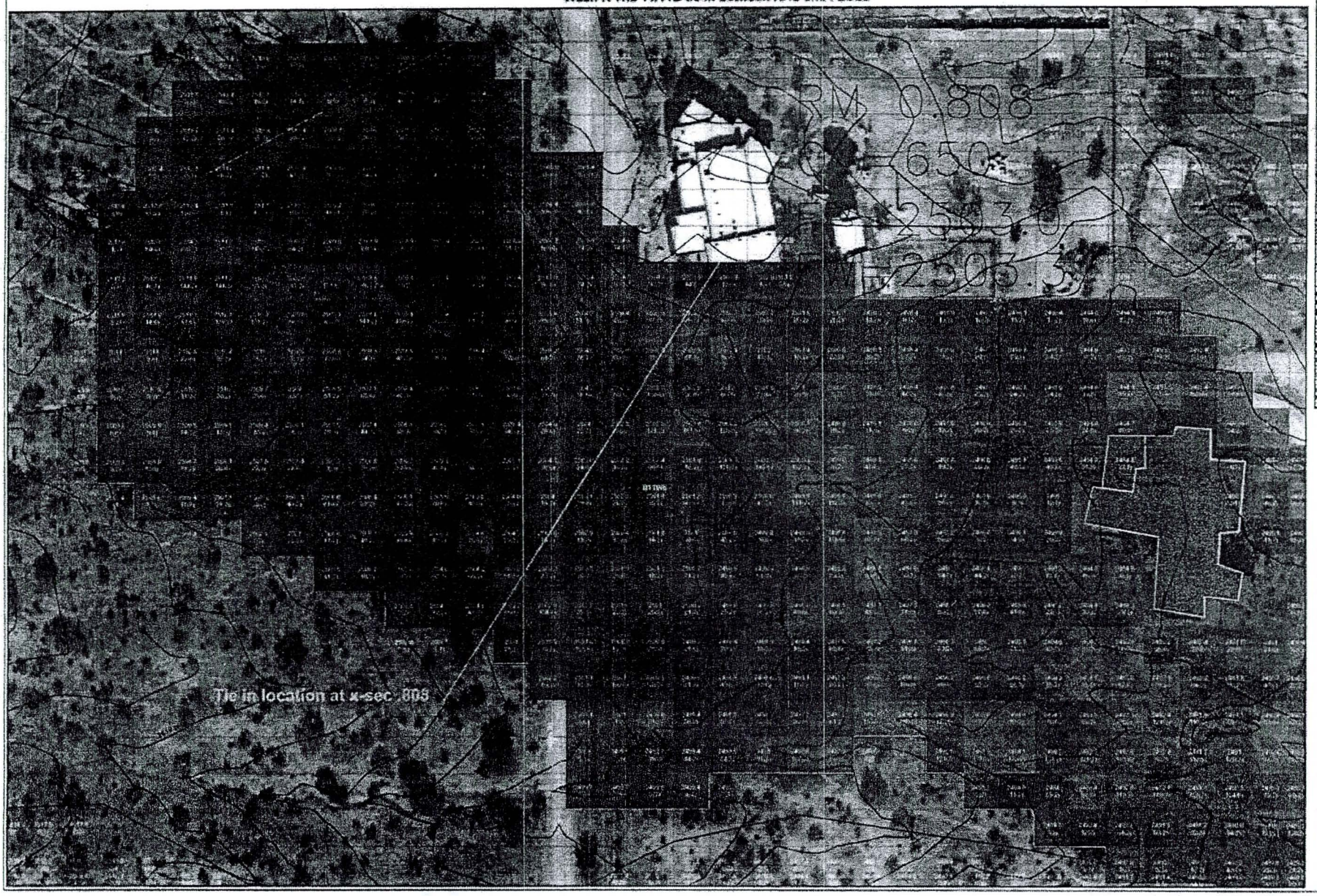
X-sec ID: 0.138

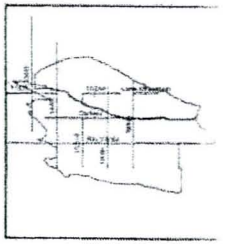
Elevations Taken Along Cross-section from left to right
Method Used: Interpolation

Grid Info:	Elev 1	Elev 2	Elev 3	Ave Cells?	Interpolated Elev	Elevations along x-sec
1	2457.1				2457	2457
2	2457.1				2457.1	2457.1
3	2456.8				2456.8	2456.8
4	2456.7				2456.7	2456.7

Resulting Final Averaged Water Surface Elevation: 2456.90
Present HEC-RAS WSEL 2455.91

Rio Verde ADMP
FLO-2D 100-year Preliminary Maximum Peak Discharge Results
Maximum of Results for FLO2D Model with and without Effects of Stock Tanks
Wash K Trib 11/11B tie-in between RAS and FLO2D





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Rio Verde ADMP

Starting Water Surface Elevation Analysis for RAS model

Wash Name: RV Wash K Trib 11/11B

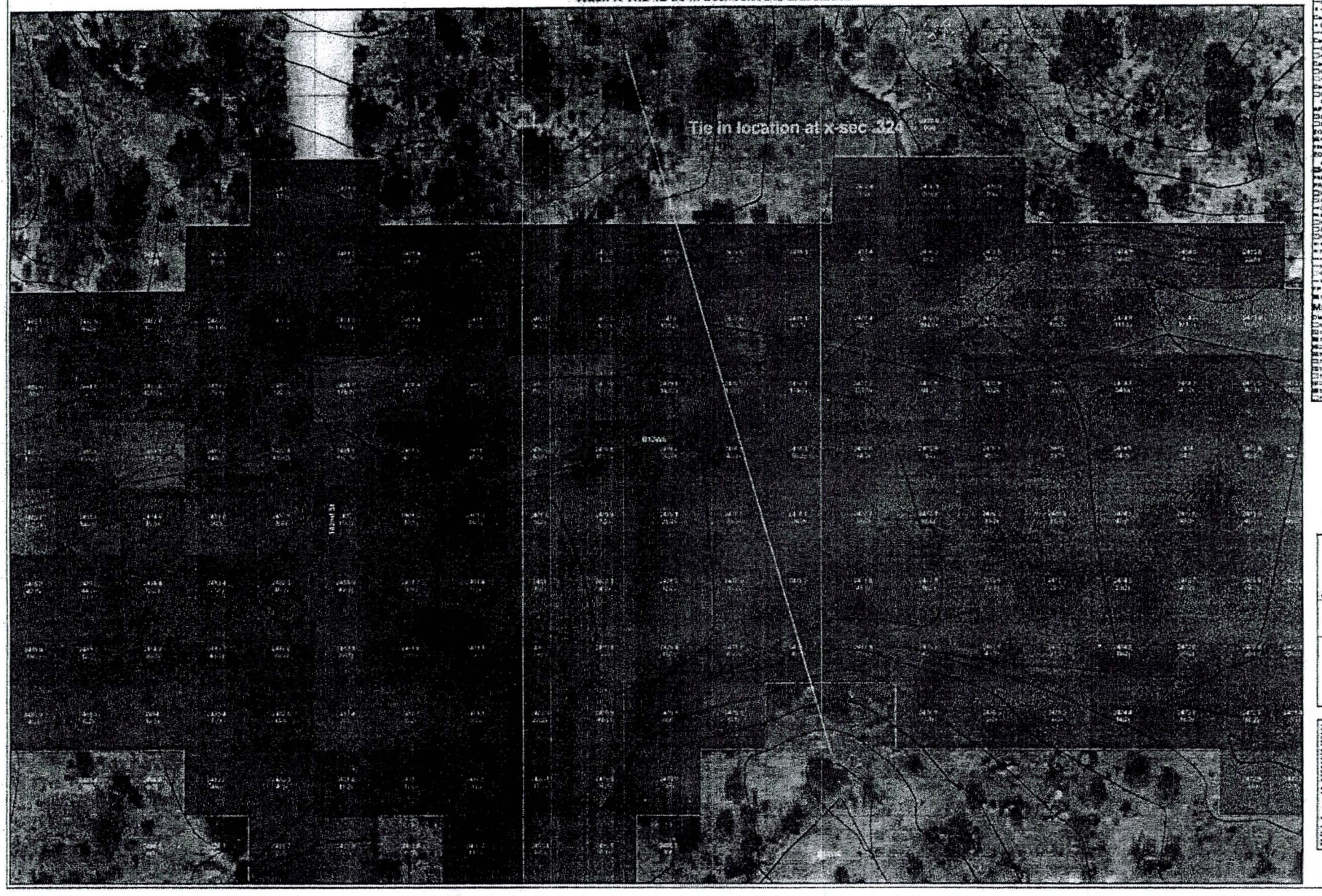
X-sec ID: 0.808

Elevations Taken Along Cross-section from left to right
Method Used: Mathematical Average

Grid Info:	Elev 1	Elev 2	Elev 3	Ave cells?	Ave (if necessary)	Elevations along x-sec
1	2503.6					2503.6
2	2503.3					2503.3
3	2503.4					2503.4
4	2502.7	2503.9		y	2503.3	2503.3
5	2503	2502.6		y	2502.8	2502.8
6	2502.8					2502.8
7	2504	2502.9		y	2503.45	2503.45
8	2503.6					2503.6
9	2503.1					2503.1
10	2503.6					2503.6
11	2504.3	2503.2		y	2503.75	2503.75
12	2503.6					2503.6
13	2503.2					2503.2

Resulting Final Averaged Water Surface Elevation: 2503.35
Present HEC-RAS WSEL:2503.02

Rio Verde ADMP
FLO-2D 100-year Preliminary Maximum Peak Discharge Results
Maximum of Results for FLO2D Model with and without Effects of Stock Tanks
Wash K Trib 12 tie-in between RAS and FLO2D



Legend

Max Q Raster w & wo Stock Tanks

N
W
E
S

Feet
0 10 20 40

146

Rio Verde ADMP

Starting Water Surface Elevation Analysis for RAS model

Wash Name: RV Wash K Trib 12

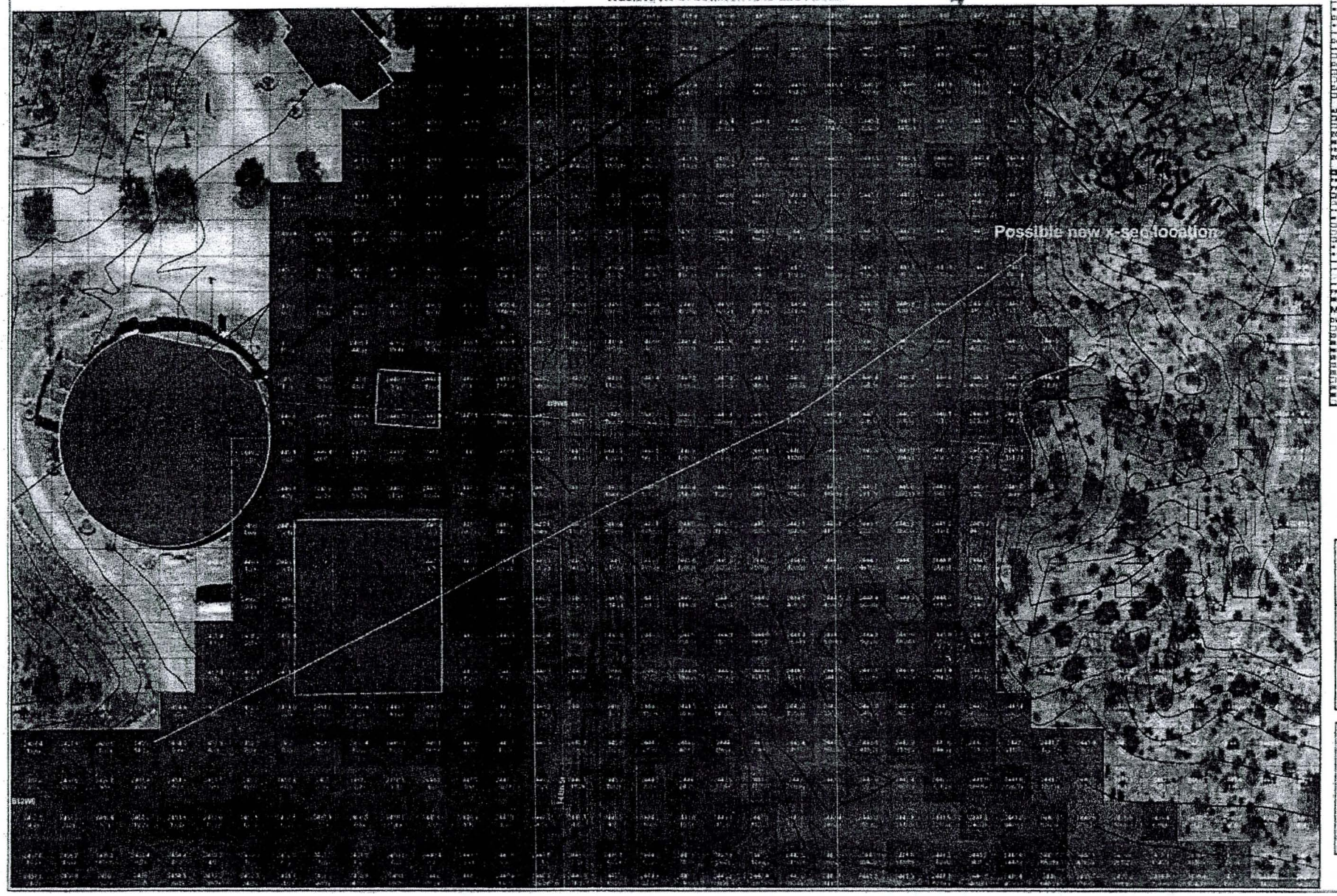
X-sec ID: 0.324

Elevations Taken Along Cross-section from left to right
Method Used: Mathematical Average

Grid Info:	Elev 1	Elev 2	Elev 3	Ave cells?	Ave (if necessary)	Elevations along x-sec
1	2478.6					2478.6
2	2478.6					2478.6
3	2478.5					2478.5
4	2478.5					2478.5
5	2478.5					2478.5
6	2478.5					2478.5
7	2478.7					2478.7
8	2479.3					2479.3

Resulting Final Averaged Water Surface Elevation: 2478.65
Present HEC-RAS WSEL 2477.84

Rio Verde ADMP
FLO-2D 100-year Preliminary Maximum Peak Discharge Results
Maximum of Results for FLO2D Model with and without Effects of Stock Tanks
Wash K Tie in between RAS and FLO2D



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Flood Control District
of Maricopa County

INTEROFFICE MEMORANDUM

Date: February 2, 2007

To: Timothy S. Phillips, P.E., Chief Engineer and General Manager

From: Felicia Terry, P.E., CFM, PPM Division

Subject: Rio Verde Area Drainage Master Plan – Regulating the Floodplains (FCD Contract 2001C056)

The Recommended Alternative for the Rio Verde ADMP is to delineate floodplains using HEC-RAS and FLO-2D and manage the single lot development using "rules" specifically developed for floodplains in the Rio Verde area. Traditional floodway modeling cannot be reasonably applied due to the braided and distributary nature of most washes and areas where the floodplain is predominantly sheetflow. Because of this, delineation of floodways does not seem necessary, but stricter management of the floodplains will be implemented. We are recommending that when development is proposed within the floodplain that the following rules must apply.

1. Development within sandy bottom wash areas (wash) is strongly discouraged. Every effort must be made to site residential structures outside of the washes. If it is not possible to site the residential structure and associated improvements within the lot setback requirements without disturbing the wash, then the wash shall be rerouted. Rerouting the wash shall not result in adverse impacts to surrounding and downstream properties. Adverse impacts are defined as any increase in the 100-year flood base water surface elevation, increases in flow depth and/or velocity to upstream, downstream, or adjacent properties, and any divergence of flow (change in flow path) from existing conditions where flow enters and exits the property. Erosion/scour protection shall be considered in the design of the rerouted wash.

2. All development shall submit a Drainage Report sealed by a Civil Engineer licensed to practice within the State of Arizona. Using discharges from the Rio Verde Area Drainage Master Plan, an engineer must show using the US Army Corps of Engineers HEC-RAS program (HEC-RAS) or District approved program that the proposed development will result in no increase (0.0 ft) in the existing condition (pre-development) water surface elevation, or any adverse impacts to adjacent, upstream, or downstream property. The proposed development site shall be modeled first for the existing condition, which will be used as a baseline, and then compared to the proposed development model. HEC-RAS shall be run in the mixed flow regime to show no increase in velocities and for use in design of erosion protection, and shall be run in subcritical regime to show no increase in water surface elevation.

2801 West Durango Street Phoenix, Arizona 85009 Phone: 602-506-1501 Fax: 602-506-4601

In addition, development within the FLO-2D study area shall be modeled using the total flow rate crossing the property. If the floodplain is wider than the parcel, the engineer shall end HEC-RAS cross sections at the property line, extended vertically. Development within the 1-dimensional (HEC-RAS) study area shall be modeled similarly. For these cases, the engineer shall meet with the District before beginning the drainage analysis to agree on a peak discharge estimate to use for the property in question.

3. The lowest floor elevation of the residential structure must be elevated a minimum of two (2) feet above the existing condition Base Flood Elevation or 18-inches above the highest point of natural ground within 10 feet of the structure, whichever is greater. Erosion protection for the pad must be engineered and sealed by a Civil Engineer licensed to practice within the State of Arizona.

4. It is recommended that new residences outside the 100-year floodplain and within the Rio Verde ADMP study area be elevated a minimum of eighteen (18) inches above highest adjacent ground within 10 feet of the structure.

When the Rio Verde ADMP is adopted by the Board of Directors, these "rules" will be used by the Floodplain Management Branch to manage the development within the Rio Verde floodplains. This memo when signed by the Chief Engineer and General Manager of the Flood Control District authorizes implementing these "rules" as the best available technical information until the Board adopts the ADMP.

Please concur and authorize below the use of this new data.

Felicia Terry, P.E., CFM Project Manager Date:	Timothy S. Phillips, P.E. Date: Chief Engineer and General Manager
Tim Murphy, P.E., CFM Flood Delineation Branch Manager Date:	Tom Loomis, P.E., RLS, CFM Special Projects Branch Manager Date:
Kathryn Gross, CFM Floodplain Delineation Reviewer Date:	Ed Raleigh, P.E. Engineering Division Manager Date:
Joe Tram, P.E., CFM Regulatory Division Manager Date:	
Russ Miracle, P.E. PPM Division Manager Date:	
File Copies: 1. _____ 2. _____	YES ☐ GIS Posted (Pending Floodplain Only) Date: ☐ No County Permits in this area Date:

2801 West Durango Street Phoenix, Arizona 85009 Phone: 602-506-1501 Fax: 602-506-4601

Josh Papworth

From: Kathryn Gross - FCDX [kag@mail.maricopa.gov]
Sent: Friday, May 13, 2005 2:00 PM
To: Frank Brown
Cc: Carlos Carriaga; Felicia Terry - FCDX
Subject: RE: Black Hills Tank

Regarding the without tank model, I think that the concentration point CB3B2 might be the best to delineate both upstream and downstream of 136th street. At the tank it appears to be 2090 cfs (CB2B6) and at 136th St it appears to be 1835 cfs (CP3B2). I would not recommend using a smaller discharge downstream of the larger discharge. Concentration point where Wash 19 and 18 combine should be used for that discharge and so on and so forth until we hit the FLO-2D tie-in.

Do you agree to this approach, Frank? I do not see it impacting the hydrology models. Its just a matter of which number we extract from the models.

Kathryn

-----Original Message-----
From: Frank Brown [mailto:fbrown@dibblecorp.com]
Sent: Friday, May 13, 2005 9:04 AM
To: Kathryn Gross - FCDX
Cc: Carlos Carriaga
Subject: Black Hills Tank

Hello Kathryn,

I want to be sure I understand the floodplain scenario near Black Hills Tank, before we make hydrology revisions. I cannot recall what hydrology revisions remain from Phase 1 for the without tank scenario.

We will be running the with and without models for the tank:

With Tank: This means that we will assume the tank is in place and is competent to withstand the 100-year flood. The floodplain delineation flow rate for 7B Spill Wash is the attenuated flow from the tank, but only from the tank to the confluence with 18 Wash (RVProposed shape file designation). The floodplain in this reach will be similar to the Phase 1 floodplain.

Without tank: We will assume that the tank is washed out, or is mechanically breached by a government agency. The hydrology will be revised for all points downstream. For 20 Wash and 18 Wash, this will be the unattenuated flow. From the confluence of 17 Wash and 18 Wash, the floodplain delineation will use the unattenuated flow rate. The floodplain in this reach will be different from the Phase 1 floodplain.

For the with and without scenarios, there will only be one floodplain delineation, based on the worst case (highest flow) from two different hydrology models. The District will also revise the 2D model with the higher flow rates for the without tank scenario.

Frank

Frank Edward Brown, P.E., CFM

Project Manager
Dibble & Associates

Phone 602.957.1155
FAX 602.957.2838
e-mail FBrown@Dibblecorp.com

10-02033 letter

Frank Brown

From: Kathryn Gross - FCDX [kag@mail.maricopa.gov]
Sent: Thursday, May 05, 2005 12:04 PM
To: Frank Brown
Subject: RE: Floodplain questions

Frank,

Sorry it has taken so long for me to get back with you on this. The purpose for running a model with the tanks not in place is essentially a FEMA requirement to model the two conditions and model the worse floodplain. Since the tanks and their training dikes are not FEMA certified structures and are not maintained we should not be taking them into consideration in our modeling; therefore, we need to model both situations. As far as the no longer existent stock tank at Cavedale and 138th we do not have to worry about it as it is gone. The engineer for the site was required to look into the impacts of the removal. As will all other individuals who may wish to remove or modify tanks on their property.

We will be running no tank FLO-2D scenarios as well.

Does that answer your questions? Let me know if you have any more.

Kathryn

-----Original Message-----
From: Frank Brown [mailto:fbrown@dibblecorp.com]
Sent: Tuesday, May 03, 2005 5:12 PM
To: Kathryn Gross - FCDX
Subject: Floodplain questions

Kathryn,

Could you provide a little more background on the stock tanks? Will all of them be completely removed, with the grading to mimic the before stock tank contours? How will the ones completely on private property be handled, i.e., what if property owner does not want the tank removed? There is one tank (near Cavedale And 138th Drive- in your review comments) that is breached so much that it holds no water: will the rest of the berm grading be removed?

Will the floodplains delineated by the 2D model also have a: with and without stock tanks scenario?

Frank

Frank Edward Brown, P.E., CFM
Project Manager
Dibble & Associates

Phone 602.957.1155
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e-mail FBrown@Dibblecorp.com

B.4.2 General Correspondence: Copy of Public Notices

AFFIDAVIT OF PUBLICATION

Rio Verde ADMP Legal Ad

ANNOUNCEMENT OF INTENT TO PERFORM FLOODPLAIN DELINEATION STUDY OF SELECTED WATERCOURSES IN THE RIO VERDE WATERSHED, SCOTTSDALE, AZ AND UNINCORPORATED MARICOPA COUNTY, AZ.

The Flood Control District of Maricopa County (FCDMC), under authority of the National Flood Insurance Act of 1968 (PL-90-448), as amended, and the Flood Disaster Protection Act of 1973 (PL93-234) is funding a detailed floodplain/floodway delineation study of flooding areas associated with the watercourses within the Rio Verde Watershed. FCDMC has contracted with Dibble and Associates, Inc. to carry out the study under the Rio Verde Area Drainage Master Plan (FCD 2001C056).

This study will evaluate the extent of flood-prone areas, and the results will be used by local jurisdictions to regulate development within the identified floodplain/floodway and will be submitted to the Federal Emergency M[illegible]ment Agency (FEMA) in order to update [illegible] Insurance Rate Maps (FIRMs), which [illegible]o determine Federal flood insurance rat[illegible] The study encompasses Sections 7, 13-15, and 18-36 of Township 5North Range 6East, Sections 19 and 30 of Township 5North Range 7East, and Sections 1, 12, 14, 23-26, 35 and 36 of Township 5North Range 5East.

This announcement is intended to inform all interested persons and communities of the commencement of this study, to provide concerned citizens with an opportunity to bring any relevant technical information to the attention of the FCDMC/FEMA. This information will be considered during the course of the study. Your comments should be addressed to Ms. Felicia Terry, P.E., Project Manager at the Flood Control District of Maricopa County, 2801 West Durango Street, Phoenix. AZ 85009, or e-mail: fet@mail.maricopa.gov , or phone: (602) 506-3111.

Published April 28; May 12, 2005

Arizona Business Gazette
The business resource

PO BOX 194
Phoenix, Arizona 85001-0194
(602) 271-7300

STATE OF ARIZONA
COUNTY OF MARICOPA } SS.

Tabitha Antoniadis, being first duly sworn, upon oath deposes and says: That she is a legal advertising representative of the Arizona Business Gazette, a newspaper of general circulation in the county of Maricopa, State of Arizona, published weekly at Phoenix, Arizona, and that the copy hereto attached is a true copy of the advertisement published in the said paper on the dates indicated.

4/28/2005
5/12/2005

Sworn to before me this
19th day of
July A.D. 2005

OFFICIAL SEAL
MARILYN GREENWOOD
NOTARY PUBLIC-ARIZONA
MARICOPA COUNTY
My Comm. Expires May 23, 2007

Marilyn Greenwood
Notary Public

Benefit To The Community

By taking an area wide approach to flood control and planning for future development, the Flood Control District intends to create a comprehensive drainage plan to provide regional flood control measures.

This plan will make sure that no one property owner has to bear the brunt of a piece-meal flood control burden and that all are protected from the devastating effects of flooding.

Get Involved

Over the course of the next two years the Flood Control District will be working in your community to provide a solution to area flooding and drainage problems. We invite you to get involved in the problem solving process now.

During the course of the plan, the Flood Control District will hold numerous informational meetings and open houses and will invite the public to provide input on the plan and the alternative solutions.

At any point during the two year process, please do not hesitate to contact the Flood Control District with any questions, queries, insights, or concerns you may have on this plan.

More Information

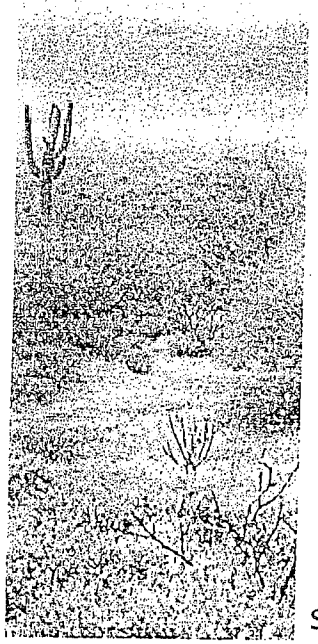
If you would like to learn more about the Rio Verde Area Drainage Master Plan process or express your ideas to the planning team, please contact:

Felicia Terry, P.E, Project Manager
Flood Control District of Maricopa County
602-506-8111
fet@mail.maricopa.gov

www.fcd.maricopa.gov/projects/rioverde

Flood Control District of Maricopa County
2801 West Durango Street
Phoenix, Arizona 85009
(602)506-1501

Rio Verde Area Drainage Master Plan



Spring 2002

Backgr. .id

Growth and development in the Rio Verde area began back in the 1970s. Recently due to the proximity and rural setting of the area, Rio Verde's population has swelled significantly and the area is rapidly developing single lot family residences and subdivisions.

The Flood Control District of Maricopa County believes that development is having a significant impact on Rio Verde's drainage needs and flood protection.

Arizona Revised Statutes Title 48, Chapter 21, requires the Board of Directors of the Flood Control District to identify flood control problems and plan for the construction of facilities to eliminate or minimize flooding problems.

Study Purpose

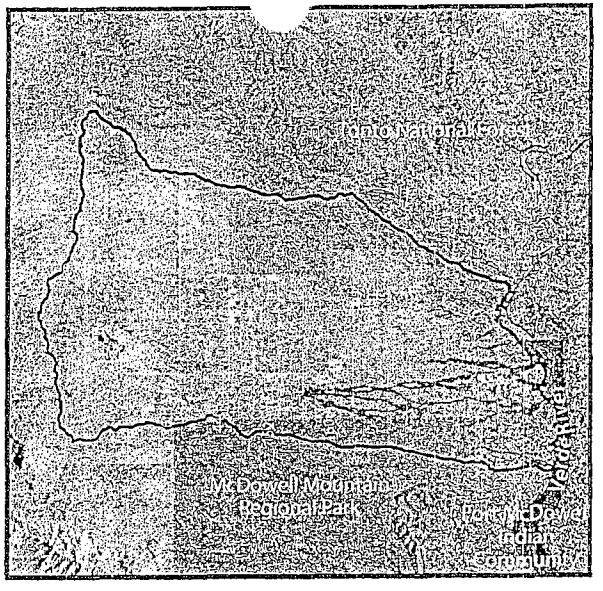
The purpose of the Rio Verde Area Drainage Master Plan is to identify flooding problems, sources, and potential hazards in the Rio Verde area.

During this process, the Flood Control District of Maricopa County will identify a range of community-based solutions which will reduce or eliminate damages to property or loss of life from storm water flooding, thus helping existing and future area residents.

The plan will incorporate the ideas and concerns of the Rio Verde area residents and will be responsive to future land use development.

Study Issues

- Regional Public Safety
- On-going Area Development
- Parcel by Parcel Drainage Review
- Obstruction/Diversion of Washes
- Individual Property Rights



Area

The area of study for the Rio Verde plan encompasses almost 40 square miles and is located in northeastern Maricopa County.

It is bounded on the east by the Verde River, on the north by the Tonto National Forest, on the west by the 115th Street Alignment, and on the south by the McDowell Mountain Regional Park.

The area is characterized with mild slopes from the McDowell Mountains to the Verde River and contains numerous braided, meandering, sandy bottom washes and channels.

Project Schedule

This effort will begin in May 2002 and is expected to be completed within 24 months. The project is divided into three phases, which are as follows:

Phase I (one year) includes: identification of both drainage problems and the impacts of development, hydraulic modeling and analysis for forecasting potential future flooding problems, production of interim development guidelines, and the development of preliminary feasible solutions.

Phase II (six months) includes: detailed analysis, refinement, and evaluation of the alternative solutions to determine a recommended plan.

Phase III (six months) involves the implementation of the recommended Master Drainage Plan.

Each phase will include public information, education and coordination.

Rio Verde Area Drainage Master Plan

Project Area

The area of the study for the Rio Verde plan encompasses almost 40 square miles and is located in northeastern Maricopa County.

It is bounded on the east by the Verde River, on the north by the Tonto National Forest, on the west by the 115th Street alignment, and on the south by the McDowell Mountain Regional Park.

If you are unable to attend the public meeting and have questions regarding the Rio Verde ADMP, please visit our website or contact...

Felicia Terry, P.E., Project Manager
Flood Control District of
Maricopa County
602-506-8111
fet@mail.maricopa.gov

www.fcd.maricopa.gov

Flood Control District of Maricopa County
2801 West Durango Street
Phoenix, Arizona 85009
(602)506-1501

Flood Control District of Maricopa County

Public Meeting Reminder:

Rio Verde Area Drainage Master Plan

August 6, 2002
6-8 p.m.
Tonto Verde
Country Club

Flood Control District of Maricopa County
RIO VERDE AREA DRAINAGE MASTER PLAN
PUBLIC MEETING

The District invites interested residents and property owners to attend a public meeting for the Rio Verde Area Drainage Master Plan.

The plan will identify flooding problems, sources, and potential hazards in the area, and then identify a range of community-based alternatives to reduce the problems.

Come learn more about the study and how it might affect you.

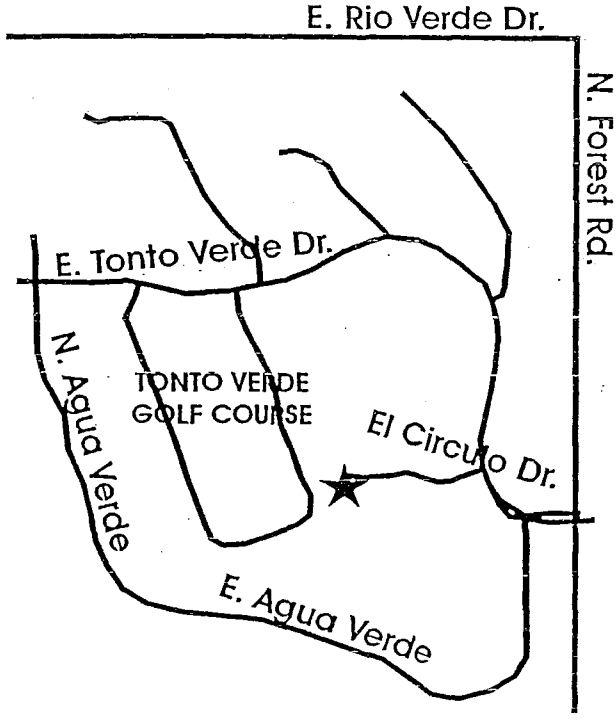
Members of the study team will be available to answer questions.

The plan, which will take approximately two years, will incorporate the ideas and concerns of the Rio Verde area residents and will be responsive to future land use development.

Date: Tuesday, August 6, 2002

Time: 6:00 pm to 8:00 pm

Location: Tonto Verde Country Club
18401 El Circulo Drive



www.fcd.maricopa.gov

Rio Verde Area Drainage Master Plan

Since the 1970s, the Rio Verde area, which is located east of Scottsdale and north of Fountain Hills in unincorporated Maricopa County, has been rapidly developing with single lot family residences and subdivisions. Growth and development is having a significant impact on Rio Verde's drainage needs and flood protection.

Arizona State Statutes require the Flood Control District of Maricopa County (District), to identify flood control and drainage problems and then to develop a plan to mitigate such problems. The Rio Verde area has been identified by the District as an area in need of study and planning and the District has begun work on the Rio Verde Area Drainage Master Plan.

The primary goal of the District is to reduce the risks of flood loss; to minimize the impacts of floods on human safety, health, and welfare; and to restore and preserve the natural and beneficial values served by floodplains.

As part of the plan, the District will identify flooding and drainage problems, sources, and hazards, and then identify a range of community-based alternatives to reduce the problems. The plan, which will take approximately two years, will incorporate the ideas and concerns of the Rio Verde area residents and will be responsive to future land use development.

For more information please contact:

Felicia Terry, P.E., Project Manager
Flood Control District of Maricopa County
602-506-8111
fet@mail.maricopa.gov

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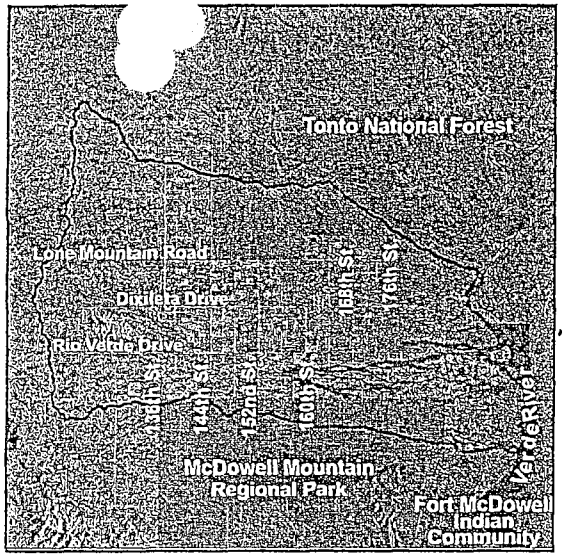
(602)506-1501

Flood Control District of Maricopa County

Rio Verde Area Drainage Master Plan

Public Meeting
August 6, 2002
6-8 p.m.
Tonto Verde
Country Club

1 of 2



Project Area

The area of the study for the Rio Verde plan encompasses almost 40 square miles and is located in northeastern Maricopa County.

It is bounded on the east by the Verde River, on the north by the Tonto National Forest, on the west by the 155th Street alignment, and on the south by the McDowell Mountain Regional Park.

More Information

If you would like to learn more about the Rio Verde Area Drainage Master Plan study or express your ideas to the planning team, please contact:

Felicia Terry, P.E., Project Manager
Flood Control District of Maricopa County
602-506-8111
fet@mail.maricopa.gov

www.fcd.maricopa.gov

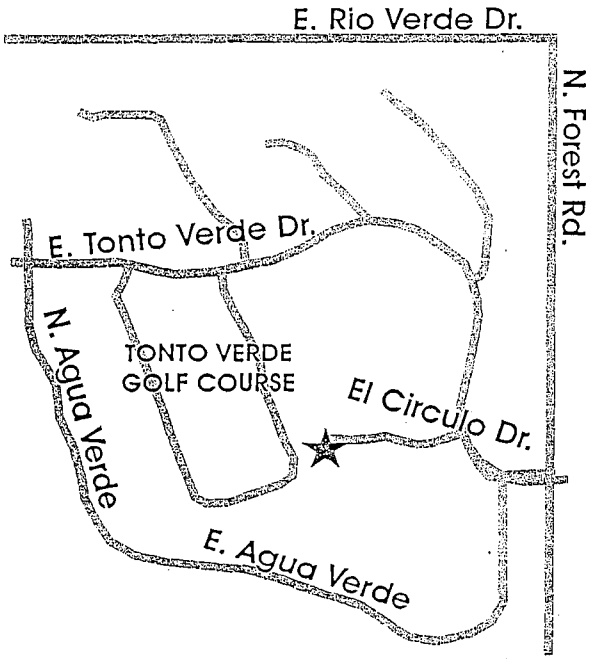
..io Verde Area Drainage Master Plan
Public Information Meeting & Open House

The District is conducting the first public meeting for the Rio Verde Area Drainage Master Plan and invites you to attend. This public meeting is being held for residents to learn more about what the District will be doing in the community over the next two years.

Date: August 6, 2002
Time: 6:00 pm to 8:00 pm

Presentation: 6:30 pm to 7:30 pm

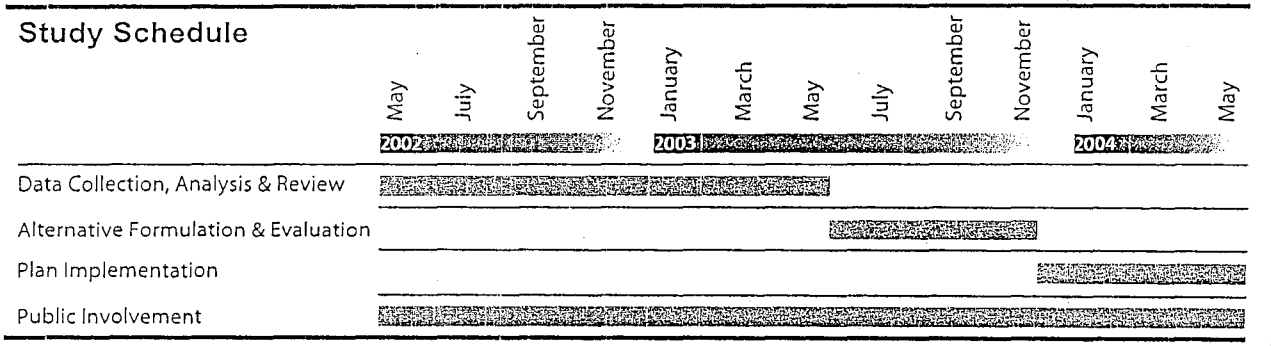
Location: Tonto Verde County Club
18401 El Circulo Drive
Rio Verde, Arizona 85263



How Can You Help?

We would like your comments. Please come to the open house and provide your comments. There will be a presentation on the project from 6:30 pm to 7:30 pm to include time for questions and answers.

Study Schedule



B.5 Contract Documents (Scope of Work)

EXHIBIT A

CLARIFICATION OF GENERAL SCOPE OF WORK FOR PHASES II & III

February 1March 14, 2005

CONTRACT FCD 2001C056

RIO VERDE AREA DRAINAGE MASTER PLAN

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1.0 GENERAL DESCRIPTION

1.1 Project Description

1.1.1 This scope of work is for professional engineering services necessary for developing an Area Drainage Master Plan (ADMP) which will identify drainage problems, and develop cost-effective solutions to alleviate or manage flooding in the Rio Verde area. This scope of work includes but is not limited to identification of drainage problems and the impact of development in the area, hydrology, hydraulics, minor surveying, development of alternative solutions, public involvement, and possibly FEMA floodplain delineations.

1.2 Purpose & Need

1.2.1 The purpose of the Rio Verde ADMP is to identify the flooding problems, flooding sources, and flooding hazards in the Rio Verde area and identify alternatives to mitigate the identified concerns. Arizona Revised Statutes Title 48, Chapter 21, requires the Board of Directors to identify flood control problems and plan for the construction of facilities, which will eliminate or minimize flooding problems.

1.2.2 There are three (3) major objectives of the ADMP. The first objective is to develop a comprehensive list of known flooding problems impacting the study area, which documents the need and necessity for the project. The second objective is to develop alternative solutions to alleviate or mitigate the flooding problems from flows of a 100-year storm. The third objective is to produce a recommended solution to alleviate or manage the flooding resulting from the 100-year storm.

1.2.3 Rio Verde is rapidly developing with one-acre lot single-family residences and subdivisions. The area is a distributary flow system that contains numerous braided channels of moveable sandy bottom beds. The impact that development will have on the drainage system needs to be defined and investigated.

1.2.4 This master plan is expected to first perform an engineering investigation that includes the review of existing hydrology and the development of future condition hydrology, review of the floodplain delineations that the FCDMC currently has on file, and hydraulic analyses of the distributary flow system. These engineering investigations will identify feasible flood control features and/or measures for the study area to reduce potential damages to property or loss of life from storm water runoff in the Rio Verde area.

1.3 Phasing of the Project

The ADMP is to be completed in three phases.

1.3.1 Phase I is to identify the drainage problems and the impacts of development, review the existing hydrology and revise as necessary and to update the hydrology for future conditions. Phase I includes performing hydraulic analysis, evaluating the current floodplain delineations, producing interim development guidelines, and developing preliminary feasible alternatives to be recommended

for consideration in Phase II of the study. Public information, education and coordination will also be included in Phase I.

1.3.2 Phase II will be conducted only if feasible implementable alternatives are identified during the Phase I effort. Phase II includes detailed analysis of the selected engineering alternatives, which could include development guidelines, floodplain delineation, structural solutions or a combination of all three. A public involvement program will also be involved in the Phase II effort. The recommended alternative will be selected during this phase.

1.3.3 Phase III involves the refinement of the recommended alternative. If floodplain delineation is part of the recommended alternative, selected washes will be delineated at this time. Preliminary Design Plans will be prepared for any structural aspect of the recommended plan. Development guidelines will be refined and procedures to implement the guidelines within the County system will be evaluated and recommended. A Master Drainage Plan report will be prepared at this time.

1.3.4 Phase I shall be completed for a lump sum fixed price. Phase II shall be a lump sum fixed fee, which is based upon information currently available and that will be renegotiated when Phase I is completed. Phase III shall be a lump sum fee based on the information currently available and will be renegotiated at the completion of Phase II.

1.4 Location

1.4.1 The area of study for the Rio Verde ADMP is as shown on Figure 1. The ADMP study area is generally bounded by the Tonto National Forest on the north, McDowell Mountain Regional Park on the south, approximately 115th Street alignment to the west, and the Verde River to the east. The total ADMP and watershed area is approximately forty (40) square miles.

1.5 Participants

1.5.1 The CONSULTANT shall coordinate with but is not limited to the following organizations for information and input into the study:

Flood Control DISTRICT of Maricopa County (DISTRICT)
Maricopa County Department of Transportation (MCDOT)
Maricopa County Planning and Development
City of Scottsdale
Tonto National Forest
Arizona State Land Department (ASLD)
Maricopa County Parks and Recreation
Fort McDowell Indian Community
Rio Verde Horseman's Association
Rio Verde Foothills Alliance
Rio Verde Master Planned Community
Tonto Verde Master Planned Community

1.6 Schedule

1.6.1 The CONSULTANT shall complete the Phase I portion of the study within 365 days from issue of the first Notice-To-Proceed (NTP) date. Phase II of the project shall be completed within 180 days from issue of the second NTP date. Phase III shall be completed within 180 days from the third NTP date.

1.7 Project Standards and References

1.7.1 All work under this scope of work shall be in accordance with the District's Consultant Guidelines dated August 1, 2000 unless otherwise noted in this scope of work.

1.7.2 General references and standards available are as outlined in Section 20, Consultant Guidelines, August 1, 2000.

1.7.3 The DISTRICT will provide the following:

- Two (2) foot contour aerial mapping of the project area.
- Aerial Photos
- Recent stereo photographs of the study area
- Digital ortho-rectified aerial photographs of the study area for use as a base map
- Rio Verde South Floodplain Delineation Study,
- Floodplain Delineation study of Rio Verde South Extension
- Rio Verde North Floodplain Delineation Study
- Rio Verde North Extension Floodplain Delineation Study

1.8 Out of Scope Items

1.8.1 Should the CONSULTANT feel that the DISTRICT, or any partner such as a city or agency staff, is requiring the CONSULTANT to provide work that is not within the scope of the contract documents, the CONSULTANT must notify the District Project Manager immediately in writing and describe the work, which the CONSULTANT feels is out of scope. Such notification shall be provided to the District Project Manager prior to the commencement of any such out-of-scope work.

1.8.2 It is the CONSULTANT'S sole responsibility to assure that no additional services beyond the Scope of Work defined in the contract documents shall commence without the written authorization of the District Project Manager.

1.8.3 Retroactive requests for additional fee shall neither be considered nor approved.

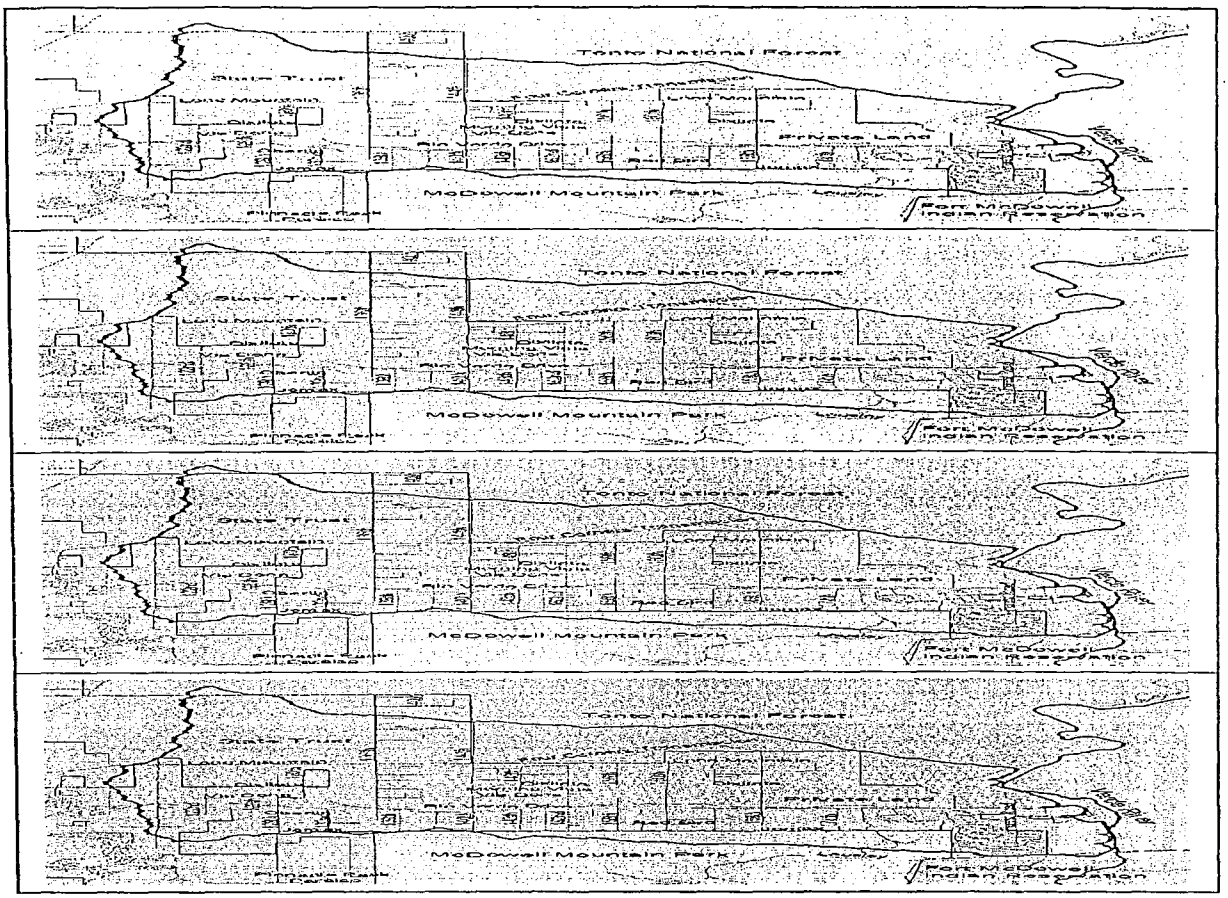


FIGURE 1. RIO VERDE ADMP – STUDY AREA MAP

2.0 PHASE I - GENERAL TASKS

2.1 Existing Conditions Analysis

2.1.1 The CONSULTANT shall collect and review pertinent data from the DISTRICT, MCDOT, and other sources. Data to be collected will include, but is not limited to; existing topographic mapping, utility quarter sections, as-built plans for existing structures, FEMA Flood Hazard Boundary Maps, any Letters of Map Amendment and/or Revisions, drainage reports, site plans, future drainage improvement plans, land use plans, and development plans. Interviews should be arranged with appropriate agencies or associations for information on drainage problems in the area. The CONSULTANT shall also develop a comprehensive list of possible existing and proposed developments impacting the study area.

2.1.2 The CONSULTANT shall develop a comprehensive list of flooding and drainage problems impacting the study area. This is an essential part of the Phase I task to document the need and necessity of the project. The CONSULTANT will research and obtain historic flood data such as precipitation data and newspaper articles to help establish past flooding within the study area. The CONSULTANT will provide a map, which indicates the location of flooding or problem areas identified by the flood data obtained.

2.1.3 The CONSULTANT shall prepare an inventory of relevant drainage facilities, stock ponds, etc., within the study area and note the condition, capacity, level of protection, and ownership of these structures. These facilities will become part of the base map for alternative analysis. The CONSULTANT shall make maximum use of these facilities, where feasible, as part of the alternative plans.

2.1.4 The CONSULTANT shall research, and become familiar with existing hydrologic/hydraulic studies and models.

2.1.5 The CONSULTANT shall prepare Part 1 of the Area Drainage Master Plan Study Report as outlined in Section 5.5.5.

2.1.6 The DISTRICT will provide to the CONSULTANT a preliminary Environmental Overview for use in the Alternatives Formulation (Phase I) portion of the work.

2.2 Alternatives Formulation

2.2.1 The CONSULTANT shall prepare an existing constraints map for presentation at the Alternatives Formulation Meeting. The presentation shall identify existing flooding problem areas and the results from data collection and existing studies in the area. The CONSULTANT will provide several seed ideas for potential solutions and consideration as part of a brainstorming session. The DISTRICT will determine who is to participate in the Alternatives Formulation Meeting.

2.2.2 The CONSULTANT shall review the alternatives generated during the brainstorming session and shall recommend a minimum of four (4) alternatives or combination of alternatives to be studied further. The CONSULTANT shall meet with the DISTRICT to approve the alternatives to be analyzed. The

alternatives shall consist of the "No Action" alternative and at least three (3) alternatives, which may address both non-structural (floodplain delineations, development guidelines, etc.) and structural alternatives. Alternatives shall be analyzed on an engineering basis to ensure the feasibility of each alternative. The focus of this feasibility level evaluation is to determine if a suitable project alternative exists to alleviate or manage flooding as determined during the Phase I analysis.

2.2.3 The CONSULTANT shall document each alternative with a schematic drawing (if appropriate) and narrative description. The CONSULTANT shall further identify the strength, weakness, estimated costs, opportunities and constraints of each alternative.

2.2.4 The CONSULTANT shall produce, interim development guidelines. The CONSULTANT shall look at what kind of construction requirements could be implemented for structures and roads. These requirements shall include but not be limited to finish floor elevations, setbacks from washes, construction of walls and road alignments. The CONSULTANT shall produce the guidelines in a document format that the DISTRICT will be able to provide to developers or landowners as a guide to construction on their property. The CONSULTANT shall develop possible methods to implement the Guidelines within the County.

2.2.5 The CONSULTANT shall prepare Part 2 of the Rio Verde ADMP Study Report as outlined in Section 5.5.5.

3.0 PHASE I - SPECIFIC TASKS

3.1 Field Survey

3.1.1 The CONSULTANT shall obtain field surveys of culverts, and drainage structures when record drawings or previous survey data is not available as necessary to supplement and/or update data available from the floodplain delineation study.

3.2 Hydrologic Analysis

3.2.1 The CONSULTANT shall model the study area using a combination of HEC-1 and FLO-2D methodology. The Piedmont Assessment (Task 3.4.1) will identify areas of one-dimensional flow and areas of two-dimensional flow characteristics. The CONSULTANT will model the one-dimensional flow areas using updated versions of the existing HEC-1 models, and the DISTRICT will model the two-dimensional flow areas using the FLO-2D model.

3.2.2 The CONSULTANT shall review and become familiar with portions of the hydrology results from the existing Hydrology Reports that are within the one-dimensional modeling area

3.2.3 The CONSULTANT shall update the HEC-1 models in the one-dimensional modeling area to reflect current watershed conditions. Subbasin boundaries and points of concentration will be revised based on current detailed mapping. The

DISTRICT will provide aerial mapping and the latest aerial photograph of the study area in digital format for use in the land use update. The existing conditions model will be as of the aerial photo date, and will reflect improvements constructed by subdivisions or drainage features completed after the original hydrology model was prepared. The hydrology models will be re-compiled based on the updated information. . The HEC-1 models include the Rio Verde South Floodplain Delineation Study and the Rio Verde North Extension Floodplain Delineation Study (Draft)(which consists of two models).

3.2.4 The DISTRICT will develop a FLO-2D model in the two-dimensional flow area incorporating recently completed improvements within the watershed. Due to the size of the modeling area, it is anticipated that multiple FLO-2D models will be required. The CONSULTANT will assist the District in formulating the modeling approach and assumptions and will provide modeling assistance during model development, including assistance in modeling the transition areas between 1-D and 2-D modeling approaches. The completed existing and developed conditions models will be provided to the CONSULTANT for the CONSULTANT'S use in evaluating flood control alternatives in Phase II.

3.2.5 The CONSULTANT shall update and revise as necessary the following hydrologic models within the one-dimensional modeling area. The DISTRICT will perform these tasks within the FLO-2D modeling area:

3.2.5.1 Existing Conditions: 100-year/24-hour, and 100 year/6-hour Storms

3.2.5.2 Developed Conditions: The updated Existing Conditions hydrology (100-year/24-hour and 100 year/6 hour) completed in task 3.2.3 shall be updated to reflect future developed watershed conditions. The developed watershed conditions shall be based on a probable future scenario assuming development takes place under current regulations and practices. The results of this analysis will establish the base condition for the "Do-Nothing" alternative. The impacts from other alternatives will be compared to the developed Do-Nothing condition.

3.2.6 The CONSULTANT shall submit both paper and electronic information at each stage of the review process.

3.2.7 The Hydrology Report: The findings of the hydrology study will be prepared in accordance with ADWR State Standard Attachment 1-97 (SSA 1-97) Section 4. The report will be organized as specified by the DISTRICT, following SSA 1-97 format. Specific deviations from this hydrology scope shall not be undertaken without written authorization from the District's Project Manager. The DISTRICT will provide the portions of the report documenting the FLO-2D modeling and results. The CONSULTANT will incorporate the District sections into the overall Hydrology Report.

3.3 Hydraulic Analysis

The study area will be modeled using a combination of HEC-RAS and FLO-2D methodology. The Piedmont Assessment (Task 3.4.1) will identify areas of one-

dimensional flow and areas of two-dimensional flow characteristics. The CONSULTANT will model the one-dimensional flow areas using HEC-RAS or normal depth computations, and the DISTRICT will model the two-dimensional flow areas using the FLO-2D model. A single FLO-2D model performs the hydrologic and hydraulic modeling simultaneously.

3.3.1 The CONSULTANT shall prepare a hydraulic analysis in the one-dimensional flow areas to estimate or provide insight into the depths of flow and the areas of inundation in the Rio Verde Area. The study area is limited to washes that have a 100-year flow rate of at least 500 cubic feet per second and are at least one mile long, which comprise about 22 river miles. Up to 15 river miles will be studied using HEC-RAS with 1,000 feet cross section spacing. Approximately 7 river miles will be studied using normal depth computations. The CONSULTANT shall prepare preliminary hydraulic analysis in accordance with Chapter 10.1 Hydraulics, Consultant Guidelines, August 1, 2000.

3.3.2 The DISTRICT shall prepare a hydraulic analysis of the two-dimensional flow area using FLO-2D. The CONSULTANT will assist the District in formulating the modeling approach and assumptions and will provide modeling assistance during model development. The completed existing and developed conditions models will be provided to the CONSULTANT for the Consultants use in evaluating flood control alternatives in Phase II.

3.3.3 The CONSULTANT shall analyze the impact of roads on the drainage flow paths. If there are no current survey data for this task, the CONSULTANT shall conduct road surveys for the required hydraulic analyses of culvert crossings.

3.3.4 The CONSULTANT shall evaluate the need for FEMA designated Floodways in the Rio Verde area. The CONSULTANT shall evaluate other options that could be implemented, such as conveyance corridors, to help manage the flooding. If removing current FEMA floodways is feasible, this task will be implemented in Phase III of this project.

3.3.5 The CONSULTANT shall document the hydraulic analysis, including the geomorphic analysis, in a Report as stated in Section 5.5.4.

3.3.6 The CONSULTANT shall document the survey information in a separate Report of Survey as shown in Section 5.5.4.

3.4 Geomorphic Analysis

3.4.1 Piedmont Assessment. The CONSULTANT will conduct a piedmont assessment and stream classification of the study area. The objective of the piedmont assessment and stream classification will be to delineate areas of defined channels with tributary drainage networks and one dimensional flow characteristics and areas of poorly defined channels with a distributary drainage network with two dimensional flow characteristics. The piedmont assessment will be based on existing soils and surficial geologic mapping, interpretation of recent aerial photographs, historical channel movement indicated by comparison of historical aerial photographs, and field investigations. The piedmont assessment will be completed within one month of notice to proceed. The

deliverable for Task 3.4.1 will be a map showing the boundaries between areas of probable one-dimensional flow and areas of probable two-dimensional flow.

3.4.2 Sedimentation and Erosion Hazard Analysis. The CONSULTANT will prepare a sedimentation and erosion hazard analysis for the study area.

3.4.2.1 The CONSULTANT will conduct field investigations to identify, inventory, and document evidence of existing scour problems, bank erosion, sediment deposition, and structure failures, and to verify mapping of geomorphic surfaces made from recent aerial photographs. The CONSULTANT will interview agency road maintenance supervisors to identify areas that experience frequent sedimentation and erosion problems. The deliverable for this task will be a map of observed sediment and erosion problems, and indexed field photographs of problems areas as well as stable areas.

3.4.2.2 The CONSULTANT will investigate the potential for lateral channel migration using mapping of geomorphic surfaces, comparison of channel positions on historical aerial photographs, field observations, existing soils and surficial mapping, application of principles of fluvial geomorphology, and interpretation of HEC-RAS and FLO-2D modeling (Tasks 3.2 and 3.3).

3.4.2.3 The CONSULTANT will collect up to ten (10) representative streambed sediment samples for use in the sedimentation and erosion hazard analysis

3.4.2.4 The CONSULTANT will identify significant flow corridors in areas of poorly defined distributary and sheet flow areas using interpretation of aerial photographs, geomorphic mapping, field observations, and characterization of the types of streams in the study area.

3.4.3 Sediment Impacts Analysis. The CONSULTANT will evaluate potential sedimentation and erosion impacts that may result from future development. The evaluation will consist of the following elements: (1) a sediment transport capacity analysis using a sediment transport function and hydraulic data developed in Tasks 3.2 and 3.3, (2) scour and erosion analysis for existing and possible future development scenarios, (3) interpretation of local geomorphic conditions, and (4) comparison with analogous landforms elsewhere in central or southern Arizona.

3.5 Define Hazard Criteria

3.5.1 The CONSULTANT shall define criteria for identifying hazards within the study area resulting from flooding, flow velocity, scour, stream bank erosion and lateral migration, sediment deposition, and structure failures. The criteria will provide a basis of measurement and will facilitate consistent determination of the existence of hazards throughout the study area.

4.0 PHASE I - PUBLIC INVOLVEMENT PROGRAM

4.1 The CONSULTANT shall work with the DISTRICT to develop a public involvement program. This program should include:

4.1.1 A public forum in which the District and the Consultant shall talk to the residents of Rio Verde to gather information and to inform the public of the purpose of the ADMP.

4.1.2 Open House to inform the public and obtain public comment on the results of the alternative formulation.

4.2 The CONSULTANT shall participate in up to eight (8) additional undefined informational meetings as necessary to gather information or to discuss the alternatives. These meetings could be with public agencies, associations, developers, neighborhood meetings, or individual homeowners.

4.2.1 The CONSULTANT shall participate in up to four (4) Work Group Meetings with select stakeholder representatives.

4.3 The CONSULTANT shall be responsible for the preparation of handouts and display boards. The CONSULTANT shall be responsible for the preparation of all the graphic displays for neighborhood meetings and public agency board meetings. The CONSULTANT can expect to prepare approximately seven (7) exhibits/graphic displays for each public meeting. The CONSULTANT shall provide, in digital and printed format a copy of each exhibit used during the public meetings. The CONSULTANT shall print and mount all display boards/graphics, after approval from the DISTRICT.

4.4 The DISTRICT shall provide all public notification, posting of signs, and/or placement of the required legal advertising and display ads. The CONSULTANT shall prepare design/text for the display ad and provide to the DISTRICT for placement. The CONSULTANT shall prepare the mailing lists and create and mail the meeting notices.

4.5 The DISTRICT will provide the CONSULTANT with guidelines and templates for preparation of ads, brochures, meeting notices and the website.

4.6 The DISTRICT shall prepare a one page front and back, color, tri-fold project informational flier providing the project purpose, background, history, schedule and points of contact.

4.7 The CONSULTANT shall prepare a maximum of six (6) pages, color handout that describes and shows the Alternatives, which were selected to be studied further. CONSULTANT shall also provide printing of handout.

4.8 The CONSULTANT shall chair the meetings as necessary. The CONSULTANT shall participate in the presentation, and respond to questions as required by making formal presentations or by written document addressing the issue.

4.9 The CONSULTANT shall arrange Open House meeting location and provide required refreshments. The DISTRICT will provide the Certificate of Insurance.

4.10 The CONSULTANT shall prepare meeting minutes of the public meetings, including concerns raised by the public.

4.11 A Rio Verde website shall be hosted on the DISTRICT Website. Approved reports and documentation from the CONSULTANT shall be submitted in a format (as specified by the DISTRICT) that can be placed on the website. The DISTRICT will provide final review and approval of all submittals for the website.

5.0 PHASE I - PROJECT ADMINISTRATION

5.1 Meetings

The CONSULTANT shall participate in the following specific meetings during the Phase I effort:

5.1.1 Kick Off Meeting - The CONSULTANT shall meet with the DISTRICT to submit the project schedule that shall include dates of all proposed submittals and review meetings, and to discuss the schedule and the tasks necessary to accomplish it. The CONSULTANT shall bring the key project team members, to the meeting to introduce them to the DISTRICT staff that will be working on the project.

5.1.2 Meetings shall be held with the DISTRICT staff at the following milestones during the hydrologic analysis:

5.1.2.1 Meeting Number 1: Field trip at the start of the project to scope out the critical points of the watershed and problem areas.

5.1.2.2 Meeting Number 2: As soon as the future conditions parameters have been determined, a meeting with the District to discuss and concur with the selected parameters.

5.1.2.3 Meeting Number 3: To review the draft Hydrologic Report and comments by the DISTRICT.

5.1.3 ADMP Study Report – Part 1 Report Review Meeting - The CONSULTANT shall meet with the District's Project Manager to review the overall project status and to discuss the results of the data collection effort and review comments.

5.1.4 Alternatives Formulation Meeting – The CONSULTANT shall facilitate a brainstorming session with the DISTRICT and other stakeholders to discuss existing flooding problems, existing studies and to identify potential solutions.

5.1.5 ADMP Study Report – Part 2 Report Review Meeting – The CONSULTANT shall meet with the DISTRICT to review the overall project status and feasibility of the possible alternatives.

5.1.6 Project Review Meetings. The CONSULTANT shall meet monthly with the District's Project Manager and project review team to review the overall project status and to discuss the District's review comments that will be provided to the CONSULTANT at the meeting. The CONSULTANT shall be prepared to discuss and address the comments. Any problems shall be identified and

discussed. The CONSULTANT shall take notes of all regularly scheduled project review meetings.

5.2 Site Visits

5.2.1 The CONSULTANT shall make site visits as necessary to become familiar with existing conditions.

5.2.2 The DISTRICT will conduct one scheduled site visit to orient the CONSULTANT with the project area, and to determine any initial conflicts or opportunities.

5.3 Schedule

5.3.1 The project schedule outline shall be consistent with the numbering and tasks defined in this scope of work and the fee proposal.

5.3.2 The CONSULTANT shall prepare a significant event calendar that shows, at a minimum, general timeframes for participant, agency and public meetings, and submittal milestones. The CONSULTANT shall update the calendar as necessary to keep it current.

5.3.3 The CONSULTANT shall provide the DISTRICT, in the project schedule, a three-week review period for each submittal.

5.4 Invoices

5.4.1 The CONSULTANT shall submit a projection of monthly project billings with the fee proposal. The projected billing will be consistent with the tasking of the scope of work, the project schedule and the fee proposal.

5.4.2 The DISTRICT will provide the format for invoices and progress/status reports. Projected invoices, with progress and status reports will be electronically delivered to the District's Project Manager no later than the first of the month. The invoices will be consistent with the tasking of the scope of work, project schedule, fee proposal and projected billing.

5.4.3 The CONSULTANT shall submit hard copy invoices to Accounts Payable, Flood Control DISTRICT of Maricopa County, 2801 West Durango, Phoenix, Arizona, 85009. A copy of the invoice will be forwarded to the DISTRICT Project Manager.

5.5 Reports or Documents

5.5.1 All reports or documents shall be submitted to the DISTRICT for review in draft form. Upon receipt of review comments, the CONSULTANT shall incorporate appropriate revisions and complete the report.

5.5.2 The Interim Development Guidelines will be documented and submitted to the District. These Interim Development Guidelines will be used by the Regulatory Branch of the Flood Control District to manage development, which includes

subdivisions and individual lots, in the Rio Verde area. The Guidelines should provide details of what can and cannot be constructed, ways to alleviate the impacts of construction on the watershed and how to protect structures from flooding and erosion.

5.5.3 The Hydrology Report will be prepared in accordance with ADWR State Standards Attachment 1-97. If needed, the hydrology report can then be inserted into a Technical Data Notebook.

5.5.4 The CONSULTANT shall submit a Report of Survey at the completion of Phase I and shall contain the following information:

5.5.4.1 Report of Survey - The Report of Survey will document survey data used in the study. Information should include, copies of all survey note books or printout of digital files developed, horizontal and vertical benchmarks used, documentation of the datum upon which the benchmark was originally established, conversion to other datum as required and a summary table of the ERM's and benchmarks.

5.5.4.2 Hydraulic and Geormorphic Report which discusses the analyses, the methodology and the results of the study. The report should provide supporting documentation for the guidelines that are developed. The District will provide written documentation for the FLO-2D analysis.

5.5.5 The CONSULTANT shall provide the Rio Verde Area Drainage Master Plan Study based on the following table of contents and the following milestones:

5.5.5.1 Part 1 following completion of the Phase I Existing Condition Analysis.

PART 1. Executive Summary
- Project Purpose & Need
- Project Purpose
- Project Need
- Project Participation
- Interagency Coordination
- Special Interest Groups
- Public Involvement Plan
- Project Overview & History
- Project Location
- Project Authorization

5.5.5.2 Part 2 following completion of the Alternatives Formulation Task

PART 2. Alternatives Formulation
- Alternatives
- Strengths
- Weaknesses
- Estimated Costs
- Opportunities
- Constraints

Trends
Impacted Area and Benefits

6.0 PHASE II - GENERAL TASKS – Alternative Analysis

Phase II of the Rio Verde ADMP shall be conducted only upon approval and issuance of an NTP for Phase II by the DISTRICT. The DISTRICT may authorize in writing part or all of the tasks in Phase II. Development of Phase II is contingent upon determination of feasible implementable alternatives resulting from the Phase I effort.

6.1 Existing Conditions - Update

6.1.1 The CONSULTANT shall contact each utility company that has facilities, known or suspected, within the structural alternative corridor, to request the alignment and size of the utility facilities.

6.1.2 The CONSULTANT shall update/refine the existing conditions' analysis to reflect any new information, as appropriate.

6.1.3 The CONSULTANT shall identify zoning of the entire area. and land ownership of property that is needed for a structural solution.

6.1.3

6.1.4 The CONSULTANT shall identify any necessary rights-of-entry within the study area. The CONSULTANT shall obtain any necessary Rights-of-Entry for the study area.

6.1.5 The CONSULTANT shall obtain supplemental field surveys as necessary to aid in the development of the alternatives or recommended alternative. Survey the culverts and the road elevation and profile of 144th Street, 150th Street, 152nd Street and the culverts within Granite Mountain Ranches.(This survey work is included in Task 9.3.5)

6.1.6 Based on the selection of three (3) feasible structural solutions, the CONSULTANT shall prepare a Landscape Aesthetics and Multi-Use Opportunities Overview. This will involve data collection and review of aerial photos, topographic mapping, engineering plans, the environmental overview, developer plans, agency plans, master plans, and trails maps as it applies directly to the structural solution. Data collection will be supplemented by site visits and field reconnaissance as required to review, assess, and document existing site conditions including landscape character, visual resources, views, multi-use opportunities, parks, trails, and open spaces. The Preliminary Landscape Aesthetics and Multi-Use Opportunities Overview will be documented in the Phase II Part 3 Report and will consist of narrative text, photographs, and 1-2 graphic plan exhibits. The data collection and review performed as part of this task will be the basis for landscape concepts developed as part of the alternative analysis task.

6.2 Alternative Analysis

6.2.1 The CONSULTANT shall analyze approximately four (4) three (3) alternatives, which were selected in Phase I, to help determine which one should be the recommended alternative.

6.2.2 The CONSULTANT shall prepare evaluation criteria and an evaluation methodology to be used to select the preferred alternative.

6.2.3 The CONSULTANT shall evaluate, as an alternative, the interim development guidelines that were produced in Phase I. These interim development guidelines may be revised to reflect any new information that is produced during the Phase II analysis. The CONSULTANT shall develop possible methods to implement the Guidelines within the County.

6.2.4 For the structural alternative or component, the CONSULTANT shall prepare conceptual designs that shall be limited to typical sizes and dimensions and shall be sufficient to determine the costs of major project components to include design, major construction items, utility relocation, land and right-of-way acquisition, engineering and legal contingencies, and shall include estimates of operation and maintenance costs.

6.2.4.1 The DISTRICT CONSULTANT shall revise the FLO-2D hydrologic models, if a structural alternative will affect the hydrology. The structural alternatives are contained entirely within the 2-D modeling area. Revisions to the 1-D HEC-1 models will therefore not be required to model structural alternatives. Additional HEC-1 hydrology modeling willmay need to be developed for some areas identified from Phase I.

6.2.4.2 The CONSULTANT shall preparerevise the hydraulic models to include any structural component that may change the hydraulic analysis. Hydraulic analysis will be limited to uniform flow methods such as Manning's equation.

6.2.4.3 The CONSULTANT shall design the structure to be environmentally friendly and to blend in with the natural landscape of the area. The Consultant shall follow the District's *Policy for the Aesthetic Treatment and Landscaping of Flood Control Project, December 16, 1992 and revised 2001.* For a maximum of three two alternatives of the structural solution, the CONSULTANT will develop landscape concepts. One exhibit will be prepared for each alternative (3 2 maximum). Each exhibit will include at a minimum a plan view and character sketch depicting the proposed landscape/aesthetic and multi-use theme (as applicable). The Alternative Analysis will be included in the Phase II Part 3 and Part 4 Report and will consist of narrative text and a maximum of 3 2 graphic plan exhibits.

6.2.5 The CONSULTANT shall evaluate the need for facilitate up to three floodplain strategy meetings with the DISTRICT to develop an approach to developing additional FEMA Floodplains in the FLO-2D modeling area of the Rio Verde Area. A nonstructural alternative may be to delineate all or partial floodplains in the area. The CONSULTANT shall recommend if which floodplains, floodways, or flood zones are necessary. The CONSULTANT shall meet with

the City of Scottsdale to determine if floodplains should be delineated in the City limits and what flood zones would be preferable.

6.2.6 The CONSULTANT shall assess the potential benefits of each alternative as compared to the "No Action" alternative.

6.2.7 The DISTRICT shall prepare an Environmental Overview Update for the structural alternatives that shall include a socioeconomic, physical and natural environmental impacts, and cultural aspects of the study area.

6.2.8 The CONSULTANT shall prepare Part 3 of the Rio Verde ADMP Study Report as outlined in Section 8.5.3 to document the preliminary alternatives analysis.

6.2.9 The CONSULTANT shall facilitate an alternative evaluation session. Participants will utilize the approved evaluation criteria in a matrix evaluation to rate the alternatives and identify the preferred alternative.

6.2.10 The CONSULTANT shall prepare Part 4 of the Rio Verde ADMP Study Report as outlined in Section 8.5.4 to document the results of the alternatives evaluation. and to present the preferred alternative.

6.2.11 The CONSULTANT shall develop possible methods of implementing the alternatives. These methods shall be documented and submitted to the District.

6.3 Assess Impacts of Preferred Alternative

6.3.1 The CONSULTANT shall update the hydraulic analysis to assess the impacts of the preferred alternative. The normal depth, HEC-RAS and FLO-2D analysis will be updated to incorporate the elements of the preferred alternative and identify the residual floodplain. The residual floodplain will be compared to the existing conditions floodplain or the probable future scenario floodplain identified in Task 3.2.4.2.

7.0 PHASE II - PUBLIC INVOLVEMENT PROGRAM

7.1 The CONSULTANT shall work with the DISTRICT to develop a public involvement program. This plan should address an open house meeting to inform the public and obtain public comment on the results of the refined alternative analysis and the recommended alternative.

7.2 The CONSULTANT shall participate in up to four (4) other, undefined information meetings as necessary for the project such as neighborhood meetings and public agency meetings.

7.2.1 The CONSULTANT shall participate in up to two (2) Work Group Meetings with select stakeholder representatives.

7.3 The CONSULTANT shall be responsible for the preparation of handouts and display boards. The CONSULTANT will be responsible for the preparation of all the graphic

displays for public open house meetings and public agency board meetings. The CONSULTANT can expect to prepare approximately seven (7) exhibits/graphic displays for each public meeting. The CONSULTANT will provide, in digital and printed format a copy of each exhibit used during the public meetings. The CONSULTANT shall print and mount all display boards/graphics, after approval by the DISTRICT.

7.4 The DISTRICT shall provide all public notification, posting of signs, and/or placement of the required legal advertising and display ads. The CONSULTANT shall prepare design/text for the display ad and provide to the DISTRICT for placement. The CONSULTANT shall also prepare the mailing lists and create and mail the meeting notices.

7.5 The DISTRICT will provide the CONSULTANT with guidelines and templates for preparation of ads, brochures, meeting notices and the website.

7.6 The CONSULTANT shall chair the meetings as necessary. The CONSULTANT shall participate in the presentation, and respond to questions as required by making formal presentations or by written document addressing the issue.

7.7 The CONSULTANT shall arrange Open House meeting location and provide required refreshments. The DISTRICT will provide the Certificate of Insurance.

7.8 The CONSULTANT shall prepare meeting minutes of the public meetings, including concerns raised by the public.

7.9 The CONSULTANT shall prepare a one (1) page, color brochures/newsletters that updates any information that was provided in the previous brochure/newsletter. This brochure/newsletter will be for the public meeting's participants and other interested parties. These brochures/newsletters will provide at a minimum a project update of work conducted during the milestone period, work to be conducted during the next time period, upcoming events, question and answers of questions identified during the study effort and the project schedule. The DISTRICT will provide final review and approval of any document to be sent to the public. The documents will be provided in mail-ready format. The CONSULTANT will print and distribute any documents.

7.10 The Rio Verde website will continue to be hosted on the DISTRICT Website. Approved reports shall be submitted in a format (specified by the DISTRICT) that can be placed on the website. The DISTRICT will provide final review and approval of all submittals for the website.

8.0 PHASE II - PROJECT ADMINISTRATION

8.1 Phase II - Meetings

The CONSULTANT shall participate in the following specific meetings:

8.1.1 ADMP Study Report Part 3 Preliminary Alternatives Report Review Meeting – The CONSULTANT shall meet with the DISTRICT team to review the overall project status and to discuss the Preliminary Alternatives Report review comments.

8.1.2 The CONSULTANT in conjunction with the DISTRICT team and based on a recommended matrix shall facilitate an Alternative Evaluation where the participants will evaluate the alternatives based on the evaluation criteria. The CONSULTANT shall assemble the evaluations and identify the recommended alternative receiving the highest composite score. The recommended alternative may be comprised of structural and non-structural features.

8.1.3 ADMP Study Report Part 4 Alternatives Analysis Report Review Meeting – The CONSULTANT shall meet with the DISTRICT team to review the overall project status and to discuss the Alternatives Analysis Report review comments.

8.1.4 Project Review Meetings. The CONSULTANT shall meet monthly with the District's Project Manager and project review team to review the overall project status and to discuss the District's review comments that will be provided to the CONSULTANT at the meeting. The CONSULTANT shall be prepared to discuss and address the comments. Any problems shall be identified and discussed. The CONSULTANT shall take notes prepare meeting minutes of all regularly scheduled project review meetings with the District or outside agencies.

8.2 Site Visits

8.2.1 The CONSULTANT shall make a site visit at the beginning and near the end of the Alternative Analysis. This site visit shall incorporate any new development or changes to the area.

8.3 Schedule

8.3.1 The project schedule outline will be consistent with the numbering and tasks defined in this scope of work and the fee proposal.

8.3.2 The CONSULTANT shall prepare a significant event calendar that shows, at a minimum, general timeframes for participant, agency and public meetings, and submittal milestones. The CONSULTANT shall update the calendar as necessary to keep it current.

8.3.3 The CONSULTANT shall provide the DISTRICT, in the project schedule, a three-week review period for each submittal

8.4 Invoices

8.4.1 The CONSULTANT will submit a projection of monthly project billings with the fee proposal. The projected billing will be consistent with the tasking of the scope of work, the project schedule and the fee proposal.

8.4.2 The DISTRICT will provide the format for invoices and progress/status reports. Projected invoices, with progress and status reports will be electronically delivered to the District's Project Manager no later than the first of the month. The invoices will be consistent with the tasking of the scope of work, project schedule, fee proposal and projected billing.

8.4.3 The CONSULTANT shall submit hard copy invoices to Accounts Payable, Flood Control DISTRICT of Maricopa County, 2801 West Durango, Phoenix, Arizona, 85009. A copy of the invoice will be forwarded to the DISTRICT Project Manager.

8.5 Reports

8.5.1 All reports shall be submitted to the DISTRICT for review in draft form. Upon receipt of review comments, the CONSULTANT shall incorporate appropriate revisions and complete the report.

8.5.2 The CONSULTANT shall provide the Rio Verde Area Drainage Master Plan Study Report based on the following table of contents and the following milestones:

8.5.3 PART 3. Characteristics of the Structural Alternative

Existing Conditions Update
Hydrology Updates (HEC-1 only)
Landscape Concepts
Potential Benefits
Environmental Overview Update (DISTRICT)
Implementation Methods
Maintenance Plan
Dimensional
Widths
Configuration
Design Flows
Modal
Vehicular
Major Streets
Bridge Crossings
Equestrian Trails
Bikeways
Trail ways
Summary of Modal Characteristics
Socioeconomic Environment
Jurisdiction and Ownership
Land Use
Zoning
Population
Environmental Justice
Summary of Sociological Environment

DISTRICT TO PROVIDE
Physical and Natural Environment
Topography
Biotic Communities
Wildlife
Sensitive Species and Habitat

Cultural Resources
Summary of Physical and Natural Environment

Summary of the Existing Corridor
Corridor Opportunities & Constraints
Opportunities
Constraints

8.5.4 PART 4. Alternative Development
Alternative Analysis
Development Guidelines Document
Impacts of Socioeconomic Environment
Impact of Physical/Natural Environment
Impact of Cultural Resources
Advantages/Disadvantages
Estimate of Costs
Capital
Operation & Maintenance
Implementation

9.0 PHASE III – GENERAL TASKS - Recommended Plan

Phase III of the Rio Verde ADMP shall be conducted only upon approval and issuance of an NTP for Phase III by the DISTRICT. The DISTRICT may authorize in writing part or all of the tasks in Phase III. Development of Phase III is contingent upon determination of a feasible implementable alternative resulting from the Phase II effort.

9.1 Development Drainage Guidelines

9.1.1 Development Interim Drainage Guidelines that were produced in Phase Irefined in Phase II will now need to be finalized. An implementation Plan for the Development Drainage Guidelines that the District can follow shall be developed and documented. The CONSULTANT shall evaluate the possibility of implementing the Guidelines through the Maricopa County Planning and Development Department or through the District's Regulatory Branch. The Drainage Guidelines need to include recommendations for "Roadway Design Standards in Rio Verde". The Guidelines also need to include recommendations on how to handle Stock Tanks.

9.2 Structural Alternative

9.2.1 For a structural alternative or component the CONSULTANT shall prepare Preliminary Design Plans which will identify the approximate sizes, slopes, profiles, alignments, cross-sections and plan and profile for proposed channels, culverts, basins and/or other features at 1" = 200' scale, 2-foot contour. The CONSULTANT shall estimate the construction cost for the recommended plan. Landscaping, recreation, and/or ecological sites and aesthetic features shall be included in project drawings and cost estimates. Contours may be turned off on final drawings.

9.2.2 The CONSULTANT shall show major existing utilities impacting the recommended plan on the Preliminary Design Plans. Estimates of the cost to relocate or realign the utilities shall be included in the project cost estimates as a separate line item.

9.2.3 The CONSULTANT shall identify permanent and temporary right-of-way and easement requirements necessary for the recommended plan.

9.2.4 The CONSULTANT shall provide hydrologic models that incorporate the hydrologic effects of the recommended plan and features identified for the watershed as part of this Area Drainage Master Plan.

9.2.5 The CONSULTANT shall document the recommended plan in Part 5 of the ADMP Study Report as shown in Section 11.5.3.

9.2.6 The CONSULTANT shall prepare an implementation plan for the recommended plan.

9.2.7 The CONSULTANT shall present the recommended plan, to include the maintenance plan, and preliminary implementation plan at the Feature Prioritization Meeting. The Participants shall prioritize the features of the recommended plan and the CONSULTANT shall include the prioritization in the final report.

9.2.8 The CONSULTANT shall assess the area benefited for each identified project feature of the recommended plan. The assessment should include the area benefited by the feature, the number and type of public facilities within the benefited area, type and number of residential or commercial buildings, quantitative evaluation of damages prevented and/or other information that will typify the benefited area.

9.2.9 The CONSULTANT shall document the recommended plan and project prioritization in Part 6 of the ADMP Study Report as shown in Section 11.5.4.

9.3 Floodplain Delineations Alternative

9.3.1 If floodplain delineations are deemed to be a part of the Recommended Plan, the CONSULTANT shall delineate up to seventeen (17) twenty-one (21) linear miles of additional floodplains (to be defined during the analysis). This contract will be based on an estimated five (5) miles of delineation but can be increased by change order if additional floodplain delineations are determined to be required. In addition to the approximately fifteen (15) miles of Phase 1 floodplains (non-overlap length). The total floodplain delineation will be about 32 miles, of which 23.6 miles will be delineated with detailed methods, resulting in base flood elevations and a floodway. The remaining 7.9 miles will be delineated with approximate methods without base flood elevations. All Phase 1 floodplains within a mapping problem area generally bounded by Rio Verde Drive, 154th Street, four miles north of Rio Verde Drive and 136th Street will be revised, based on new topographic mapping supplied by the District. ones already approved.

9.3.2 Floodplain delineations will be conducted using methodology as outlined by FEMA. The CONSULTANT will prepare the study using the guidelines established in FEMA 37, *Flood Insurance Study Guidelines and Specification for Flood Hazard Mapping Partners Study Contractors*, January 1995, April 2003; FIA 12, *Appeals, Revisions, and Amendments to Flood Insurance Maps*, December 1993; and FEMA 265, *Managing Floodplain Development in Approximate Zone A Areas*, April 1995.

9.3.3 The delineation work shall meet requirements for floodplain delineations as prescribed by FEMA and ADWR. Elevation Reference Marks will be placed per FEMA requirements and the Consultant Guidelines. The DISTRICT will supply the monument markers.

9.3.4 The CONSULTANT DISTRICT is responsible for placement of the legal advertising, notifying the public of the study. The advertisement will be run two times in a widely circulated newspaper, with approximately one week between runs. The advertisement must also be run two times in a local newspaper that serves the area being studied or other local publication as approved by the District Project Manager. After the advertisement is run the CONSULTANT DISTRICT will supply the CONSULTANTDISTRICT with a copy of the original affidavit of publication from each of the newspapers for each day that the advertisement ran.

9.3.5 The CONSULTANT shall obtain supplemental field surveys as necessary for hydraulic modeling of roadways and culverts constructed along study washes since completion of Phase I and provide elevation certificates for up to 50 houses that may be flooded but have never been surveyed. Houses that may be flooded need towill be documented in a report and depicted on a map. Road profile surveys and culvert surveys will be conducted along 144th Street, 150th Street, 152nd Street, and Lone Mountain Road and culverts within Granite Mountain Ranches and Rio Mountain Estates.

The finished floor elevations from the elevation certificates will be compared with the base flood elevations from the HEC-RAS and FLO-2D floodplain models to identify existing structures with finished floors below the BFE's. Floodproofing measures will be identified for up to five (5) structures found to be below the BFE.

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

9.3.7 The findings of the floodplain/floodway delineation study will be presented in section 4 of the Technical Data Notebook and shall be prepared in accordance with ADWR State Standards Attachment 1-90 (SSA 1-90). The report shall be organized as specified by the DISTRICT standards, following SSA 1-90 format

9.3.8 If Floodways are delineated, they shall be determined using equal conveyance encroachment (method 4) to start with, but only encroachment method 1 will be used in the final analysis. The floodway encroachment is to be as near the one-foot maximum rise in elevation as possible. If Conveyance Corridors are more

appropriate, then they shall be determined in accordance with the method outlined in the "Rio Verde Delineation and Development Guidelines (Draft)".

9.3.9 The CONSULTANT shall obtain DISTRICT approval at each of the following steps:

Field reconnaissance report and estimation of Manning's "n" values.
Proposed location and alignment of the cross sections and channel centerline.
Floodplain (natural) delineation.
Floodway delineation using equal conveyance encroachment (method 4).
Floodway delineation using encroachment method 1.
Final Hydraulics Report.

9.3.10 Cross Sections

9.3.10.1 The location and alignment of cross sections and channel centerline will be submitted for the District's review and approval before digitizing the cross section data. Cross section stationing will be from left to right looking downstream with the thalweg as station 10,000. Cross sections will be spaced approximately every 500 feet for detailed study washes and 1,000 feet for approximate study washes, unless geographic or structural constraints dictate otherwise, and will extend the full width of the area inundated by 100-year floodwaters. Identification of cross sections will be in river miles, increasing upstream. The stationing will tie into the specified river mile of the existing FEMA studies. The cross section may need to be reoriented or altered after running the HEC-RAS model to ensure that they are perpendicular to flow per FEMA criteria. Cross sections developed by the HEC-RAS interpolation feature are not to be used.

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

9.3.10.3 Cross section plots are limited to one plot at the following three stages of work: (a.) a plot of digitized "GR", STCHL, STCHR, centerline (station 10,000) to be used as a check of input data and for working sections during compilation of the floodplain model; (b.) a plot of the cross section for the completed floodplain run which shows the floodplain water surface elevation, ineffective flow areas, "n" values, and encroachments to be used as working sections for development of the floodway model; (c.) a plot of the final floodway model cross sections which will show Type 1 encroachments and encroached water surface, in addition to data covered in items (a.) and (b.). These cross sections, generated under (c.), will be submitted as part of the Final Report.

9.3.10.4 Flood zones shall be determined according to FEMA criteria and clearly labeled on the final drawings. The HEC-RAS floodplains east of approximately 136th Street and/or south of Rio Verde Drive will be

delineated with Zone AE. The remaining floodplains will be determined with Zone A without base flood elevations.

9.3.10.5 The CONSULTANT shall submit pertinent HIS data with each submittal.

9.3.11 Floodway Removal (Optional)

9.3.11.1 This task will not be completed unless authorized by the DISTRICT. If floodway removal is recommended in Task 3.3.46.2.5, the CONSULTANT shall implement the recommendation. The appropriate documents will be prepared and submitted to FEMA, requesting official removal of certain FEMA-designated Floodways in the Rio Verde area.

9.4 Implementation Plan

9.4.1 The CONSULTANT shall develop a strategy for the implementation of the Rio Verde Recommended Plan consisting of the following.

9.4.2 The CONSULTANT shall identify potential funding sources for implementation of the plan. The CONSULTANT shall prepare a funding document that includes the source of funding, application procedures, cost-share, and constraints.

9.4.3 The CONSULTANT shall produce landscape and multi-use design guidelines as appropriate to provide consistency during implementation.

9.4.4 The CONSULTANT shall review the floodplain and stormwater ordinances for jurisdictions relevant to the Rio Verde area. The CONSULTANT shall provide recommendations as to ordinance modifications that may be required to ensure the implementation of the plan. This does not include the drafting of ordinance specific language.

9.4.5 The CONSULTANT shall prepare a separate memo to the DISTRICT that identifies key opportunities and constraints for implementation of all the alternatives. The memo shall consider timing, funding, proposed public projects, summary of public feedback, permitting, and regulatory issues.

9.5 Maintenance Plan for Any Structural Alternatives

9.5.1 The CONSULTANT shall estimate maintenance requirements and costs for the flood control elements of the recommended Project on an annual basis. The life cycle to be used in calculations shall be 50 years. The DISTRICT will provide maintenance and cost data to the CONSULTANT. The results will be included in the Part 3 Report.

9.5.2 The CONSULTANT shall estimate maintenance requirements and typical costs on the landscape and appropriate multi-use components of the recommended plan on an annual basis, using a 50-year project life cycle. The plan will also identify jurisdictional responsibilities of these components.

10.0 PHASE III - PUBLIC INVOLVEMENT PROGRAM

10.1 The CONSULTANT shall work with the DISTRICT to develop a public involvement program. This plan should address an open house meeting to inform the public of the Final results of selected recommended alternative.

10.2 The CONSULTANT shall be responsible for the preparation of handouts and display boards. The CONSULTANT will be responsible for the preparation of all the graphic displays for public open house meetings and public agency board meetings. The CONSULTANT can expect to prepare approximately seven (7) exhibits/graphic displays for each public meeting. The CONSULTANT will provide, in digital and printed format a copy of each exhibit used during the public meetings. The CONSULTANT shall print and mount all display boards/graphics.

10.3 The DISTRICT shall provide all public notification, posting of signs, and/or placement of the required legal advertising and display ads. The CONSULTANT shall prepare design/text for the display ad and provide to the DISTRICT for placement. The CONSULTANT shall also prepare the mailing lists and mail the meeting notices.

10.4 The DISTRICT will provide the CONSULTANT with guidelines and templates for preparation of ads, brochures, meeting notices and the website.

10.5 The CONSULTANT shall chair the meetings as necessary. The CONSULTANT shall participate in the presentation, and respond to questions as required by making formal presentations or by written document addressing the issue.

10.6 The CONSULTANT DISTRICT shall arrange Open House meeting location and the CONSULTANT will provide required refreshments. The DISTRICT will provide the Certificate of Insurance.

10.7 The CONSULTANT shall prepare meeting minutes of the public meetings, including concerns raised by the public.

10.8 The CONSULTANT shall prepare and print a one page front and back, color, tri-fold project informational flier which updates the information since the last public meeting. The DISTRICT will provide final review and approval of any document to be sent to the public.

10.9 The DISTRICT will continue with the Website for the project to communicate project information and status. The website shall be hosted on the DISTRICT Website. Approved reports shall be submitted in a format that can be placed on the website. The DISTRICT will provide final review and approval of all submittals for the website.

10.10 The CONSULTANT shall participate in up to one (1) final Work Group Meeting with select stakeholder representatives.

11.0 PHASE III – PROJECT ADMINISTRATION

11.1 Meetings

11.1.1 ADMP Study Report – Part 5 Recommended Plan Submittal Meeting – The CONSULTANT shall meet with the DISTRICT team to review the overall project status and to discuss the Recommended Plan. The CONSULTANT shall explain all assumptions and calculations completed up to this point. Any problems will be identified and corrective actions agreed upon at this meeting.

11.1.2 Feature Prioritization Meeting – The CONSULTANT shall coordinate a meeting with the participants to discuss implementation of the Recommended Plan and develop project priorities and phasing.

11.1.3 Project Review Meetings. The CONSULTANT shall meet monthly with the District's Project Manager and project review team to review the overall project status and to discuss the District's review comments that will be provided to the CONSULTANT at the meeting. The CONSULTANT shall be prepared to discuss and address the comments. Any problems shall be identified and discussed. The CONSULTANT shall take notes prepare meeting minutes of all regularly scheduled project review meetings.

11.1.4 ADMP Study Report – Part 6 Recommended Plan Submittal Meeting – The CONSULTANT shall meet with the DISTRICT team to review the overall project status and to discuss the Recommended Plan. The CONSULTANT shall explain all assumptions and calculations completed up to this point. Any problems will be identified and corrective actions agreed upon at this meeting

11.1.5 The CONSULTANT and DISTRICT shall meet to discuss the final performance evaluation.

11.2 Site Visits

11.2.1 Site visit during the Recommended Plan Analysis to verify that the conditions have not significantly changed during the final stages of the project.

11.3 Schedule

11.3.1 The project schedule outline will be consistent with the numbering and tasks defined in this scope of work and the fee proposal.

11.3.2 The CONSULTANT shall prepare a significant event calendar that shows, at a minimum, general timeframes for participant, agency and public meetings, and submittal milestones. The CONSULTANT shall update the calendar as necessary to keep it current.

11.3.3 The CONSULTANT shall provide the DISTRICT, in the project schedule, a three-week review period for each submittal

11.4 Invoices

11.4.1 The CONSULTANT will submit a projection of monthly project billings with the fee proposal. The projected billing will be consistent with the tasking of the scope of work, the project schedule and the fee proposal.

11.4.2 The DISTRICT will provide the format for invoices and progress/status reports. Projected invoices, with progress and status reports will be electronically delivered to the District's Project Manager no later than the first of the month. The invoices will be consistent with the tasking of the scope of work, project schedule, fee proposal and projected billing.

11.4.3 The CONSULTANT shall submit hard copy invoices to Accounts Payable, Flood Control DISTRICT of Maricopa County, 2801 West Durango, Phoenix, Arizona, 85009. A copy of the invoice will be forwarded to the DISTRICT Project Manager.

11.5 Phase III - Reports

11.5.1 All reports shall be submitted to the DISTRICT for review in draft form. Upon receipt of review comments, the CONSULTANT shall incorporate appropriate revisions and complete the report.

11.5.2 The CONSULTANT shall provide the Rio Verde Area Drainage Master Plan Study Report based on the following table of contents and the following milestones:

11.5.3 PART 5. Recommended Plan
Preferred Alternative

11.5.4 PART 6. Recommended Plan (Preliminary design plans for structural component)
Maintenance Plan
Implementation Plan
Key Success Factors
Funding Sources
Priority of Features to be implemented

Parts 1, 2, and 3 and 4 following completion of the Alternatives AnalysisDevelopment Task.

Executive Summary and Parts 1, 2, 3, 4 and 5 following completion of the Recommended Plan Task. Six (6) Copies of the Executive Summary shall be bound separately from the Study Report.

11.5.5 If FEMA floodplains are delineated, the CONSULTANT shall prepare a Technical Data Notebook in accordance with ADWR State Standards Attachment 1-90 (SSA 1-90) and the Consultant Guidelines, except as modified within this Scope of Work.

12.0 DELIVERABLES FOR ALL PHASES

12.1 The CONSULTANT shall submit all items 'sealed' by a registered civil engineer in the State of Arizona. Upon receipt of the final submittal, the DISTRICT shall review the report and preliminary plans for the accurate incorporation of all final comments. If incomplete and/or incorrect incorporation of those comments is found, the original documents shall be returned to the CONSULTANT for correction and re-submittal.

12.2 The CONSULTANT shall submit computer files of the information to the DISTRICT delivered on CD diskettes.

12.3 Reports, documents, figures, exhibits, and tables shall be submitted in Word 6.0 and/or Excel 97 or other acceptable software format as determined by the DISTRICT.

12.4 Plans should be in AutoCAD version 14 format (dwg) or MicroStation (dgn) format in accordance with Section 19, CADD Drafting Standards, and Consultant Guidelines dated August 1, 2000.

12.5 The CONSULTANT shall submit five three (53) hard (paper) and one (1) electronic copy for each DRAFT report, estimates, schedules or drawings to the DISTRICT.

12.6 The CONSULTANT shall submit five (5) copies and one (1) electronic copy in PDF format for each FINAL report, estimates, schedules or drawings to the DISTRICT.

12.7 If a FEMA submittal is required. The CONSULTANT will deliver the following items to the DISTRICT before delivering the FEMA submittal package:

12.7.1 Original Copies of Affidavits of Publication of the legal advertisements. Additional copies are to be included in the Technical Data Notebook.

12.7.2 All topographic and related data for the District's Hydrologic Information System that isn't subject to change during FEMA's review should be submitted at this time. The Digital Terrain Model and related data should also be submitted at this time.

12.7.3 If bound separately from the Technical Data Notebook, three (3) copies of the field survey notes and office calculations.

12.8 FEMA Submittal (if necessary): The CONSULTANT will submit the following items to the DISTRICT for review by FEMA and any other appropriate governmental agency. All of the following products are considered deliverables for the FEMA submittal:

12.8.1 Two (2) Three (3) complete sets of black line topographic base maps with the floodplain/floodway delineations shown. All drawings will be signed and sealed by persons of appropriate professional registration(s). Each registrant will provide a specific statement as to what service they performed.

12.8.2 Two (2) Three (3) complete copies of the Technical Data Notebook, including HEC-1 and HEC-RAS input/output files on diskettes. The Technical Data Notebook will be prepared in accordance with ADWR State Standards

Attachment 1-90 (SSA 1-90). The notebook will be organized as specified by the DISTRICT, following SSA 1-90 format.

12.8.3 Two (2) sets of completed FEMA forms will be submitted in a notebook separate from the Final Report.

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

12.9 Final Submittal: The following products are considered deliverables for the final submittal to the DISTRICT after FEMA approval is issued:

12.9.1 One (1) complete set of non-erasable topographic mylars of the work-study drawings. Sheets shall be 24" X 36" in size and numbered to correspond to the delineation maps.

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

12.9.3 All remaining hydrologic and floodplain/floodway delineation data in conformance with the District's HIS Specifications.

12.9.4 Four (4) Two (2) complete copies of the Technical Data Notebook including HEC-1 and HEC-RAS input/output files on diskettes. The Technical Data Notebook will be prepared in accordance with ADWR State Standards Attachment 1-90 (SSA 1-90). The notebook will be organized as specified by the DISTRICT, following SSA 1-90 format. This submittal of the Technical Data Notebook shall include any correspondence and/or meeting minutes with the reviewing agencies and shall reflect any revisions required by those reviewing agencies. Revisions may include, but are not limited to, modifications to the delineation maps, the HEC-1 model, the HEC-RAS model, and/or the Final Report.

EXHIBIT A

SCOPE OF WORK

CONTRACT FCD 2005CO23
Work Assignment #1

Rio Verde ADMP
Floodplain Delineation FEMA Submittal

March 6, 2007

1. GENERAL DESCRIPTION

1.1 PROJECT DESCRIPTION

1.1.1 This scope of work is for professional engineering services necessary for modifying floodplain workmaps and technical documentation for FEMA submittal/approval of 1-Dimensional floodplain delineations within the Rio Verde ADMP study area. The CONSULTANT will coordinate with the Flood Control District of Maricopa County (FCDMC) to obtain downstream boundary conditions and other coordination items to finalize 1-Dimensional floodplain delineations and corresponding FEMA submittal documents. The project shall be performed according to direction presented in the FCDMC *Consultant Guidelines, Section 11.0* and the following.

1.2 PURPOSE & NEED

1.2.1 The Rio Verde ADMP study area is experiencing rapid population and economic growth necessitating detailed flood hazard information for use in regulating development. FEMA approval of 100-Year floodplain delineations and subsequent revision to Federal Insurance Rate Maps provide flood hazard information and means to effectively manage floodplain encroachment.

1.2.2 1-Dimensional floodplain delineations already performed with the Rio Verde ADMP use assumed starting water surface as downstream boundary conditions. Downstream floodplain features have been studied by FCDMC using 2-Dimensional modeling methods. 1-Dimensional floodplain delineations need to be modified to make use of detailed hydraulic modeling results at their downstream boundary.

1.3 LOCATION

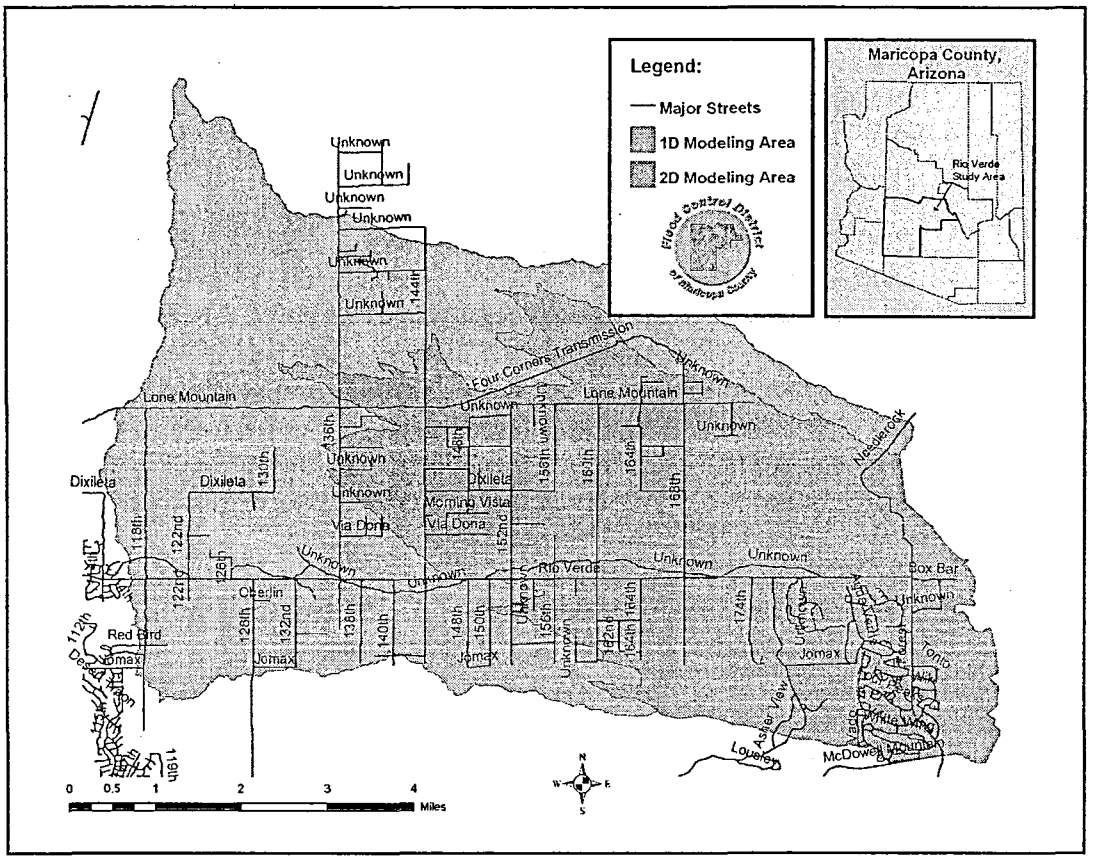
1.1.1 The area of study for the Rio Verde ADMP 1-D Floodplain Delineation Study is shown on Figure 1. The ADMP study area is generally bounded by the Tonto National Forest on the north, McDowell Mountain Regional Park on the south, approximately 115th Street alignment to the west, and the Verde River to the east. The total ADMP and watershed area is approximately forty (40) square miles.

1.4 PARTICIPANTS

Coordination with the following organizations is expected for information and input into the study:

Felicia Terry, Project Manager, Flood Control District of Maricopa County
Tom Loomis, Special Projects, Flood Control District of Maricopa County
Federal Emergency Management Agency

Developers/Landowners for Adjacent Properties
Figure 1



1.5 SCHEDULE

1.5.1 The milestones shall be as follows in weeks from notice to proceed (NTP):

Notice to Proceed (Schedule to be determined)

- Draft Submittal – 6 week from NTP
- Public Meeting – 10 weeks from NTP
- FEMA Submittal – 12 weeks from NTP
- Final Submittal – 2 weeks from FEMA Approval

2. TASKS

2.1 COORDINATION

The CONSULTANT will arrange and attend one (1) open house style Public Meeting to allow the public to comment on delineated floodplains. This task shall include the following:

2.1.1 The DISTRICT shall arrange the Open House meeting location and provide the Certificate of Insurance. The CONSULTANT shall provide refreshments.

2.1.2 The CONSULTANT shall be responsible for the preparation of handouts and display boards for the Public Meeting. The CONSULTANT can expect to prepare approximately ten (10) exhibits/graphic displays for the public meeting. The CONSULTANT shall provide in pdf format a copy of each exhibit to be used during the public meeting. The CONSULTANT shall print and mount all display boards/graphics, after approval from the DISTRICT.

2.1.3 The CONSULTANT shall prepare a PowerPoint presentation for the meeting if requested by the DISTRICT. The CONSULTANT shall provide in PDF format a copy of the power point presentation to the DISTRICT for review prior to the public meeting.

2.1.4 The CONSULTANT shall provide up to 5000 public notification postcards, a Legal Advertisement, and a Display Advertisement for the newspaper.

2.1.5 The DISTRICT shall prepare the mailing lists and create mailing labels, provide postage, mail the public notification postcards, and arrange and pay for the placement of the Legal Advertisement and the Display Advertisement in the newspaper. The DISTRICT shall create a Press Release.

2.1.6 The CONSULTANT shall prepare meeting minutes of the public meeting, including concerns raised by the public.

2.2 FLOODPLAIN DELINEATION

2.2.1 The DISTRICT will provide direction on modifications to be made to the existing floodplain HEC-RAS models in order to tie in hydraulically with downstream floodplains. Modifications will be limited to: (1) modification necessary to tie into the water surface elevation provided by 2-Dimensional floodplain analysis, (2) removal of cross sections and floodplains that overlap the 2-Dimensional floodplain analysis or are no longer needed, and (3) an additional overflow weir at a location specified by the DISTRICT. The CONSULTANT will modify the HEC-RAS models for affected floodplains, rerun the models, redelineate the floodplain boundaries as necessary, and present the results on floodplain workmaps and within the Final Report and Technical Data Notebook (hereafter referred to as the TDN). Additional changes to 1-D floodplain models resulting from future or additional changes to the 2-Dimensional floodplain model are not included in this Scope of Work. Floodway delineation is not included in this scope of work.

2.2.2 The CONSULTANT will revise the Rio Verde Floodplains Technical Data Notebook to include revised 1-Dimensional floodplain delineation results and supporting documentation and provide appropriate references to a separate TDN volume, to be composed by the DISTRICT, documenting the 2-Dimensional floodplain analysis. The TDN will be

prepared in accordance with ADWR State Standards Attachment 1-97 (SS1- 97). The notebook will be organized as specified by the DISTRICT, following SS1-97 format.

2.2.3 The CONSULTANT will revise the Rio Verde ADMP Hydrology Report to provide reference to the 2-Dimensional floodplain delineation volume of the TDN for project soils information. The CONSULTANT will provide and insert replacement sheets into the existing Hydrology Reports at the DISTRICT office.

2.2.4 If requested by the DISTRICT, the CONSULTANT will provide Flood Profiles for 1-Dimensional floodplain delineations. Flood Profiles will be prepared in accordance with FEMA *Guidelines and Specifications for Flood Hazard Partners*, Appendix J, and Section J.2.2.

2.2.5 The CONSULTANT will provide the DISTRICT all sealed submittal materials received for the topographic survey performed by Consultant Engineering, Inc during the completed portion of the Rio Verde ADMP. No additional survey services are anticipated with this project.

2.2.6 The CONSULTANT will complete FEMA MT-2 forms for the 1-Dimensional floodplain delineations in accordance with FEMA published instructions.

2.2.7 The CONSULTANT will provide HIS submittal items for 1-Dimensional floodplain delineations in accordance with *C.A.D.D. Data Delivery Specifications Revision 1.0* and *H.I.S. Data Delivery Specifications Revision 3.1*. CONSULTANT shall follow the GIS shape file standards presented in *ShapeFileSpecification.xls* produced by the District's staff. The DISTRICT will provide review comments on the previous Rio Verde ADMP 1-Dimensional floodplain C.A.D.D. and H.I.S. submittal to be incorporated in the revised submittal. The DISTRICT will review and comment on HIS submittal items and the CONSULTANT will make necessary revisions prior to FEMA submittal.

2.2.8 The CONSULTANT will assist the DISTRICT in preparation of H.I.S. submittal items for 2-Dimensional floodplain delineations. The CONSULTANT will provide a GIS technician to work at the FCDMC office for a period not to exceed four (4) weeks.

2.3 ADMP REPORT

2.3.1 The CONSULTANT will incorporate "rules" specifically developed for floodplains in the Rio Verde area, provided by the DISTRICT, to the Final Rio Verde ADMP Report.

2.3.2 The CONSULTANT will incorporate the final floodplains into the report text and exhibits and will provide the DISTRICT revised reports.

2.4 MEETINGS

2.4.1 The CONSULTANT will attend up to eight (8) bi-weekly meetings and two (2) additional coordination meetings at the FCDMC office.

2.5 SUBMITTALS

The CONSULTANT will submit the following items to the DISTRICT as part of a DRAFT submittal. Allowing the DISTRICT to comment and request changes. The CONSULTANT will make necessary changes prior to the FEMA Submittal.

2.5.1 Two (2) complete sets of DRAFT black line topographic base maps with the floodplain delineations shown.
2.5.2 One (1) copy of HEC-RAS models on compact disk.
2.5.3 Two (2) copies of DRAFT Flood Profile drawings

The CONSULTANT will submit the following items to the DISTRICT for review by FEMA and any other appropriate governmental agency. All of the following products are considered deliverables for the FEMA submittal:

2.5.4 Three (3) complete sets of black line topographic base maps with the floodplain delineations shown. All drawings will be signed and sealed by persons of appropriate professional registration(s). Each registrant will provide a specific statement as to what service they performed.
2.5.5 Three (3) complete copies of the revised Floodplain Technical Data Notebook and revised sheets of the Hydrology Report, including HEC-RAS input/output files on compact discs.
2.5.6 Three (3) sets of completed FEMA MT-2 forms will be submitted in the TDN.
2.5.7 Three (3) sets of Flood Profile drawings (11x17) will be submitted in the TDN.
2.5.8 One (1) set of sealed survey deliverables, performed by Consultant Engineering, Inc.
2.5.9 One (1) copy of C.A.D.D. and H.I.S. floodplain delineation and hydrology data will be submitted to the DISTRICT on compact disk.

The following products are considered deliverables for the final submittal to the DISTRICT after FEMA approval is issued:

2.5.10 One (1) copy of C.A.D.D. and H.I.S. floodplain delineation and hydrology data will be submitted to the DISTRICT on compact disk.
2.5.11 Five (5) complete copies of the Final Rio Verde ADMP Report.
2.5.12 One (1) complete set of mylar originals and four (4) complete sets of sealed black line topographic base maps with the floodplain delineations shown. All drawings will be signed and sealed by persons of appropriate professional registration(s). Each registrant will provide a specific statement as to what service they performed.
2.5.13 Two (2) complete copies of the TDN including HEC-1 and HEC-RAS input/output files on diskettes. This submittal of the Technical Data Notebook shall include any correspondence and/or meeting minutes with

the reviewing agencies and shall reflect any revisions required by those reviewing agencies. Revisions may include, but are not limited to, modifications to the delineation maps, the HEC-1 model, the HEC-RAS model, and/or the Final Report.

Board of Directors
Fulton Brock, District 1
Don Stapley, District 2
Andrew Kunasek, District 3
Max Wilson, District 4
Mary Rose Wilcox, District 5

Flood Control District
of Maricopa County

www.fcd.maricopa.gov
2801 West Durango Street
Phoenix, Arizona 85009
Phone: 602-506-1501
Fax: 602-506-4601
TT: 602-505-5897

February 27, 2008

Mr. Mounir Boudjemaa, Regional Manager
Michael Baker Jr. Inc.
3601 Eisenhower Avenue, Suite 600
Alexandria, Virginia 22304

Subject: Rio Verde Area Drainage Master Plan – Floodplain Delineation Study (FCD contract 2001C056), by Dibble and Associates and the Flood Control District of Maricopa Co.

Communities: Unincorporated Maricopa County, Community No. 040037
City of Scottsdale, Community No. 045012

Flooding Sources:
Rio Verde Wash 7
Rio Verde Wash 10 and associated tributaries and splits
Rio Verde Wash 11 and associated splits
Rio Verde Wash 12 and associated splits
Rio Verde Wash A and associated tributaries and splits
Rio Verde Wash D
Rio Verde Wash F and associated tributaries and splits
Rio Verde Wash I and associated tributaries and splits
Rio Verde Wash J
Rio Verde Wash K
Rio Verde Wash L
Rio Verde Wash P and associated tributaries

FIRM panels affected:
0413C0840F
0413C01276G
0413C01277G
0413C01285G

Dear Mr. Boudjemaa:

Enclosed is the technical supporting data for the Rio Verde Floodplain Delineation Study as performed under the Rio Verde Area Drainage Master Plan. This delineation covers a previously unstudied portion of the Rio Verde area as well as revises portions of 6 currently effective delineations in the area. The study area is located in the northeast portion of Maricopa County.

The results are presented in a series of seven Technical Data Notebooks. The delineations are a result of two different methodologies. Dibble and Associates performed the floodplain delineation for the upper portion of the watershed using HEC-RAS. The Flood Control District was responsible for the modeling of the floodplains for the lower portion of the watershed using FLO-2D. The upper watershed technical

data is presented in Volumes 3 and 4, 1-Dimensional Hydrology Notebooks, and Volume 5, 1-Dimensional Hydraulics Notebook. The lower watershed technical data is presented in Volume 6, 2-Dimensional Modeling Technical Data Notebook. Survey and Mapping information is provided in Volume 2.

As part of this floodplain study, the District is recommending the current effective floodway limits shown for the majority of the Rio Verde Area be removed from the FIRM panel and any associated information removed from the Floodway Data Tables. This specifically applies to:

- Rio Verde Wash 10 starting from 500 ft downstream of FEMA cross-section G to 550 ft upstream of FEMA cross-section M
- All of Rio Verde Wash 11 and 11 South
- All of Rio Verde Wash 10 South and 10 North
- Rio Verde Wash 12 starting from 200 ft downstream of FEMA cross-section D to Wash 12's tie-in with Rio Verde Wash 11 660 ft upstream of FEMA cross-section N
- All of Rio Wash 12 South, 12 South Branch 1, and 12 South Branch 2
- All of Rio Verde Wash F
- All of Rio Verde North Wash A and A South

Reasons for this recommendation are discussed in Section 5.6 and 5.7 of Volume 6 listed above.

When adopted, the District is recommending the FIRM panels for the Rio Verde Area be presented at 500 scale.

The FEMA forms can be found within Volume 5 and Volume 6. Floodplain profiles for the two study areas can be found in Volume 5 for the 1-dimensional profiles and Volume 7 for the 2-dimensional profiles. Digital versions of the hydrologic and hydraulic analyses are included on cds in their respective reports. The digital floodplain limits for the full study area is included on the cd included in the manila envelope with this letter. Two rolled set of maps are provided with this submittal. One for the upstream portion of the watershed modeled using RAS and the second is for the lower watershed modeled with FLO-2D.

If you have any questions, please contact me at (602) 506-4837, or kag@mail.maricopa.gov.

Sincerely,

Kathryn Gross, CFM, M.A.
Floodplain Delineation Branch

Enclosure

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Appendix E: Hydraulic Analysis Supporting Documentation

E.1 Field Reconnaissance Report and Roughness Coefficient Estimation.

E.2 HEC-RAS Cross Section Plots

E.3 HEC-RAS Output

E.4 Miscellaneous Hydraulic Analysis Supporting Documentation

- E.4.1 Rio Verde ADMP ReadMe File
- E.4.2 HEC-1 Final 100-Year Flow Values and Selected Subbasin Maps
- E.4.3 Wash Name & River Mile Conversion Table

E.1 Field Reconnaissance Report and Roughness Coefficient Documentation

FLOOD CONTROL DISTRICT
OF
MARICOPA COUNTY

2801 WEST DURANGO STREET
PHOENIX, ARIZONA 85009

FLOODPLAIN DELINEATION OF THE RIO VERDE AREA DRAINAGE MASTER PLAN

FIELD RECONNAISSANCE REPORT

FCDMC CONTRACT NO. FCD2001C056

APRIL 18, 2005

PREPARED BY:

DIBBLE & ASSOCIATES
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CERTIFICATE NO.
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FRANK EDWARD BROWN
18 April 2005
Date Signed
ARIZONA, U.S.A.

RIO VERDE AREA DRAINAGE MASTER PLAN

FLOODPLAIN DELINEATION FIELD RECONNAISSANCE REPORT

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Appendix B – Hydraulic Structures

Rear Map Pocket - Roughness Value Map

RIO VERDE AREA DRAINAGE MASTER PLAN

FLOODPLAIN DELINEATION FIELD RECONNAISSANCE REPORT

1.0 Introduction

This report documents the fieldwork performed prior to modeling work in the HEC-RAS floodplain delineation model. The existing floodplain conditions were observed in the field and the left and right bank stations are initially set. Photographs were taken to document the Manning's n value roughness coefficients to be utilized in the hydraulic analyses. Visual observation was made for possible overflow areas. Structures and obstructions that could affect the floodplain delineation are described. This report incorporates the roughness values computed in Phase 1 of the Rio Verde Area Drainage Master Study (ADMP) and computes the values for Phase 3. The Phase 1 study washes comprise about 15 river miles while the new Phase 3 washes have about 17 additional river miles, for a total Phase 3 study length of 32 river miles. Both the Phase 1 and Phase 3 roughness coefficient computation sheets are presented in the same format. Dibble & Associates conducted field reconnaissance of the study area on 1 October 2002 for the Phase 1 study washes and on 12 and 13 April 2005 for the newer study washes added to Phase 3. The plastic grid appearing in many of the photographs adds scale factor to the photographs; the grid has 18 inches outside measure, with 1-inch inner squares. Wash names for the study washes added in Phase 3 are preliminary, and are based upon the ID field of the additional washes' attribute table. A typical Phase 1 wash name would be W1 Wash, while a temporary Phase 3 name would be 1 Wash.

2.0 Study Limits

The areas for the flood delineation encompass the one-dimensional (HEC-RAS models) portion of the Rio Verde area, mostly covering washes in the upper watershed west and north sides of the ADMP study area. There are 31 study washes for the delineation study (numbering all tributaries) with a total length of about 32 river miles. Each study wash generally has one reach for roughness coefficients, but some study washes contain two or three reaches.

3.0 Mapping

This project utilizes the topographic mapping provided by the Flood Control District of Maricopa County. The contours are based upon information gathered on the flight dates from several previous Rio Verde projects, with flights dates varying from 1993 to 2002. To assist in incorporating recent changes to the land use, such as new developments that could affect the floodplain, 2002 aerial photographs are reviewed. The more recent 2004 color aerial photographs will be reviewed prior to finalization of the floodplain delineations.

4.0 General Watershed and Floodplain Conditions

The study washes drain a piedmont, at a longitudinal slope of around 2 to 3 %, draining to the Verde River. The "Roughness Value Map" contained in the rear map pocket shows reach limits, the location of photographs, and the Manning's roughness values for a reach. In general, the Upper Sonoran plant community covers the study area. The density of vegetation has significant impact on the roughness coefficient and has been considered in the n values. Vegetation within the floodplain has been identified to include the following:

- Brittle Bush
- Cactus – Barrel, Teddy Bear Cholla, Prickly Pear, Saguaro
- Catclaw
- Creosote Brush
- Desert Broom
- Mesquite
- Native Grasses
- Ocotillo
- Little Leaf Palo Verde Tree
- Jojoba
- Mormon Tea
- Brittle Bush
- Hackberry

For the most part, these desert washes do not contain much vegetation on the channel bottom. The left and right overbank stations are placed at the edge of the low flow channel. Low flow channels range from 6 inches to 18 inches in depth for the majority, with some washes incised 2 to 4 feet. The widths on the low flow channels vary from 4 feet to 18 feet or so. The overbank areas and sand/gravel deposit bars for braided washes are more heavily vegetated. The roughness coefficient values generally reflect this variation in roughness, although some of the channel bottom edges contain vegetation and other roughness factors, tending to drive up the channel bottom coefficients. The channel bed sediments are typically coarse sub-angular sands and angular gravels. Some cobbles were observed in a few of the study washes.

The USGS document, Estimated Manning's Roughness Coefficients for Streams and Channels and Flood Plains in Maricopa County, contains the roughness values and computation procedure utilized in this report. The basic methodology is to select a base value for the bed material, then add adjustments for irregularity, obstructions, vegetation and variations in channel cross section. No washes had sufficient meander to warrant multiplication by the coefficients for degree of meandering.

Overflow areas

Visual observation was made for possible overflow areas. These areas are generally located in the overbank areas where residential structures have been constructed. In addition, there are overflow areas that will be identified on the floodplain delineation work maps as "sheet flow flooding" or "overflow area."

Significant Hydraulic Structures

Numerous culverts are located within the study area, but only one culvert will be modeled in the HEC-RAS model. That culvert is a 6 barrel 8 foot by 4-foot concrete box culvert located at the confluence of 10 Wash with 11 Wash at 142nd Street within the Granite Mountain Ranch subdivision. Several culverts within the RAS model areas are too small to be significant for hydraulic modeling. An insignificant culvert is one that carries less than 25% of the 100-year flood, and at such locations, all of the flow will be allowed to overtop the adjacent roadway. The

remaining culverts are found in the two-dimensional modeling area. The geometric and elevation data for all of the culverts to be modeled hydraulically have been surveyed.

There are a few stock tanks within the one dimensional model area. The stock tank on 22 Wash near 140th Street has been abandoned. The embankment has been completely breached and a numbed dirt road cuts through the former ponding area. The embankment only serves to divide flow with the floodplain. The outflow channel drops over a minor grade control structure. Hydraulic modeling of the grade control structure is not necessary. The stock tank at the downstream end of 11F Wash will be included in the floodplain delineation. The stock tank located on 7B Wash is owned and maintained by the City of Scottsdale and is under the jurisdiction of the Arizona Department of Water Resources. This dam may be breached in the near future.

5.0 Summary

The Manning's n values presented in this report are determined by a combination of field reconnaissance, ground and aerial photographs, calculations, personal experience on other similar projects (including projects within the study area) and engineering judgment. Adjustments are made for urban residential houses or industrial/commercial buildings when discernible vegetation removal has been accomplished. Supplementing this report is data collected from previous studies that would have an influence on the floodplain delineation. Photographic documentation of the floodplain characteristics and the Manning's n value calculations are presented in the Appendix A to this report. Roughness coefficients range from 0.035 to 0.065 for the channel area and from 0.045 to 0.085 for the overbank areas. Significant hydraulic structures photographs are reported in Appendix B. The rear map pocket contains the roughness value map, depicting the location of photos and direction of view and the roughness values.

6.0 References

Flood Control District of Maricopa County, Rio Verde North Floodplain Delineation Study, Hydraulics, FCD # 93-06, sealed on 7 September 1995.

Flood Control District of Maricopa County, Rio Verde North Extension Floodplain Delineation Study, Hydraulic Analysis, Volume V through Volume VI, FCD # 98-21, sealed on 20 December 2002.

Flood Control District of Maricopa County, Rio Verde South Floodplain Delineation Study, Hydraulics, Books 1 & 2, FCD # 93-07, sealed on 3 October 1995.

Flood Control District of Maricopa County, Rio Verde South Extension Floodplain Delineation Study, Technical Data Notebook, Volumes 1 and 2, FCD # 97-13, sealed on 26 May 1999.

Scottsdale 275 Limited Liability Company, Master Drainage Report for Scottsdale National, CMX Group Inc., November 27, 2001.

United States Geological Survey, Estimated Manning's Roughness Coefficients for Streams and Channels and Flood Plains in Maricopa County, Arizona, April 1991.

APPENDIX A

Manning's N Value Documentation and Calculations

Photog[illegible]h Legend

Left Overbank

Looking Upstream or Downstream

Bed Material

Main Channel

Looking Upstream or Downstream

Right Overbank

Looking Upstream or Downstream

Note: Photographs for a given reach are on the page immediately following the corresponding computations.

DETERMINATION OF MANNING'S ROUGHNESS COEFFICIENTS BY FCDMC METHOD

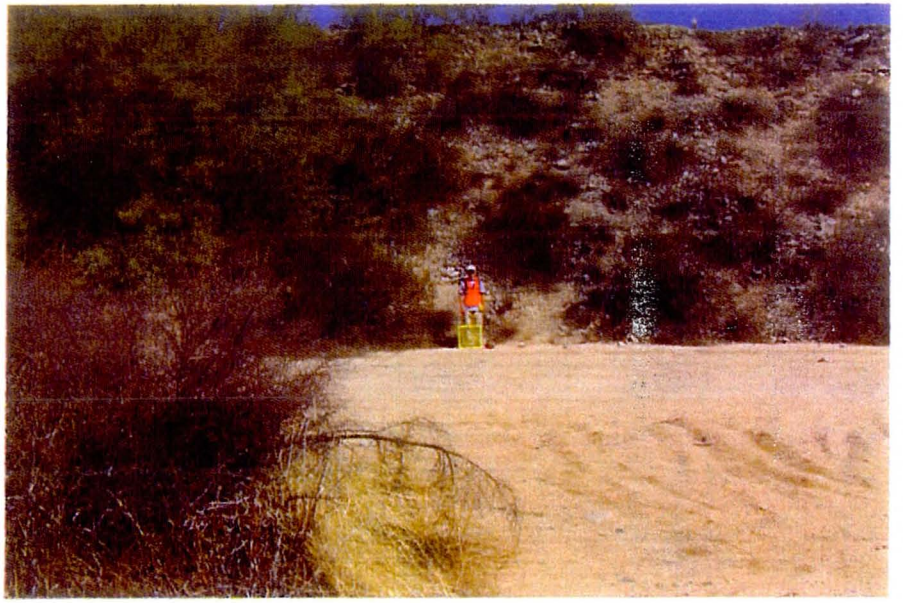
Project: Rio Verde Area Drainage Master Plan, FCD 2001C056, Phase 3 – Floodplain Delineations
Stream: W1 Wash – R1
Location: From Upstream Limits of Phase 1 Study to 4,400' Upstream of Needle Rock Road
Photos: 206, 208, 210, 212
Notes:

Channel Conditions		Manning's n Adjustment		Left Overbank	Channel	Right Overbank
Channel Material	Firm Soil	n_b	.025 - .032			
	Coarse Sand		.026 - .035	0.028	0.032	0.028
	Gravel		.028 - .035			
	Cobble		.030 - .050			
	Boulder		.040 - .070			
Degree of Irregularity	Smooth	n_1	0			
	Minor		.001 - .005	0.001	0.003	0.001
	Moderate		.006 - .010			
	Severe		.011 - .020			
Effects of Obstruction	Negligible	n_2	.000 - .004	0.003	0.001	0.003
	Minor		.005 - .015			
	Appreciable		.020 - .030			
	Severe		.040 - .060			
Vegetation	Small	n_3	.002 - .010			
	Medium		.010 - .025	0.025	0.010	0.025
	Large		.025 - .050			
	Very Large		.050 - .100			
Variations in Channel Cross Section	Gradual	n_4	0			
	Occ. Alt.		.001 - .005	0.000	0.001	0.000
	Freq. Alt.		.010 - .015			
Subtotal				0.057	0.047	0.057
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n = (n_b+n_1+n_2+n_3+n_4)m$				0.057	0.047	0.057
Manning's n Value Used				0.055	0.050	0.055

DETERMINATION OF MANNING'S ROUGHNESS COEFFICIENTS BY FCDMC METHOD

Project: Rio Verde Area Drainage Master Plan, FCD 2001C056, Phase 3 – Floodplain Delineations
Stream: W1 Wash – R2
Location: From 4,400' Upstream of Needle Rock Road to Needle Rock Road
Photos: 298, 200, 201
Notes:

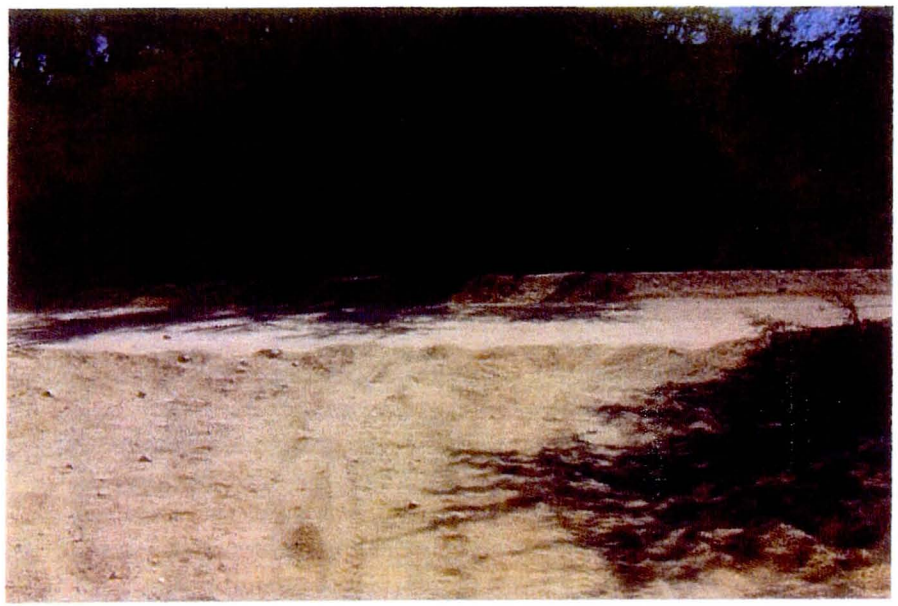
Channel Conditions		Manning's n Adjustment		Left Overbank	Channel	Right Overbank
Channel Material	Firm Soil	n_b	.025 - .032	0.020		0.020
	Coarse Sand		.026 - .035		0.028	
	Gravel		.028 - .035			
	Cobble		.030 - .050			
	Boulder		.040 - .070			
Degree of Irregularity	Smooth	n_1	0	0.000		0.000
	Minor		.001 - .005			
	Moderate		.006 - .010		0.006	
	Severe		.011 - .020			
Effects of Obstruction	Negligible	n_2	.000 - .004		0.002	
	Minor		.005 - .015	0.015		0.015
	Appreciable		.020 - .030			
	Severe		.040 - .060			
Vegetation	Small	n_3	.002 - .010	0.010	0.005	0.010
	Medium		.010 - .025			
	Large		.025 - .050			
	Very Large		.050 - .100			
Variations in Channel Cross Section	Gradual	n_4	0	0.000		0.000
	Occ. Alt.		.001 - .005		0.001	
	Freq. Alt.		.010 - .015			
Subtotal				0.045	0.042	0.045
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n = (n_b+n_1+n_2+n_3+n_4)m$				0.045	0.042	0.045
Manning's n Value Used				**0.045**	**0.040**	**0.045**



DETERMINATION OF MANNING'S ROUGHNESS COEFFICIENTS BY FCDMC METHOD

Project: Rio Verde Area Drainage Master Plan, FCD 2001C056, Phase 3 – Floodplain Delineations
Stream: W1 Wash – R3
Location: From Needle Rock Road to Verde River
Photos: 296, 297
Notes:

Channel Conditions		Manning's n Adjustment		Left Overbank	Channel	Right Overbank
Channel Material	Firm Soil	n_b	.025 - .032	0.020	0.020	0.020
	Coarse Sand		.026 - .035			
	Gravel		.028 - .035			
	Cobble		.030 - .050			
	Boulder		.040 - .070			
Degree of Irregularity	Smooth	n_1	0	0.000	0.000	0.000
	Minor		.001 - .005			
	Moderate		.006 - .010			
	Severe		.011 - .020			
Effects of Obstruction	Negligible	n_2	.000 - .004			
	Minor		.005 - .015	0.015	0.015	0.015
	Appreciable		.020 - .030			
	Severe		.040 - .060			
Vegetation	Small	n_3	.002 - .010			
	Medium		.010 - .025	0.025	0.025	0.025
	Large		.025 - .050			
	Very Large		.050 - .100			
Variations in Channel Cross Section	Gradual	n_4	0	0.000	0.000	0.000
	Occ. Alt.		.001 - .005			
	Freq. Alt.		.010 - .015			
Subtotal				0.060	0.060	0.060
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n = (n_b+n_1+n_2+n_3+n_4)m$				0.060	0.060	0.060
Manning's n Value Used				**0.060**	**0.060**	**0.060**



DETERMINATION OF MANNING'S ROUGHNESS COEFFICIENTS BY FCDMC METHOD

Project: Rio Verde Area Drainage Master Plan, FCD 2001C056, Phase 3 – Floodplain Delineations

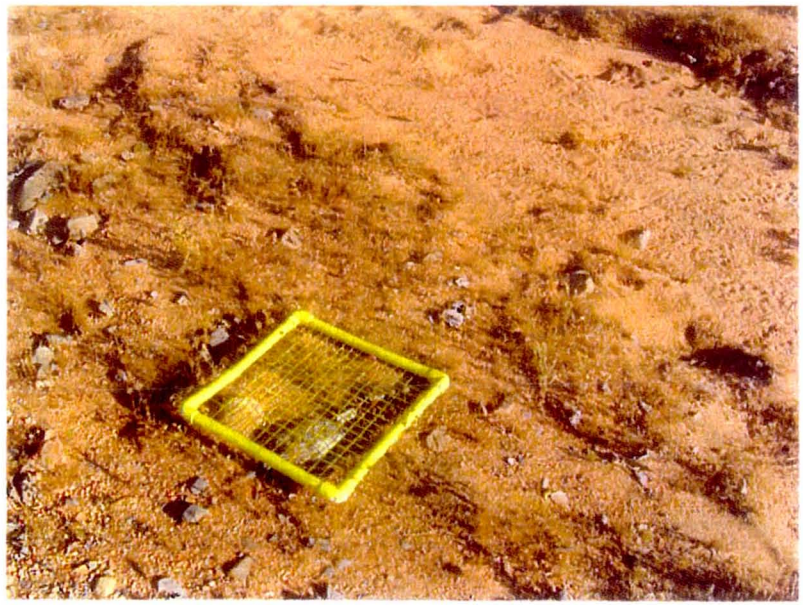
Stream: 3 Wash – R1

Location: From Upstream Limits of Study to Upstream Limits of W1 Wash of Phase 1 Study

Photos: 191, 193, 194, 196

Notes:

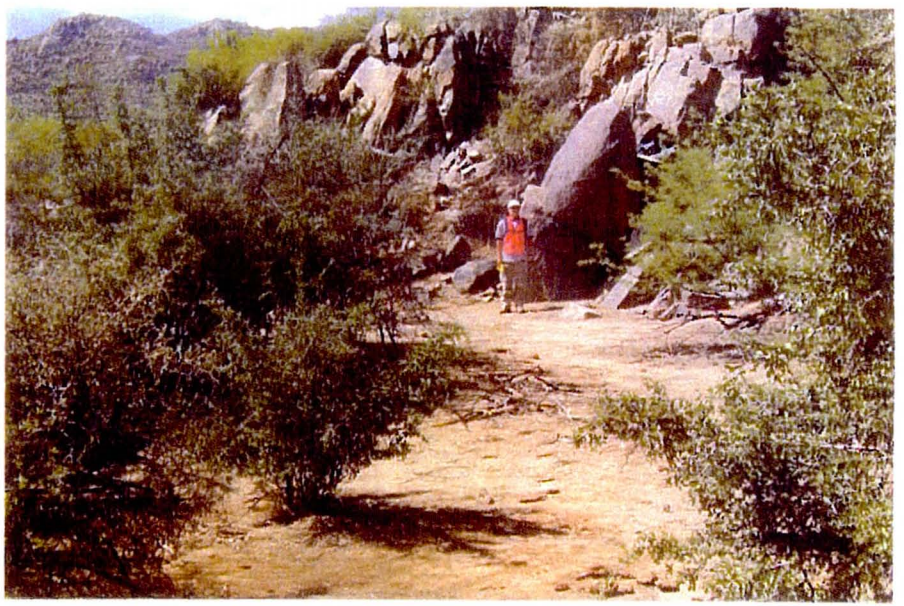
Channel Conditions		Manning's n Adjustment		Left Overbank	Channel	Right Overbank
Channel Material	Firm Soil	n_b	.025 - .032			
	Coarse Sand		.026 - .035			
	Gravel		.028 - .035	0.028	0.029	0.028
	Cobble		.030 - .050			
	Boulder		.040 - .070			
Degree of Irregularity	Smooth	n_1	0			
	Minor		.001 - .005	0.004	0.004	0.004
	Moderate		.006 - .010			
	Severe		.011 - .020			
Effects of Obstruction	Negligible	n_2	.000 - .004	0.003	0.004	0.003
	Minor		.005 - .015			
	Appreciable		.020 - .030			
	Severe		.040 - .060			
Vegetation	Small	n_3	.002 - .010			
	Medium		.010 - .025	0.018	0.010	0.018
	Large		.025 - .050			
	Very Large		.050 - .100			
Variations in Channel Cross Section	Gradual	n_4	0			
	Occ. Alt.		.001 - .005	0.001	0.003	0.001
	Freq. Alt.		.010 - .015			
Subtotal				0.054	0.050	0.054
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n = (n_b+n_1+n_2+n_3+n_4)m$				0.054	0.050	0.054
Manning's n Value Used				**0.055**	**0.050**	**0.055**



DETERMINATION OF MANNING'S ROUGHNESS COEFFICIENTS BY FCDMC METHOD

Project: Rio Verde Area Drainage Master Plan, FCD 2001C056, Phase 3 – Floodplain Delineations
Stream: W6 Wash – R1
Location: From Upstream Limits of Study to Downstream Limits of Study
Photos: 287, 288, 293
Notes: W6 Wash North and South.

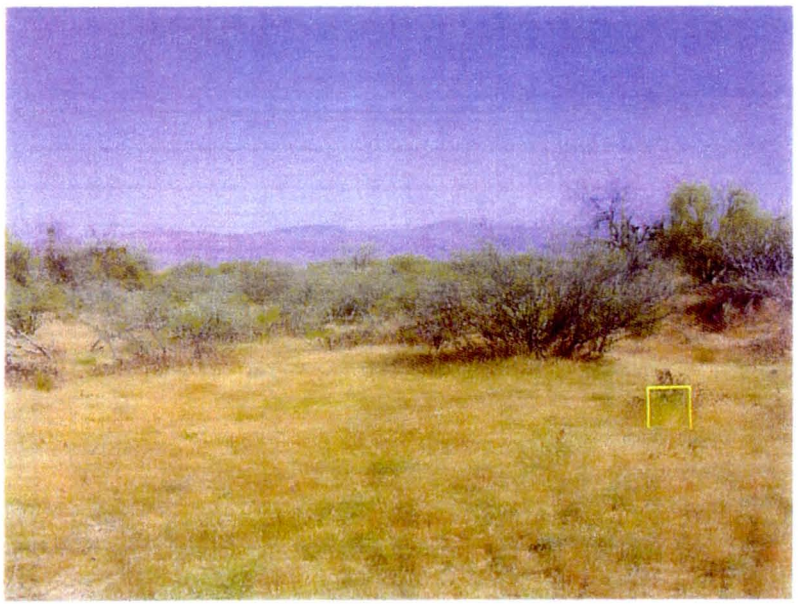
Channel Conditions		Manning's n Adjustment		Left Overbank	Channel	Right Overbank
Channel Material	Firm Soil	n_b	.025 - .032	0.026		0.026
	Coarse Sand		.026 - .035		0.026	
	Gravel		.028 - .035			
	Cobble		.030 - .050			
	Boulder		.040 - .070			
Degree of Irregularity	Smooth	n_1	0			
	Minor		.001 - .005	0.004	0.001	0.004
	Moderate		.006 - .010			
	Severe		.011 - .020			
Effects of Obstruction	Negligible	n_2	.000 - .004	0.000	0.001	0.000
	Minor		.005 - .015			
	Appreciable		.020 - .030			
	Severe		.040 - .060			
Vegetation	Small	n_3	.002 - .010	0.001	0.003	0.001
	Medium		.010 - .025			
	Large		.025 - .050			
	Very Large		.050 - .100			
Variations in Channel Cross Section	Gradual	n_4	0			
	Occ. Alt.		.001 - .005			
	Freq. Alt.		.010 - .015	0.030	0.010	0.030
Subtotal				0.061	0.041	0.061
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n = (n_b+n_1+n_2+n_3+n_4)m$				0.061	0.041	0.061
Manning's n Value Used				**0.060**	**0.040**	**0.060**

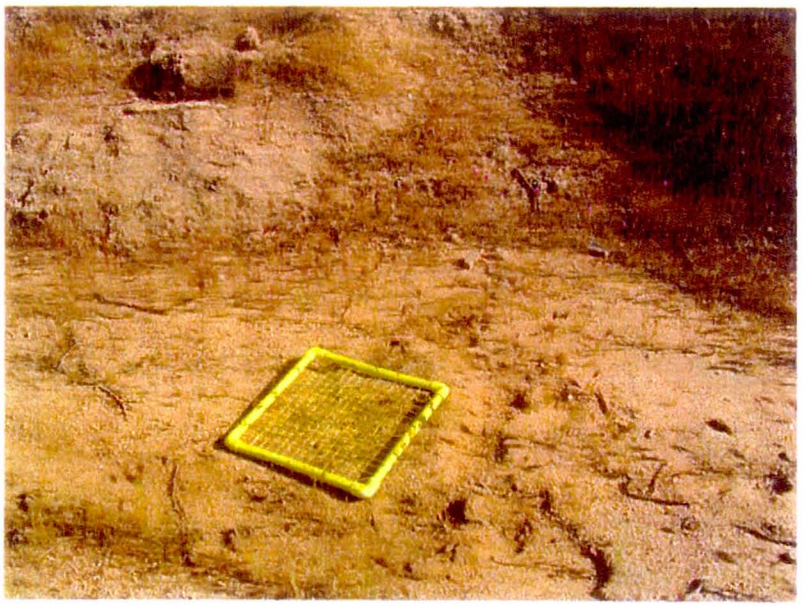


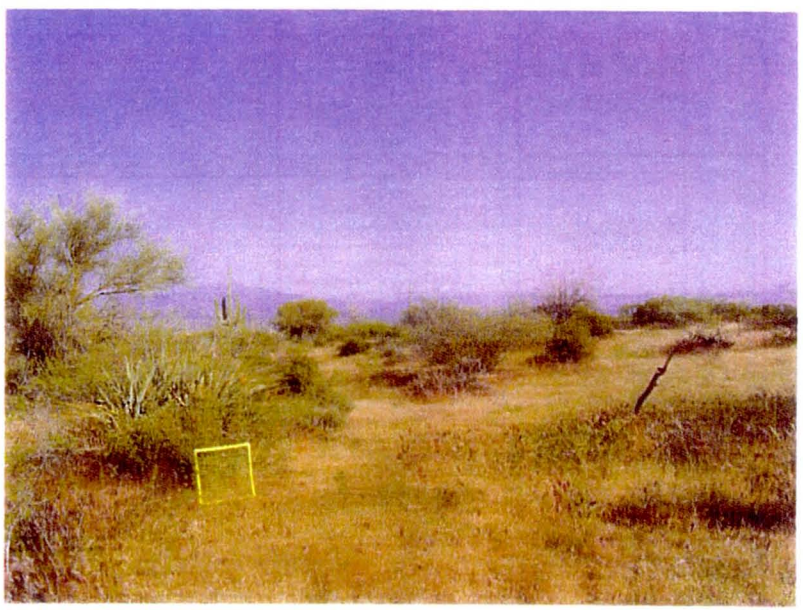
DETERMINATION OF MANNING'S ROUGHNESS COEFFICIENTS BY FCDMC METHOD

Project: Rio Verde Area Drainage Master Plan, FCD 2001C056, Phase 3 – Floodplain Delineations
Stream: 6 Wash – R1
Location: From Upstream Limits of Study to Downstream Limits of Study
Photos: 81, 82, 83, 84
Notes:

Channel Conditions		Manning's n Adjustment		Left Overbank	Channel	Right Overbank
Channel Material	Firm Soil	n_b	.025 - .032	0.027		0.027
	Coarse Sand		.026 - .035		0.026	
	Gravel		.028 - .035			
	Cobble		.030 - .050			
	Boulder		.040 - .070			
Degree of Irregularity	Smooth	n_1	0			
	Minor		.001 - .005	0.001	0.001	0.001
	Moderate		.006 - .010			
	Severe		.011 - .020			
Effects of Obstruction	Negligible	n_2	.000 - .004	0.004	0.004	0.004
	Minor		.005 - .015			
	Appreciable		.020 - .030			
	Severe		.040 - .060			
Vegetation	Small	n_3	.002 - .010		0.008	
	Medium		.010 - .025	0.015		0.015
	Large		.025 - .050			
	Very Large		.050 - .100			
Variations in Channel Cross Section	Gradual	n_4	0	0.000	0.000	0.000
	Occ. Alt.		.001 - .005			
	Freq. Alt.		.010 - .015			
Subtotal				0.047	0.039	0.047
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n = (n_b+n_1+n_2+n_3+n_4)m$				0.047	0.039	0.047
Manning's n Value Used				**0.045**	**0.040**	**0.045**







DETERMINATION OF MANNING'S ROUGHNESS COEFFICIENTS BY FCDMC METHOD

Project: Rio Verde Area Drainage Master Plan, FCD 2001C056, Phase 3 – Floodplain Delineations

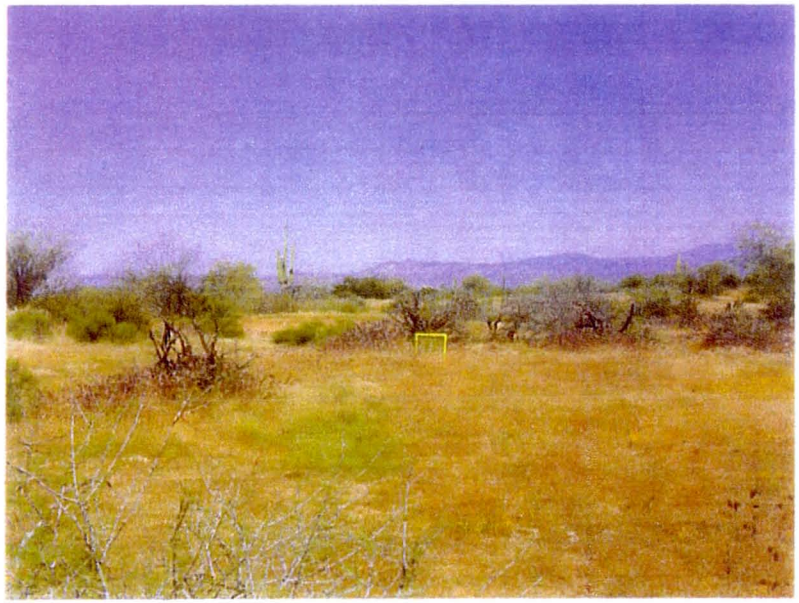
Stream: 7 7 Wash – R1

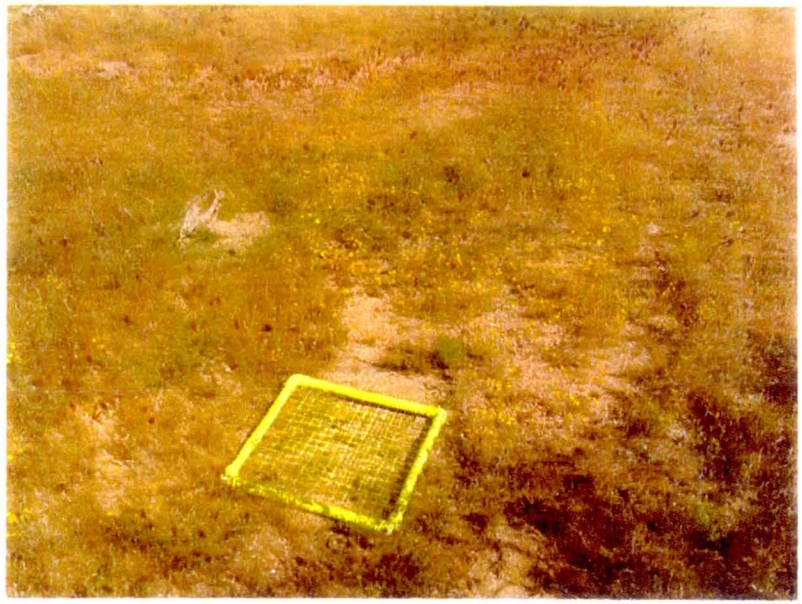
Location: From Upstream Limits of Study to Downstream Limits of Study

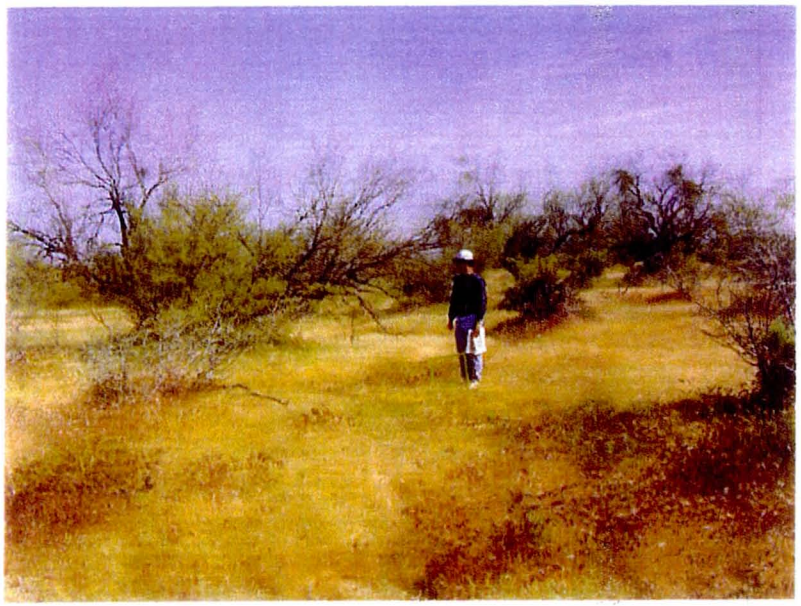
Photos: 70, 71, 72, 73

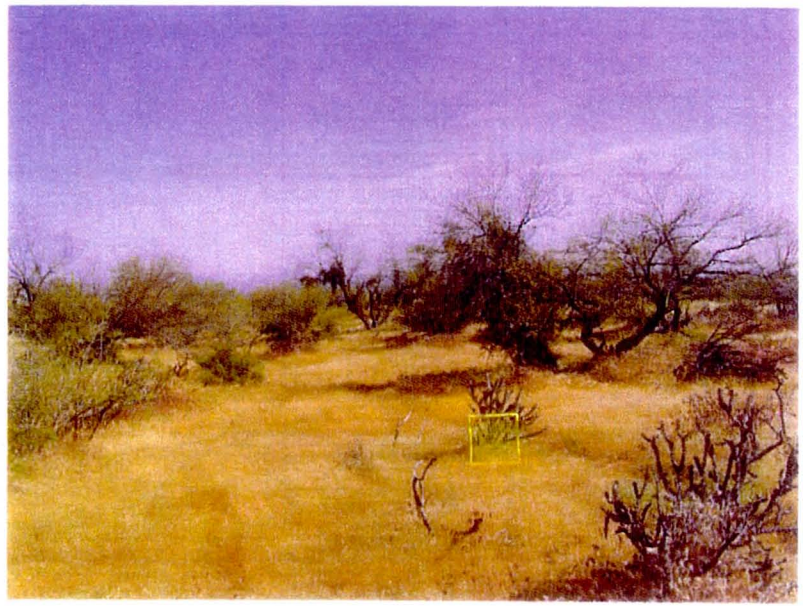
Notes:

Channel Conditions		Manning's n Adjustment		Left Overbank	Channel	Right Overbank
Channel Material	Firm Soil	n_b	.025 - .032	0.027		0.027
	Coarse Sand		.026 - .035		0.028	
	Gravel		.028 - .035			
	Cobble		.030 - .050			
	Boulder		.040 - .070			
Degree of Irregularity	Smooth	n_1	0			
	Minor		.001 - .005	0.001	0.001	0.001
	Moderate		.006 - .010			
	Severe		.011 - .020			
Effects of Obstruction	Negligible	n_2	.000 - .004	0.004	0.004	0.004
	Minor		.005 - .015			
	Appreciable		.020 - .030			
	Severe		.040 - .060			
Vegetation	Small	n_3	.002 - .010			
	Medium		.010 - .025	0.015	0.010	0.015
	Large		.025 - .050			
	Very Large		.050 - .100			
Variations in Channel Cross Section	Gradual	n_4	0	0.000	0.000	0.000
	Occ. Alt.		.001 - .005			
	Freq. Alt.		.010 - .015			
Subtotal				0.047	0.043	0.047
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n = (n_b+n_1+n_2+n_3+n_4)m$				0.047	0.043	0.047
Manning's n Value Used				**0.045**	**0.045**	**0.045**









DETERMINATION OF MANNING'S ROUGHNESS COEFFICIENTS BY FCDMC METHOD

Project: Rio Verde Area Drainage Master Plan, FCD 2001C056, Phase 3 – Floodplain Delineations
Stream: 7B Wash – R1
Location: From Upstream Limits of Study to Downstream Limits of Study
Photos: 270
Notes: Values typical for both 7B Spill and 7B Breach.

Channel Conditions		Manning's n Adjustment		Left Overbank	Channel	Right Overbank
Channel Material	Firm Soil	n_b	.025 - .032	0.028		0.028
	Coarse Sand		.026 - .035		0.028	
	Gravel		.028 - .035			
	Cobble		.030 - .050			
	Boulder		.040 - .070			
Degree of Irregularity	Smooth	n_1	0			
	Minor		.001 - .005	0.004	0.002	0.004
	Moderate		.006 - .010			
	Severe		.011 - .020			
Effects of Obstruction	Negligible	n_2	.000 - .004	0.000	0.001	0.000
	Minor		.005 - .015			
	Appreciable		.020 - .030			
	Severe		.040 - .060			
Vegetation	Small	n_3	.002 - .010	0.001	0.001	0.001
	Medium		.010 - .025			
	Large		.025 - .050			
	Very Large		.050 - .100			
Variations in Channel Cross Section	Gradual	n_4	0			
	Occ. Alt.		.001 - .005			
	Freq. Alt.		.010 - .015	0.015	0.010	0.015
Subtotal				0.048	0.042	0.048
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n = (n_b+n_1+n_2+n_3+n_4)m$				0.048	0.042	0.048
Manning's n Value Used				**0.050**	**0.040**	**0.050**

DETERMINATION OF MANNING'S ROUGHNESS COEFFICIENTS BY FCDMC METHOD

Project: Rio Verde Area Drainage Master Plan. FCD 2001C056. Phase 3 – Floodplain Delineations

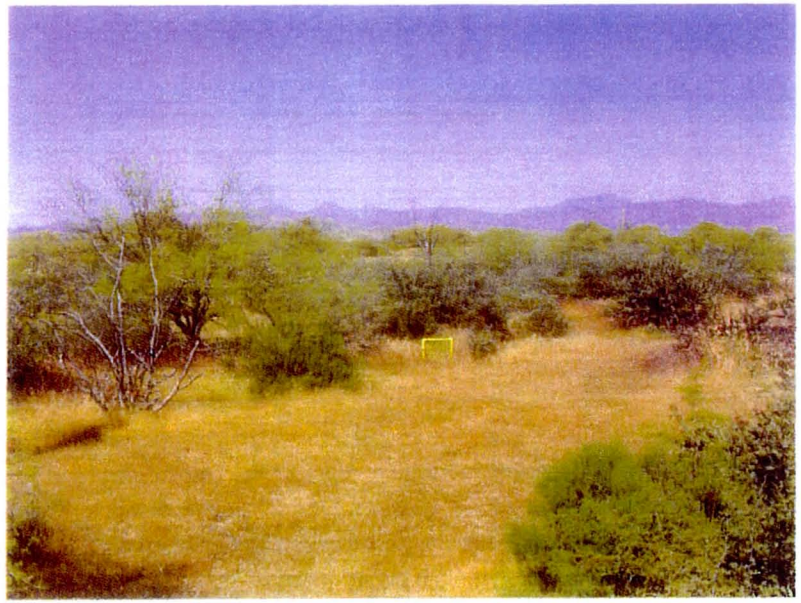
Stream: 8 Wash – R1

Location: From Upstream Limits of Study to 140th Street

Photos: 74, 75, 76, 77

Notes:

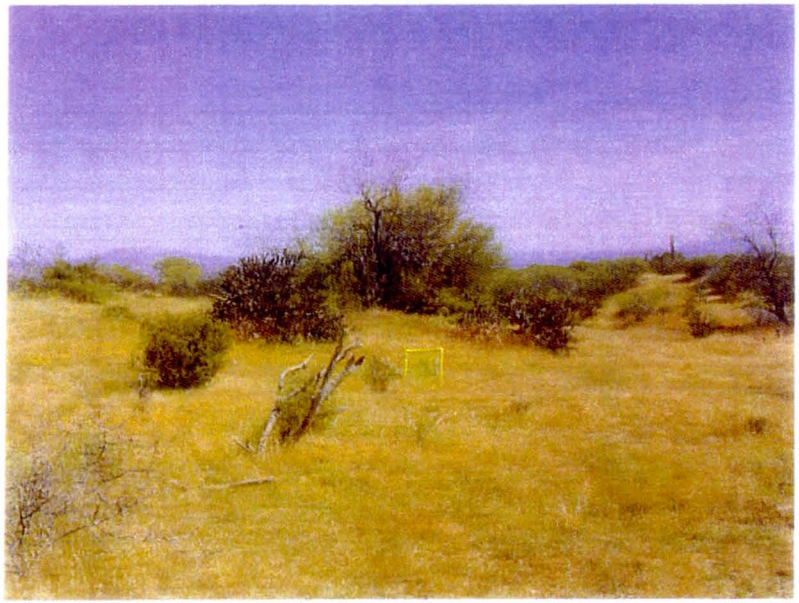
Channel Conditions		Manning's n Adjustment		Left Overbank	Channel	Right Overbank
Channel Material	Firm Soil	n_b	.025 - .032	0.027		0.027
	Coarse Sand		.026 - .035		0.028	
	Gravel		.028 - .035			
	Cobble		.030 - .050			
	Boulder		.040 - .070			
Degree of Irregularity	Smooth	n_1	0			
	Minor		.001 - .005	0.001	0.001	0.001
	Moderate		.006 - .010			
	Severe		.011 - .020			
Effects of Obstruction	Negligible	n_2	.000 - .004	0.004	0.004	0.004
	Minor		.005 - .015			
	Appreciable		.020 - .030			
	Severe		.040 - .060			
Vegetation	Small	n_3	.002 - .010			
	Medium		.010 - .025	0.020	0.012	0.020
	Large		.025 - .050			
	Very Large		.050 - .100			
Variations in Channel Cross Section	Gradual	n_4	0	0.000	0.000	0.000
	Occ. Alt.		.001 - .005			
	Freq. Alt.		.010 - .015			
Subtotal				0.052	0.045	0.052
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n = (n_b+n_1+n_2+n_3+n_4)m$				0.052	0.045	0.052
Manning's n Value Used				**0.050**	**0.045**	**0.050**

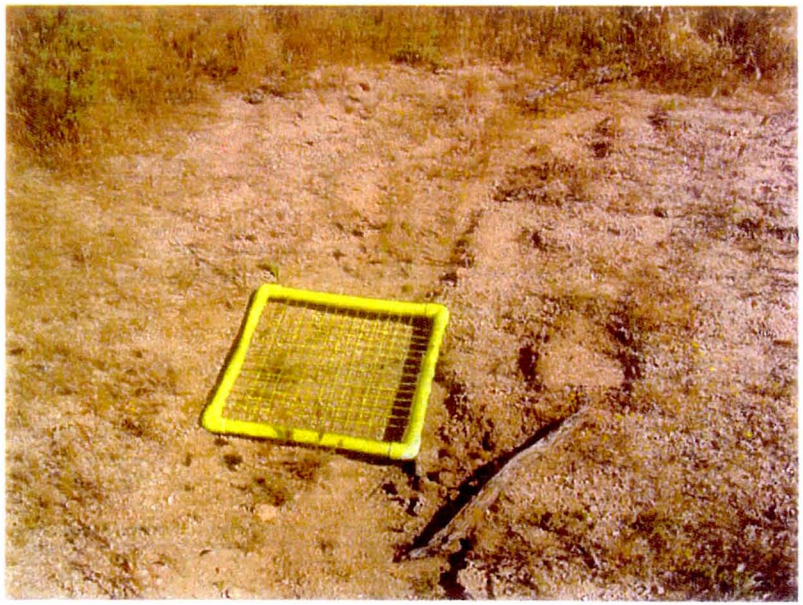


DETERMINATION OF MANNING'S ROUGHNESS COEFFICIENTS BY FCDMC METHOD

Project: Rio Verde Area Drainage Master Plan, FCD 2001C056, Phase 3 – Floodplain Delineations
Stream: 8 Wash – R2
Location: From 140th Street to Downstream Limits of Study
Photos: 62, 63, 64, 65
Notes:

Channel Conditions		Manning's n Adjustment		Left Overbank	Channel	Right Overbank
Channel Material	Firm Soil	n_b	.025 - .032	0.027		0.027
	Coarse Sand		.026 - .035		0.028	
	Gravel		.028 - .035			
	Cobble		.030 - .050			
	Boulder		.040 - .070			
Degree of Irregularity	Smooth	n_1	0			
	Minor		.001 - .005	0.001	0.001	0.001
	Moderate		.006 - .010			
	Severe		.011 - .020			
Effects of Obstruction	Negligible	n_2	.000 - .004	0.004	0.004	0.004
	Minor		.005 - .015			
	Appreciable		.020 - .030			
	Severe		.040 - .060			
Vegetation	Small	n_3	.002 - .010			
	Medium		.010 - .025	0.015	0.010	0.015
	Large		.025 - .050			
	Very Large		.050 - .100			
Variations in Channel Cross Section	Gradual	n_4	0	0.000	0.000	0.000
	Occ. Alt.		.001 - .005			
	Freq. Alt.		.010 - .015			
Subtotal				0.047	0.043	0.047
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n = (n_b+n_1+n_2+n_3+n_4)m$				0.047	0.043	0.047
Manning's n Value Used				**0.045**	**0.045**	**0.045**

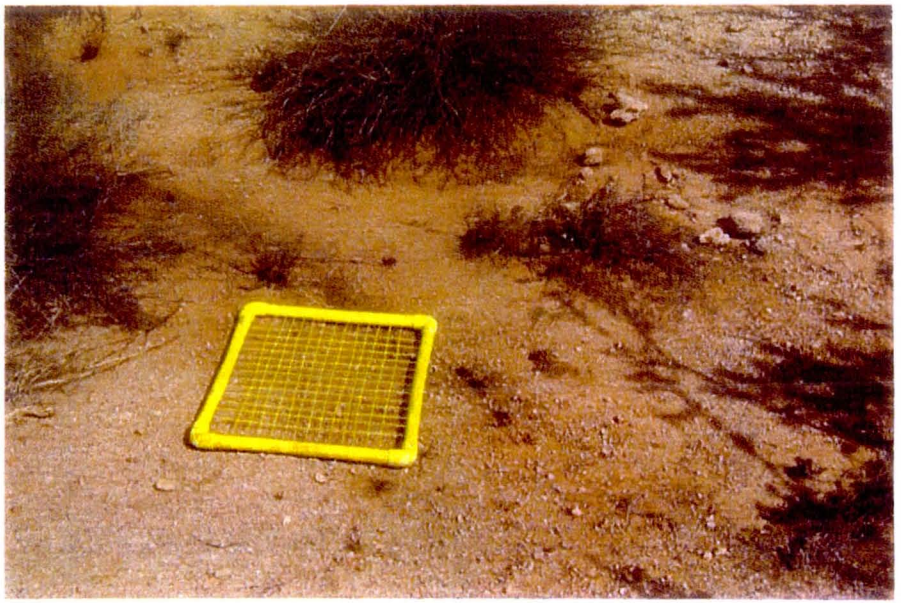




DETERMINATION OF MANNING'S ROUGHNESS COEFFICIENTS BY FCDMC METHOD

Project: Rio Verde Area Drainage Master Plan, FCD 2001C056, Phase 3 – Floodplain Delineations
Stream: 9B Wash – R1
Location: From Upstream Limits of Study to Downstream Limits of Study
Photos: 281, 283, 284
Notes:

Channel Conditions		Manning's n Adjustment		Left Overbank	Channel	Right Overbank
Channel Material	Firm Soil	n_b	.025 - .032	0.028		0.028
	Coarse Sand		.026 - .035		0.028	
	Gravel		.028 - .035			
	Cobble		.030 - .050			
	Boulder		.040 - .070			
Degree of Irregularity	Smooth	n_1	0			
	Minor		.001 - .005	0.004	0.005	0.004
	Moderate		.006 - .010			
	Severe		.011 - .020			
Effects of Obstruction	Negligible	n_2	.000 - .004	0.001	0.001	0.001
	Minor		.005 - .015			
	Appreciable		.020 - .030			
	Severe		.040 - .060			
Vegetation	Small	n_3	.002 - .010	0.010	0.009	0.010
	Medium		.010 - .025			
	Large		.025 - .050			
	Very Large		.050 - .100			
Variations in Channel Cross Section	Gradual	n_4	0			
	Occ. Alt.		.001 - .005			
	Freq. Alt.		.010 - .015	0.032	0.008	0.032
Subtotal				0.075	0.051	0.075
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n = (n_b+n_1+n_2+n_3+n_4)m$				0.075	0.051	0.075
Manning's n Value Used				**0.075**	**0.050**	**0.075**



DETERMINATION OF MANNING'S ROUGHNESS COEFFICIENTS BY FCDMC METHOD

Project: Rio Verde Area Drainage Master Plan, FCD 2001C056, Phase 3 – Floodplain Delineations

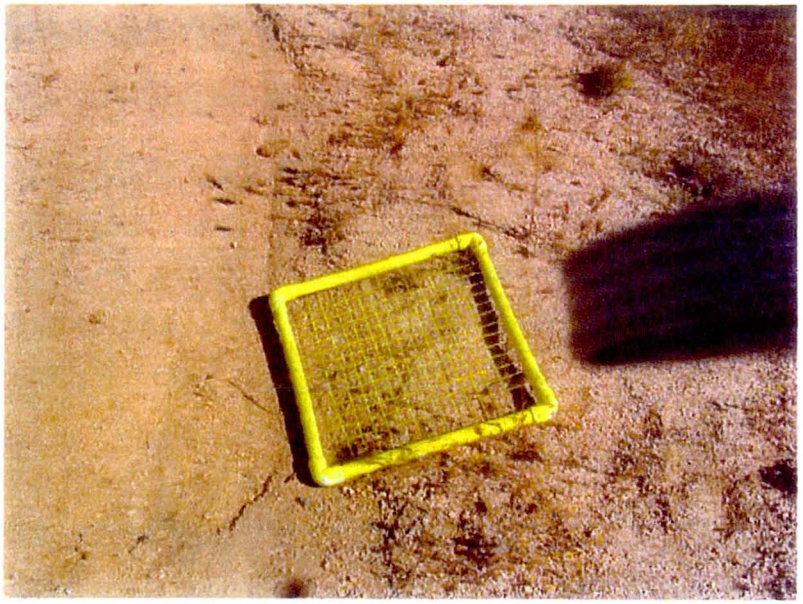
Stream: 10 Wash – R1

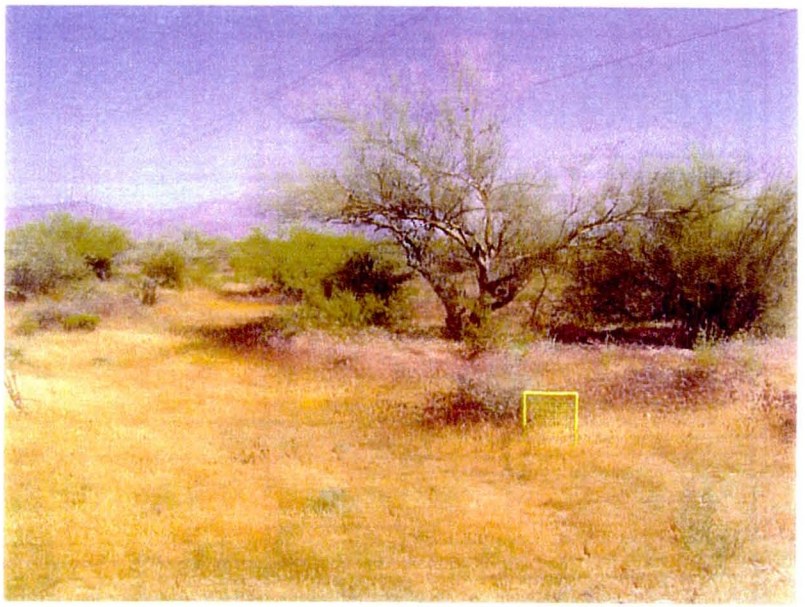
Location: From Upstream Limits of Study to 140th Street

Photos: 163, 164, 166, 168

Notes: Subtract 0.015 from n value for both overbanks and channel through the horse ranch west of 140th Street.

Channel Conditions		Manning's n Adjustment		Left Overbank	Channel	Right Overbank
Channel Material	Firm Soil	n_b	.025 - .032	0.025		0.025
	Coarse Sand		.026 - .035		0.026	
	Gravel		.028 - .035			
	Cobble		.030 - .050			
	Boulder		.040 - .070			
Degree of Irregularity	Smooth	n_1	0			
	Minor		.001 - .005	0.001	0.003	0.001
	Moderate		.006 - .010			
	Severe		.011 - .020			
Effects of Obstruction	Negligible	n_2	.000 - .004	0.001	0.001	0.001
	Minor		.005 - .015			
	Appreciable		.020 - .030			
	Severe		.040 - .060			
Vegetation	Small	n_3	.002 - .010			
	Medium		.010 - .025	0.025	0.015	0.025
	Large		.025 - .050			
	Very Large		.050 - .100			
Variations in Channel Cross Section	Gradual	n_4	0			
	Occ. Alt.		.001 - .005	0.002	0.003	0.002
	Freq. Alt.		.010 - .015			
Subtotal				0.054	0.048	0.054
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n = (n_b+n_1+n_2+n_3+n_4)m$				0.054	0.048	0.054
Manning's n Value Used				**0.055**	**0.050**	**0.055**





DETERMINATION OF MANNING'S ROUGHNESS COEFFICIENTS BY FCDMC METHOD

Project: Rio Verde Area Drainage Master Plan, FCD 2001C056, Phase 3 – Floodplain Delineations

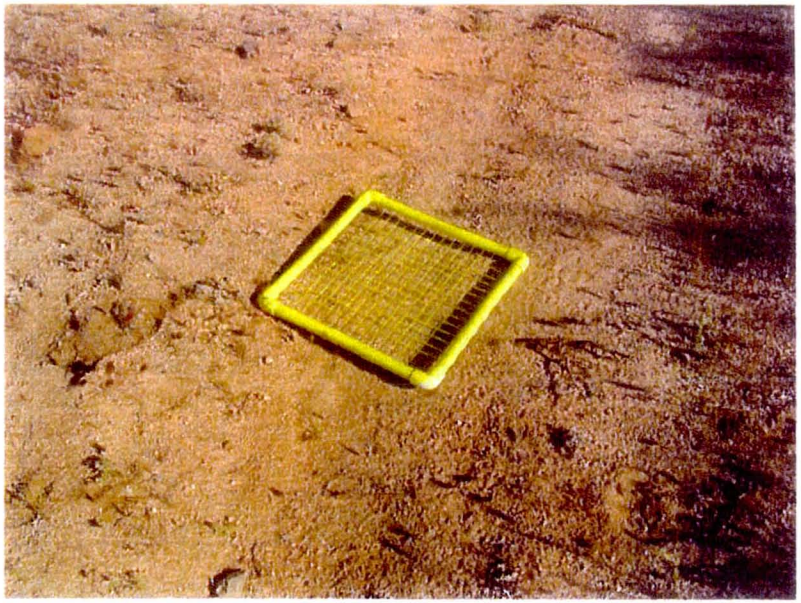
Stream: 10 Wash – R2

Location: From 140th Street to Downstream Limits of Study

Photos: 186, 187, 188, 189

Notes:

Channel Conditions		Manning's n Adjustment		Left Overbank	Channel	Right Overbank
Channel Material	Firm Soil	n_b	.025 - .032	0.025		0.025
	Coarse Sand		.026 - .035		0.026	
	Gravel		.028 - .035			
	Cobble		.030 - .050			
	Boulder		.040 - .070			
Degree of Irregularity	Smooth	n_1	0			
	Minor		.001 - .005	0.001	0.002	0.001
	Moderate		.006 - .010			
	Severe		.011 - .020			
Effects of Obstruction	Negligible	n_2	.000 - .004	0.001	0.001	0.001
	Minor		.005 - .015			
	Appreciable		.020 - .030			
	Severe		.040 - .060			
Vegetation	Small	n_3	.002 - .010			
	Medium		.010 - .025	0.025	0.020	0.025
	Large		.025 - .050			
	Very Large		.050 - .100			
Variations in Channel Cross Section	Gradual	n_4	0			
	Occ. Alt.		.001 - .005	0.001	0.002	0.001
	Freq. Alt.		.010 - .015			
Subtotal				0.053	0.051	0.053
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n = (n_b+n_1+n_2+n_3+n_4)m$				0.053	0.051	0.053
Manning's n Value Used				**0.055**	**0.050**	**0.055**



DETERMINATION OF MANNING'S ROUGHNESS COEFFICIENTS BY FCDMC METHOD

Project: Rio Verde Area Drainage Master Plan, FCD 2001C056. Phase 3 – Floodplain Delineations

Stream: 11 Wash – R1

Location: From Upstream Limits of Study to 140th Street

Photos: 182, 183, 184, 185

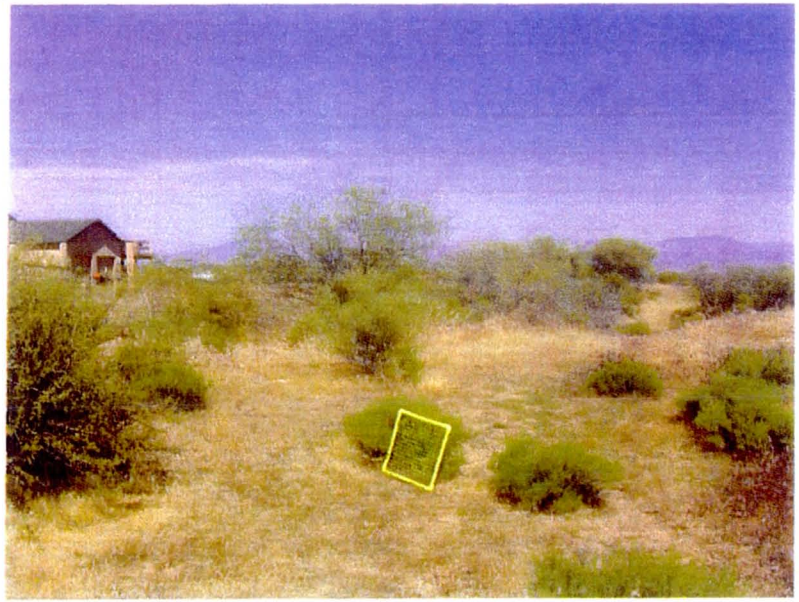
Notes: Subtract 0.015 from n value for left overbank through the horse ranch west of 140th Street.

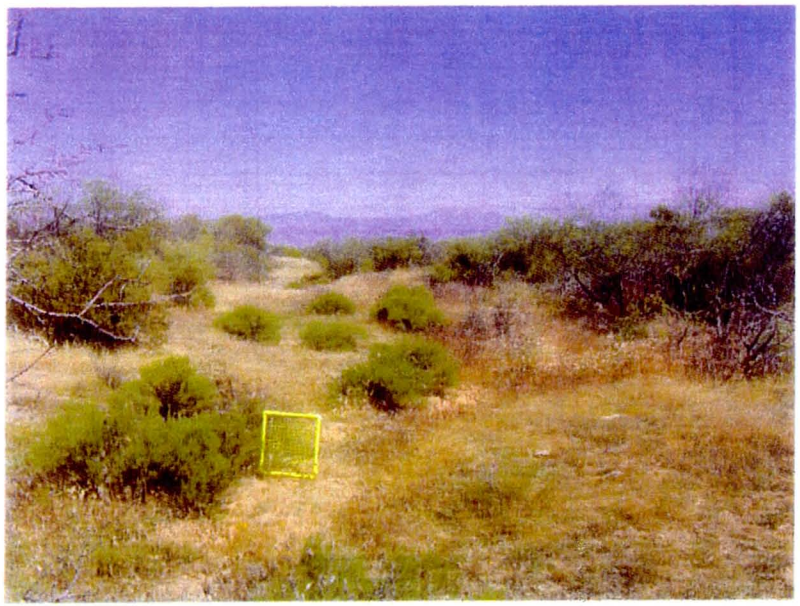
Channel Conditions		Manning's n Adjustment		Left Overbank	Channel	Right Overbank
Channel Material	Firm Soil	n_b	.025 - .032	0.025		0.025
	Coarse Sand		.026 - .035		0.026	
	Gravel		.028 - .035			
	Cobble		.030 - .050			
	Boulder		.040 - .070			
Degree of Irregularity	Smooth	n_1	0			
	Minor		.001 - .005	0.001	0.002	0.001
	Moderate		.006 - .010			
	Severe		.011 - .020			
Effects of Obstruction	Negligible	n_2	.000 - .004	0.001	0.001	0.001
	Minor		.005 - .015			
	Appreciable		.020 - .030			
	Severe		.040 - .060			
Vegetation	Small	n_3	.002 - .010			
	Medium		.010 - .025	0.025	0.020	0.025
	Large		.025 - .050			
	Very Large		.050 - .100			
Variations in Channel Cross Section	Gradual	n_4	0			
	Occ. Alt.		.001 - .005	0.001	0.002	0.001
	Freq. Alt.		.010 - .015			
Subtotal				0.053	0.051	0.053
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n = (n_b+n_1+n_2+n_3+n_4)m$				0.053	0.051	0.053
Manning's n Value Used				**0.055**	**0.050**	**0.055**

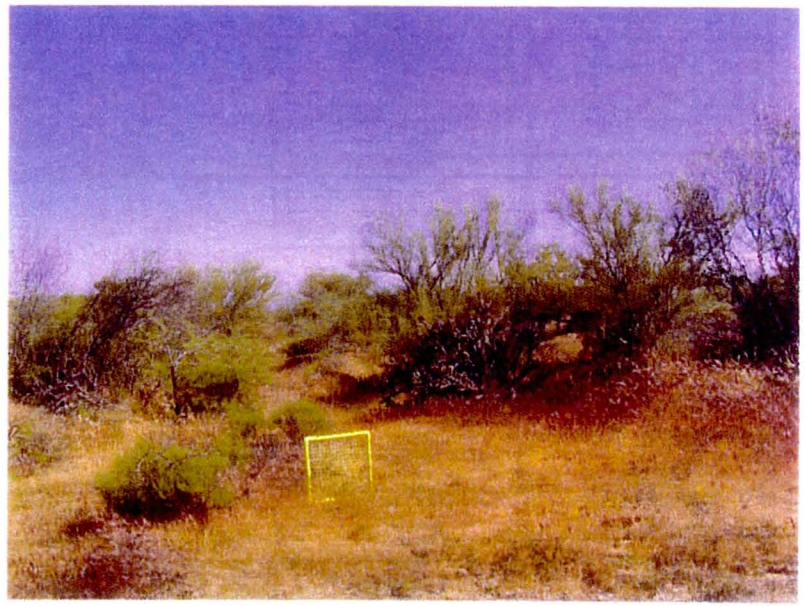
DETERMINATION OF MANNING'S ROUGHNESS COEFFICIENTS BY FCDMC METHOD

Project: Rio Verde Area Drainage Master Plan, FCD 2001C0 Phase 3 – Floodplain Delineations
Stream: 11 Wash – R2
Location: From 140th Street to Downstream Limits of Study
Photos: 169, 170, 171, 172
Notes:

Channel Conditions		Manning's n Adjustment		Left Overbank	Channel	Right Overbank
Channel Material	Firm Soil	n_b	.025 - .032	0.025		0.025
	Coarse Sand		.026 - .035		0.026	
	Gravel		.028 - .035			
	Cobble		.030 - .050			
	Boulder		.040 - .070			
Degree of Irregularity	Smooth	n_1	0			
	Minor		.001 - .005	0.001	0.001	0.001
	Moderate		.006 - .010			
	Severe		.011 - .020			
Effects of Obstruction	Negligible	n_2	.000 - .004	0.001	0.001	0.001
	Minor		.005 - .015			
	Appreciable		.020 - .030			
	Severe		.040 - .060			
Vegetation	Small	n_3	.002 - .010			
	Medium		.010 - .025	0.025	0.015	0.025
	Large		.025 - .050			
	Very Large		.050 - .100			
Variations in Channel Cross Section	Gradual	n_4	0			
	Occ. Alt.		.001 - .005	0.001	0.001	0.001
	Freq. Alt.		.010 - .015			
Subtotal				0.053	0.044	0.053
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n = (n_b+n_1+n_2+n_3+n_4)m$				0.053	0.044	0.053
Manning's n Value Used				**0.055**	**0.045**	**0.055**







DETERMINATION OF MANNING'S ROUGHNESS COEFFICIENTS BY FCDMC METHOD

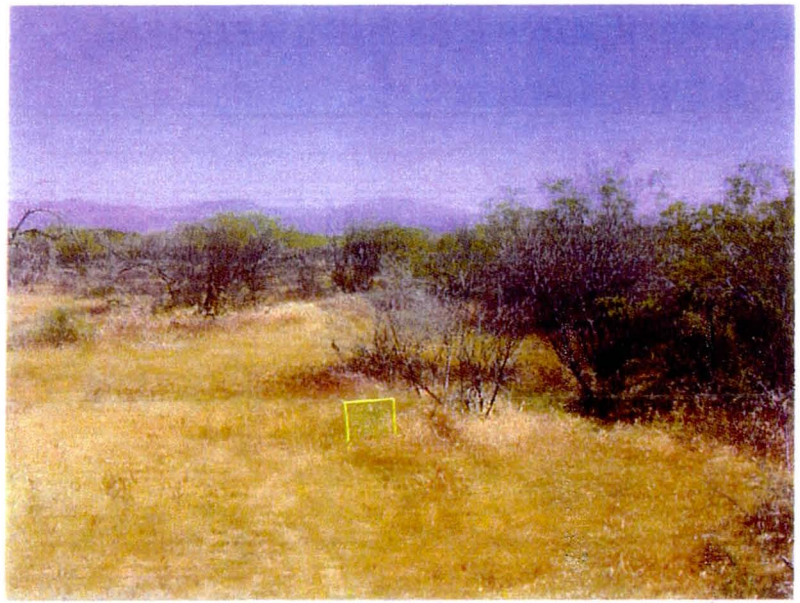
Project: Rio Verde Area Drainage Master Plan, FCD 2001C056, Phase 3 – Floodplain Delineations
Stream: 11E, 11F, 11G & 11H Washes – R1
Location: From Upstream Limits of Study to Downstream Limits of Study
Photos: 258, 261
Notes:

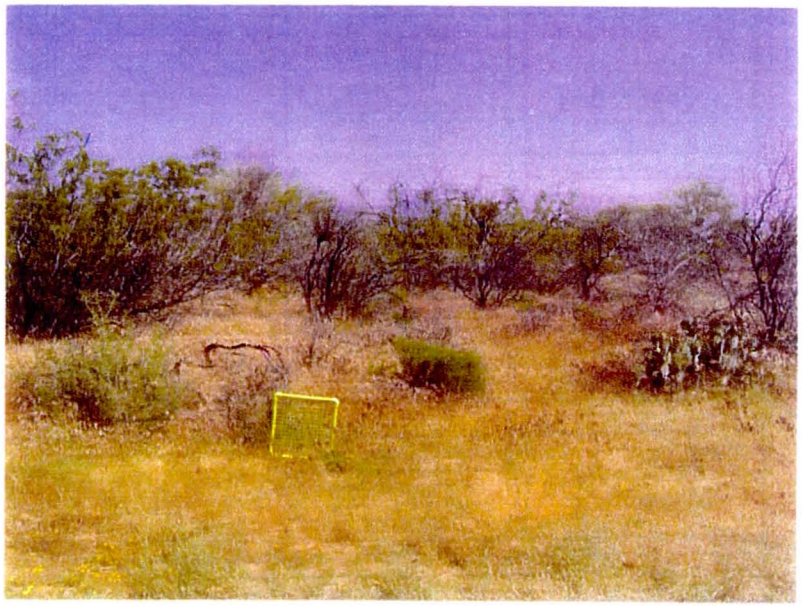
Channel Conditions		Manning's n Adjustment		Left Overbank	Channel	Right Overbank
Channel Material	Firm Soil	n_b	.025 - .032	0.028		0.028
	Coarse Sand		.026 - .035		0.028	
	Gravel		.028 - .035			
	Cobble		.030 - .050			
	Boulder		.040 - .070			
Degree of Irregularity	Smooth	n_1	0			
	Minor		.001 - .005	0.001	0.003	0.001
	Moderate		.006 - .010			
	Severe		.011 - .020			
Effects of Obstruction	Negligible	n_2	.000 - .004	0.003	0.001	0.003
	Minor		.005 - .015			
	Appreciable		.020 - .030			
	Severe		.040 - .060			
Vegetation	Small	n_3	.002 - .010			
	Medium		.010 - .025	0.025	0.010	0.025
	Large		.025 - .050			
	Very Large		.050 - .100			
Variations in Channel Cross Section	Gradual	n_4	0	0.000		0.000
	Occ. Alt.		.001 - .005		0.001	
	Freq. Alt.		.010 - .015			
Subtotal				0.057	0.043	0.057
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n = (n_b+n_1+n_2+n_3+n_4)m$				0.057	0.043	0.057
Manning's n Value Used				**0.055**	**0.045**	**0.055**

DETERMINATION OF MANNING'S ROUGHNESS COEFFICIENTS BY FCDMC METHOD

Project: Rio Verde Area Drainage Master Plan, FCD 2001C056, Phase 3 – Floodplain Delineations
Stream: 21 Wash – R1
Location: From Upstream Limits of Study to Downstream Limits of Study
Photos: 152, 153, 154, 155
Notes:

Channel Conditions		Manning's n Adjustment		Left Overbank	Channel	Right Overbank
Channel Material	Firm Soil	n_b	.025 - .032	0.025		0.025
	Coarse Sand		.026 - .035		0.026	
	Gravel		.028 - .035			
	Cobble		.030 - .050			
	Boulder		.040 - .070			
Degree of Irregularity	Smooth	n_1	0			
	Minor		.001 - .005	0.001	0.004	0.001
	Moderate		.006 - .010			
	Severe		.011 - .020			
Effects of Obstruction	Negligible	n_2	.000 - .004	0.001	0.001	0.001
	Minor		.005 - .015			
	Appreciable		.020 - .030			
	Severe		.040 - .060			
Vegetation	Small	n_3	.002 - .010			
	Medium		.010 - .025		0.018	
	Large		.025 - .050	0.032		0.032
	Very Large		.050 - .100			
Variations in Channel Cross Section	Gradual	n_4	0			
	Occ. Alt.		.001 - .005	0.005	0.005	0.005
	Freq. Alt.		.010 - .015			
Subtotal				0.064	0.054	0.064
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n = (n_b+n_1+n_2+n_3+n_4)m$				0.064	0.054	0.064
Manning's n Value Used				**0.065**	**0.055**	**0.065**

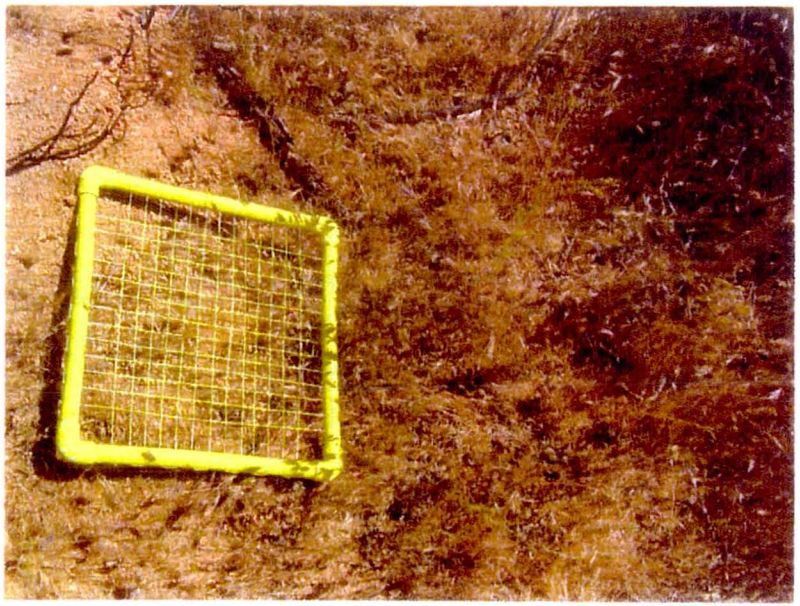


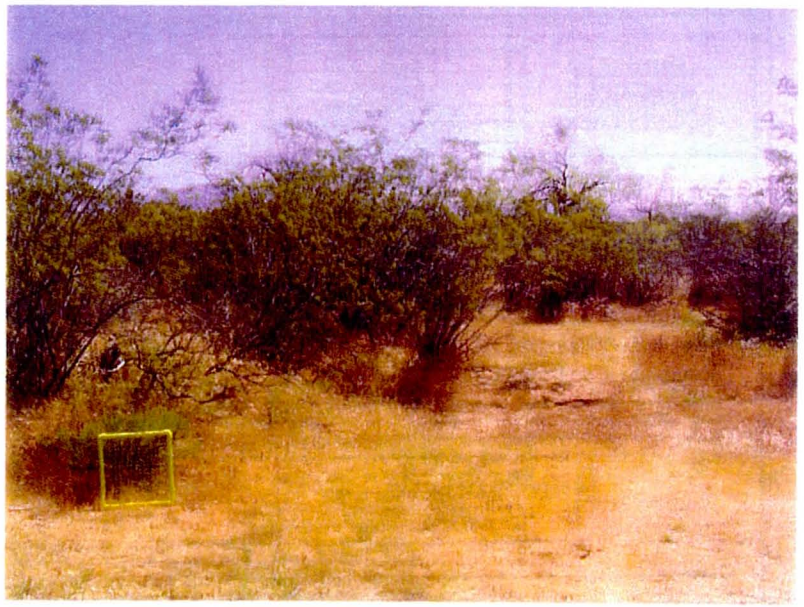


DETERMINATION OF MANNING'S ROUGHNESS COEFFICIENTS BY FCDMC METHOD

Project: Rio Verde Area Drainage Master Plan, FCD 2001C056, Phase 3 – Floodplain Delineations
Stream: 22 Wash – R1
Location: From Upstream Limits of Study to 500' Upstream from 138th Street
Photos: 114, 115, 116, 117
Notes:

Channel Conditions		Manning's n Adjustment		Left Overbank	Channel	Right Overbank
Channel Material	Firm Soil	n_b	.025 - .032	0.025		0.025
	Coarse Sand		.026 - .035		0.026	
	Gravel		.028 - .035			
	Cobble		.030 - .050			
	Boulder		.040 - .070			
Degree of Irregularity	Smooth	n_1	0			
	Minor		.001 - .005	0.001	0.002	0.001
	Moderate		.006 - .010			
	Severe		.011 - .020			
Effects of Obstruction	Negligible	n_2	.000 - .004	0.001	0.001	0.001
	Minor		.005 - .015			
	Appreciable		.020 - .030			
	Severe		.040 - .060			
Vegetation	Small	n_3	.002 - .010			
	Medium		.010 - .025		0.020	
	Large		.025 - .050	0.035		0.035
	Very Large		.050 - .100			
Variations in Channel Cross Section	Gradual	n_4	0			
	Occ. Alt.		.001 - .005	0.001	0.001	0.001
	Freq. Alt.		.010 - .015			
Subtotal				0.063	0.050	0.063
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n = (n_b+n_1+n_2+n_3+n_4)m$				0.063	0.050	0.063
Manning's n Value Used				**0.065**	**0.050**	**0.065**





DETERMINATION OF MANNING'S ROUGHNESS COEFFICIENTS BY FCDMC METHOD

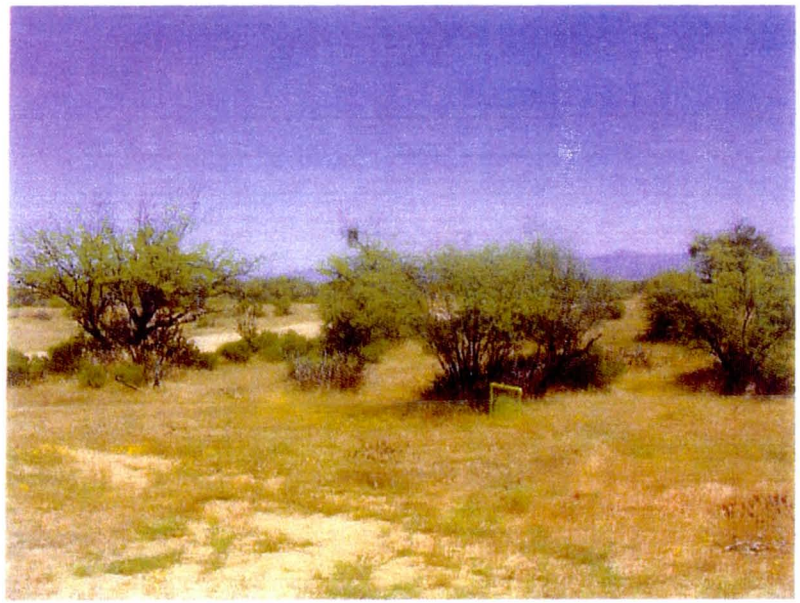
Project: Rio Verde Area Drainage Master Plan, FCD 2001C056, Phase 3 – Floodplain Delineations
Stream: 22 Wash – R2
Location: From 500' Upstream from 138th Street to 140th Street
Photos: 102, 103, 104, 105
Notes:

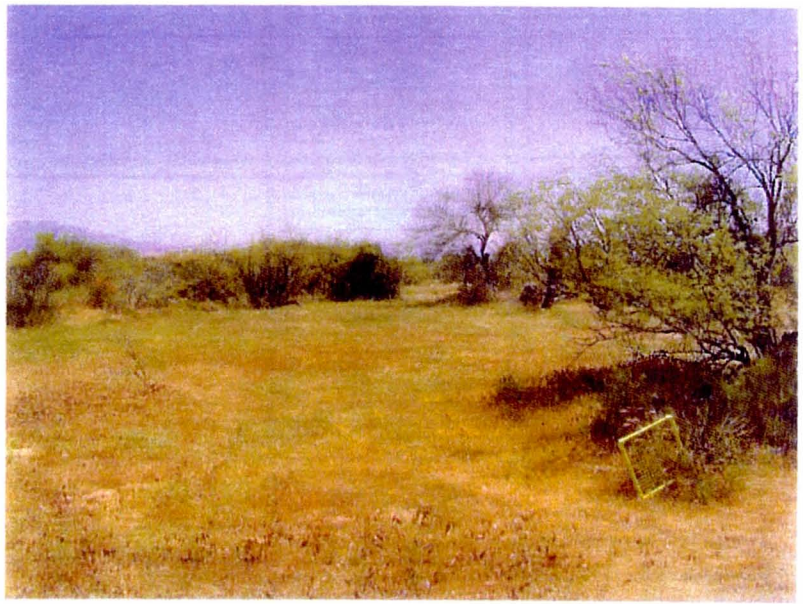
Channel Conditions		Manning's n Adjustment		Left Overbank	Channel	Right Overbank
Channel Material	Firm Soil	n_b	.025 - .032	0.025		0.025
	Coarse Sand		.026 - .035		0.026	
	Gravel		.028 - .035			
	Cobble		.030 - .050			
	Boulder		.040 - .070			
Degree of Irregularity	Smooth	n_1	0			
	Minor		.001 - .005	0.001	0.002	0.001
	Moderate		.006 - .010			
	Severe		.011 - .020			
Effects of Obstruction	Negligible	n_2	.000 - .004	0.001	0.001	0.001
	Minor		.005 - .015			
	Appreciable		.020 - .030			
	Severe		.040 - .060			
Vegetation	Small	n_3	.002 - .010		0.005	
	Medium		.010 - .025	0.020		0.020
	Large		.025 - .050			
	Very Large		.050 - .100			
Variations in Channel Cross Section	Gradual	n_4	0			
	Occ. Alt.		.001 - .005	0.002	0.003	0.002
	Freq. Alt.		.010 - .015			
Subtotal				0.049	0.037	0.049
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n = (n_b+n_1+n_2+n_3+n_4)m$				0.049	0.037	0.049
Manning's n Value Used				**0.050**	**0.035**	**0.050**

DETERMINATION OF MANNING'S ROUGHNESS COEFFICIENTS BY FCDMC METHOD

Project: Rio Verde Area Drainage Master Plan, FCD 2001C056, Phase 3 – Floodplain Delineations
Stream: 22 Wash – R3
Location: From 140th Street to Downstream Limits of Study
Photos: 146, 147, 148, 149
Notes:

Channel Conditions		Manning's n Adjustment		Left Overbank	Channel	Right Overbank
Channel Material	Firm Soil	n_b	.025 - .032	0.025		0.025
	Coarse Sand		.026 - .035		0.030	
	Gravel		.028 - .035			
	Cobble		.030 - .050			
	Boulder		.040 - .070			
Degree of Irregularity	Smooth	n_1	0			
	Minor		.001 - .005	0.001	0.003	0.001
	Moderate		.006 - .010			
	Severe		.011 - .020			
Effects of Obstruction	Negligible	n_2	.000 - .004	0.001	0.001	0.001
	Minor		.005 - .015			
	Appreciable		.020 - .030			
	Severe		.040 - .060			
Vegetation	Small	n_3	.002 - .010		0.002	
	Medium		.010 - .025	0.015		0.015
	Large		.025 - .050			
	Very Large		.050 - .100			
Variations in Channel Cross Section	Gradual	n_4	0			
	Occ. Alt.		.001 - .005	0.002	0.002	0.002
	Freq. Alt.		.010 - .015			
Subtotal				0.044	0.038	0.044
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n = (n_b+n_1+n_2+n_3+n_4)m$				0.044	0.038	0.044
Manning's n Value Used				**0.045**	**0.040**	**0.045**





DETERMINATION OF MANNING'S ROUGHNESS COEFFICIENTS BY FCDMC METHOD

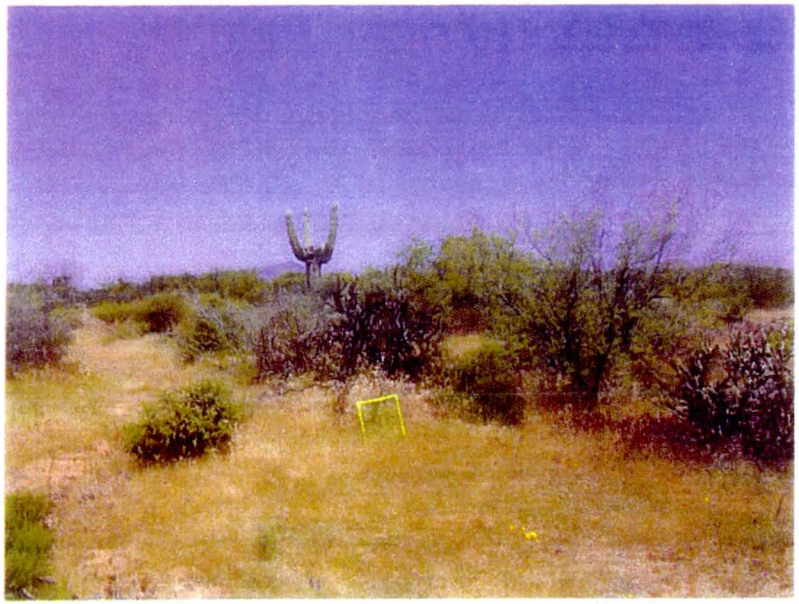
Project: Rio Verde Area Drainage Master Plan. FCD 2001C056. Phase 3 – Floodplain Delineations
Stream: 23 Wash – R1
Location: From Upstream Limits of Study to 140th Street
Photos: 1, 2, 3, 4
Notes:

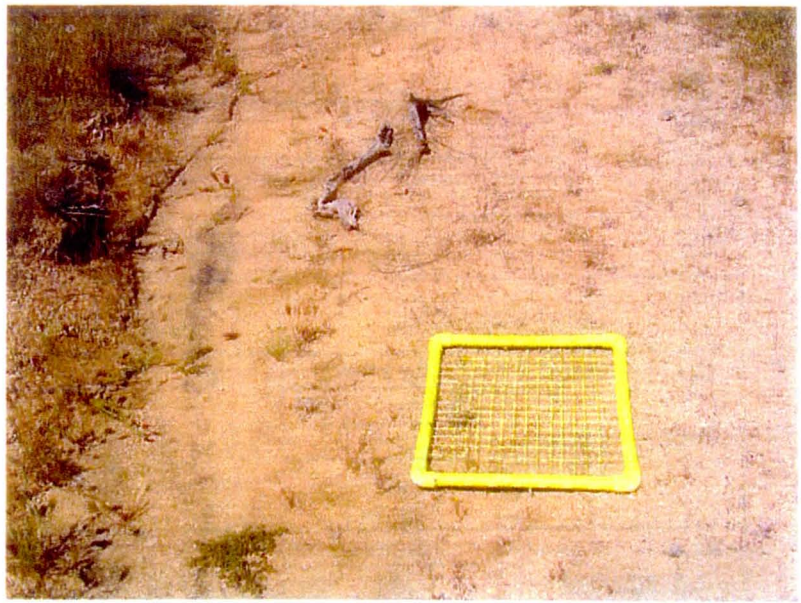
Channel Conditions		Manning's n Adjustment		Left Overbank	Channel	Right Overbank
Channel Material	Firm Soil	n_b	.025 - .032			
	Coarse Sand		.026 - .035	0.026	0.026	0.026
	Gravel		.028 - .035			
	Cobble		.030 - .050			
	Boulder		.040 - .070			
Degree of Irregularity	Smooth	n_1	0	0.000		0.000
	Minor		.001 - .005		0.005	
	Moderate		.006 - .010			
	Severe		.011 - .020			
Effects of Obstruction	Negligible	n_2	.000 - .004			
	Minor		.005 - .015	0.010	0.005	0.010
	Appreciable		.020 - .030			
	Severe		.040 - .060			
Vegetation	Small	n_3	.002 - .010			
	Medium		.010 - .025		0.025	
	Large		.025 - .050			
	Very Large		.050 - .100	0.050		0.050
Variations in Channel Cross Section	Gradual	n_4	0			
	Occ. Alt.		.001 - .005	0.001	0.003	0.001
	Freq. Alt.		.010 - .015			
Subtotal				0.087	0.064	0.087
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n = (n_b+n_1+n_2+n_3+n_4)m$				0.087	0.064	0.087
Manning's n Value Used				**0.085**	**0.065**	**0.085**

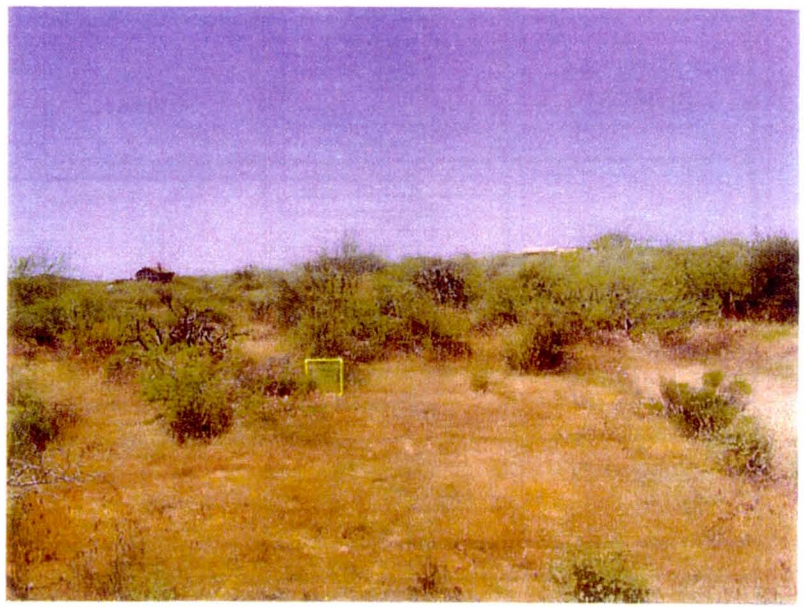
DETERMINATION OF MANNING'S ROUGHNESS COEFFICIENTS BY FCDMC METHOD

Project: Rio Verde Area Drainage Master Plan, FCD 2001C056, Phase 3 – Floodplain Delineations
Stream: 23 Wash – R1
Location: From 140th Street to Downstream Limits of Study
Photos: 27, 28, 29, 30
Notes:

Channel Conditions		Manning's n Adjustment		Left Overbank	Channel	Right Overbank
Channel Material	Firm Soil	n_b	.025 - .032	0.025		0.025
	Coarse Sand		.026 - .035		0.026	
	Gravel		.028 - .035			
	Cobble		.030 - .050			
	Boulder		.040 - .070			
Degree of Irregularity	Smooth	n_1	0			
	Minor		.001 - .005	0.003	0.001	0.003
	Moderate		.006 - .010			
	Severe		.011 - .020			
Effects of Obstruction	Negligible	n_2	.000 - .004	0.003	0.002	0.003
	Minor		.005 - .015			
	Appreciable		.020 - .030			
	Severe		.040 - .060			
Vegetation	Small	n_3	.002 - .010			
	Medium		.010 - .025	0.020	0.015	0.020
	Large		.025 - .050			
	Very Large		.050 - .100			
Variations in Channel Cross Section	Gradual	n_4	0			
	Occ. Alt.		.001 - .005	0.004	0.001	0.004
	Freq. Alt.		.010 - .015			
Subtotal				0.055	0.045	0.055
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n = (n_b+n_1+n_2+n_3+n_4)m$				0.055	0.045	0.055
Manning's n Value Used				**0.055**	**0.045**	**0.055**







DETERMINATION OF MANNING'S ROUGHNESS COEFFICIENTS BY FCDMC METHOD

Project: Rio Verde Area Drainage Master Plan. FCD 2001C056. Phase 3 – Floodplain Delineations

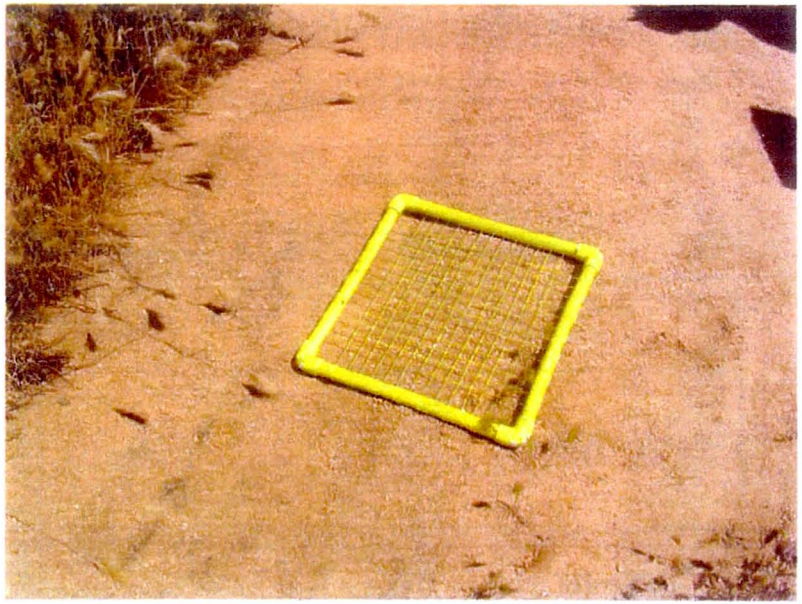
Stream: 26 Wash – R1

Location: From Upstream Limits of Study to Approximately 1,400' Upstream of 144th Street

Photos: 39, 40, 41, 42

Notes: Downstream limits to reach 1 is unnamed road bearing northeast across wash.

Channel Conditions		Manning's n Adjustment		Left Overbank	Channel	Right Overbank
Channel Material	Firm Soil	n_b	.025 - .032	0.025		0.025
	Coarse Sand		.026 - .035		0.026	
	Gravel		.028 - .035			
	Cobble		.030 - .050			
	Boulder		.040 - .070			
Degree of Irregularity	Smooth	n_1	0			
	Minor		.001 - .005	0.002	0.001	0.002
	Moderate		.006 - .010			
	Severe		.011 - .020			
Effects of Obstruction	Negligible	n_2	.000 - .004	0.003	0.002	0.003
	Minor		.005 - .015			
	Appreciable		.020 - .030			
	Severe		.040 - .060			
Vegetation	Small	n_3	.002 - .010			
	Medium		.010 - .025		0.025	
	Large		.025 - .050	0.030		0.030
	Very Large		.050 - .100			
Variations in Channel Cross Section	Gradual	n_4	0			
	Occ. Alt.		.001 - .005	0.005	0.001	0.005
	Freq. Alt.		.010 - .015			
Subtotal				0.065	0.055	0.065
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n = (n_b+n_1+n_2+n_3+n_4)m$				0.065	0.055	0.065
Manning's n Value Used				**0.065**	**0.055**	**0.065**



DETERMINATION OF MANNING'S ROUGHNESS COEFFICIENTS BY FCDMC METHOD

Project: **Rio Verde Area Drainage Master Plan, FCD 2001C056, Phase 3 – Floodplain Delineations**

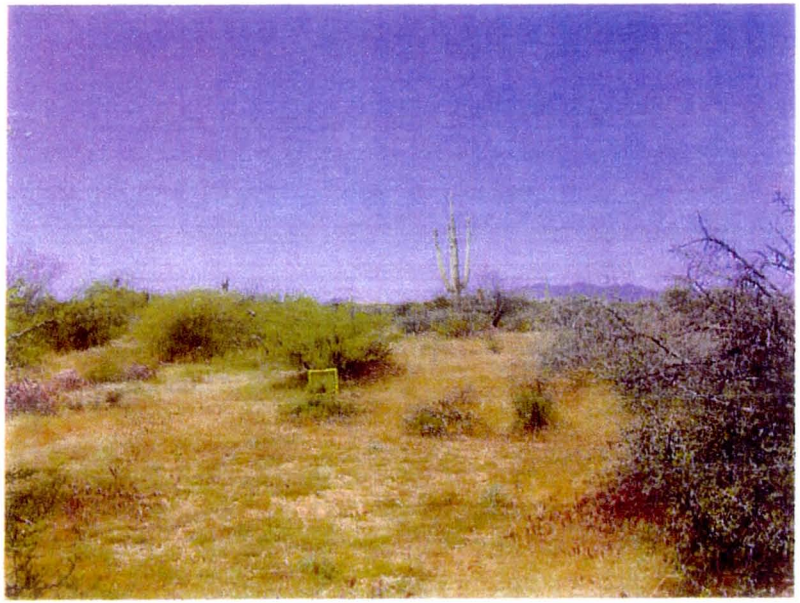
Stream: 26 Wash – R1

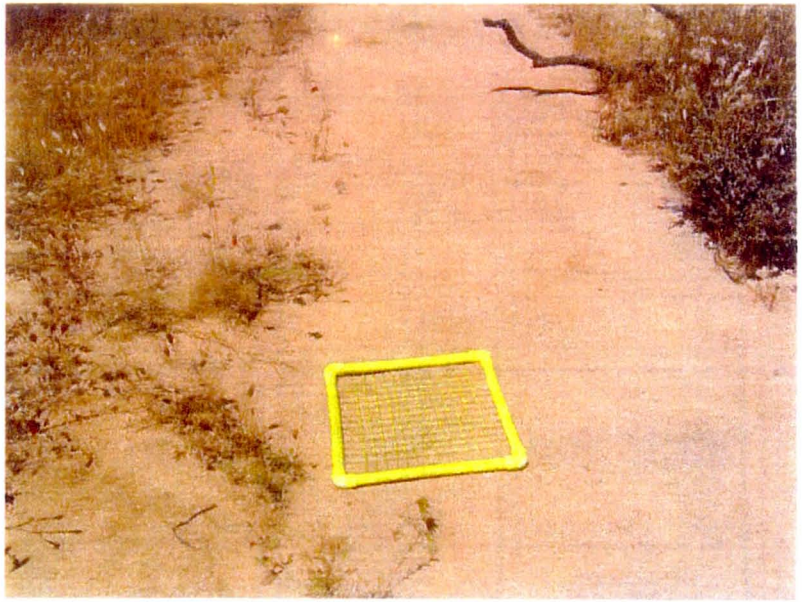
Location: From Approximately 1,400' Upstream of 144th Street to Downstream Limits of Study

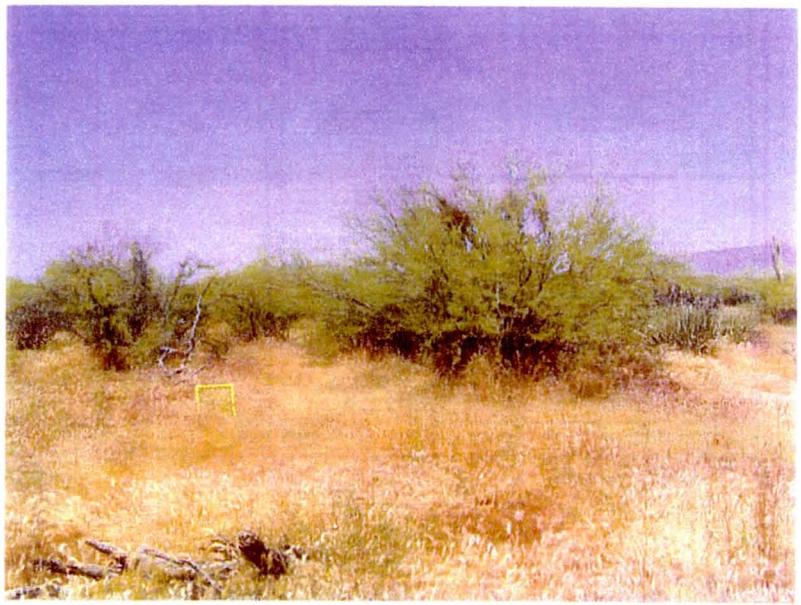
Photos: 31, 32, 33, 34

Notes: Upstream limits to reach 1 is unnamed road bearing northeast across wash.

Channel Conditions		Manning's n Adjustment		Left Overbank	Channel	Right Overbank
Channel Material	Firm Soil	n_b	.025 - .032	0.025		0.025
	Coarse Sand		.026 - .035		0.026	
	Gravel		.028 - .035			
	Cobble		.030 - .050			
	Boulder		.040 - .070			
Degree of Irregularity	Smooth	n_1	0			
	Minor		.001 - .005	0.002	0.001	0.002
	Moderate		.006 - .010			
	Severe		.011 - .020			
Effects of Obstruction	Negligible	n_2	.000 - .004	0.003	0.002	0.003
	Minor		.005 - .015			
	Appreciable		.020 - .030			
	Severe		.040 - .060			
Vegetation	Small	n_3	.002 - .010			
	Medium		.010 - .025		0.025	
	Large		.025 - .050	0.030		0.030
	Very Large		.050 - .100			
Variations in Channel Cross Section	Gradual	n_4	0			
	Occ. Alt.		.001 - .005	0.005	0.001	0.005
	Freq. Alt.		.010 - .015			
Subtotal				0.065	0.055	0.065
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n = (n_b+n_1+n_2+n_3+n_4)m$				0.065	0.055	0.065
Manning's n Value Used				**0.065**	**0.055**	**0.065**



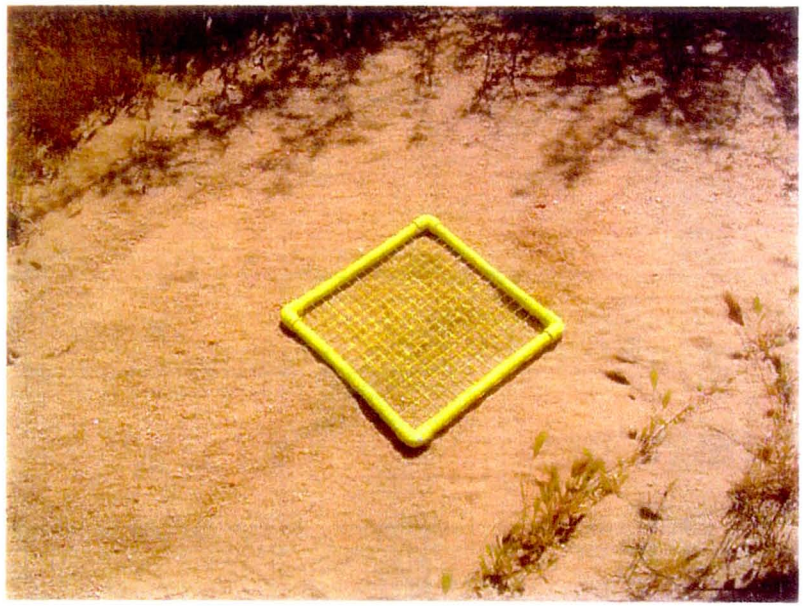




DETERMINATION OF MANNING'S ROUGHNESS COEFFICIENTS BY FCDMC METHOD

Project: Rio Verde Area Drainage Master Plan, FCD 2001C056, Phase 3 – Floodplain Delineations
Stream: 27 Wash – R1
Location: From Upstream Limits of Study to Westland Drive
Photos: 16, 17, 18, 19
Notes:

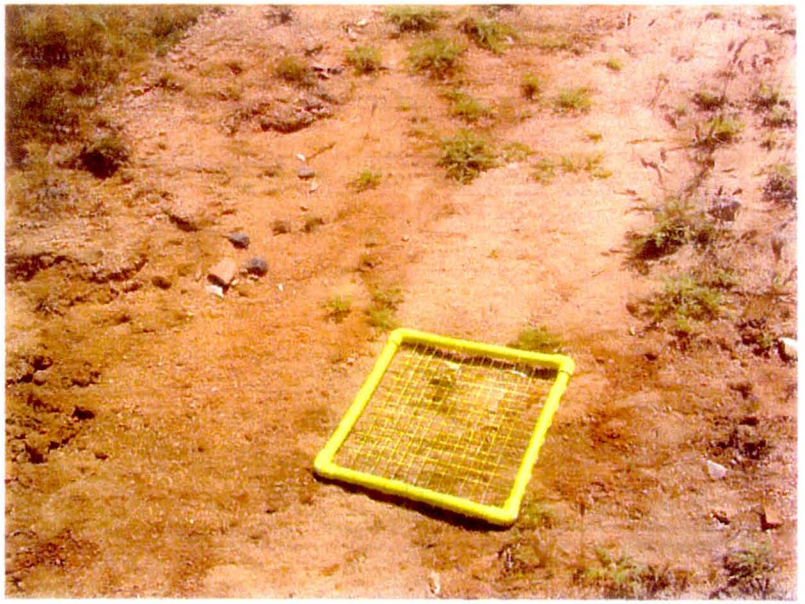
Channel Conditions		Manning's n Adjustment		Left Overbank	Channel	Right Overbank
Channel Material	Firm Soil	n_b	.025 - .032	0.025		0.025
	Coarse Sand		.026 - .035		0.026	
	Gravel		.028 - .035			
	Cobble		.030 - .050			
	Boulder		.040 - .070			
Degree of Irregularity	Smooth	n_1	0			
	Minor		.001 - .005	0.002	0.001	0.002
	Moderate		.006 - .010			
	Severe		.011 - .020			
Effects of Obstruction	Negligible	n_2	.000 - .004	0.003	0.002	0.003
	Minor		.005 - .015			
	Appreciable		.020 - .030			
	Severe		.040 - .060			
Vegetation	Small	n_3	.002 - .010			
	Medium		.010 - .025		0.025	
	Large		.025 - .050	0.030		0.030
	Very Large		.050 - .100			
Variations in Channel Cross Section	Gradual	n_4	0			
	Occ. Alt.		.001 - .005	0.005	0.001	0.005
	Freq. Alt.		.010 - .015			
Subtotal				0.065	0.055	0.065
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n = (n_b+n_1+n_2+n_3+n_4)m$				0.065	0.055	0.065
Manning's n Value Used				**0.065**	**0.055**	**0.065**

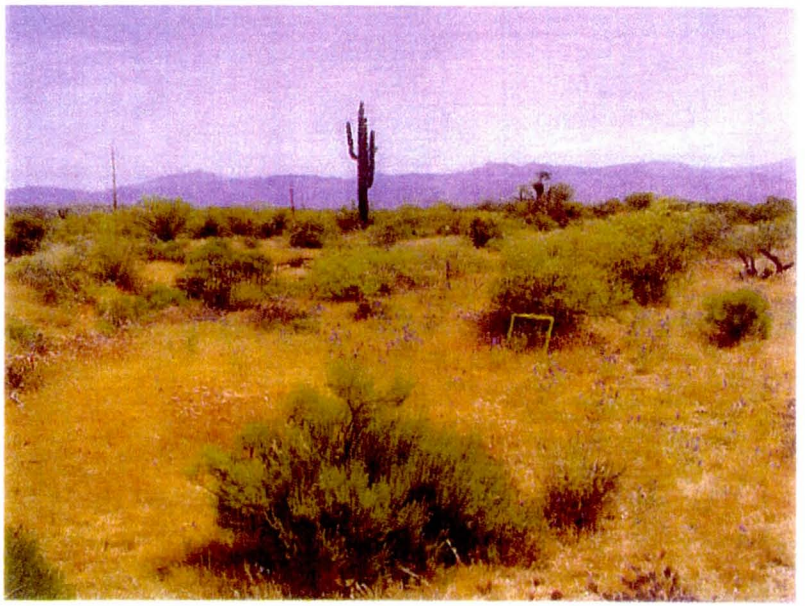


DETERMINATION OF MANNING'S ROUGHNESS COEFFICIENTS BY FCDMC METHOD

Project: Rio Verde Area Drainage Master Plan, FCD 2001C056, Phase 3 -- Floodplain Delineations
Stream: 27 Wash – R1
Location: From Westland Drive to Downstream Limits of Study
Photos: 23, 24, 25, 26
Notes:

Channel Conditions		Manning's n Adjustment		Left Overbank	Channel	Right Overbank
Channel Material	Firm Soil	n_b	.025 - .032	0.025		0.025
	Coarse Sand		.026 - .035		0.026	
	Gravel		.028 - .035			
	Cobble		.030 - .050			
	Boulder		.040 - .070			
Degree of Irregularity	Smooth	n_1	0			
	Minor		.001 - .005	0.002	0.001	0.002
	Moderate		.006 - .010			
	Severe		.011 - .020			
Effects of Obstruction	Negligible	n_2	.000 - .004	0.003	0.002	0.003
	Minor		.005 - .015			
	Appreciable		.020 - .030			
	Severe		.040 - .060			
Vegetation	Small	n_3	.002 - .010			
	Medium		.010 - .025	0.020	0.015	0.020
	Large		.025 - .050			
	Very Large		.050 - .100			
Variations in Channel Cross Section	Gradual	n_4	0			
	Occ. Alt.		.001 - .005	0.004	0.001	0.004
	Freq. Alt.		.010 - .015			
Subtotal				0.054	0.045	0.054
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n = (n_b+n_1+n_2+n_3+n_4)m$				0.054	0.045	0.054
Manning's n Value Used				**0.055**	**0.045**	**0.055**

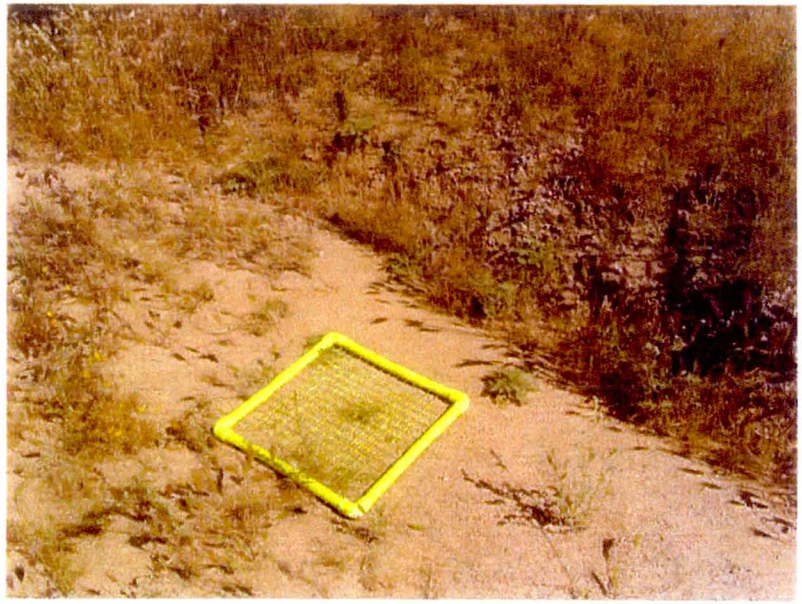




DETERMINATION OF MANNING'S ROUGHNESS COEFFICIENTS BY FCDMC METHOD

Project: Rio Verde Area Drainage Master Plan, FCD 2001C056, Phase 3 – Floodplain Delineations
Stream: 28 Wash – R1
Location: From Upstream Limits of Study to Downstream Limits of Study
Photos: 55, 56, 57, 58
Notes:

Channel Conditions		Manning's n Adjustment		Left Overbank	Channel	Right Overbank
Channel Material	Firm Soil	n_b	.025 - .032	0.025		0.025
	Coarse Sand		.026 - .035		0.027	
	Gravel		.028 - .035			
	Cobble		.030 - .050			
	Boulder		.040 - .070			
Degree of Irregularity	Smooth	n_1	0			
	Minor		.001 - .005	0.002	0.002	0.002
	Moderate		.006 - .010			
	Severe		.011 - .020			
Effects of Obstruction	Negligible	n_2	.000 - .004	0.002	0.002	0.002
	Minor		.005 - .015			
	Appreciable		.020 - .030			
	Severe		.040 - .060			
Vegetation	Small	n_3	.002 - .010			
	Medium		.010 - .025	0.015	0.010	0.015
	Large		.025 - .050			
	Very Large		.050 - .100			
Variations in Channel Cross Section	Gradual	n_4	0			
	Occ. Alt.		.001 - .005	0.002	0.002	0.002
	Freq. Alt.		.010 - .015			
Subtotal				0.046	0.043	0.046
Degree of Meandering	Minor	m	1	1	1	1
	Appreciable		1.15			
	Severe		1.3			
$n = (n_b+n_1+n_2+n_3+n_4)m$				0.046	0.043	0.046
Manning's n Value Used				**0.045**	**0.045**	**0.045**

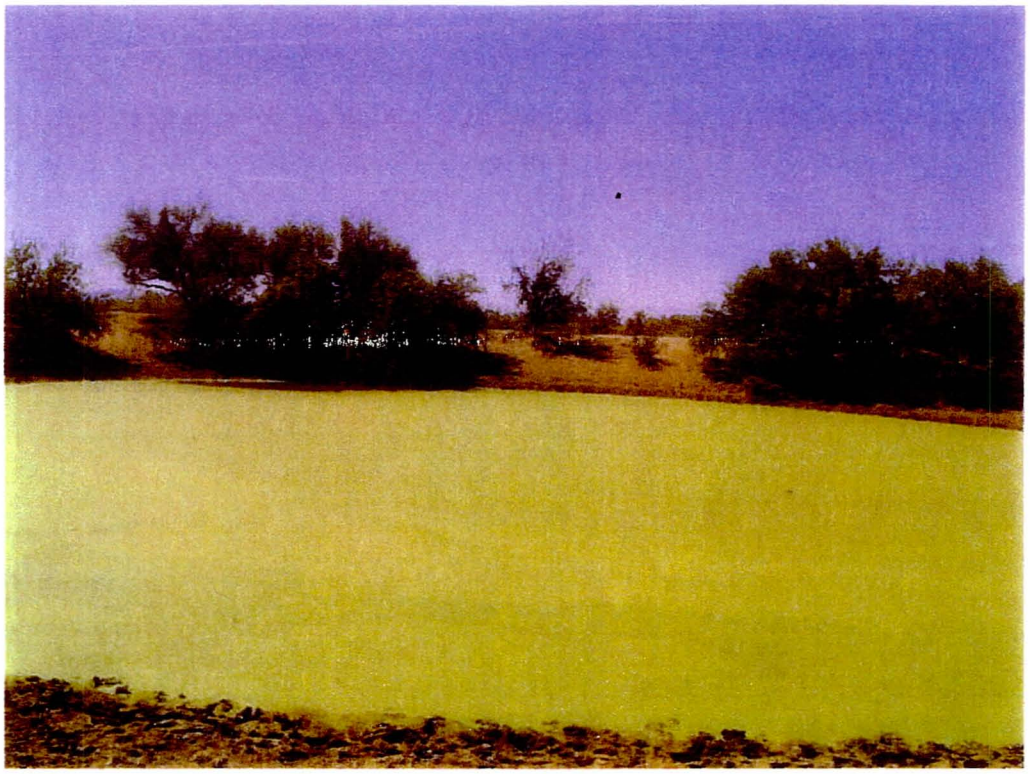


APPENDIX B

Hydraulic Structures

Looking Upstream at Grade Control Structure on 22 Wash Upstream from 140th Street

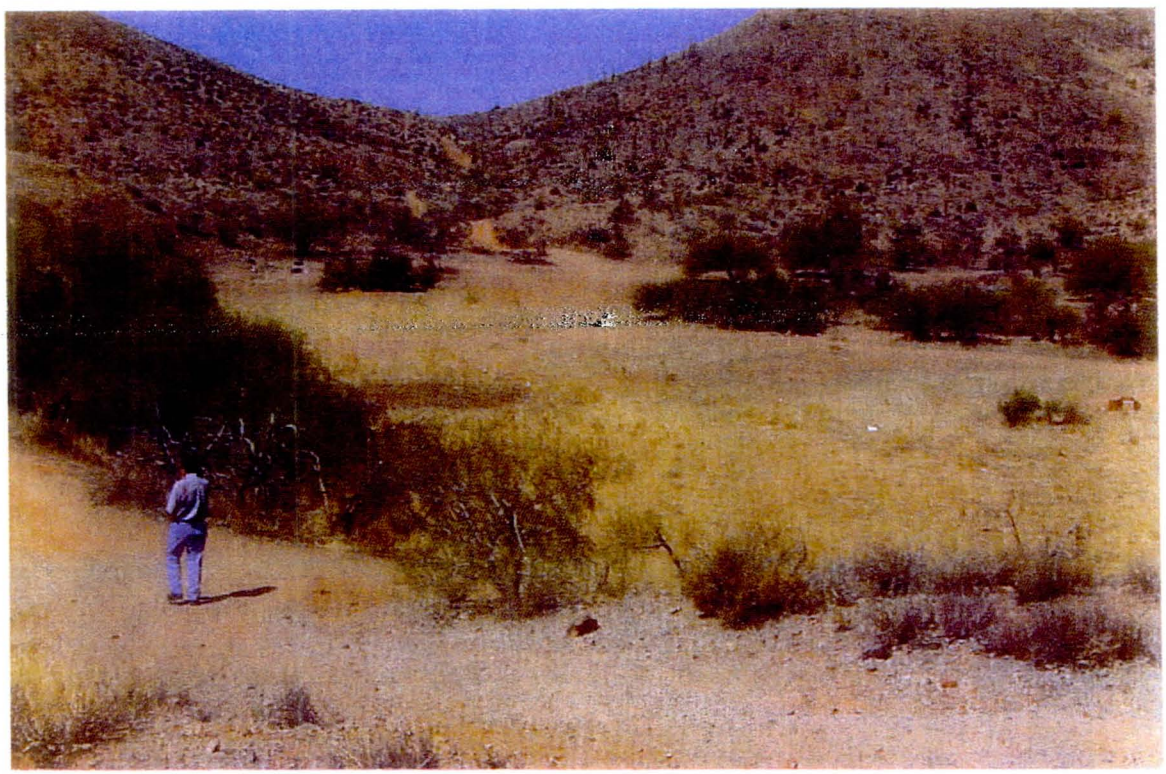
Looking East at Abandoned Stock Tank Embankment on 22 Wash Upstream from 140th Street



Northern Tank at Downstream End of 11F Wash

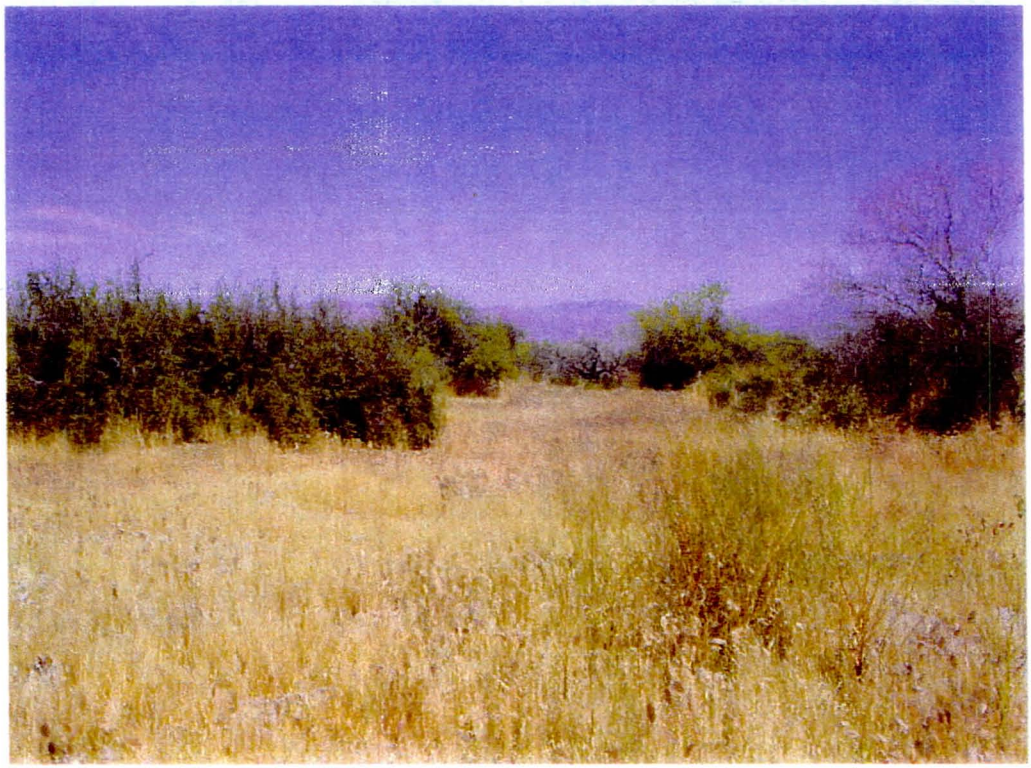
Southern Tank at Downstream End of 11F Wash

Looking South Along Dam at Black Hills Tank

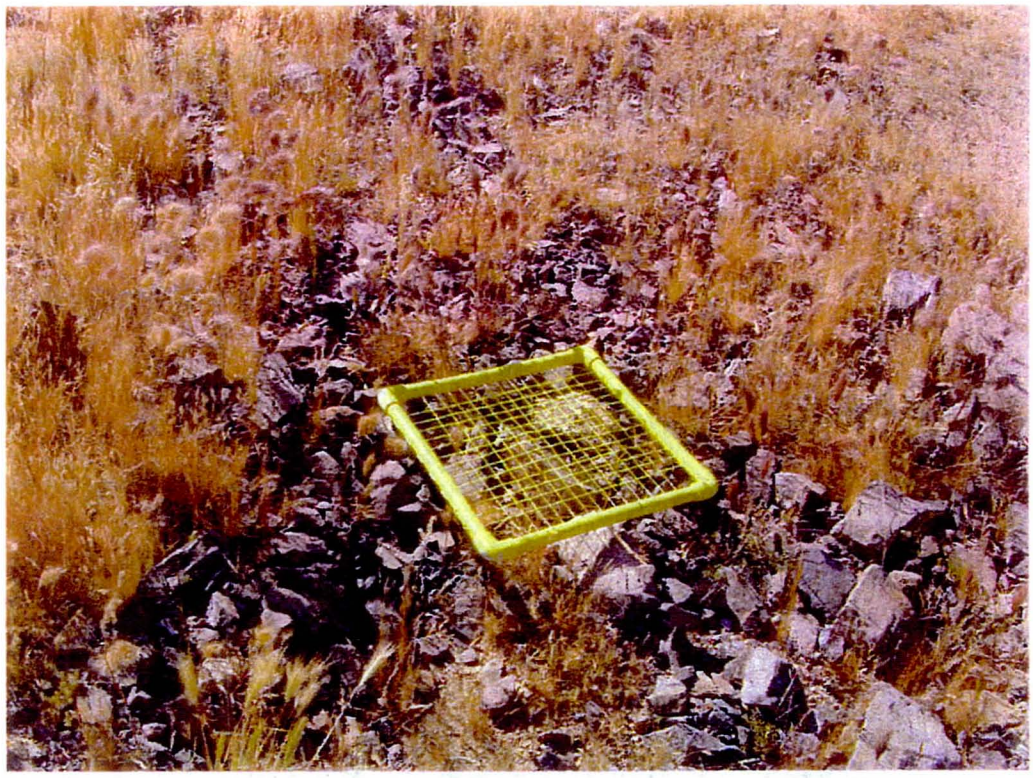


Looking Southeast Across Ponding Area at Black Hills Tank

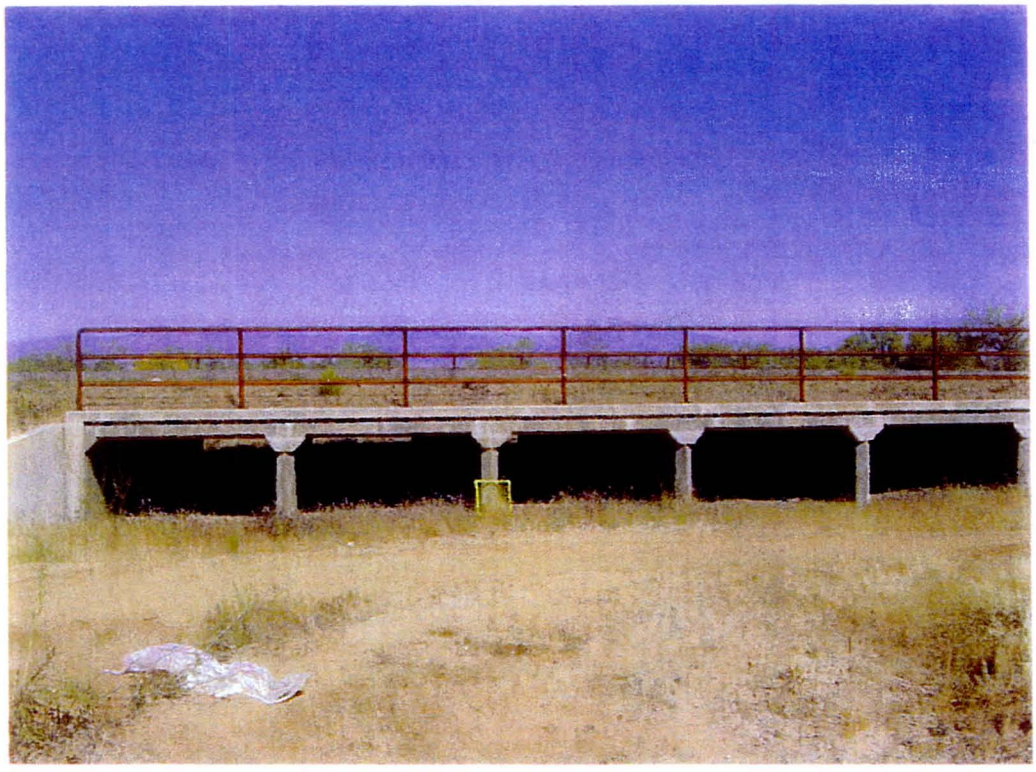
Looking at Downstream Face of Culvert at 142nd Street and 10 & 11 Wash



Looking Downstream Along 10 & 11 Wash from Downstream of Culvert at 142nd Street and 10 & 11 Wash

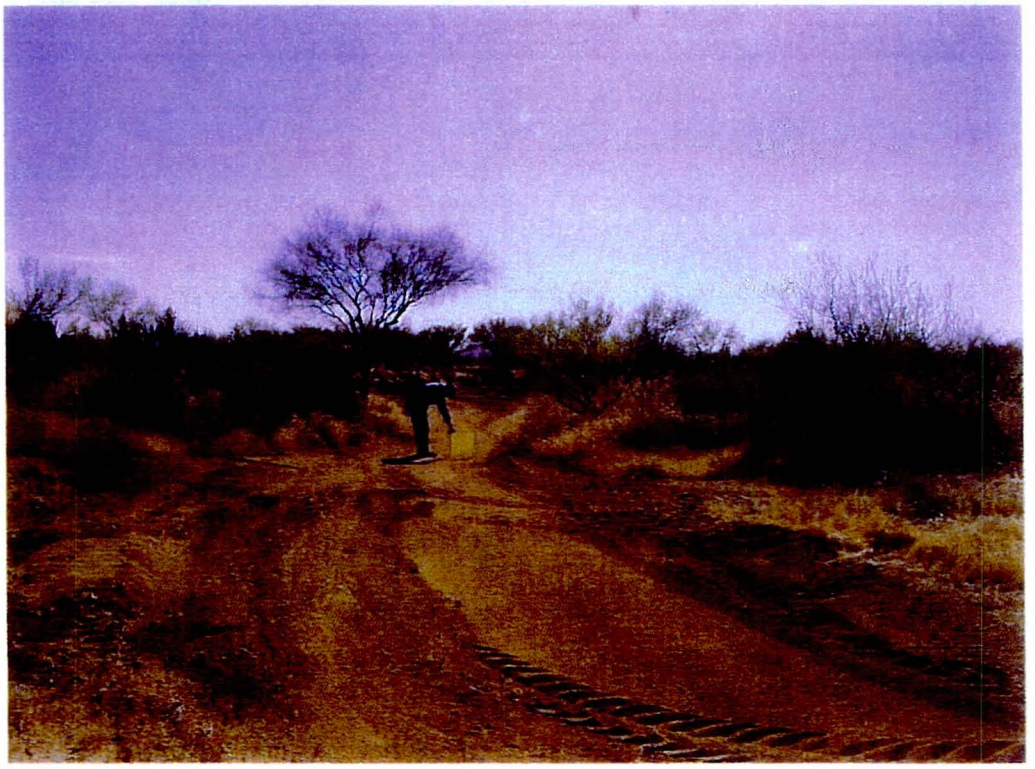


Rip Rap at Downstream End of Culvert at 142nd Street and 10 & 11 Wash



Looking at Upstream Face of Culvert at 142nd Street and 10 & 11 Wash

Looking Upstream Along 10 Wash from Upstream Side of Culvert at 142nd Street and 10 & 11 Wash



Looking Upstream Along 11 Wash from Upstream Side of Culvert at 142nd Street and 10 & 11 Wash

THIS MAP WAS PREPARED BY PHOTOGRAMMETRIC METHODS TO NATIONAL MAP ACCURACY STANDARDS FOR 1"= 200' HORIZONTAL SCALE AND 2'CONTOUR INTERVALS.

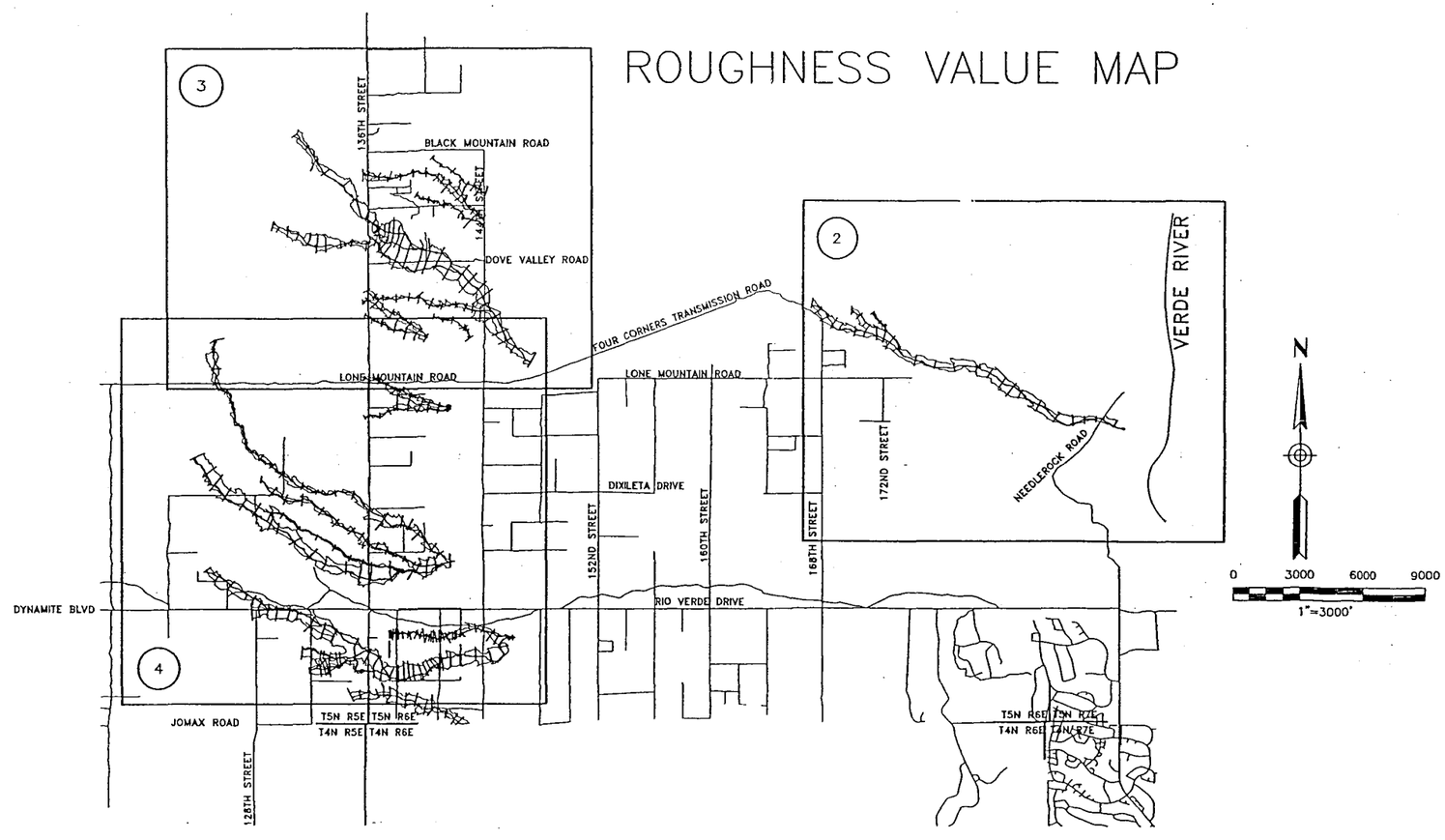
AERIAL MAPPING PROVIDED BY FCDMC

GROUND CONTROL SURVEY DATA PROVIDED BY FCDMC

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

RIO VERDE ADMP FLOODPLAIN DELINEATION APPROXIMATE STUDY – F.C.D. CONTRACT NO. 2001C056

ROUGHNESS VALUE MAP



DIBBLE & ASSOCIATES
CONSULTING ENGINEERS

	BY	DATE
DESIGN	JWL	4/18/05
DESIGN CHK.	FEB	4/18/05
PLANS	RAK	4/18/05
PLANS CHK.	FEB	4/18/05

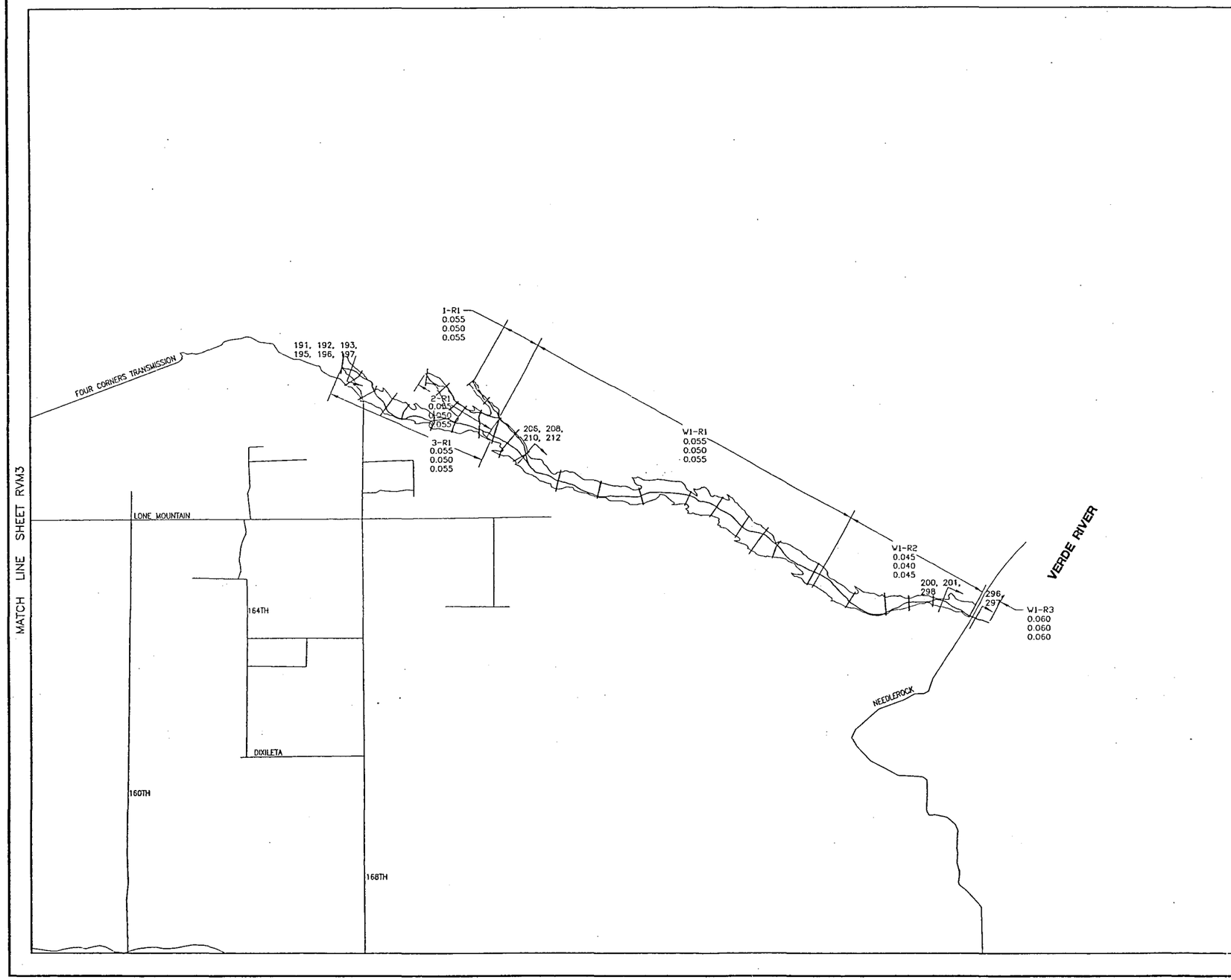
SHEET 1 OF 4

FILE:J:\10-0203\ J3 Phase 2_and_3\ACAD\RVMcover.dwg DATE:Jun, 29 2006 TIME: 07:53 am

THIS MAP WAS PREPARED BY PHOTOGRAMMETRIC METHODS TO NATIONAL MAP ACCURACY STANDARDS FOR 1"= 200' HORIZONTAL SCALE AND 2' CONTOUR INTERVALS.

AERIAL MAPPING PROVIDED BY FCDMC

GROUND CONTROL SURVEY DATA PROVIDED BY FCDMC



LEGEND

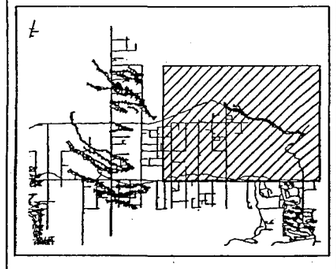
REACH LABEL (WASH NAME-REACH NUMBER)	1-R1
PHOTO LOCATION AND DIRECTION	196, 197
HYDRAULIC BASE LINE	
LEFT OVERBANK n VALUE	.055
MAIN CHANNEL n VALUE	.050
RIGHT OVERBANK n VALUE	.055

NOTES

1. THE HYDRAULIC BASE LINE IS CROSS SECTION STATION 10,000 UNLESS NOTED OTHERWISE.

-1000' 0' 1000' 2000'

SCALE: 1"= 1000 FEET
CONTOUR INTERVAL = 2 FEET



NO.	REVISION	BY	DATE
2			
1			

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

RIO VERDE ADMP
ROUGHNESS VALUE MAP

F.C.D. CONTRACT NO. 2001C056

Registered Professional Engineer (Civil) CERTIFICATE NO. 23988 FRANK EDWARD BROWN Date Signed ARIZONA U.S.A.

DIBBLE & ASSOCIATES
CONSULTING ENGINEERS

	BY	DATE
DESIGN	JWL	4/18/05
DESIGN CHK.	FEB	4/18/05
PLANS	RAK	4/18/05
PLANS CHK.	FEB	4/18/05

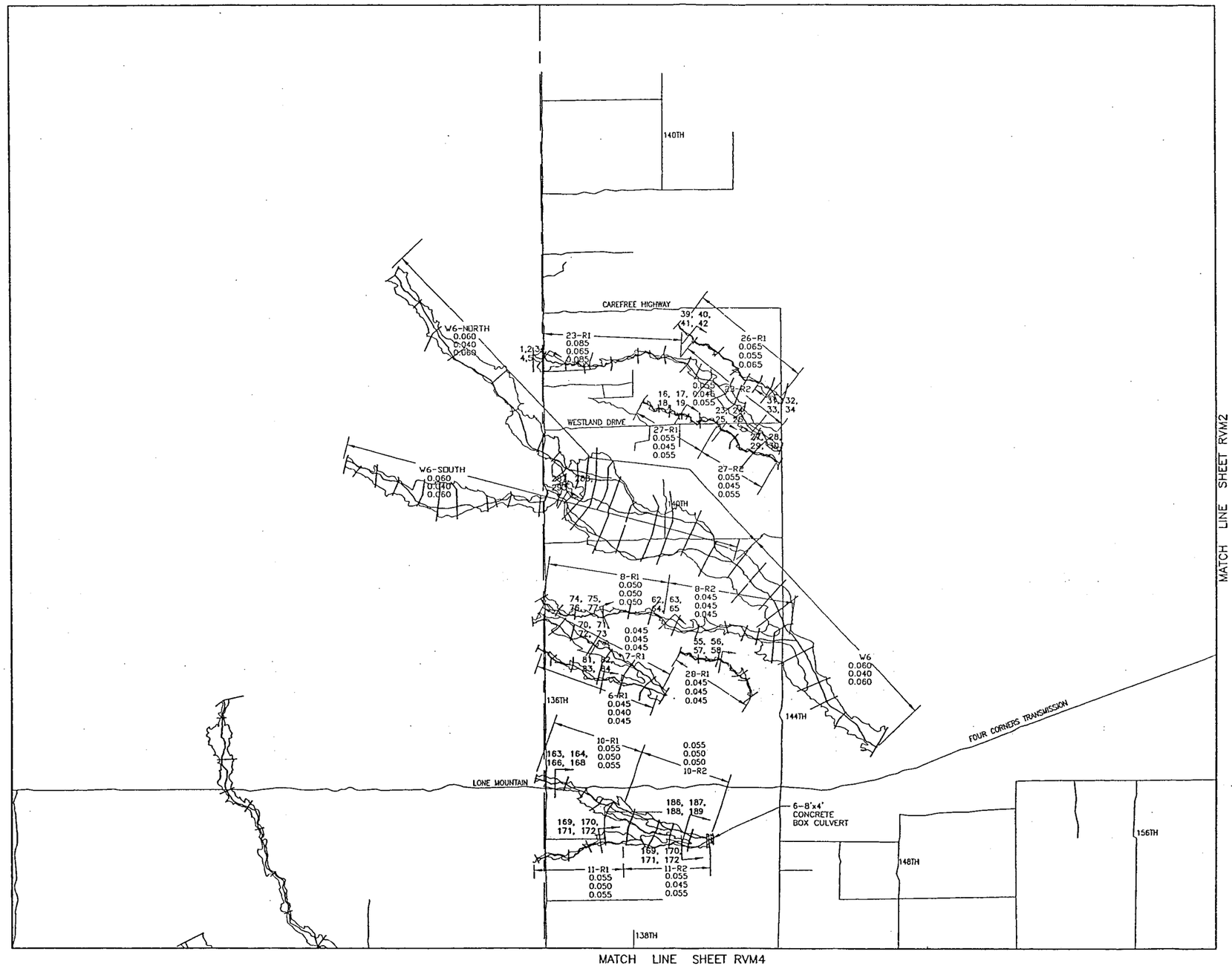
SHEET 2 OF 4

FILE:J:\10-0203\10-0203 Phase 2_ch4_3\ACAD\RVM2.dwg DATE:Jun. 29 2006 TIME: 07:55 am

THIS MAP WAS PREPARED BY PHOTOGRAMMETRIC METHODS TO NATIONAL MAP ACCURACY STANDARDS FOR 1"= 200' HORIZONTAL SCALE AND 2'CONTOUR INTERVALS.

AERIAL MAPPING PROVIDED BY FCDMC

GROUND CONTROL SURVEY DATA PROVIDED BY FCDMC



MATCH LINE SHEET RVM4

MATCH LINE SHEET RVM2

LEGEND

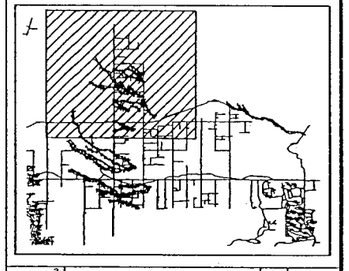
REACH LABEL (WASHNAME-REACH NUMBER)	1-R1
PHOTO LOCATION AND DIRECTION	.196, .197
HYDRAULIC BASE LINE	
LEFT OVERBANK n VALUE	.055
MAIN CHANNEL n VALUE	.050
RIGHT OVERBANK n VALUE	.055

NOTES

1. THE HYDRAULIC BASE LINE IS CROSS SECTION STATION 10,000 UNLESS NOTED OTHERWISE

-1000' 0' 1000' 2000'

SCALE: 1"= 1000 FEET
CONTOUR INTERVAL = 2 FEET



NO.	REVISION	BY	DATE
2			
1			

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

RIO VERDE ADMP
ROUGHNESS VALUE MAP

F.C.D. CONTRACT NO. 2001C056

DIBBLE & ASSOCIATES
CONSULTING ENGINEERS

	BY	DATE
DESIGN	JWL	4/18/05
DESIGN CHK.	FEB	4/18/05
PLANS	RAK	4/18/05
PLANS CHK.	FEB	4/18/05

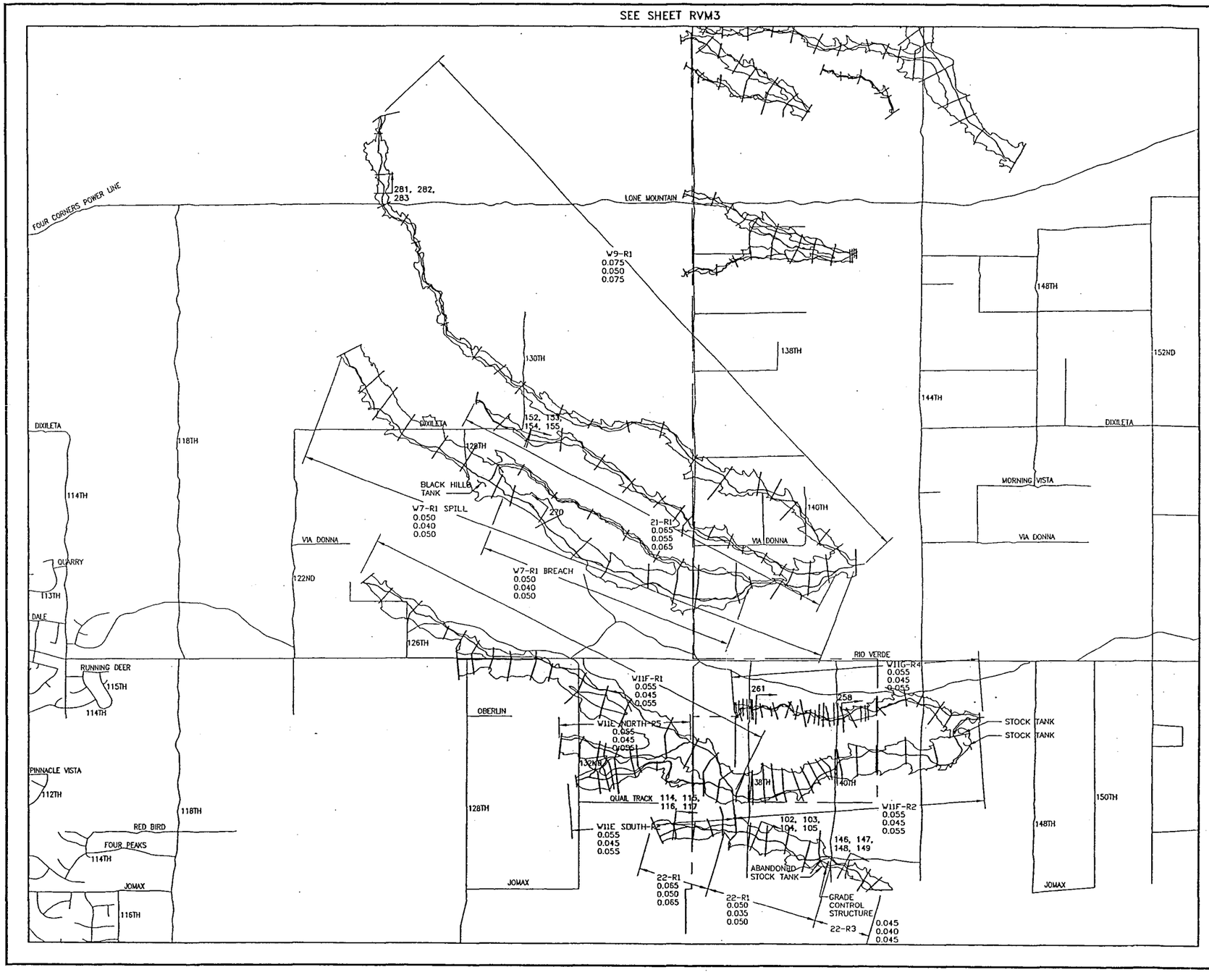
SHEET 3 OF 4

FILE:J:\10-0203\10-0203 Phase 2_and_3\ACAD\RVM3.dwg DATE:Jun. 29 2006 TIME: 07:57 am

THIS MAP WAS PREPARED BY PHOTOGRAMMETRIC METHODS TO NATIONAL MAP ACCURACY STANDARDS FOR 1"= 200' HORIZONTAL SCALE AND 2' CONTOUR INTERVALS.

AERIAL MAPPING PROVIDED BY FCDMC

GROUND CONTROL SURVEY DATA PROVIDED BY FCDMC



LEGEND

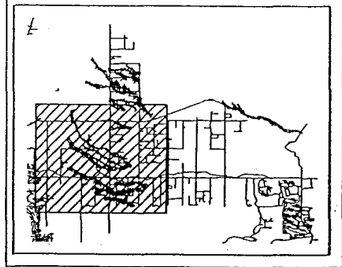
REACH LABEL (WASHNAME-REACH NUMBER)	1-R1
PHOTO LOCATION AND DIRECTION	.196, .197
HYDRAULIC BASE LINE	
LEFT OVERBANK n VALUE	.055
MAIN CHANNEL n VALUE	.050
RIGHT OVERBANK n VALUE	.055

NOTES

1. THE HYDRAULIC BASE LINE IS CROSS SECTION STATION 10,000 UNLESS NOTED OTHERWISE

-1000' 0' 1000' 2000'

SCALE: 1"= 1000 FEET
CONTOUR INTERVAL = 2 FEET



NO	REVISION	BY	DATE
2			
1			

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

RIO VERDE ADMP
ROUGHNESS VALUE MAP

F.C.D. CONTRACT NO. 2001C056

DIBBLE & ASSOCIATES
CONSULTING ENGINEERS

23969 FRANK EDWARD BROWN ARIZONA U.S.A.

	BY	DATE
DESIGN	JWL	4/18/05
DESIGN CHK	FEB	4/18/05
PLANS	RAK	4/18/05
PLANS CHK	FEB	4/18/05

SHEET 4 OF 4

FILE:J:\10-0203\10-0203 Phase 2_and_3\ACAD\RVM4.dwg DATE:Jun, 29 2006 TIME: 07:58 am

E.2 HEC-RAS Cross Section Plots

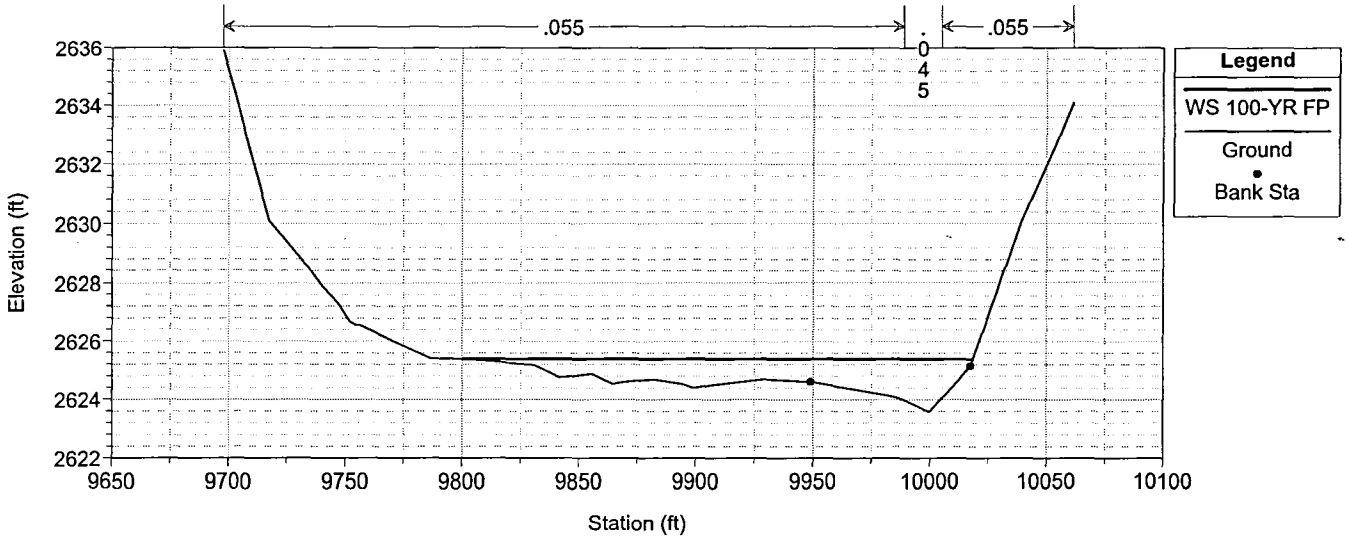
E.2.1 RV Wash 10
E.2.2 RV Wash 7
E.2.3 RV Wash A
E.2.4 RV Wash A Tank Spillway
E.2.5 RV Wash I
E.2.6 RV Wash K
E.2.7 RV Wash K Trib 11
E.2.8 RV Wash K Trib 11A
E.2.9 RV Wash K Trib 6
E.2.10 RV Wash K Trib 6D
E.2.11 RV Wash K Trib 6D1
E.2.12 RV Wash P

E.2.1 HEC-RAS Cross Section Plots

RV Wash 10

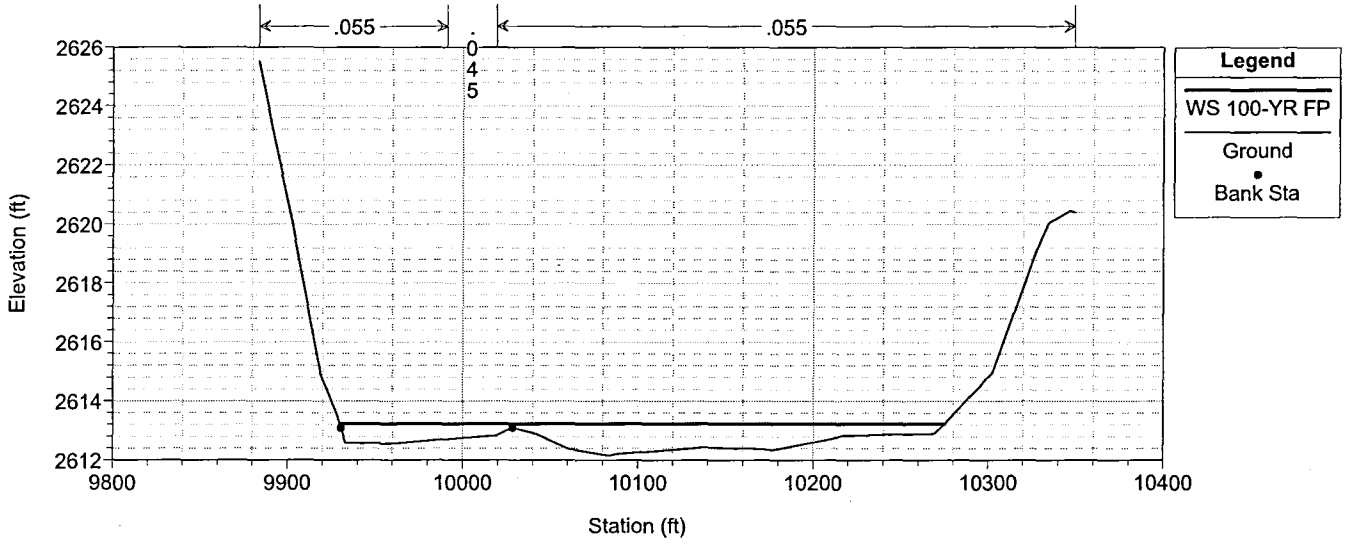
RV Wash 10 Plan: RV Wash 10 11/1/2007

River = RV W10 Reach = R1 RS = 9.689



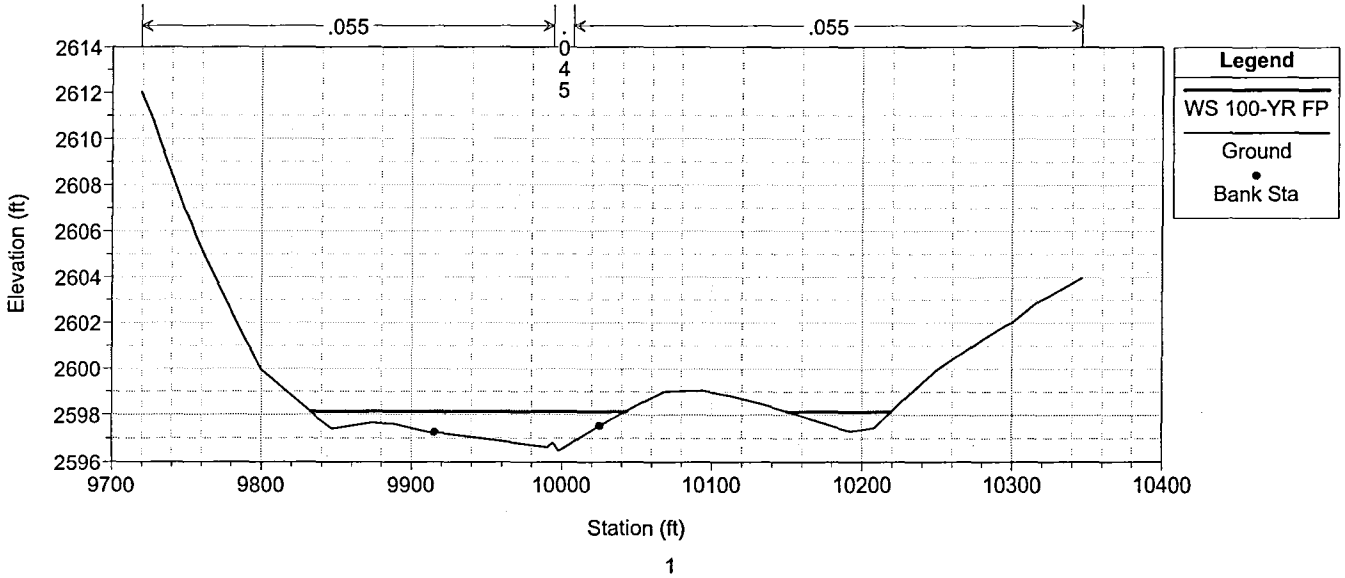
RV Wash 10 Plan: RV Wash 10 11/1/2007

River = RV W10 Reach = R1 RS = 9.564



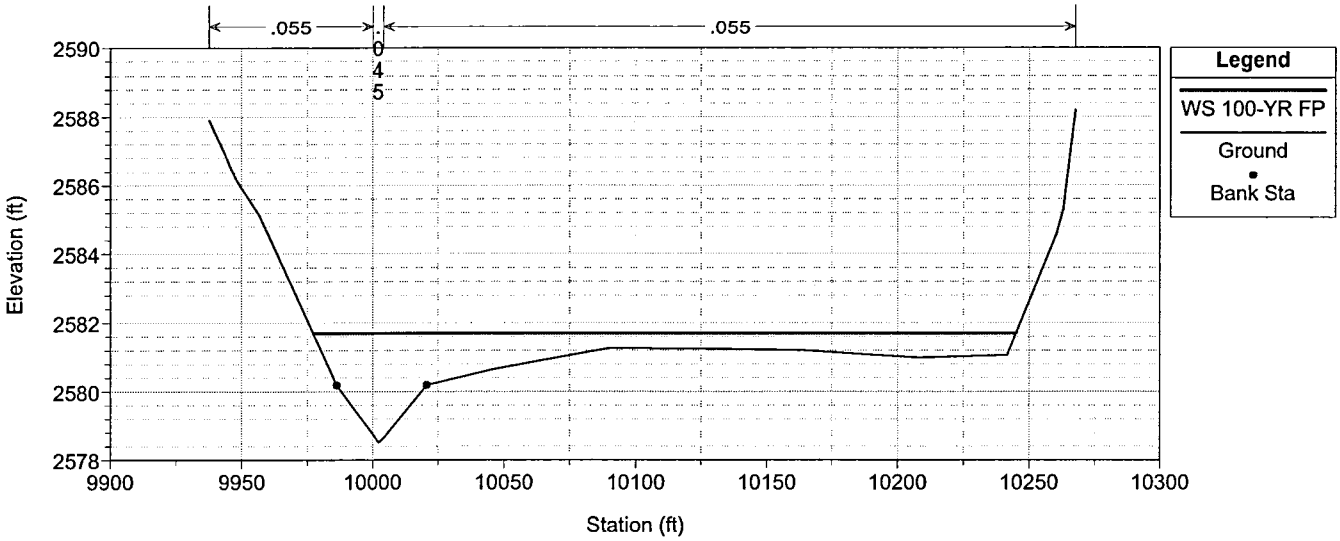
RV Wash 10 Plan: RV Wash 10 11/1/2007

River = RV W10 Reach = R1 RS = 9.429



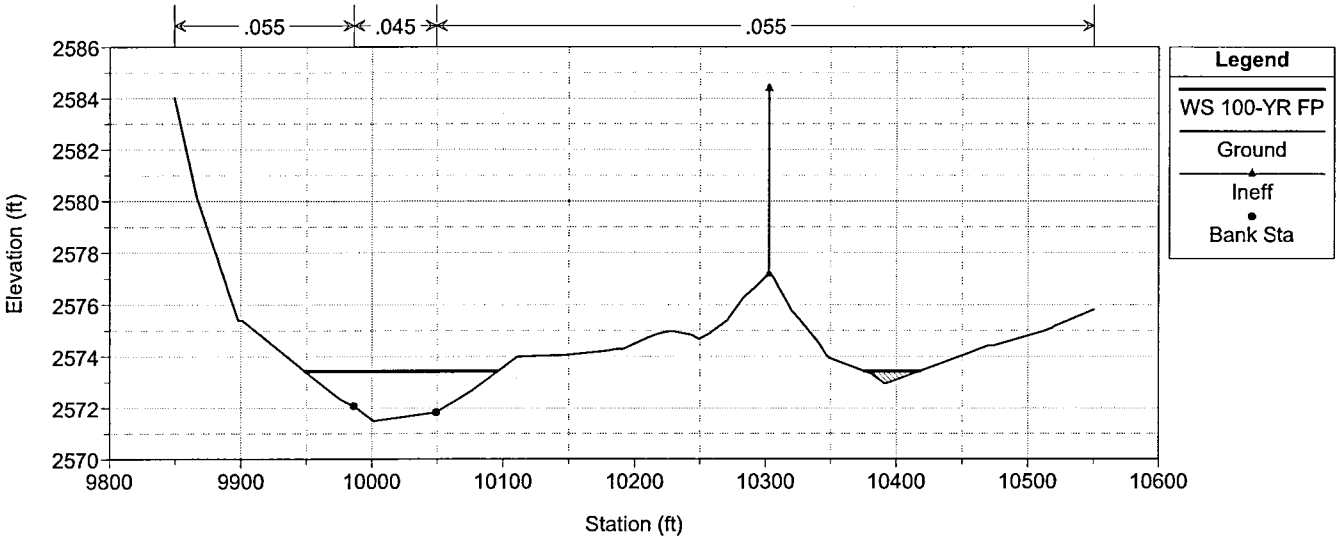
RV Wash 10 Plan: RV Wash 10 11/1/2007

River = RV W10 Reach = R1 RS = 9.252



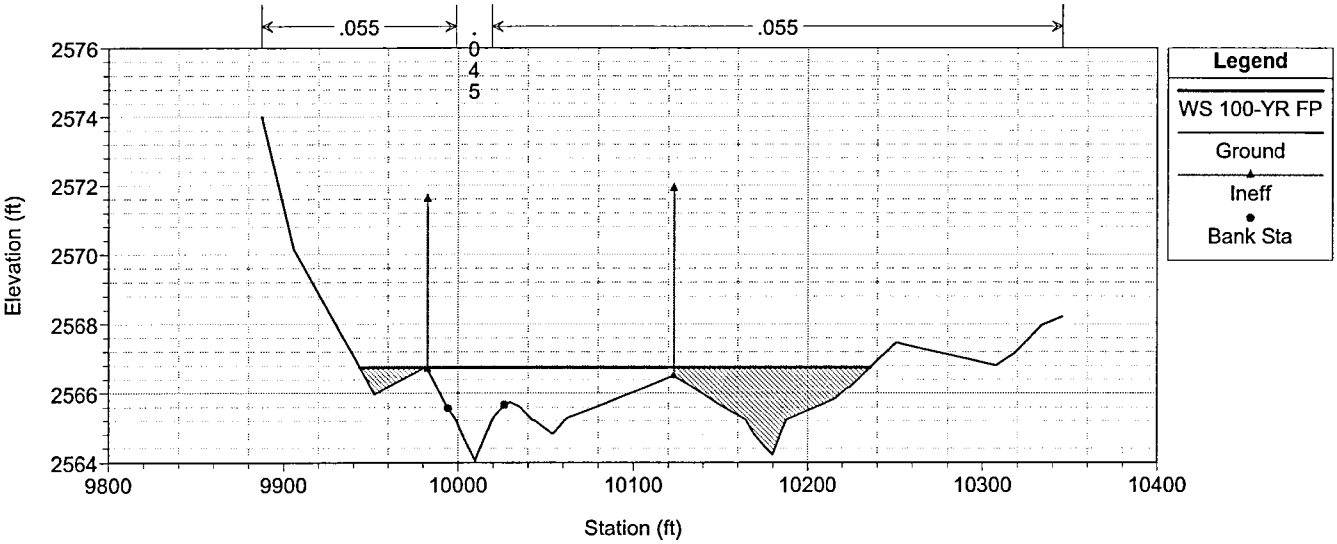
RV Wash 10 Plan: RV Wash 10 11/1/2007

River = RV W10 Reach = R1 RS = 9.176



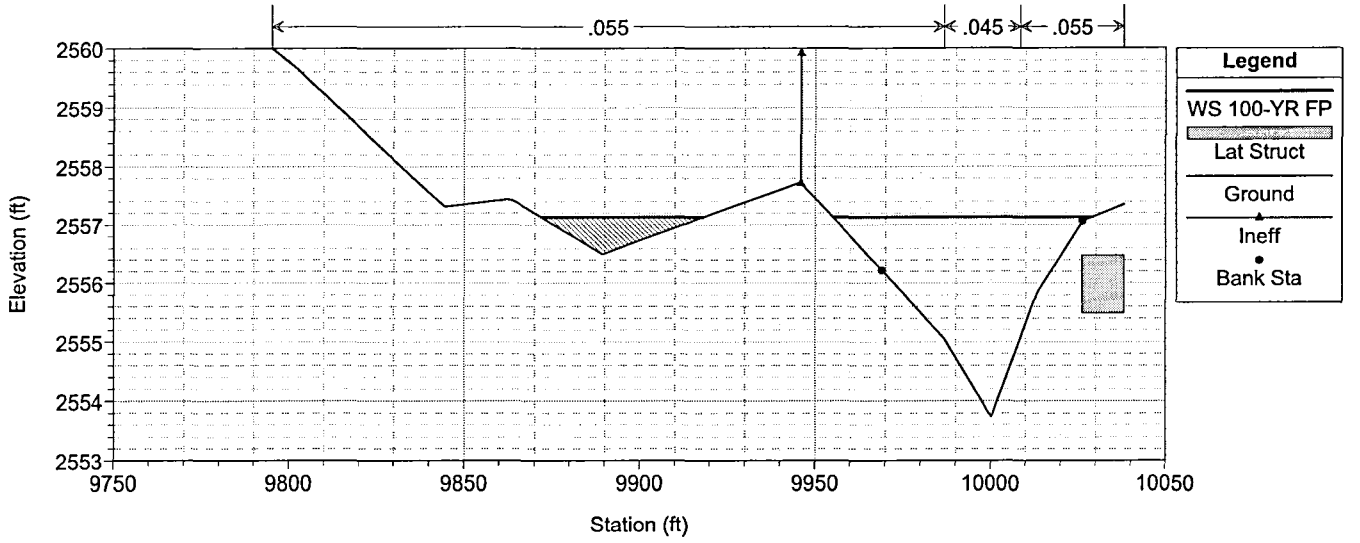
RV Wash 10 Plan: RV Wash 10 11/1/2007

River = RV W10 Reach = R1 RS = 9.104



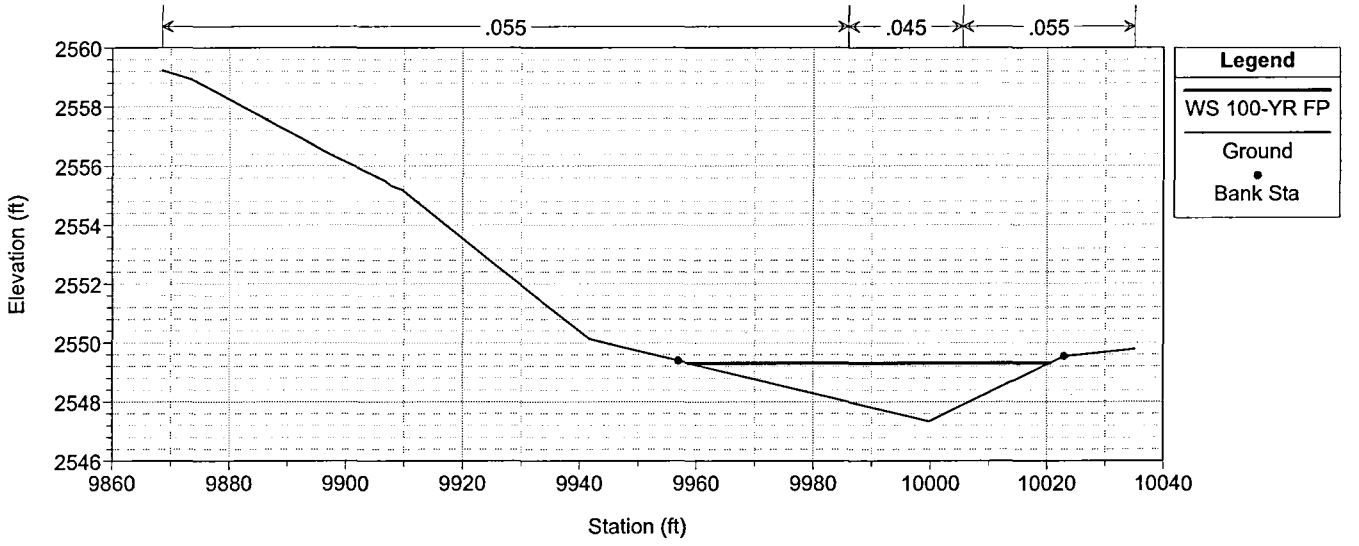
RV Wash 10 Plan: RV Wash 10 11/1/2007

River = RV W10 Reach = R1 RS = 9.012



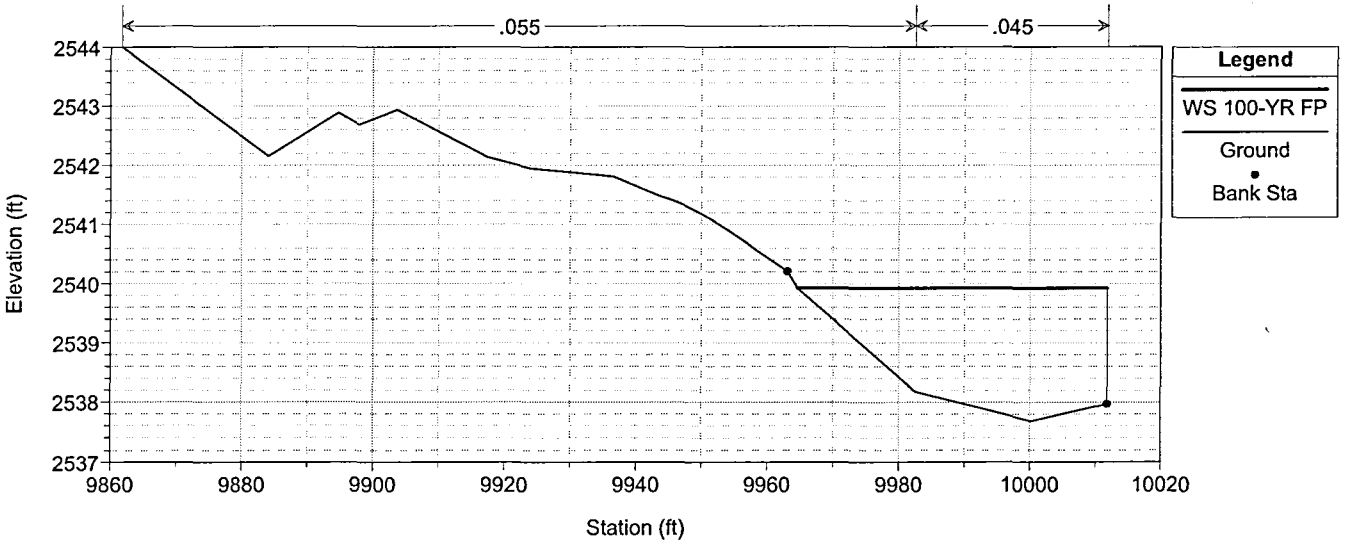
RV Wash 10 Plan: RV Wash 10 11/1/2007

River = RV W10 Reach = R1 RS = 8.937



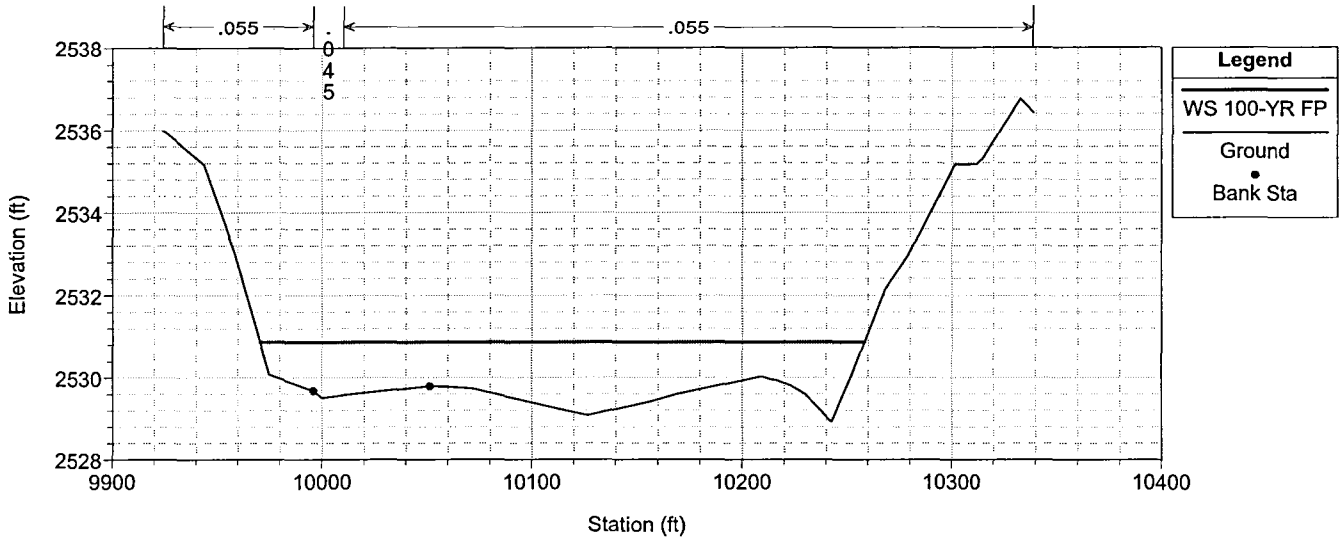
RV Wash 10 Plan: RV Wash 10 11/1/2007

River = RV W10 Reach = R1 RS = 8.826



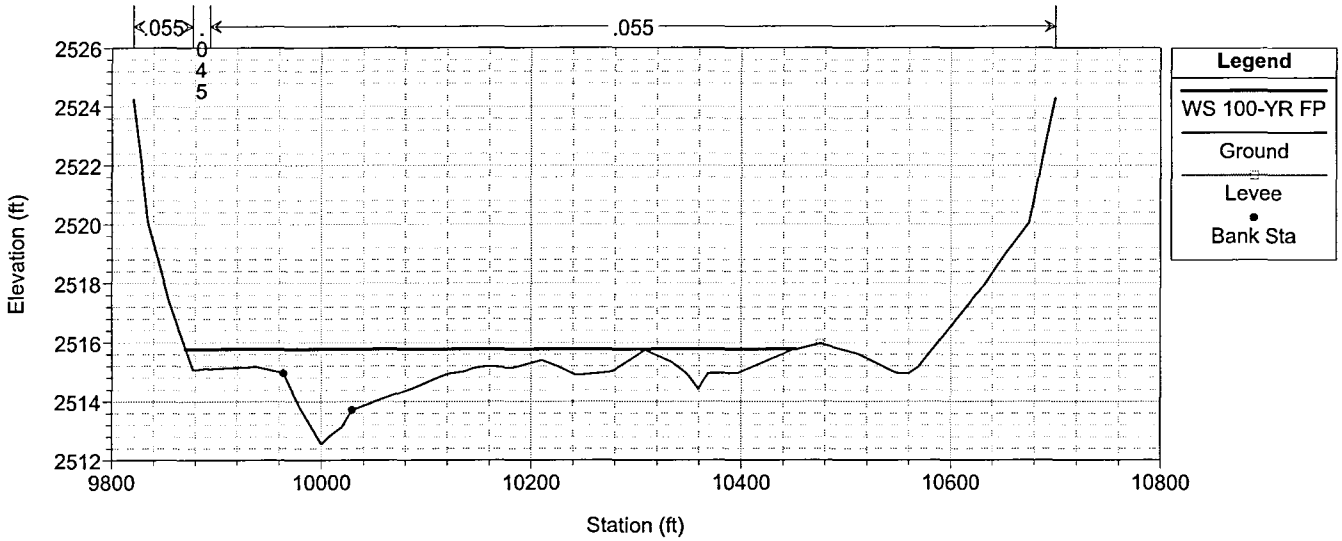
RV Wash 10 Plan: RV Wash 10 11/1/2007

River = RV W10 Reach = R2 RS = 8.740



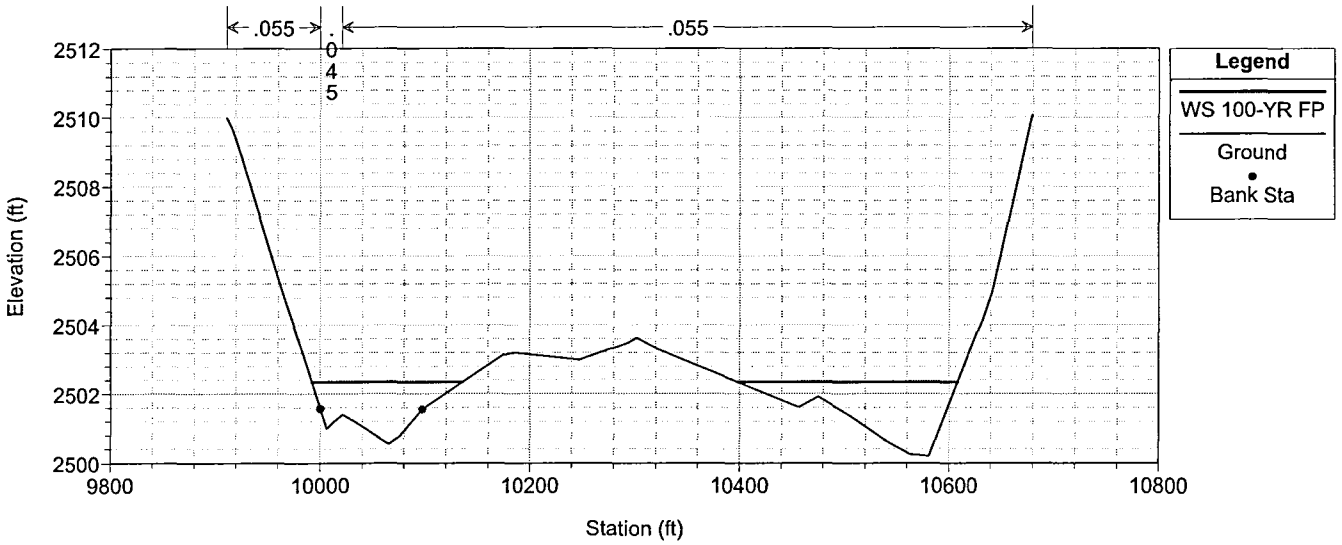
RV Wash 10 Plan: RV Wash 10 11/1/2007

River = RV W10 Reach = R2 RS = 8.586



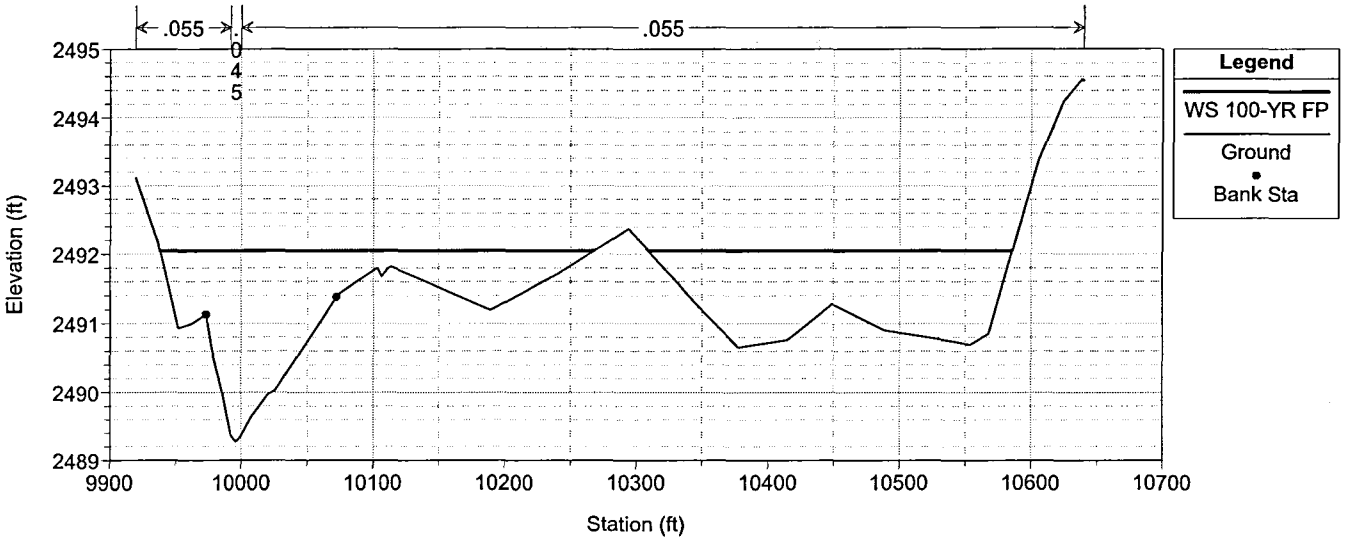
RV Wash 10 Plan: RV Wash 10 11/1/2007

River = RV W10 Reach = R2 RS = 8.467



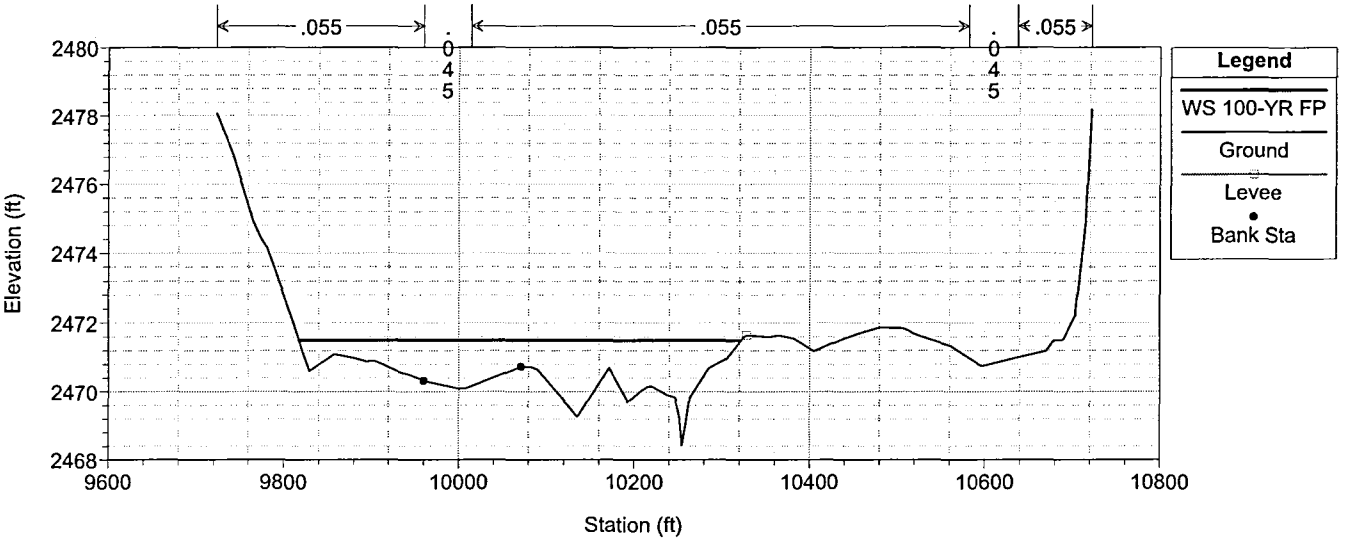
RV Wash 10 Plan: RV Wash 10 11/1/2007

River = RV W10 Reach = R2 RS = 8.354



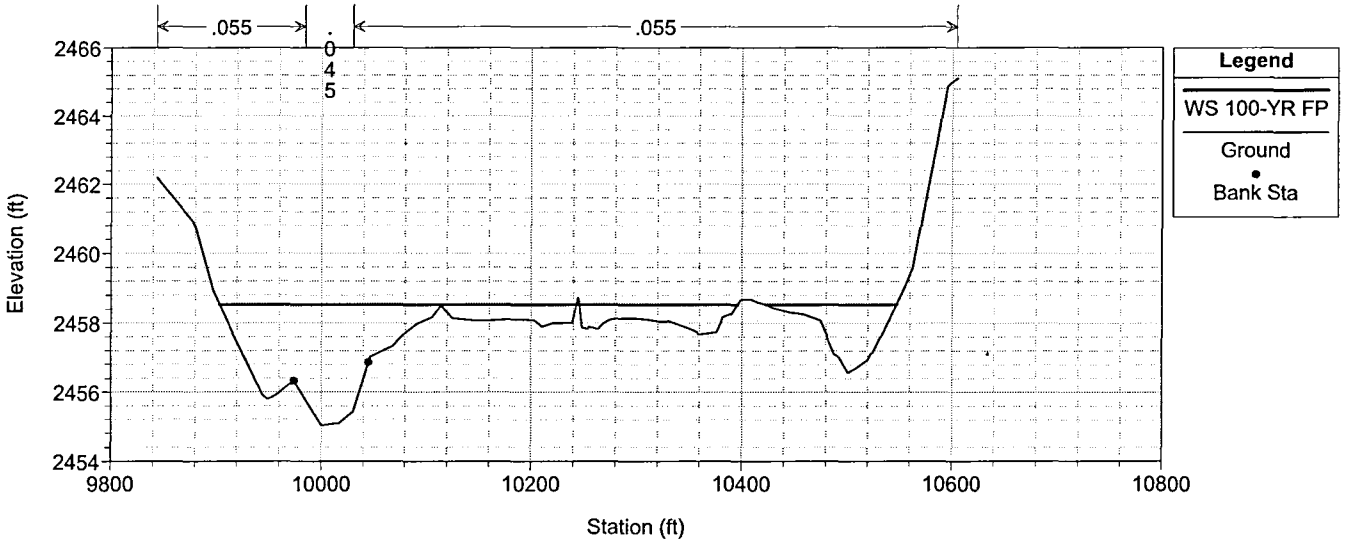
RV Wash 10 Plan: RV Wash 10 11/1/2007

River = RV W10 Reach = R2 RS = 8.134



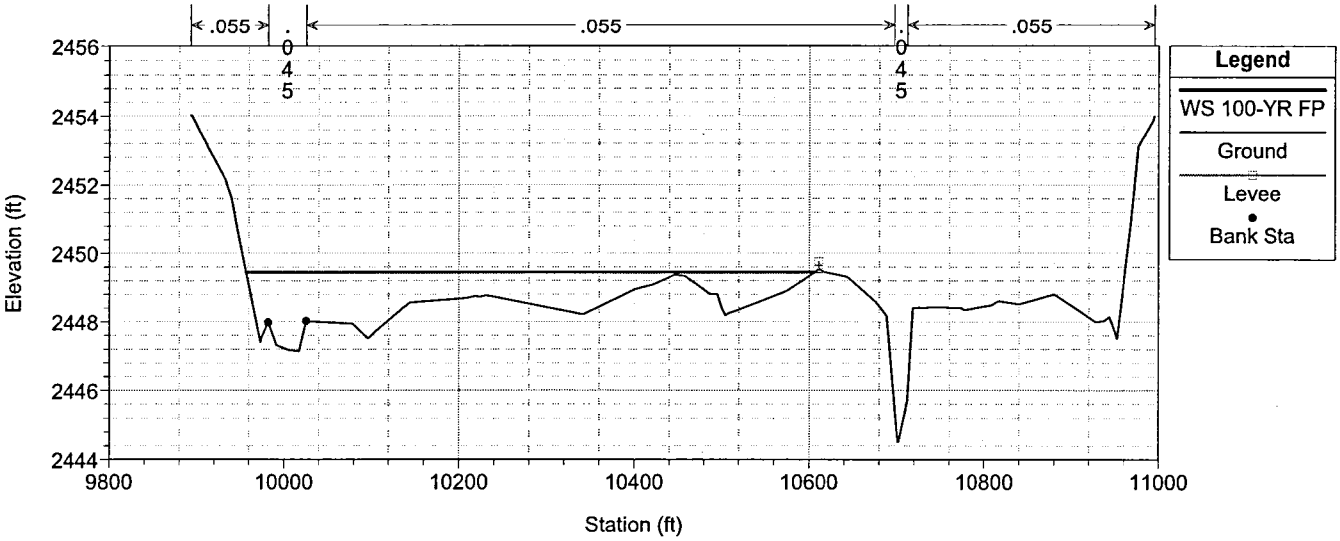
RV Wash 10 Plan: RV Wash 10 11/1/2007

River = RV W10 Reach = R3 RS = 7.984



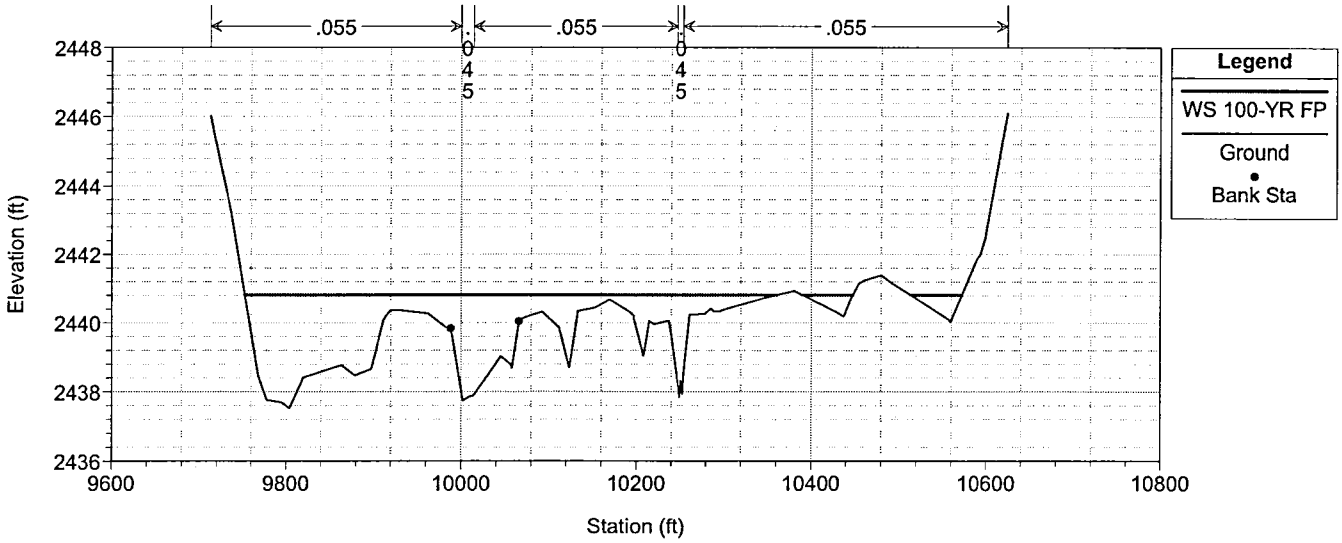
RV Wash 10 Plan: RV Wash 10 11/1/2007

River = RV W10 Reach = R3 RS = 7.886



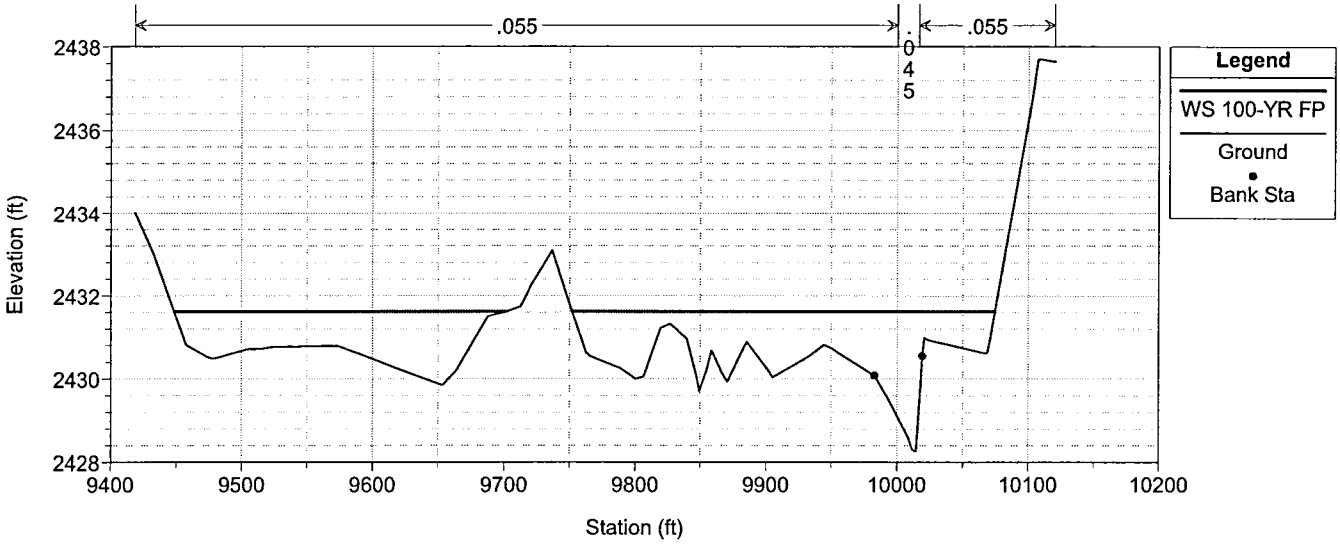
RV Wash 10 Plan: RV Wash 10 11/1/2007

River = RV W10 Reach = R3 RS = 7.784



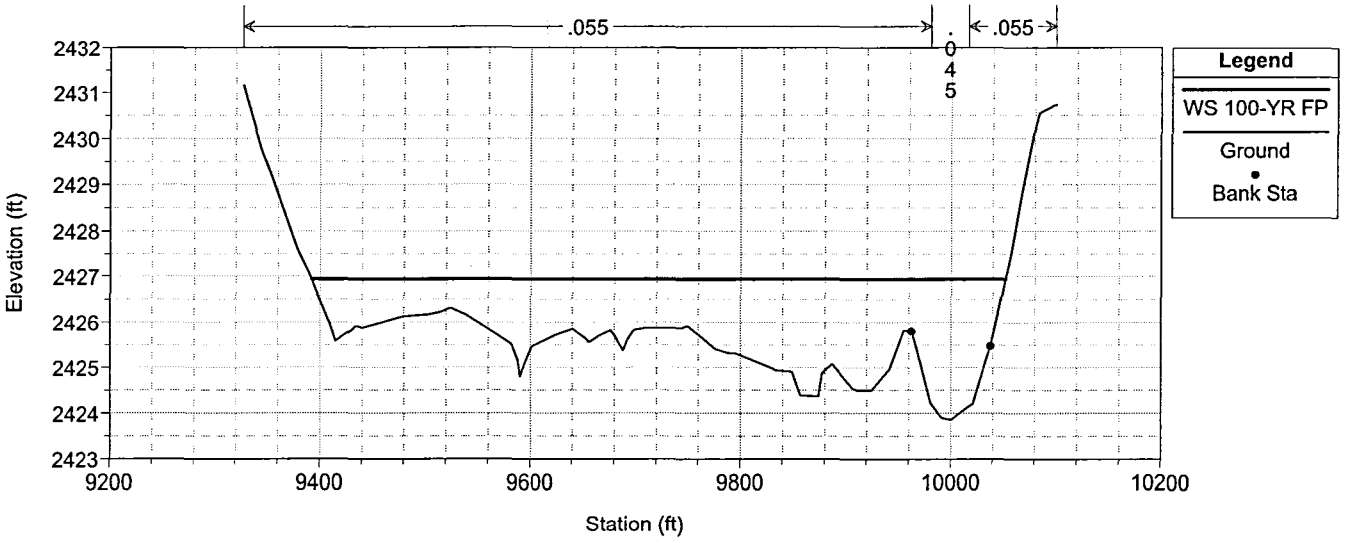
RV Wash 10 Plan: RV Wash 10 11/1/2007

River = RV W10 Reach = R4 RS = 7.678



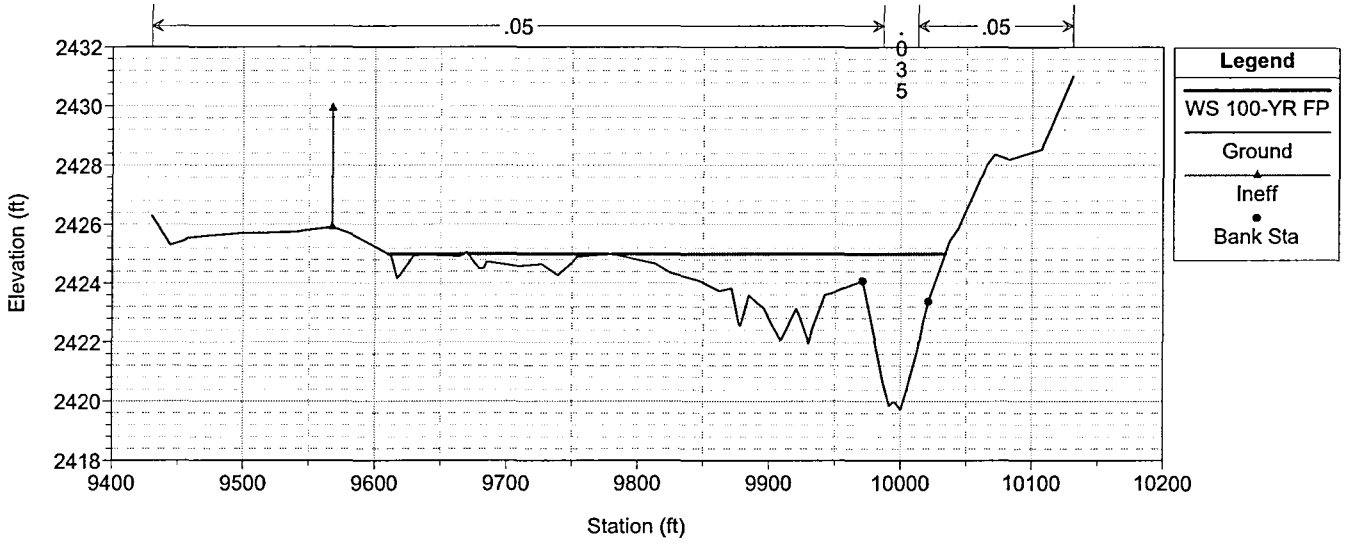
RV Wash 10 Plan: RV Wash 10 11/1/2007

River = RV W10 Reach = R4 RS = 7.611



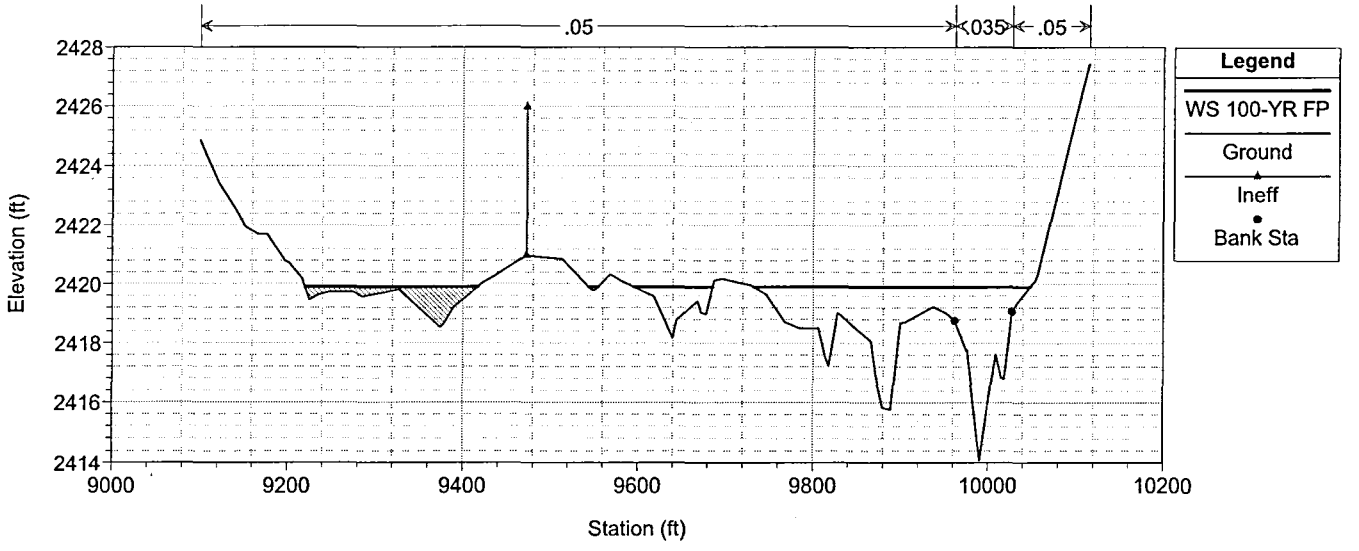
RV Wash 10 Plan: RV Wash 10 11/1/2007

River = RV W10 Reach = R4 RS = 7.596



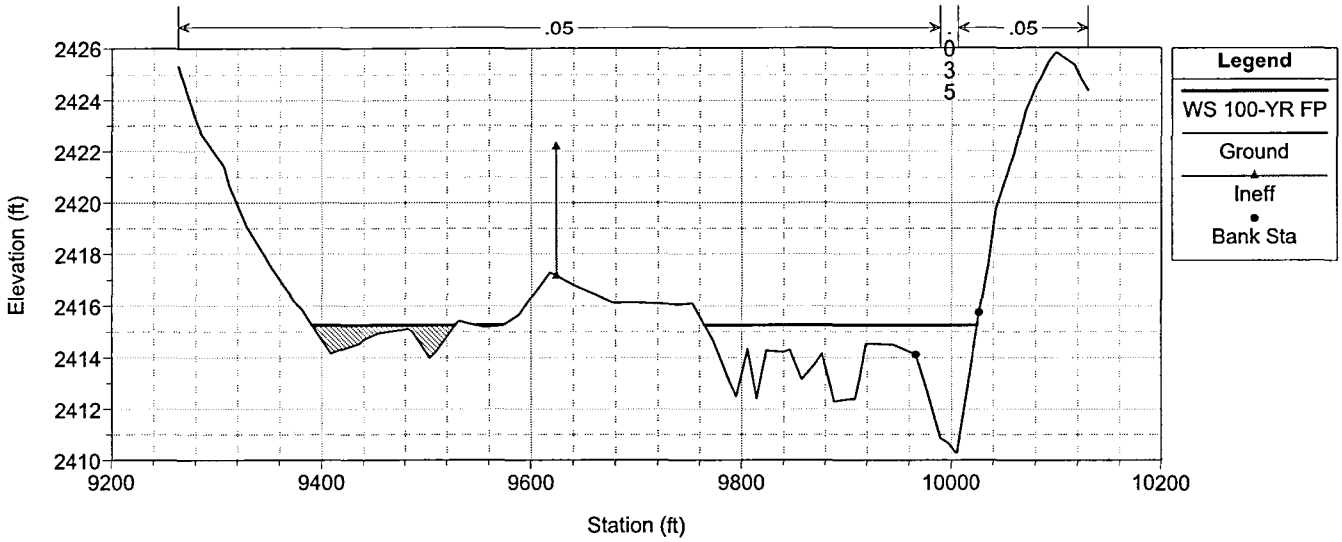
RV Wash 10 Plan: RV Wash 10 11/1/2007

River = RV W10 Reach = R4 RS = 7.541



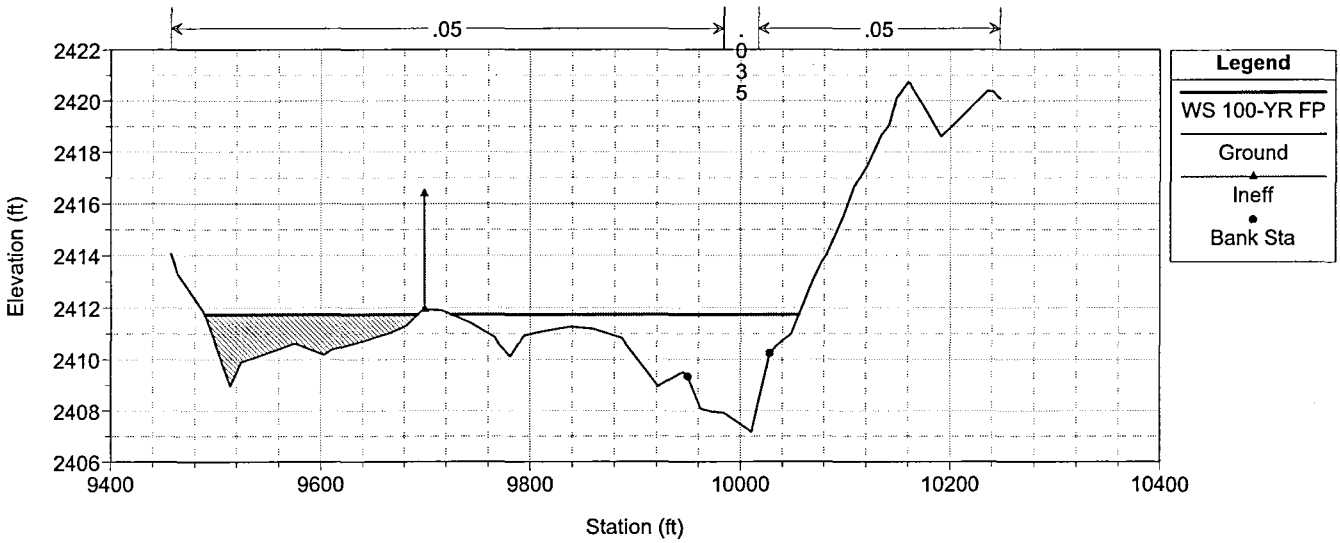
RV Wash 10 Plan: RV Wash 10 11/1/2007

River = RV W10 Reach = R4 RS = 7.491



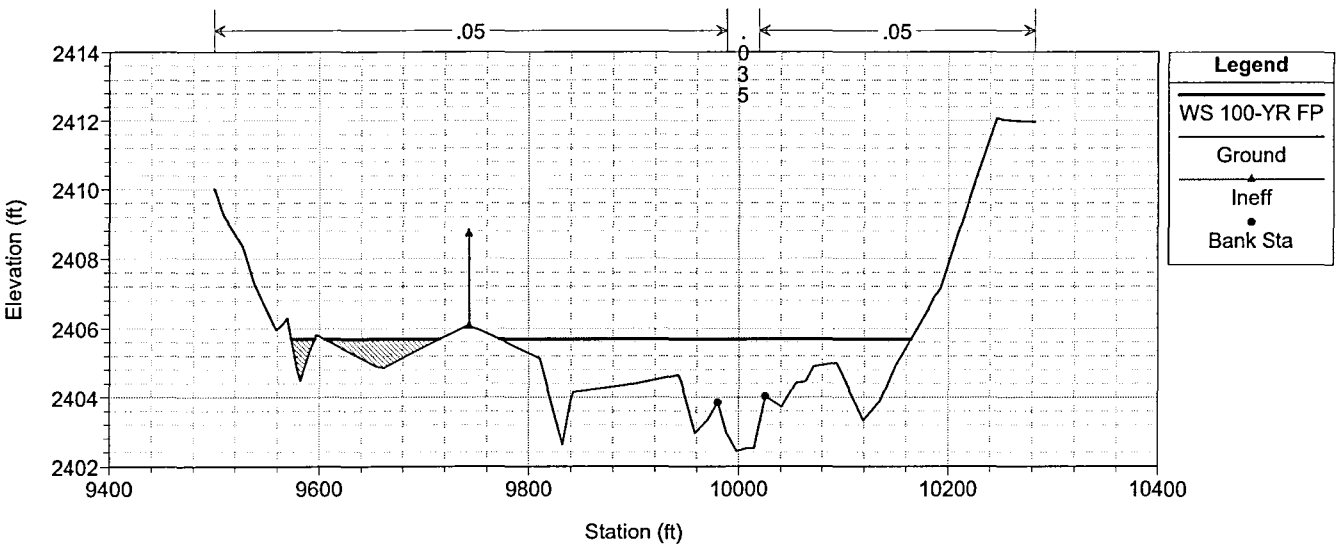
RV Wash 10 Plan: RV Wash 10 11/1/2007

River = RV W10 Reach = R4 RS = 7.450



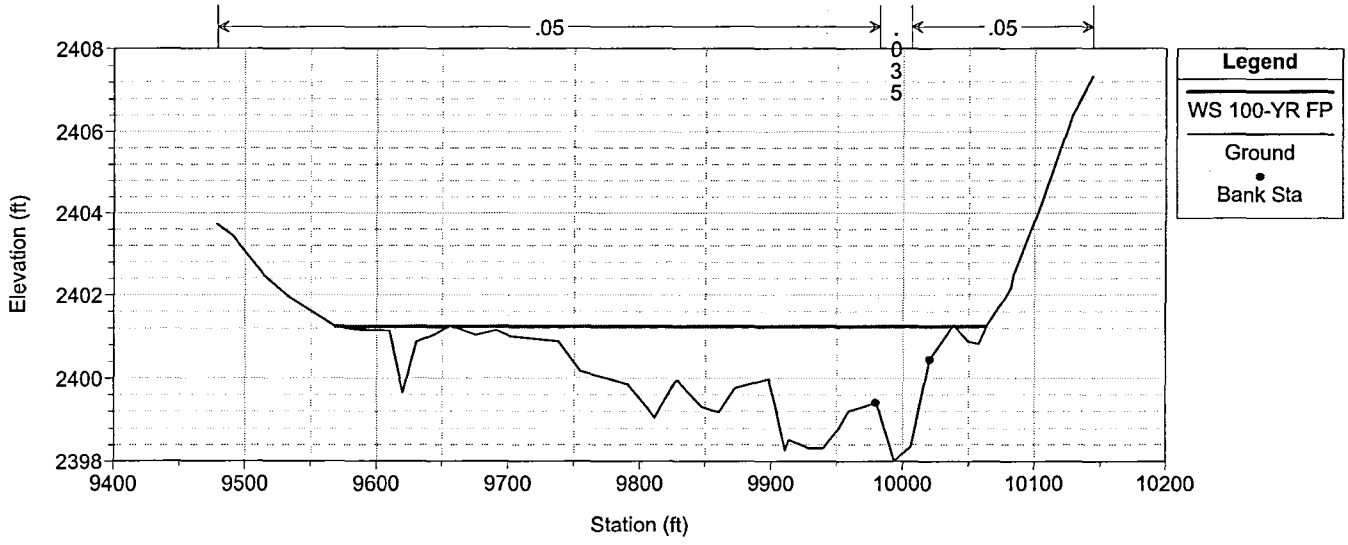
RV Wash 10 Plan: RV Wash 10 11/1/2007

River = RV W10 Reach = R4 RS = 7.382



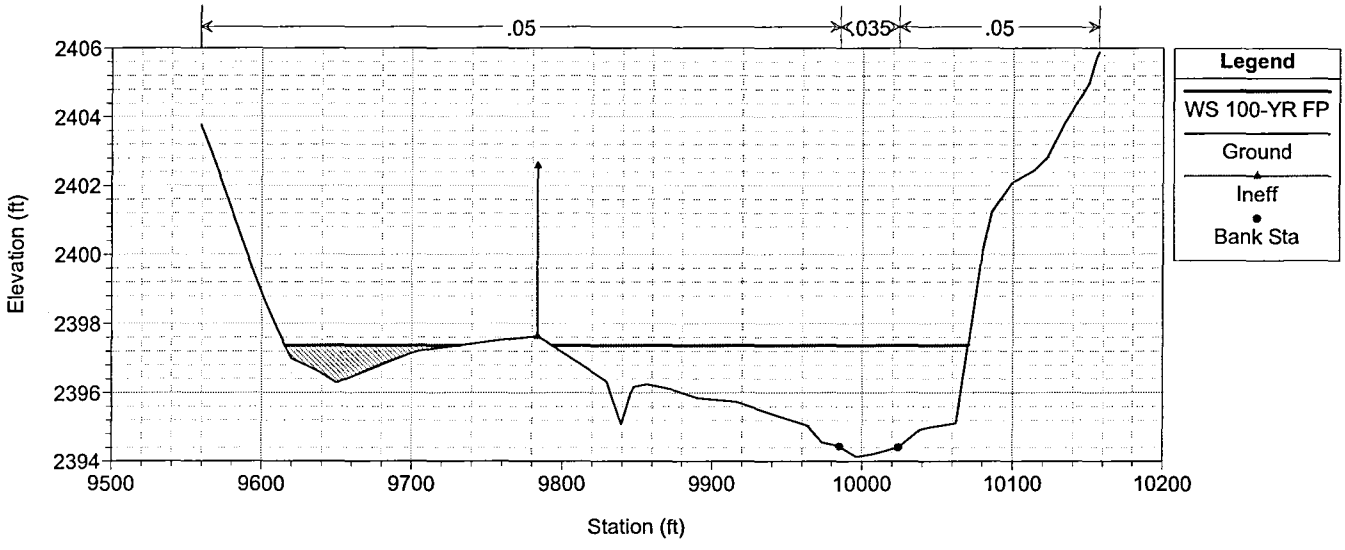
RV Wash 10 Plan: RV Wash 10 11/1/2007

River = RV W10 Reach = R4 RS = 7.331



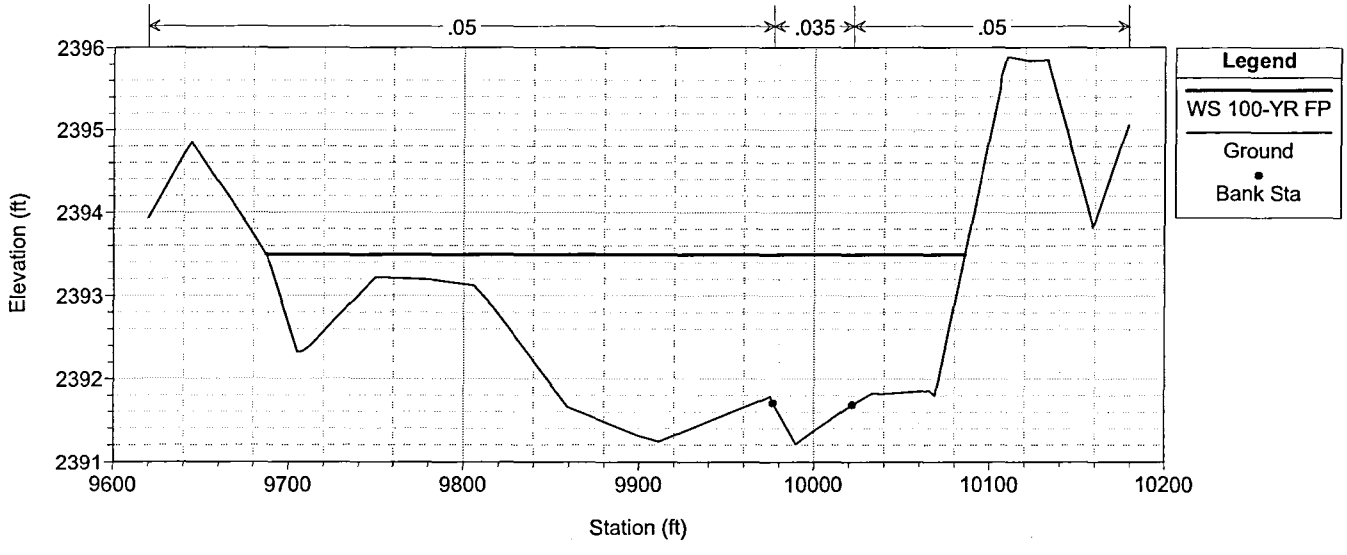
RV Wash 10 Plan: RV Wash 10 11/1/2007

River = RV W10 Reach = R4 RS = 7.283



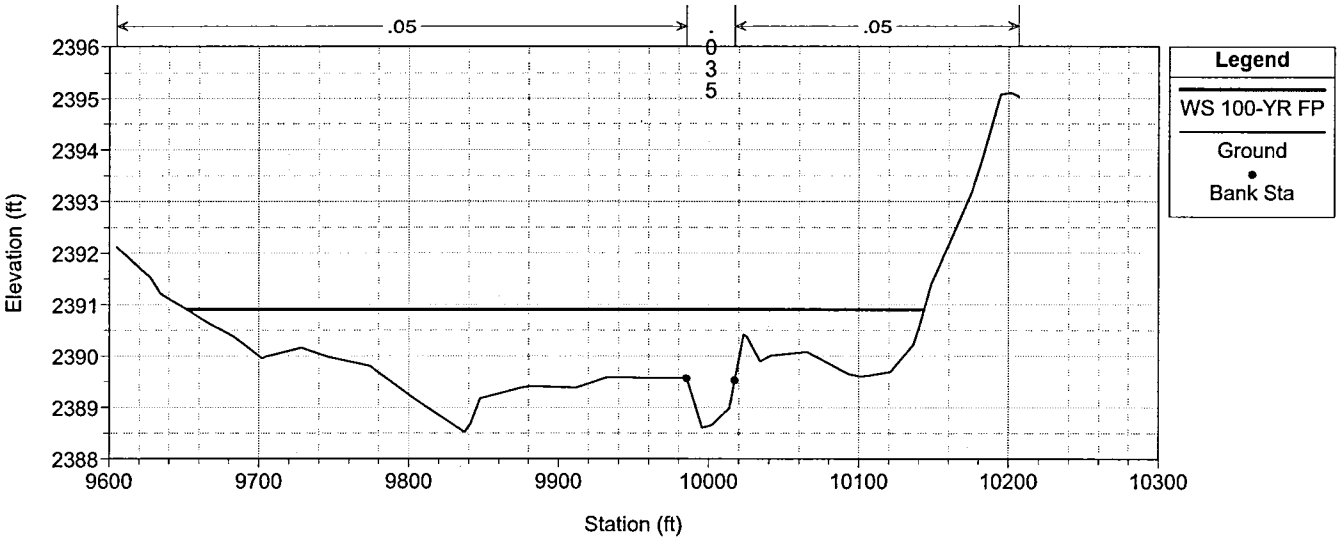
RV Wash 10 Plan: RV Wash 10 11/1/2007

River = RV W10 Reach = R4 RS = 7.240



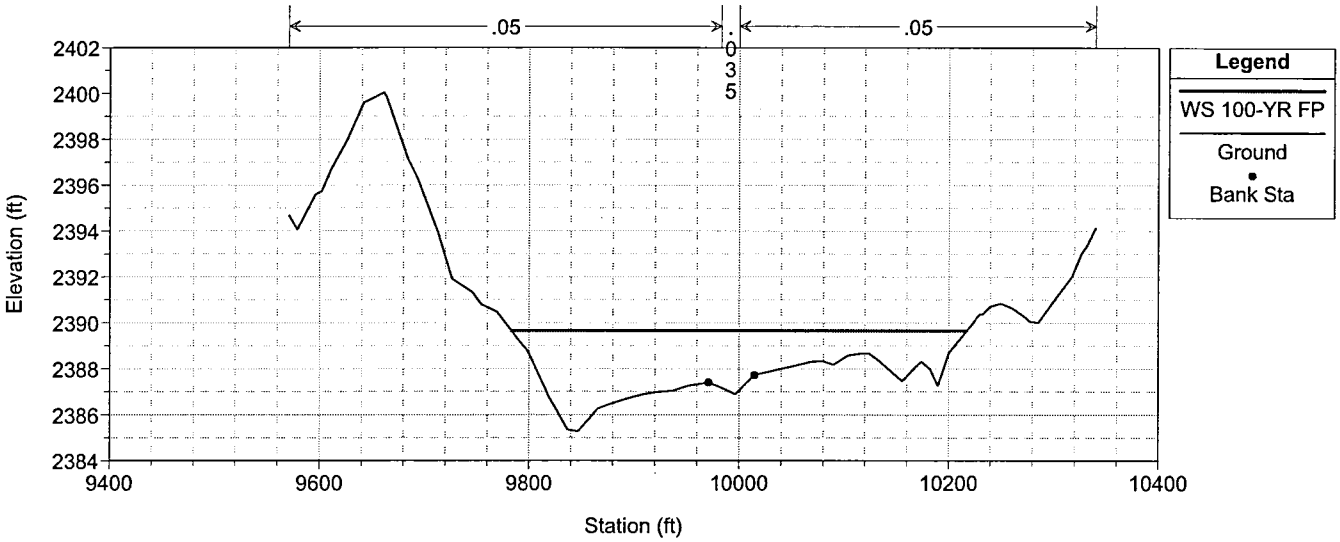
RV Wash 10 Plan: RV Wash 10 11/1/2007

River = RV W10 Reach = R4 RS = 7.215



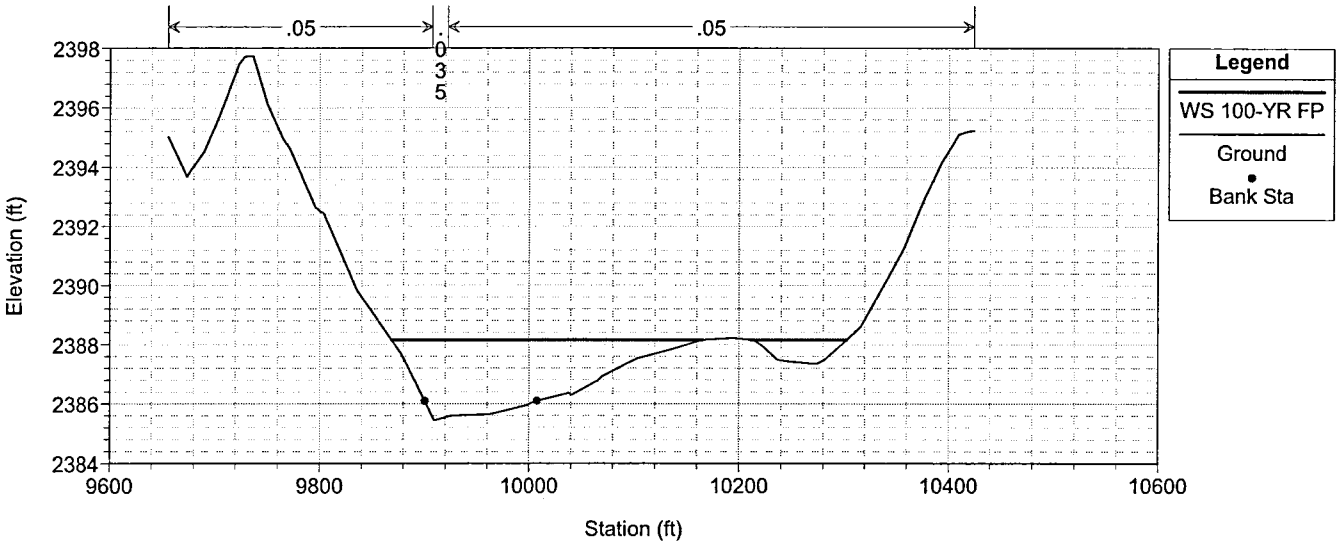
RV Wash 10 Plan: RV Wash 10 11/1/2007

River = RV W10 Reach = R4 RS = 7.193



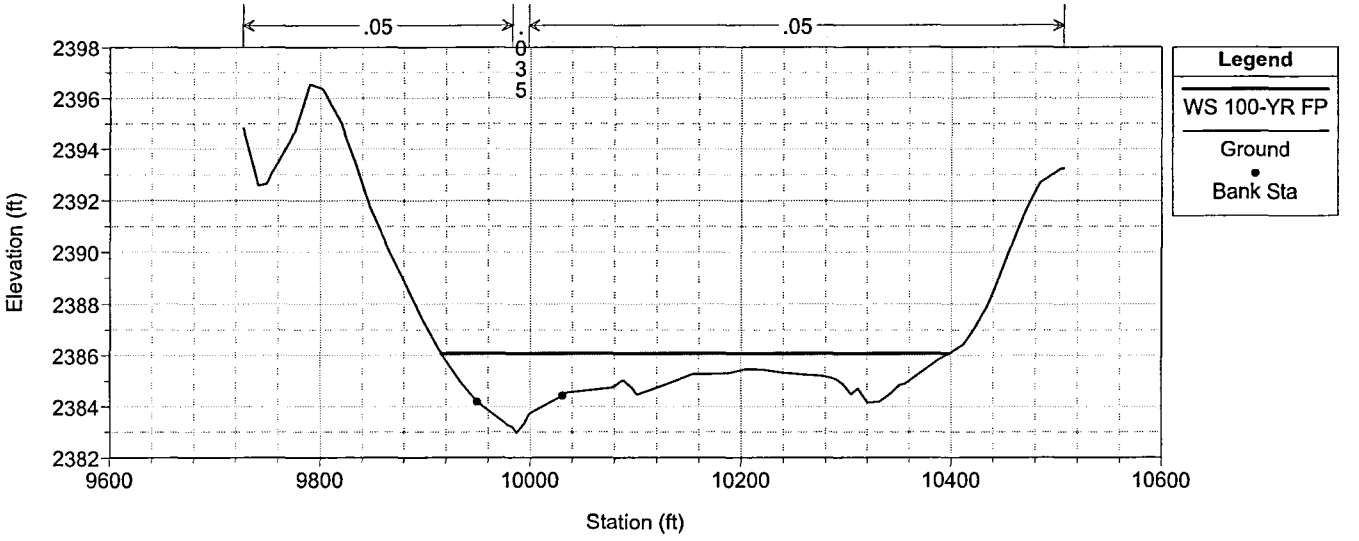
RV Wash 10 Plan: RV Wash 10 11/1/2007

River = RV W10 Reach = R4 RS = 7.174



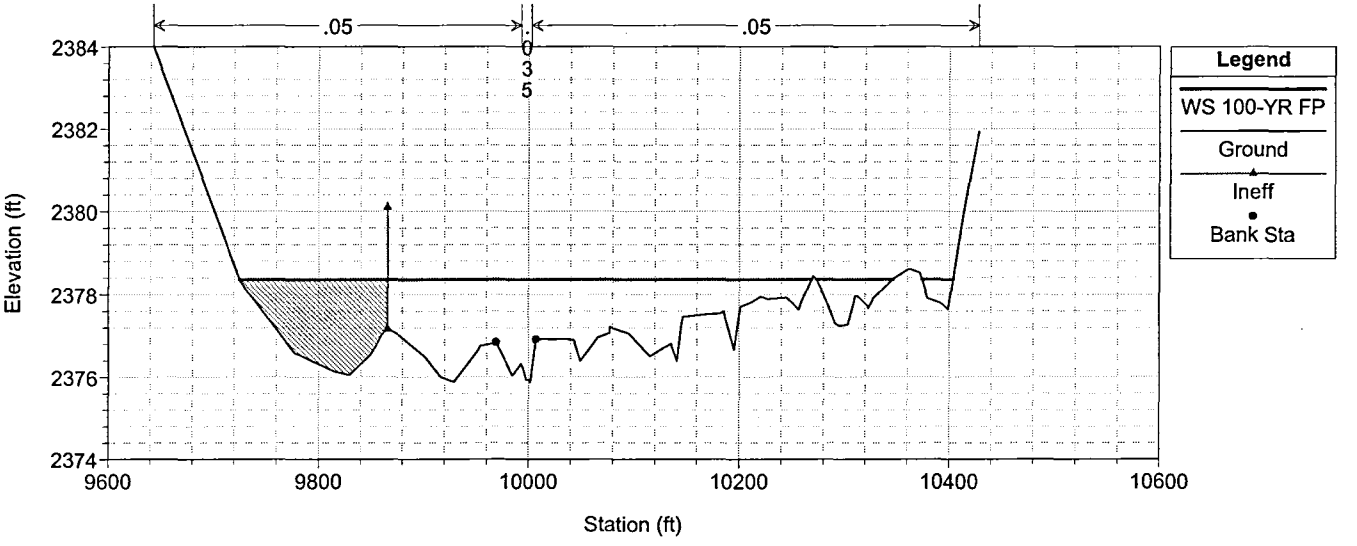
RV Wash 10 Plan: RV Wash 10 11/1/2007

River = RV W10 Reach = R4 RS = 7.155



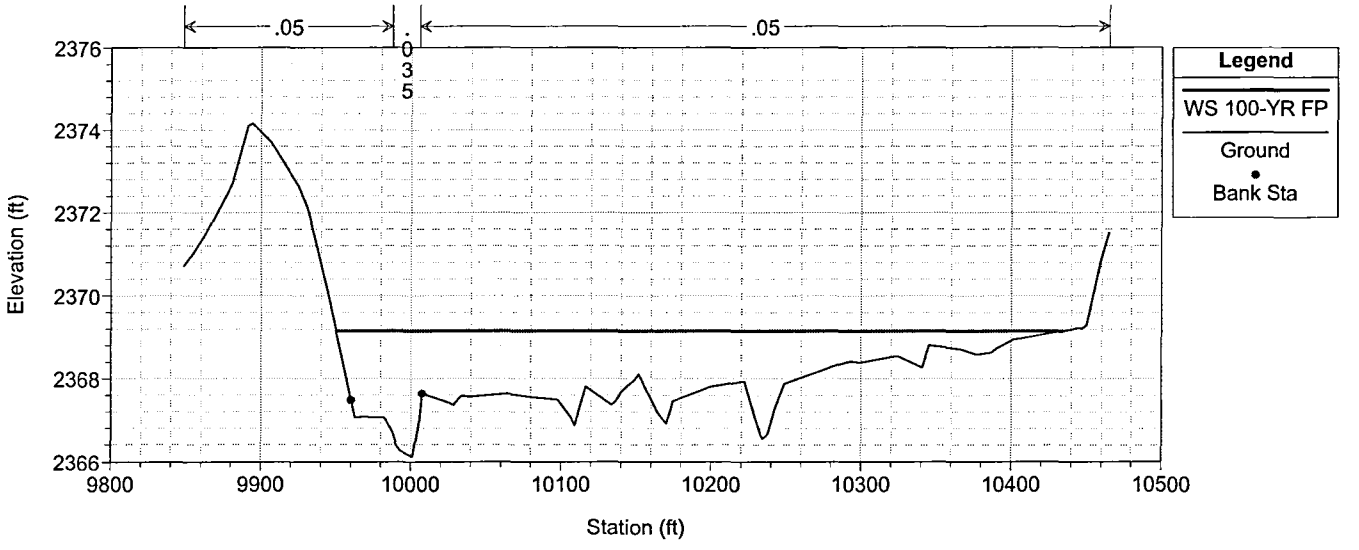
RV Wash 10 Plan: RV Wash 10 11/1/2007

River = RV W10 Reach = R4 RS = 7.076



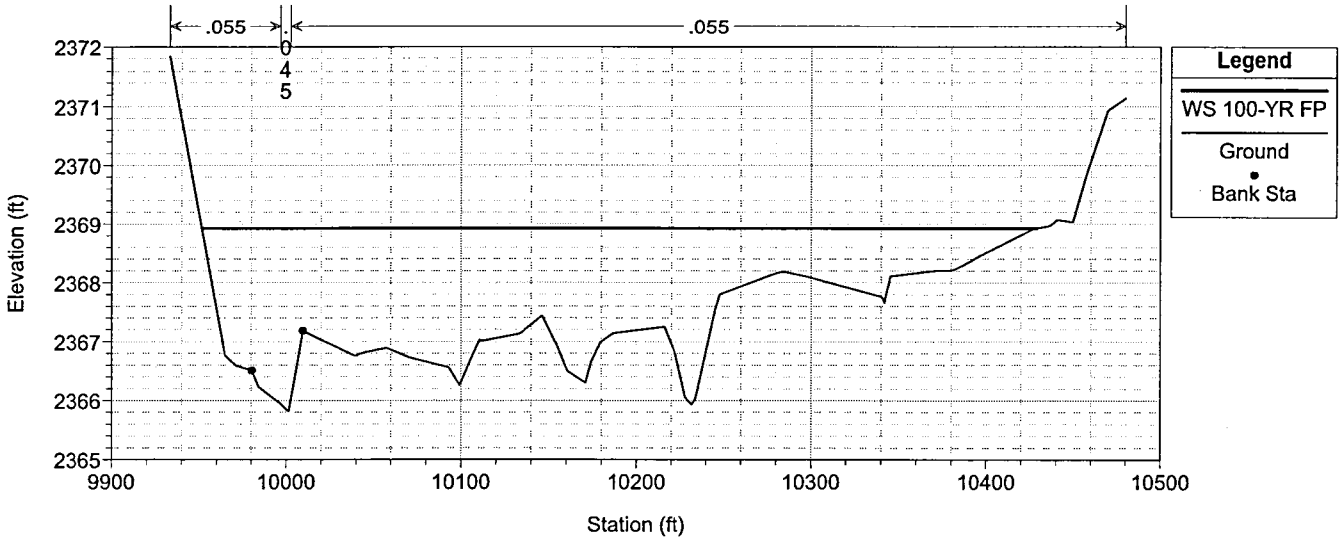
RV Wash 10 Plan: RV Wash 10 11/1/2007

River = RV W10 Reach = R4 RS = 6.982



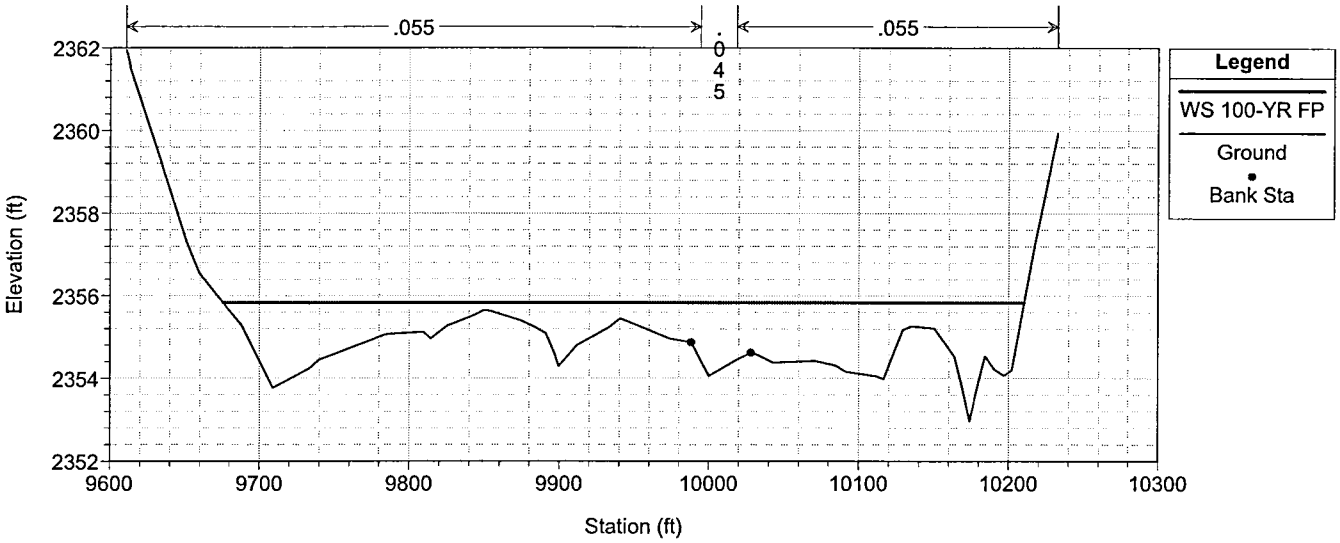
RV Wash 10 Plan: RV Wash 10 11/1/2007

River = RV W10 Reach = R4 RS = 6.977



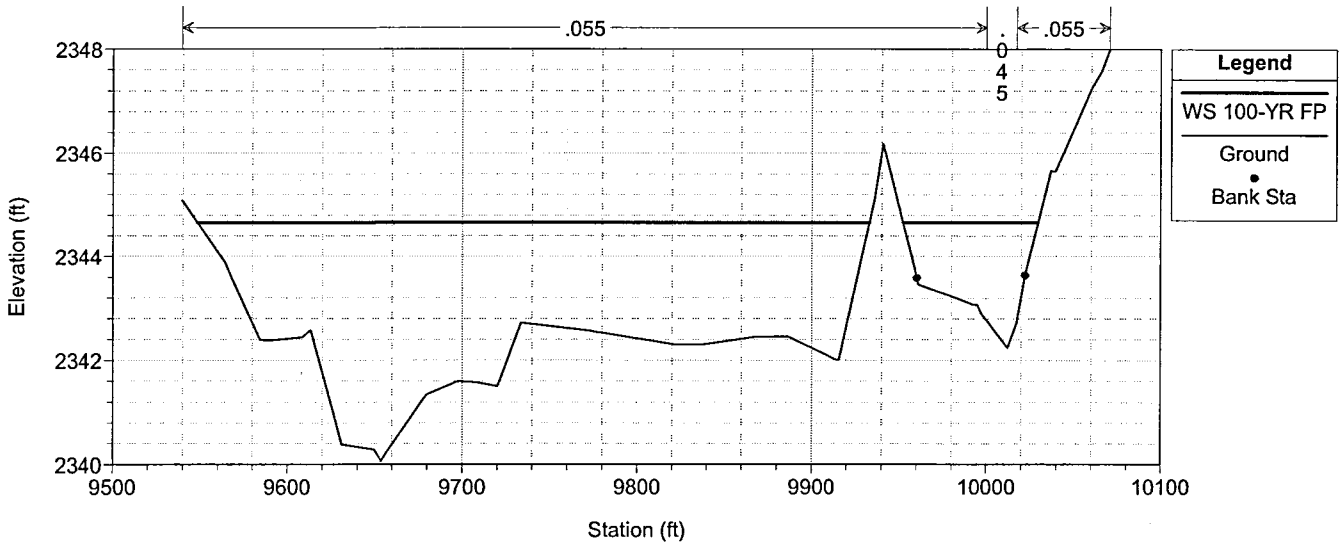
RV Wash 10 Plan: RV Wash 10 11/1/2007

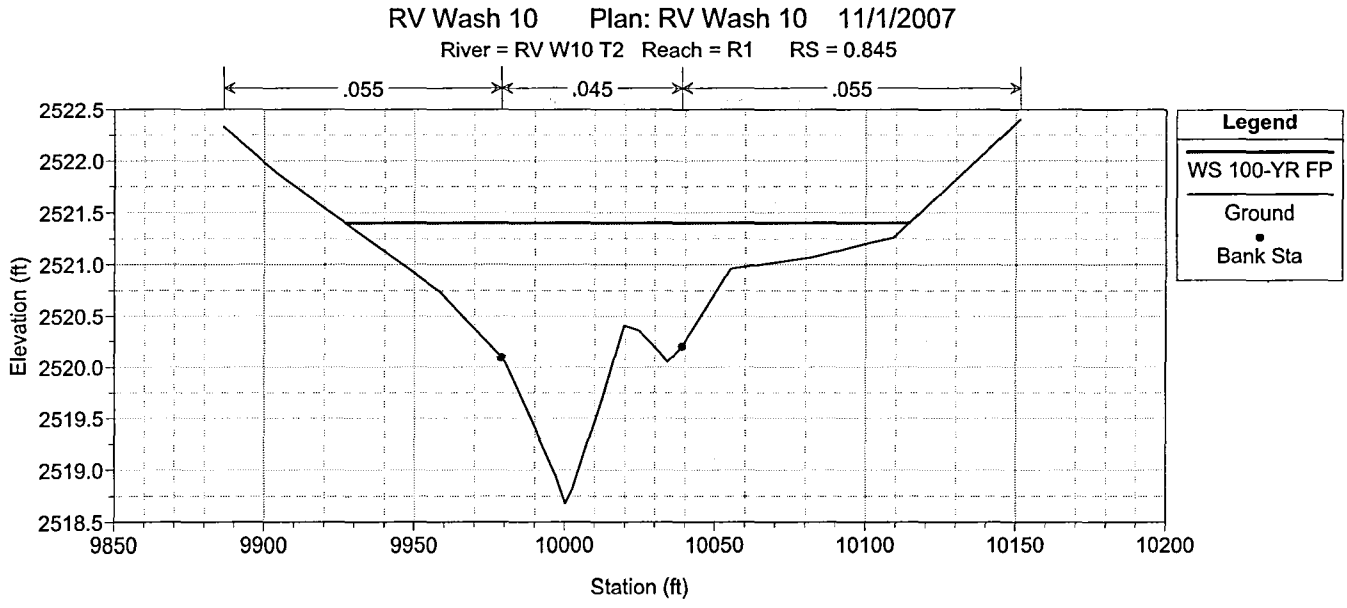
River = RV W10 Reach = R4 RS = 6.849

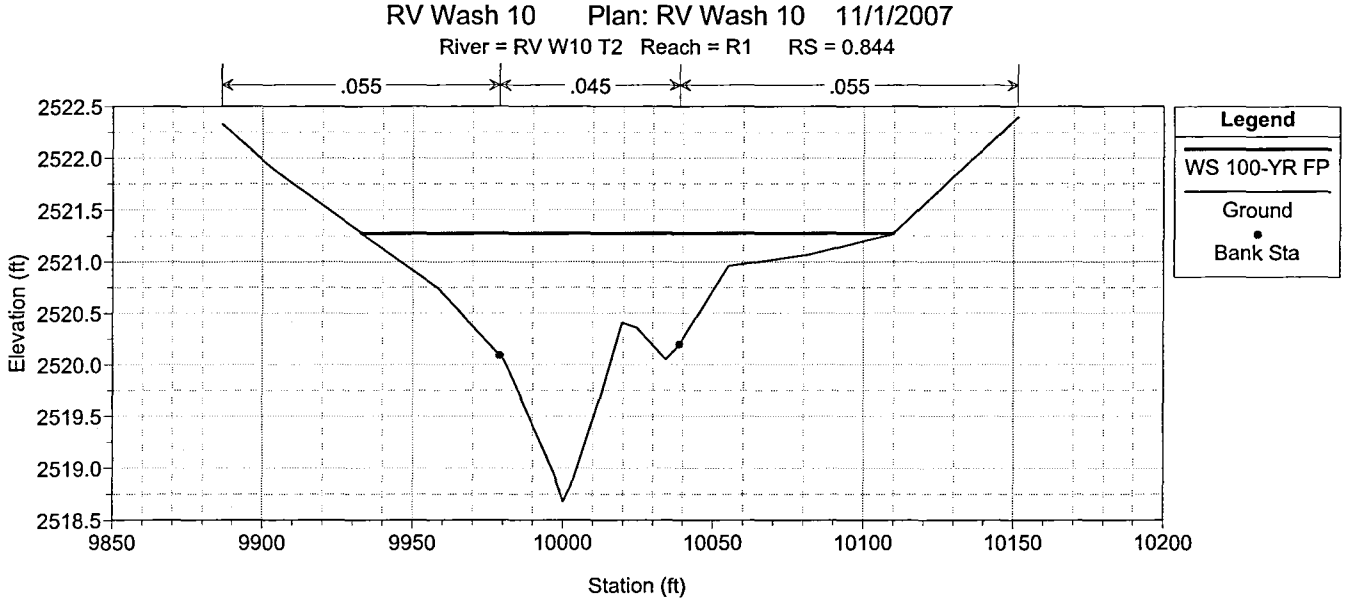


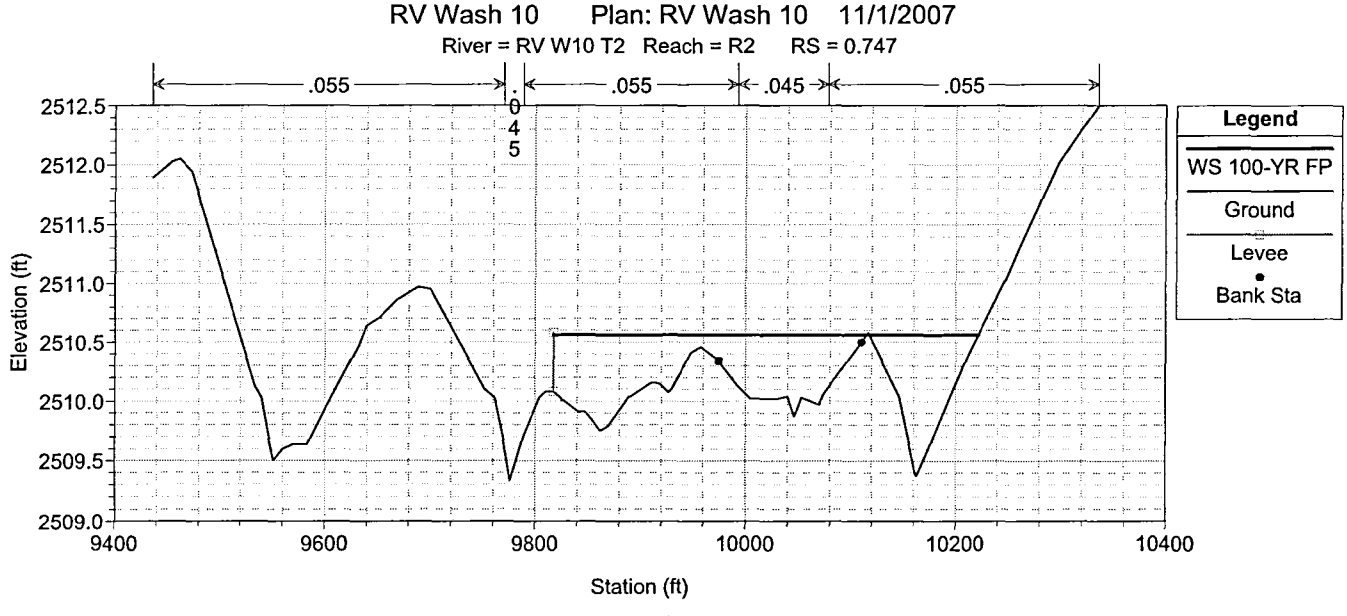
RV Wash 10 Plan: RV Wash 10 11/1/2007

River = RV W10 Reach = R4 RS = 6.697



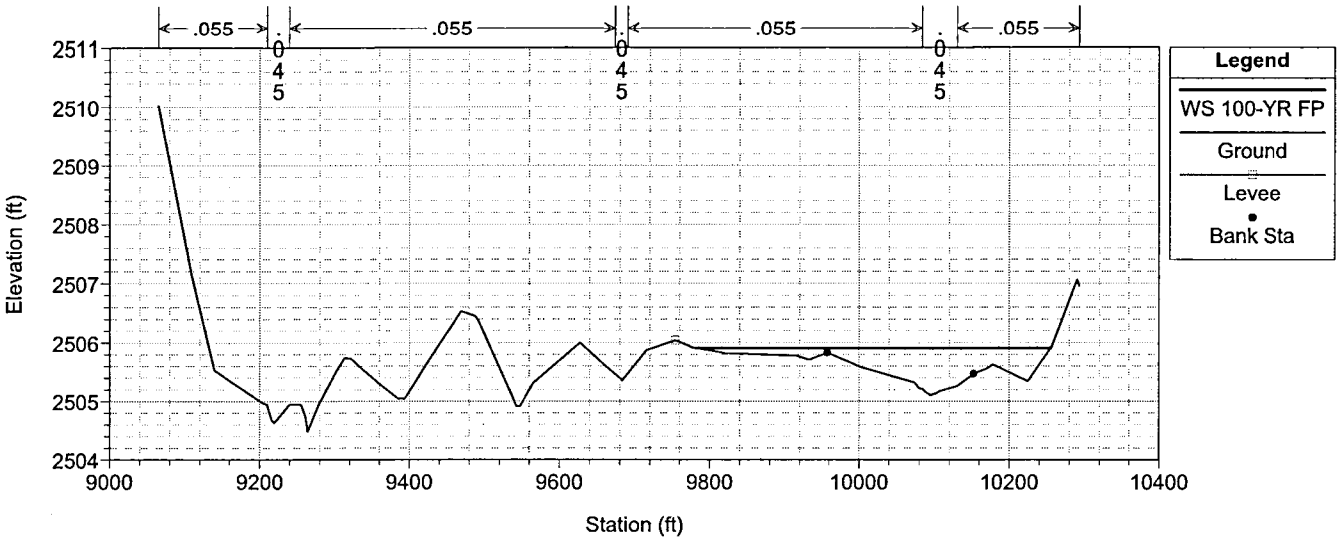

RV Wash 10 Plan: RV Wash 10 11/1/2007
River = RV W10 T2 Reach = R1 RS = 0.845
.055
.045
.055
Elevation (ft)
Station (ft)
Legend
WS 100-YR FP
Ground
Bank Sta


RV Wash 10 Plan: RV Wash 10 11/1/2007
River = RV W10 T2 Reach = R1 RS = 0.844
.055
.045
.055
Elevation (ft)
Station (ft)
Legend
WS 100-YR FP
Ground
Bank Sta


RV Wash 10 Plan: RV Wash 10 11/1/2007
River = RV W10 T2 Reach = R2 RS = 0.747
.055
.055
.045
.055
0.045
Elevation (ft)
Station (ft)
Legend
WS 100-YR FP
Ground
Levee
Bank Sta

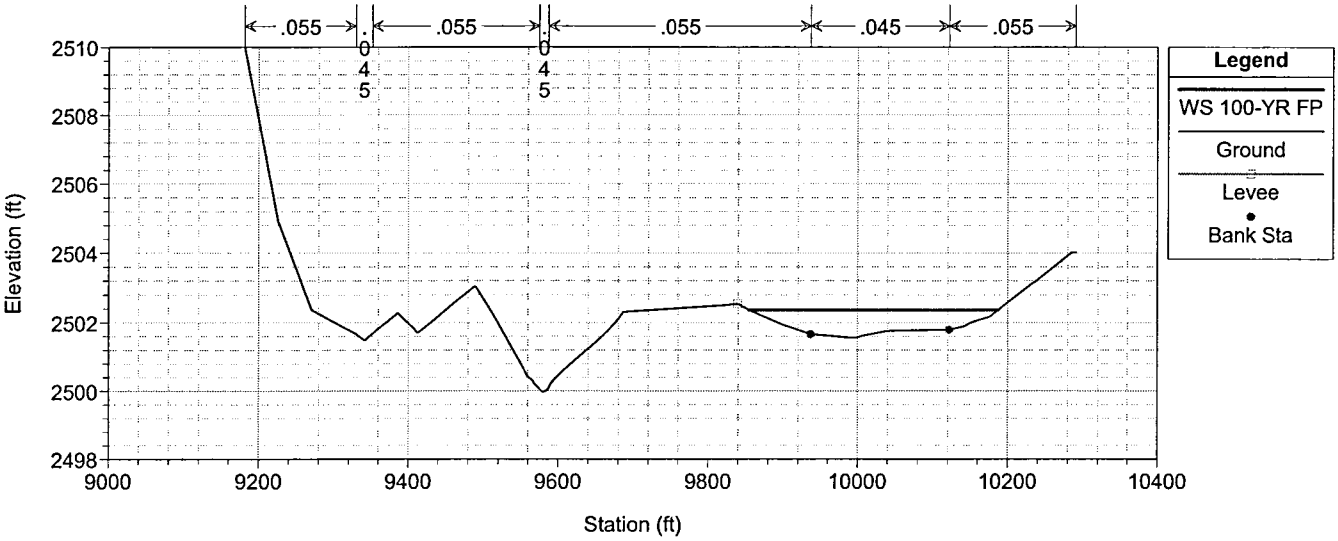
RV Wash 10 Plan: RV Wash 10 11/1/2007

River = RV W10 T2 Reach = R2 RS = 0.711



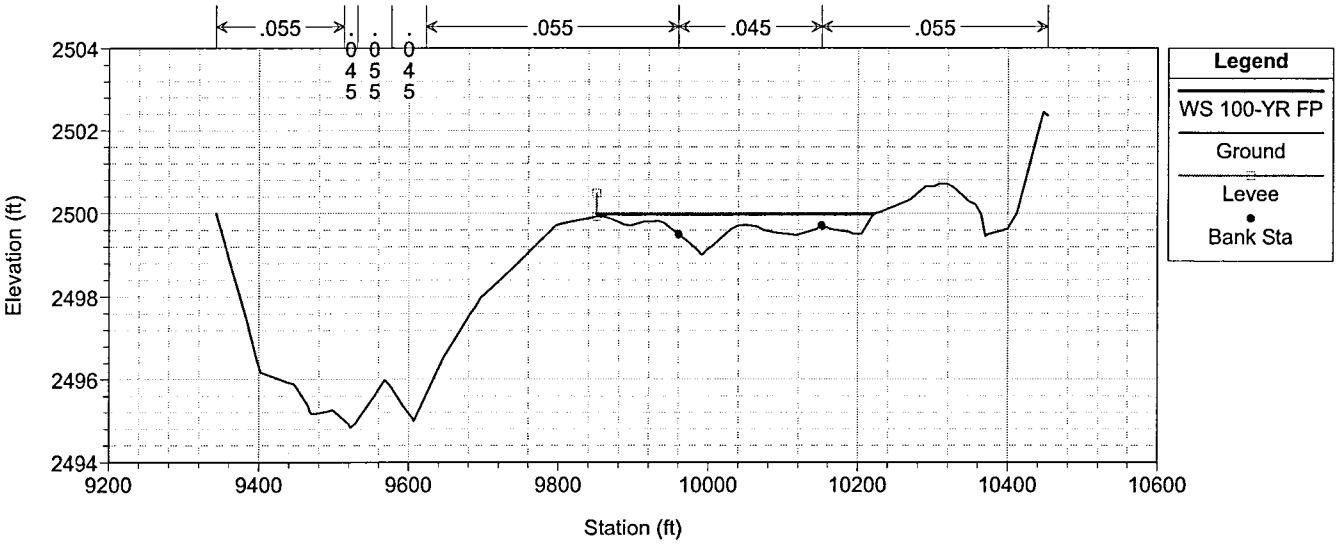
RV Wash 10 Plan: RV Wash 10 11/1/2007

River = RV W10 T2 Reach = R2 RS = 0.684



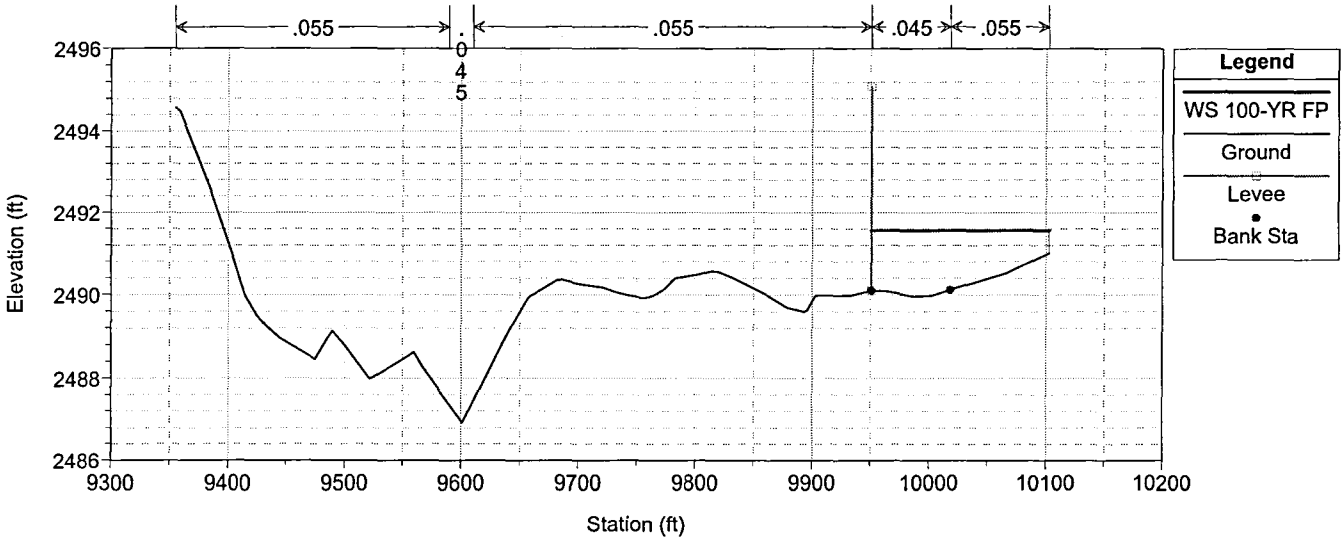
RV Wash 10 Plan: RV Wash 10 11/1/2007

River = RV W10 T2 Reach = R2 RS = 0.663



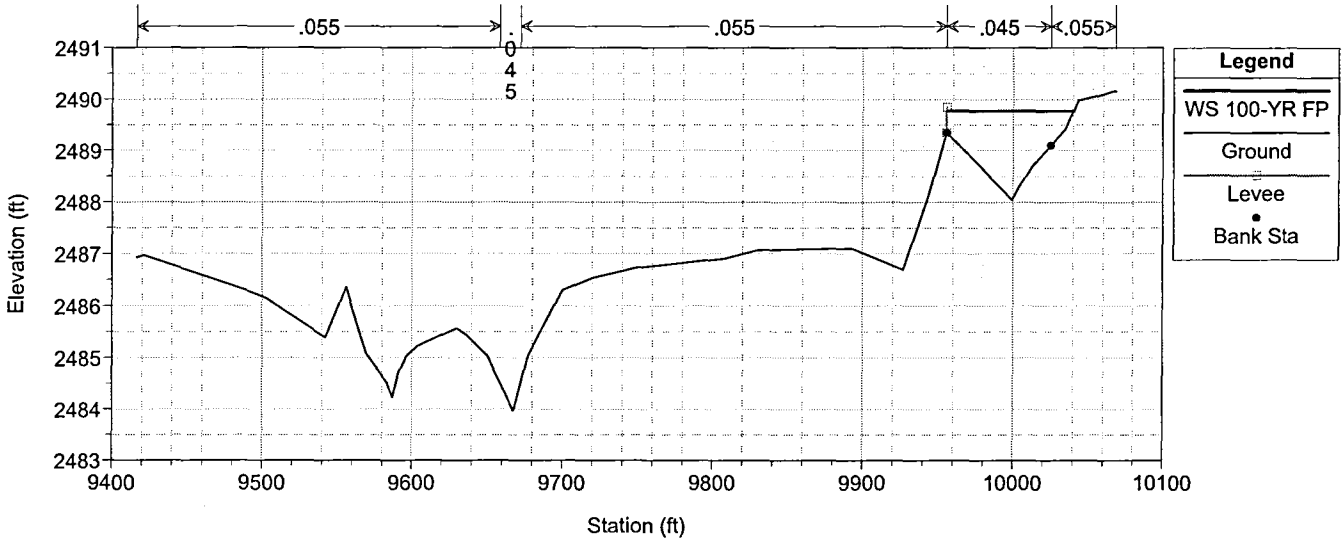
RV Wash 10 Plan: RV Wash 10 11/1/2007

River = RV W10 T2 Reach = R2 RS = 0.581



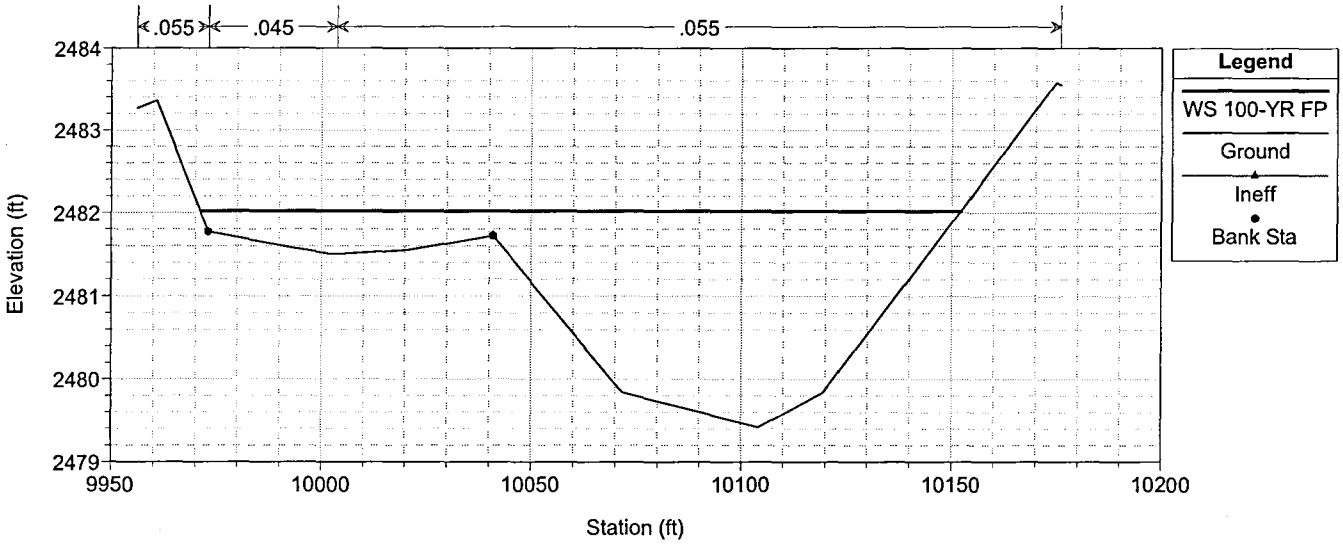
RV Wash 10 Plan: RV Wash 10 11/1/2007

River = RV W10 T2 Reach = R2 RS = 0.552



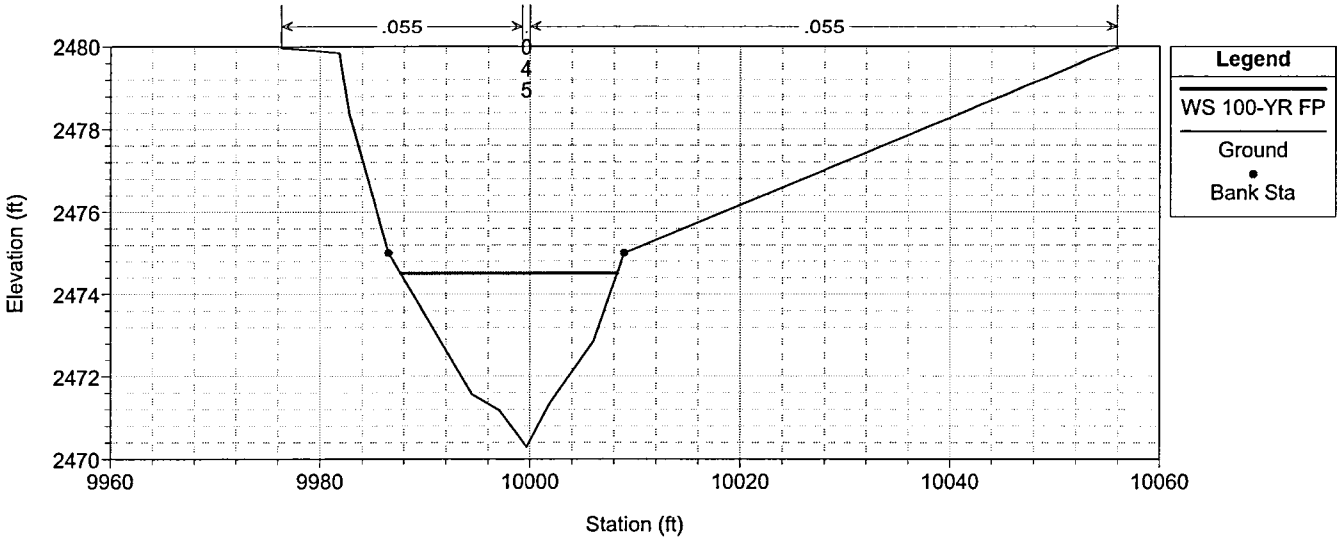
RV Wash 10 Plan: RV Wash 10 11/1/2007

River = RV W10 T2 Reach = R2 RS = 0.465



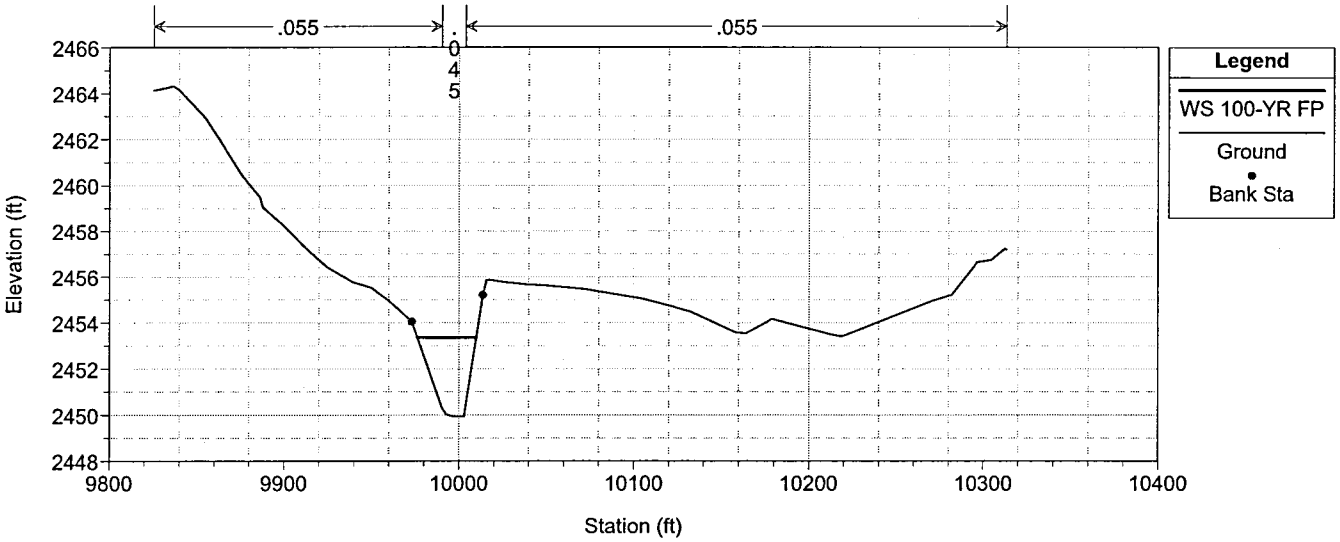
RV Wash 10 Plan: RV Wash 10 11/1/2007

River = RV W10 T2 Reach = R2 RS = 0.312



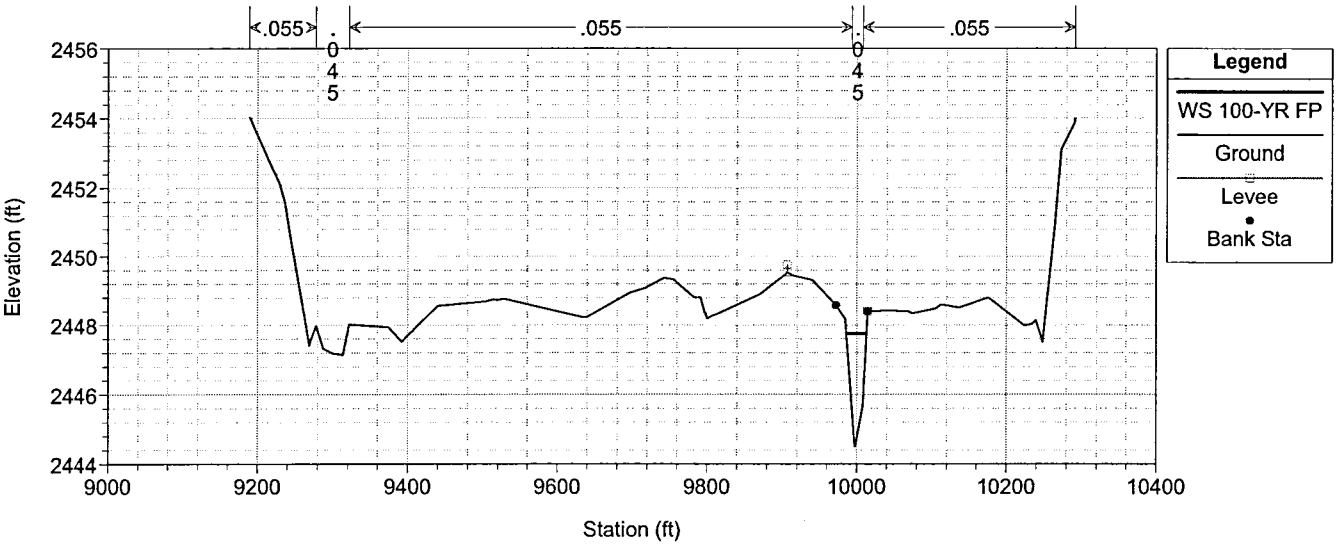
RV Wash 10 Plan: RV Wash 10 11/1/2007

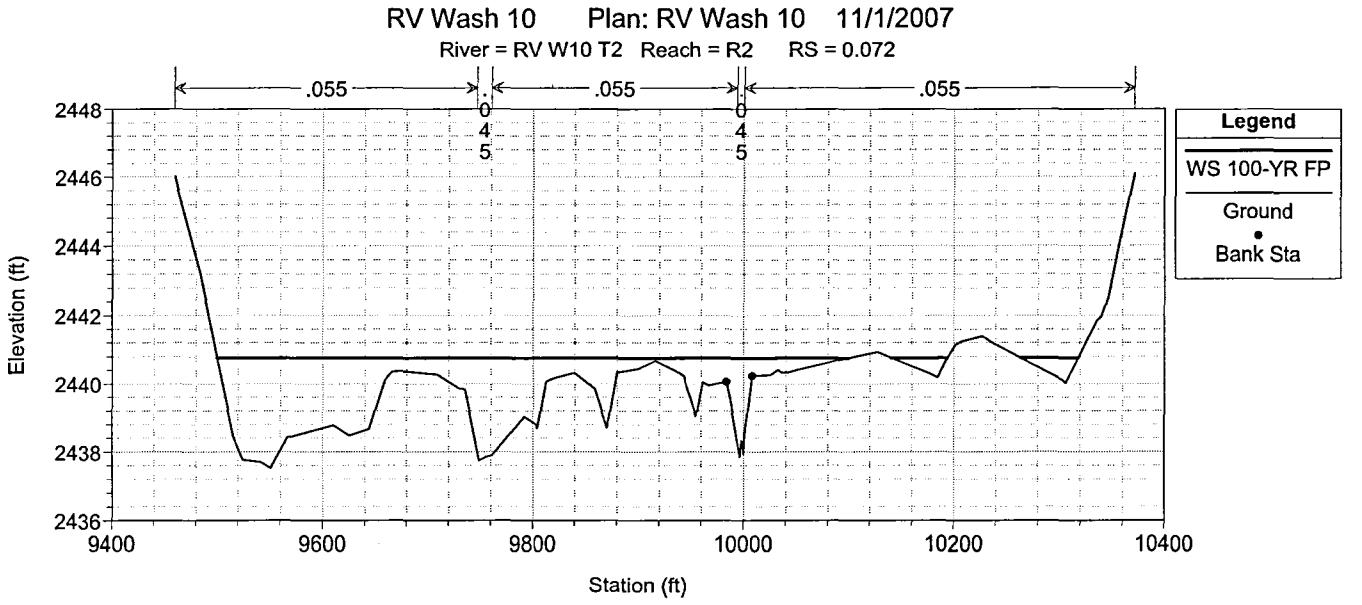
River = RV W10 T2 Reach = R2 RS = 0.193

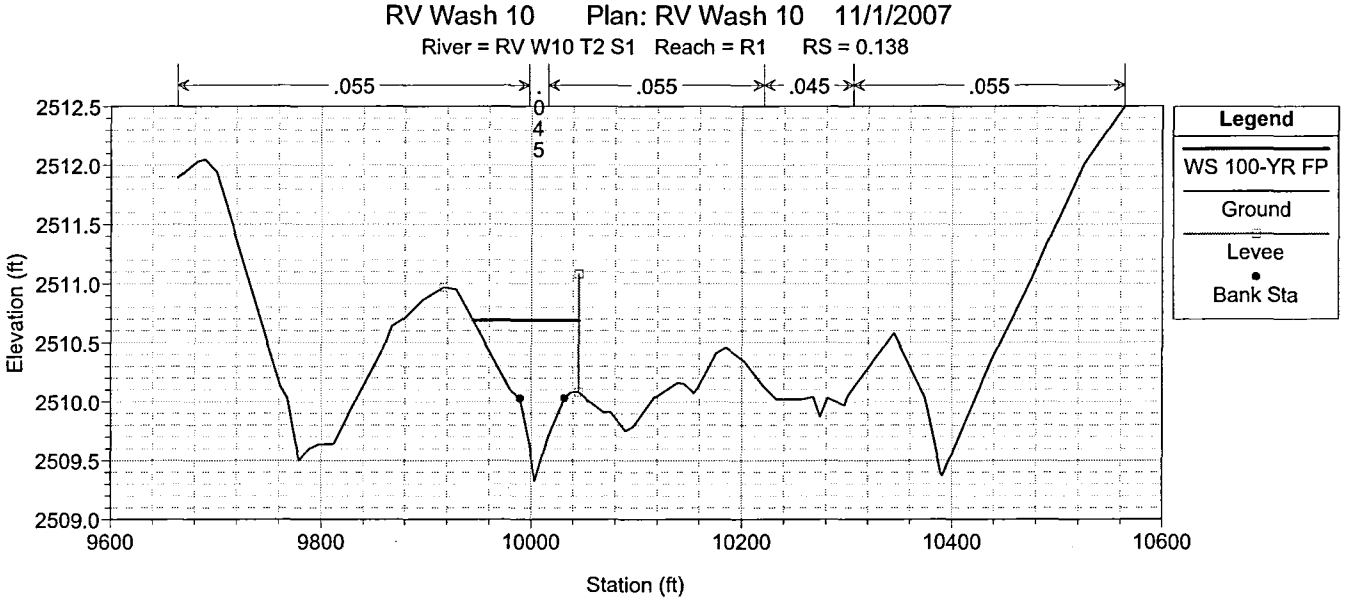


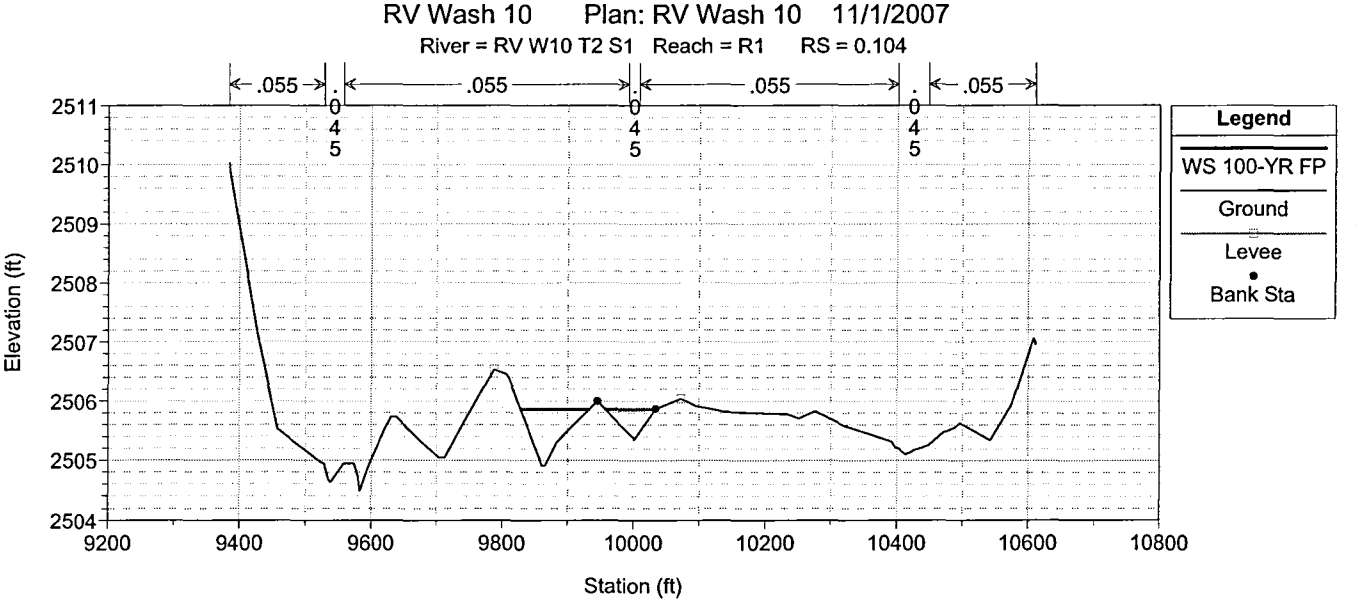
RV Wash 10 Plan: RV Wash 10 11/1/2007

River = RV W10 T2 Reach = R2 RS = 0.143



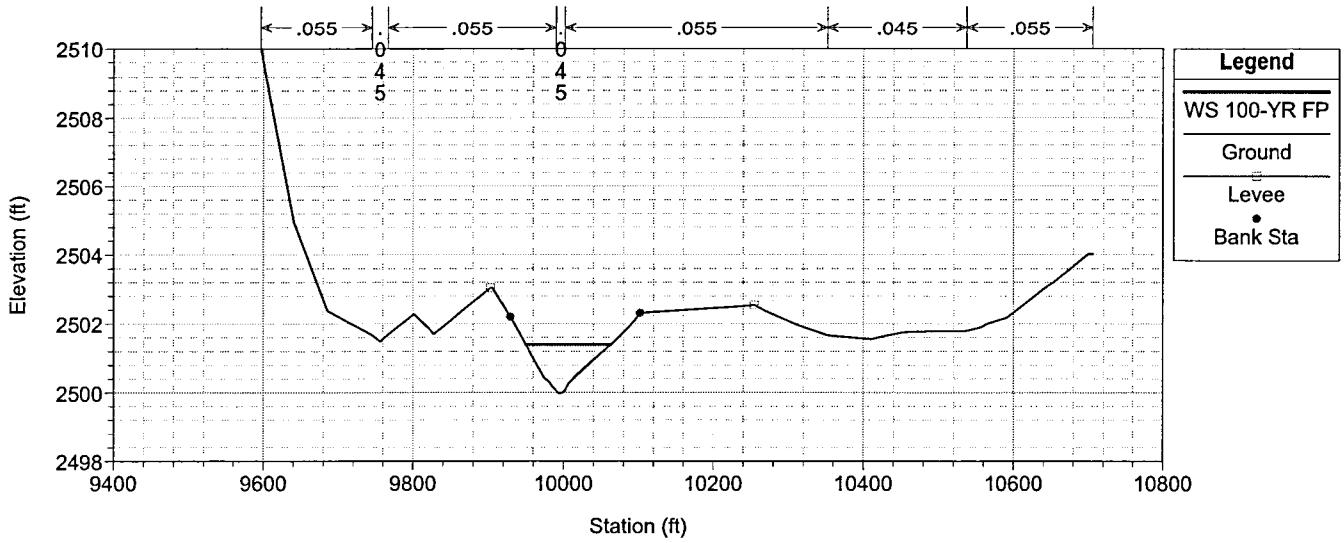

RV Wash 10 Plan: RV Wash 10 11/1/2007
River = RV W10 T2 Reach = R2 RS = 0.072
.055
.045
.055
.055
Elevation (ft)
Station (ft)
Legend
WS 100-YR FP
Ground
Bank Sta


RV Wash 10 Plan: RV Wash 10 11/1/2007
River = RV W10 T2 S1 Reach = R1 RS = 0.138
.055
.045
.055
.045
.055
Elevation (ft)
Station (ft)
Legend
WS 100-YR FP
Ground
Levee
Bank Sta


RV Wash 10 Plan: RV Wash 10 11/1/2007
River = RV W10 T2 S1 Reach = R1 RS = 0.104
.055
.045
.055
.045
.055
.045
.055
Elevation (ft)
Station (ft)
Legend
WS 100-YR FP
Ground
Levee
Bank Sta

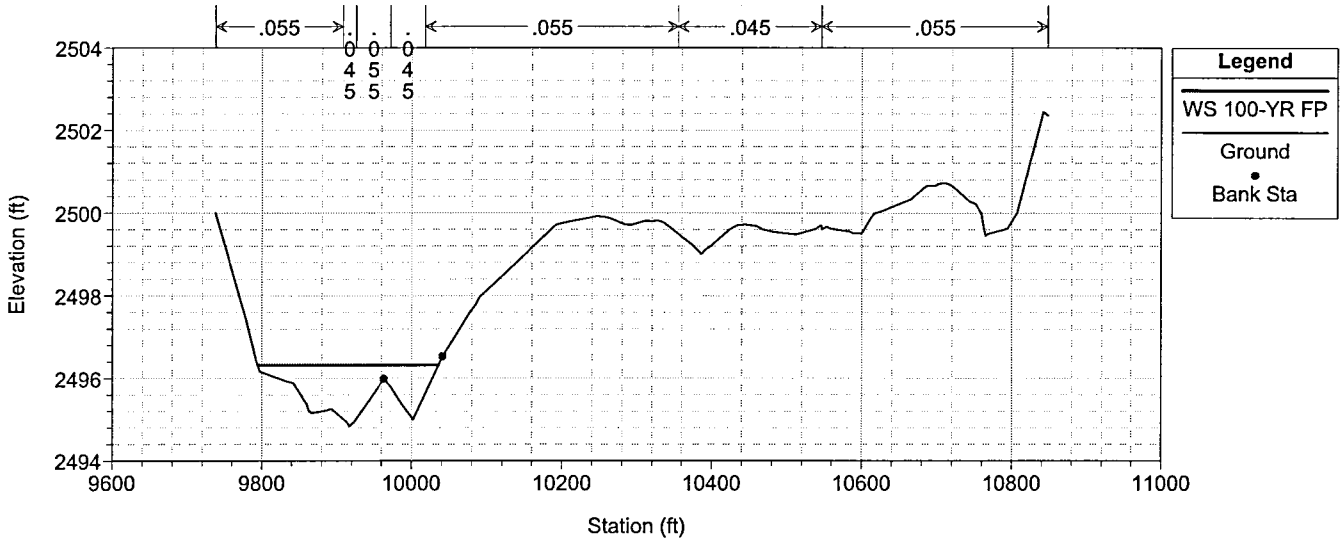
RV Wash 10 Plan: RV Wash 10 11/1/2007

River = RV W10 T2 S1 Reach = R1 RS = 0.068



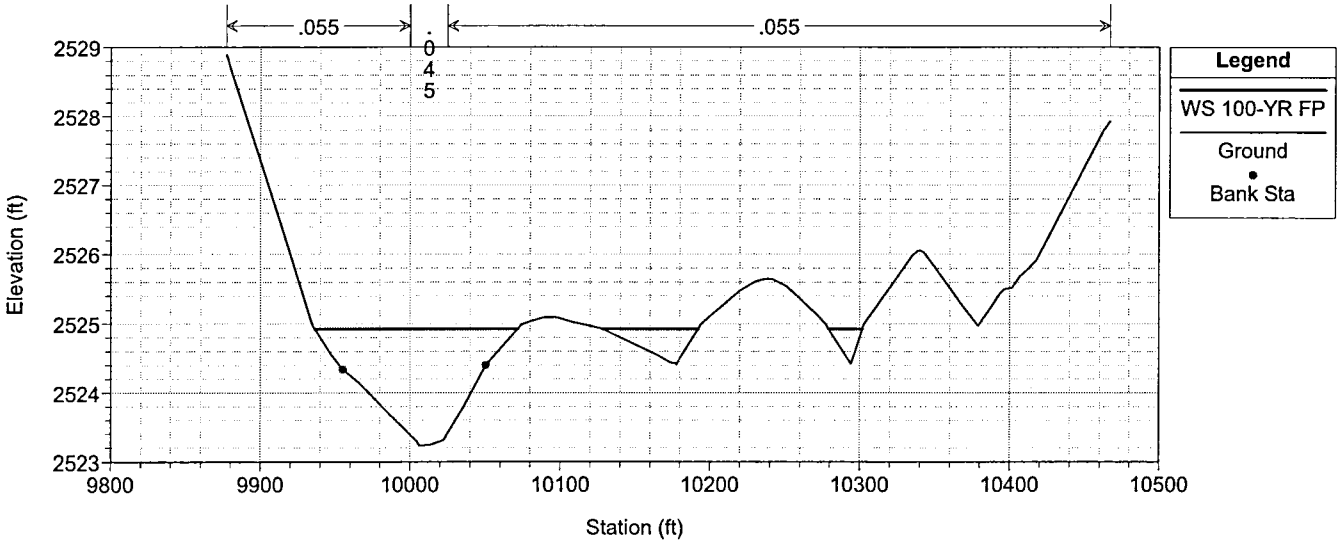
RV Wash 10 Plan: RV Wash 10 11/1/2007

River = RV W10 T2 S1 Reach = R1 RS = 0.026



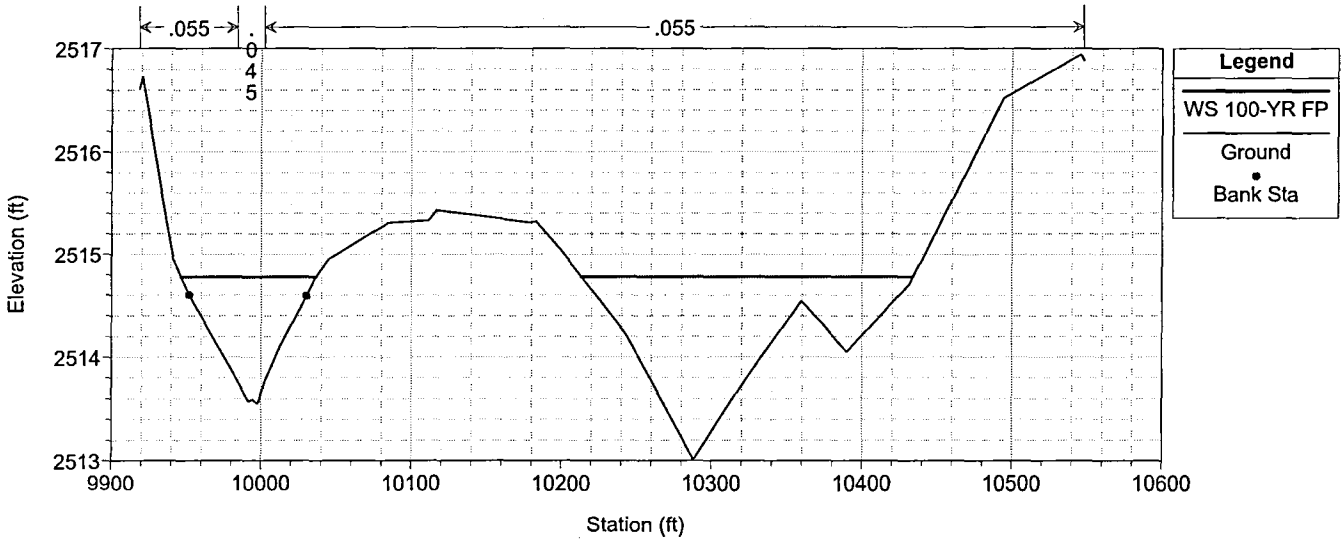
RV Wash 10 Plan: RV Wash 10 11/1/2007

River = RV W10 T3 Reach = R1 RS = 0.615



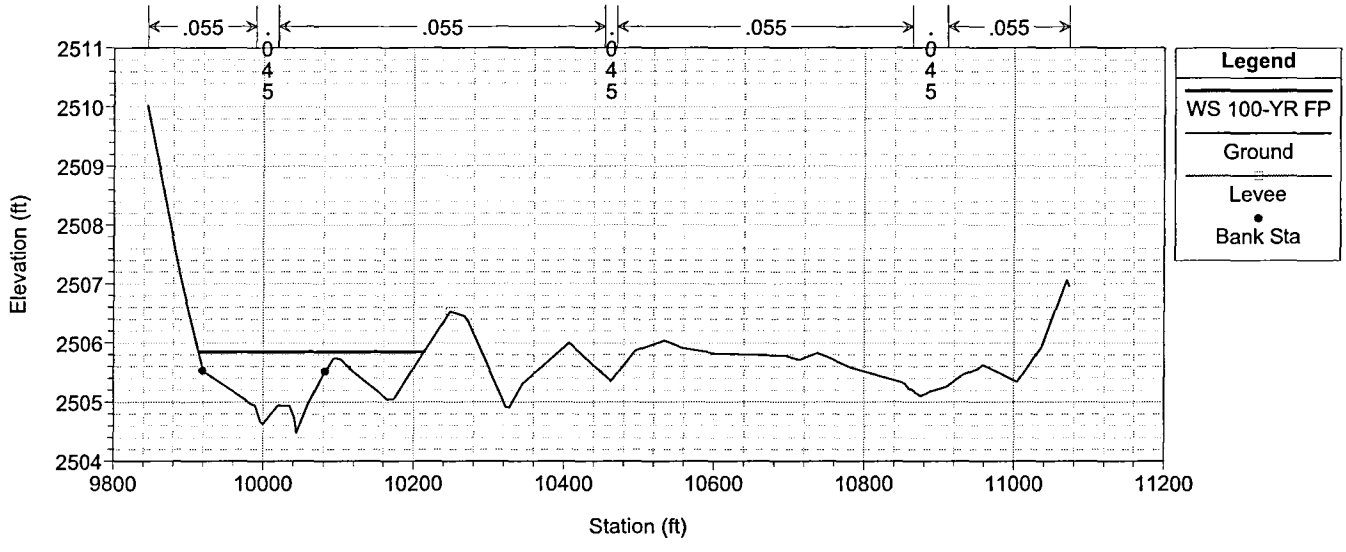
RV Wash 10 Plan: RV Wash 10 11/1/2007

River = RV W10 T3 Reach = R1 RS = 0.520



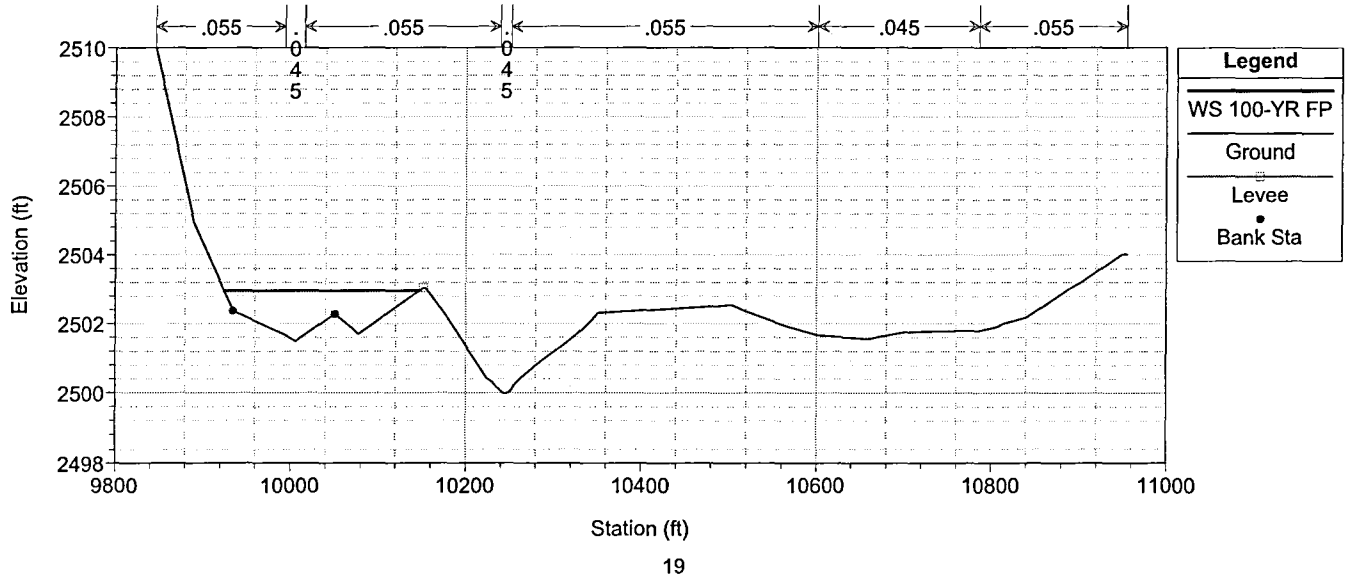
RV Wash 10 Plan: RV Wash 10 11/1/2007

River = RV W10 T3 Reach = R1 RS = 0.438



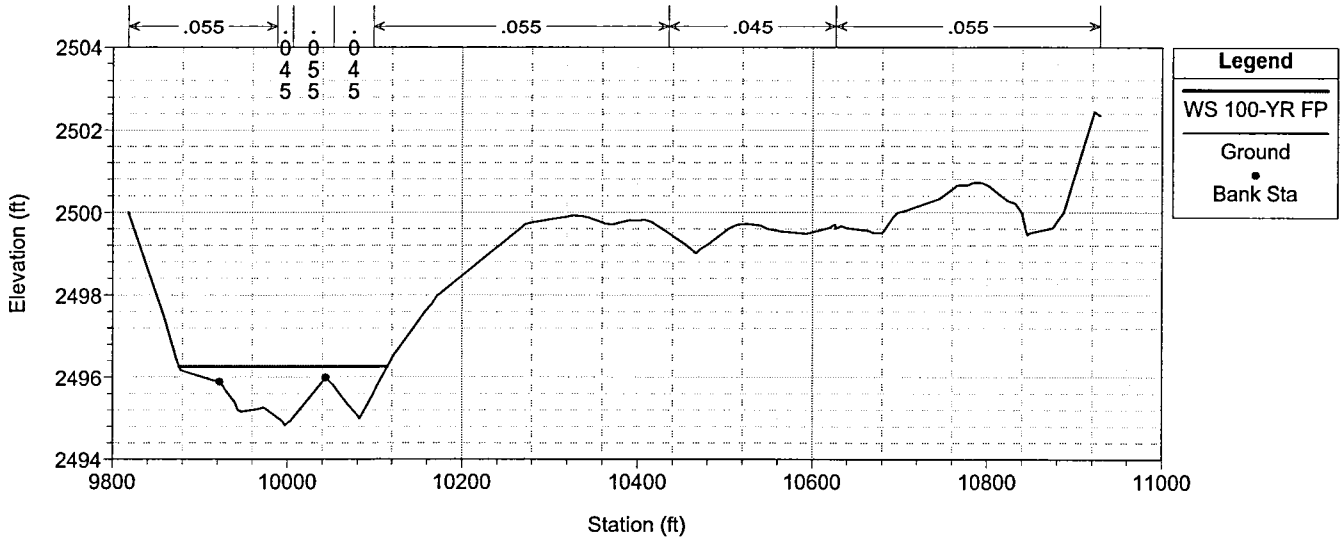
RV Wash 10 Plan: RV Wash 10 11/1/2007

River = RV W10 T3 Reach = R1 RS = 0.411



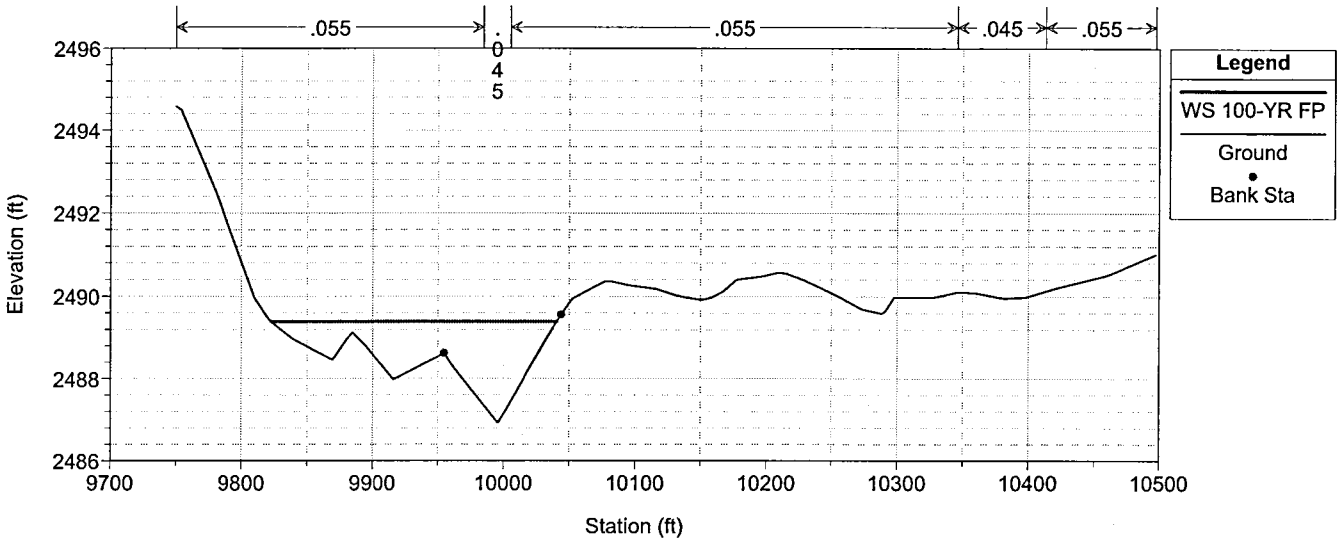
RV Wash 10 Plan: RV Wash 10 11/1/2007

River = RV W10 T3 Reach = R1 RS = 0.357



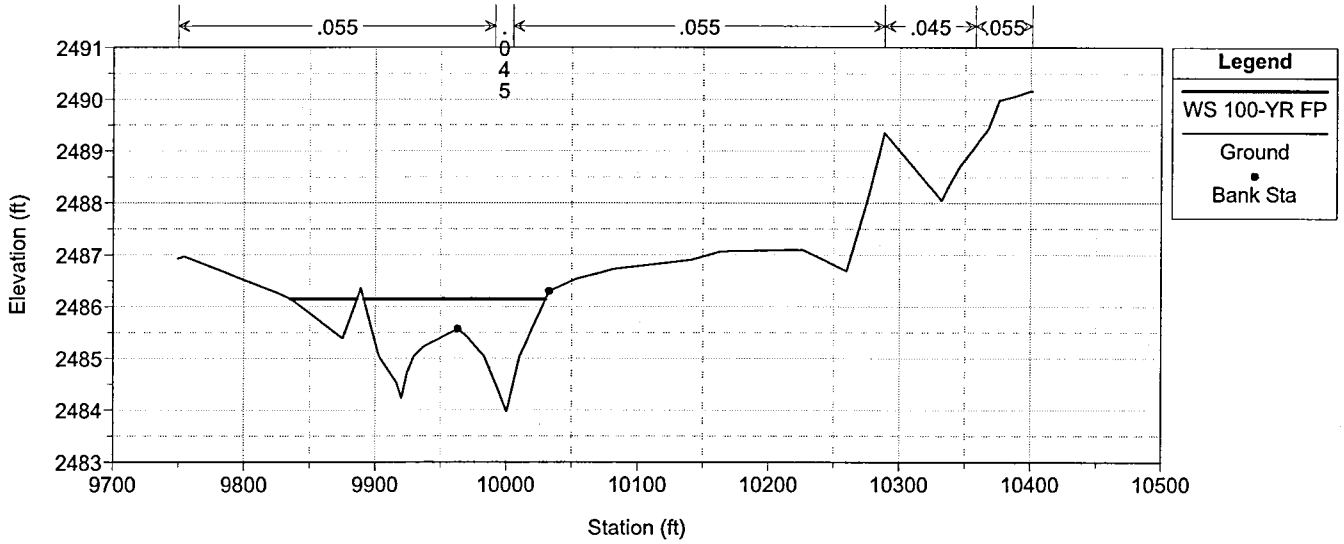
RV Wash 10 Plan: RV Wash 10 11/1/2007

River = RV W10 T3 Reach = R2 RS = 0.289



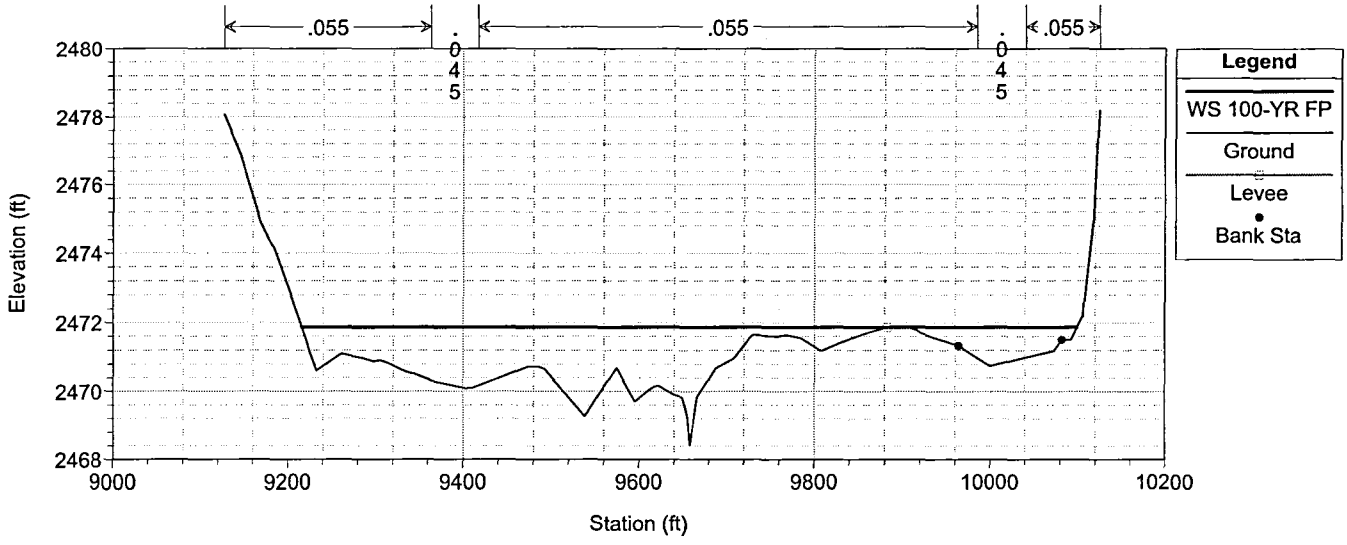
RV Wash 10 Plan: RV Wash 10 11/1/2007

River = RV W10 T3 Reach = R2 RS = 0.259



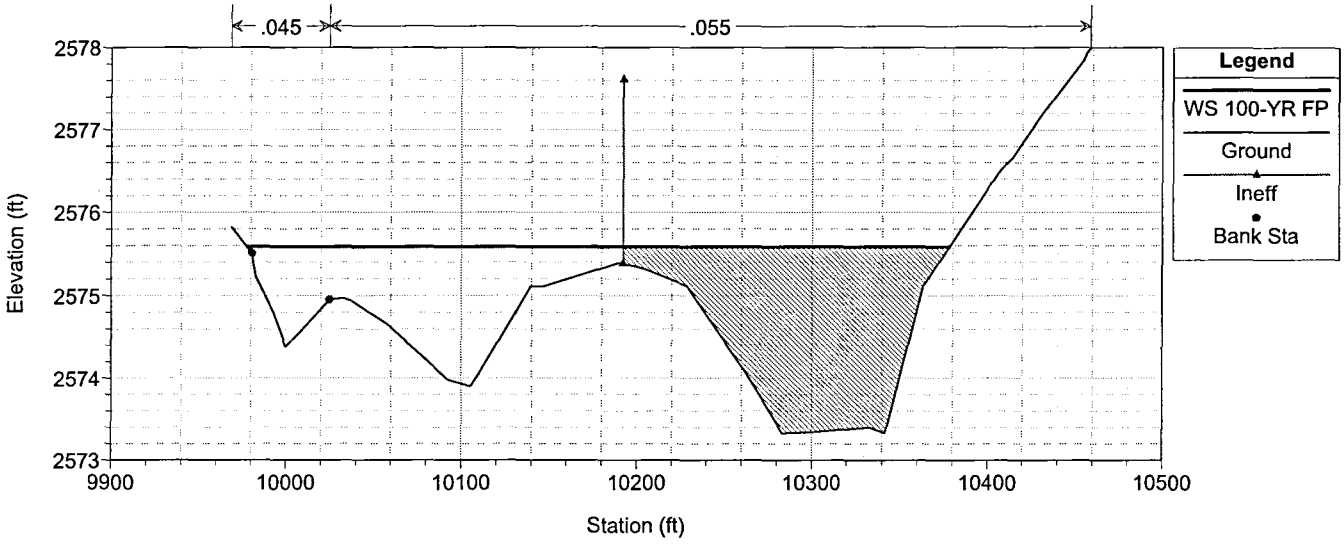
RV Wash 10 Plan: RV Wash 10 11/1/2007

River = RV W10 T3 Reach = R2 RS = 0.123



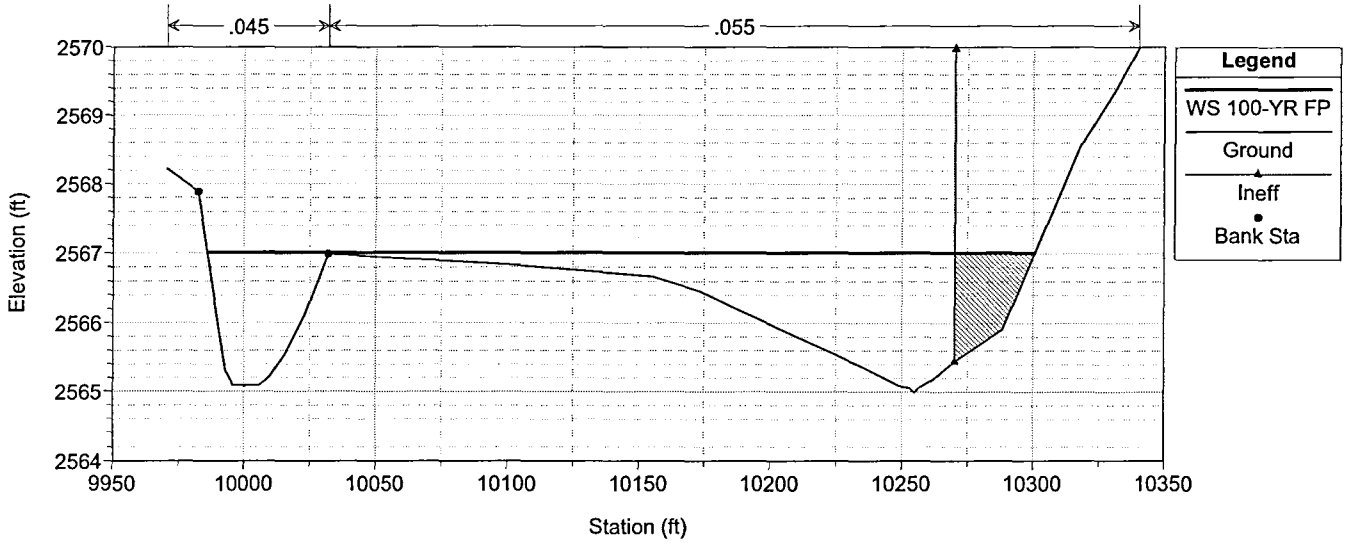
RV Wash 10 Plan: RV Wash 10 11/1/2007

River = RV W10 T4 Reach = R1 RS = 0.373



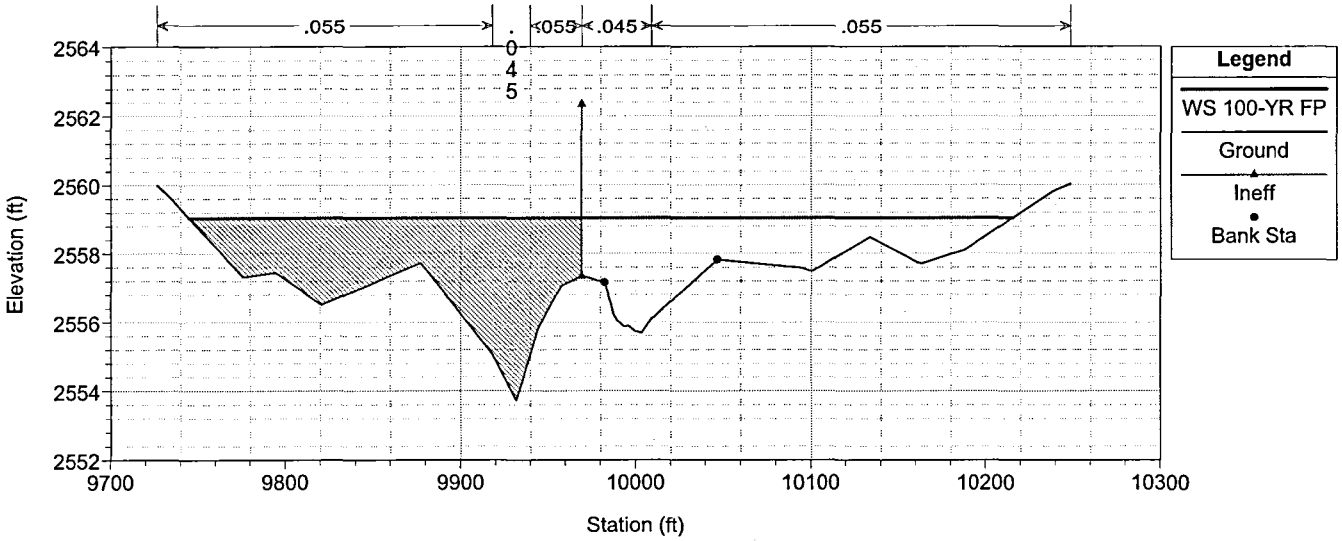
RV Wash 10 Plan: RV Wash 10 11/1/2007

River = RV W10 T4 Reach = R1 RS = 0.310



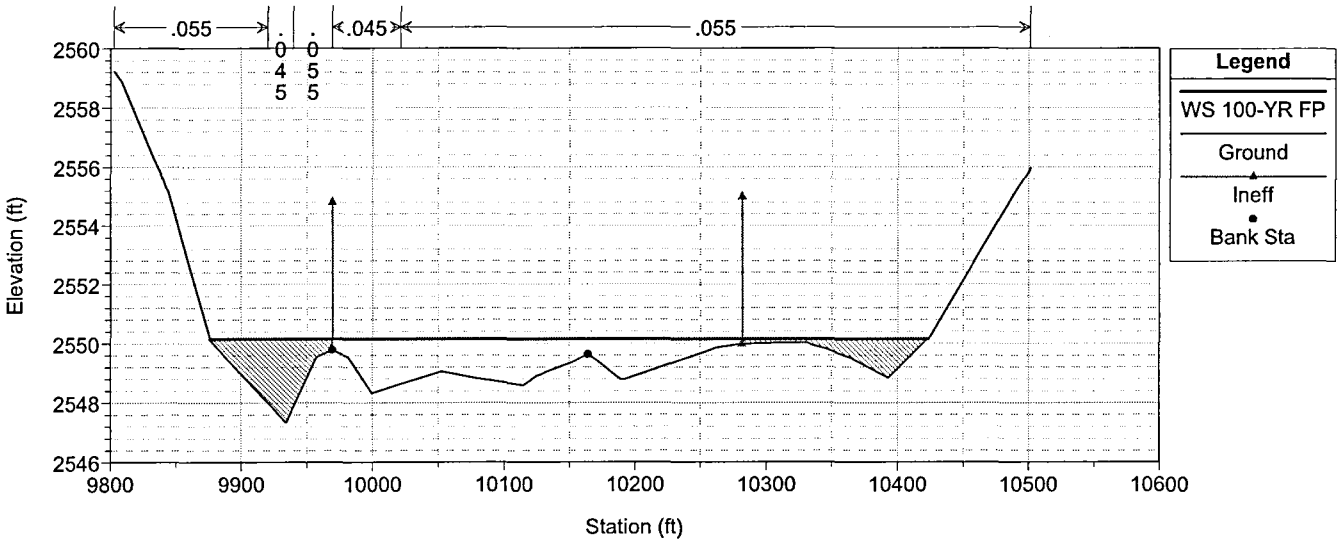
RV Wash 10 Plan: RV Wash 10 11/1/2007

River = RV W10 T4 Reach = R1 RS = 0.222



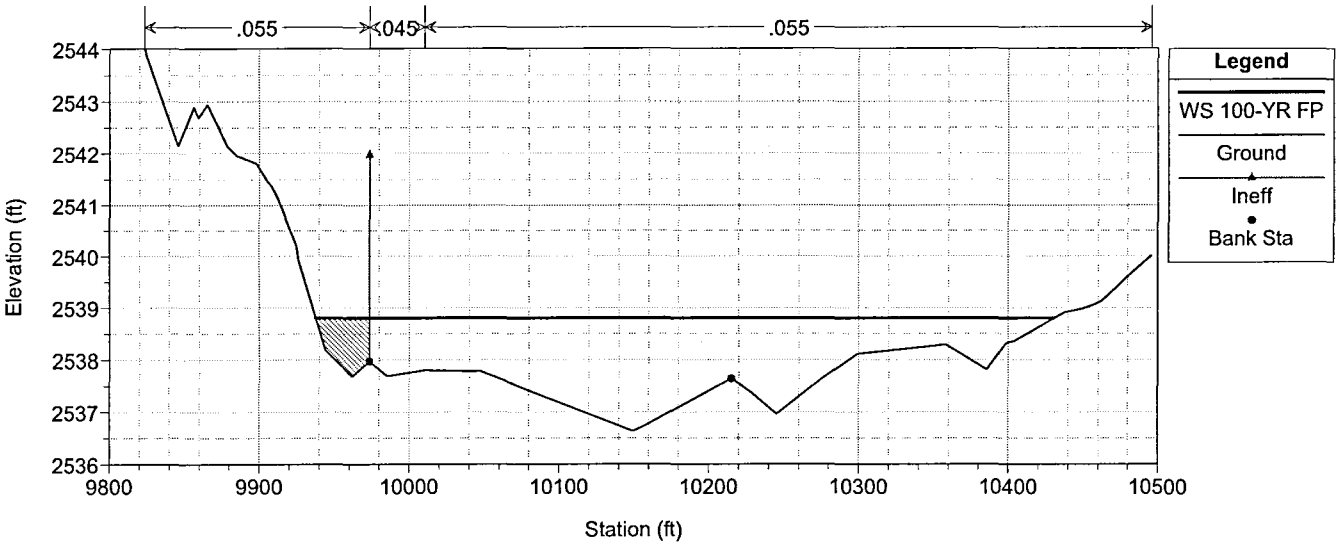
RV Wash 10 Plan: RV Wash 10 11/1/2007

River = RV W10 T4 Reach = R1 RS = 0.145



RV Wash 10 Plan: RV Wash 10 11/1/2007

River = RV W10 T4 Reach = R1 RS = 0.034

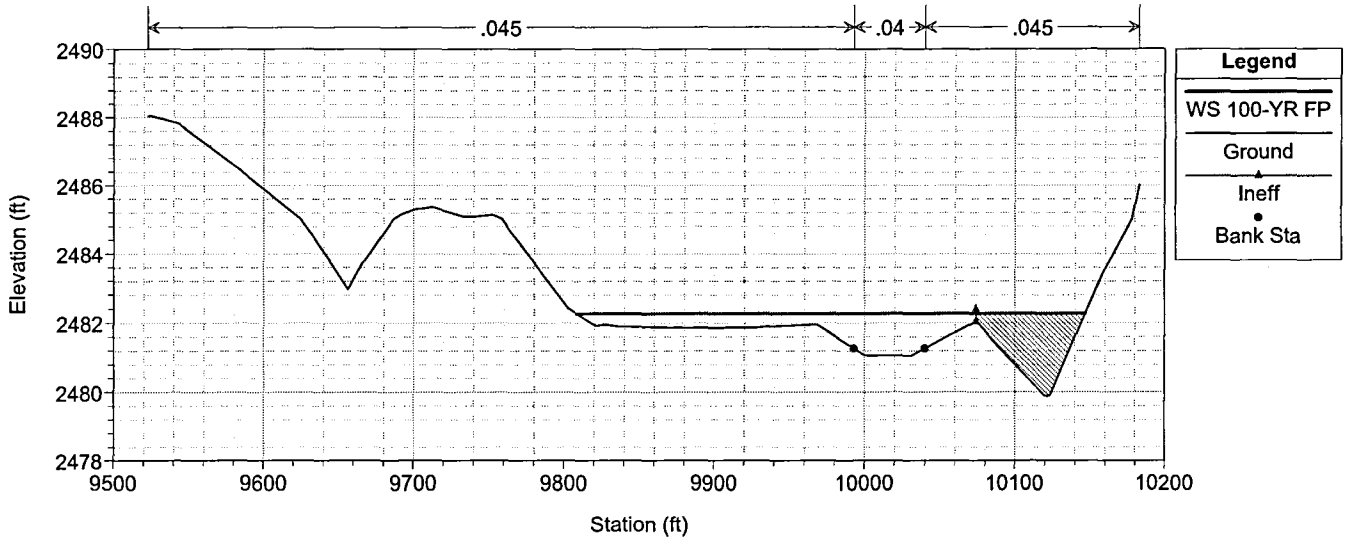


E.2.2 HEC-RAS Cross Section Plots

RV Wash 7

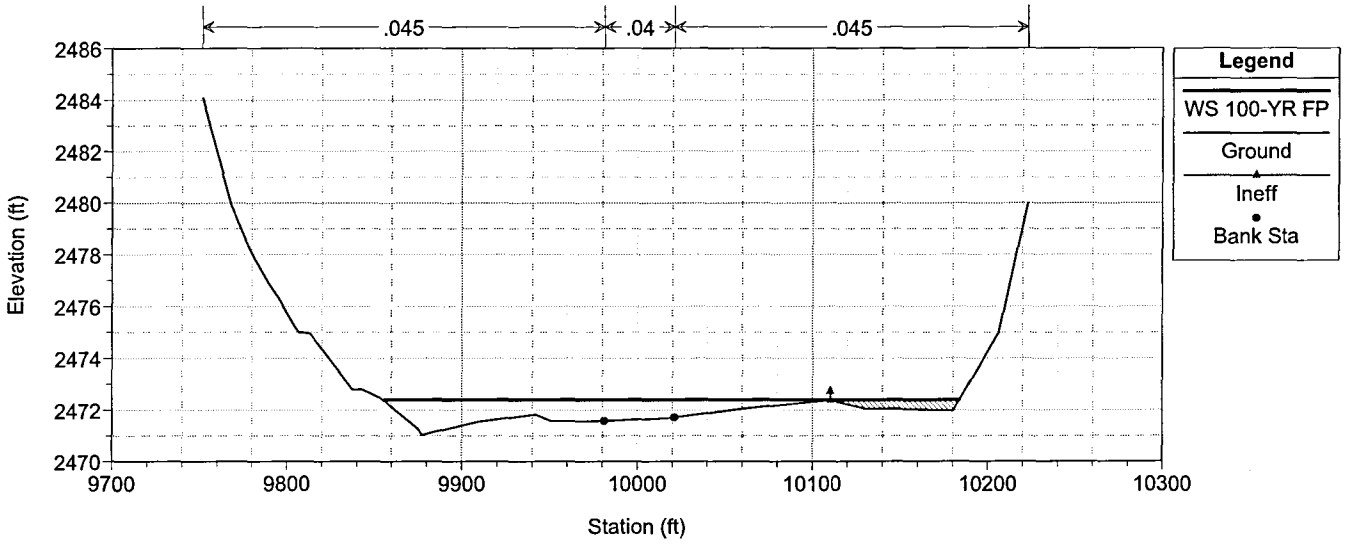
RV Wash 7 Plan: RV Wash 7 11/1/2007

River = RV W7 Reach = R1 RS = 8.325



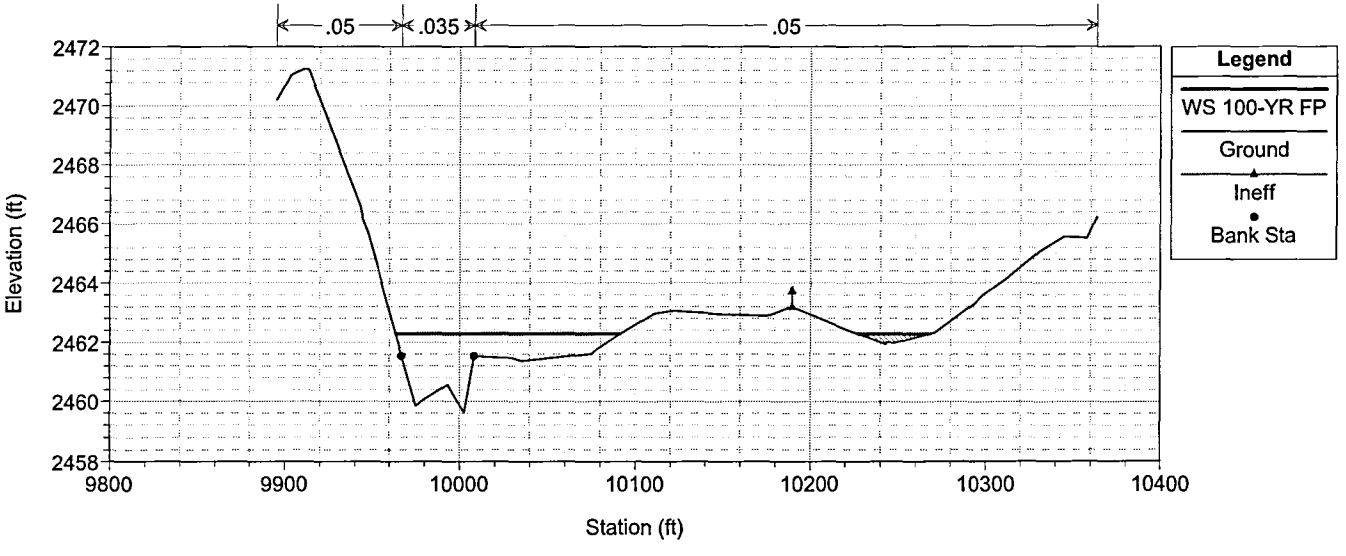
RV Wash 7 Plan: RV Wash 7 11/1/2007

River = RV W7 Reach = R1 RS = 8.252



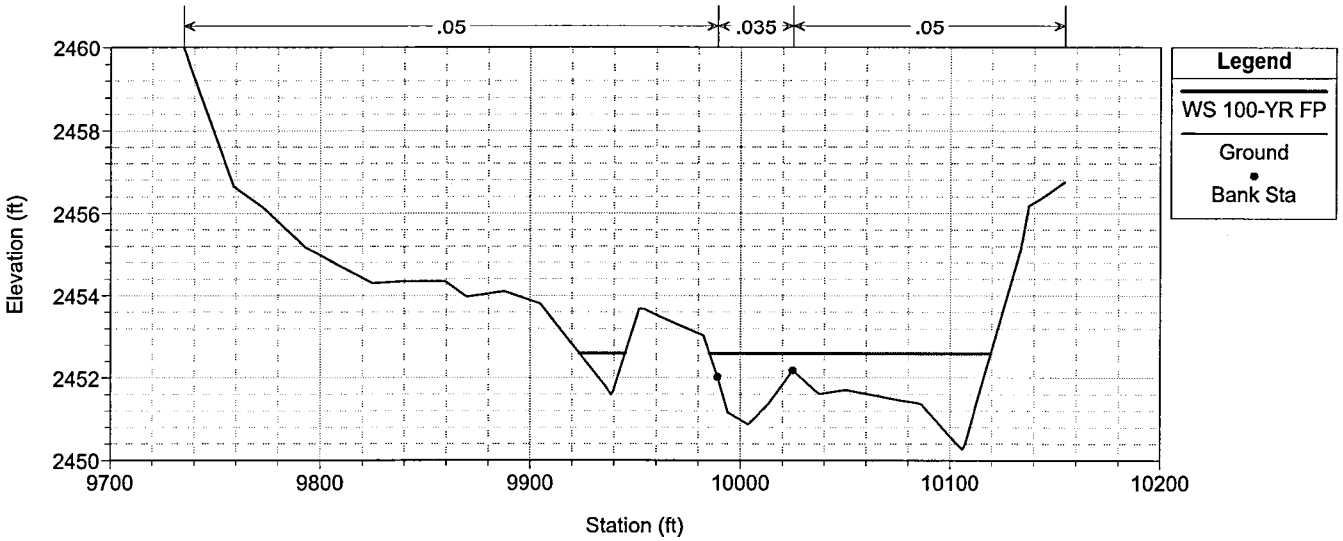
RV Wash 7 Plan: RV Wash 7 11/1/2007

River = RV W7 Reach = R1 RS = 8.162



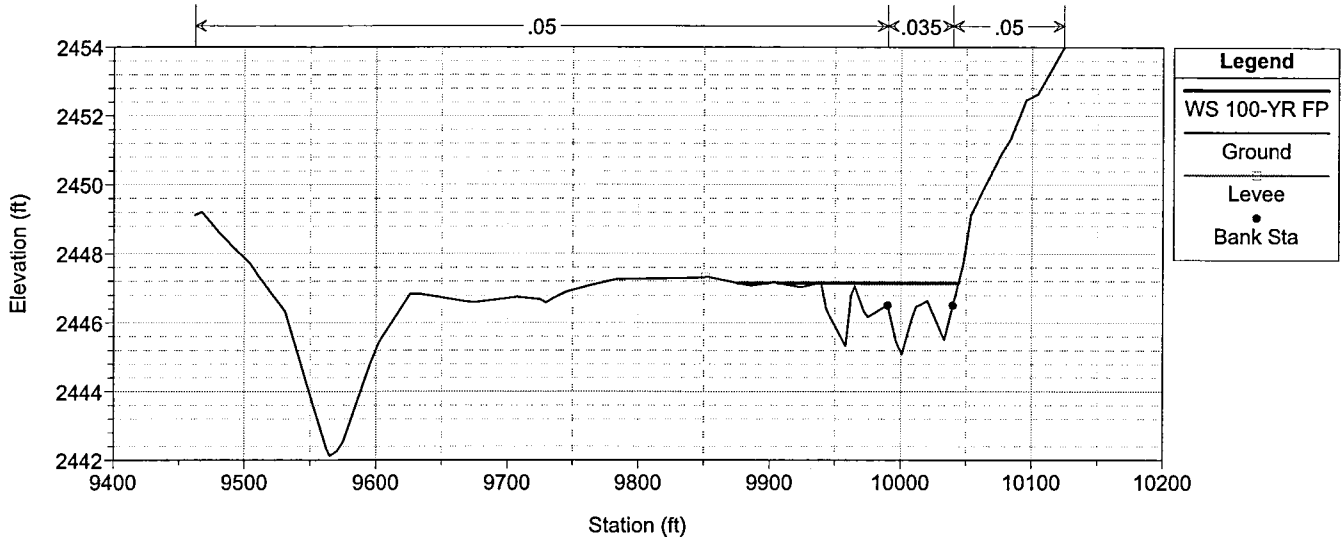
RV Wash 7 Plan: RV Wash 7 11/1/2007

River = RV W7 Reach = R1 RS = 8.087



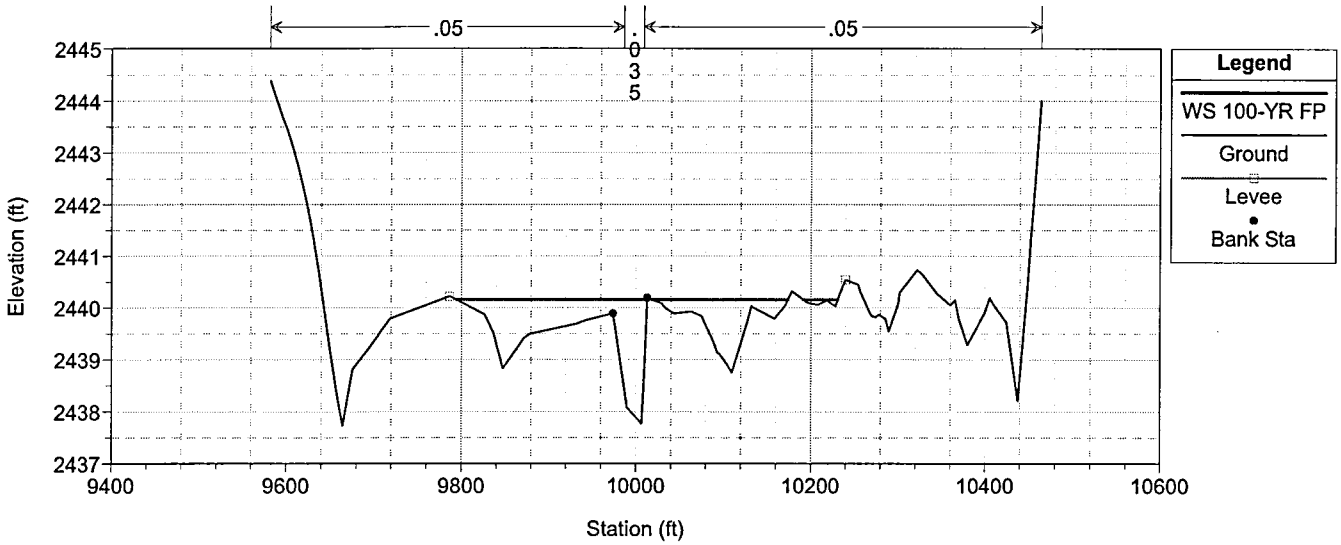
RV Wash 7 Plan: RV Wash 7 11/1/2007

River = RV W7 Reach = R1 RS = 8.037



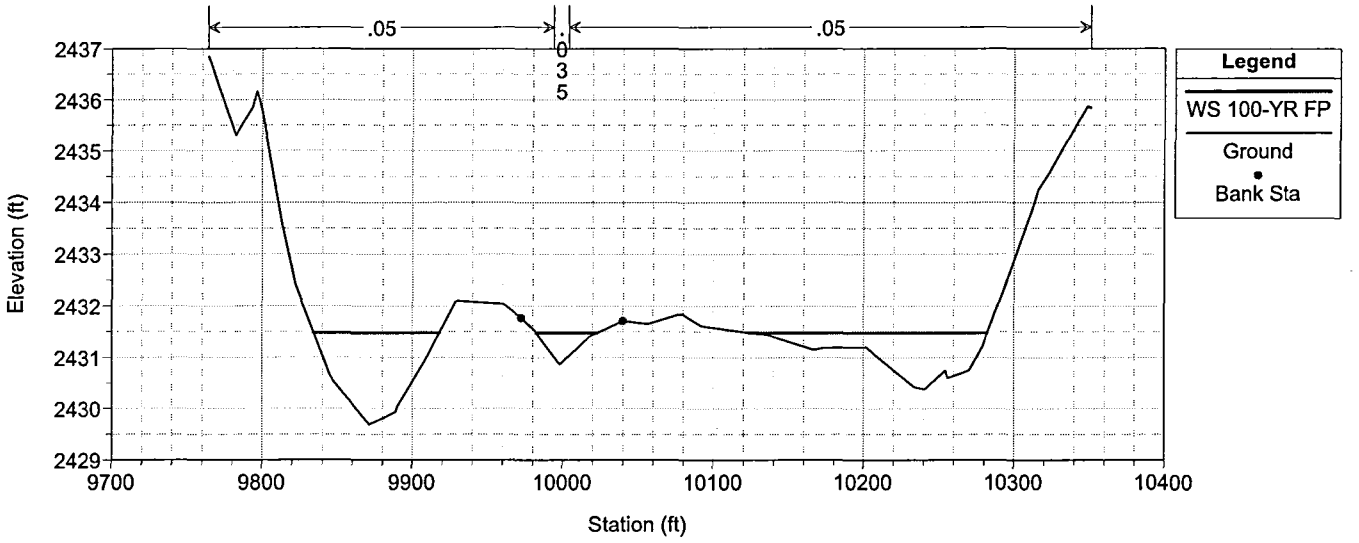
RV Wash 7 Plan: RV Wash 7 11/1/2007

River = RV W7 Reach = R1 RS = 7.974



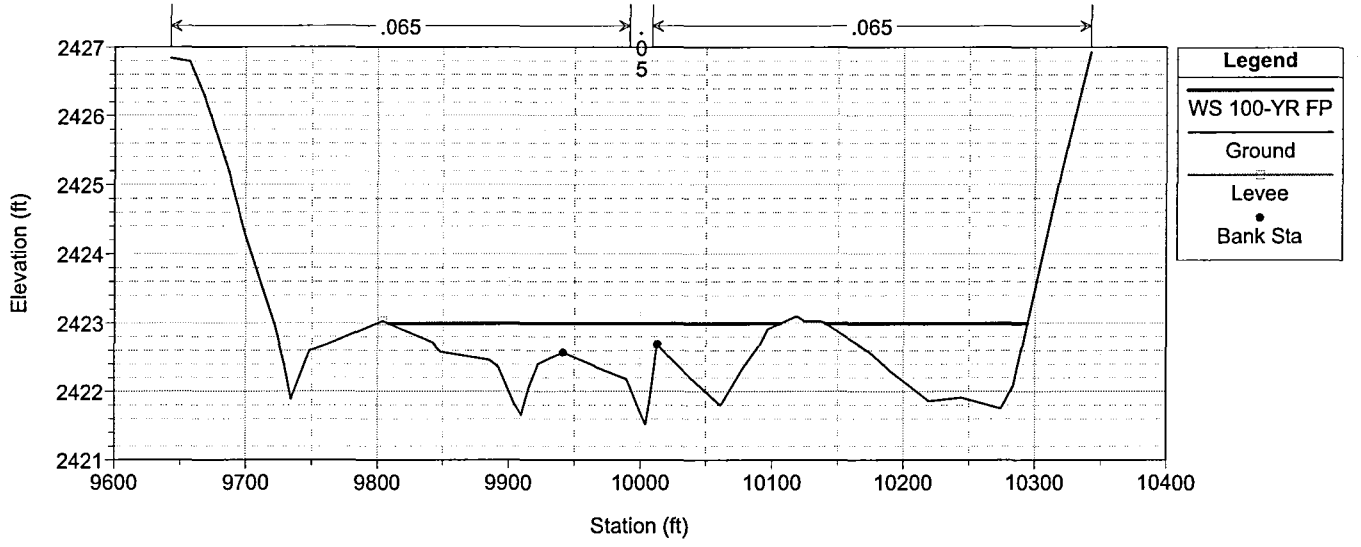
RV Wash 7 Plan: RV Wash 7 11/1/2007

River = RV W7 Reach = R1 RS = 7.910



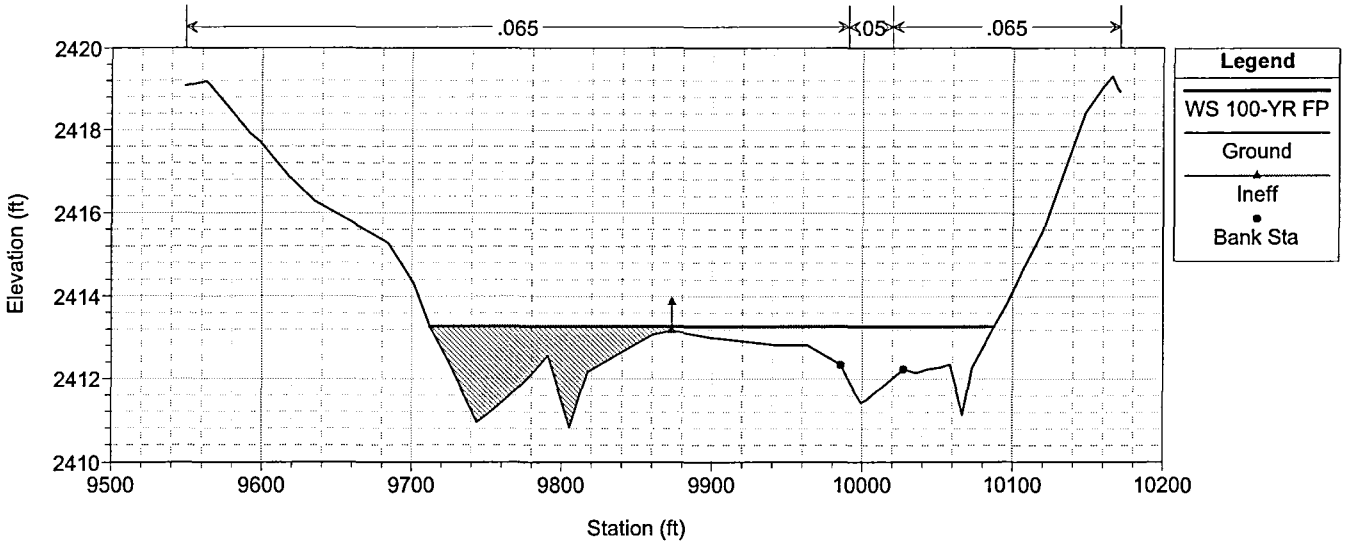
RV Wash 7 Plan: RV Wash 7 11/1/2007

River = RV W7 Reach = R1 RS = 7.825



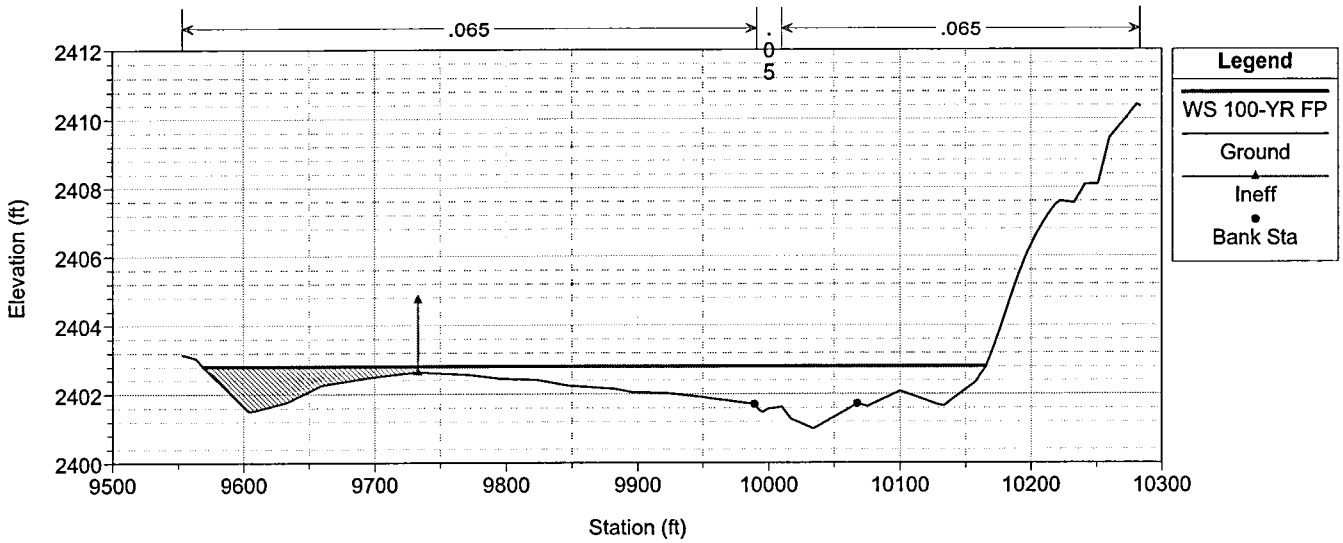
RV Wash 7 Plan: RV Wash 7 11/1/2007

River = RV W7 Reach = R1 RS = 7.730



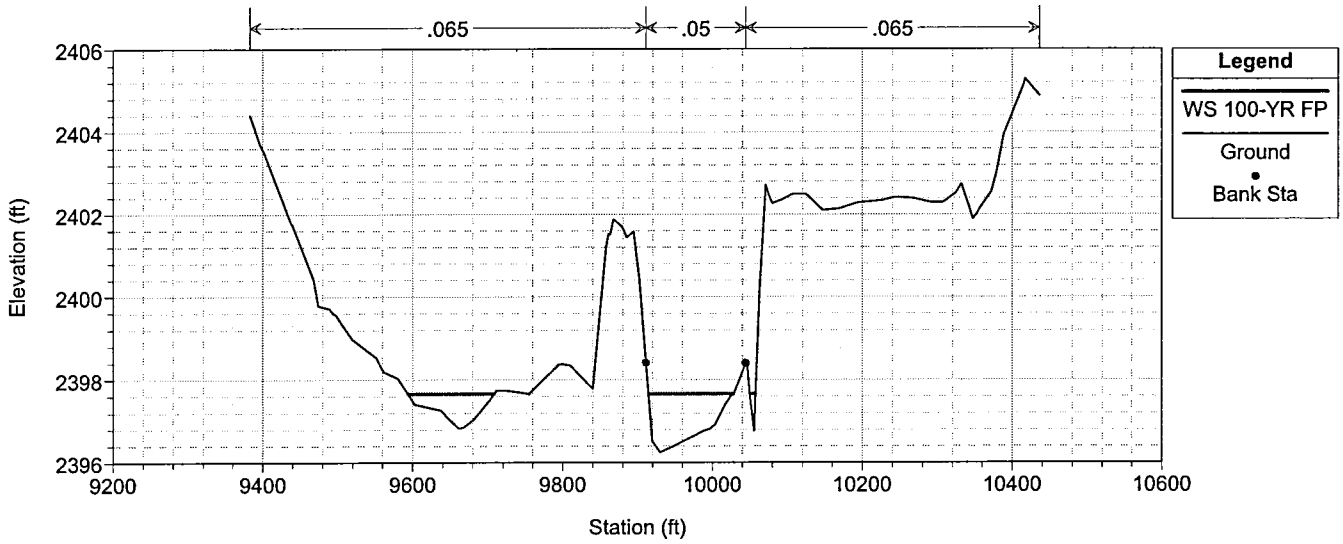
RV Wash 7 Plan: RV Wash 7 11/1/2007

River = RV W7 Reach = R1 RS = 7.620



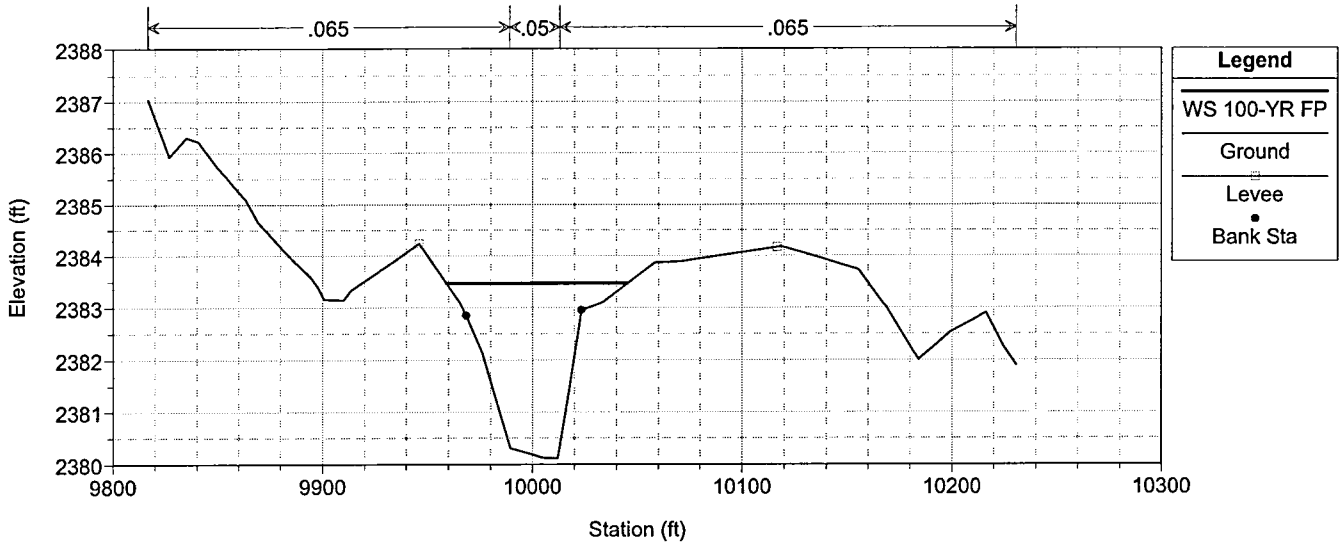
RV Wash 7 Plan: RV Wash 7 11/1/2007

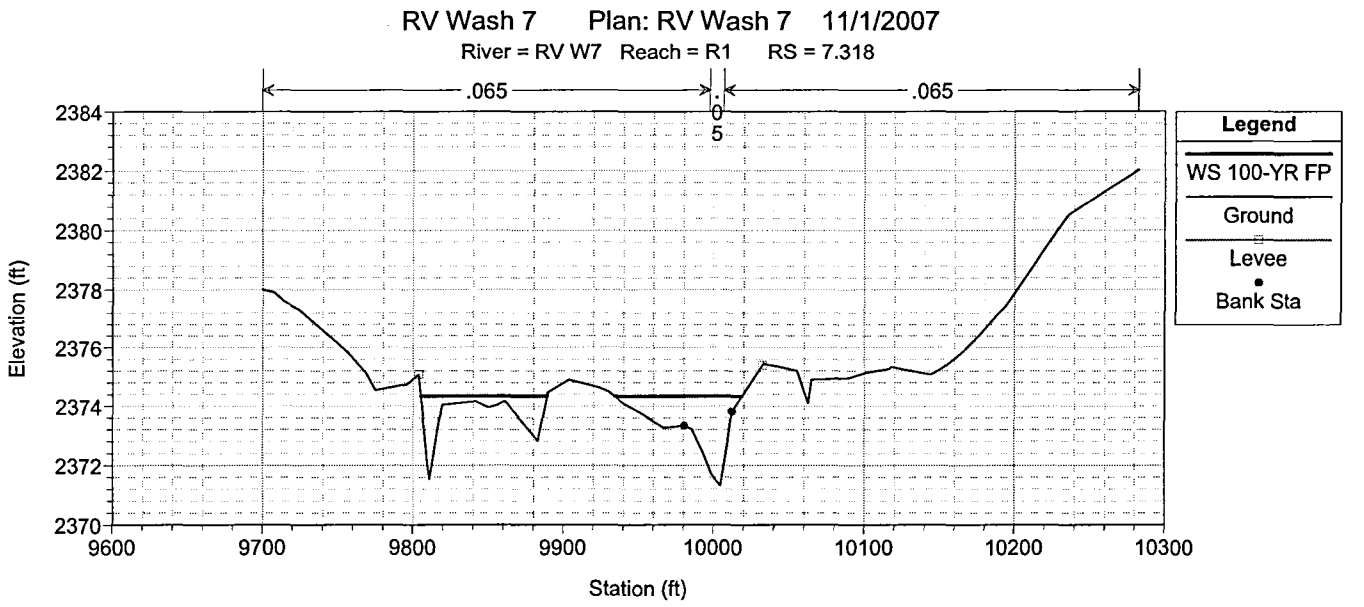
River = RV W7 Reach = R1 RS = 7.554

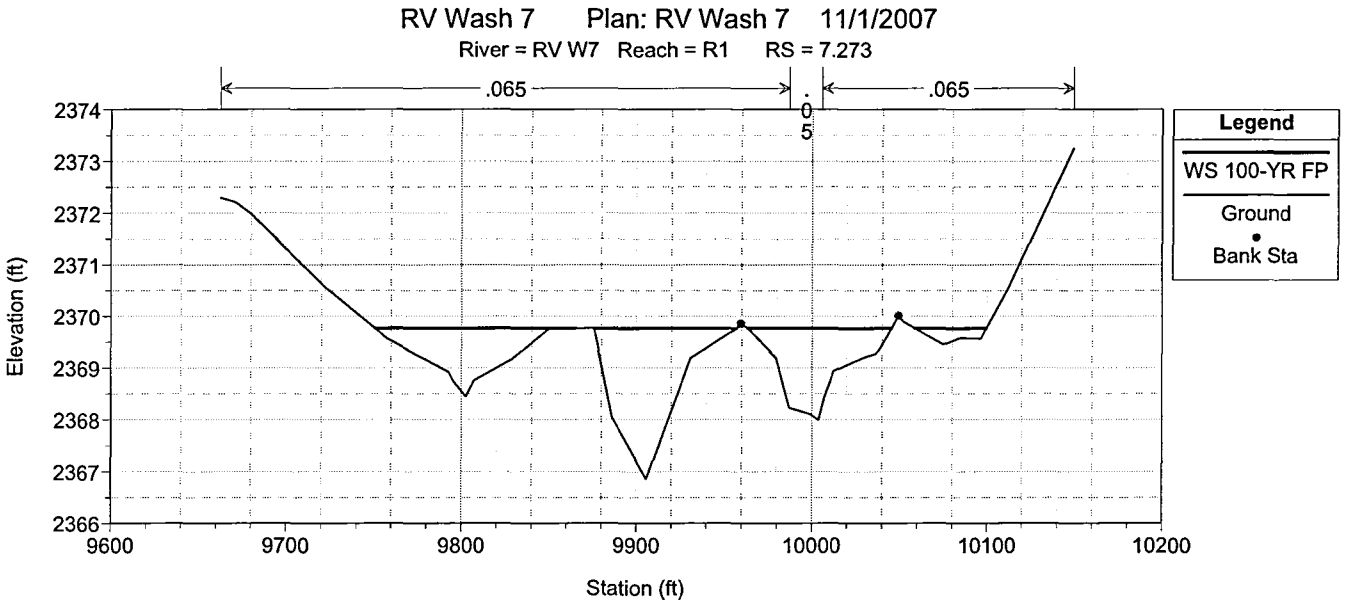


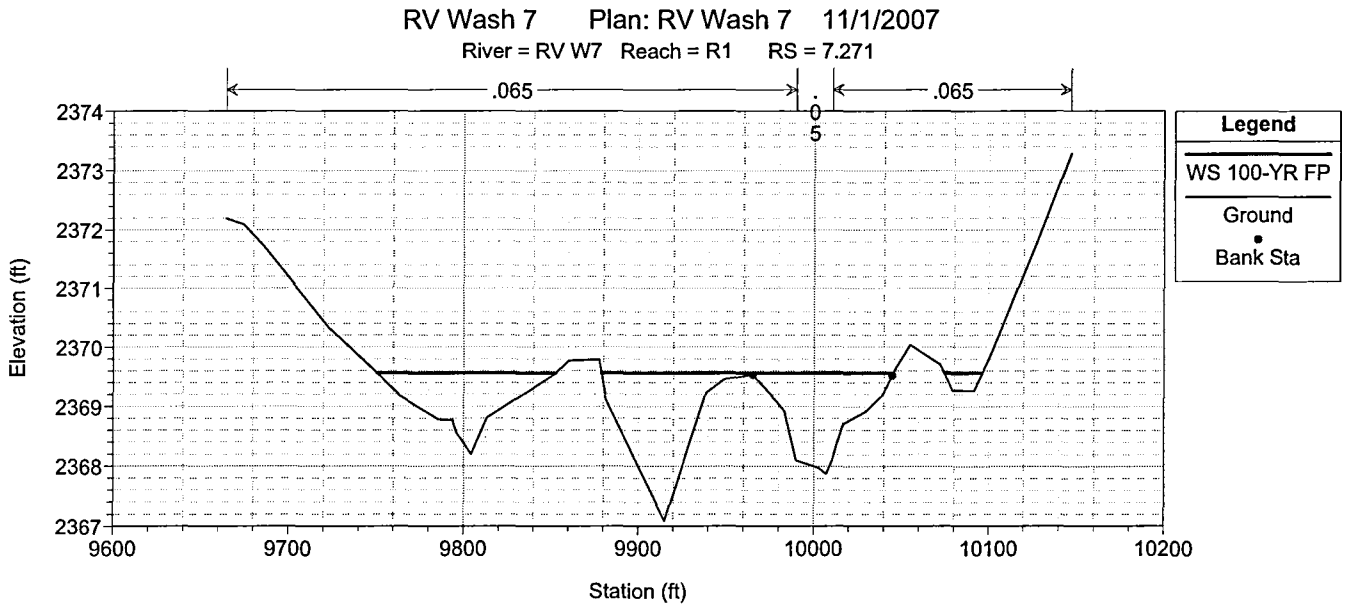
RV Wash 7 Plan: RV Wash 7 11/1/2007

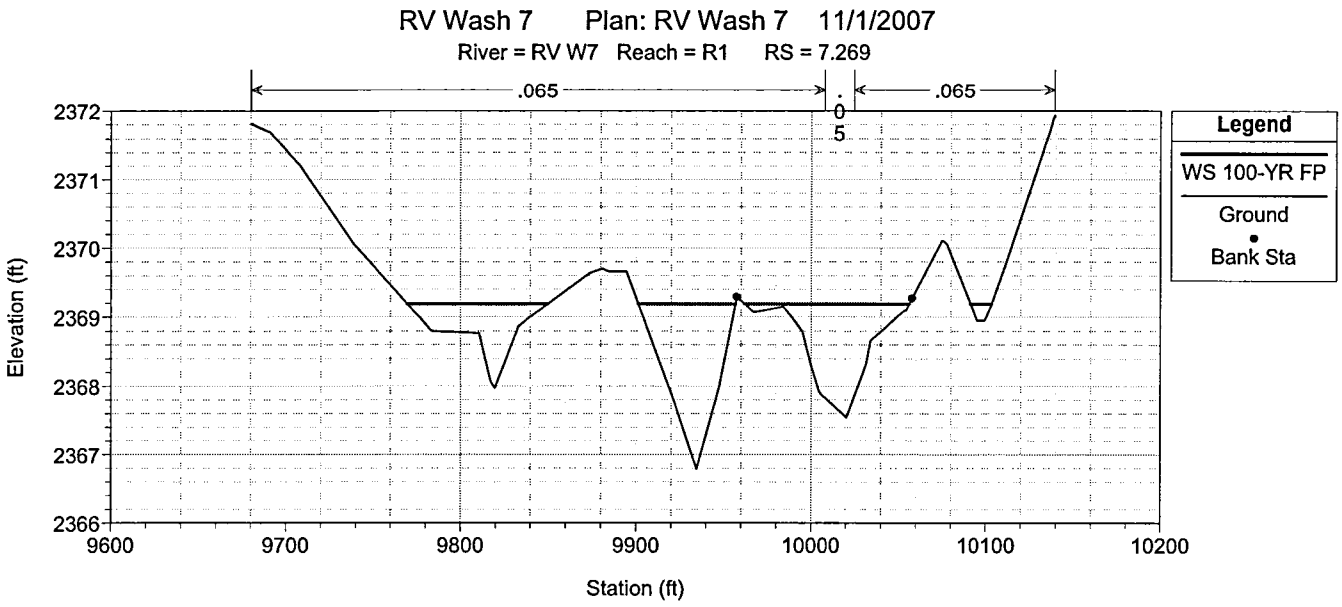
River = RV W7 Reach = R1 RS = 7.413




RV Wash 7 Plan: RV Wash 7 11/1/2007
River = RV W7 Reach = R1 RS = 7.318
.065
.05
.065
Elevation (ft)
Station (ft)
Legend
WS 100-YR FP
Ground
Levee
Bank Sta


RV Wash 7 Plan: RV Wash 7 11/1/2007
River = RV W7 Reach = R1 RS = 7.273
.065
.05
.065
Elevation (ft)
Station (ft)
Legend
WS 100-YR FP
Ground
Bank Sta


RV Wash 7 Plan: RV Wash 7 11/1/2007
River = RV W7 Reach = R1 RS = 7.271
.065
.05
.065
Elevation (ft)
Station (ft)
Legend
WS 100-YR FP
Ground
Bank Sta

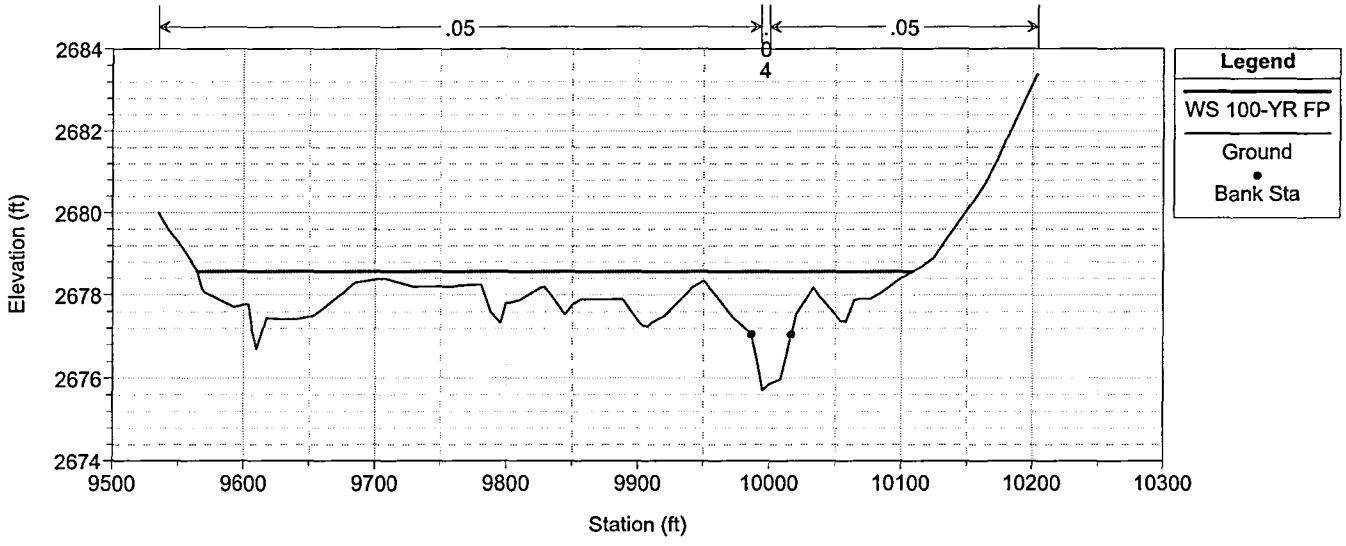

RV Wash 7 Plan: RV Wash 7 11/1/2007
River = RV W7 Reach = R1 RS = 7.269
.065
.05
.065
Legend
WS 100-YR FP
Ground
Bank Sta
Elevation (ft)
2372
2371
2370
2369
2368
2367
2366
9600
9700
9800
9900
10000
10100
10200
Station (ft)

E.2.3 HEC-RAS Cross Section Plots

RV Wash A

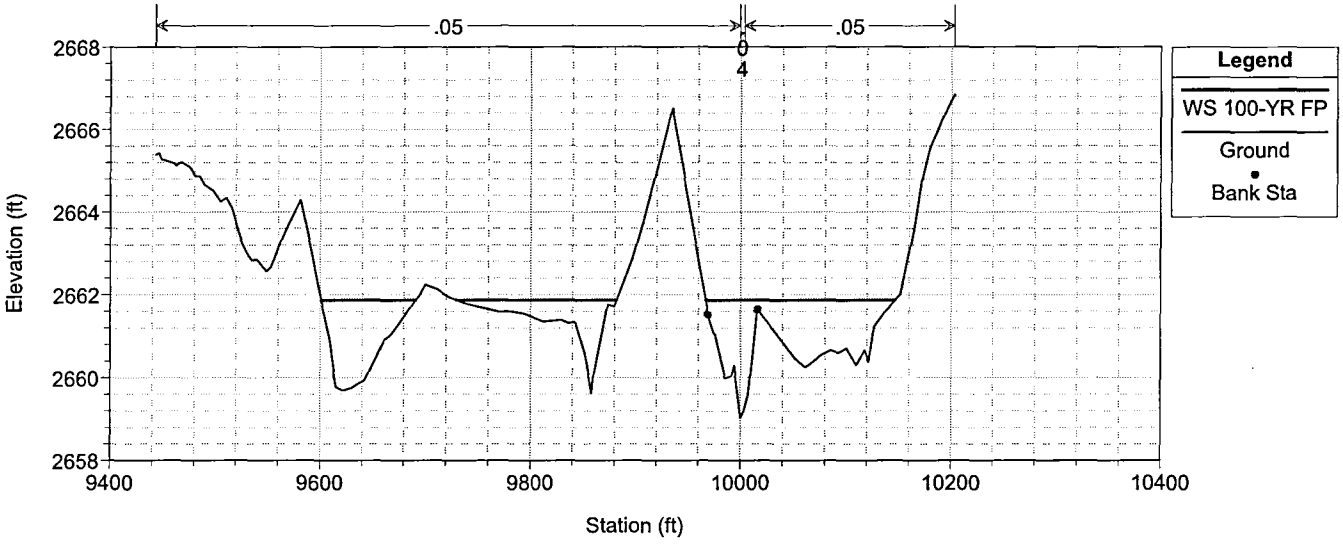
RV Wash A Plan: RV Wash A 11/1/2007

River = RV WA Reach = R1 RS = 9.834



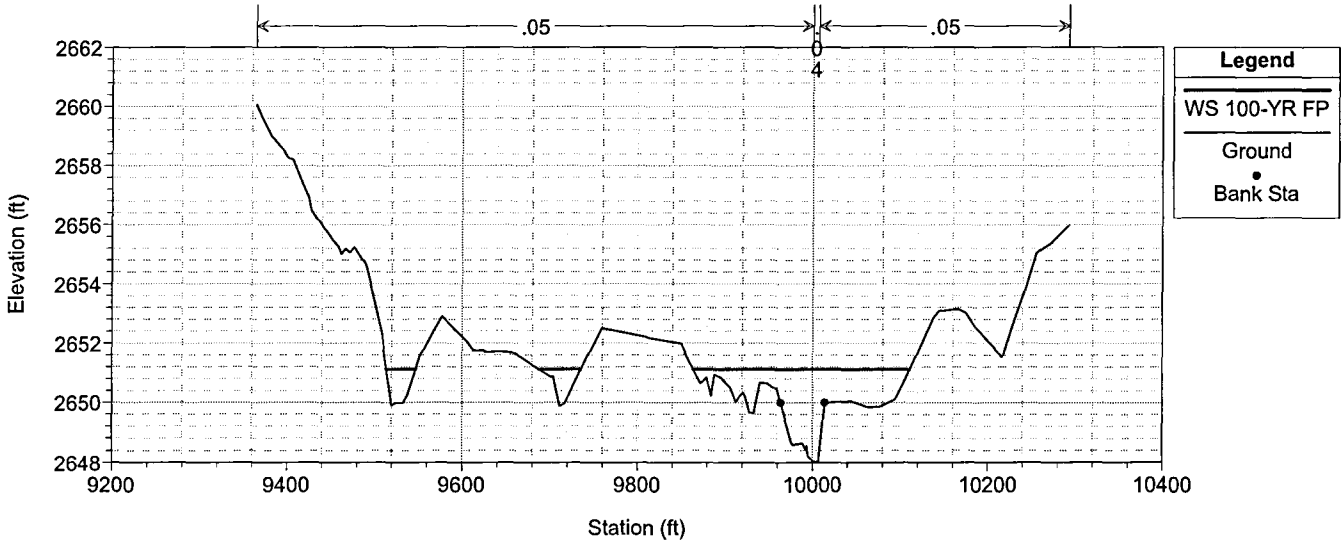
RV Wash A Plan: RV Wash A 11/1/2007

River = RV WA Reach = R1 RS = 9.648



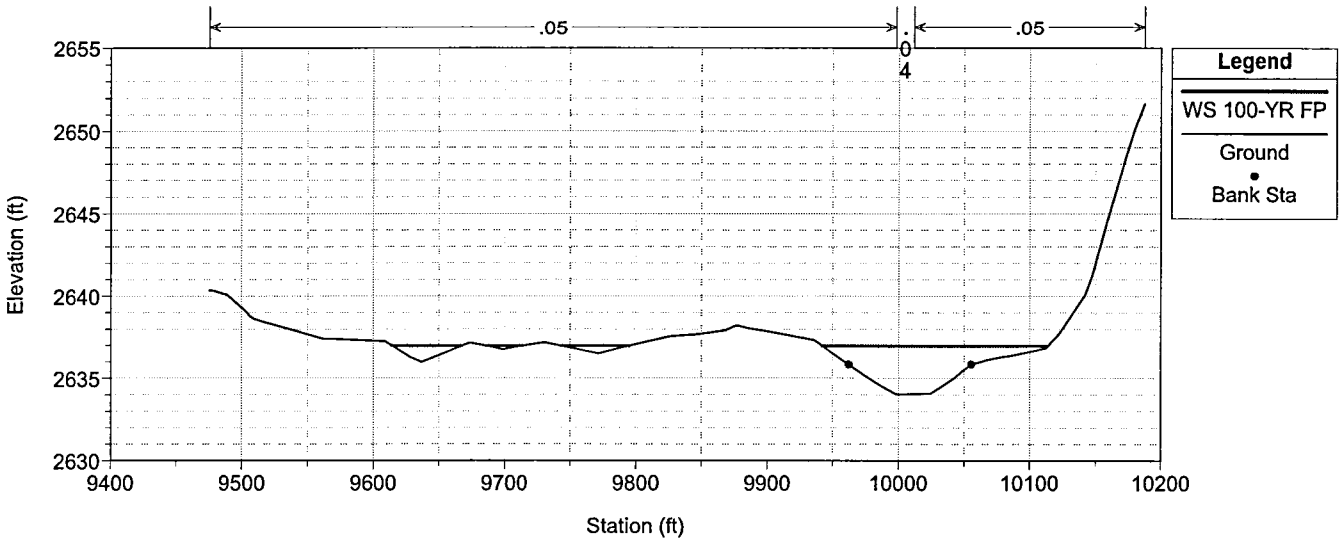
RV Wash A Plan: RV Wash A 11/1/2007

River = RV WA Reach = R1 RS = 9.518



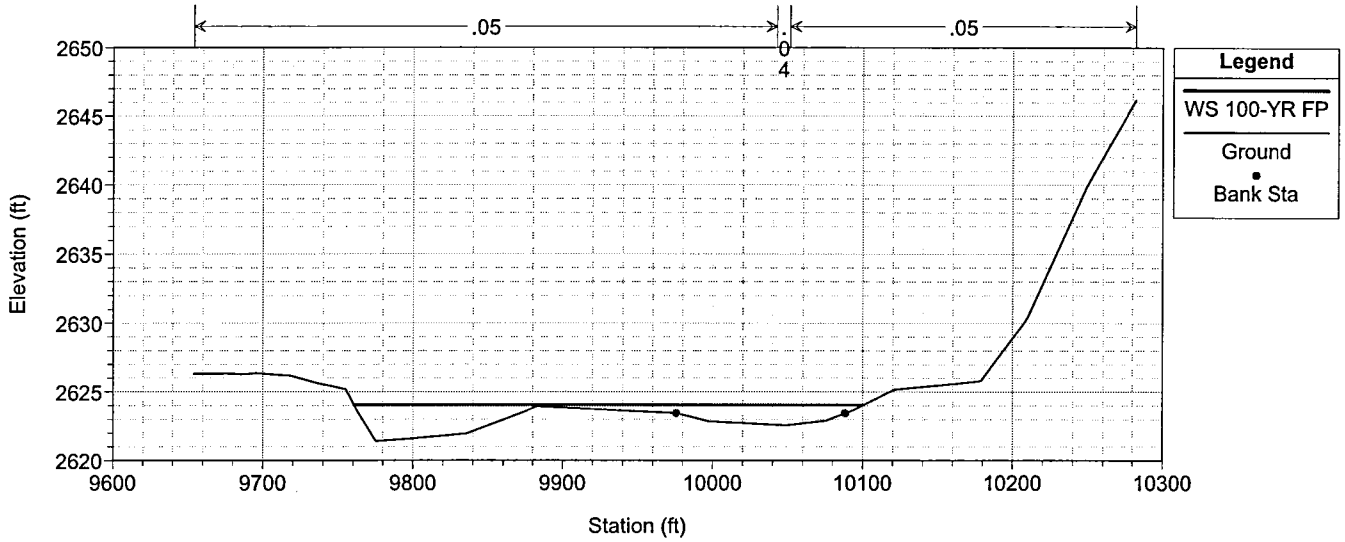
RV Wash A Plan: RV Wash A 11/1/2007

River = RV WA Reach = R1 RS = 9.372



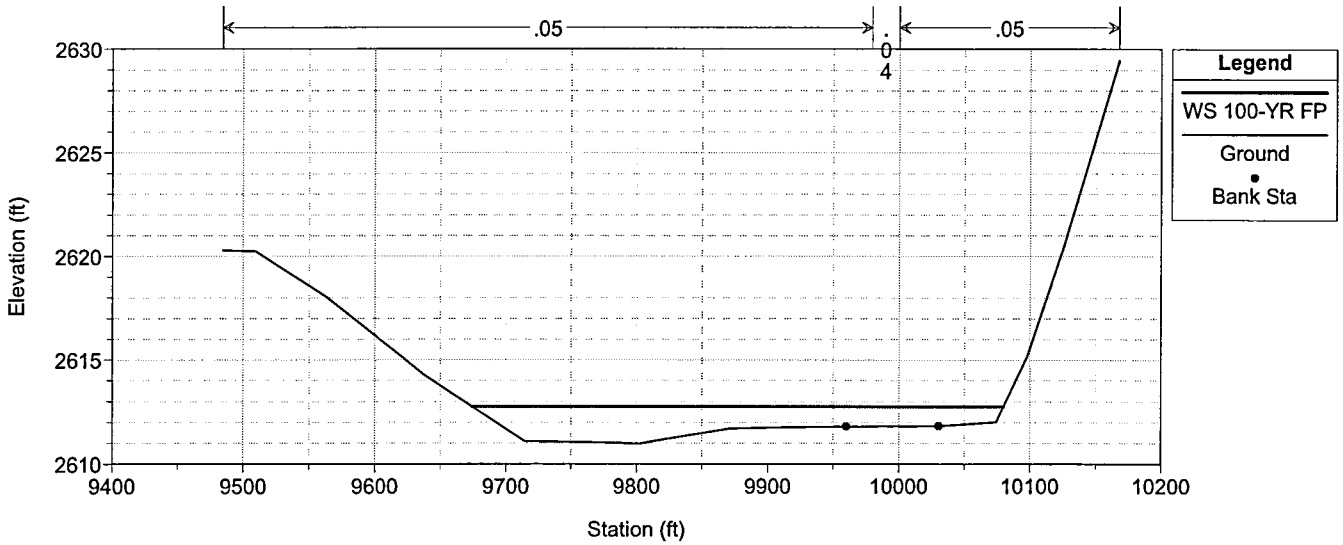
RV Wash A Plan: RV Wash A 11/1/2007

River = RV WA Reach = R1 RS = 9.197



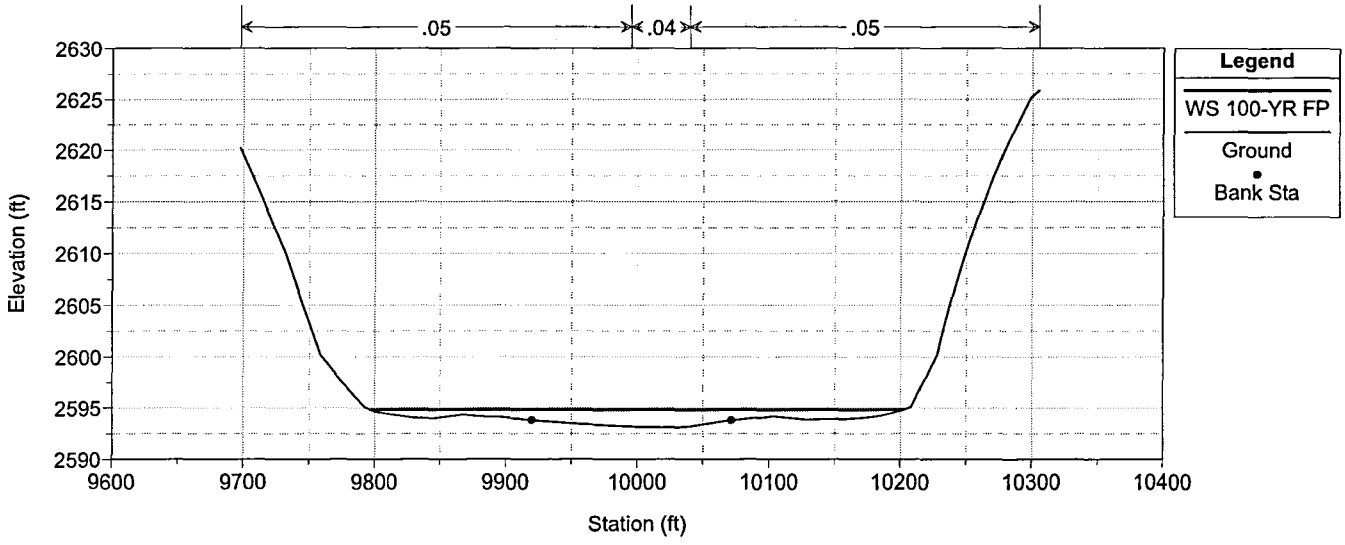
RV Wash A Plan: RV Wash A 11/1/2007

River = RV WA Reach = R1 RS = 9.065



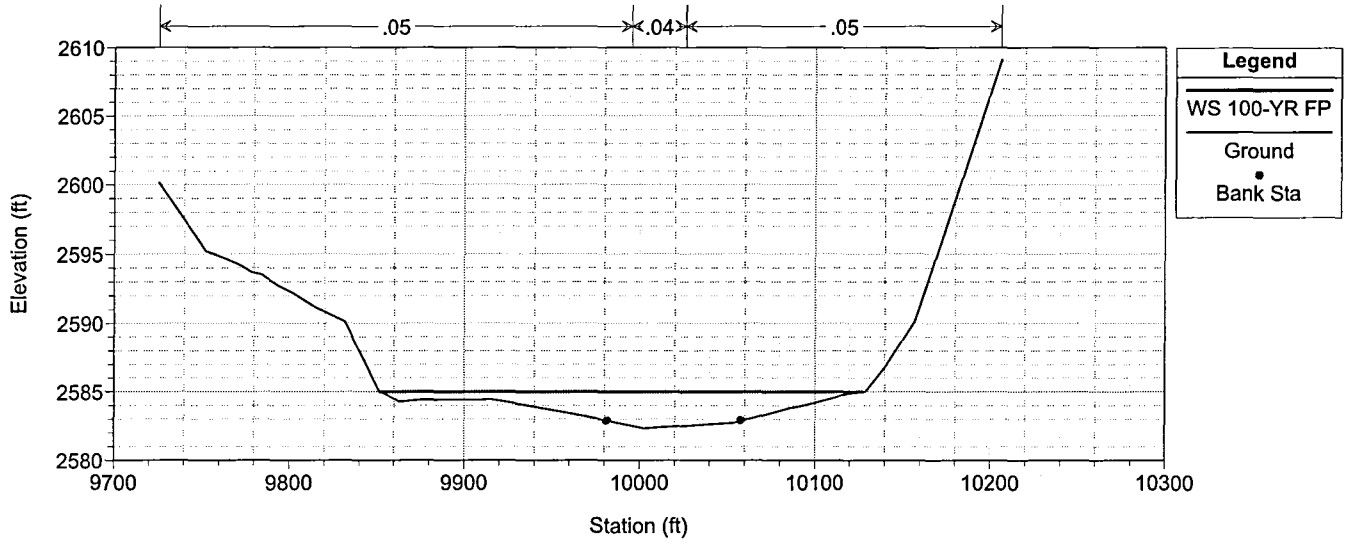
RV Wash A Plan: RV Wash A 11/1/2007

River = RV WA Reach = R1 RS = 8.893



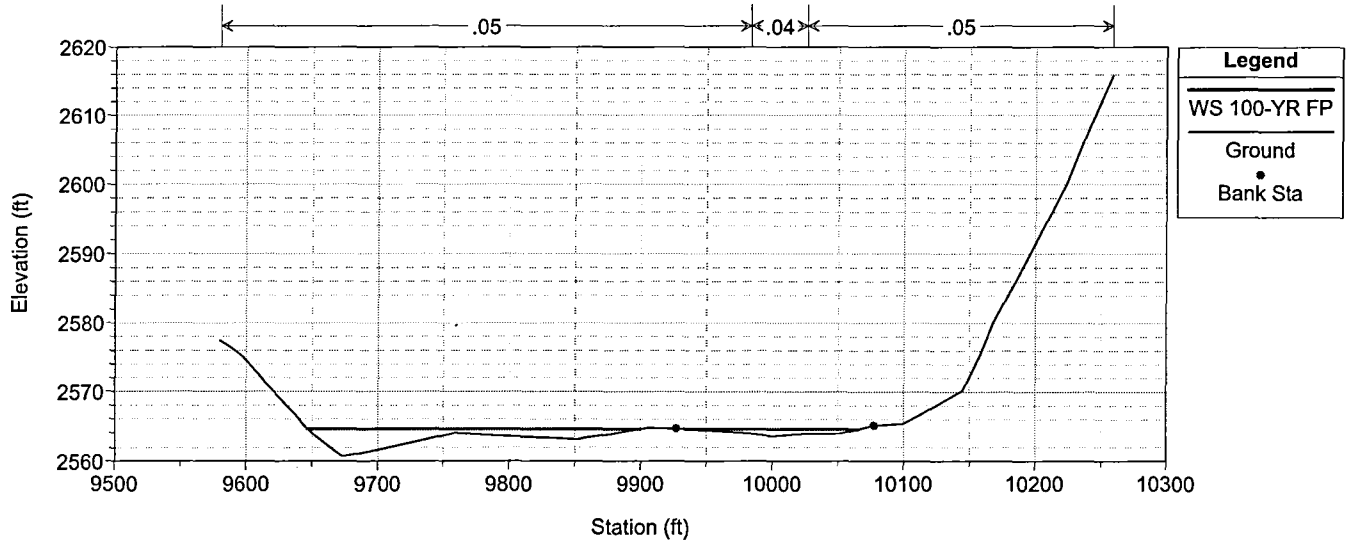
RV Wash A Plan: RV Wash A 11/1/2007

River = RV WA Reach = R1 RS = 8.807



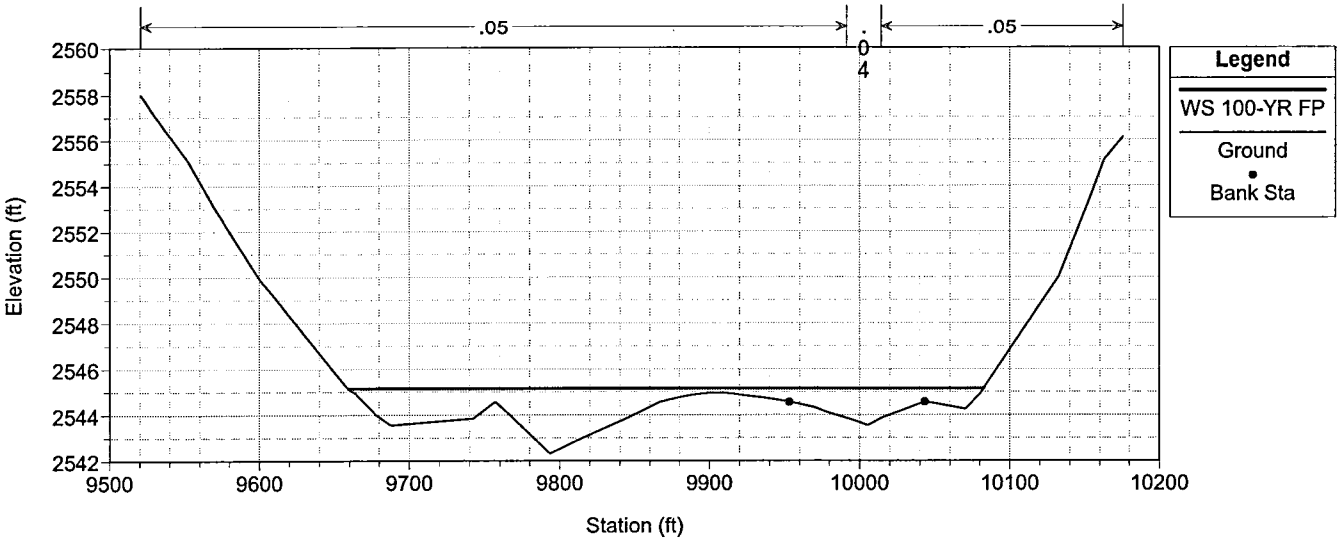
RV Wash A Plan: RV Wash A 11/1/2007

River = RV WA Reach = R1 RS = 8.613



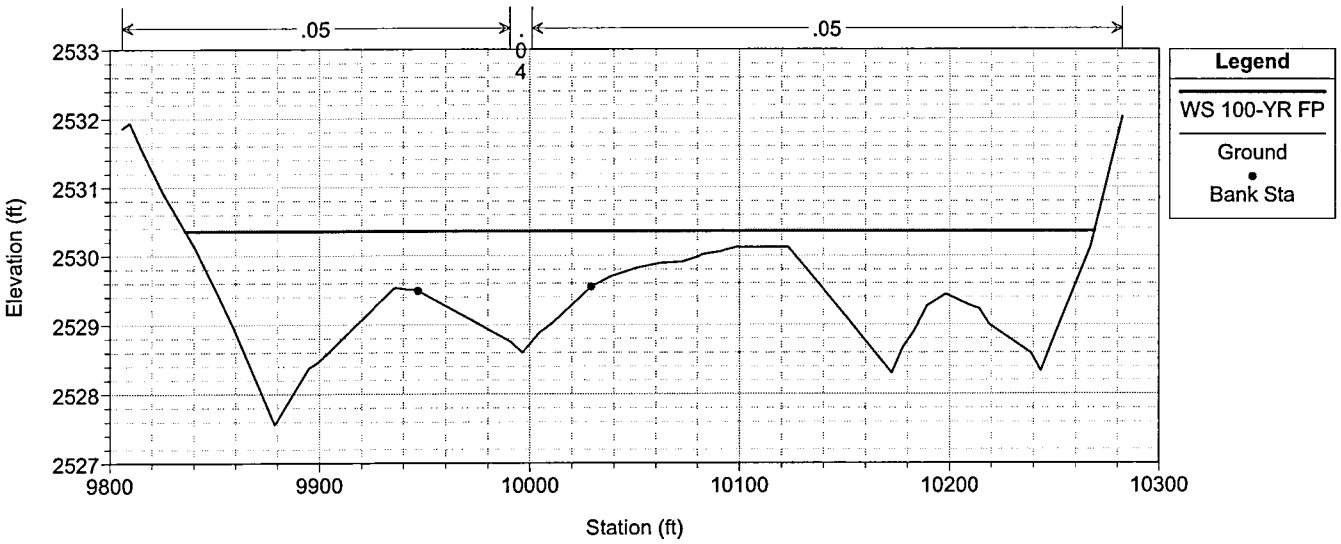
RV Wash A Plan: RV Wash A 11/1/2007

River = RV WA Reach = R1 RS = 8.415



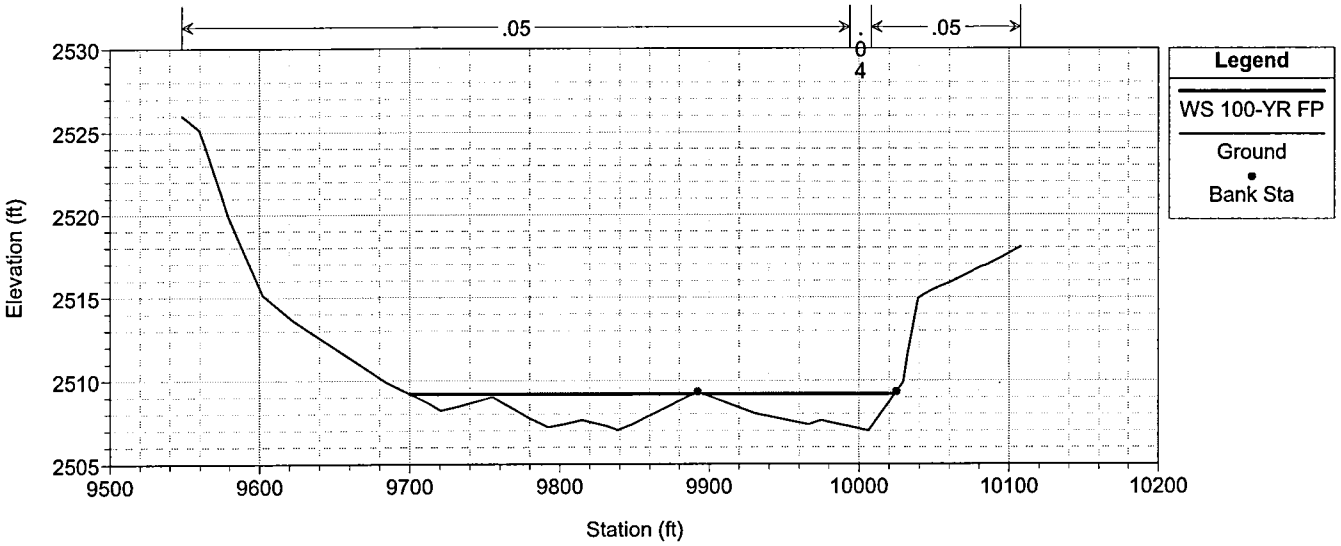
RV Wash A Plan: RV Wash A 11/1/2007

River = RV WA Reach = R1 RS = 8.262



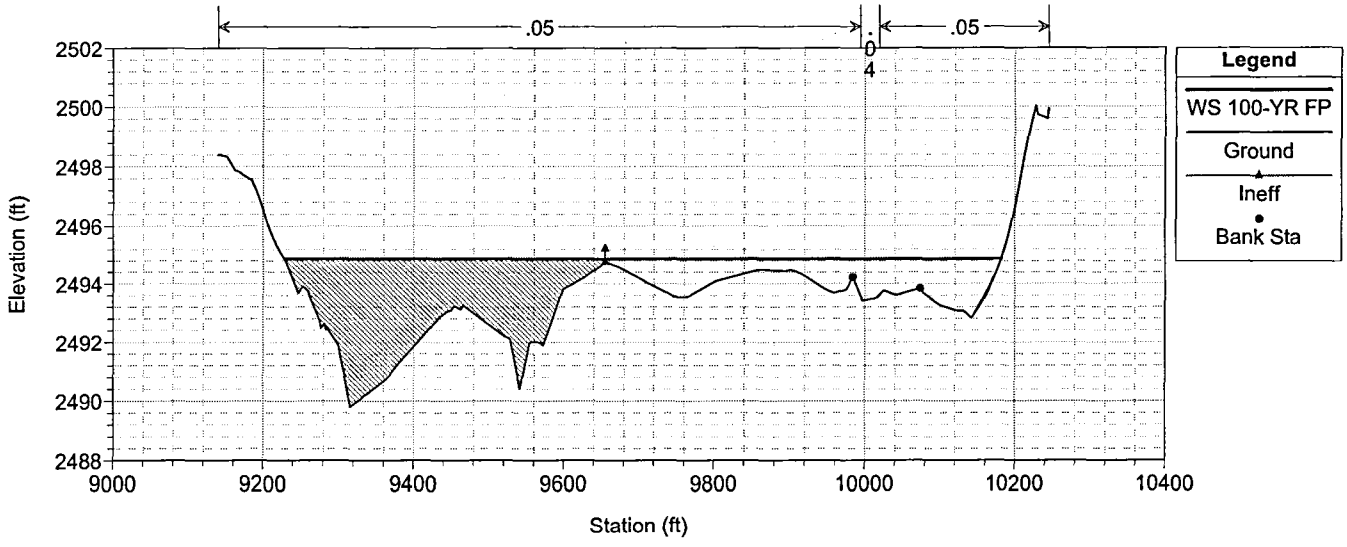
RV Wash A Plan: RV Wash A 11/1/2007

River = RV WA Reach = R1 RS = 8.060



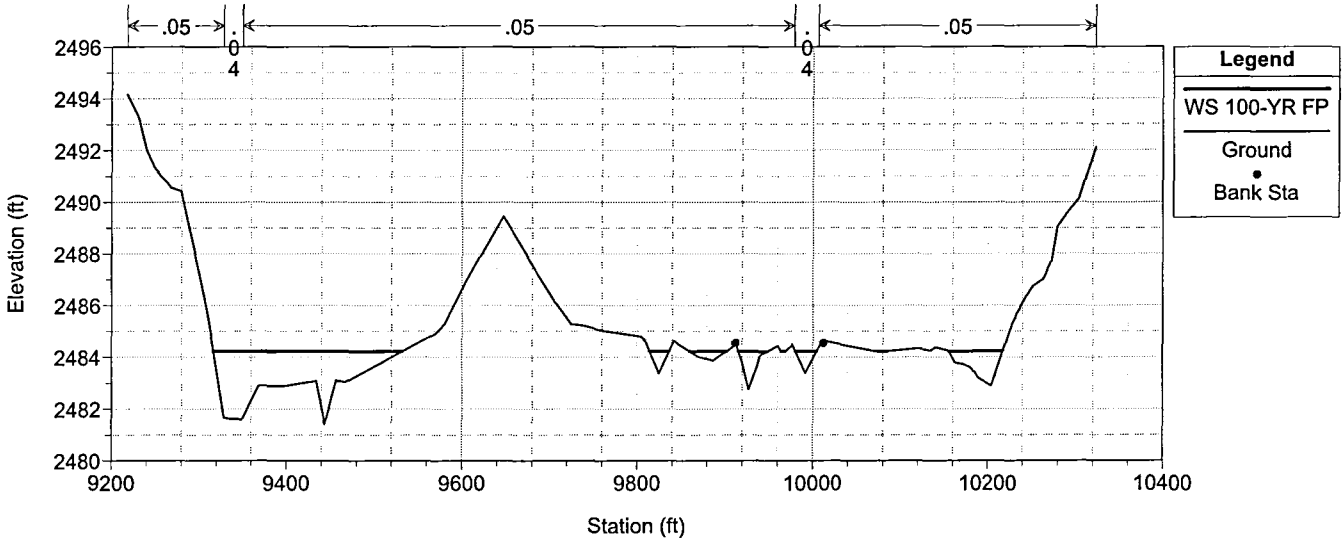
RV Wash A Plan: RV Wash A 11/1/2007

River = RV WA Reach = R1 RS = 7.925



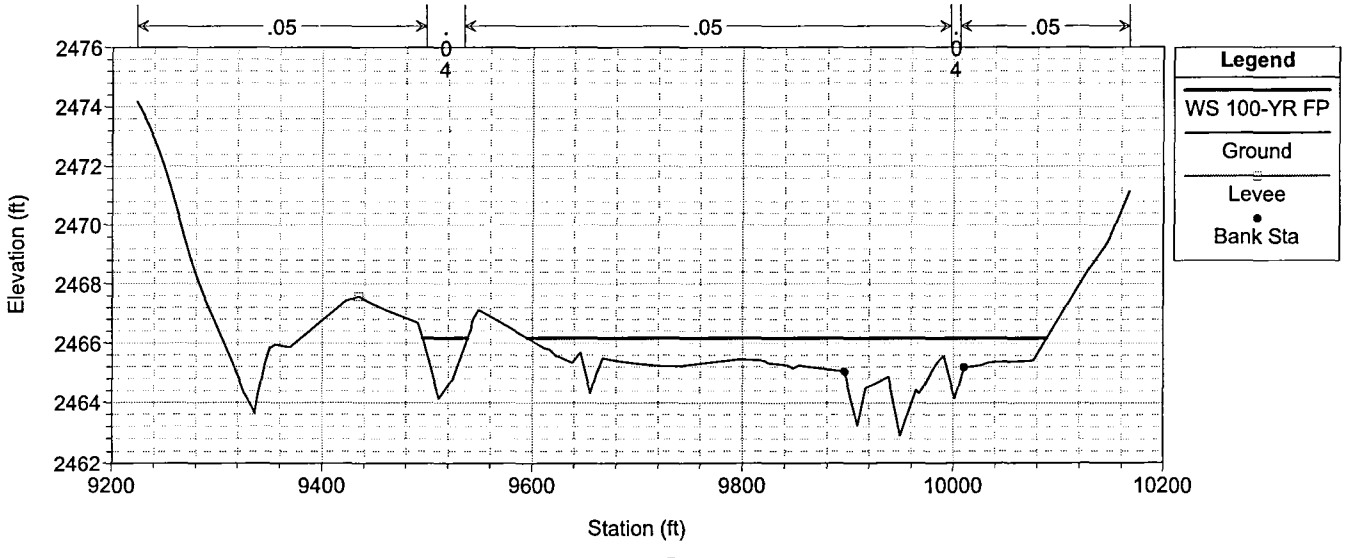
RV Wash A Plan: RV Wash A 11/1/2007

River = RV WA Reach = R1 RS = 7.828



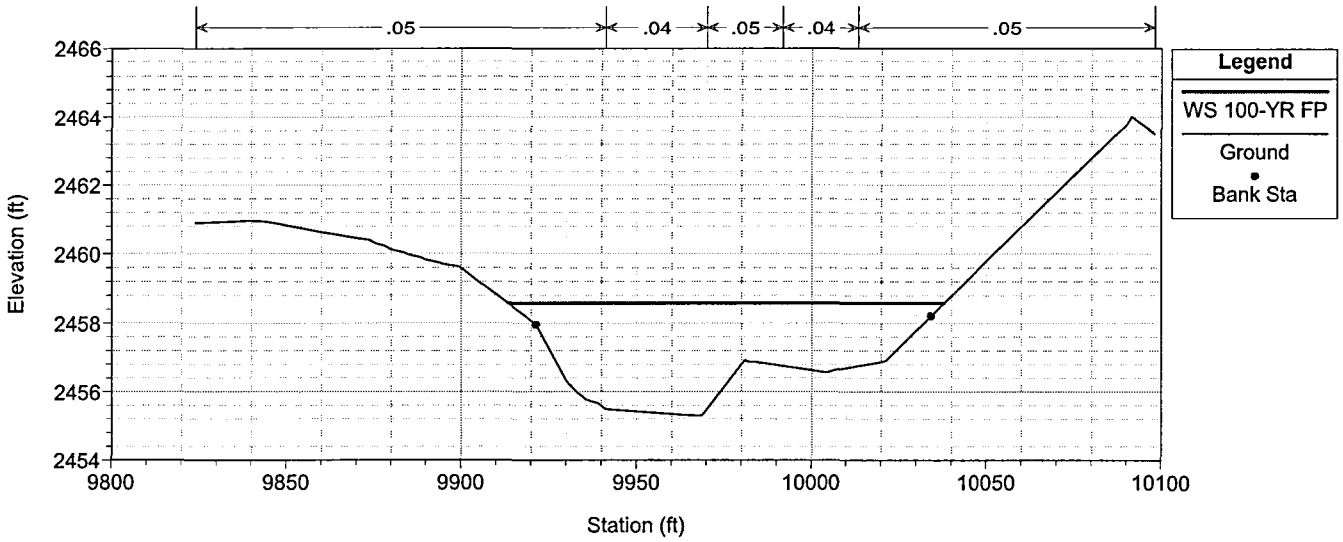
RV Wash A Plan: RV Wash A 11/1/2007

River = RV WA Reach = R1 RS = 7.636



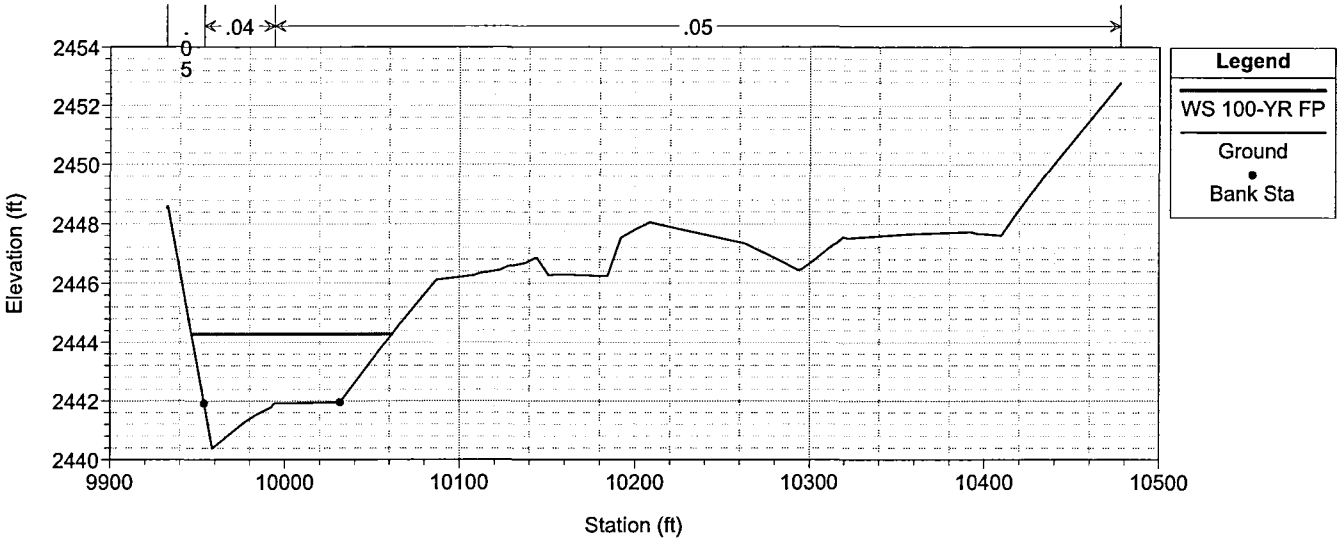
RV Wash A Plan: RV Wash A 11/1/2007

River = RV WA Reach = R1 RS = 7.554



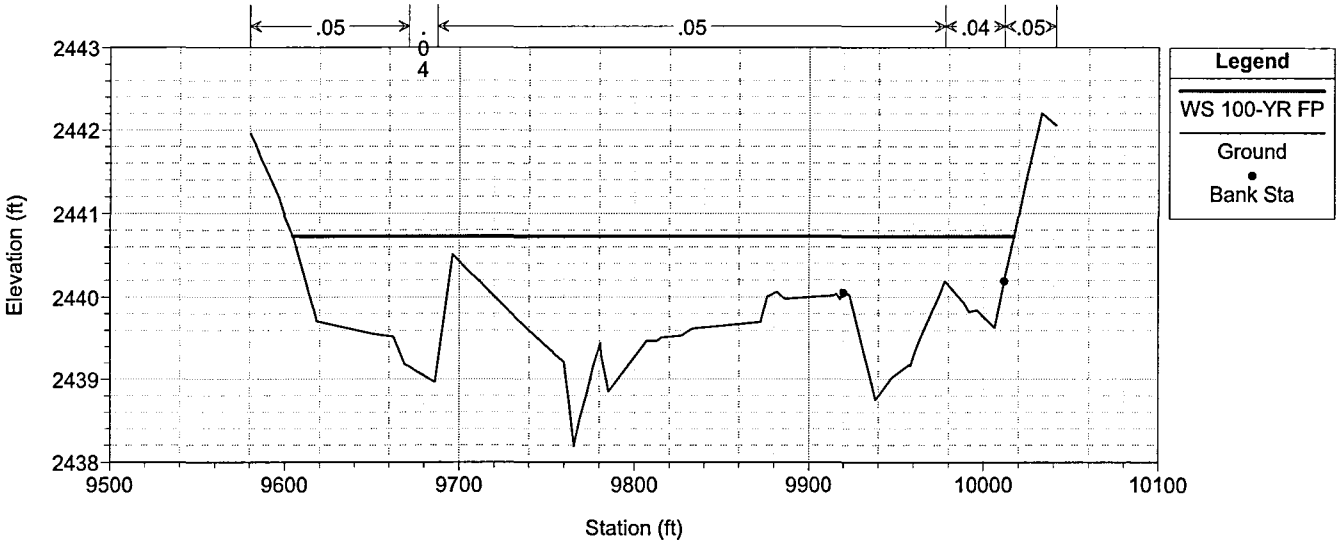
RV Wash A Plan: RV Wash A 11/1/2007

River = RV WA Reach = R1 RS = 7.414



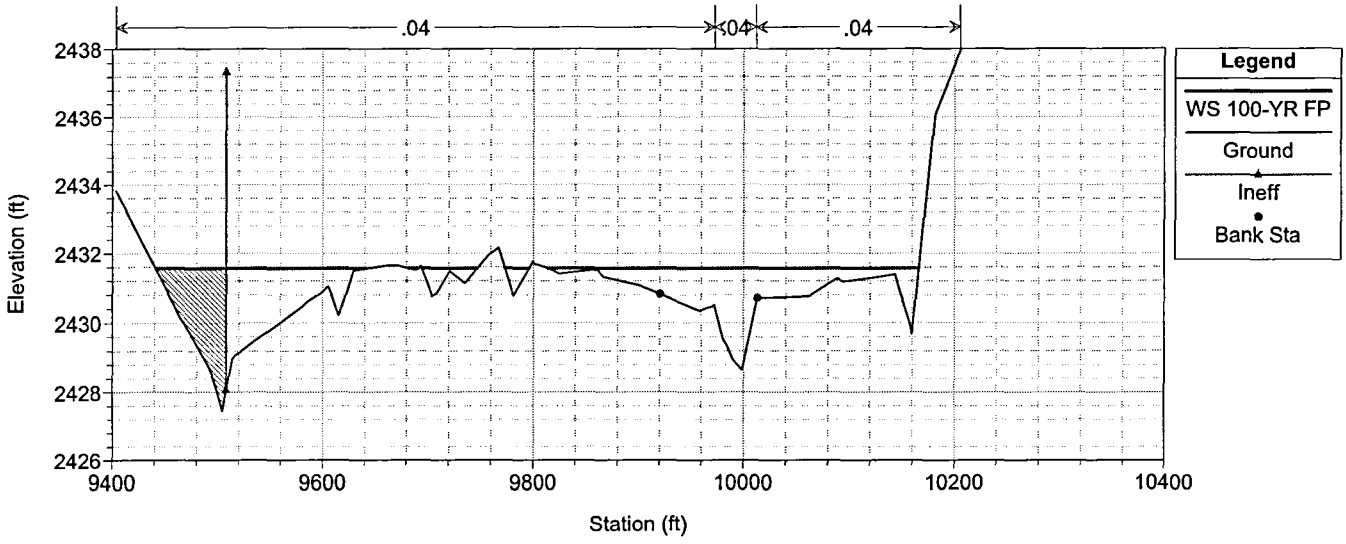
RV Wash A Plan: RV Wash A 11/1/2007

River = RV WA Reach = R1 RS = 7.390



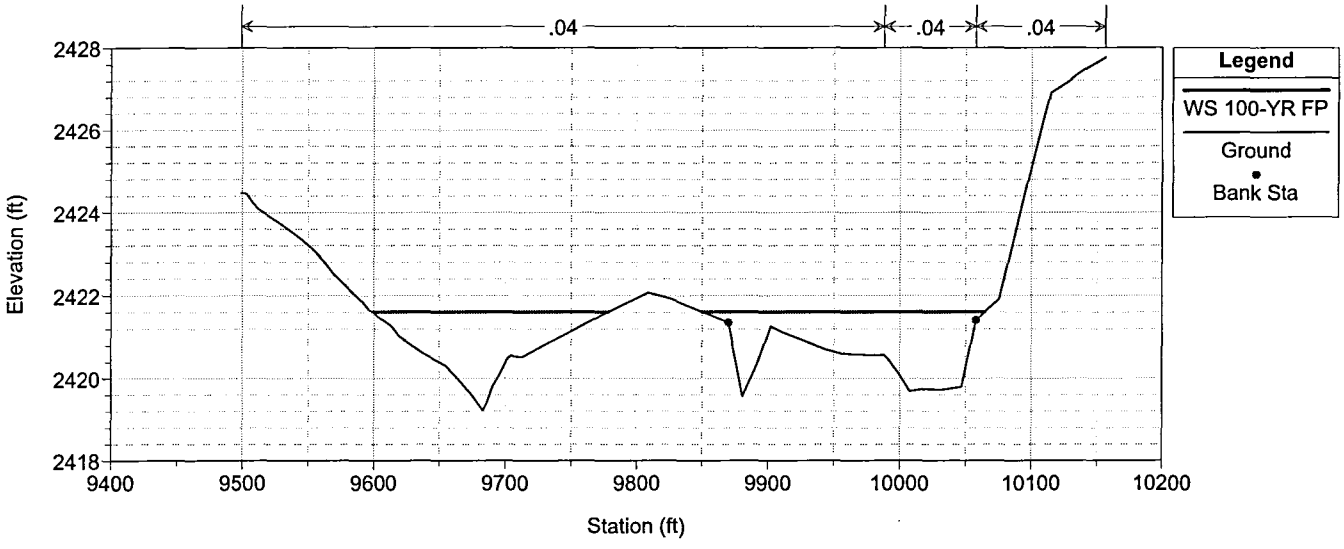
RV Wash A Plan: RV Wash A 11/1/2007

River = RV WA Reach = R1 RS = 7.292



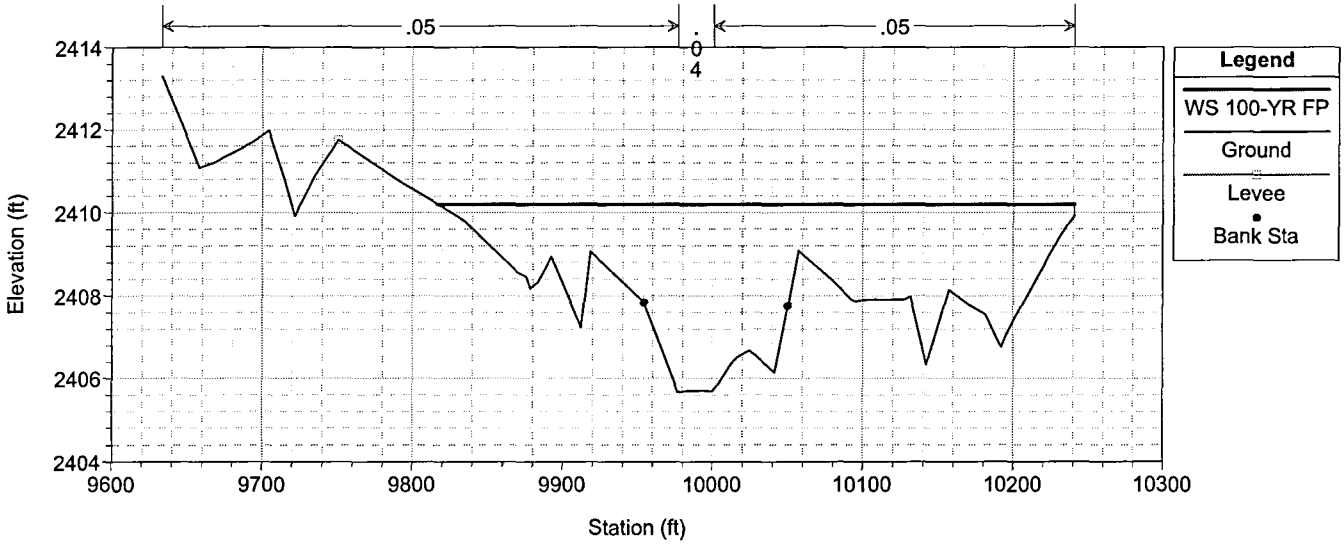
RV Wash A Plan: RV Wash A 11/1/2007

River = RV WA Reach = R1 RS = 7.184



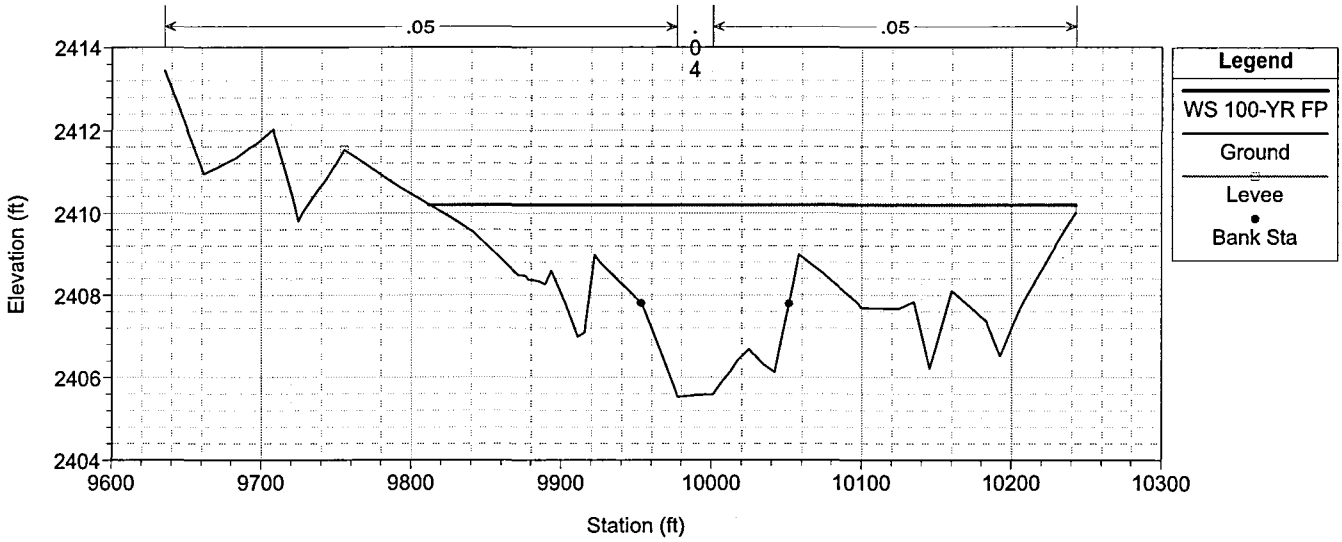
RV Wash A Plan: RV Wash A 11/1/2007

River = RV WA Reach = R2 RS = 7.052



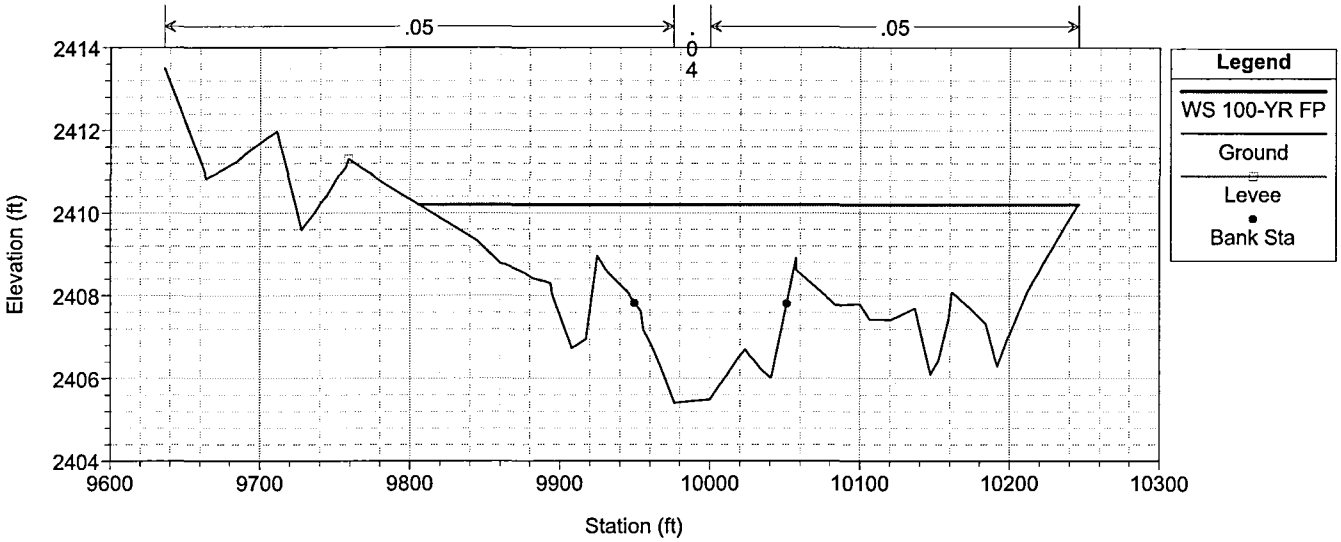
RV Wash A Plan: RV Wash A 11/1/2007

River = RV WA Reach = R2 RS = 7.051



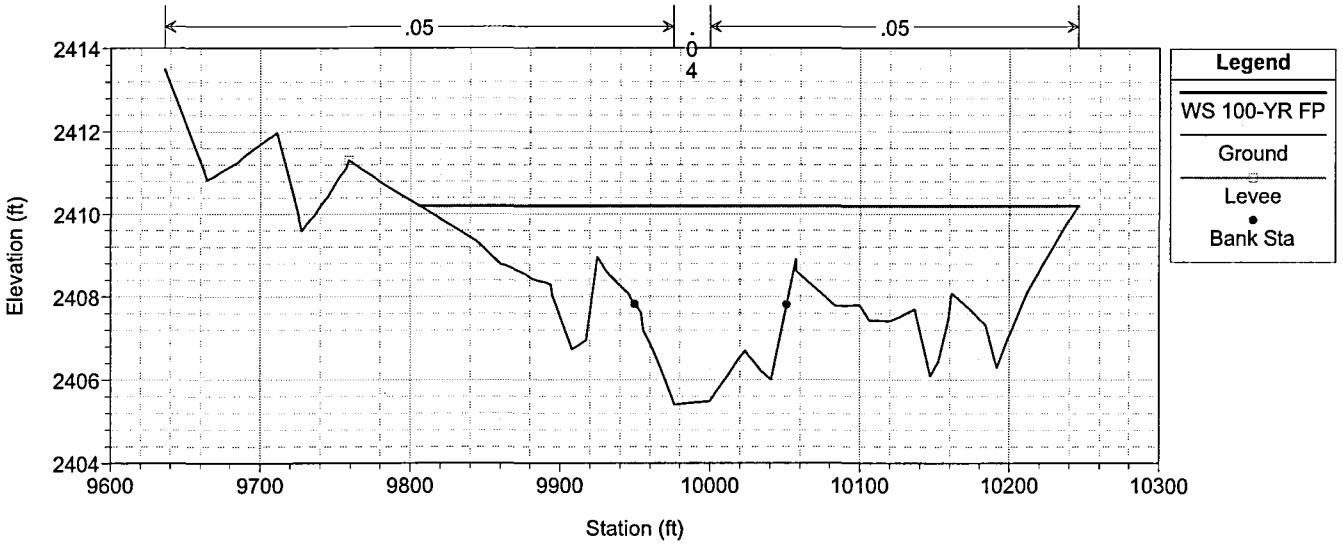
RV Wash A Plan: RV Wash A 11/1/2007

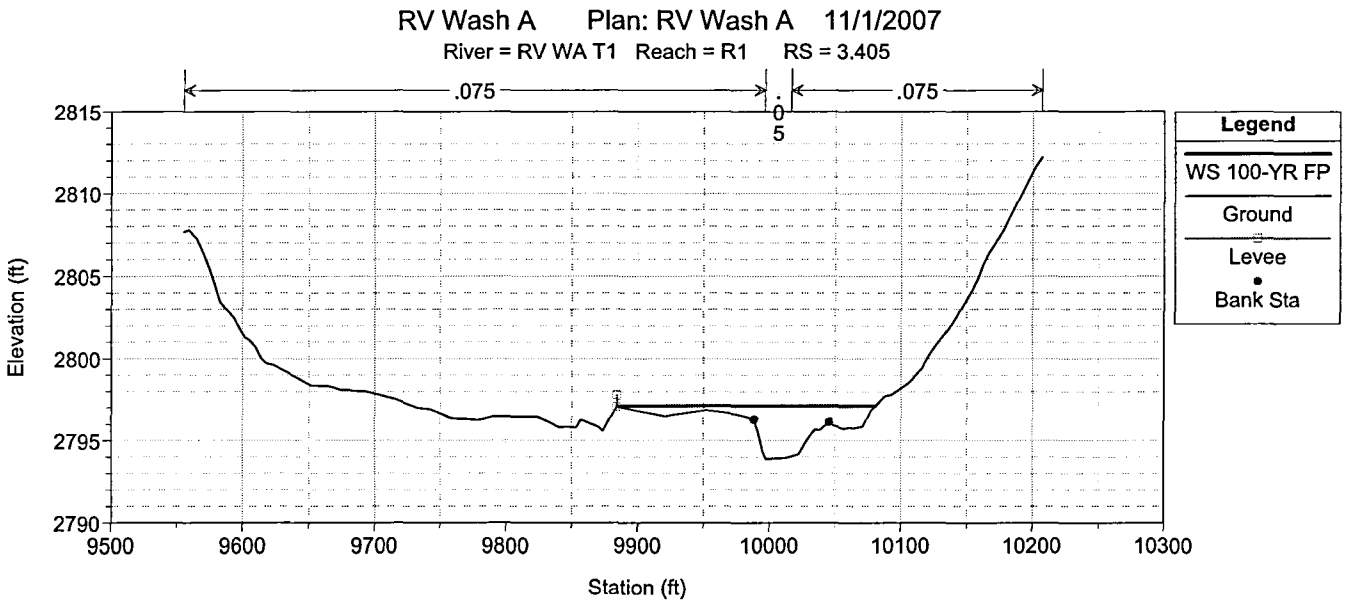
River = RV WA Reach = R3 RS = 7.050

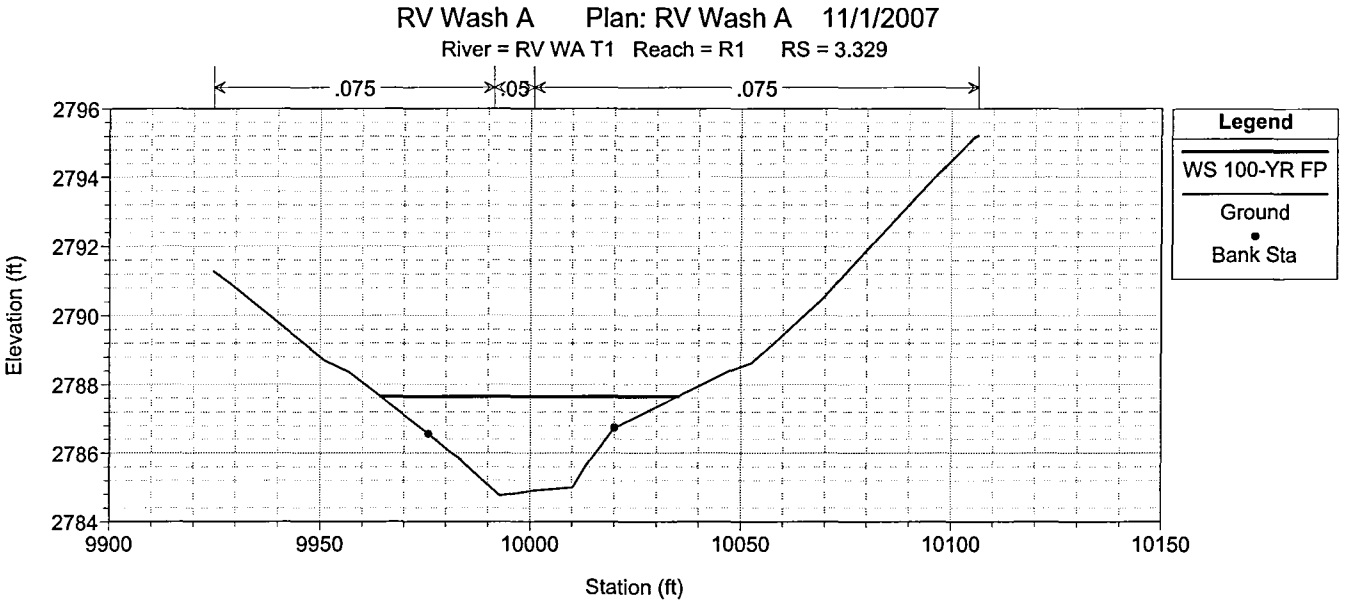


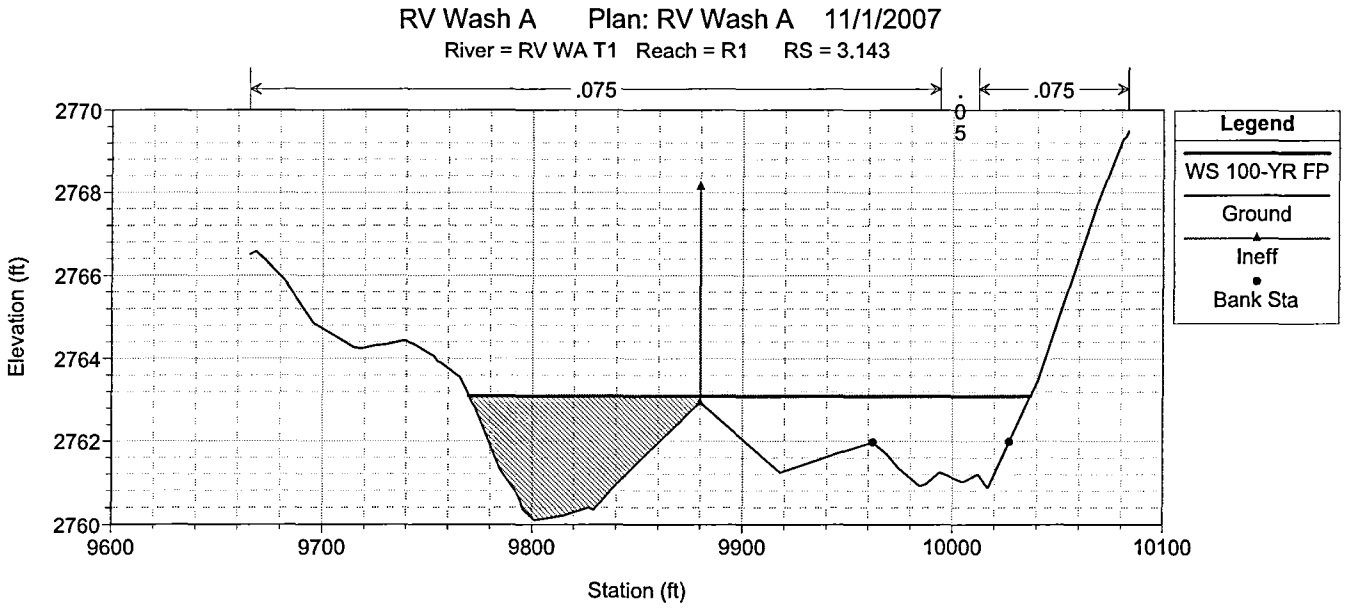
RV Wash A Plan: RV Wash A 11/1/2007

River = RV WA Reach = R3 RS = 7.049



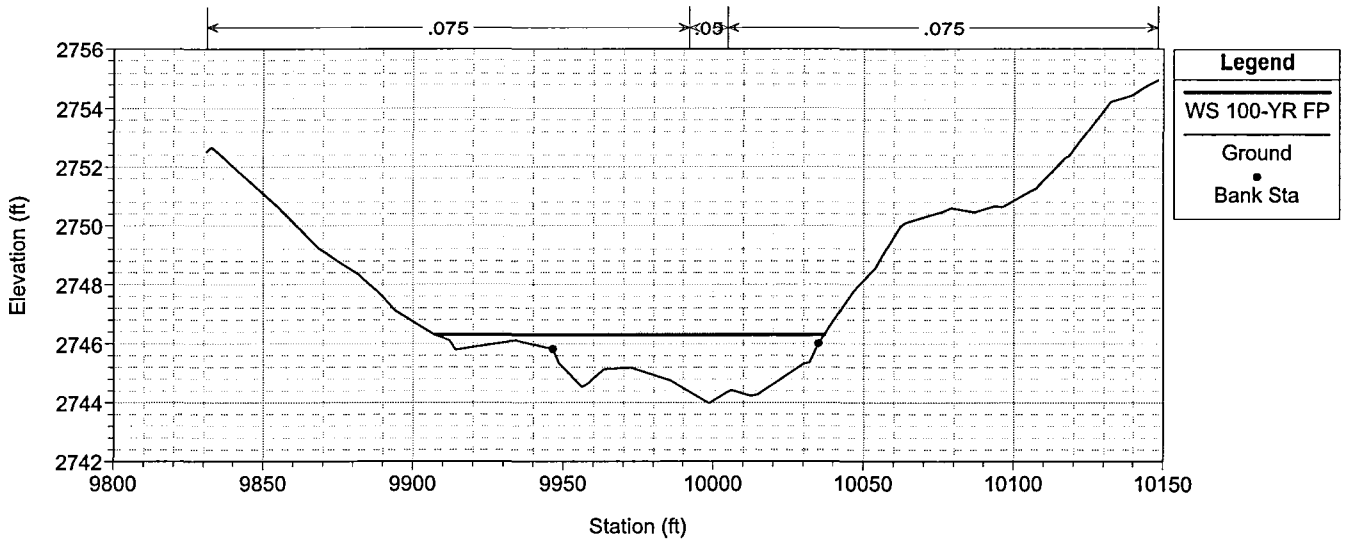

RV Wash A Plan: RV Wash A 11/1/2007
River = RV WA T1 Reach = R1 RS = 3.405
.075
.05
.075
Legend
WS 100-YR FP
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)


RV Wash A Plan: RV Wash A 11/1/2007
River = RV WA T1 Reach = R1 RS = 3.329
.075
.05
.075
Legend
WS 100-YR FP
Ground
Bank Sta
Elevation (ft)
Station (ft)


RV Wash A Plan: RV Wash A 11/1/2007
River = RV WA T1 Reach = R1 RS = 3.143
.075
.05
.075
Legend
WS 100-YR FP
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

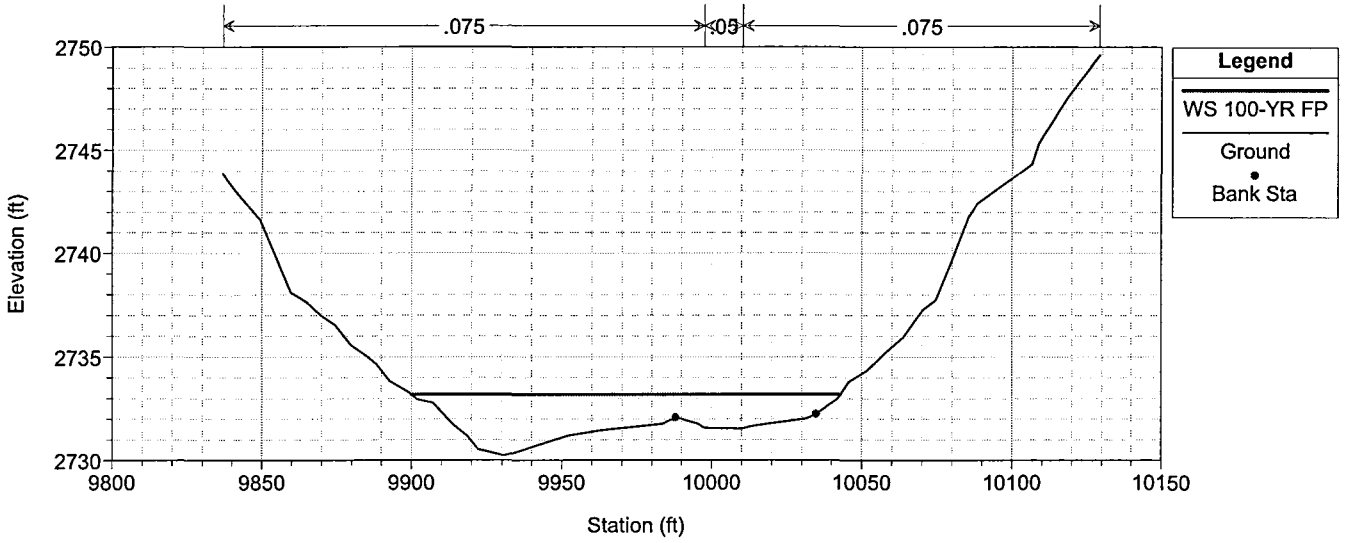
RV Wash A Plan: RV Wash A 11/1/2007

River = RV WA T1 Reach = R1 RS = 3.000



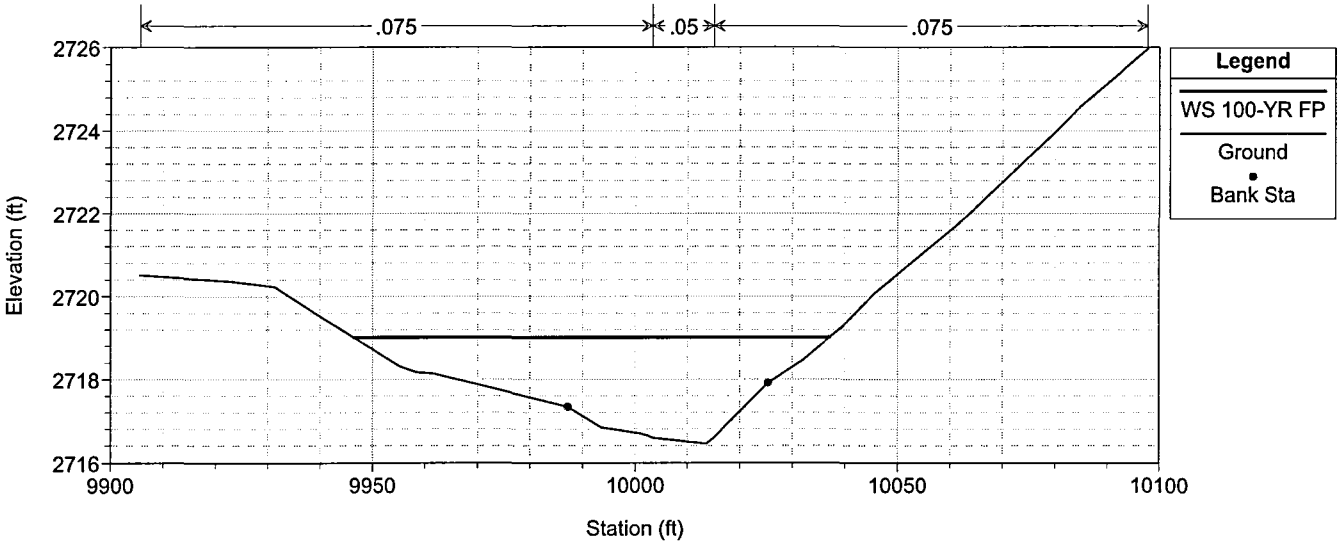
RV Wash A Plan: RV Wash A 11/1/2007

River = RV WA T1 Reach = R1 RS = 2.881



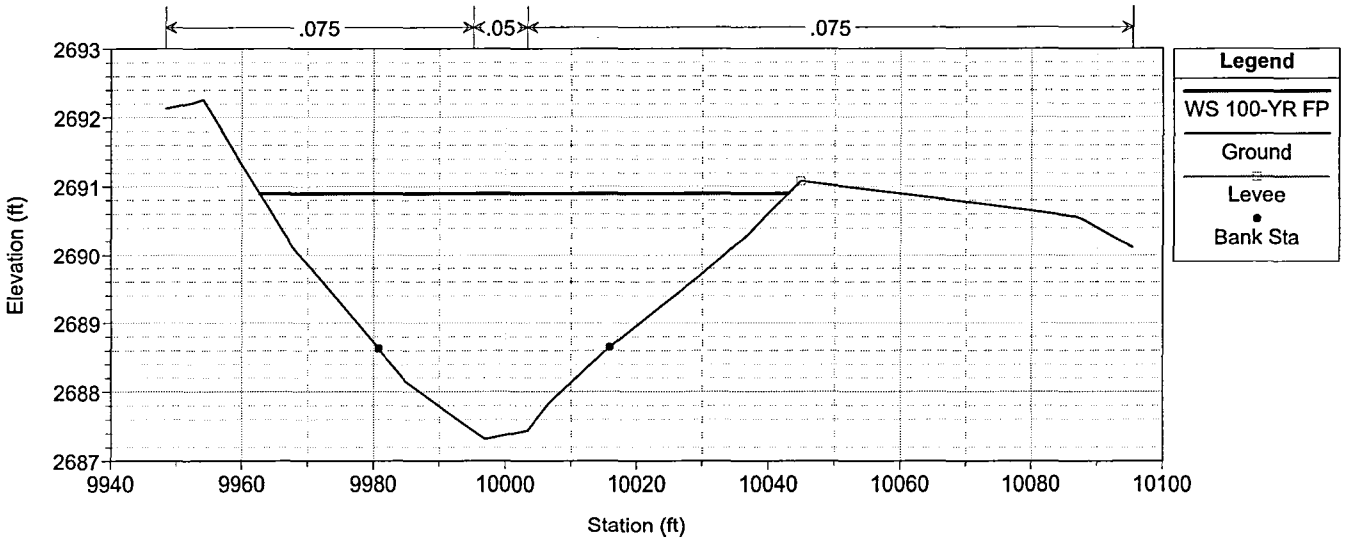
RV Wash A Plan: RV Wash A 11/1/2007

River = RV WA T1 Reach = R1 RS = 2.760



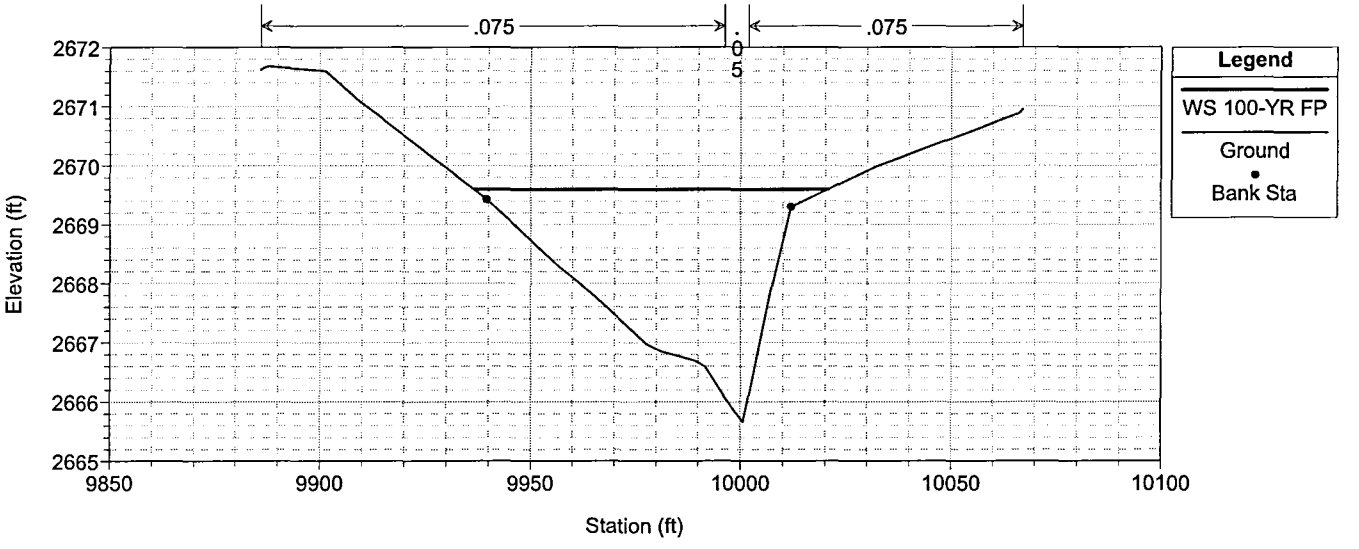
RV Wash A Plan: RV Wash A 11/1/2007

River = RV WA T1 Reach = R1 RS = 2.541



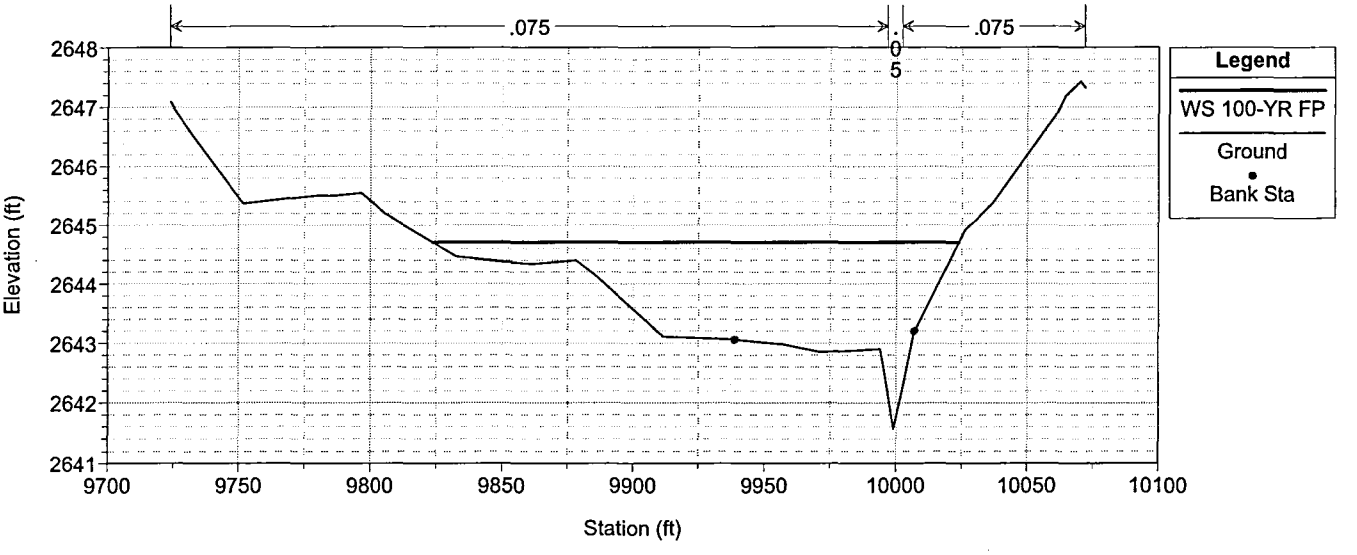
RV Wash A Plan: RV Wash A 11/1/2007

River = RV WA T1 Reach = R1 RS = 2.344



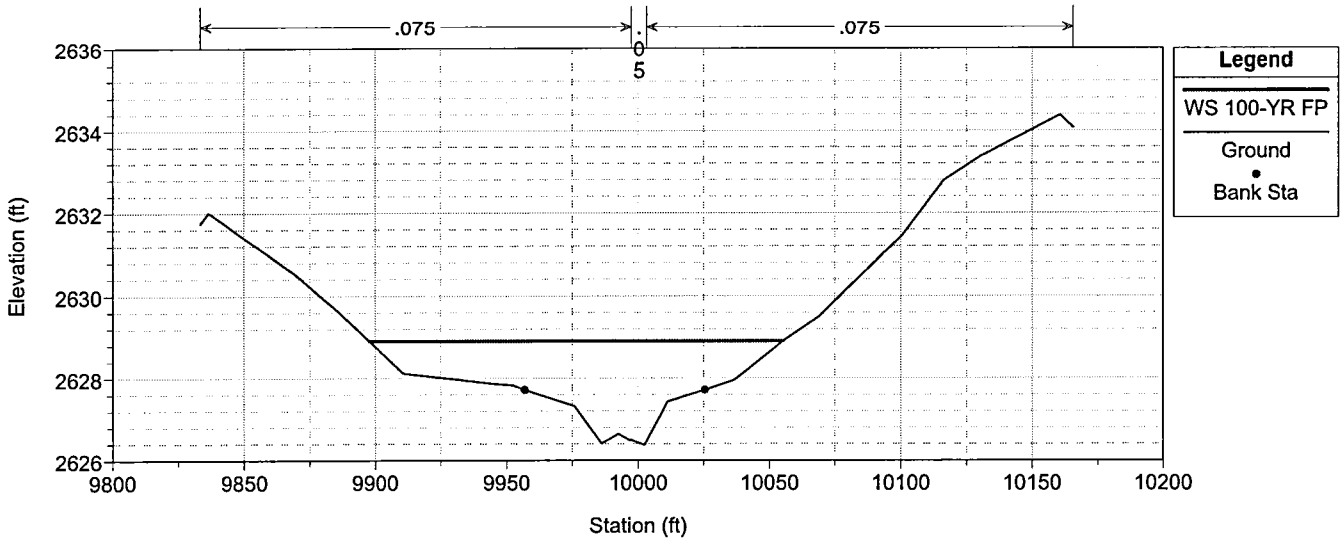
RV Wash A Plan: RV Wash A 11/1/2007

River = RV WA T1 Reach = R1 RS = 2.133



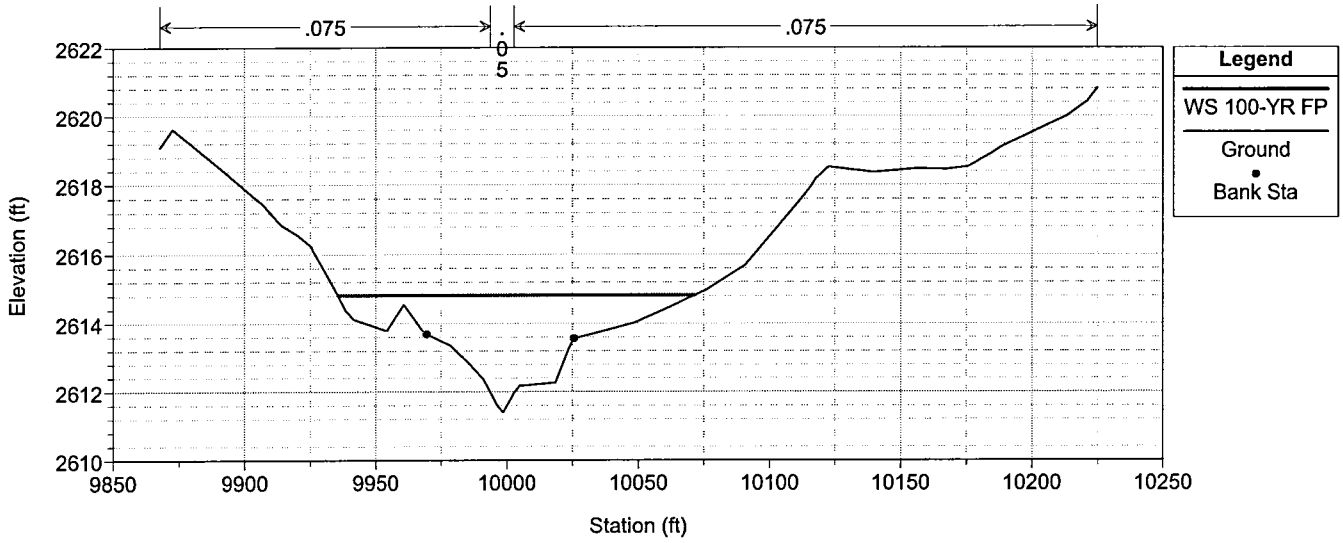
RV Wash A Plan: RV Wash A 11/1/2007

River = RV WA T1 Reach = R1 RS = 1.994



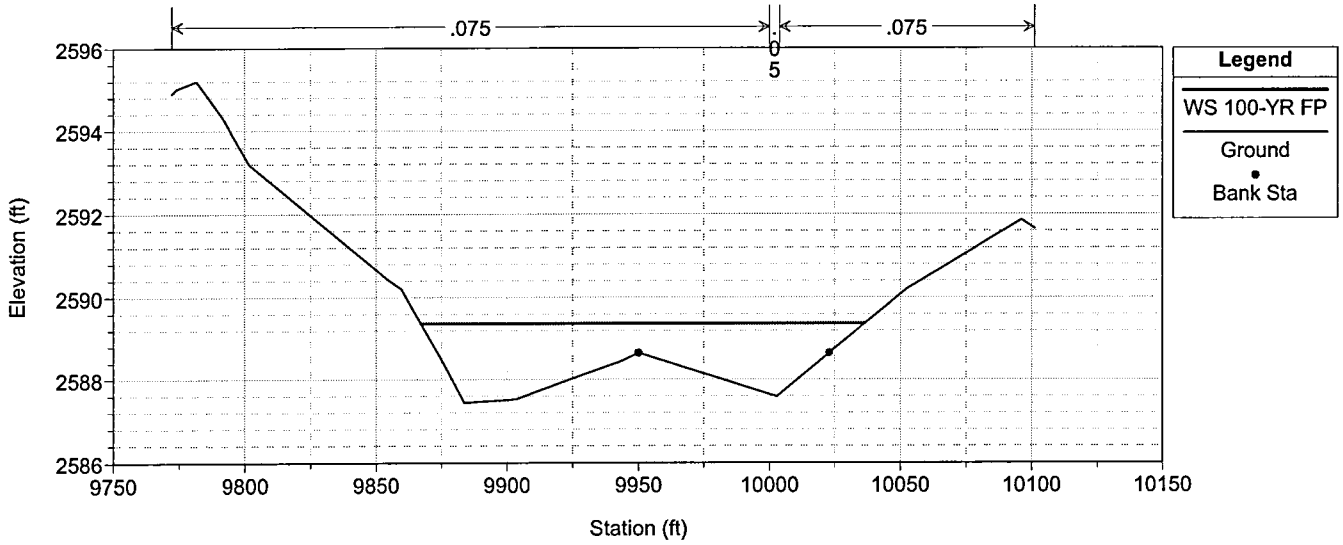
RV Wash A Plan: RV Wash A 11/1/2007

River = RV WA T1 Reach = R1 RS = 1.867



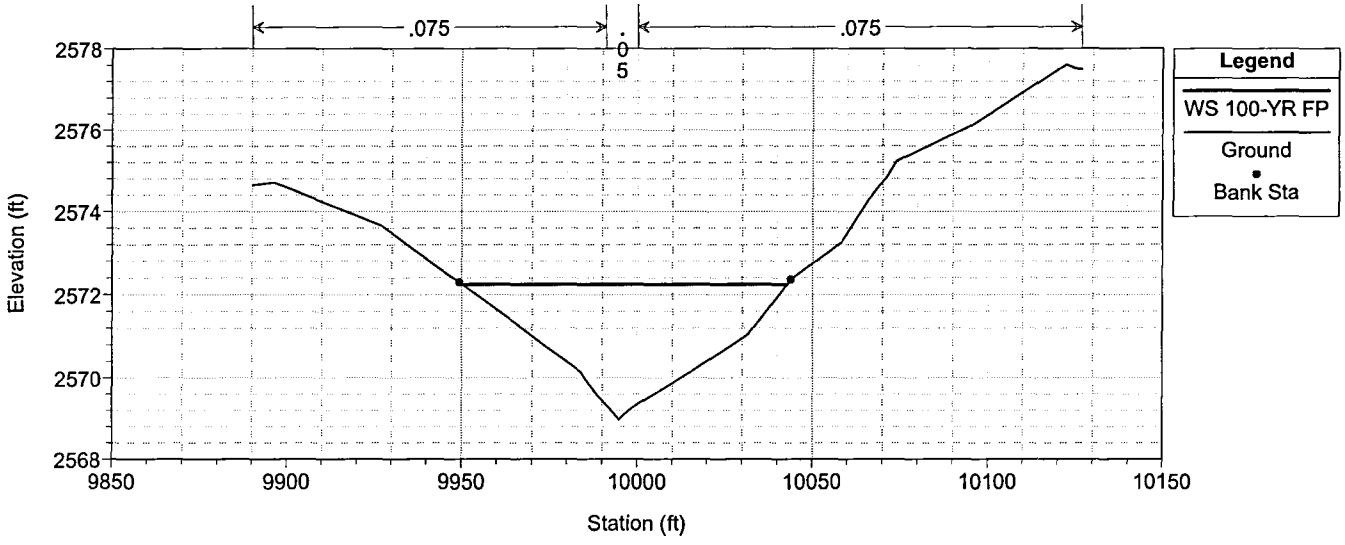
RV Wash A Plan: RV Wash A 11/1/2007

River = RV WA T1 Reach = R1 RS = 1.638



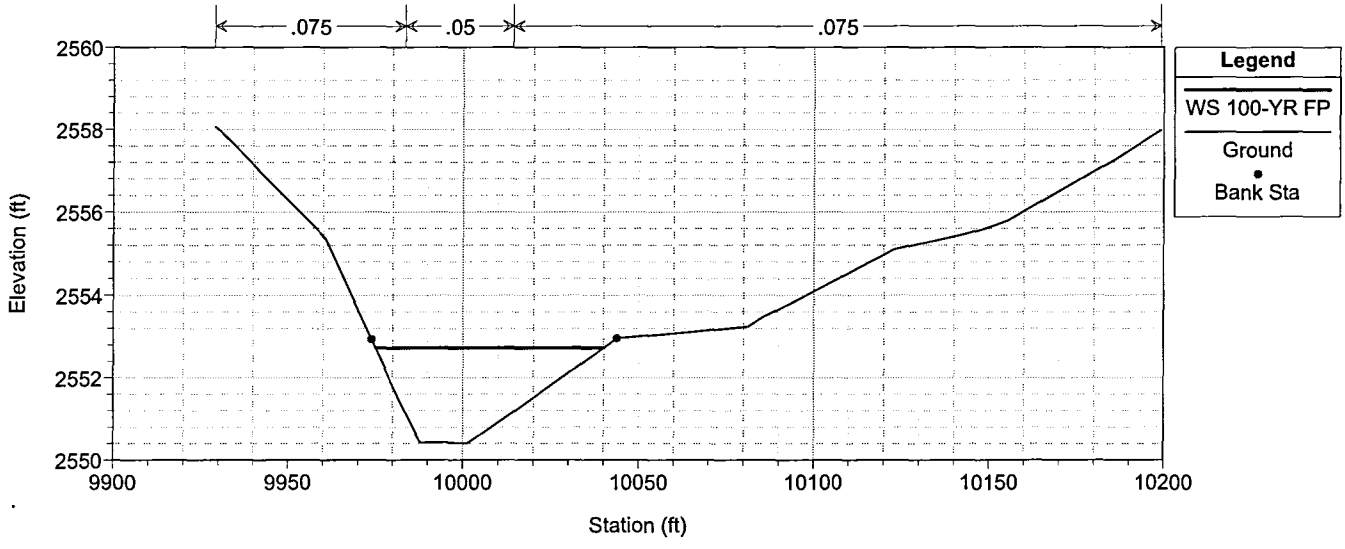
RV Wash A Plan: RV Wash A 11/1/2007

River = RV WA T1 Reach = R1 RS = 1.476



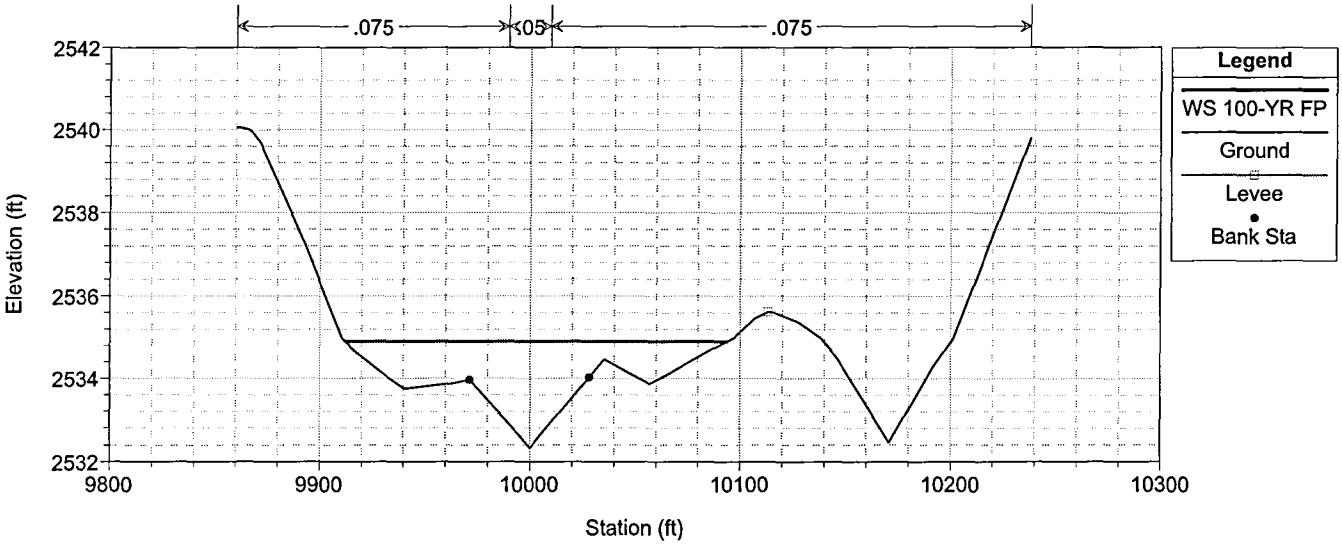
RV Wash A Plan: RV Wash A 11/1/2007

River = RV WA T1 Reach = R1 RS = 1.304



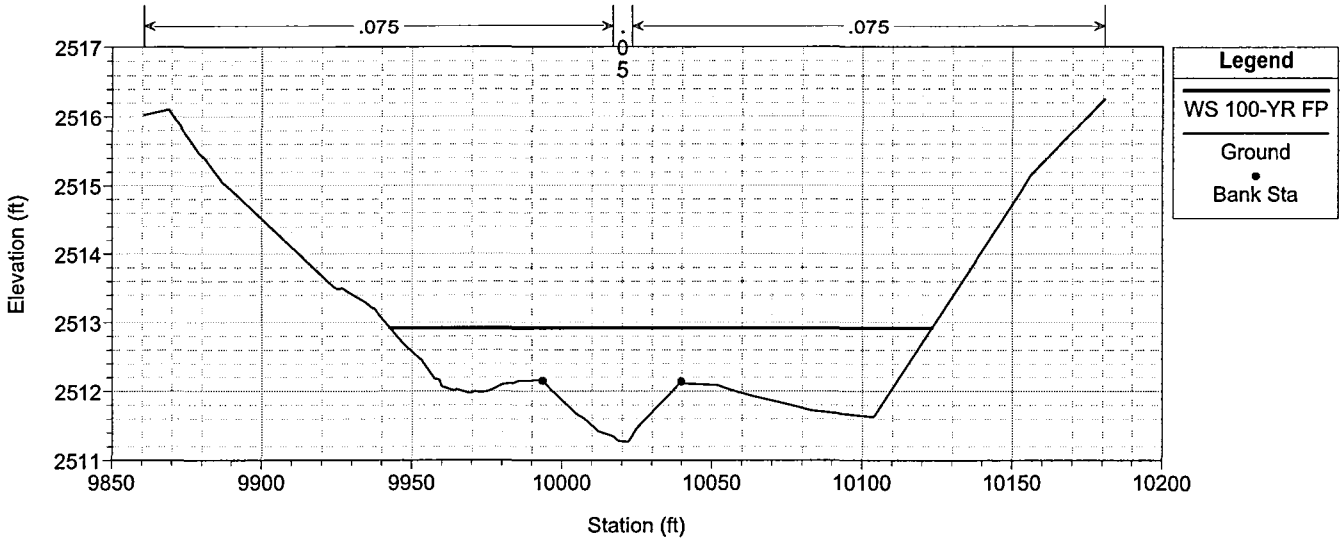
RV Wash A Plan: RV Wash A 11/1/2007

River = RV WA T1 Reach = R1 RS = 1.140



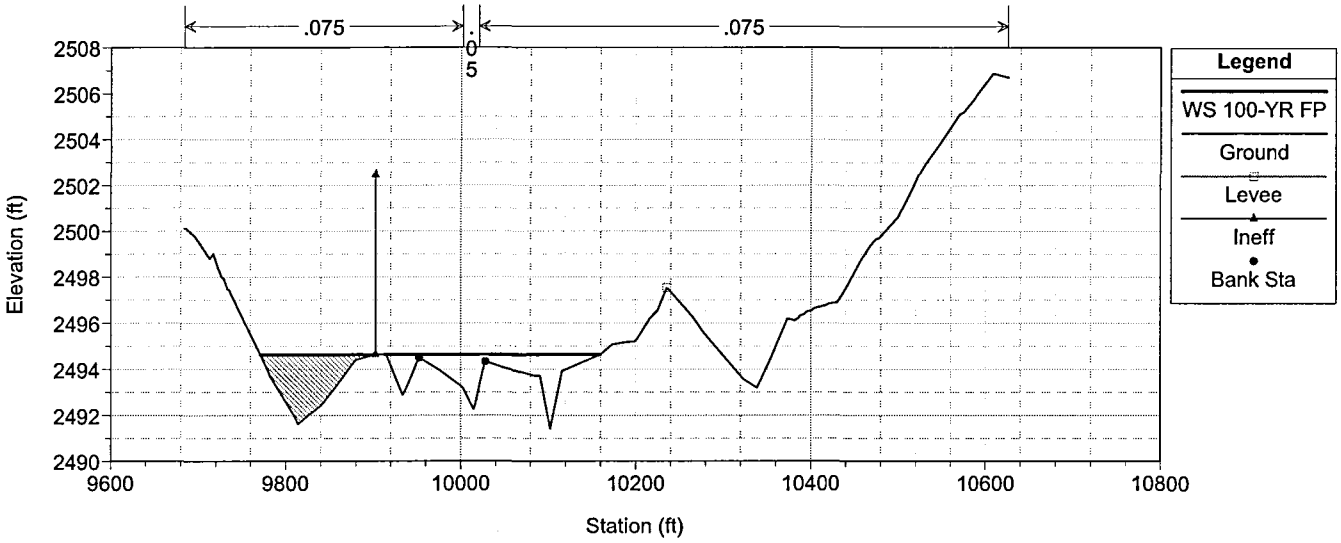
RV Wash A Plan: RV Wash A 11/1/2007

River = RV WA T1 Reach = R1 RS = 0.935



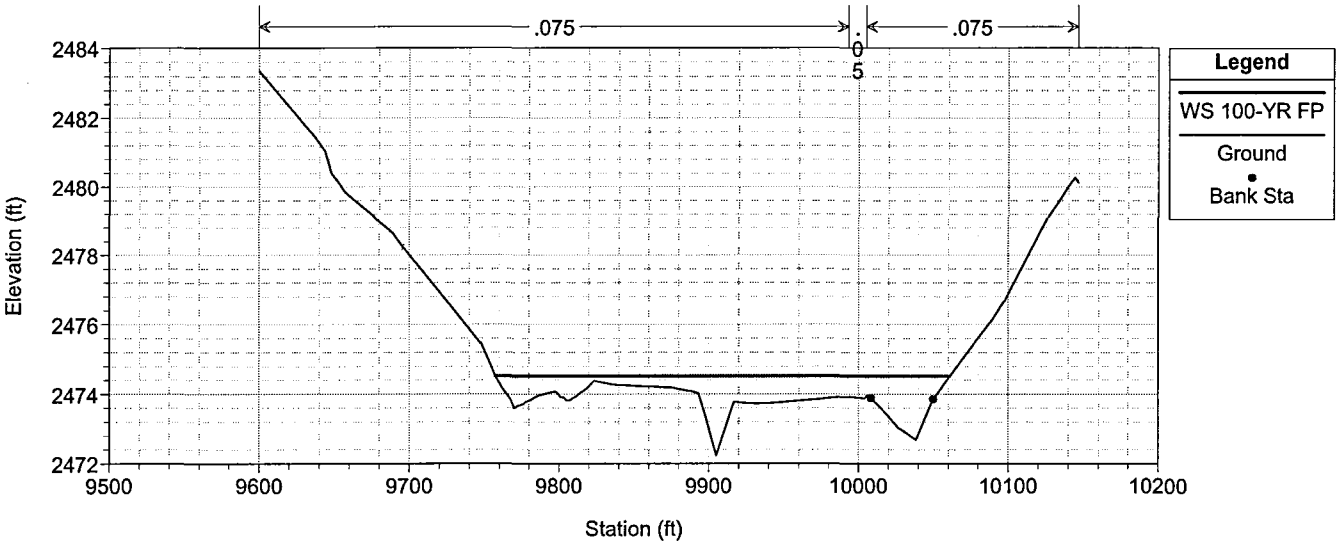
RV Wash A Plan: RV Wash A 11/1/2007

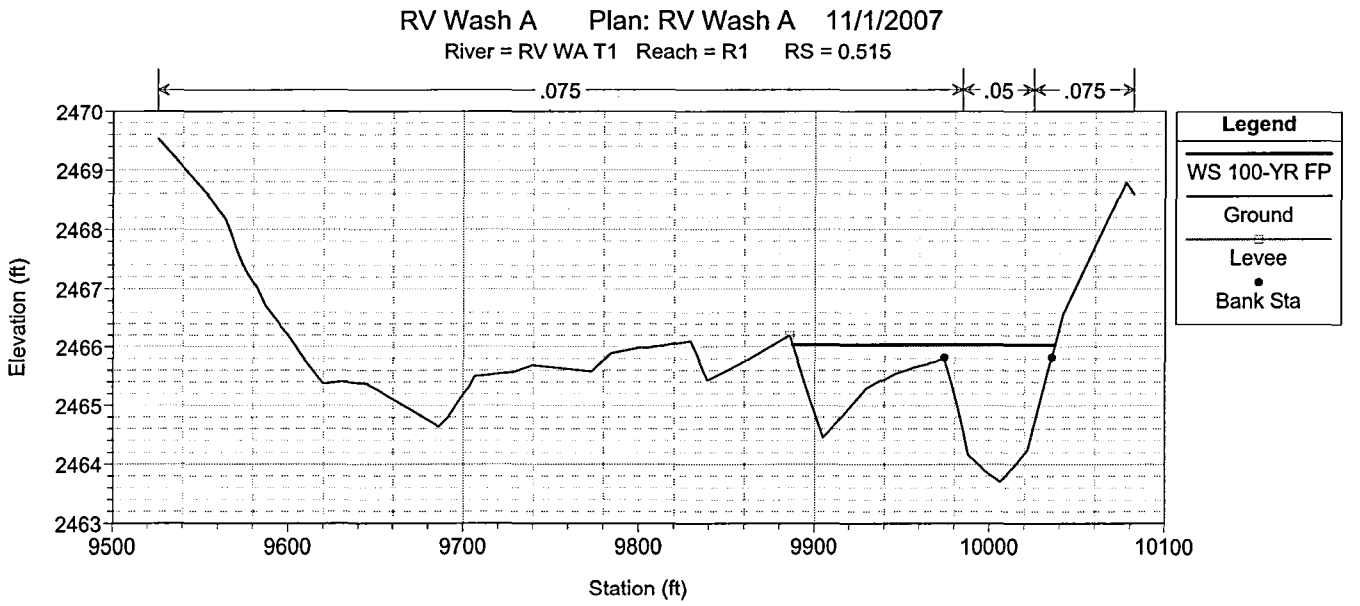
River = RV WA T1 Reach = R1 RS = 0.780

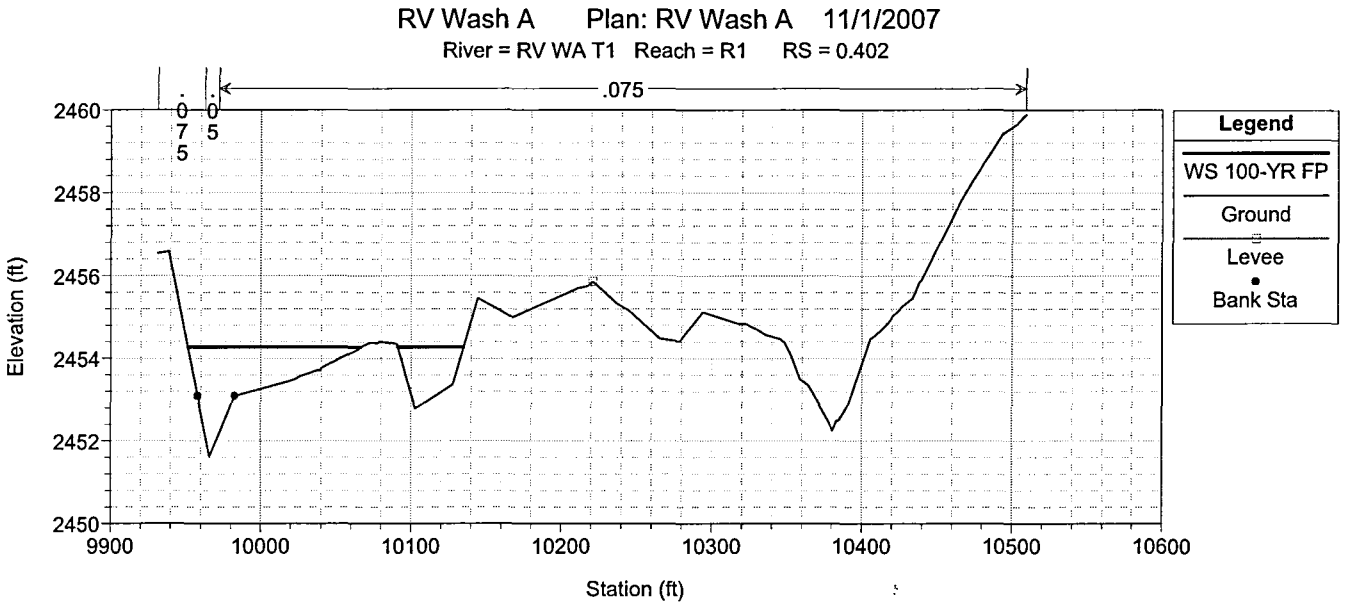


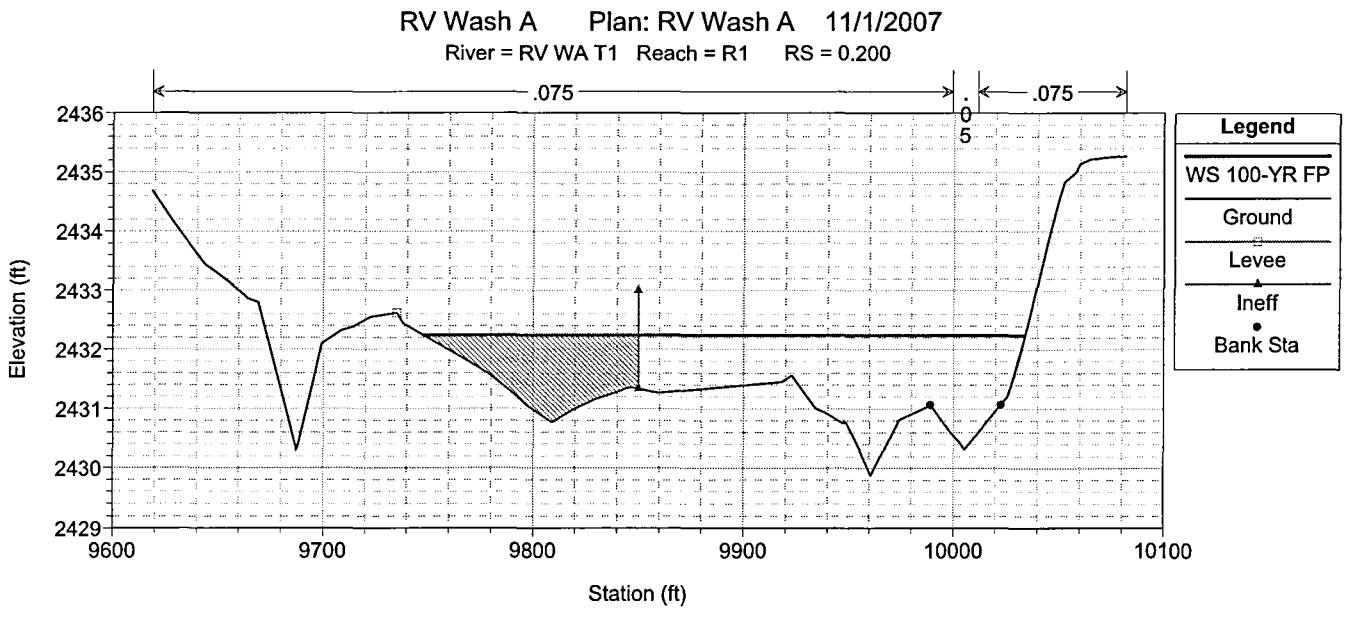
RV Wash A Plan: RV Wash A 11/1/2007

River = RV WA T1 Reach = R1 RS = 0.592



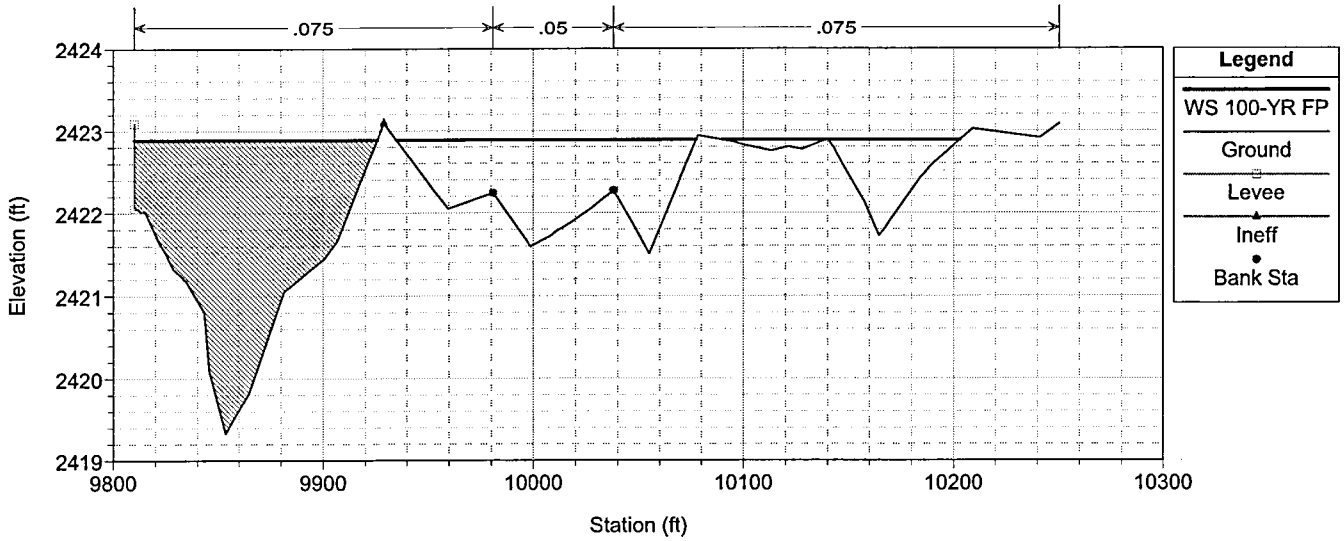

RV Wash A Plan: RV Wash A 11/1/2007
River = RV WA T1 Reach = R1 RS = 0.515
.075
.05
.075
Elevation (ft)
Station (ft)
Legend
WS 100-YR FP
Ground
Levee
Bank Sta


RV Wash A Plan: RV Wash A 11/1/2007
River = RV WA T1 Reach = R1 RS = 0.402
.075
Elevation (ft)
Station (ft)
Legend
WS 100-YR FP
Ground
Levee
Bank Sta


RV Wash A Plan: RV Wash A 11/1/2007
River = RV WA T1 Reach = R1 RS = 0.200
.075
.05
.075
Elevation (ft)
Station (ft)
Legend
WS 100-YR FP
Ground
Levee
Ineff
Bank Sta

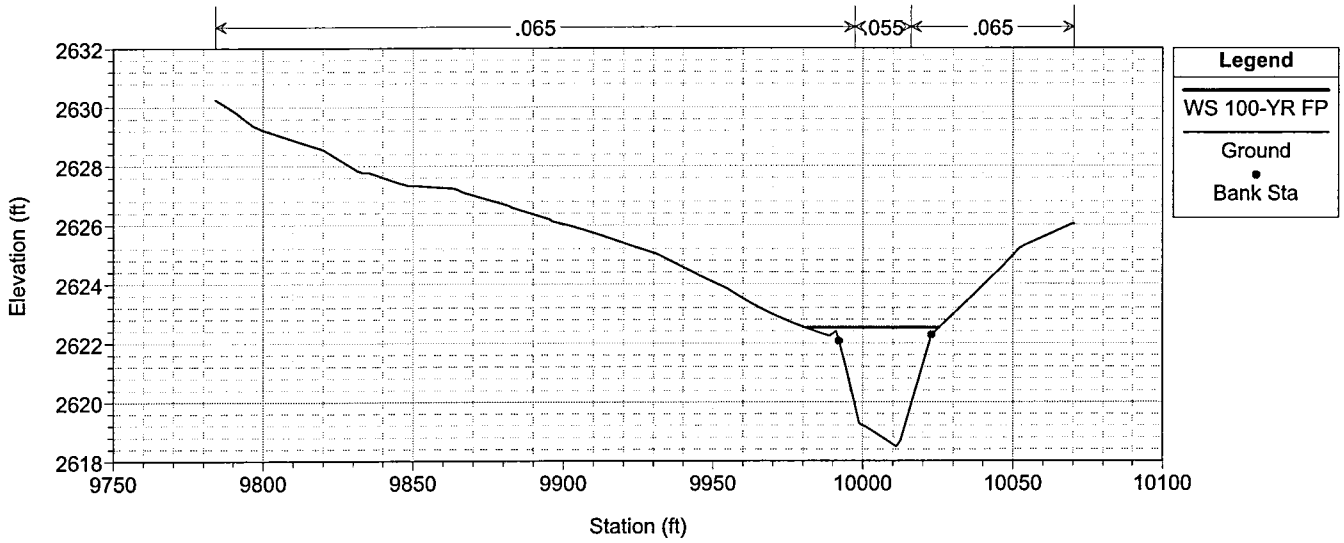
RV Wash A Plan: RV Wash A 11/1/2007

River = RV WA T1 Reach = R1 RS = 0.122



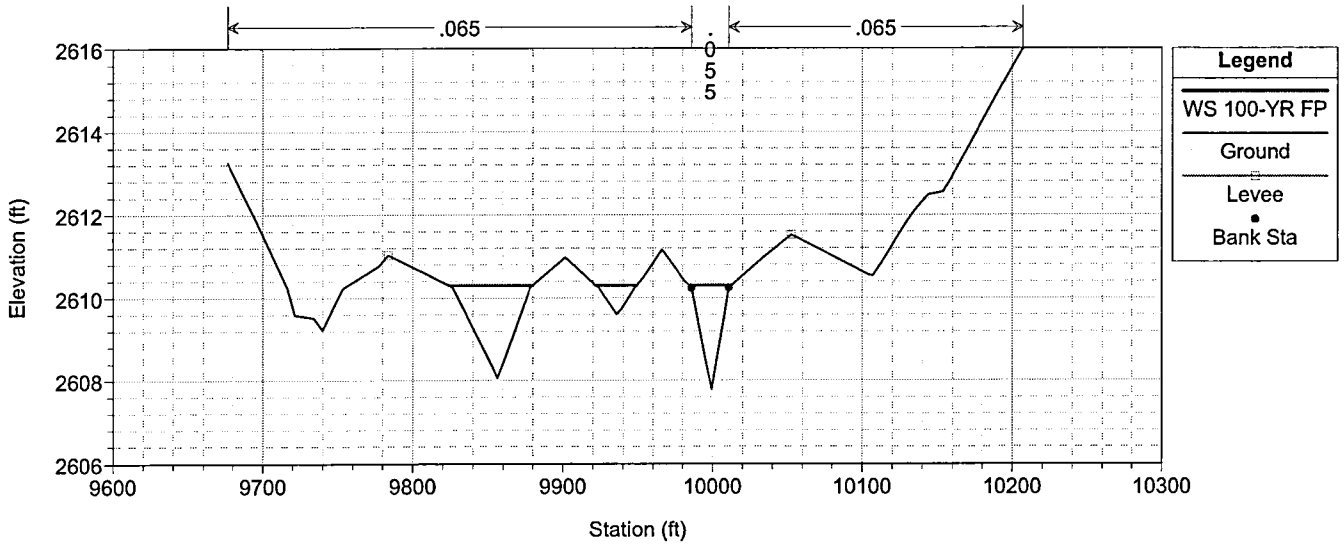
RV Wash A Plan: RV Wash A 11/1/2007

River = RV WA T2 Reach = R1 RS = 1.920



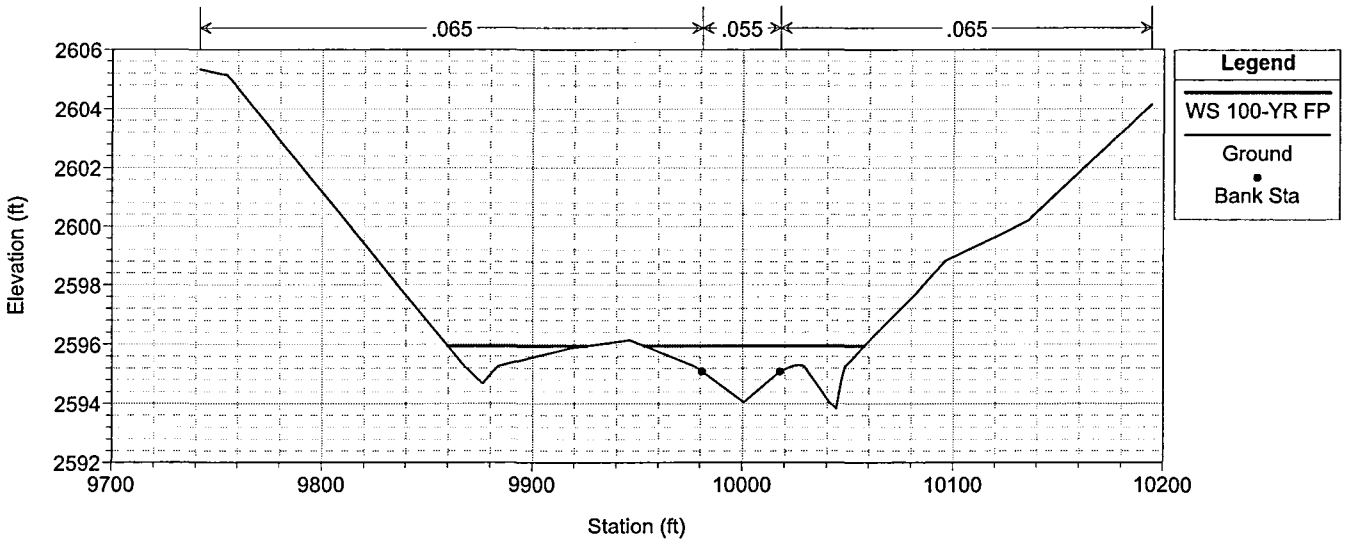
RV Wash A Plan: RV Wash A 11/1/2007

River = RV WA T2 Reach = R1 RS = 1.765



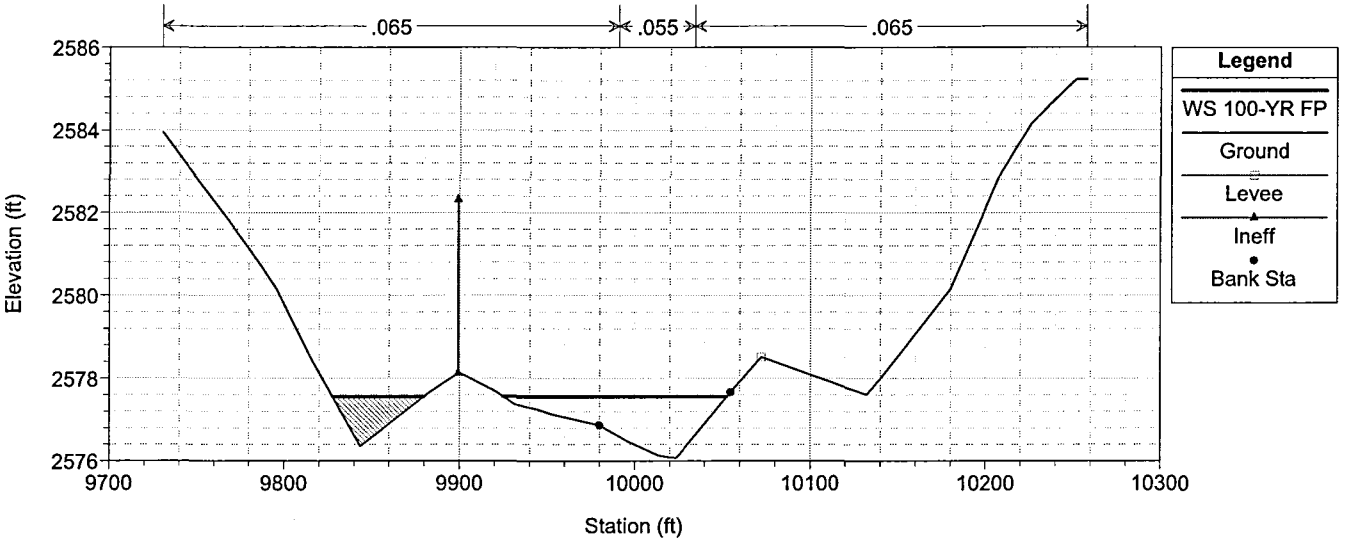
RV Wash A Plan: RV Wash A 11/1/2007

River = RV WA T2 Reach = R1 RS = 1.627



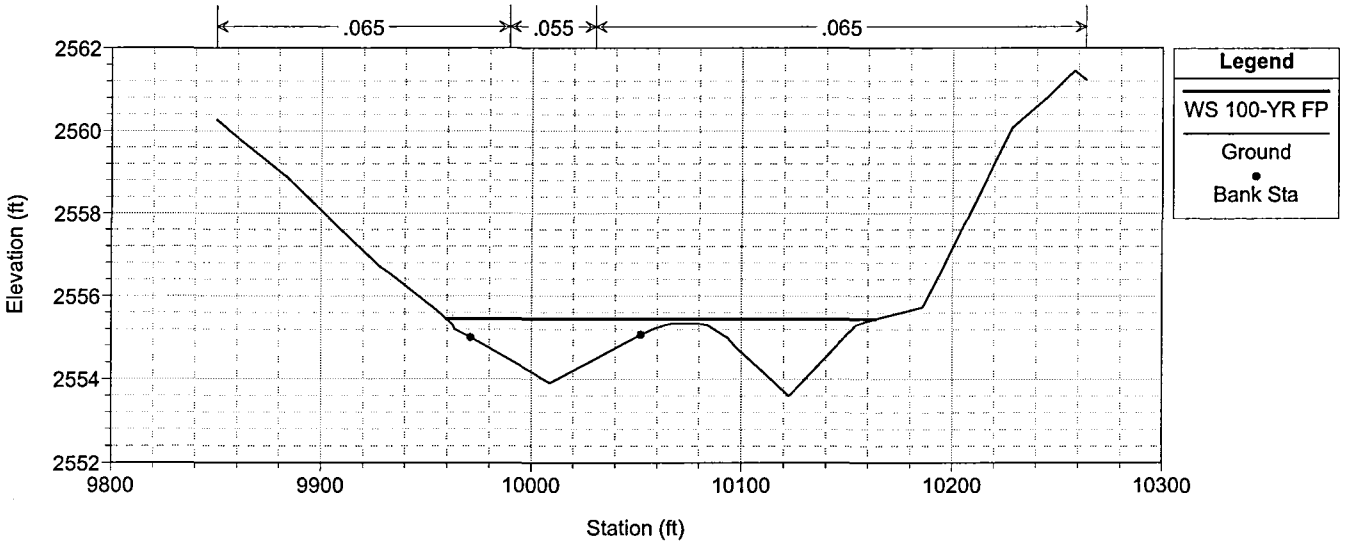
RV Wash A Plan: RV Wash A 11/1/2007

River = RV WA T2 Reach = R1 RS = 1.467



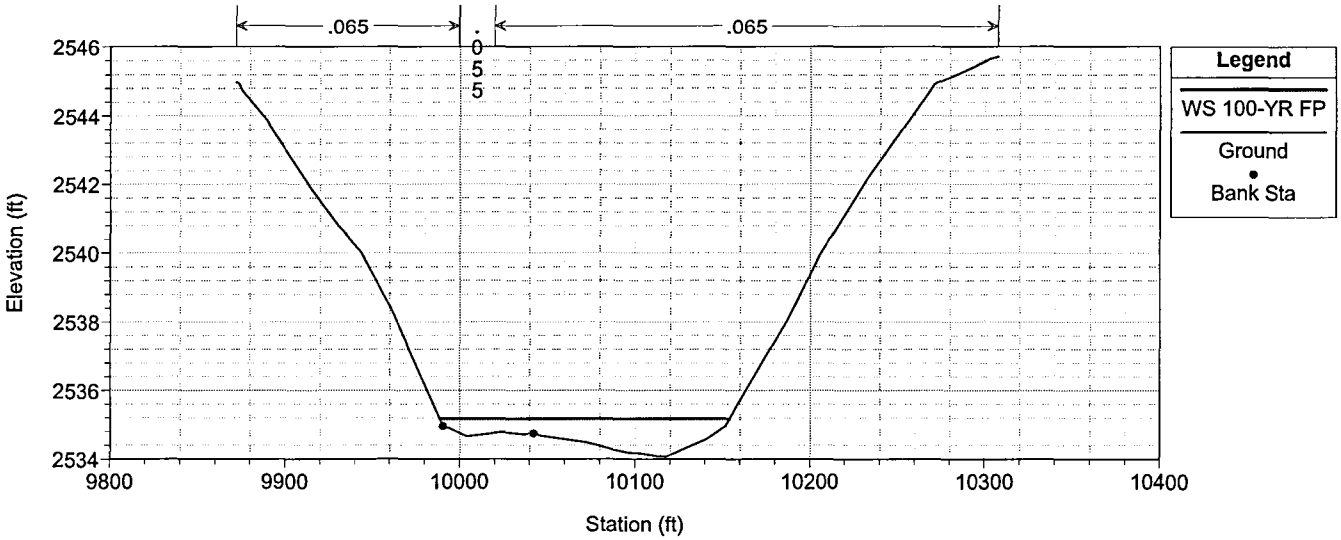
RV Wash A Plan: RV Wash A 11/1/2007

River = RV WA T2 Reach = R1 RS = 1.251



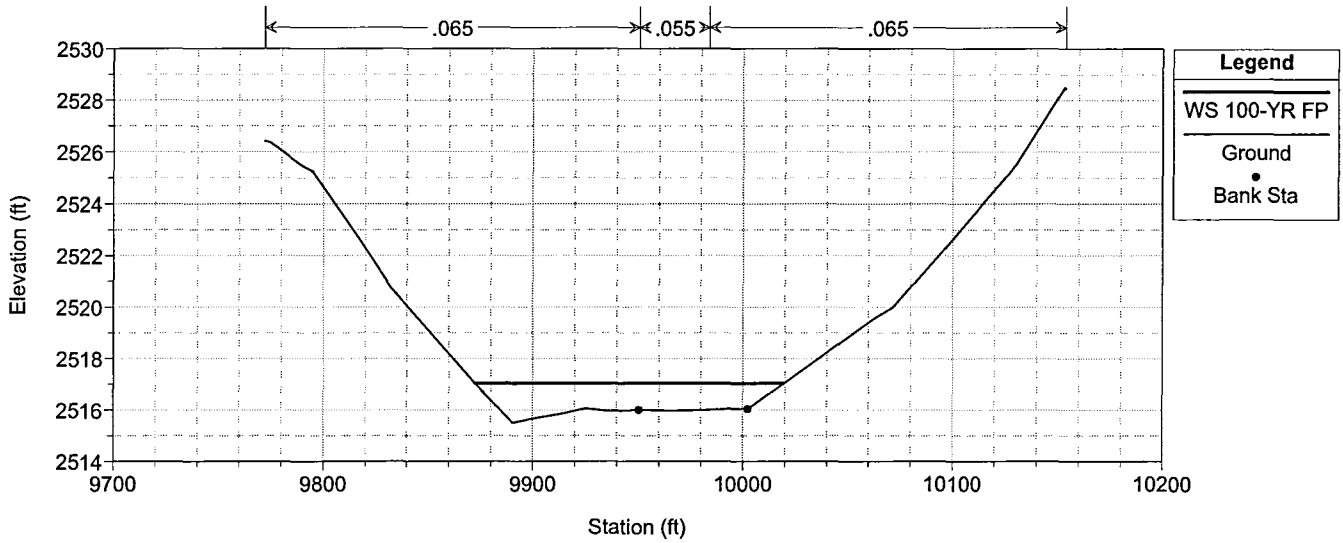
RV Wash A Plan: RV Wash A 11/1/2007

River = RV WA T2 Reach = R1 RS = 1.084



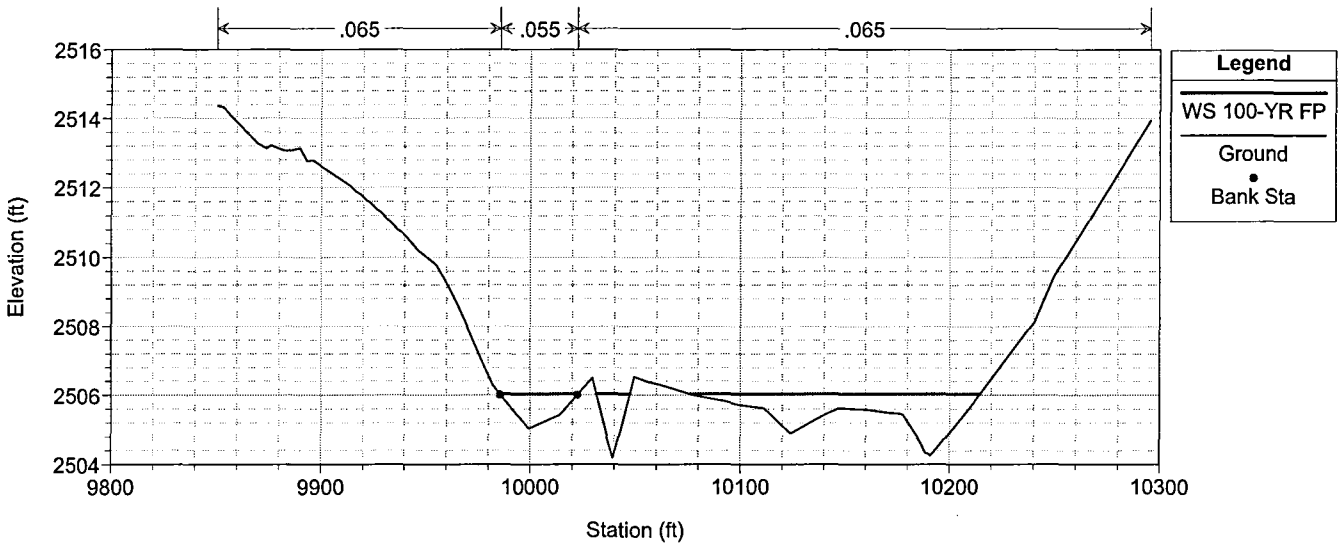
RV Wash A Plan: RV Wash A 11/1/2007

River = RV WA T2 Reach = R1 RS = 0.924



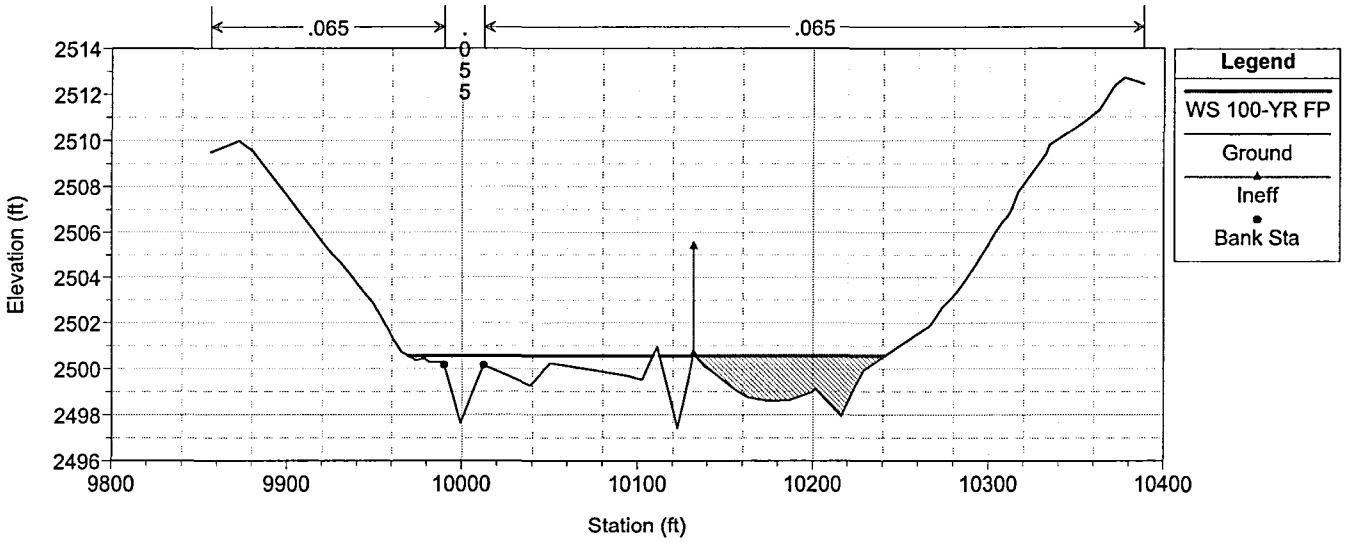
RV Wash A Plan: RV Wash A 11/1/2007

River = RV WA T2 Reach = R1 RS = 0.817



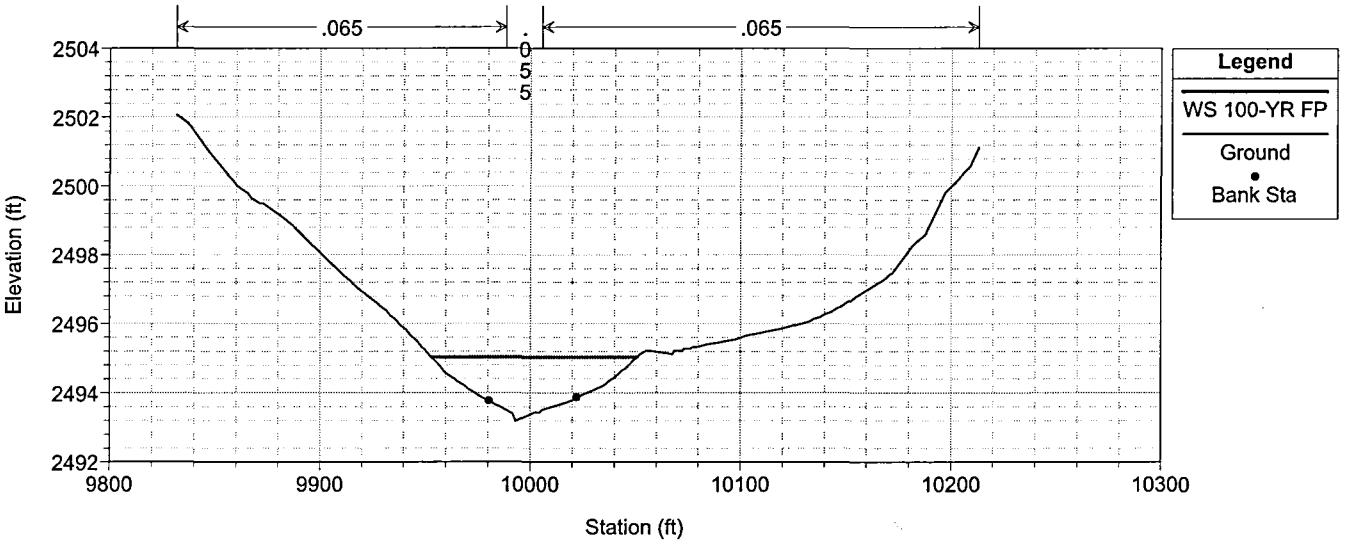
RV Wash A Plan: RV Wash A 11/1/2007

River = RV WA T2 Reach = R1 RS = 0.762



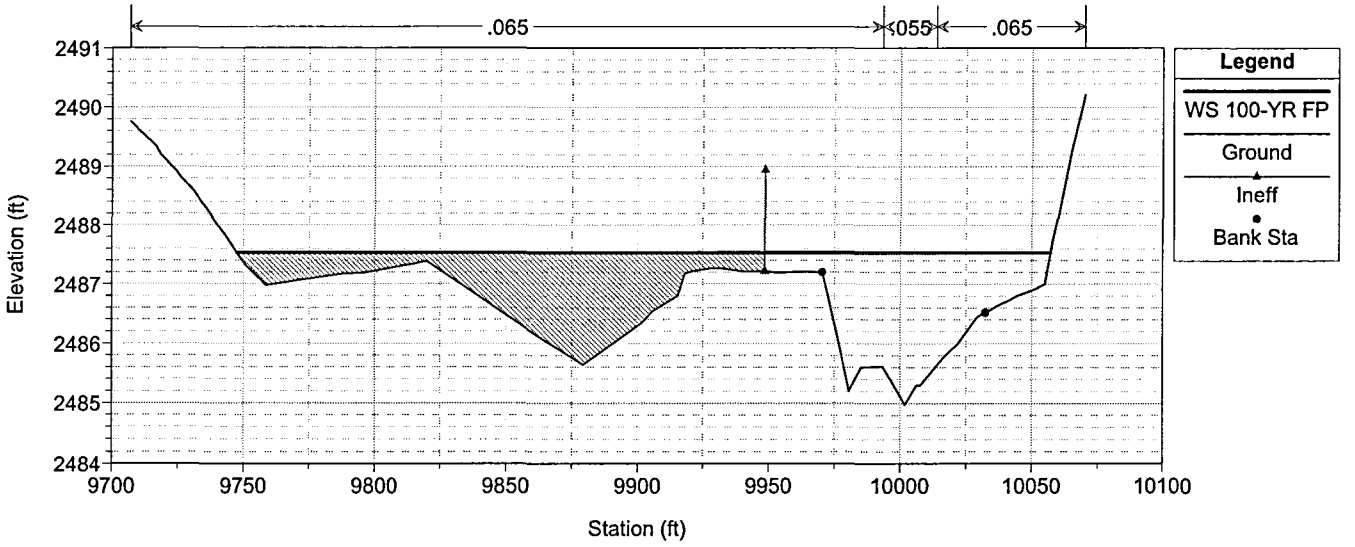
RV Wash A Plan: RV Wash A 11/1/2007

River = RV WA T2 Reach = R1 RS = 0.715



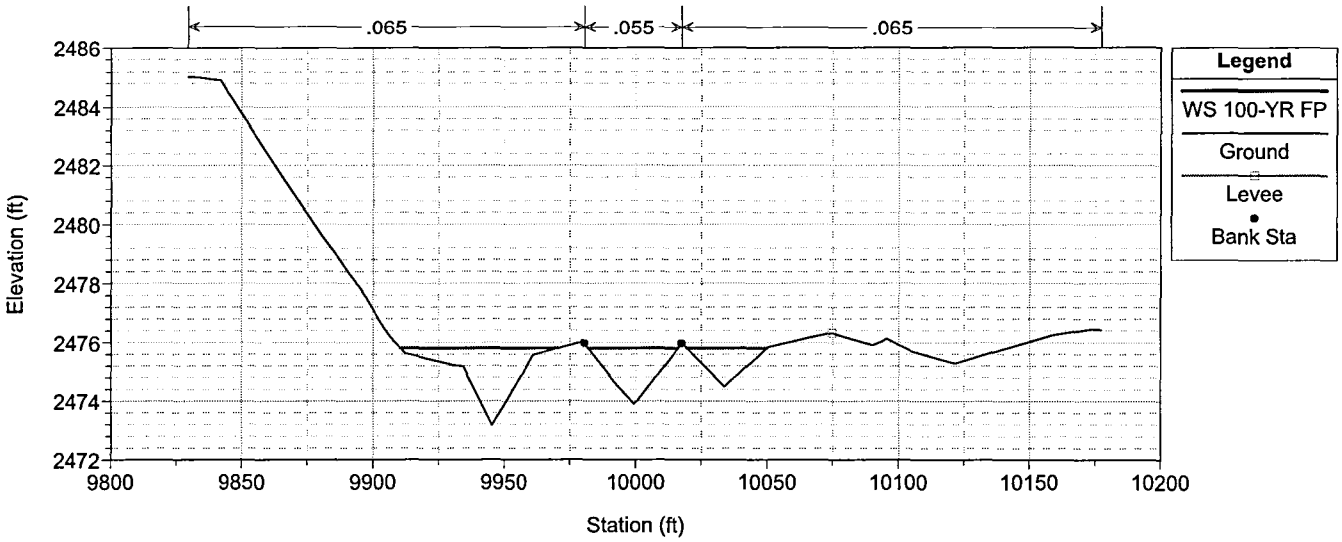
RV Wash A Plan: RV Wash A 11/1/2007

River = RV WA T2 Reach = R1 RS = 0.642



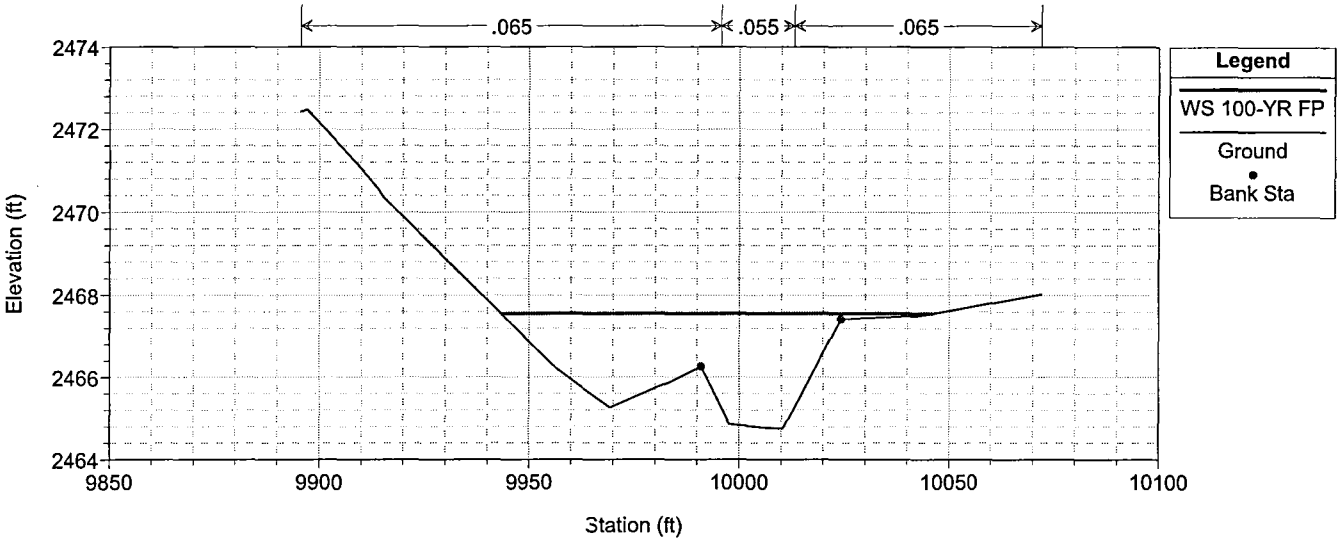
RV Wash A Plan: RV Wash A 11/1/2007

River = RV WA T2 Reach = R1 RS = 0.547



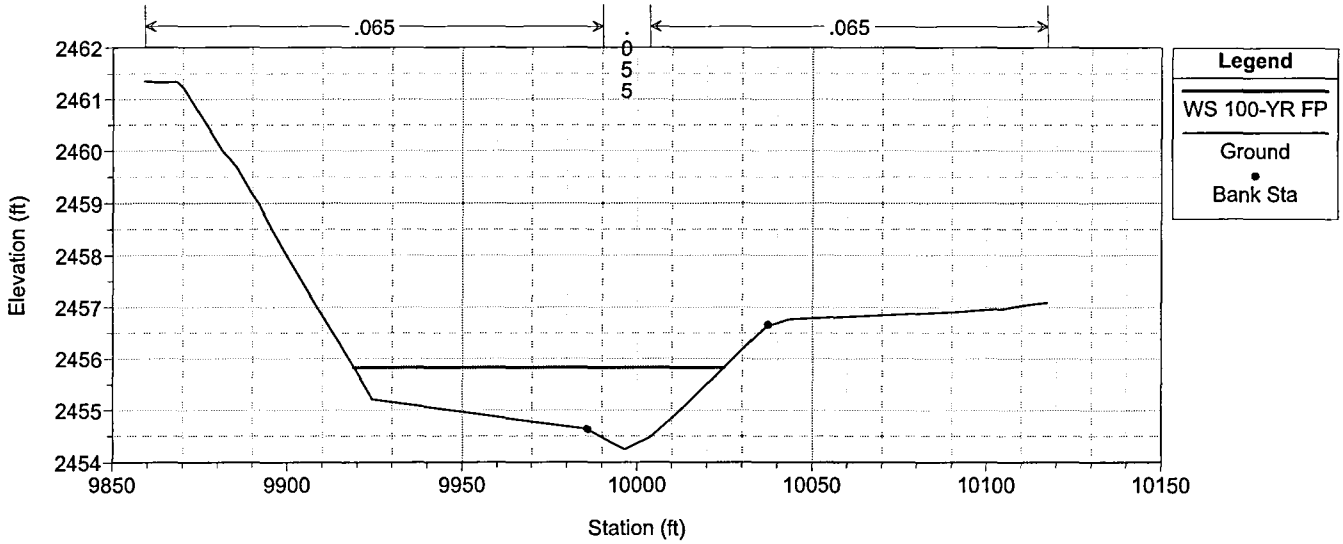
RV Wash A Plan: RV Wash A 11/1/2007

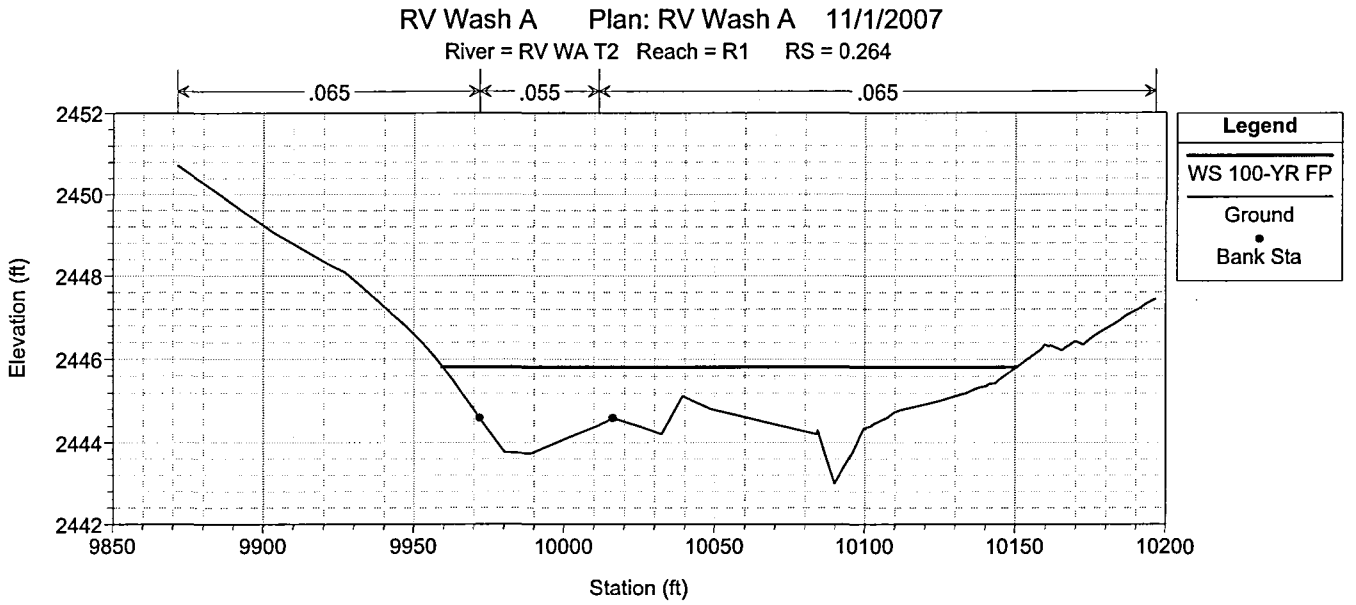
River = RV WA T2 Reach = R1 RS = 0.473

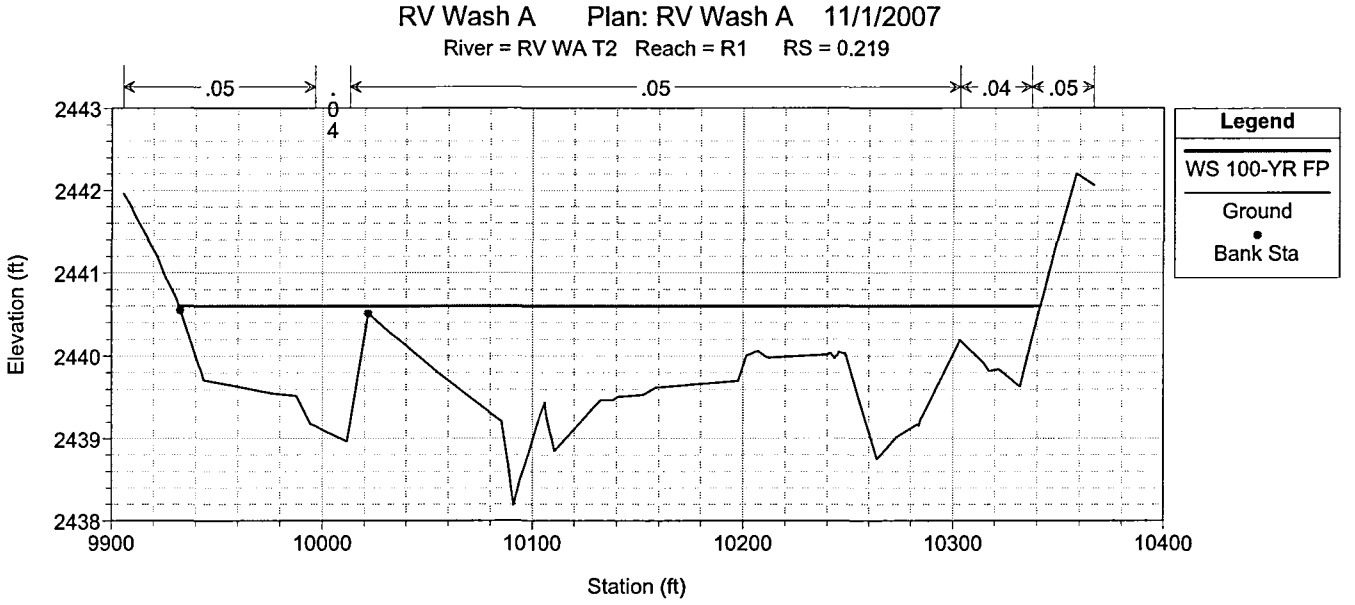


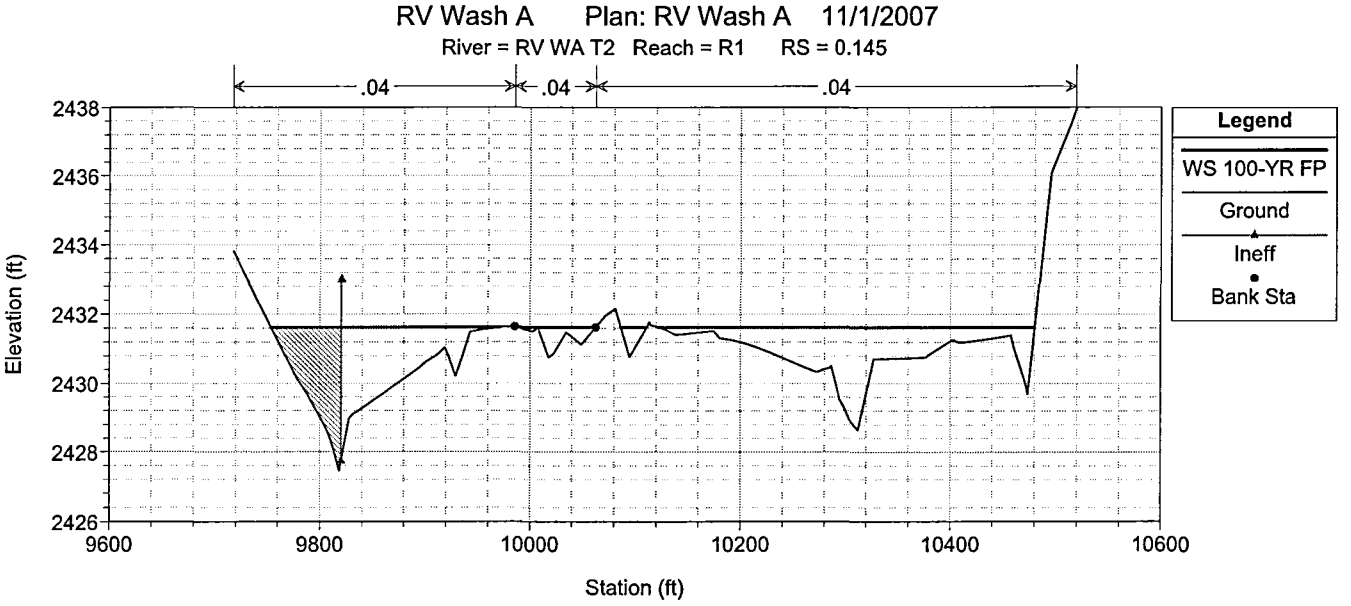
RV Wash A Plan: RV Wash A 11/1/2007

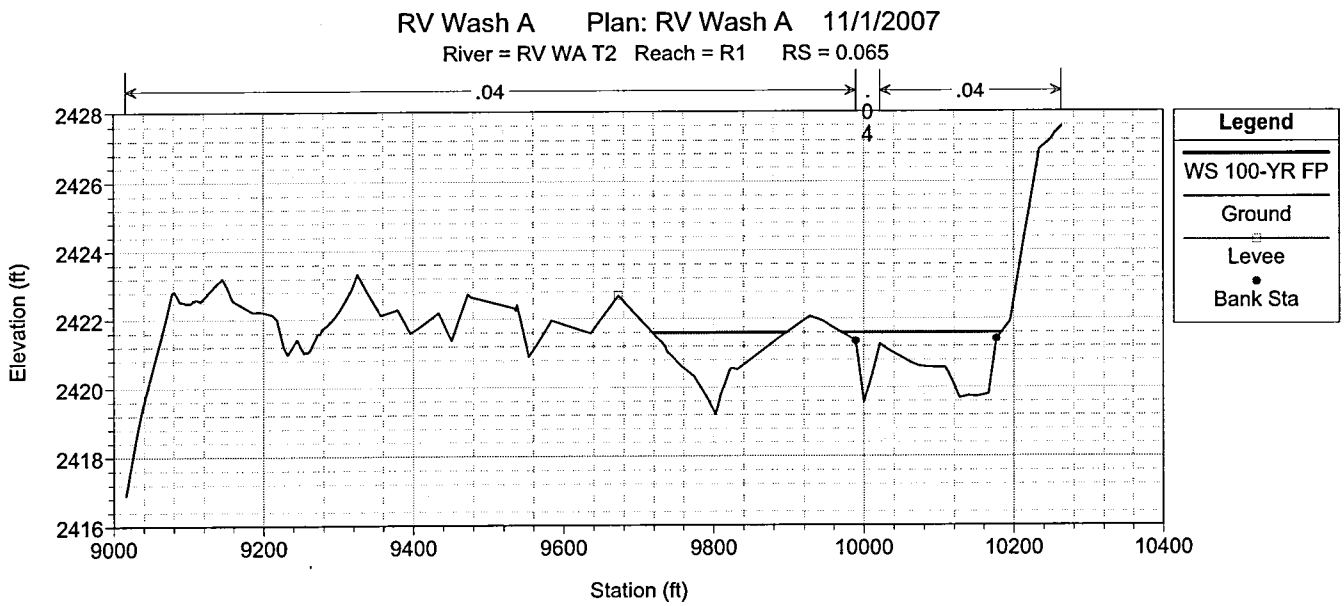
River = RV WA T2 Reach = R1 RS = 0.366




RV Wash A Plan: RV Wash A 11/1/2007
River = RV WA T2 Reach = R1 RS = 0.264
.065
.055
.065
Elevation (ft)
Station (ft)
Legend
WS 100-YR FP
Ground
Bank Sta


RV Wash A Plan: RV Wash A 11/1/2007
River = RV WA T2 Reach = R1 RS = 0.219
.05
.04
.05
.04
.05
Elevation (ft)
Station (ft)
Legend
WS 100-YR FP
Ground
Bank Sta


RV Wash A Plan: RV Wash A 11/1/2007
River = RV WA T2 Reach = R1 RS = 0.145
.04
.04
.04
Elevation (ft)
Station (ft)
Legend
WS 100-YR FP
Ground
Ineff
Bank Sta

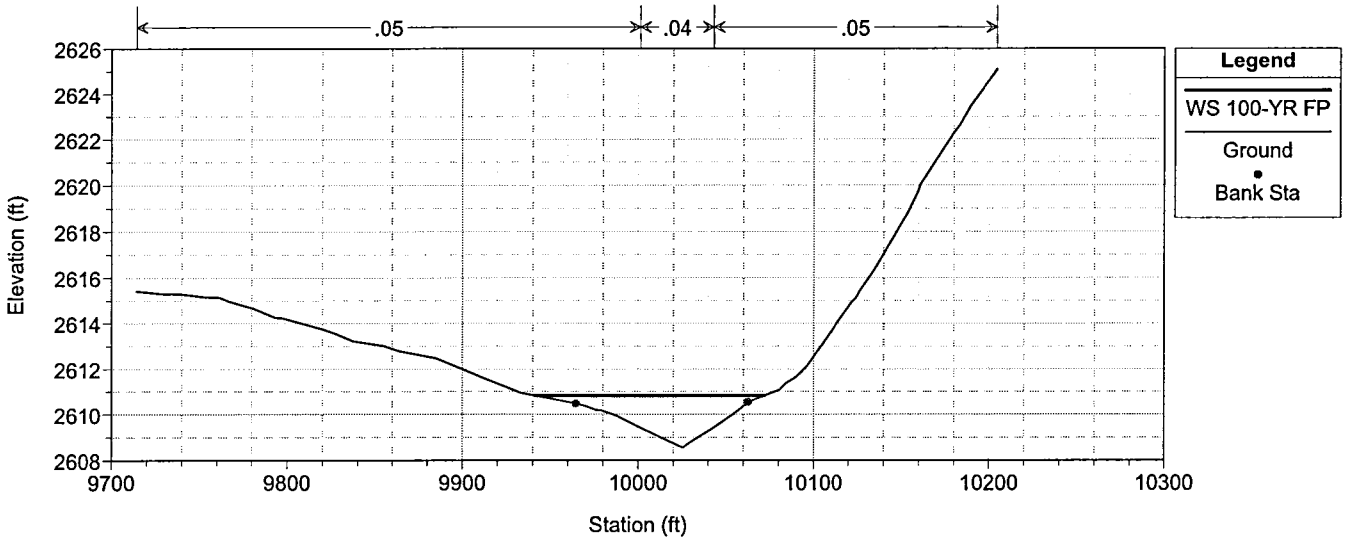

RV Wash A Plan: RV Wash A 11/1/2007
River = RV WA T2 Reach = R1 RS = 0.065
.04
.04
0.4
Elevation (ft)
2428
2426
2424
2422
2420
2418
2416
9000
9200
9400
9600
9800
10000
10200
10400
Station (ft)
Legend
WS 100-YR FP
Ground
Levee
Bank Sta

E.2.4 HEC-RAS Cross Section Plots

RV Wash A Tank Spillway

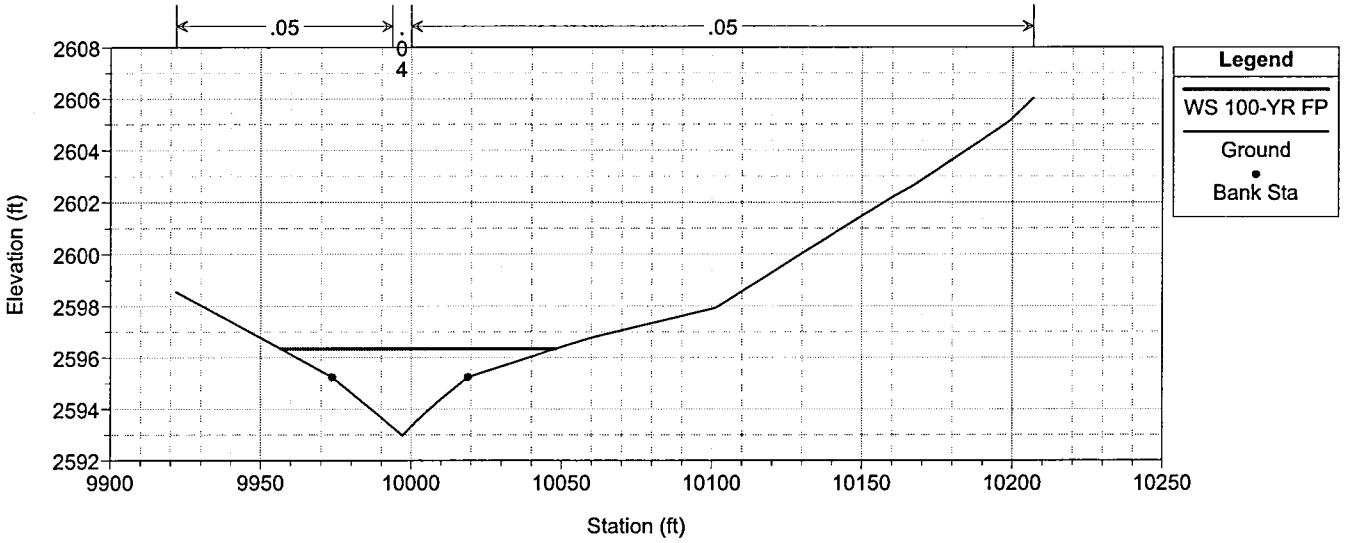
RV Wash A Tank Spillway Plan: RV Wash A Tank Spillway 11/1/2007

River = RV WA TS Reach = R1 RS = 1.378



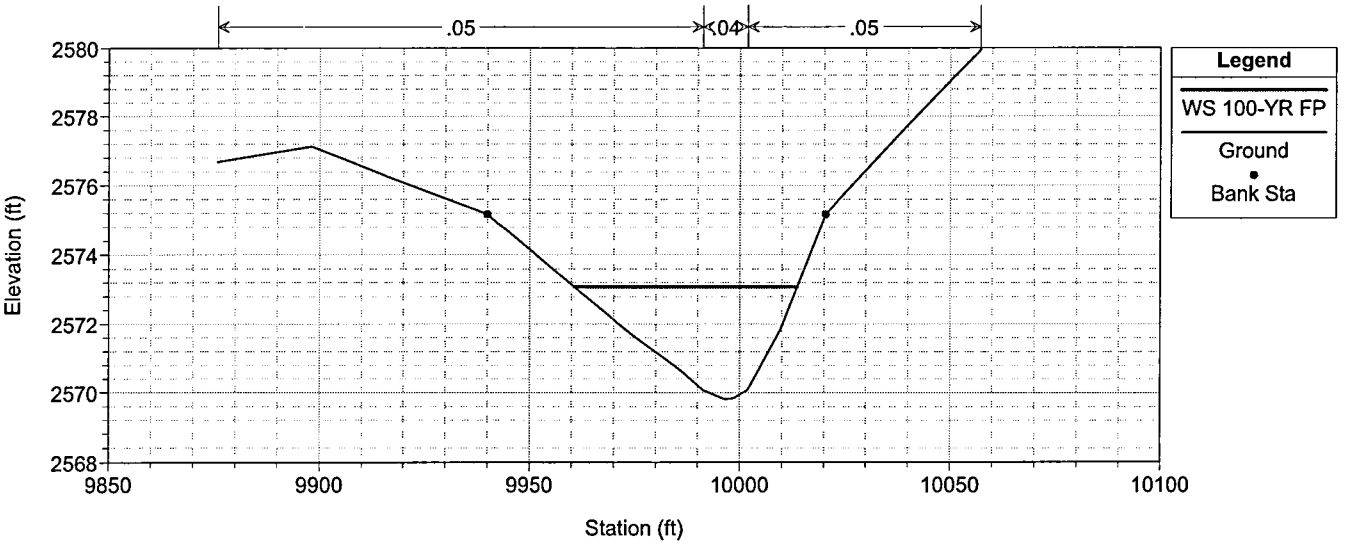
RV Wash A Tank Spillway Plan: RV Wash A Tank Spillway 11/1/2007

River = RV WA TS Reach = R1 RS = 1.266



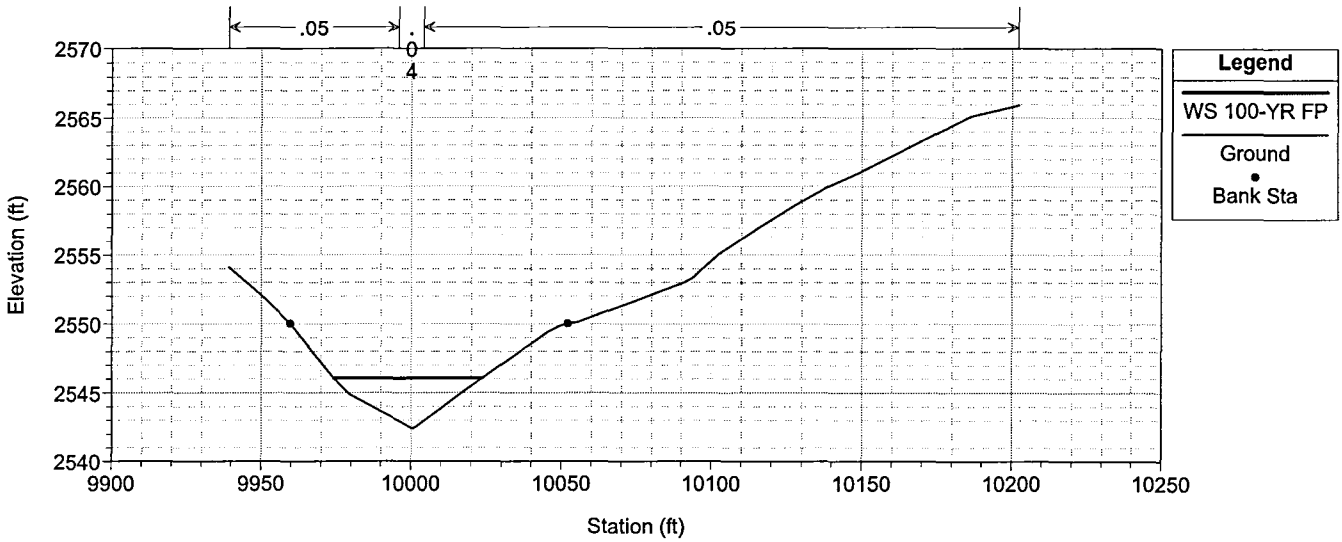
RV Wash A Tank Spillway Plan: RV Wash A Tank Spillway 11/1/2007

River = RV WA TS Reach = R1 RS = 1.058



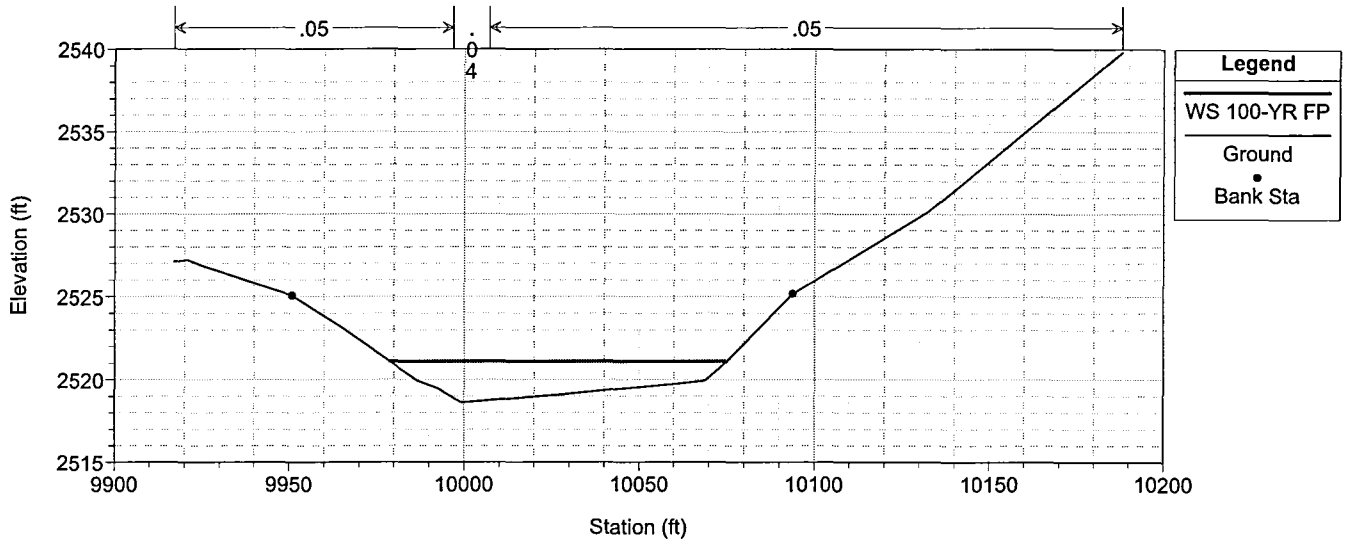
RV Wash A Tank Spillway Plan: RV Wash A Tank Spillway 11/1/2007

River = RV WA TS Reach = R1 RS = 0.858



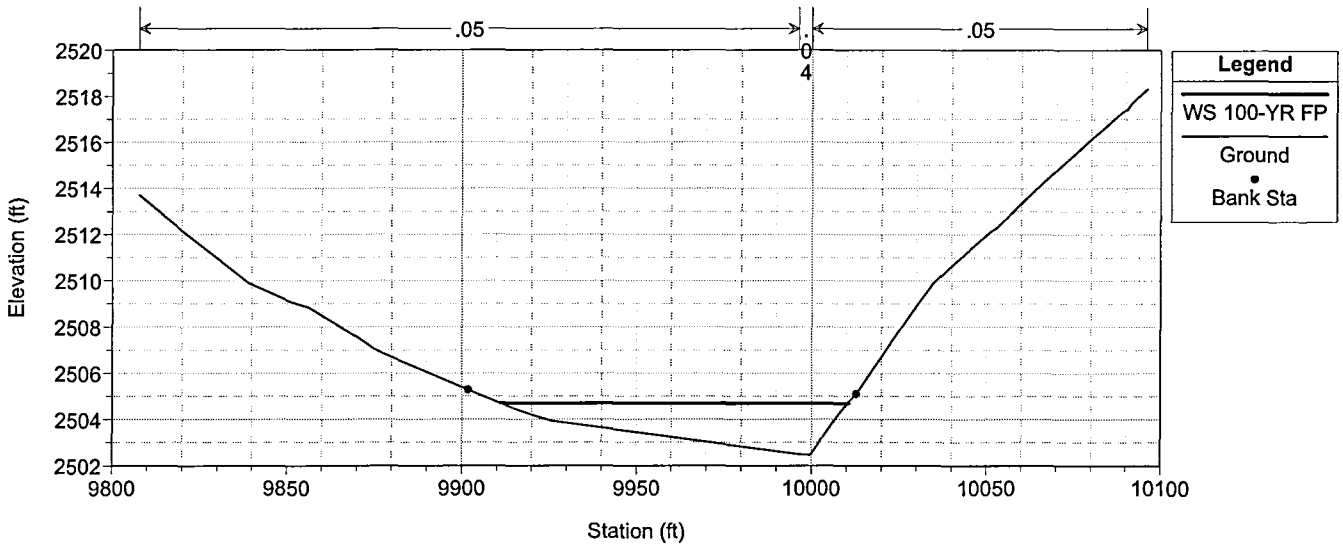
RV Wash A Tank Spillway Plan: RV Wash A Tank Spillway 11/1/2007

River = RV WA TS Reach = R1 RS = 0.663



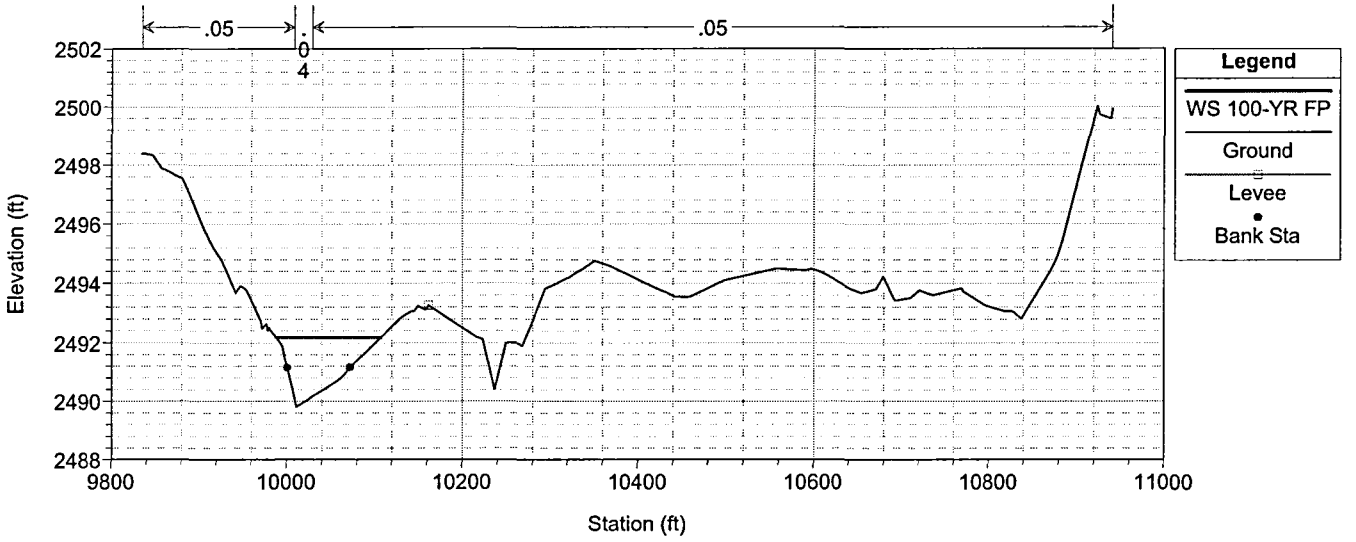
RV Wash A Tank Spillway Plan: RV Wash A Tank Spillway 11/1/2007

River = RV WA TS Reach = R1 RS = 0.481



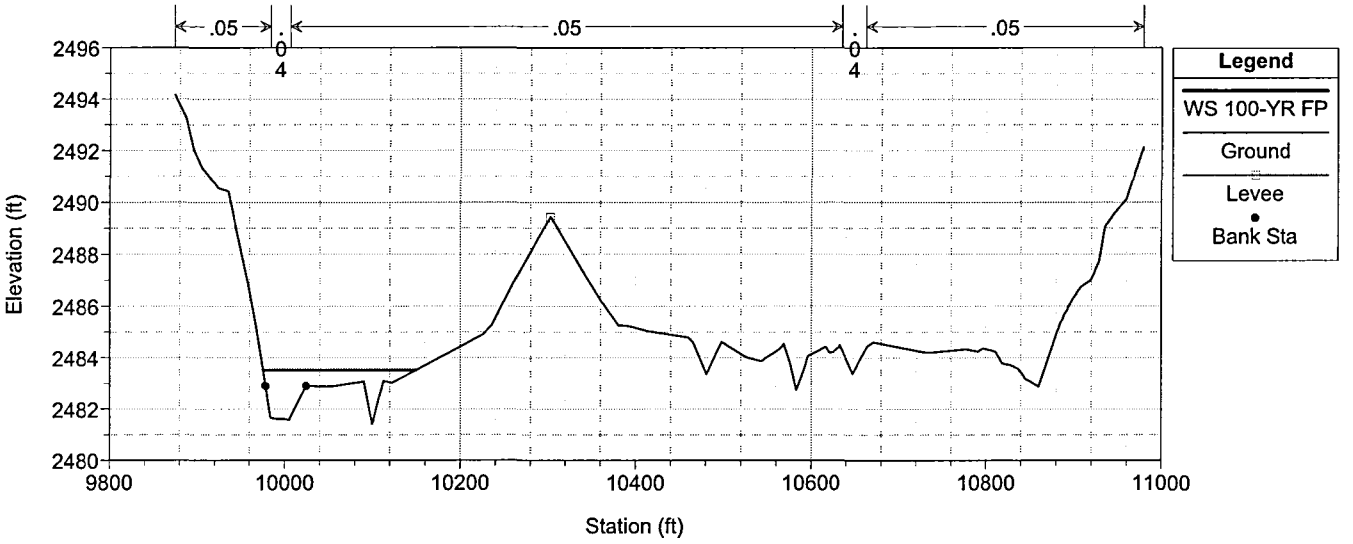
RV Wash A Tank Spillway Plan: RV Wash A Tank Spillway 11/1/2007

River = RV WA TS Reach = R1 RS = 0.355



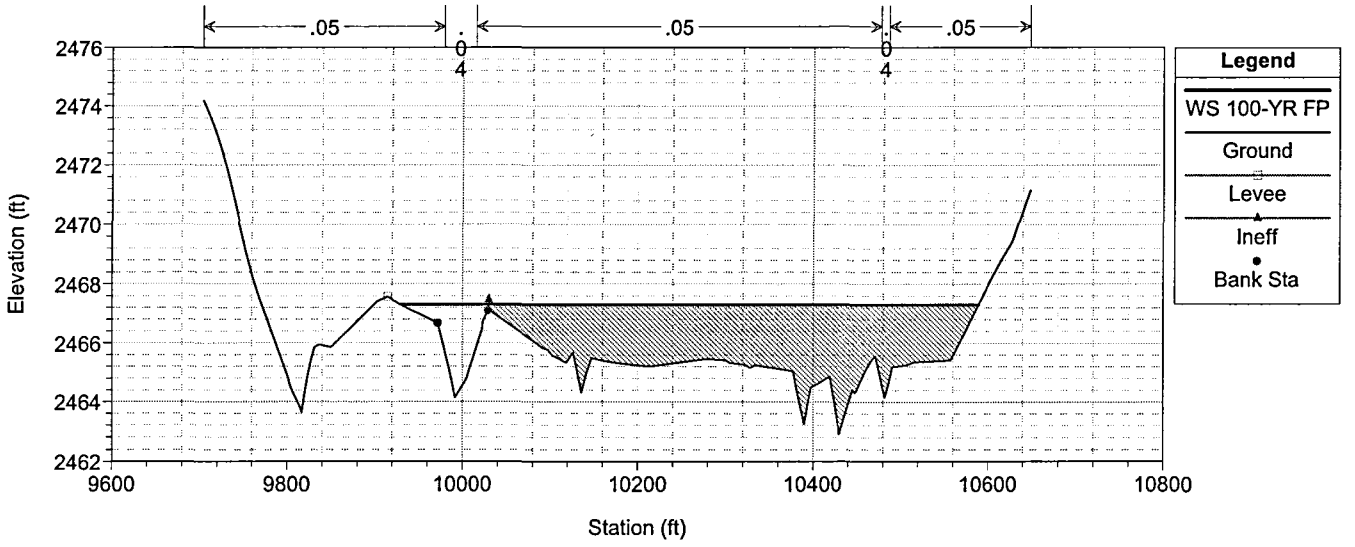
RV Wash A Tank Spillway Plan: RV Wash A Tank Spillway 11/1/2007

River = RV WA TS Reach = R1 RS = 0.266



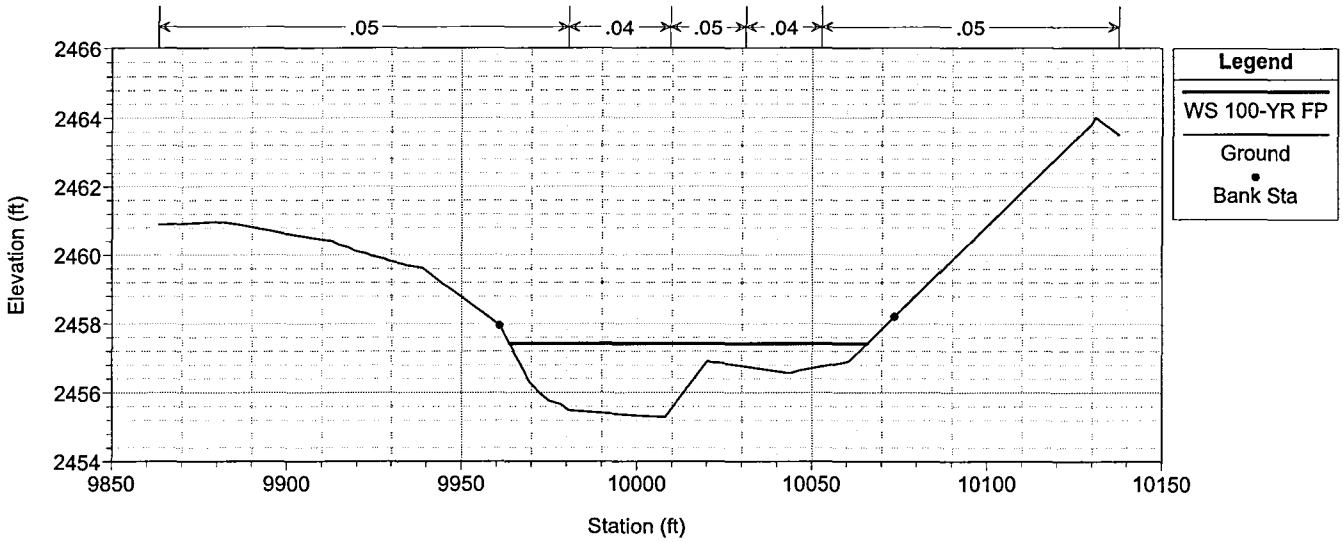
RV Wash A Tank Spillway Plan: RV Wash A Tank Spillway 11/1/2007

River = RV WA TS Reach = R1 RS = 0.098



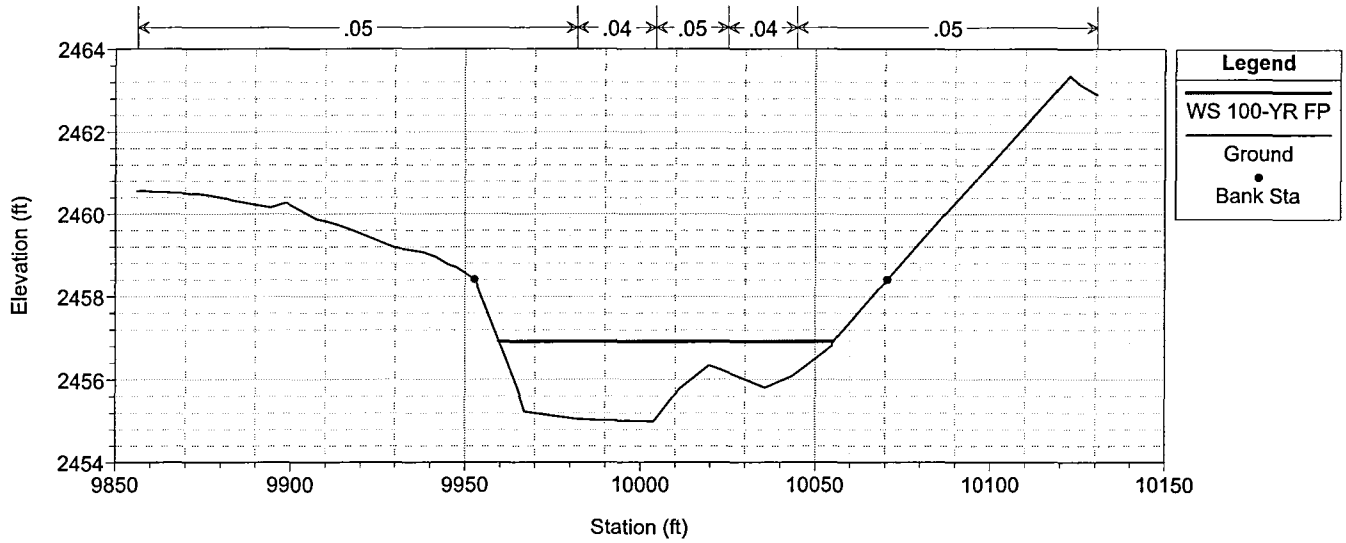
RV Wash A Tank Spillway Plan: RV Wash A Tank Spillway 11/1/2007

River = RV WA TS Reach = R1 RS = 0.017



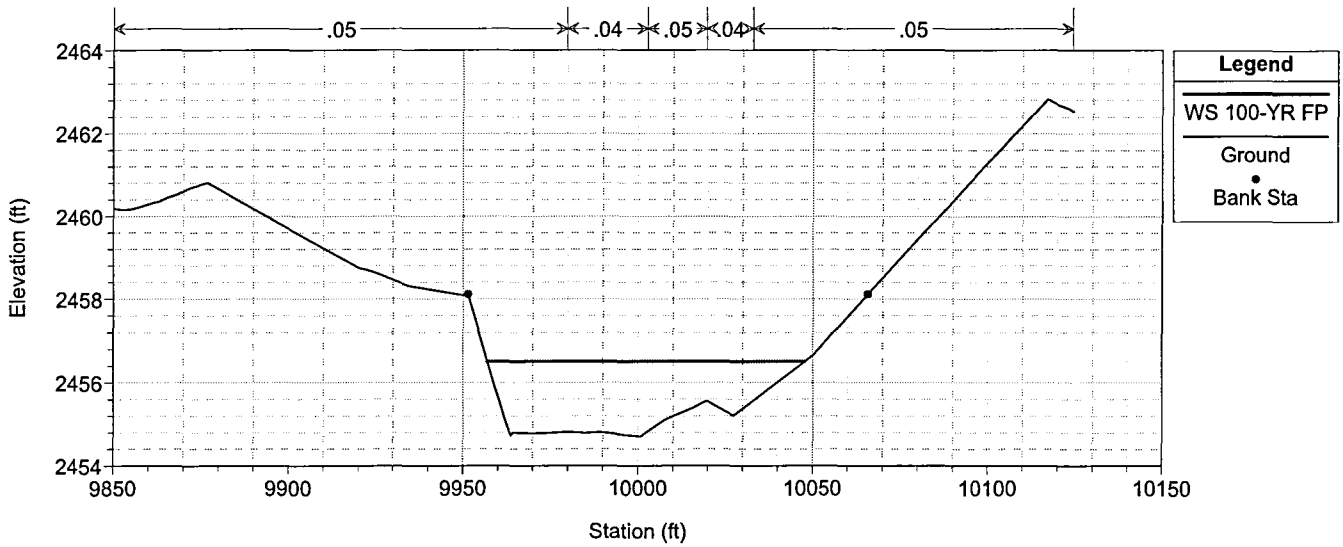
RV Wash A Tank Spillway Plan: RV Wash A Tank Spillway 11/1/2007

River = RV WA TS Reach = R1 RS = 0.015



RV Wash A Tank Spillway Plan: RV Wash A Tank Spillway 11/1/2007

River = RV WA TS Reach = R1 RS = 0.013

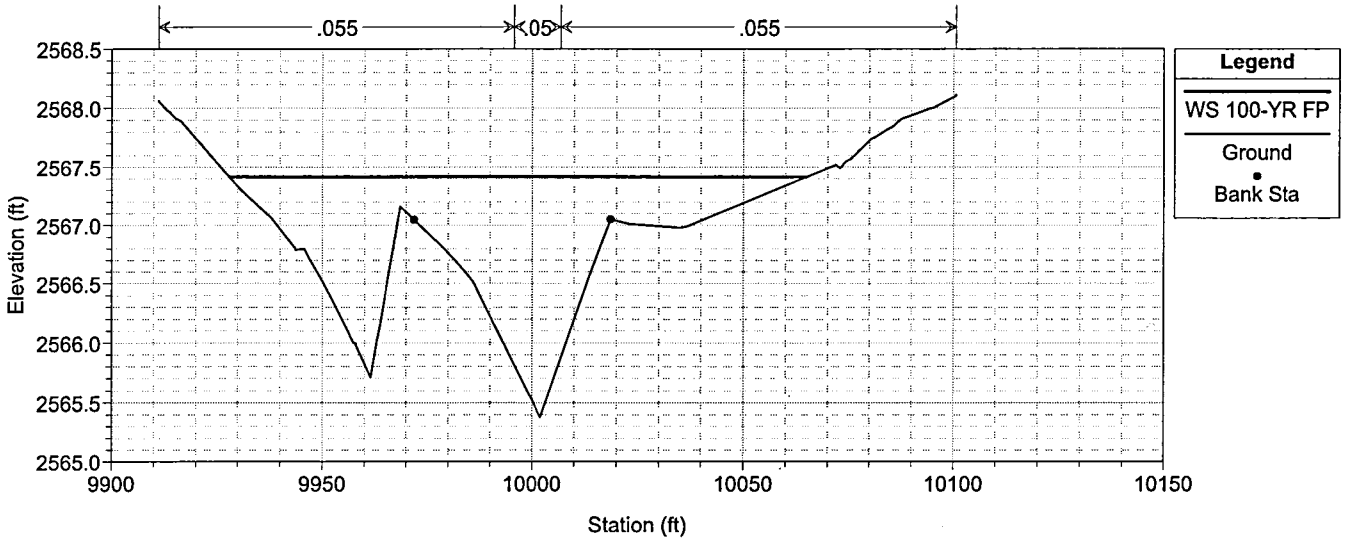


E.2.5 HEC-RAS Cross Section Plots

RV Wash I

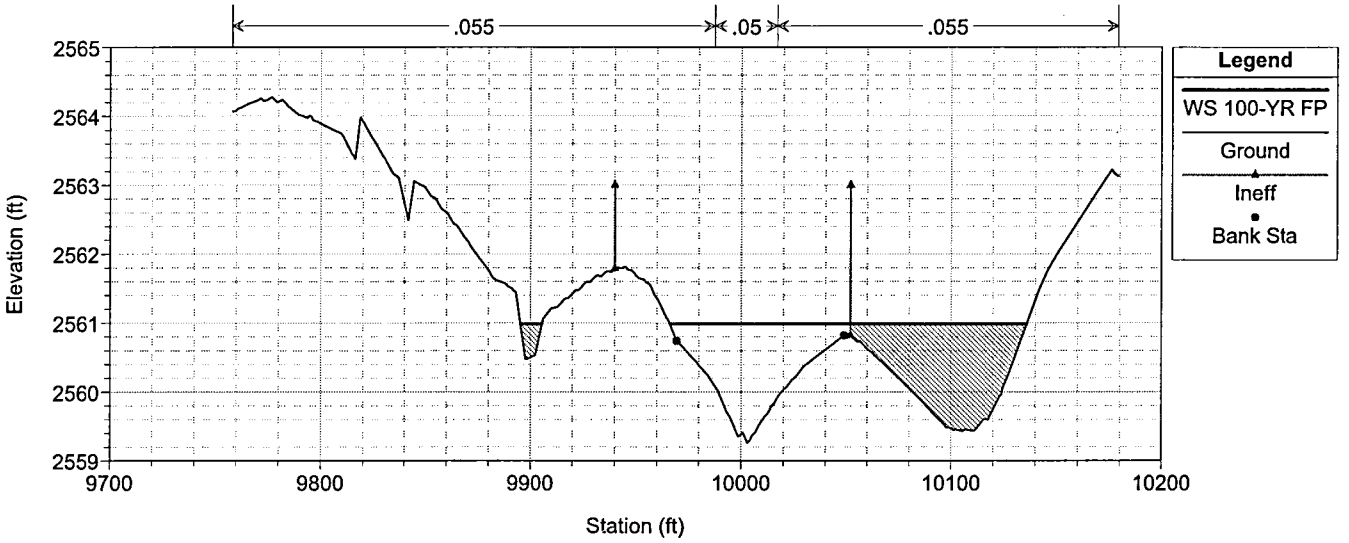
RV Wash I Plan: RV Wash I 11/1/2007

River = RV WI Reach = R1 RS = 7.262



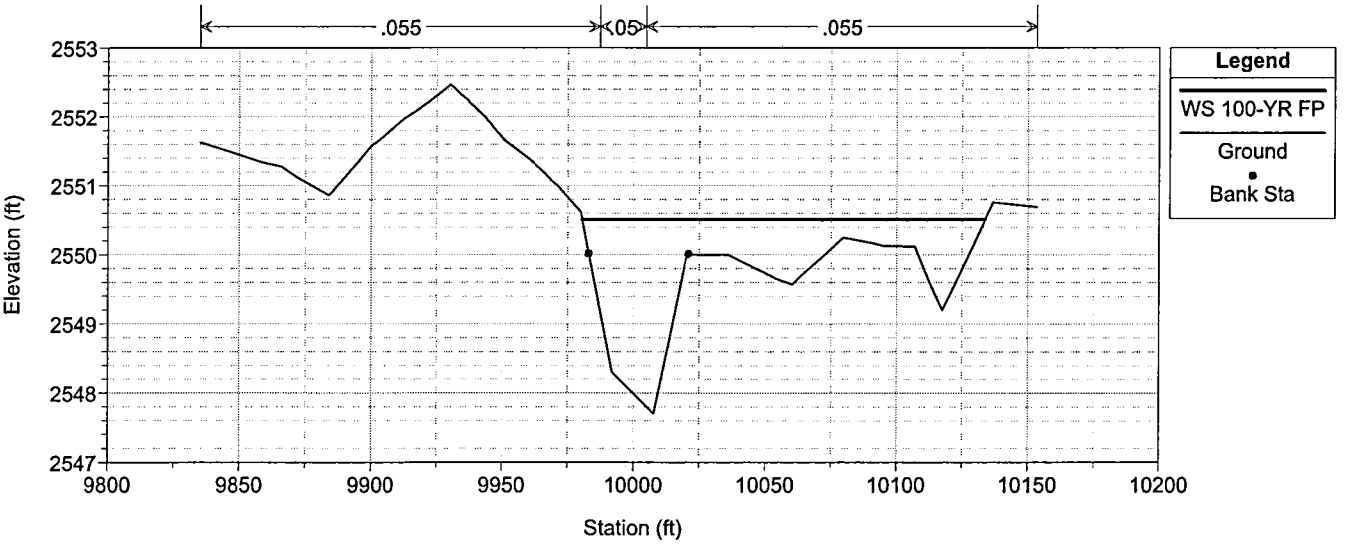
RV Wash I Plan: RV Wash I 11/1/2007

River = RV WI Reach = R1 RS = 7.217



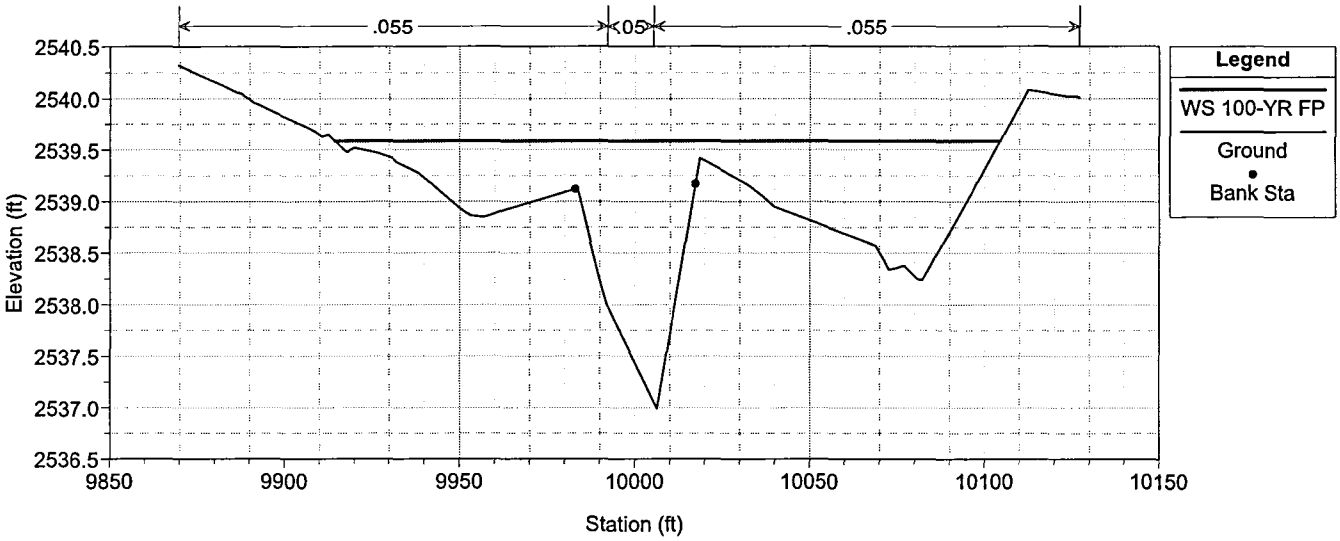
RV Wash I Plan: RV Wash I 11/1/2007

River = RV WI Reach = R1 RS = 7.127



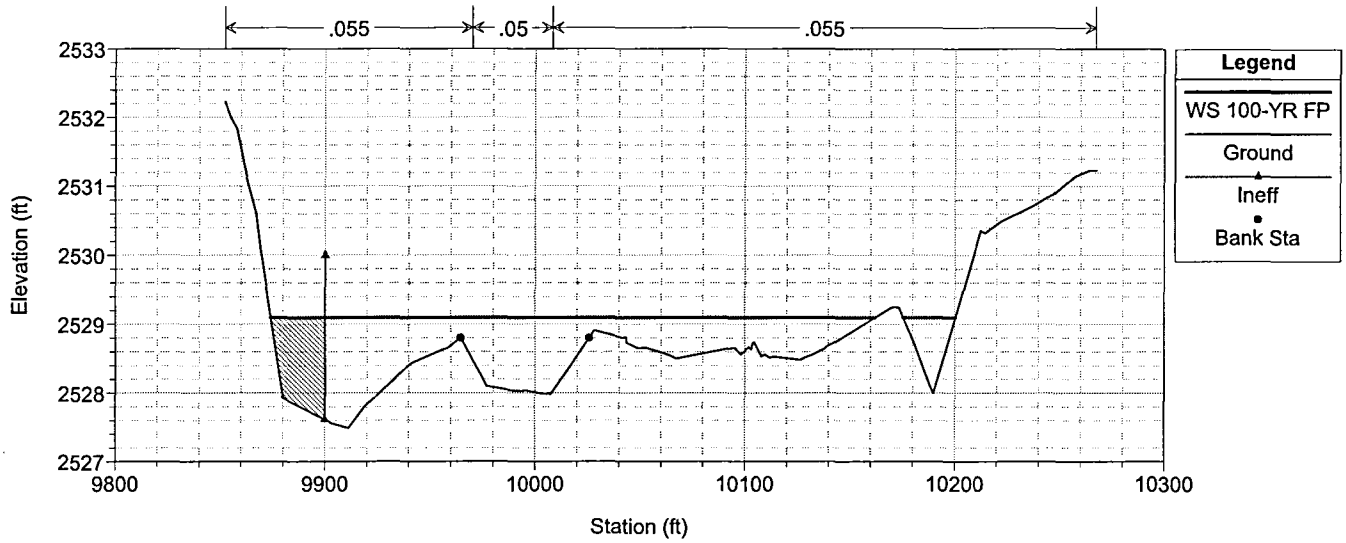
RV Wash I Plan: RV Wash I 11/1/2007

River = RV WI Reach = R1 RS = 7.042



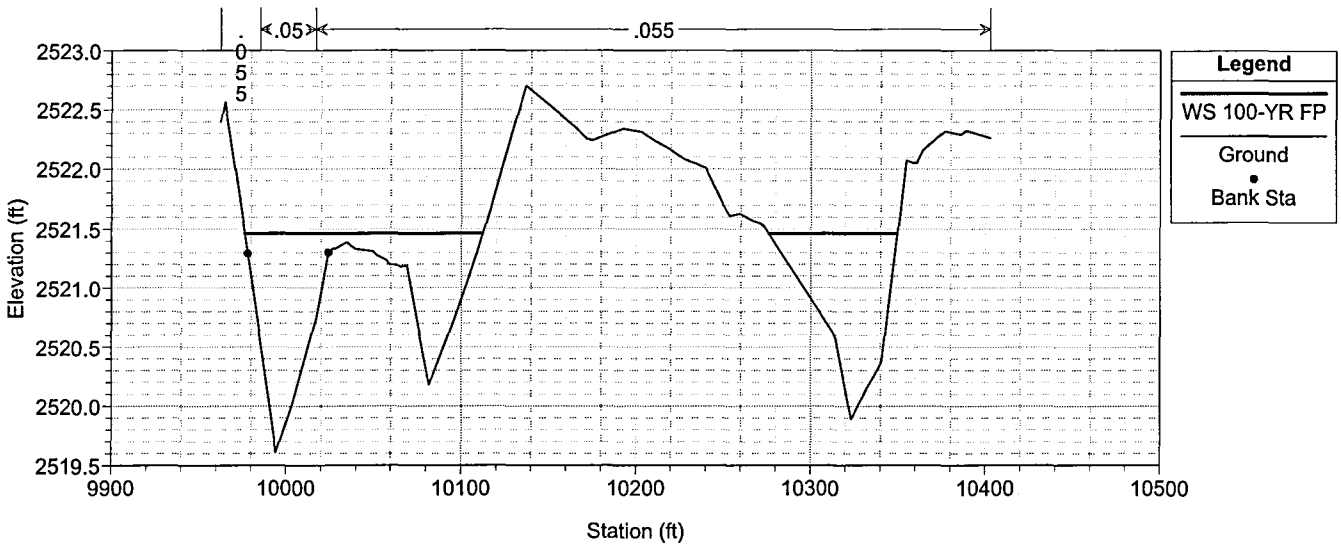
RV Wash I Plan: RV Wash I 11/1/2007

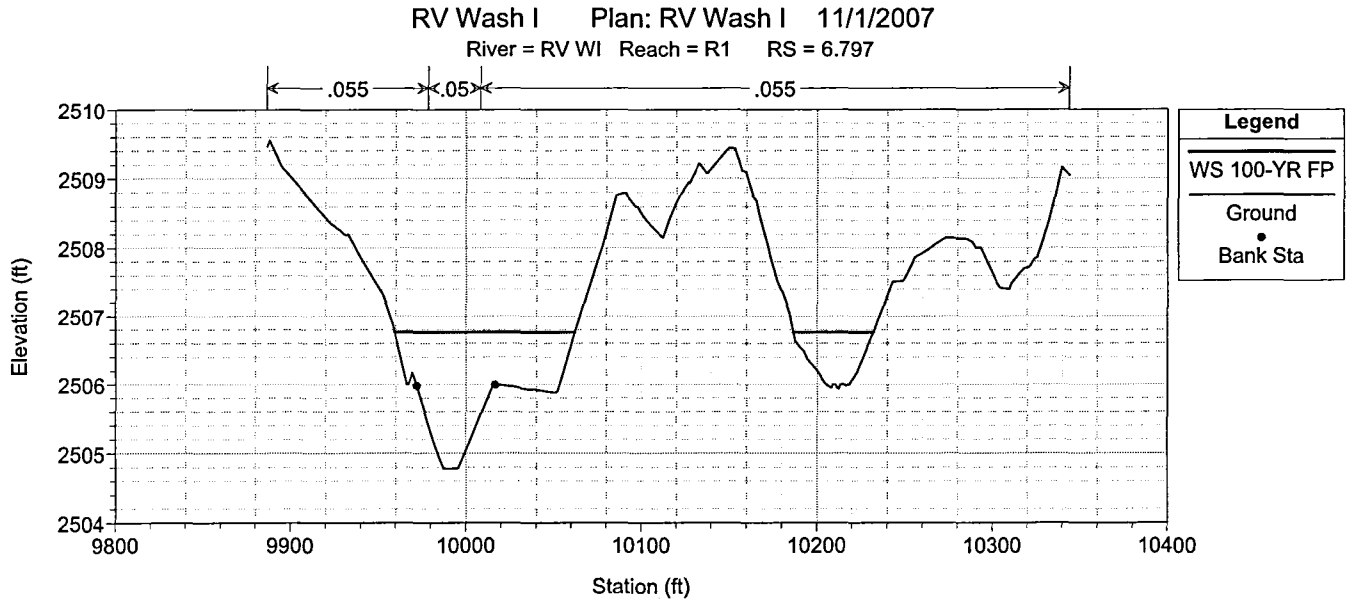
River = RV WI Reach = R1 RS = 6.961

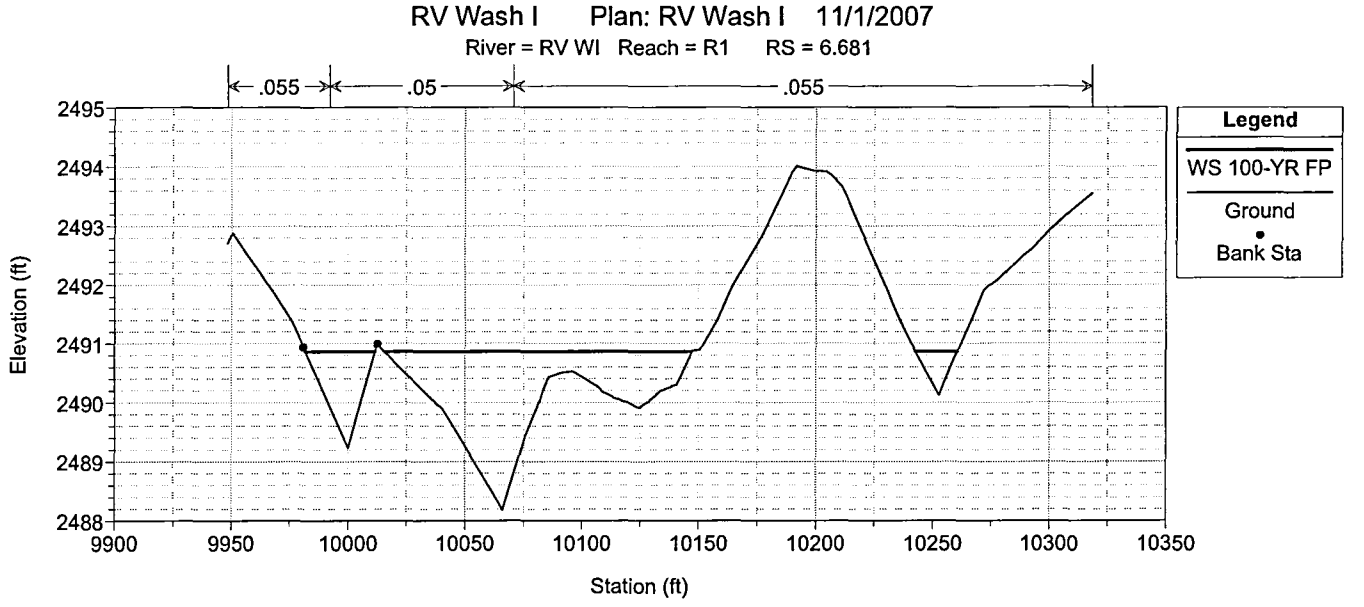


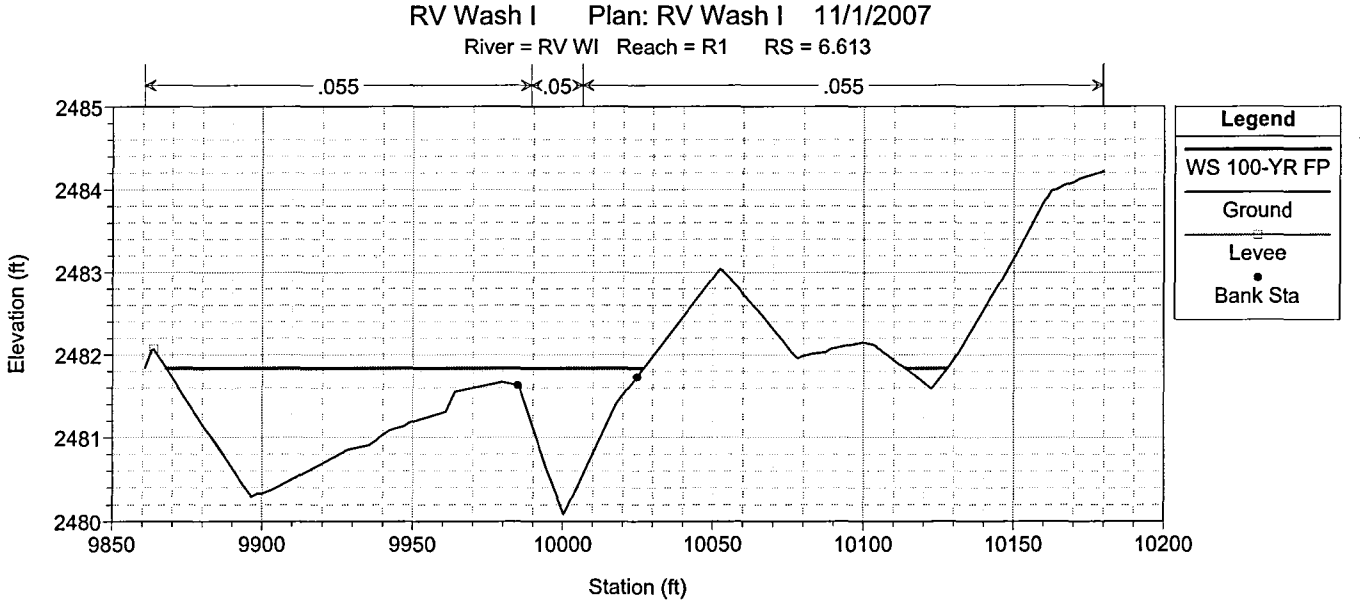
RV Wash I Plan: RV Wash I 11/1/2007

River = RV WI Reach = R1 RS = 6.898



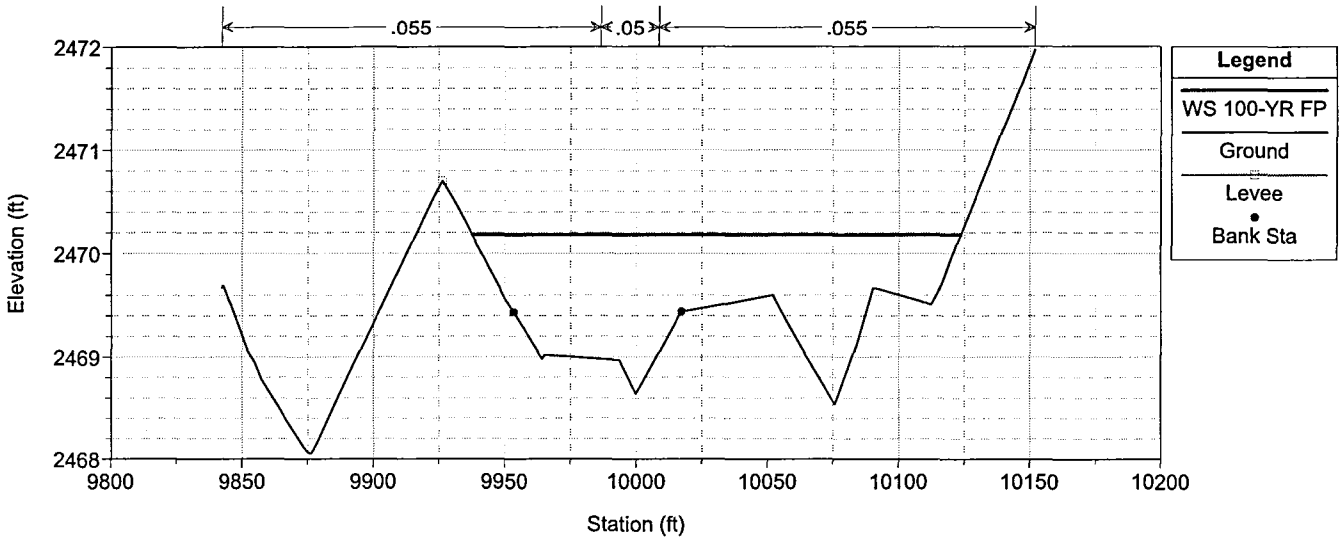

RV Wash I Plan: RV Wash I 11/1/2007
River = RV WI Reach = R1 RS = 6.797
.055
.05
.055
Elevation (ft)
Station (ft)
Legend
WS 100-YR FP
Ground
Bank Sta


RV Wash I Plan: RV Wash I 11/1/2007
River = RV WI Reach = R1 RS = 6.681
.055
.05
.055
Elevation (ft)
Station (ft)
Legend
WS 100-YR FP
Ground
Bank Sta


RV Wash I Plan: RV Wash I 11/1/2007
River = RV WI Reach = R1 RS = 6.613
.055
.05
.055
Elevation (ft)
Station (ft)
Legend
WS 100-YR FP
Ground
Levee
Bank Sta

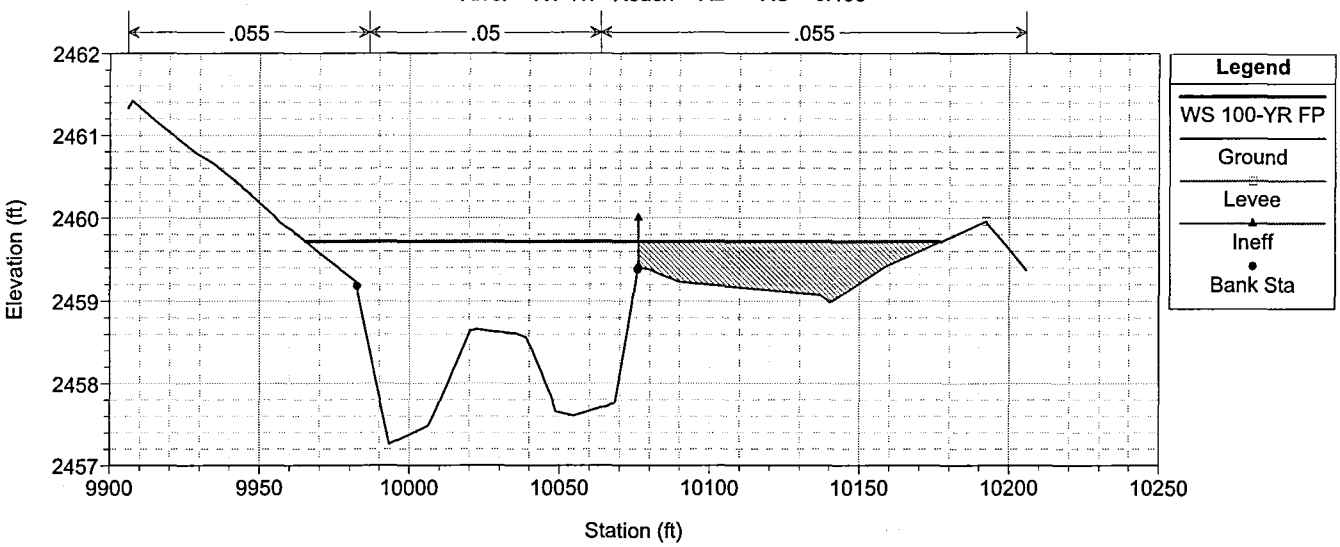
RV Wash I Plan: RV Wash I 11/1/2007

River = RV WI Reach = R1 RS = 6.526



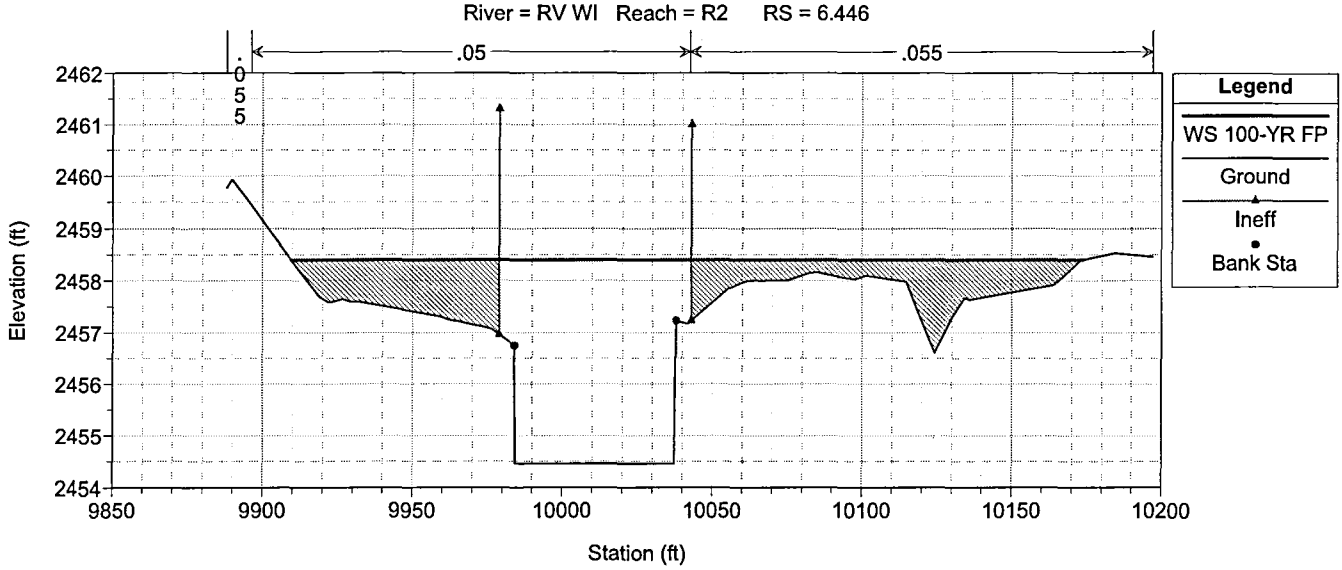
RV Wash I Plan: RV Wash I 11/1/2007

River = RV WI Reach = R2 RS = 6.453



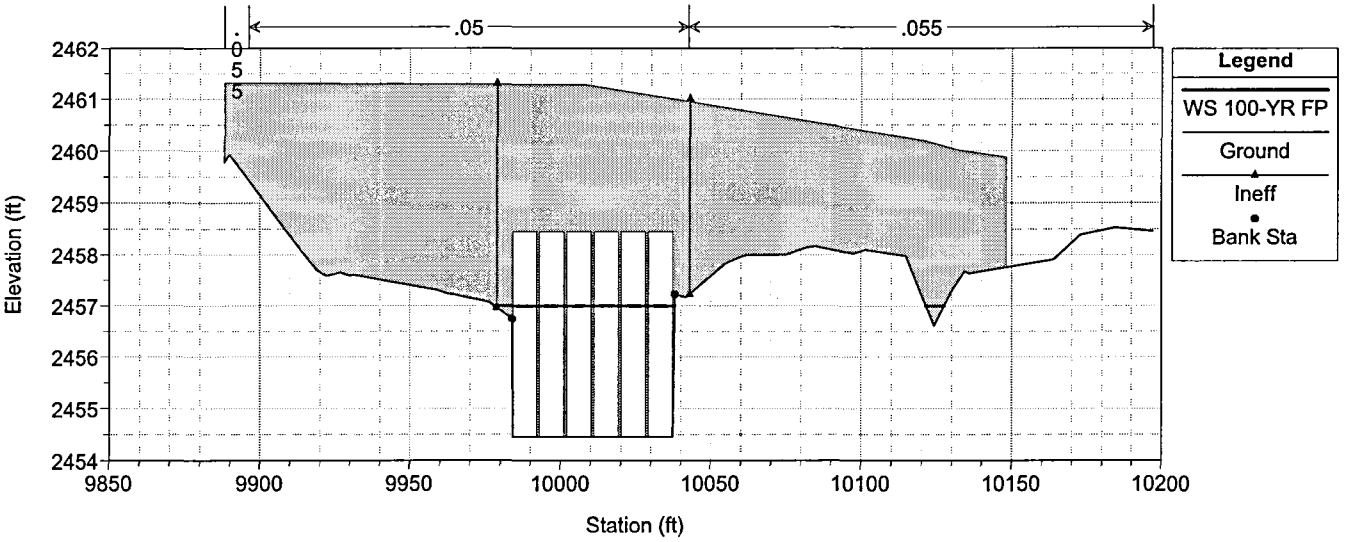
RV Wash I Plan: RV Wash I 11/1/2007

River = RV WI Reach = R2 RS = 6.446



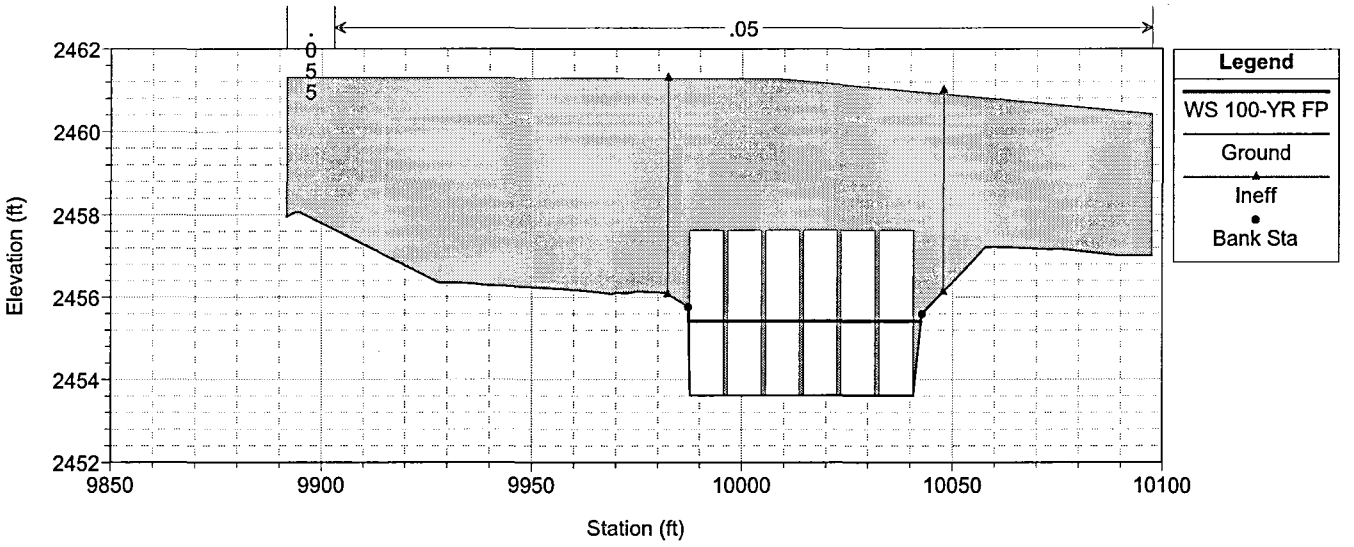
RV Wash I Plan: RV Wash I 11/1/2007

River = RV WI Reach = R2 RS = 6.439 Culv



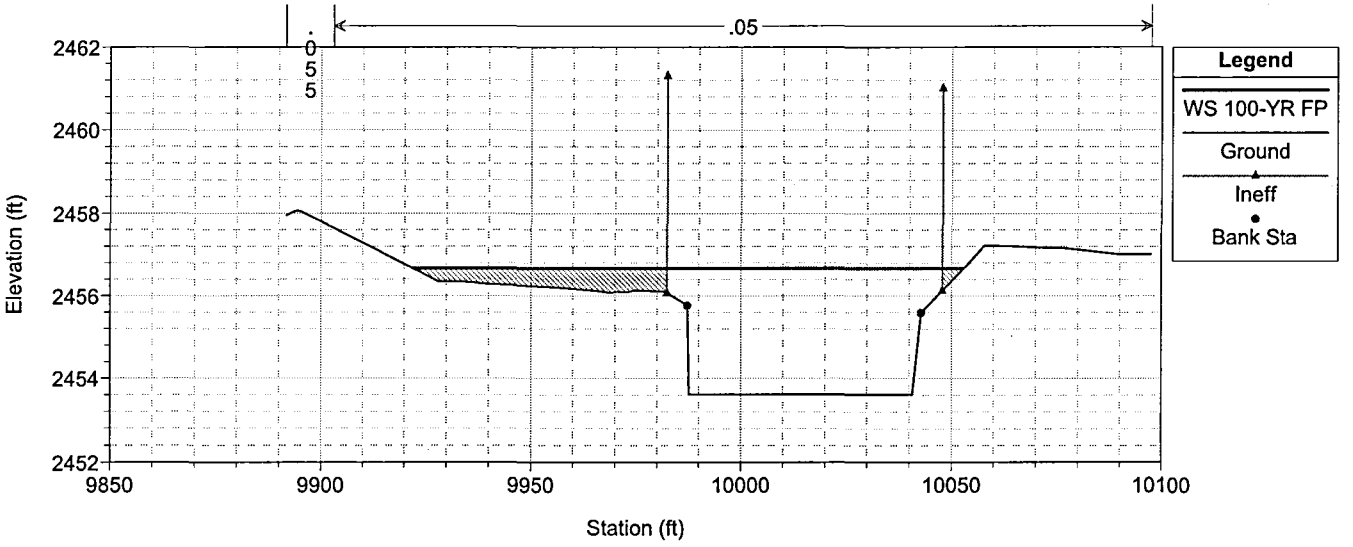
RV Wash I Plan: RV Wash I 11/1/2007

River = RV WI Reach = R2 RS = 6.439 Culv



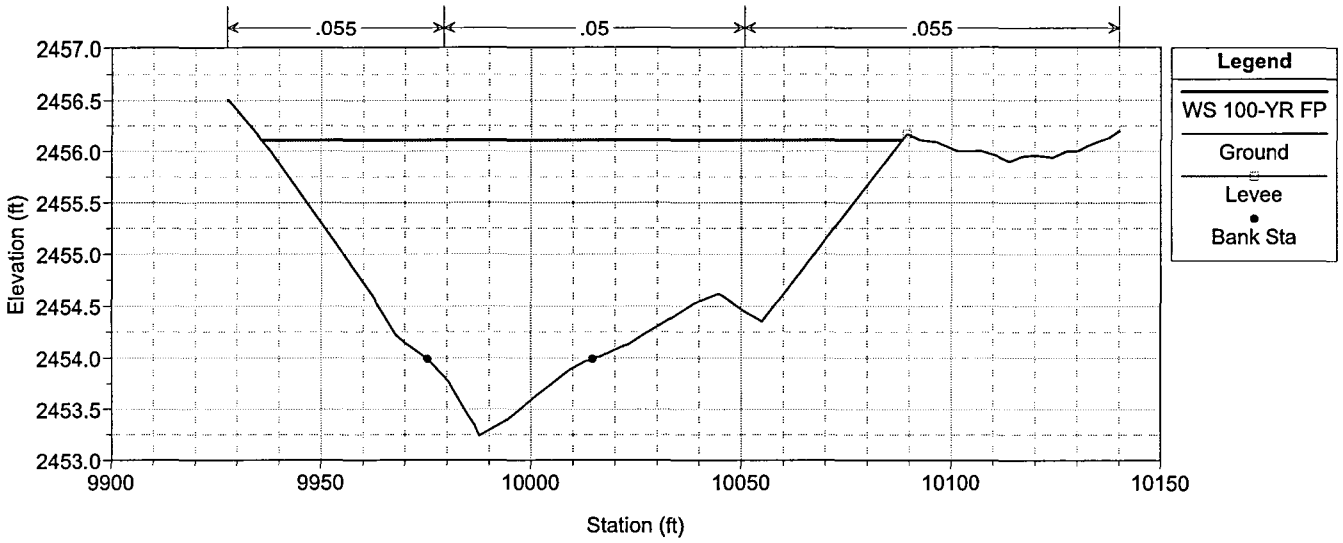
RV Wash I Plan: RV Wash I 11/1/2007

River = RV WI Reach = R2 RS = 6.435



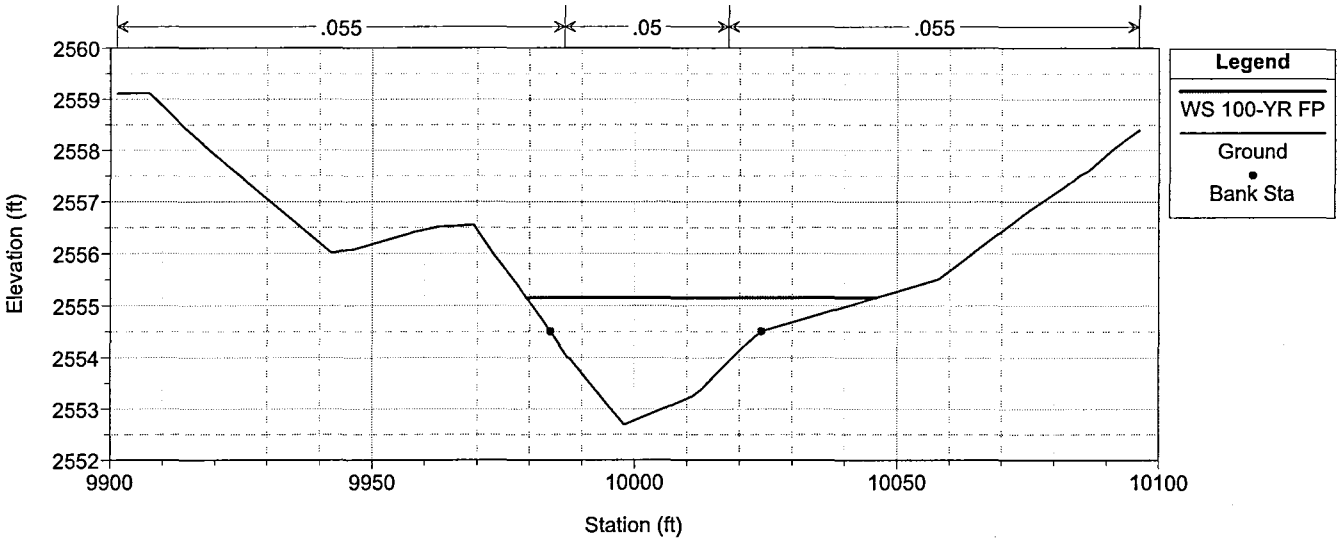
RV Wash I Plan: RV Wash I 11/1/2007

River = RV WI Reach = R2 RS = 6.423



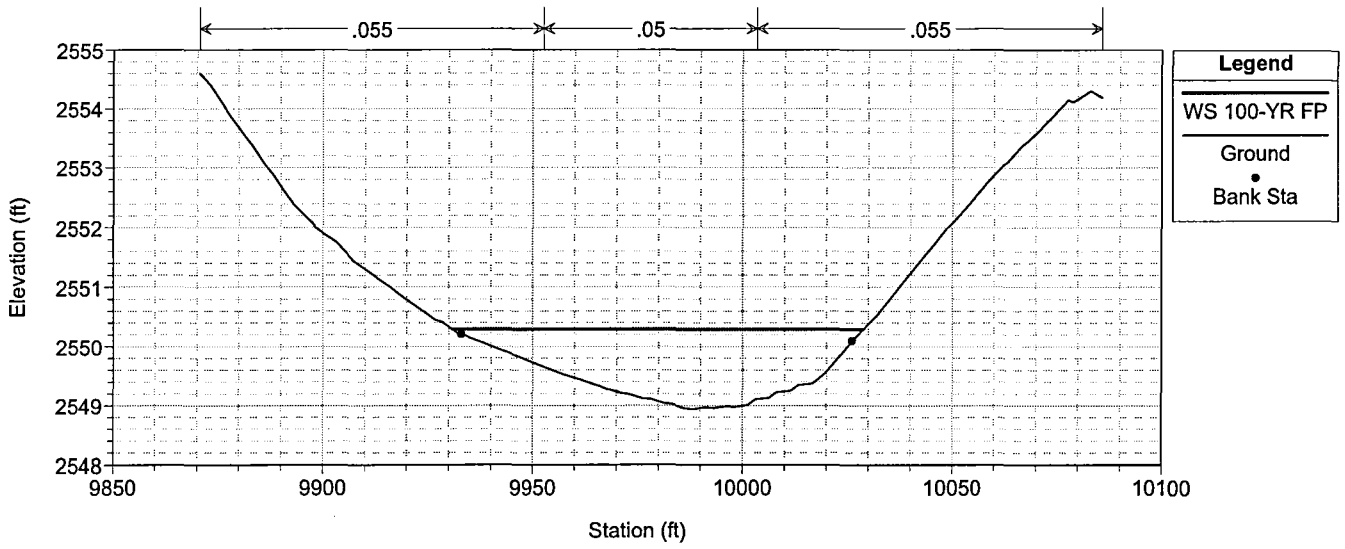
RV Wash I Plan: RV Wash I 11/1/2007

River = RV WI T3 Reach = R1 RS = 0.797



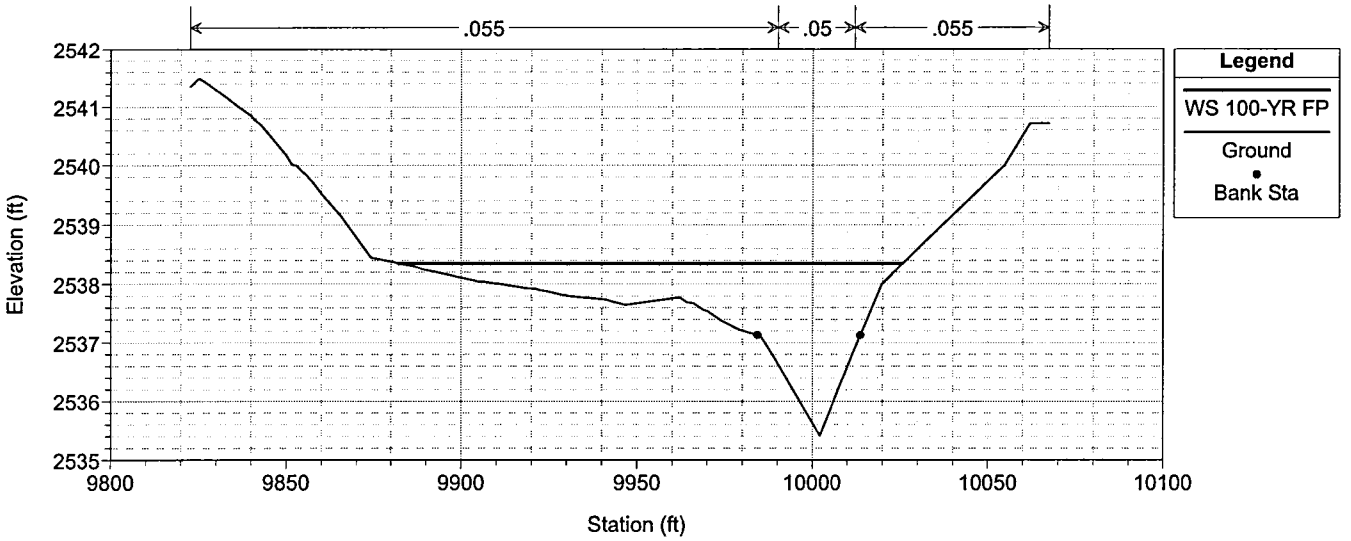
RV Wash I Plan: RV Wash I 11/1/2007

River = RV WI T3 Reach = R1 RS = 0.760



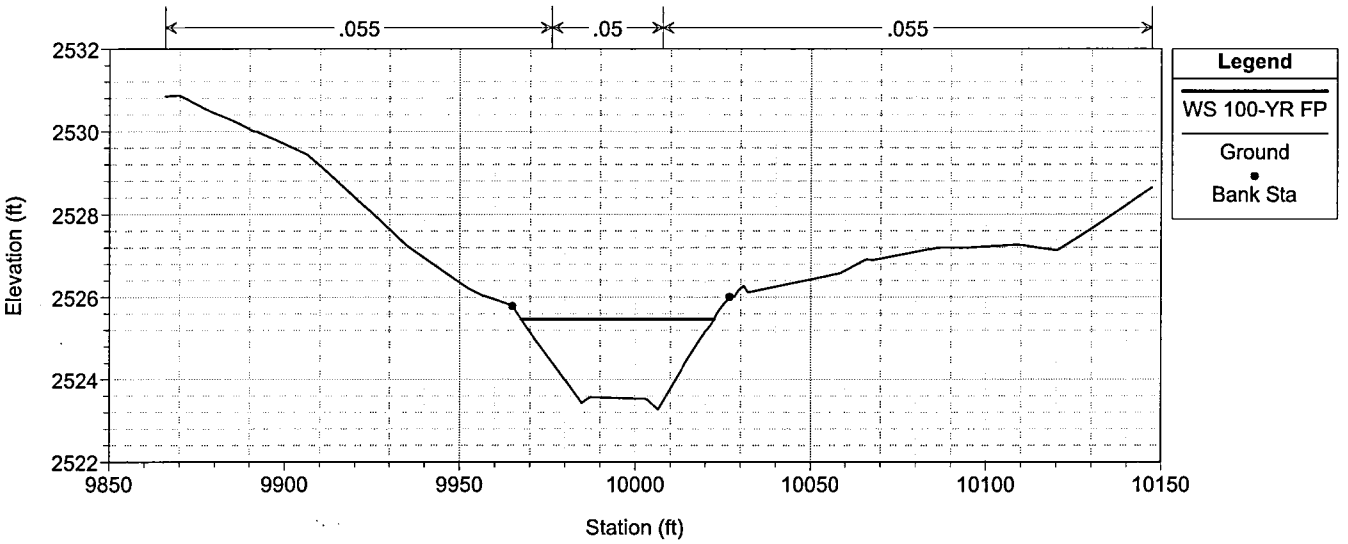
RV Wash I Plan: RV Wash I 11/1/2007

River = RV WI T3 Reach = R1 RS = 0.656



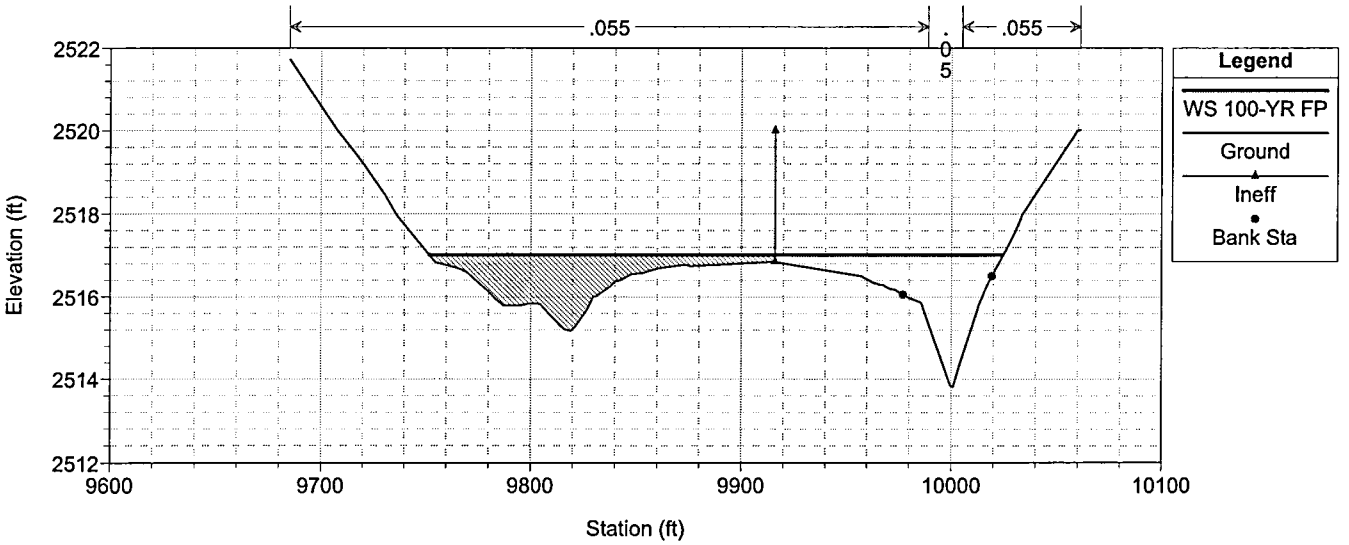
RV Wash I Plan: RV Wash I 11/1/2007

River = RV WI T3 Reach = R1 RS = 0.552



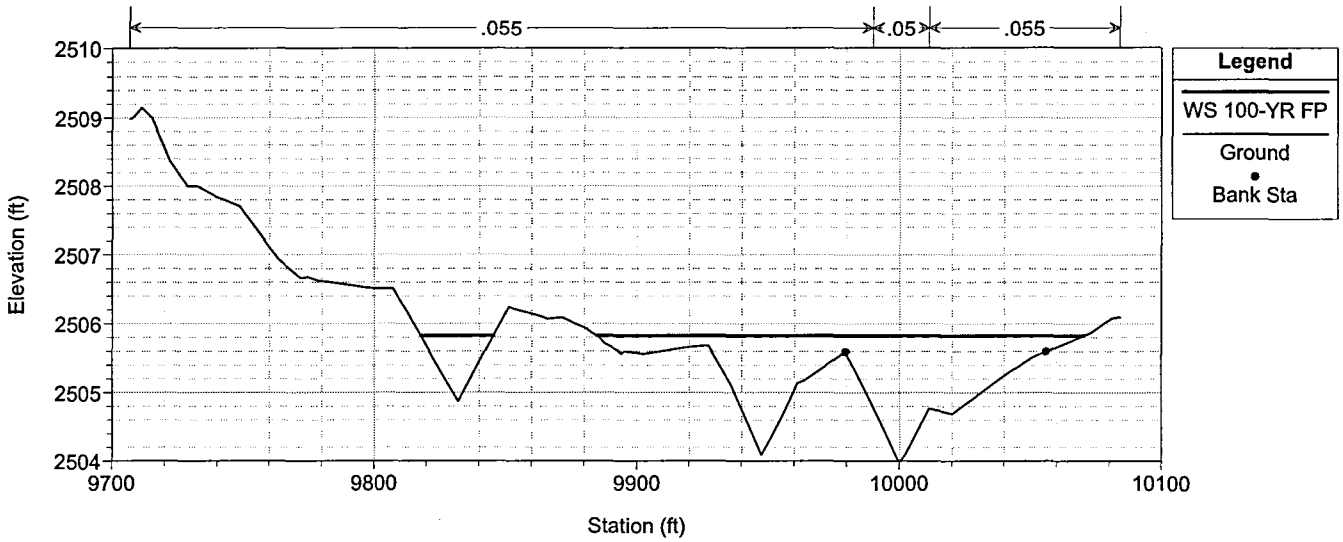
RV Wash I Plan: RV Wash I 11/1/2007

River = RV WI T3 Reach = R1 RS = 0.475



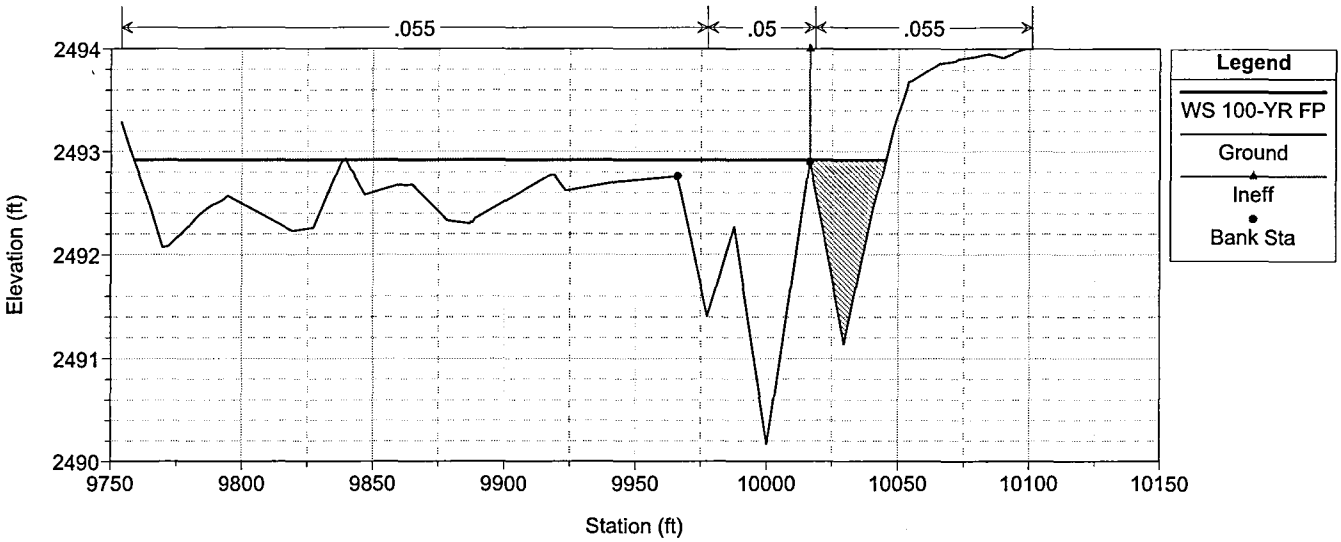
RV Wash I Plan: RV Wash I 11/1/2007

River = RV WI T3 Reach = R1 RS = 0.380



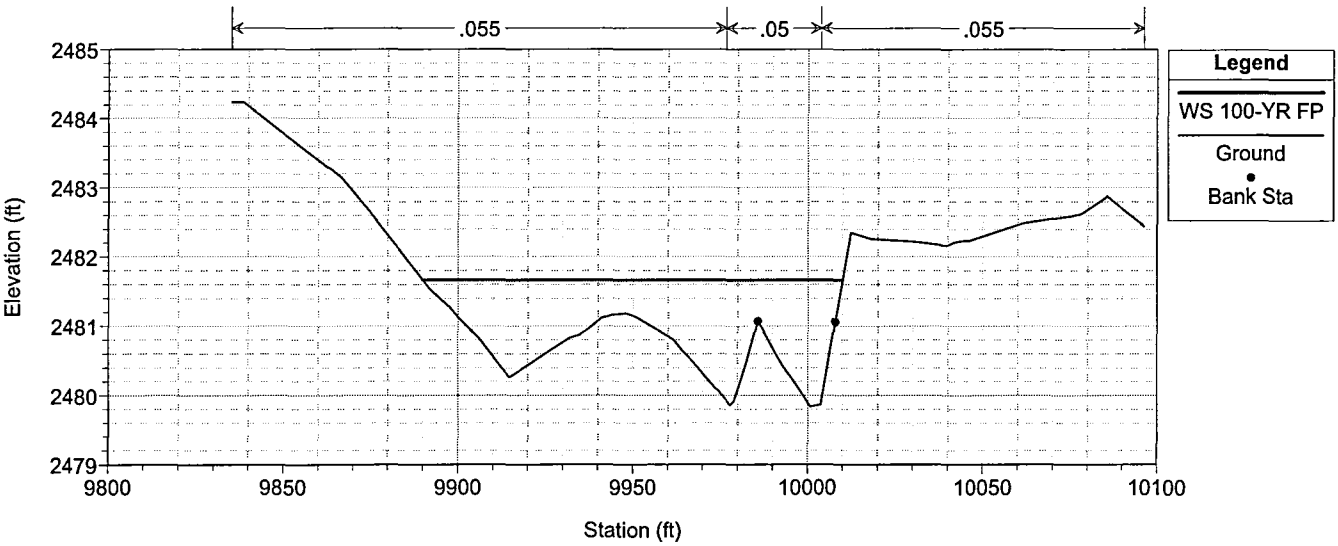
RV Wash I Plan: RV Wash I 11/1/2007

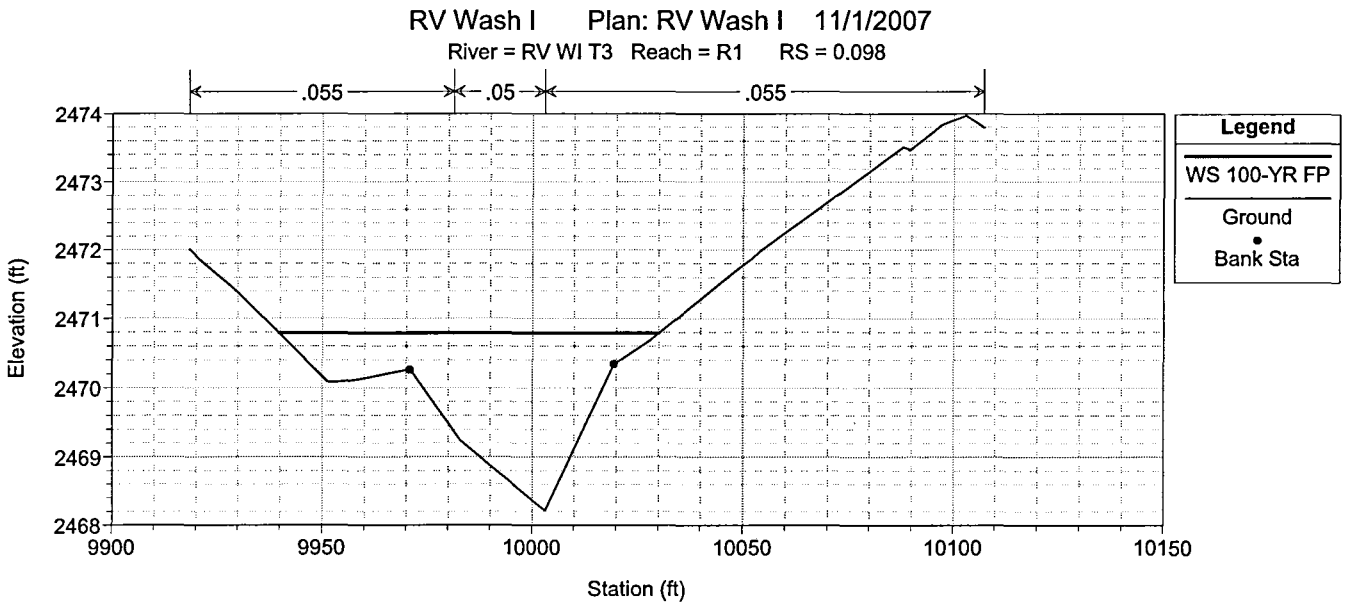
River = RV WI T3 Reach = R1 RS = 0.277



RV Wash I Plan: RV Wash I 11/1/2007

River = RV WI T3 Reach = R1 RS = 0.186



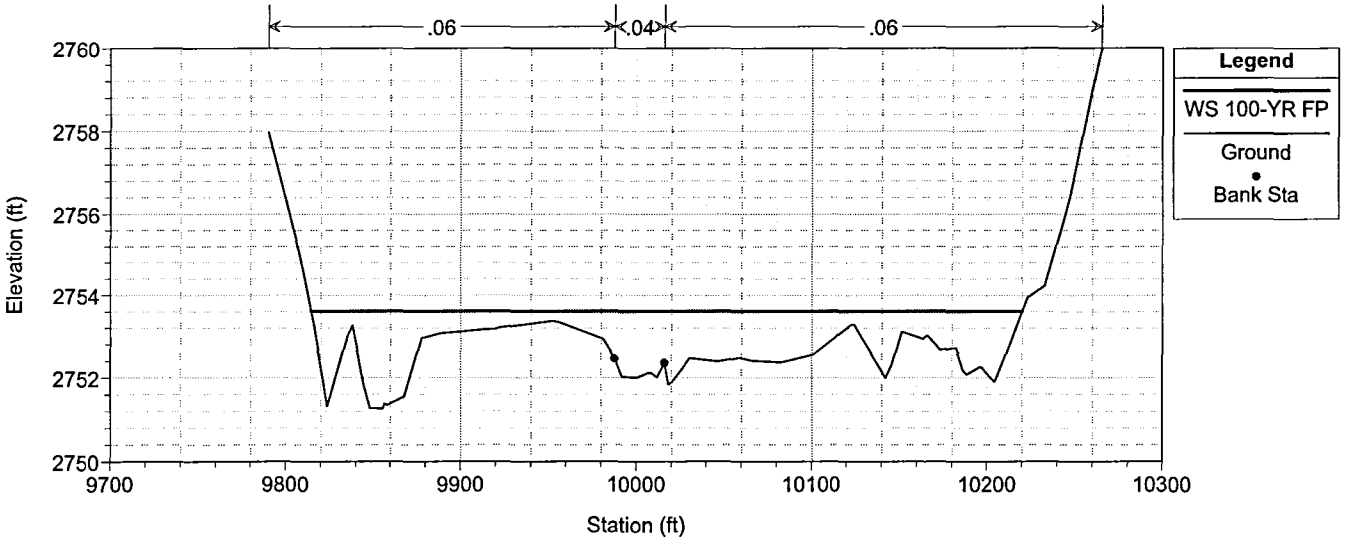

RV Wash I Plan: RV Wash I 11/1/2007
River = RV WI T3 Reach = R1 RS = 0.098
.055
.05
.055
Elevation (ft)
2474
2473
2472
2471
2470
2469
2468
9900
9950
10000
10050
10100
10150
Station (ft)
Legend
WS 100-YR FP
Ground
Bank Sta

E.2.6 HEC-RAS Cross Section Plots

RV Wash K

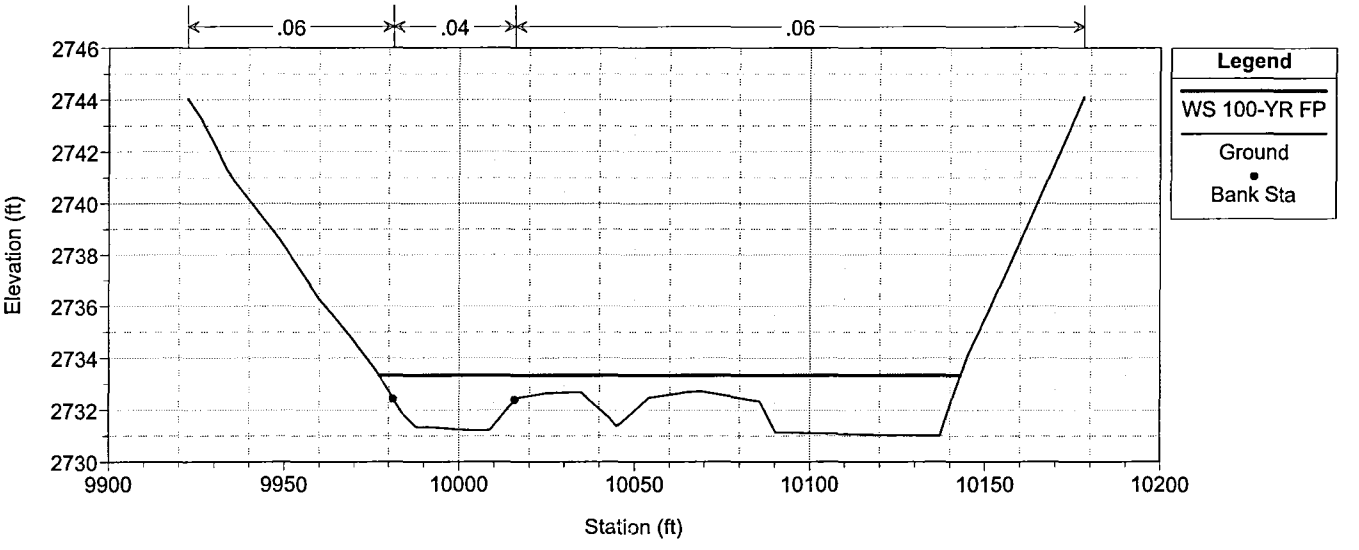
RV Wash K Plan: RV Wash K 11/1/2007

River = RV WK Reach = R1 RS = 8.742



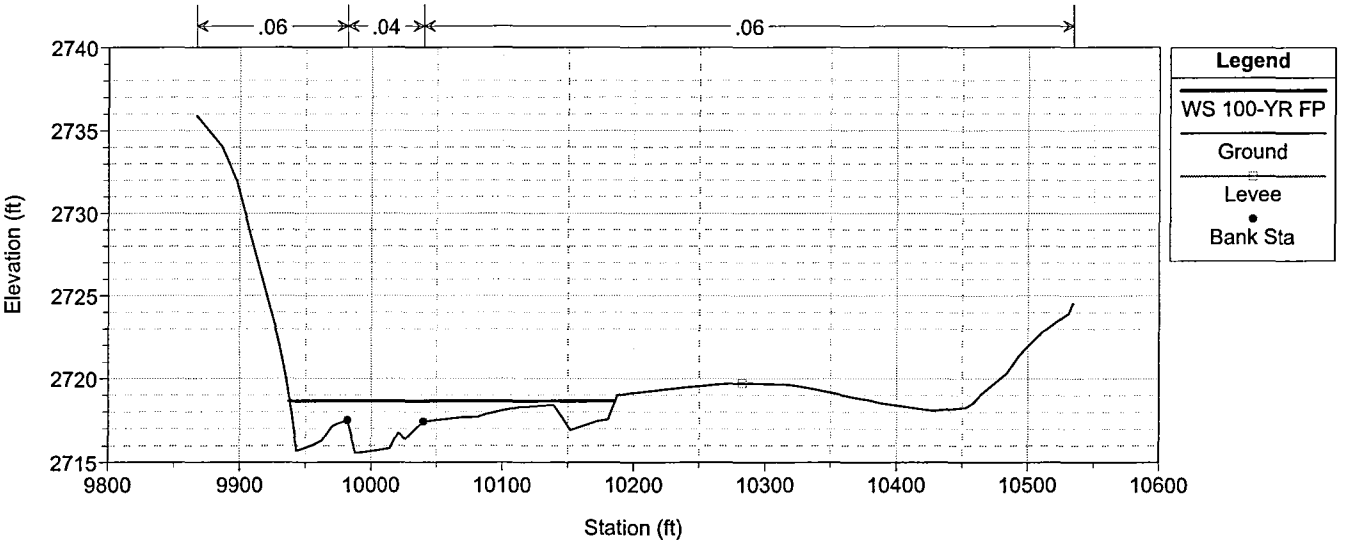
RV Wash K Plan: RV Wash K 11/1/2007

River = RV WK Reach = R1 RS = 8.583



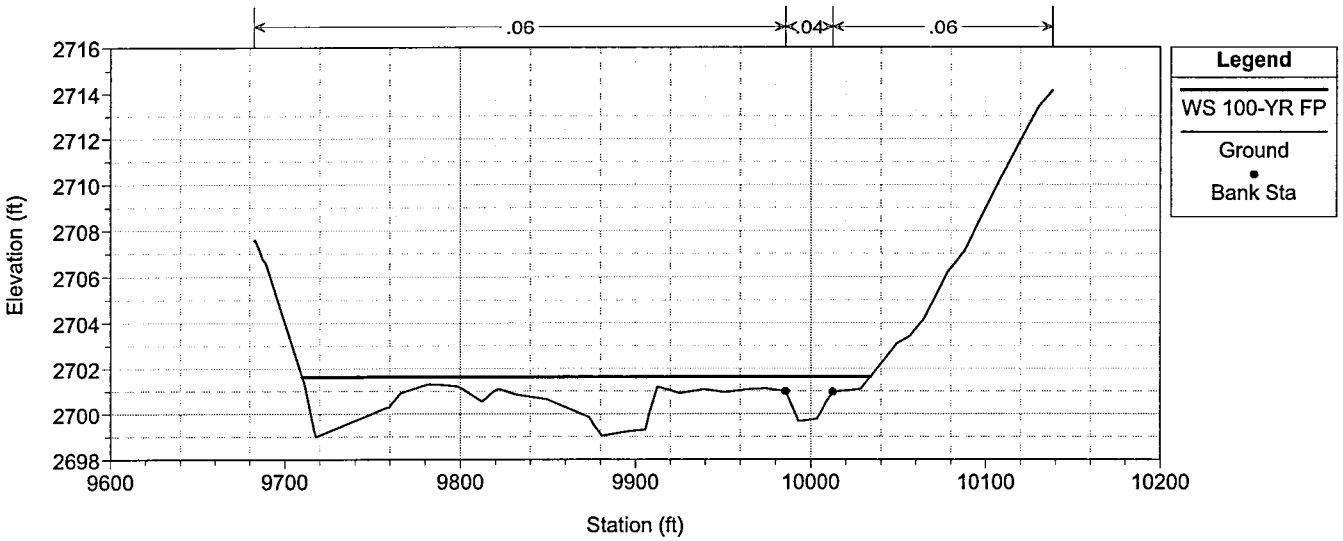
RV Wash K Plan: RV Wash K 11/1/2007

River = RV WK Reach = R1 RS = 8.444



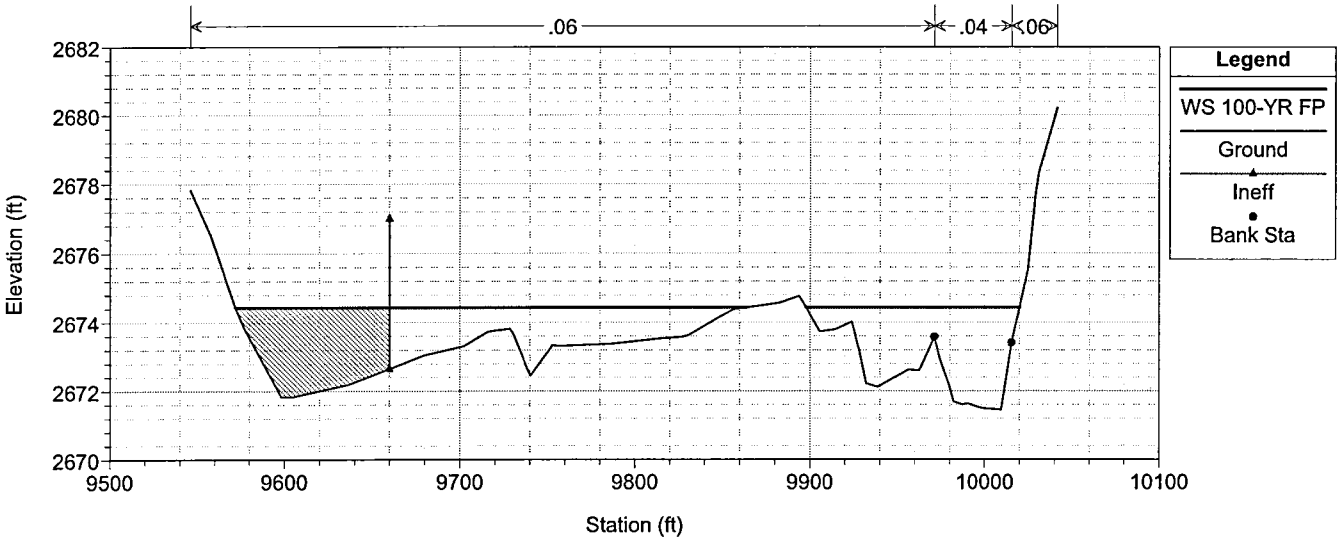
RV Wash K Plan: RV Wash K 11/1/2007

River = RV WK Reach = R1 RS = 8.311



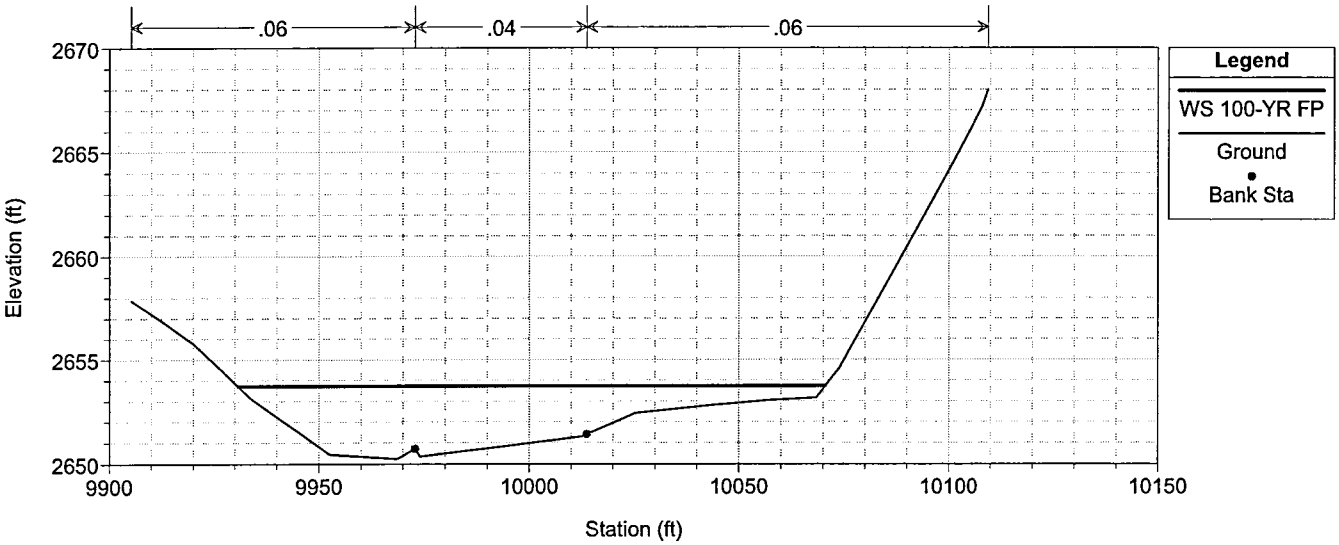
RV Wash K Plan: RV Wash K 11/1/2007

River = RV WK Reach = R1 RS = 8.107



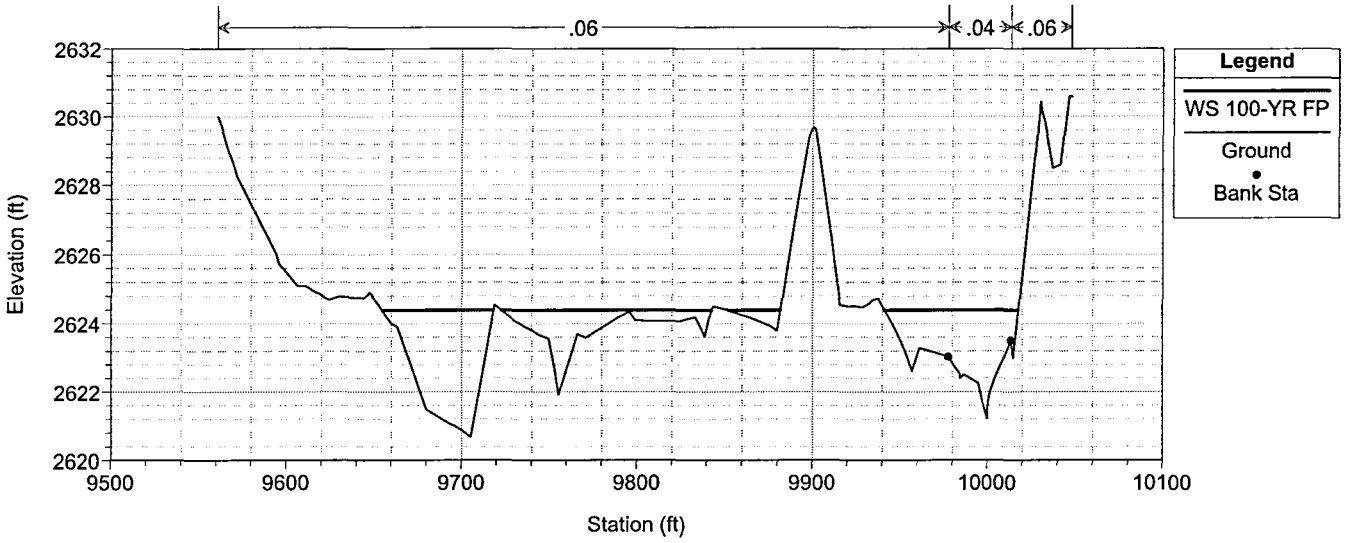
RV Wash K Plan: RV Wash K 11/1/2007

River = RV WK Reach = R1 RS = 7.952



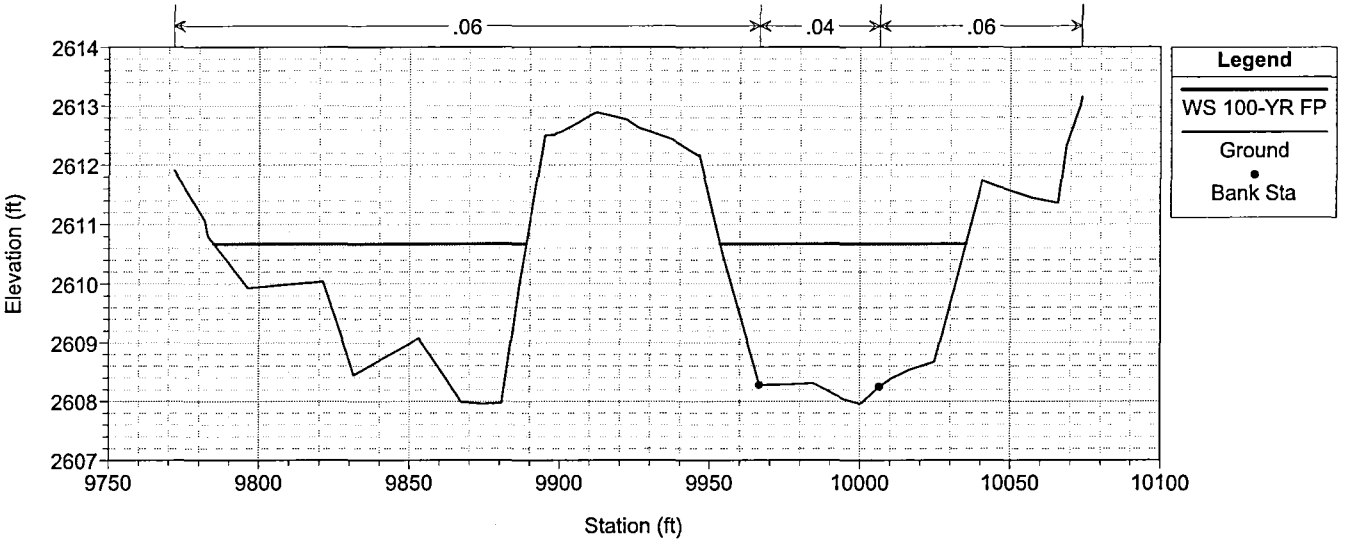
RV Wash K Plan: RV Wash K 11/1/2007

River = RV WK Reach = R1 RS = 7.747



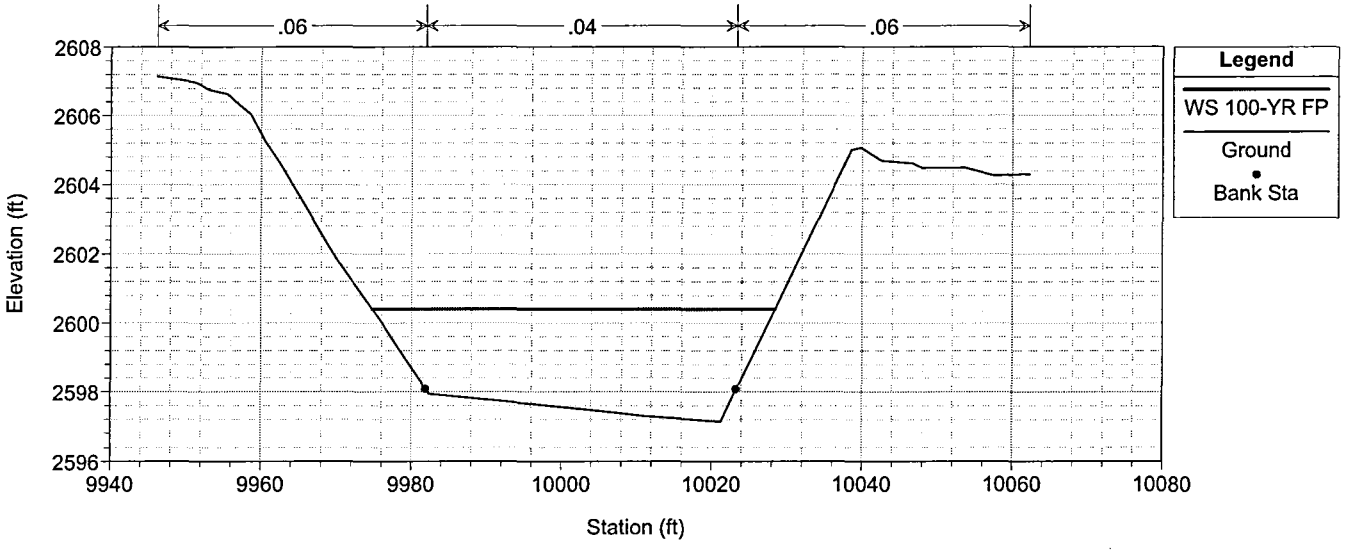
RV Wash K Plan: RV Wash K 11/1/2007

River = RV WK Reach = R1 RS = 7.671



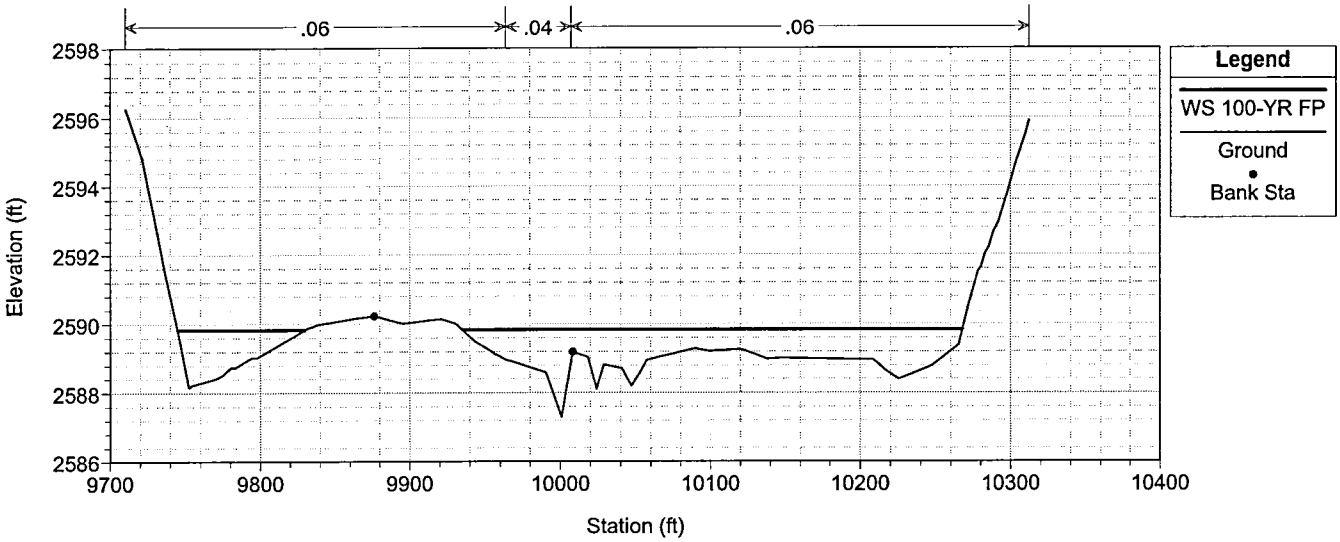
RV Wash K Plan: RV Wash K 11/1/2007

River = RV WK Reach = R2 RS = 7.603



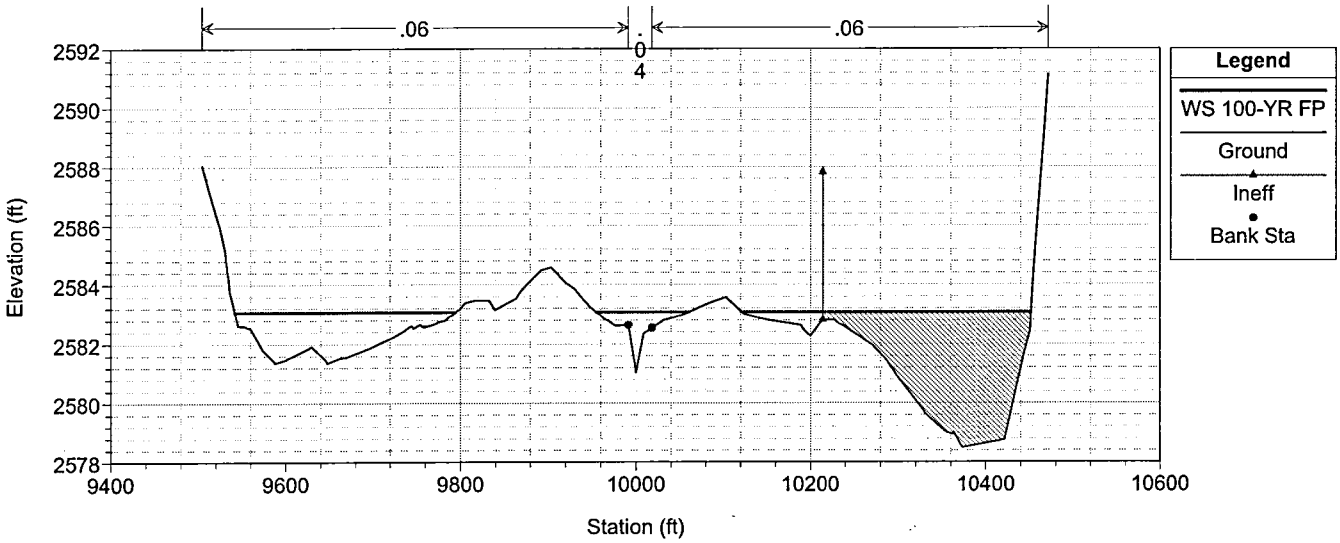
RV Wash K Plan: RV Wash K 11/1/2007

River = RV WK Reach = R2 RS = 7.541



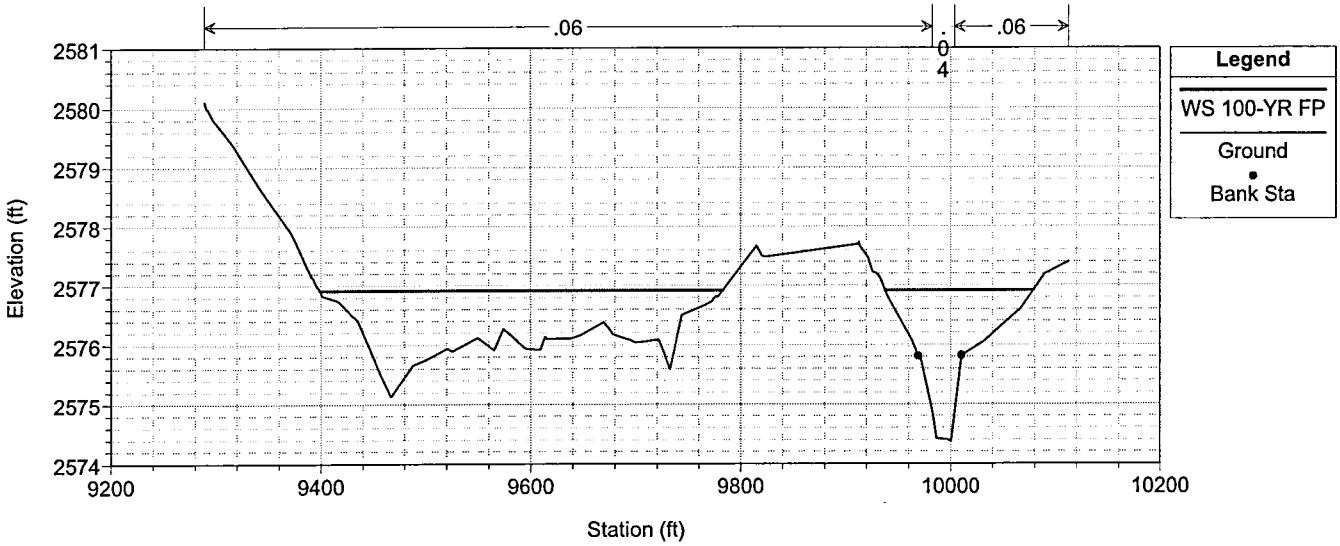
RV Wash K Plan: RV Wash K 11/1/2007

River = RV WK Reach = R2 RS = 7.504



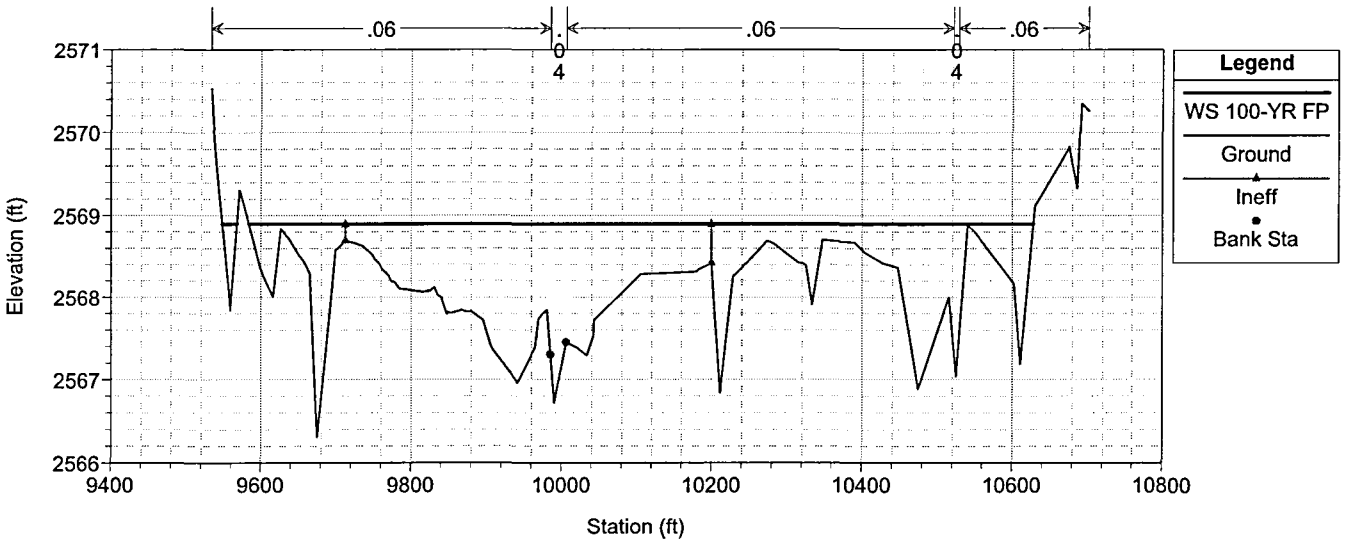
RV Wash K Plan: RV Wash K 11/1/2007

River = RV WK Reach = R2 RS = 7.463



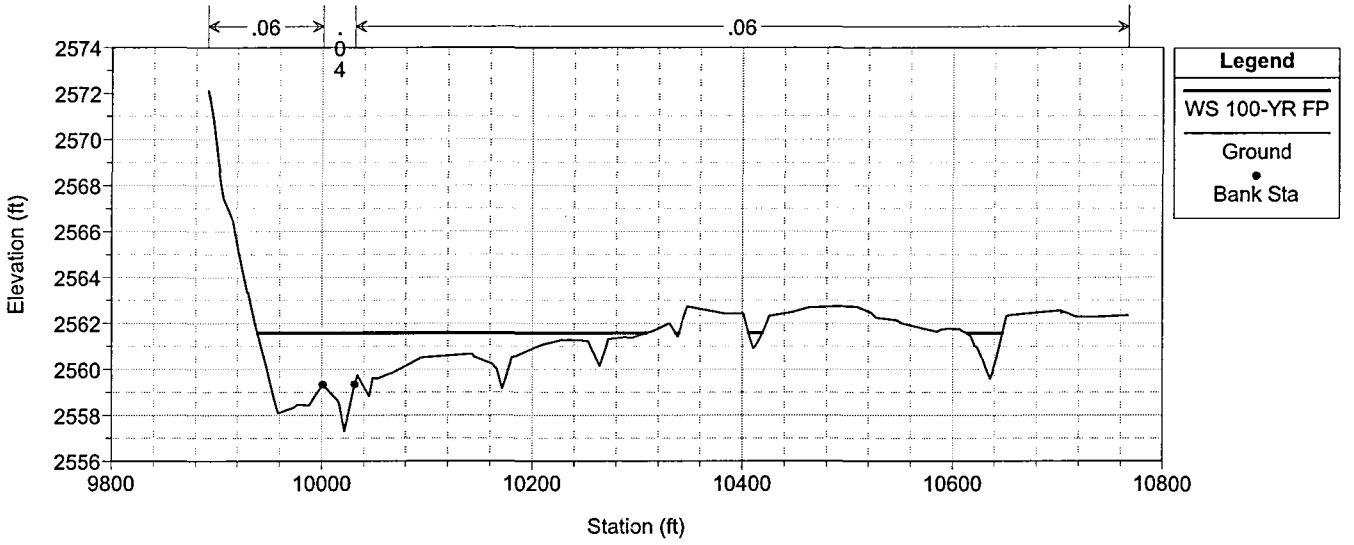
RV Wash K Plan: RV Wash K 11/1/2007

River = RV WK Reach = R2 RS = 7.413



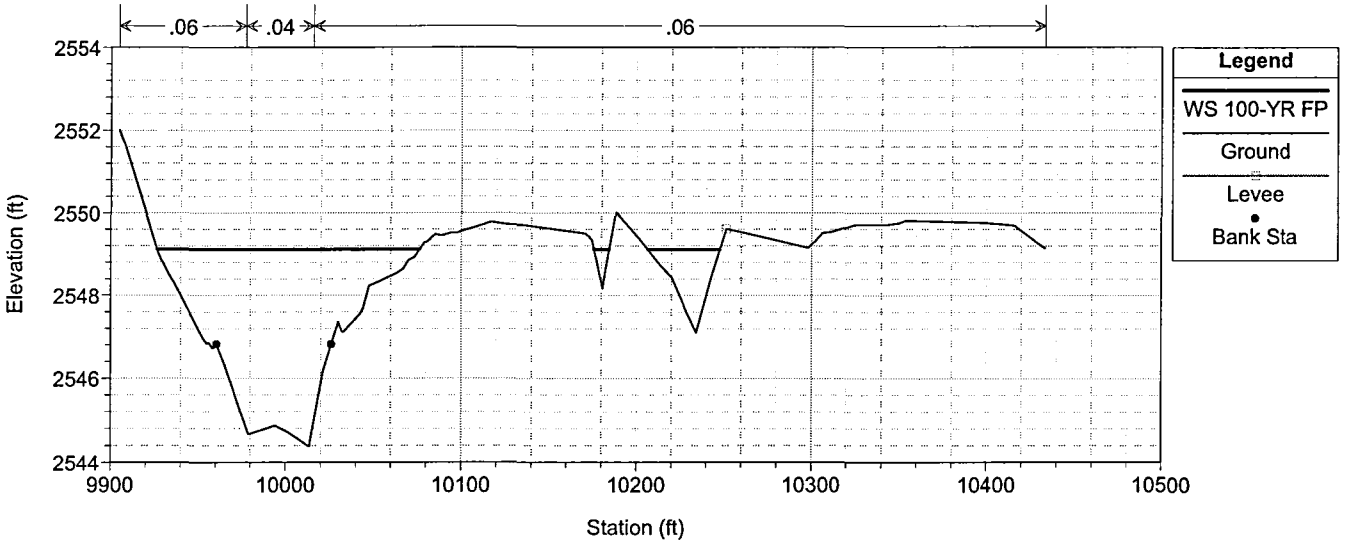
RV Wash K Plan: RV Wash K 11/1/2007

River = RV WK Reach = R2 RS = 7.363



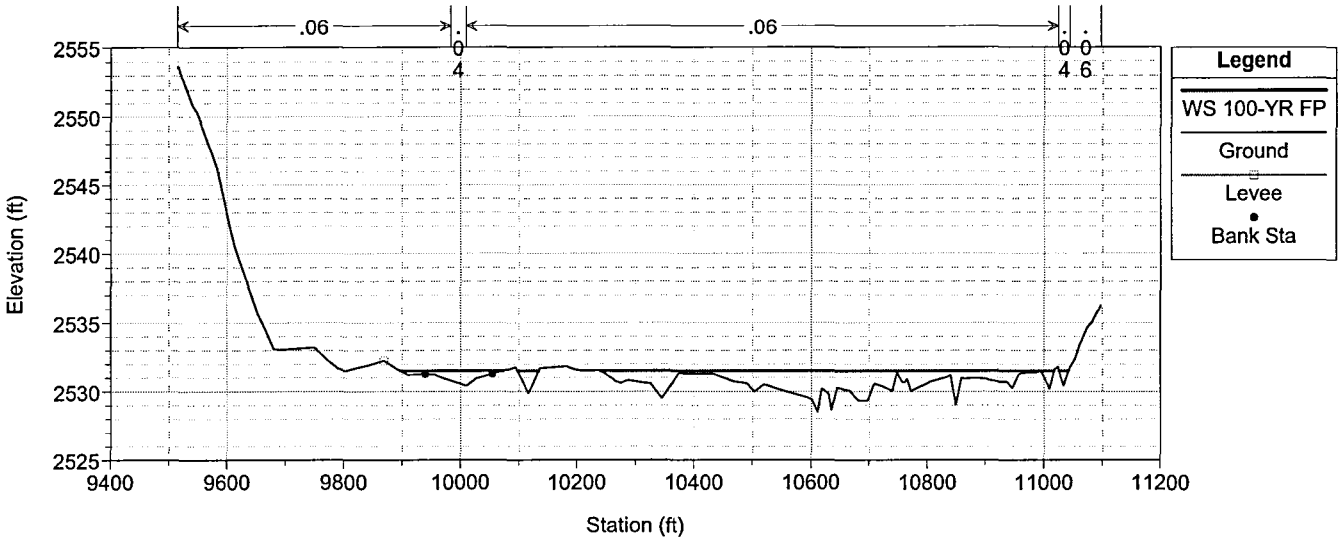
RV Wash K Plan: RV Wash K 11/1/2007

River = RV WK Reach = R2 RS = 7.246



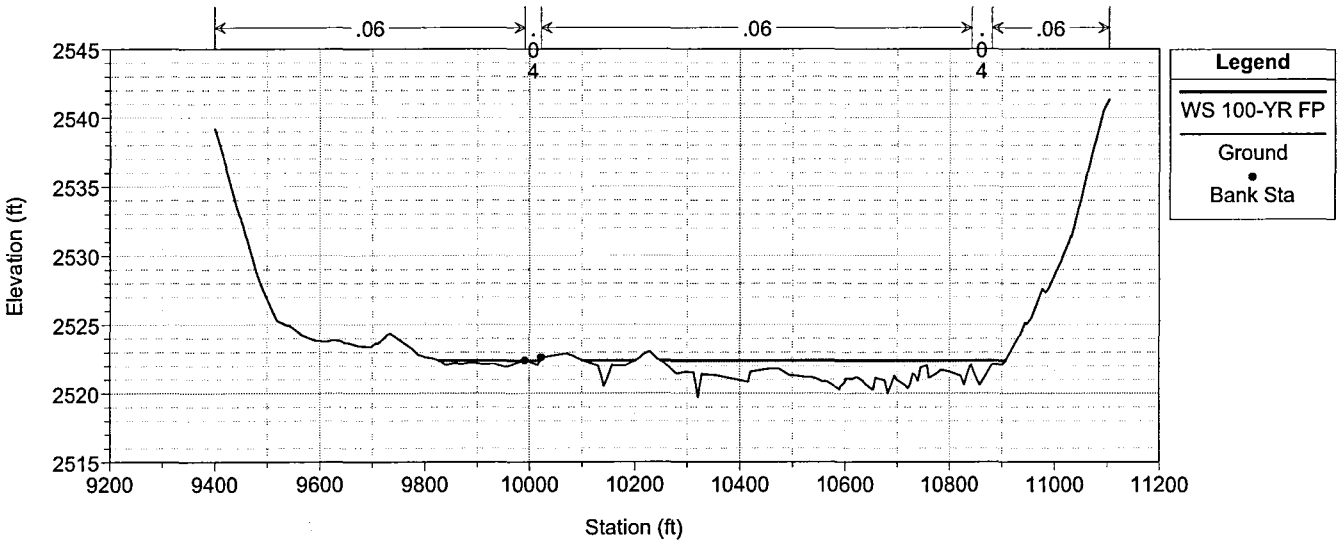
RV Wash K Plan: RV Wash K 11/1/2007

River = RV WK Reach = R3 RS = 7.131



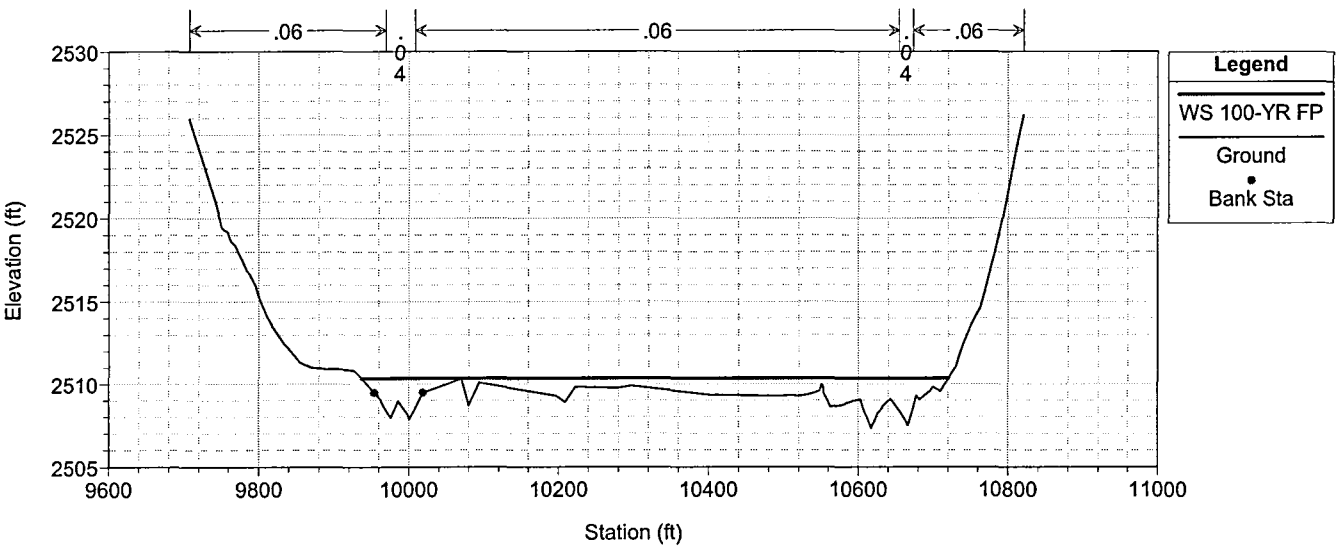
RV Wash K Plan: RV Wash K 11/1/2007

River = RV WK Reach = R3 RS = 7.061



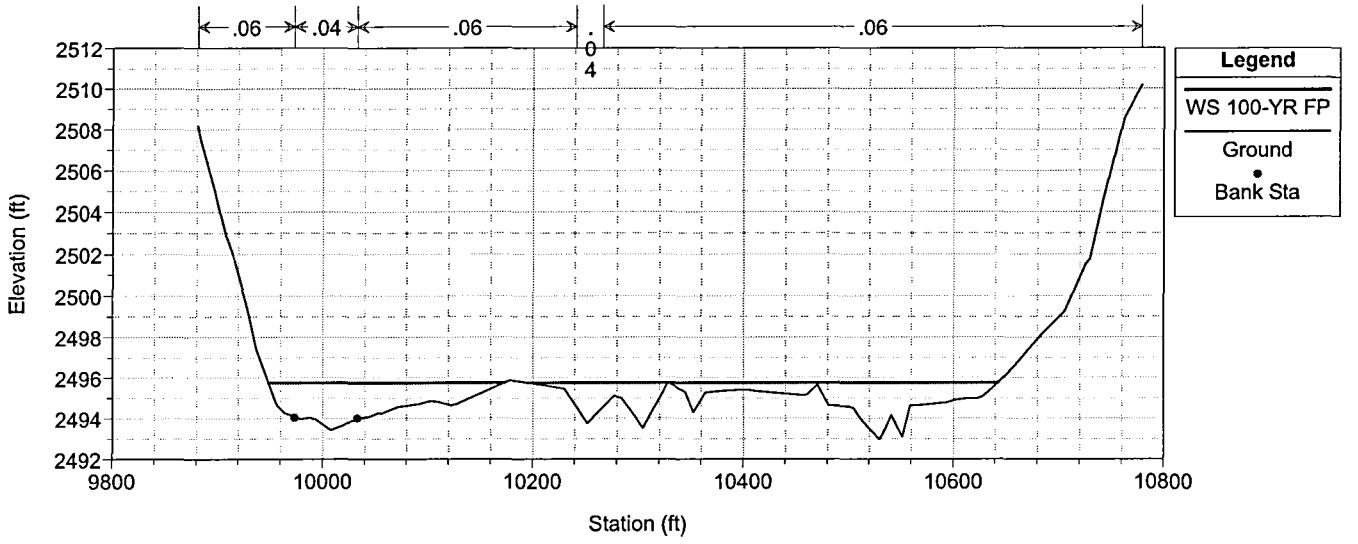
RV Wash K Plan: RV Wash K 11/1/2007

River = RV WK Reach = R3 RS = 6.957



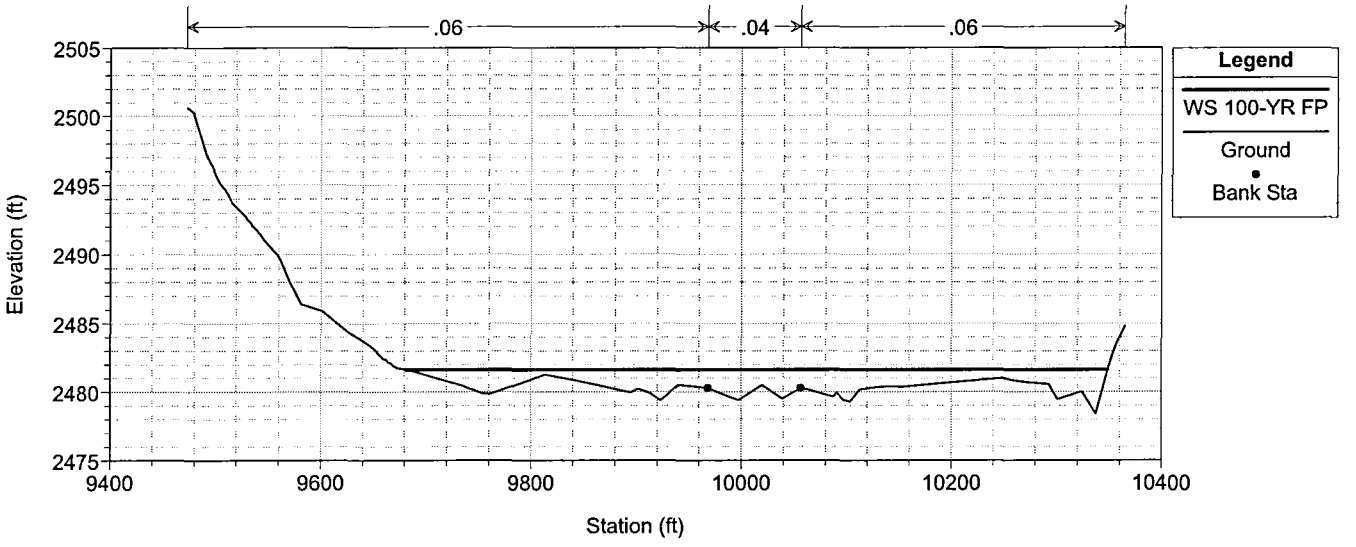
RV Wash K Plan: RV Wash K 11/1/2007

River = RV WK Reach = R3 RS = 6.818



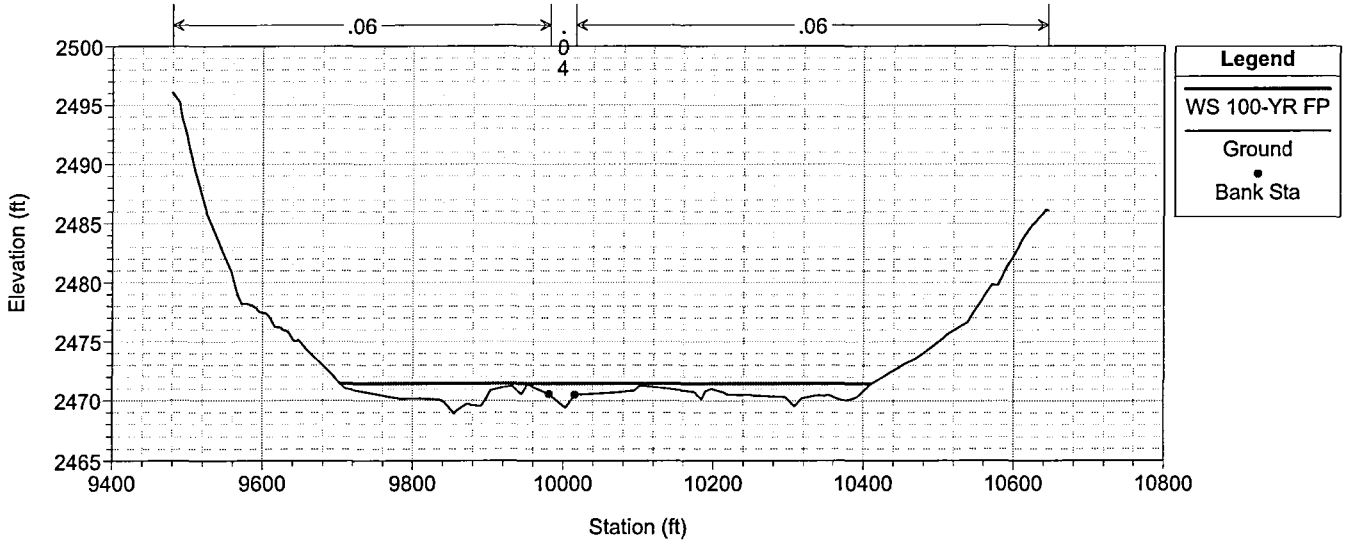
RV Wash K Plan: RV Wash K 11/1/2007

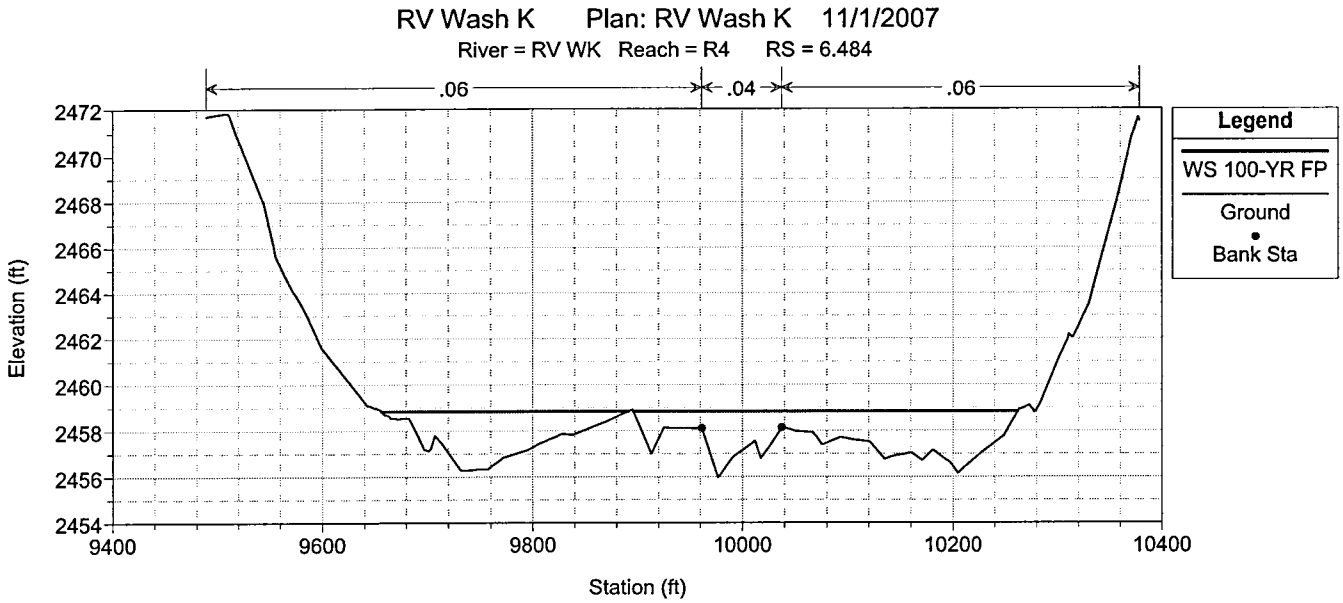
River = RV WK Reach = R4 RS = 6.686

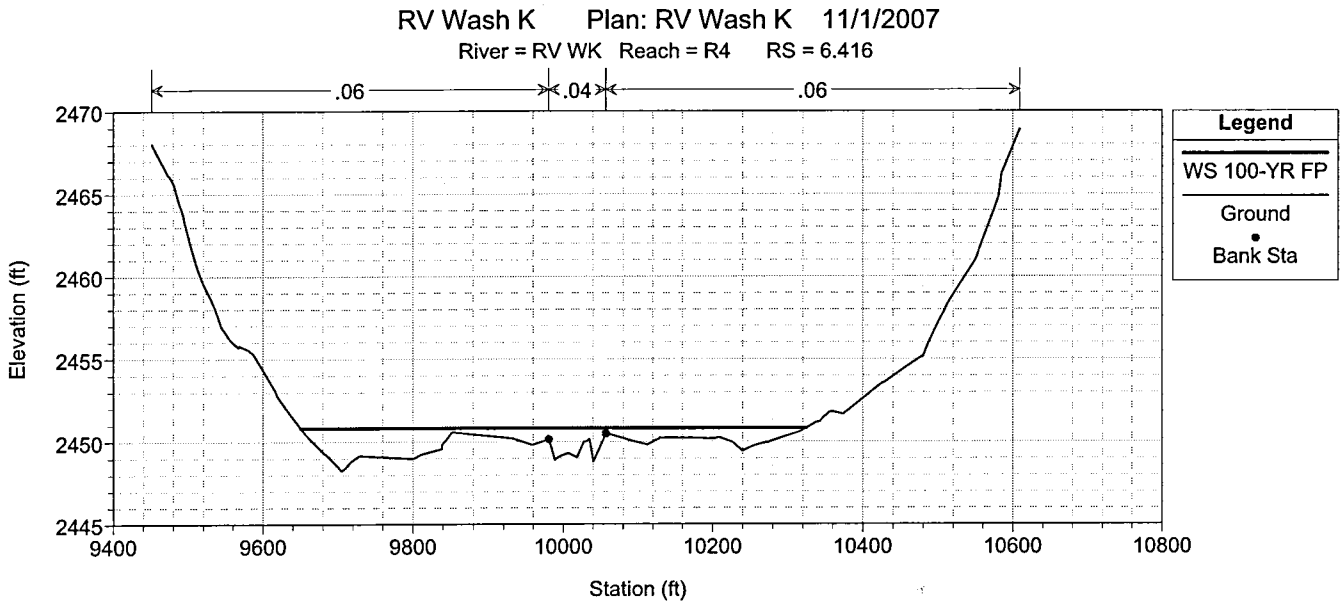


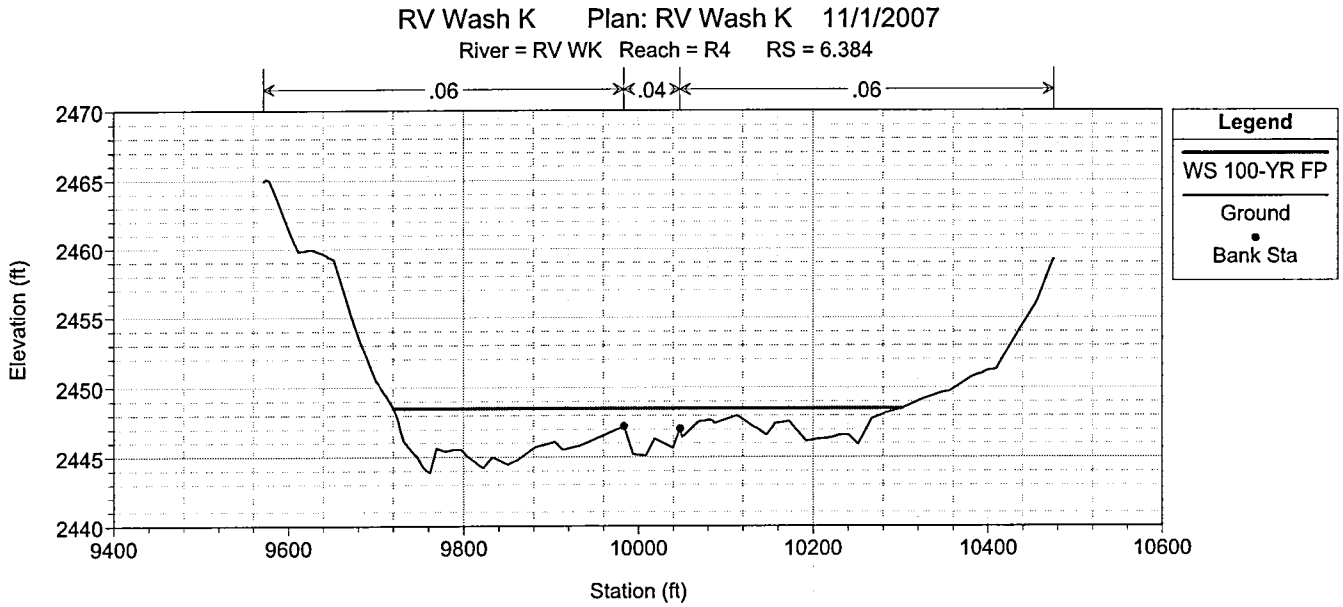
RV Wash K Plan: RV Wash K 11/1/2007

River = RV WK Reach = R4 RS = 6.597



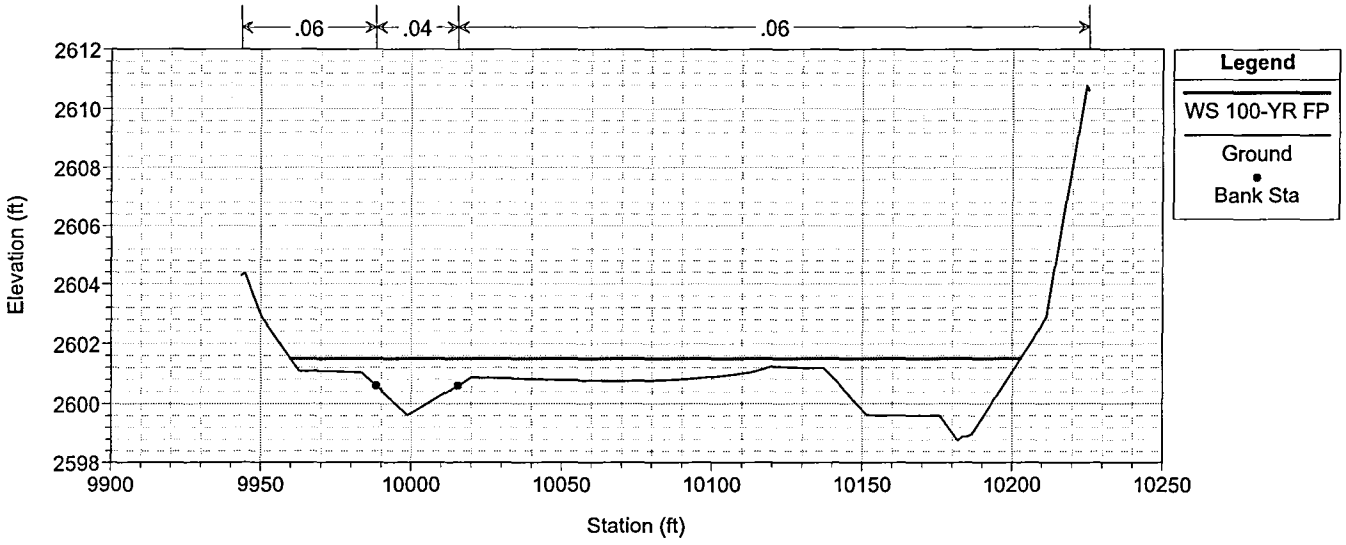

RV Wash K Plan: RV Wash K 11/1/2007
River = RV WK Reach = R4 RS = 6.484
.06
.04
.06
Legend
WS 100-YR FP
Ground
Bank Sta
Elevation (ft)
Station (ft)


RV Wash K Plan: RV Wash K 11/1/2007
River = RV WK Reach = R4 RS = 6.416
.06
.04
.06
Legend
WS 100-YR FP
Ground
Bank Sta
Elevation (ft)
Station (ft)


RV Wash K Plan: RV Wash K 11/1/2007
River = RV WK Reach = R4 RS = 6.384
.06
.04
.06
Legend
WS 100-YR FP
Ground
Bank Sta
Elevation (ft)
Station (ft)

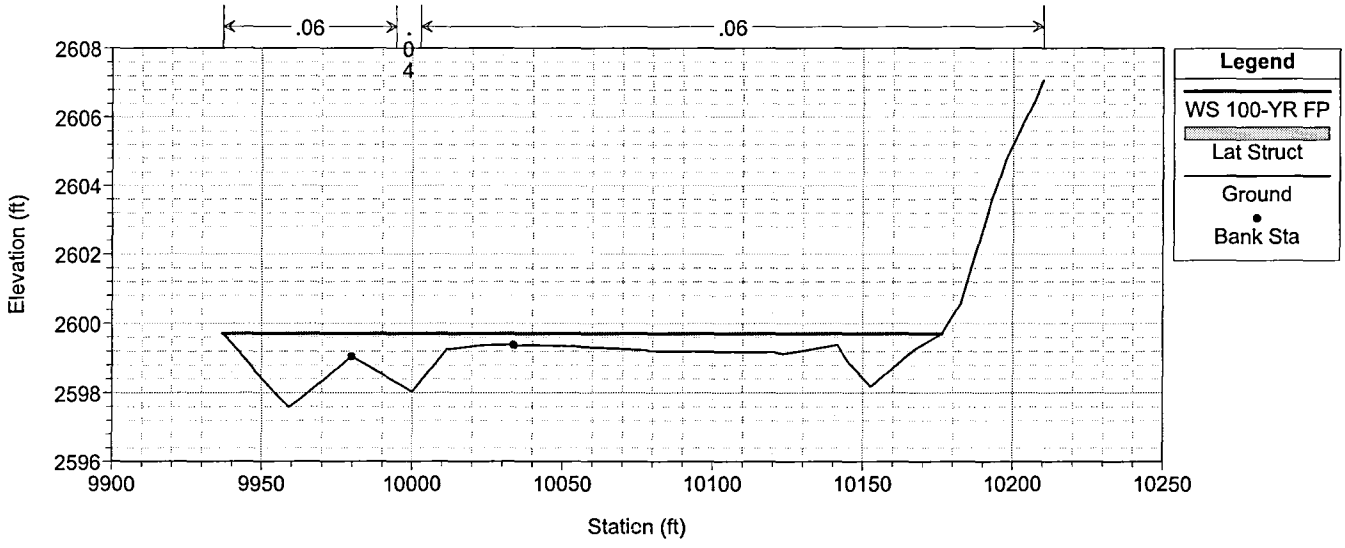
RV Wash K Plan: RV Wash K 11/1/2007

River = RV WK S4 Reach = R1 RS = 0.497



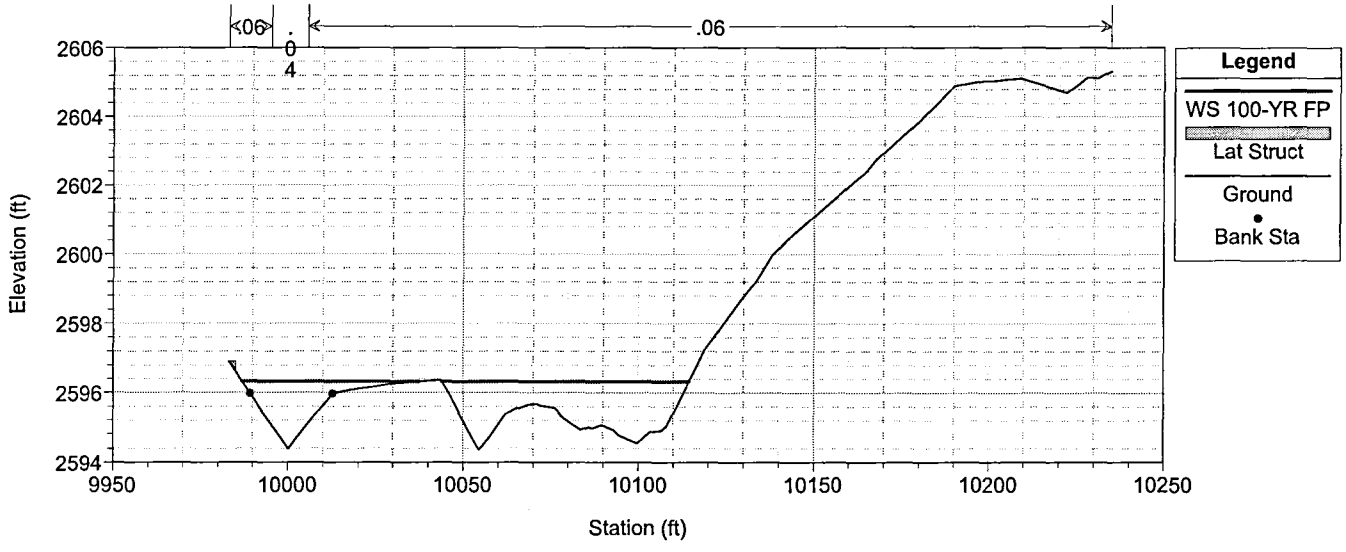
RV Wash K Plan: RV Wash K 11/1/2007

River = RV WK S4 Reach = R1 RS = 0.483



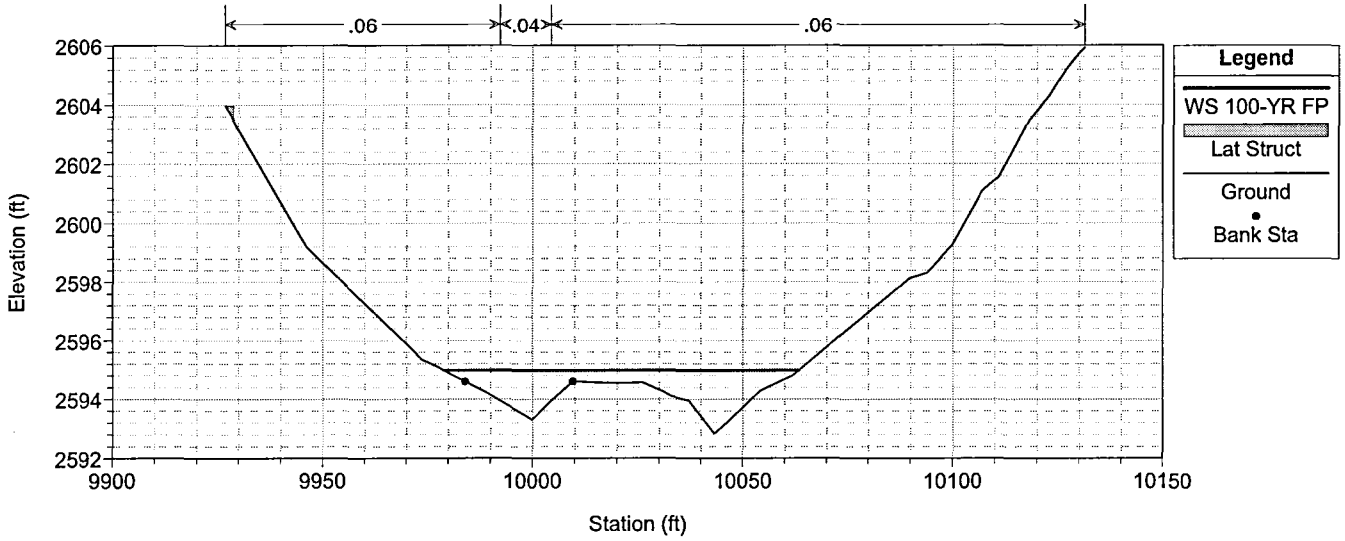
RV Wash K Plan: RV Wash K 11/1/2007

River = RV WK S4 Reach = R1 RS = 0.456



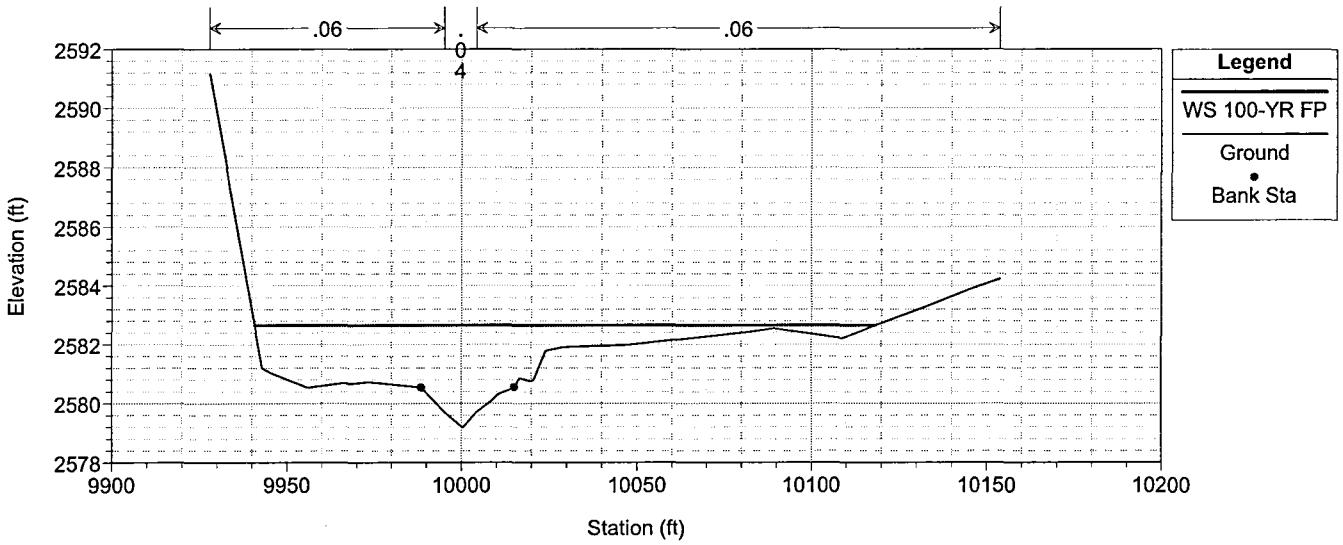
RV Wash K Plan: RV Wash K 11/1/2007

River = RV WK S4 Reach = R1 RS = 0.443



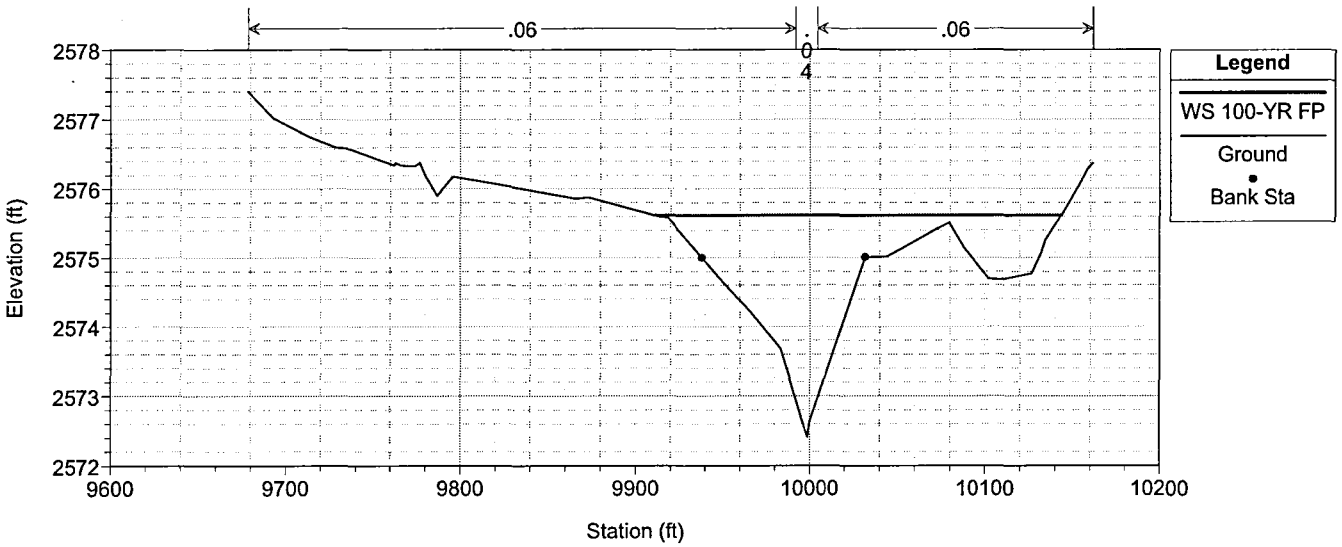
RV Wash K Plan: RV Wash K 11/1/2007

River = RV WK S4 Reach = R2 RS = 0.339



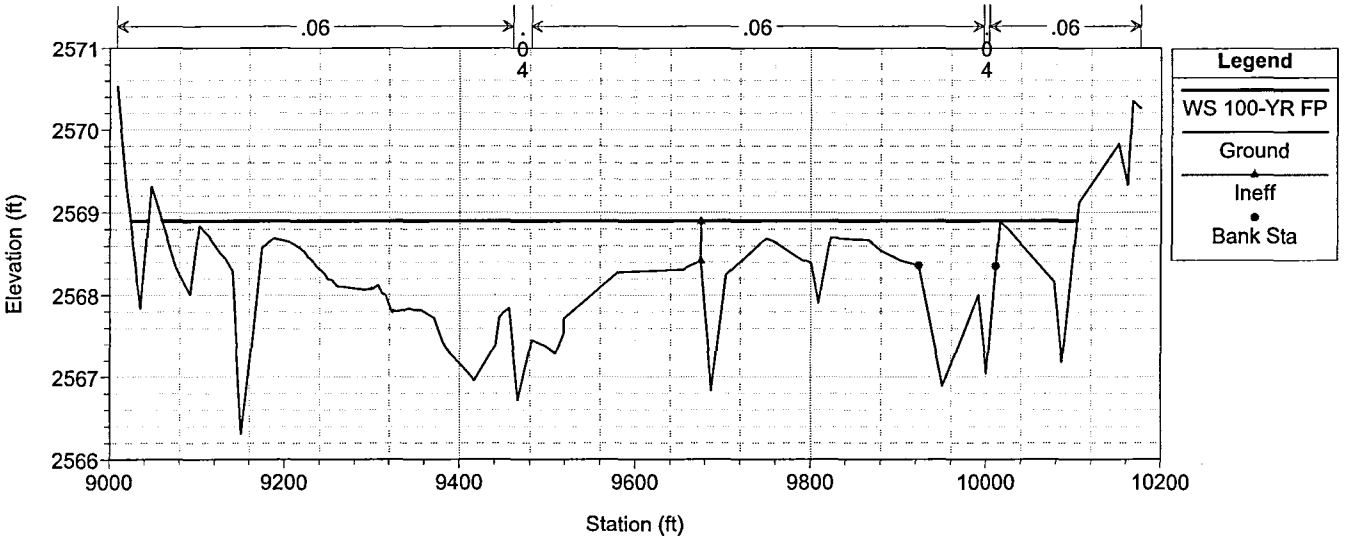
RV Wash K Plan: RV Wash K 11/1/2007

River = RV WK S4 Reach = R2 RS = 0.285



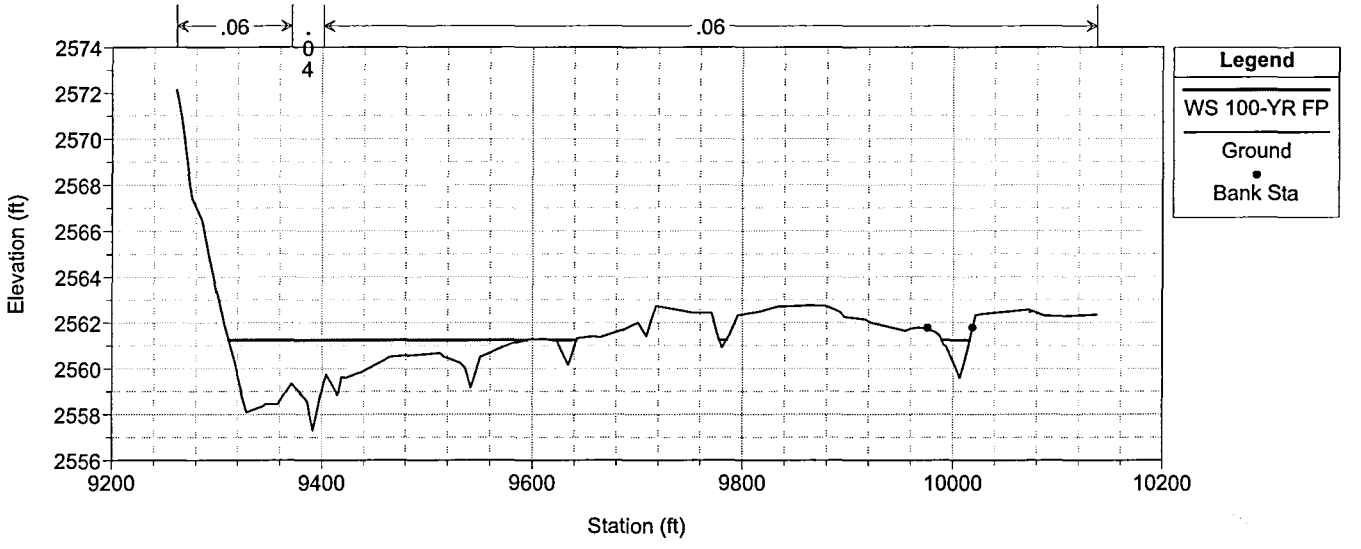
RV Wash K Plan: RV Wash K 11/1/2007

River = RV WK S4 Reach = R2 RS = 0.240



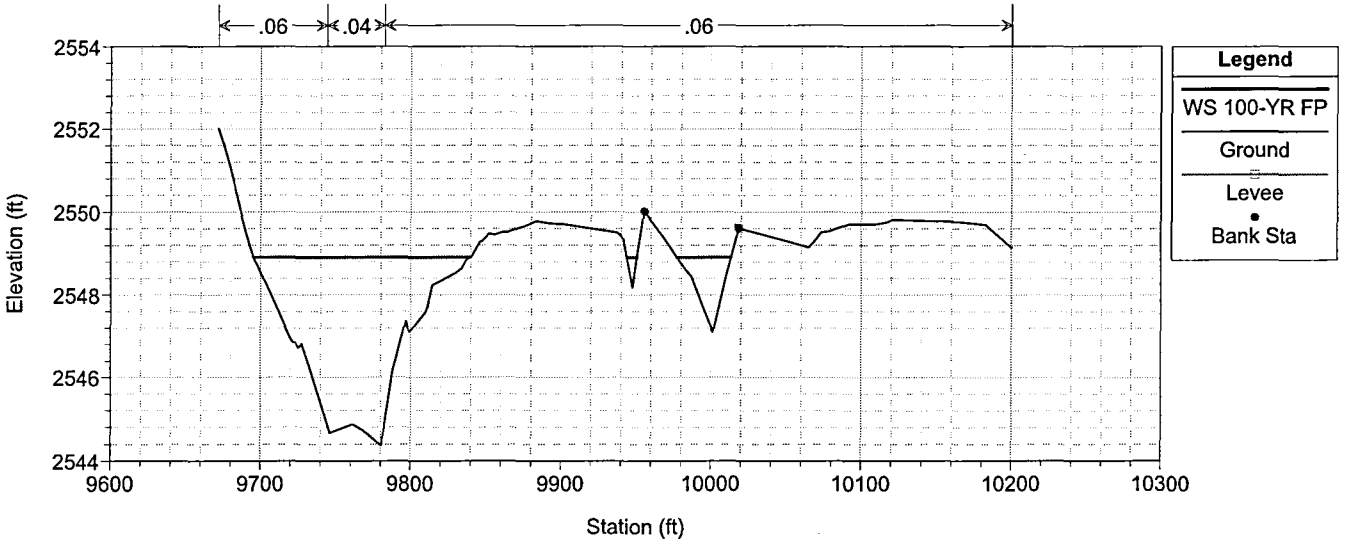
RV Wash K Plan: RV Wash K 11/1/2007

River = RV WK S4 Reach = R2 RS = 0.194



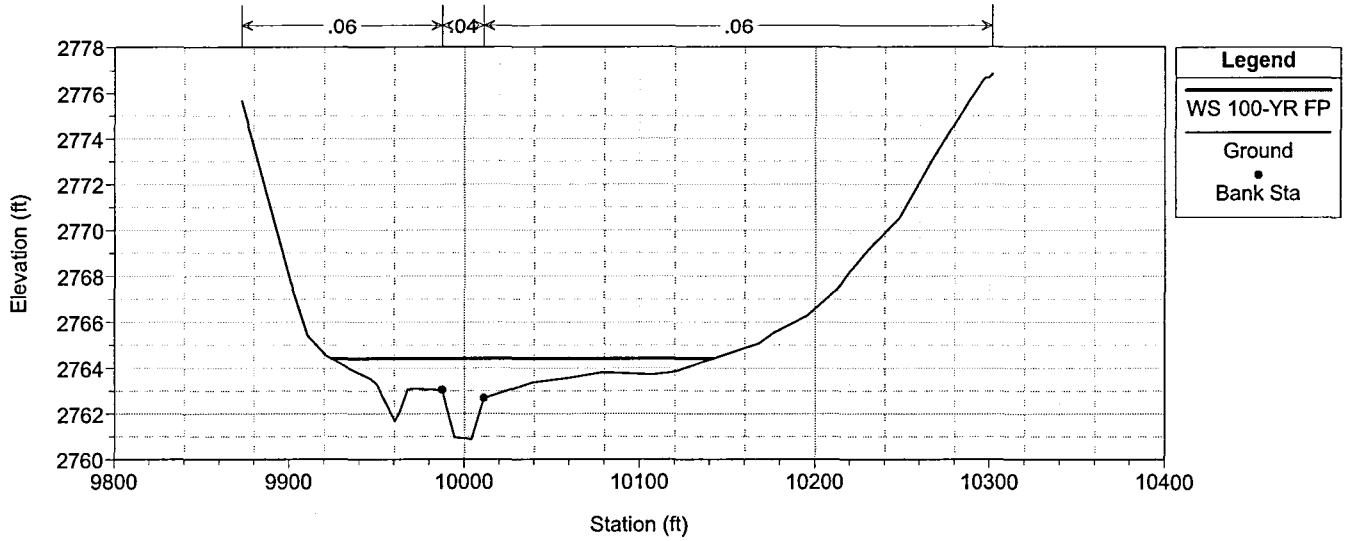
RV Wash K Plan: RV Wash K 11/1/2007

River = RV WK S4 Reach = R2 RS = 0.108



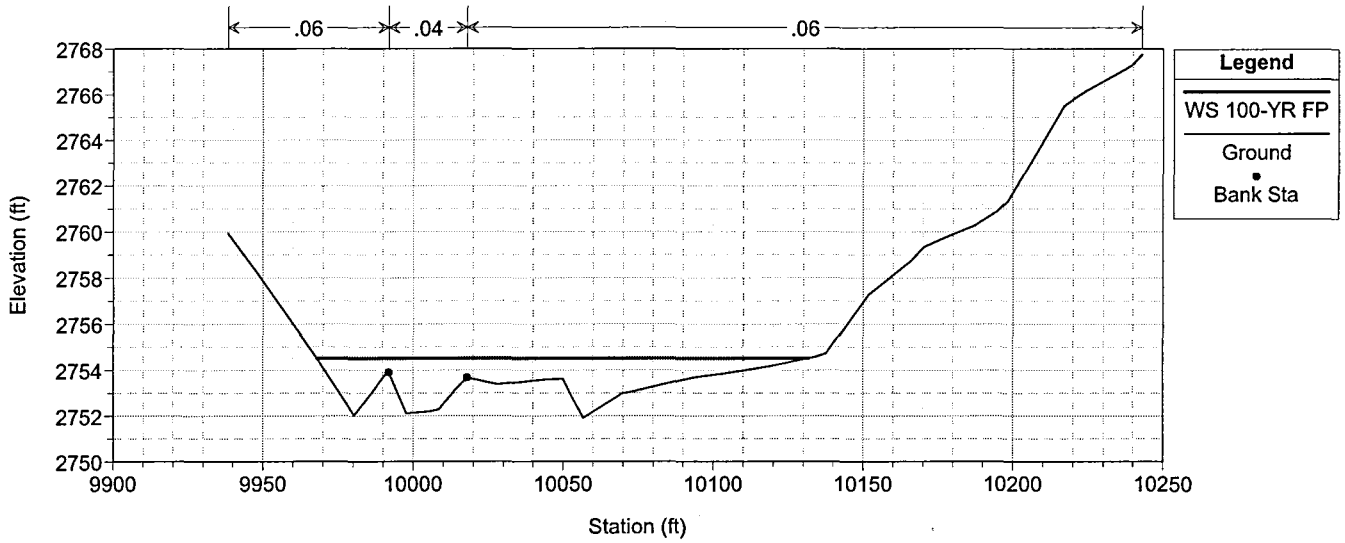
RV Wash K Plan: RV Wash K 11/1/2007

River = RV WK T13 Reach = R1 RS = 1.960



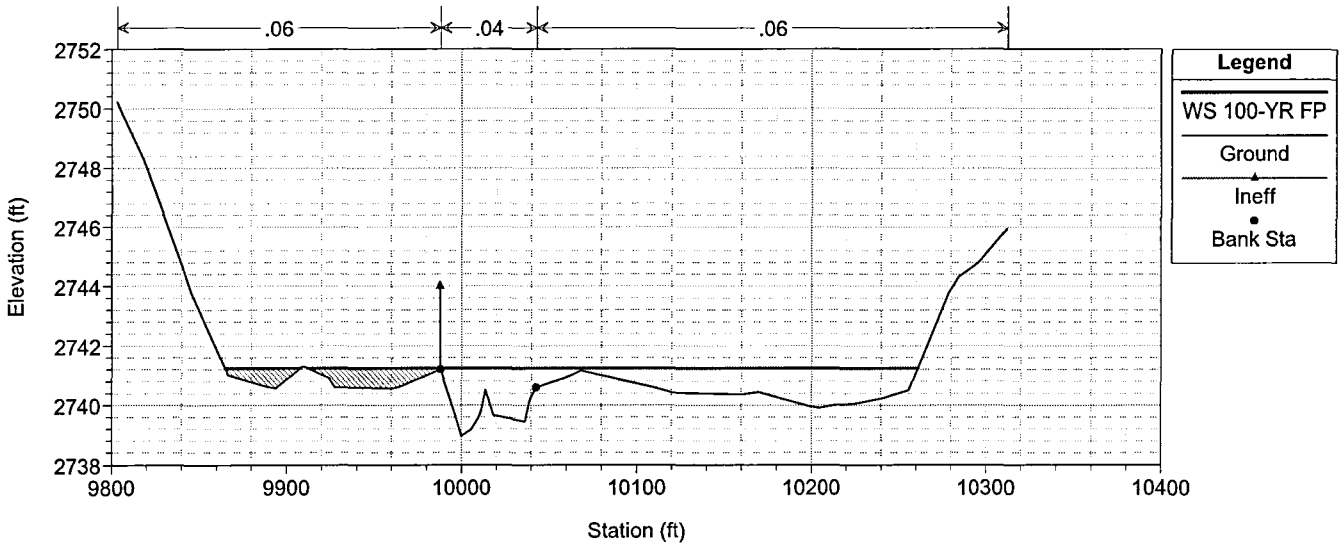
RV Wash K Plan: RV Wash K 11/1/2007

River = RV WK T13 Reach = R1 RS = 1.894



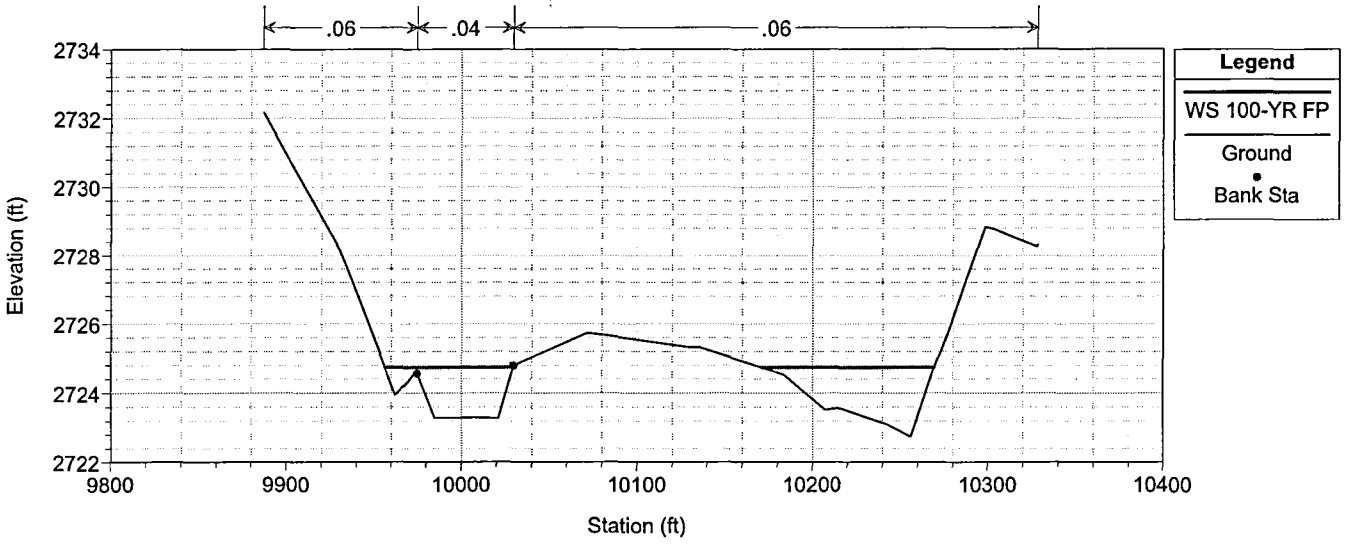
RV Wash K Plan: RV Wash K 11/1/2007

River = RV WK T13 Reach = R1 RS = 1.810



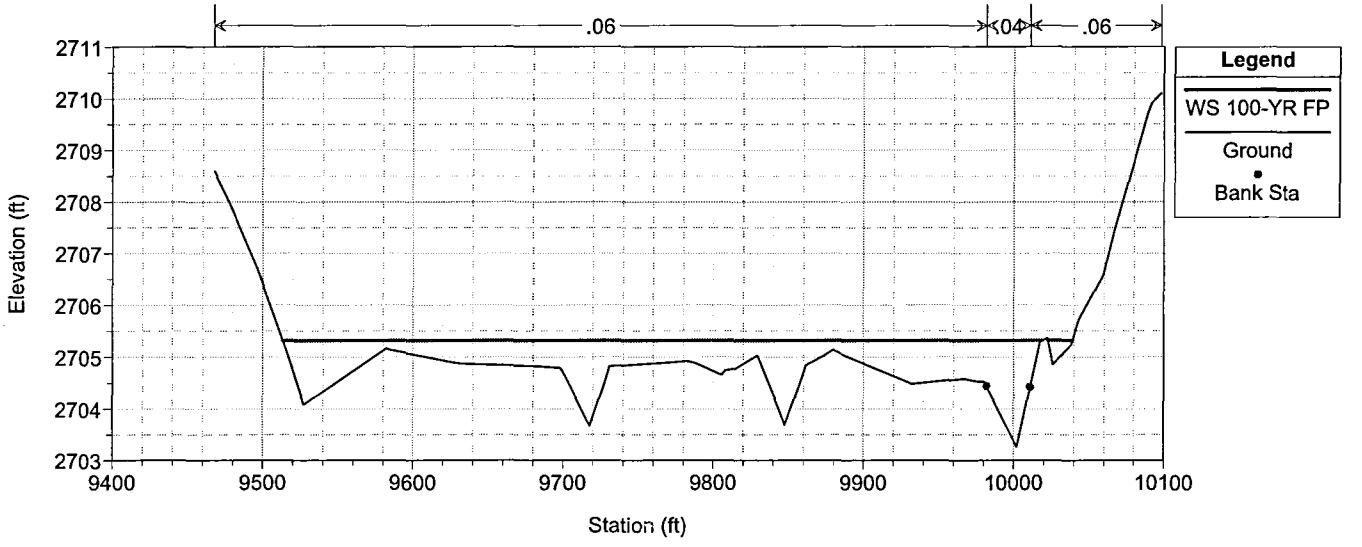
RV Wash K Plan: RV Wash K 11/1/2007

River = RV WK T13 Reach = R1 RS = 1.700



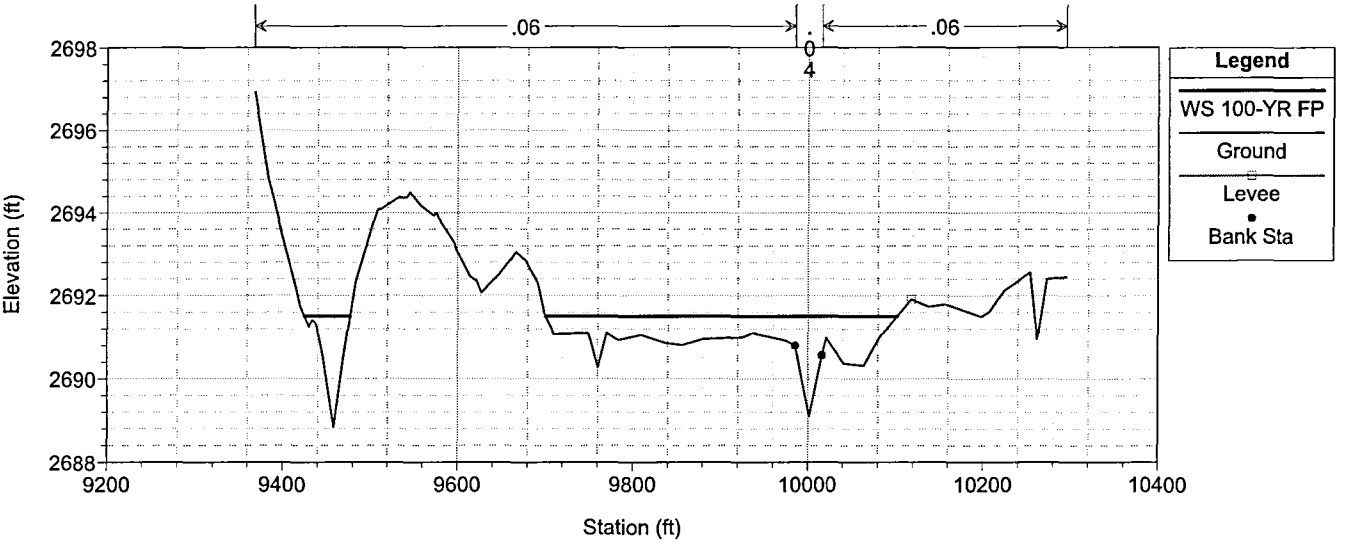
RV Wash K Plan: RV Wash K 11/1/2007

River = RV WK T13 Reach = R1 RS = 1.577



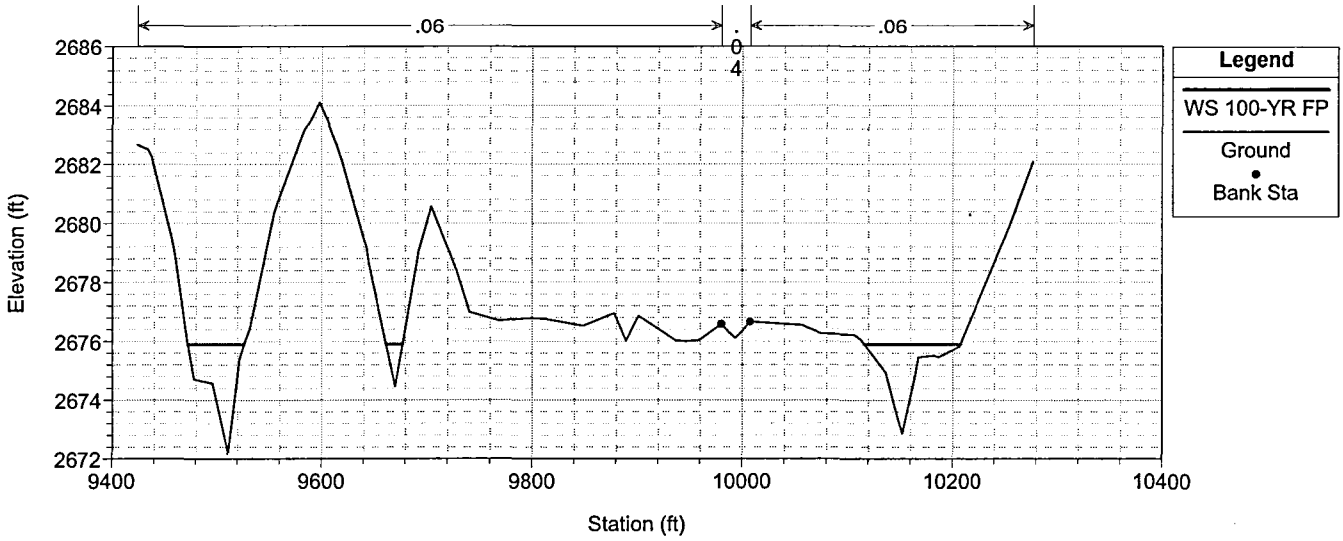
RV Wash K Plan: RV Wash K 11/1/2007

River = RV WK T13 Reach = R1 RS = 1.494



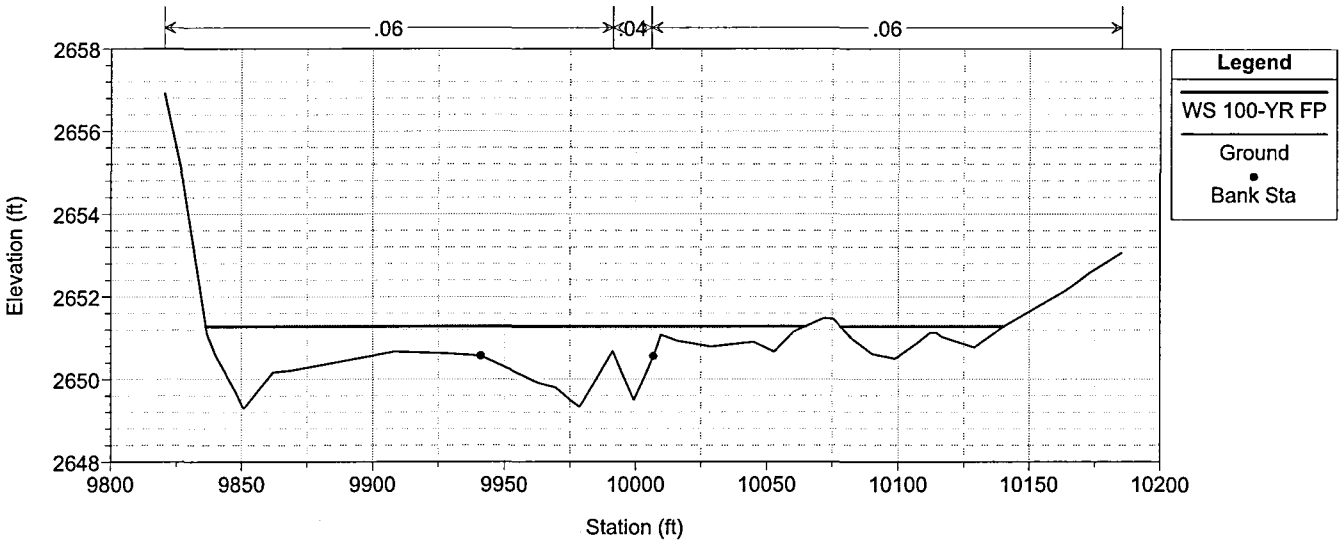
RV Wash K Plan: RV Wash K 11/1/2007

River = RV WK T13 Reach = R1 RS = 1.415



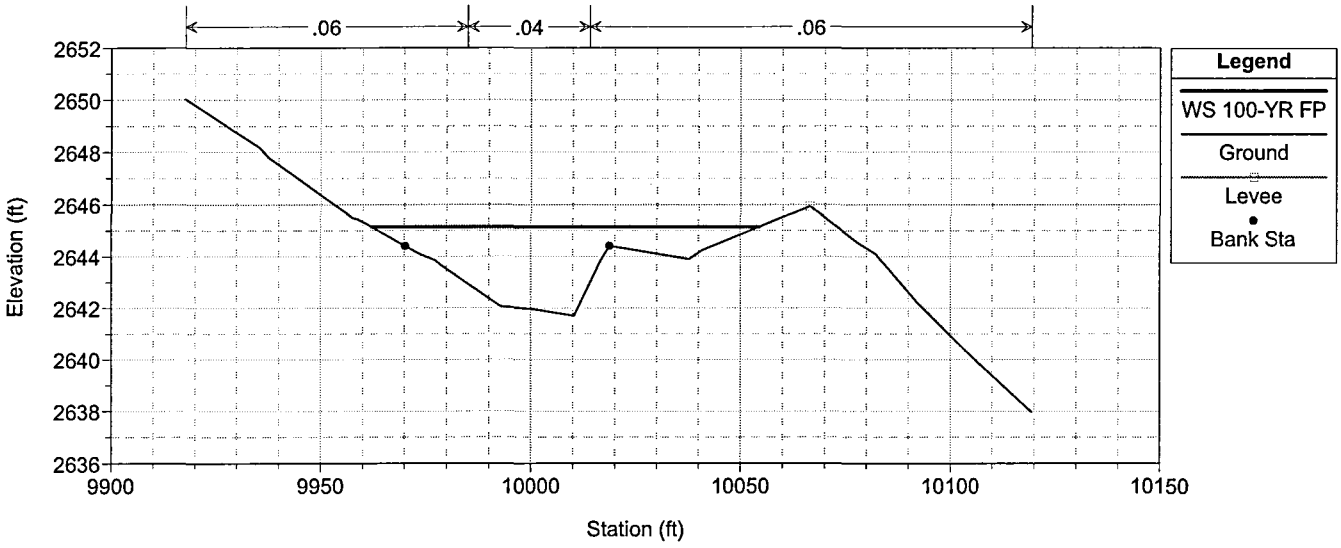
RV Wash K Plan: RV Wash K 11/1/2007

River = RV WK T13 Reach = R1 RS = 1.276



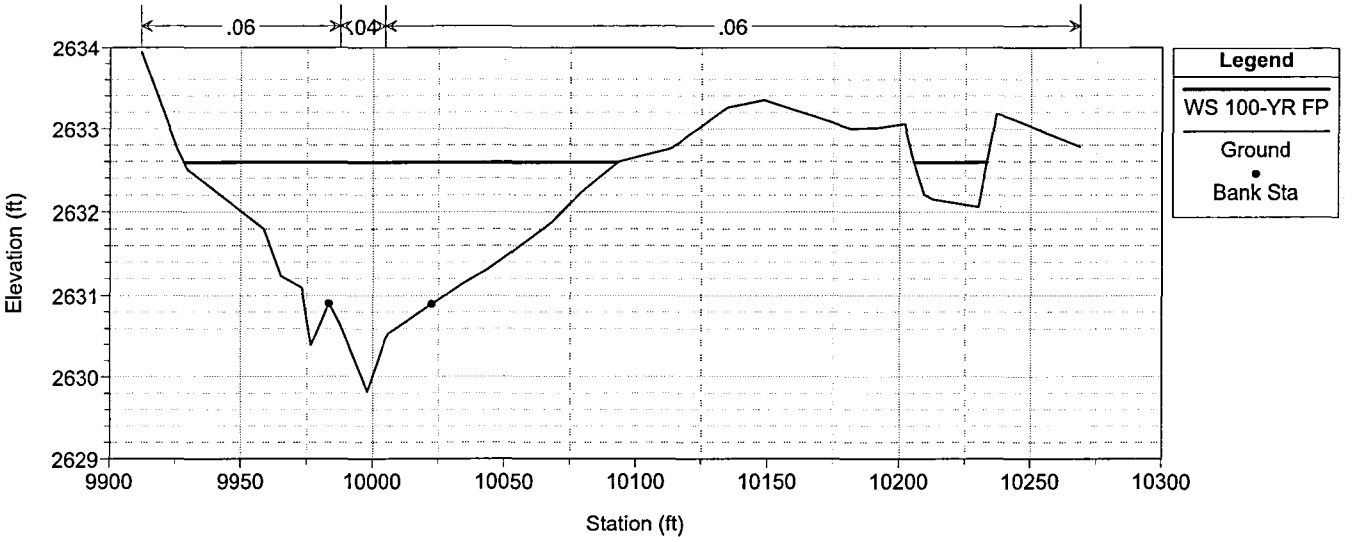
RV Wash K Plan: RV Wash K 11/1/2007

River = RV WK T13 Reach = R1 RS = 1.239



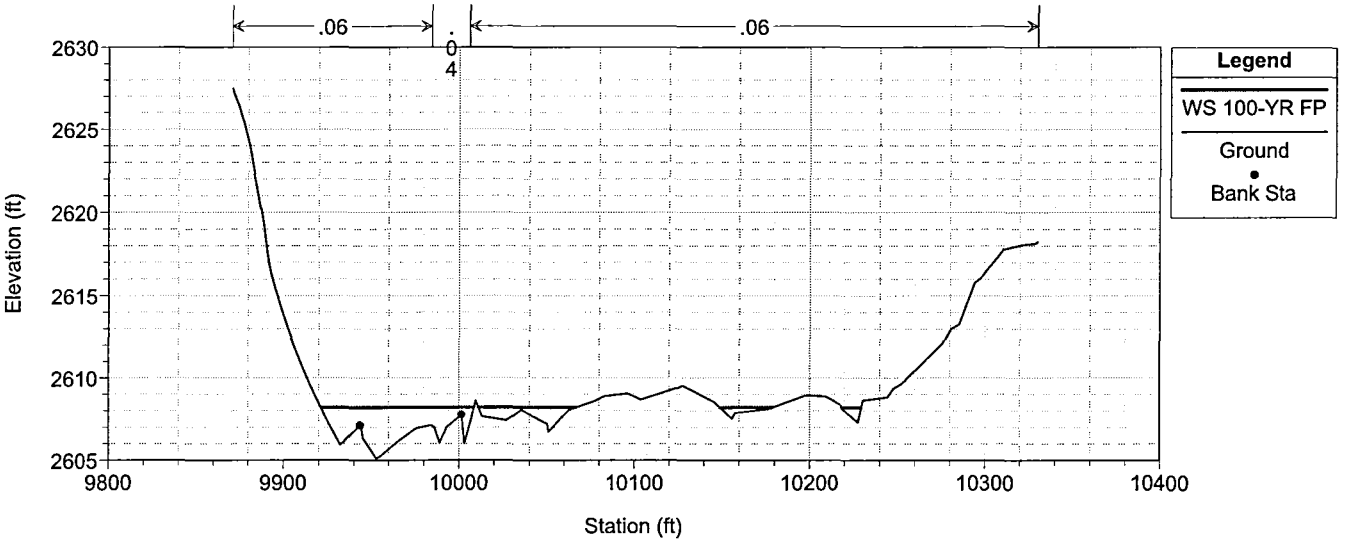
RV Wash K Plan: RV Wash K 11/1/2007

River = RV WK T13 Reach = R1 RS = 1.164



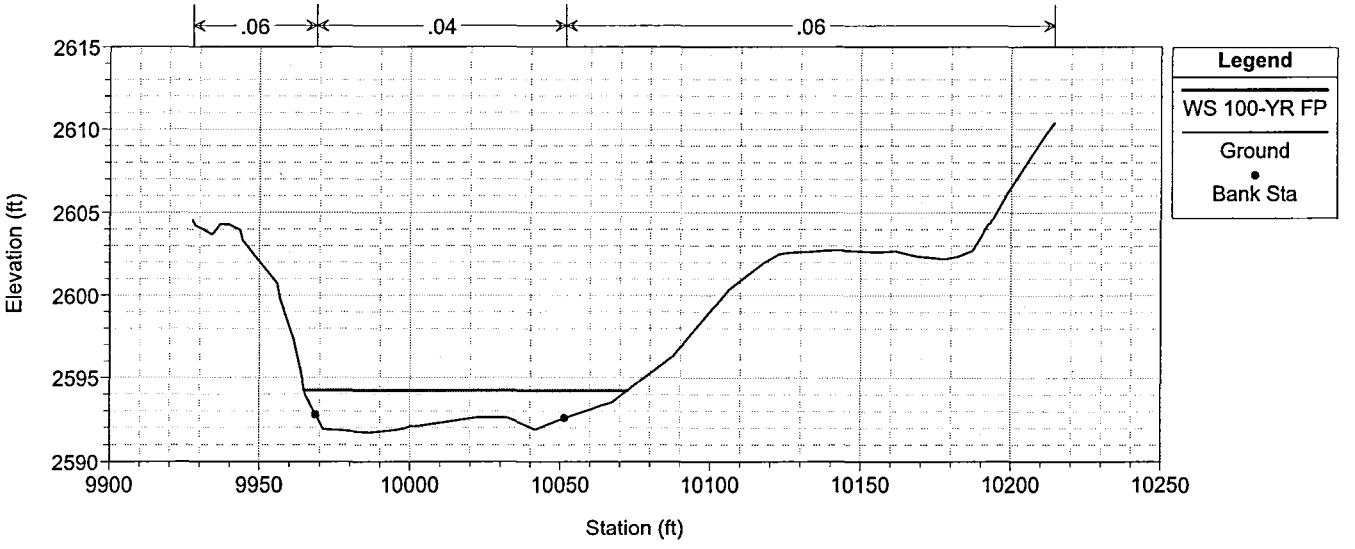
RV Wash K Plan: RV Wash K 11/1/2007

River = RV WK T13 Reach = R1 RS = 1.026



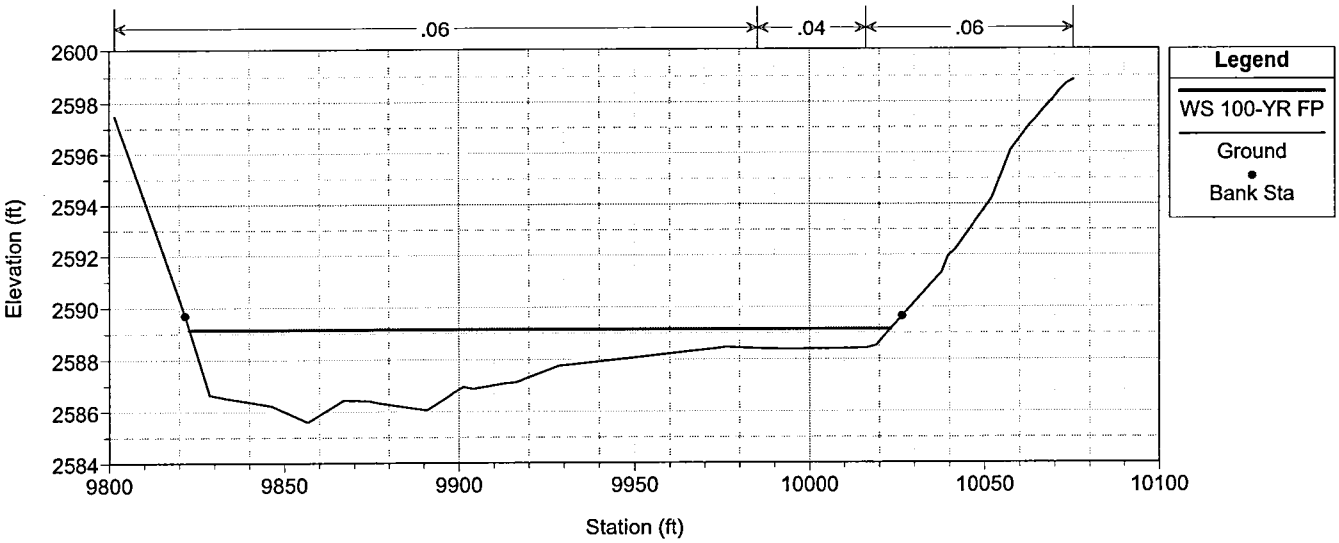
RV Wash K Plan: RV Wash K 11/1/2007

River = RV WK T13 Reach = R1 RS = 0.901



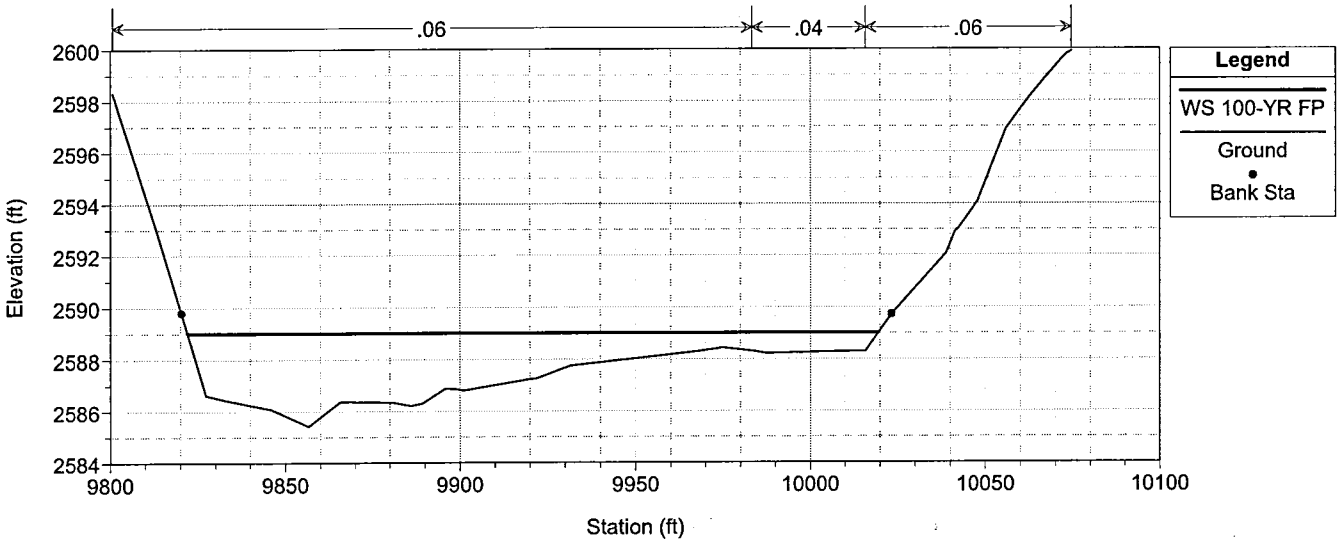
RV Wash K Plan: RV Wash K 11/1/2007

River = RV WK T13 Reach = R2 RS = 0.866



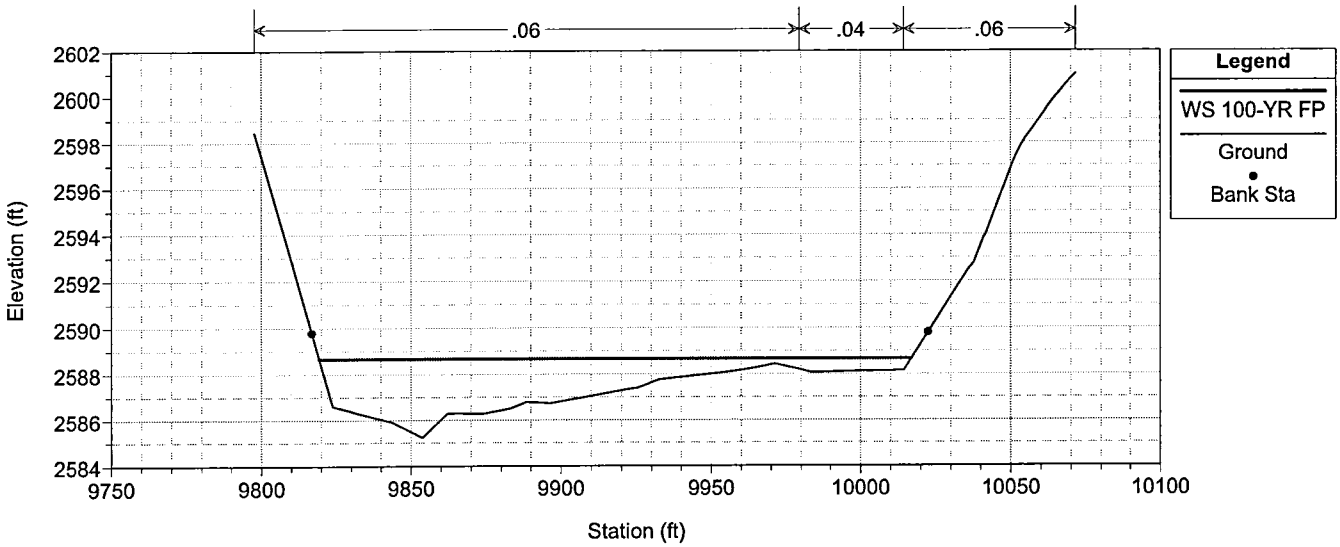
RV Wash K Plan: RV Wash K 11/1/2007

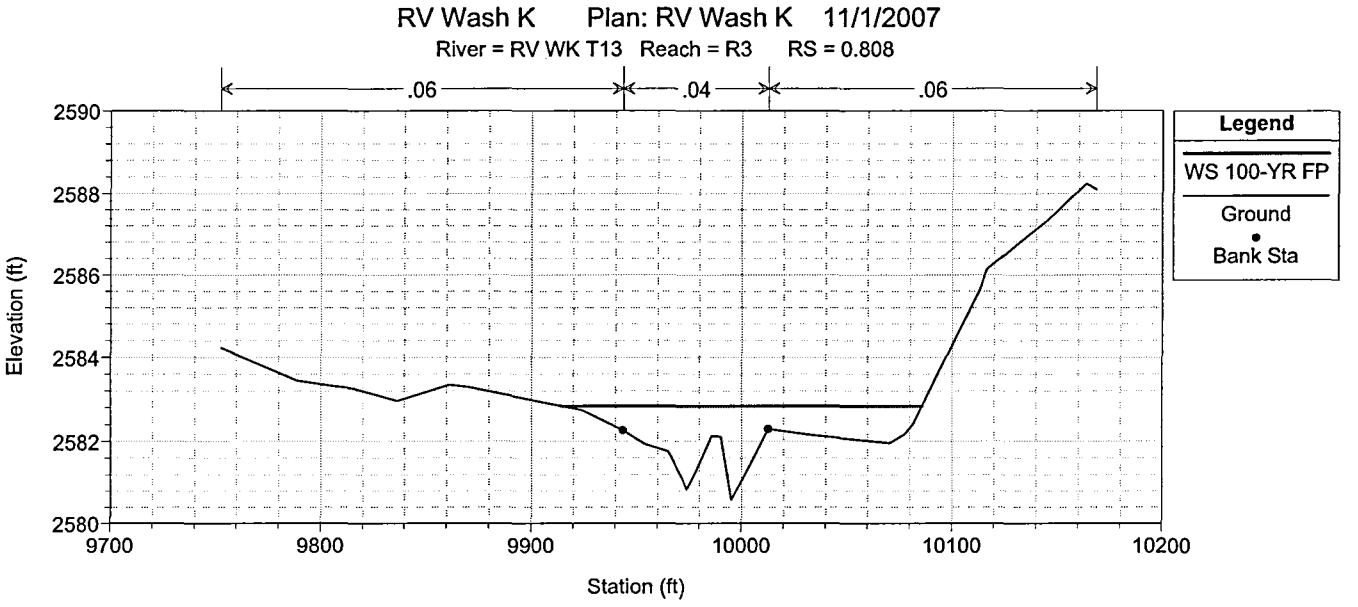
River = RV WK T13 Reach = R2 RS = 0.865

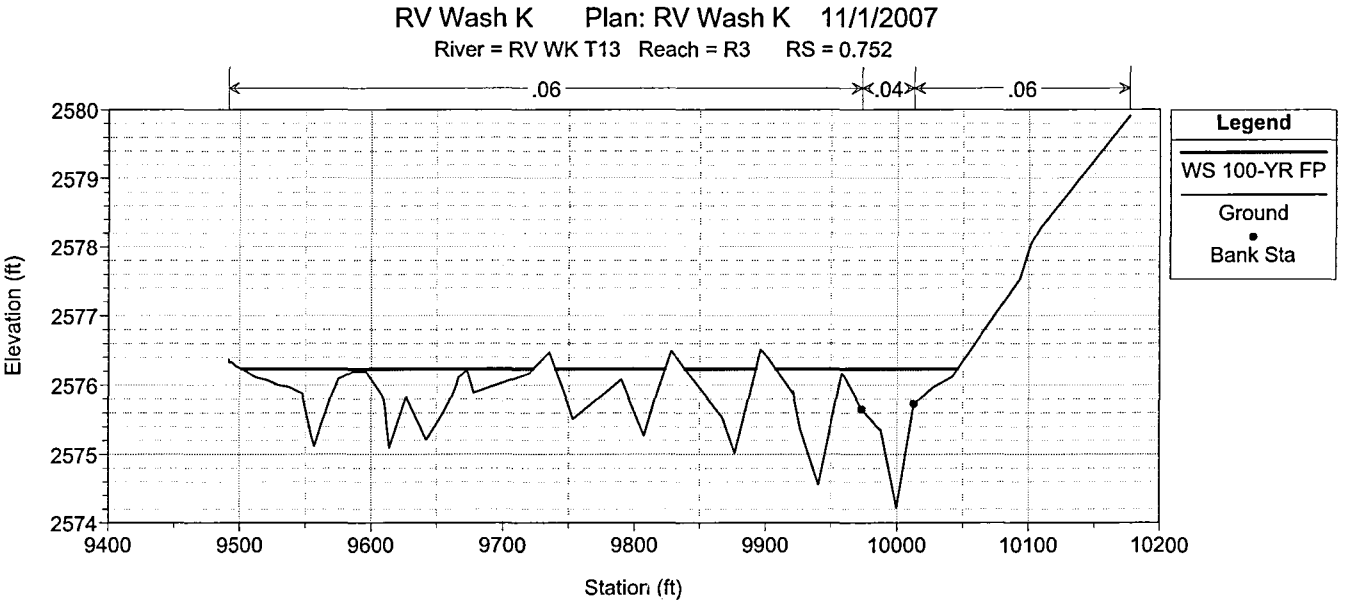


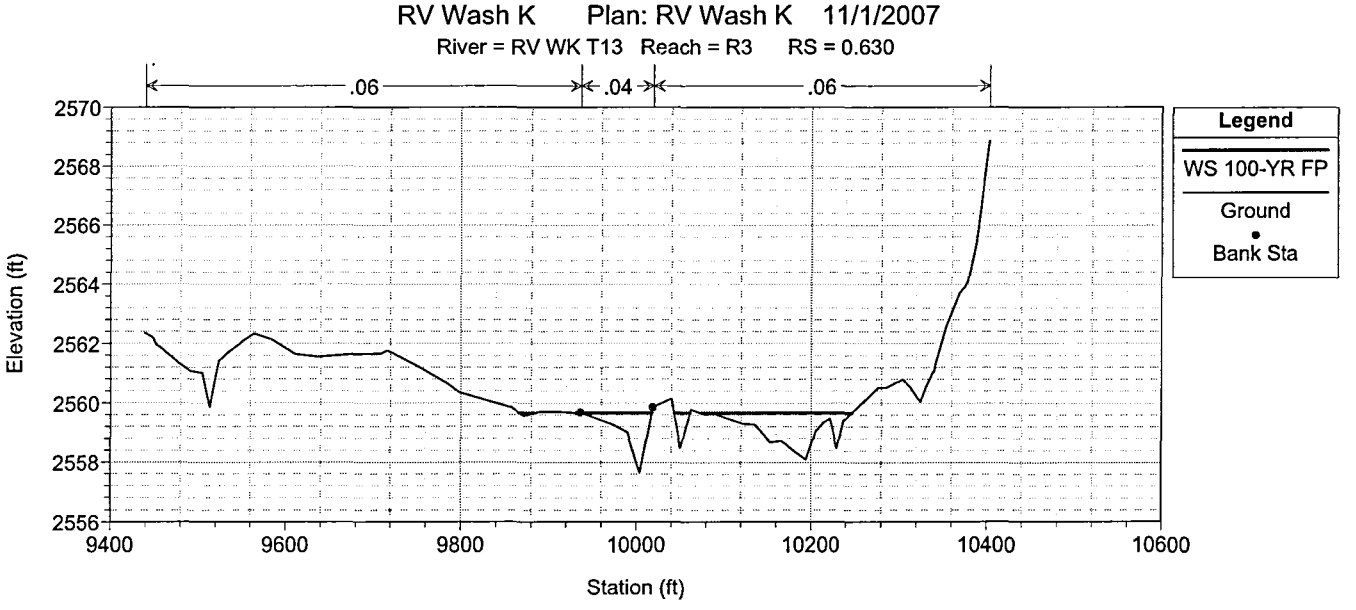
RV Wash K Plan: RV Wash K 11/1/2007

River = RV WK T13 Reach = R2 RS = 0.864



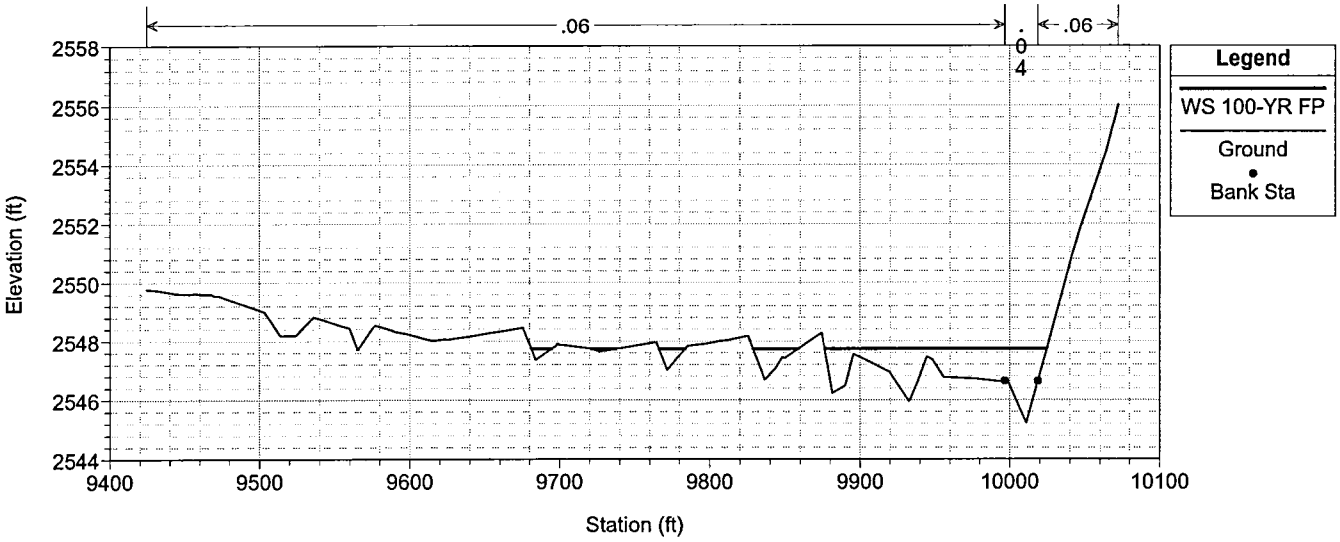

RV Wash K Plan: RV Wash K 11/1/2007
River = RV WK T13 Reach = R3 RS = 0.808
.06
.04
.06
Elevation (ft)
Station (ft)
Legend
WS 100-YR FP
Ground
Bank Sta


RV Wash K Plan: RV Wash K 11/1/2007
River = RV WK T13 Reach = R3 RS = 0.752
.06
.04
.06
Elevation (ft)
Station (ft)
Legend
WS 100-YR FP
Ground
Bank Sta


RV Wash K Plan: RV Wash K 11/1/2007
River = RV WK T13 Reach = R3 RS = 0.630
.06
.04
.06
Elevation (ft)
Station (ft)
Legend
WS 100-YR FP
Ground
Bank Sta

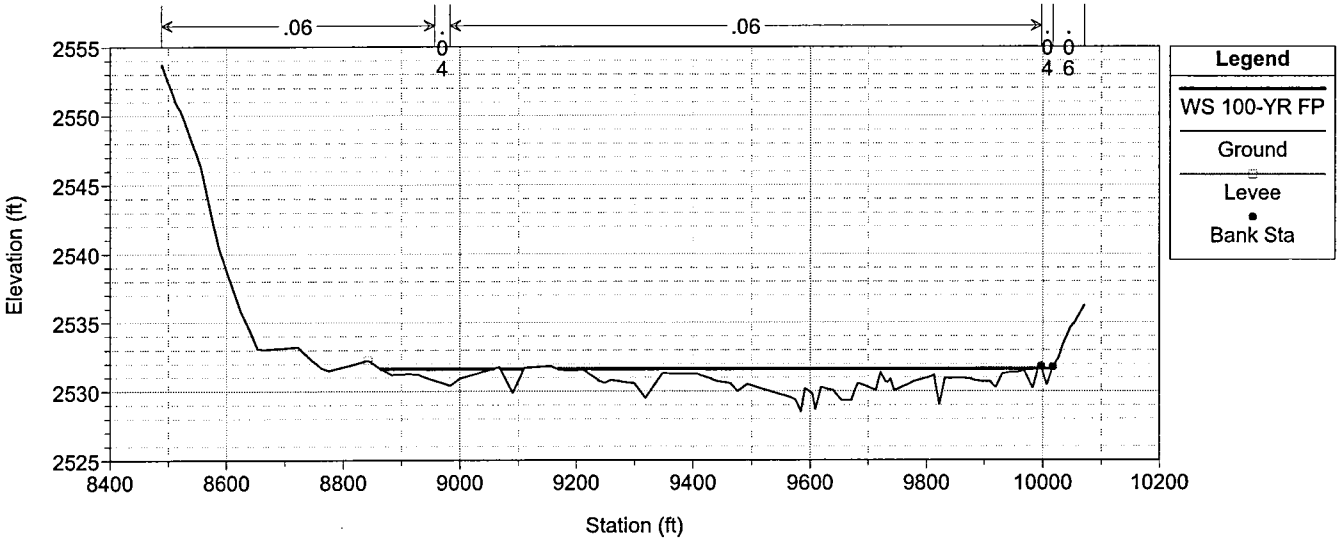
RV Wash K Plan: RV Wash K 11/1/2007

River = RV WK T13 Reach = R3 RS = 0.537



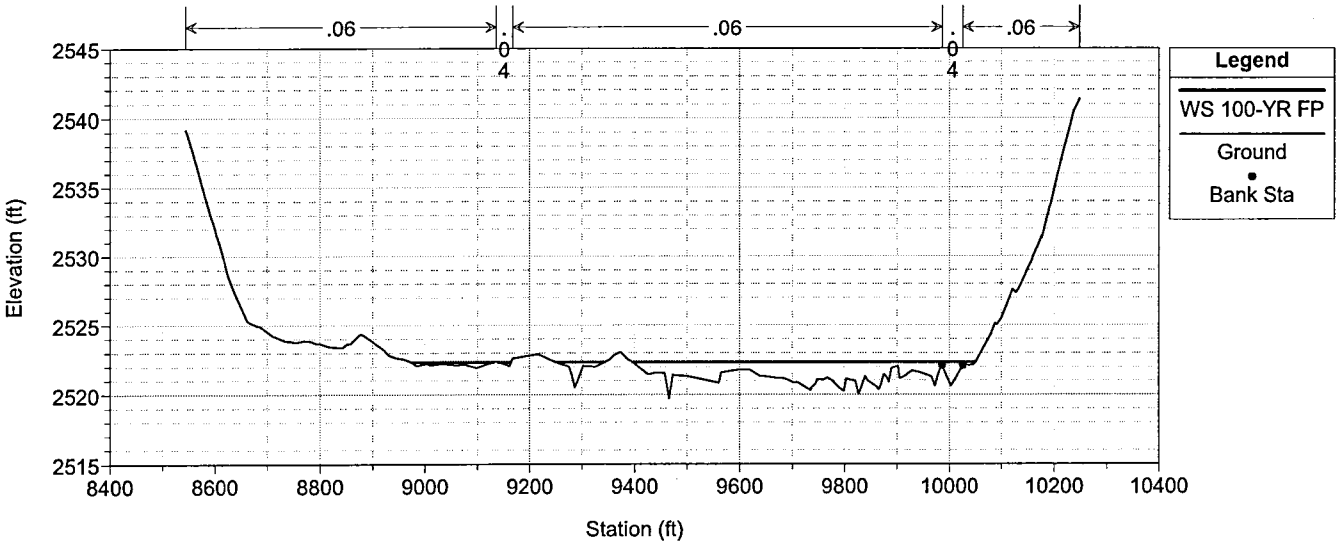
RV Wash K Plan: RV Wash K 11/1/2007

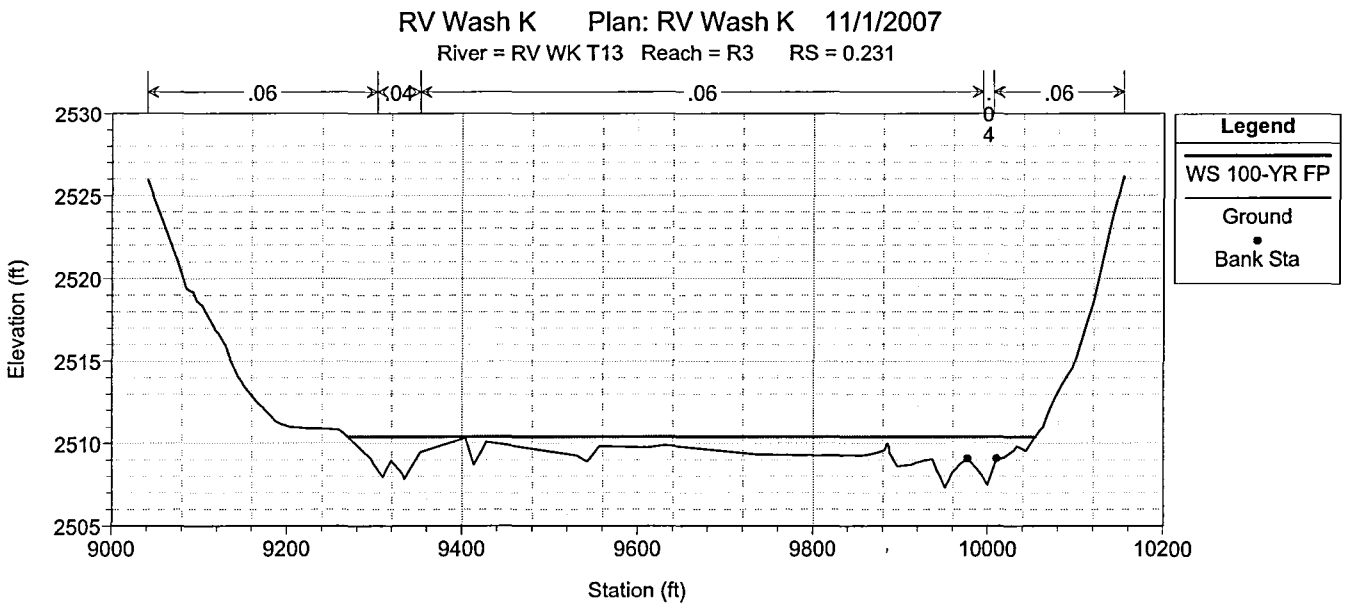
River = RV WK T13 Reach = R3 RS = 0.419

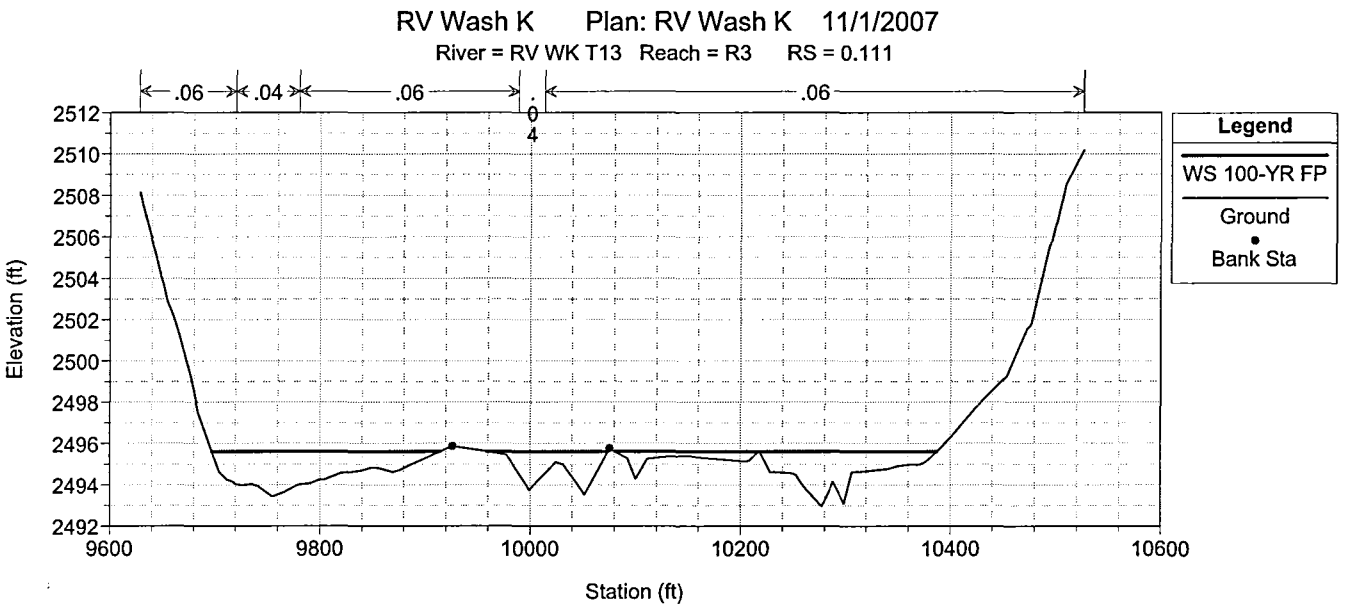


RV Wash K Plan: RV Wash K 11/1/2007

River = RV WK T13 Reach = R3 RS = 0.339




RV Wash K Plan: RV Wash K 11/1/2007
River = RV WK T13 Reach = R3 RS = 0.231
.06
.04
.06
.06
Legend
WS 100-YR FP
Ground
Bank Sta
Elevation (ft)
Station (ft)

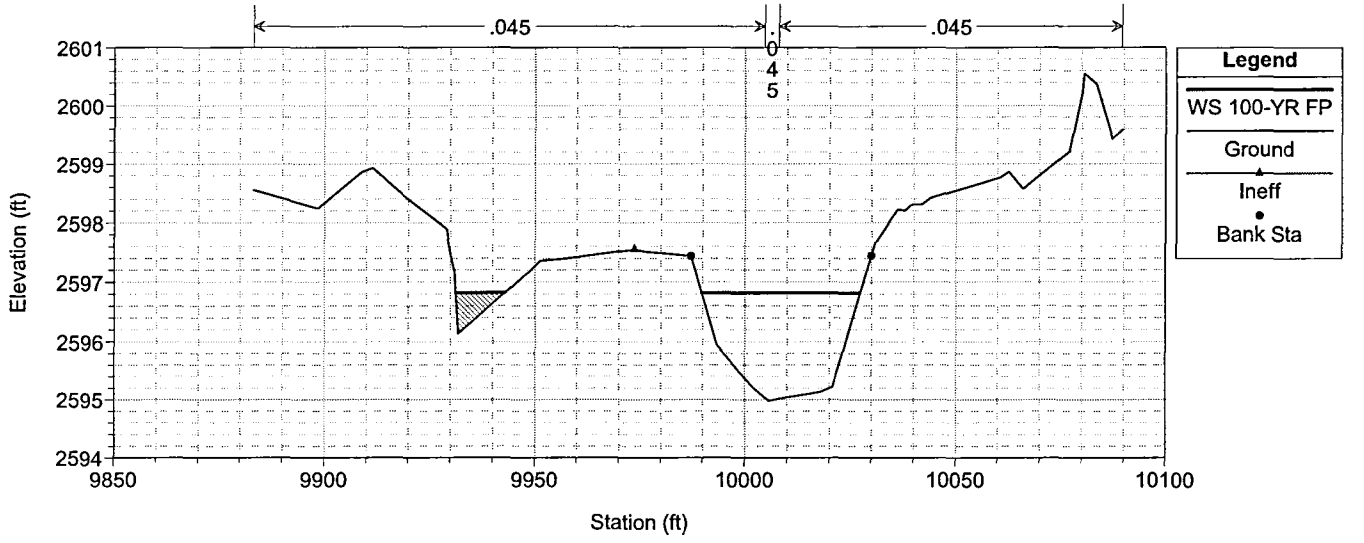

RV Wash K Plan: RV Wash K 11/1/2007
River = RV WK T13 Reach = R3 RS = 0.111
.06
.04
.06
.06
Legend
WS 100-YR FP
Ground
Bank Sta
Elevation (ft)
Station (ft)

E.2.7 HEC-RAS Cross Section Plots

RV Wash K Trib 11

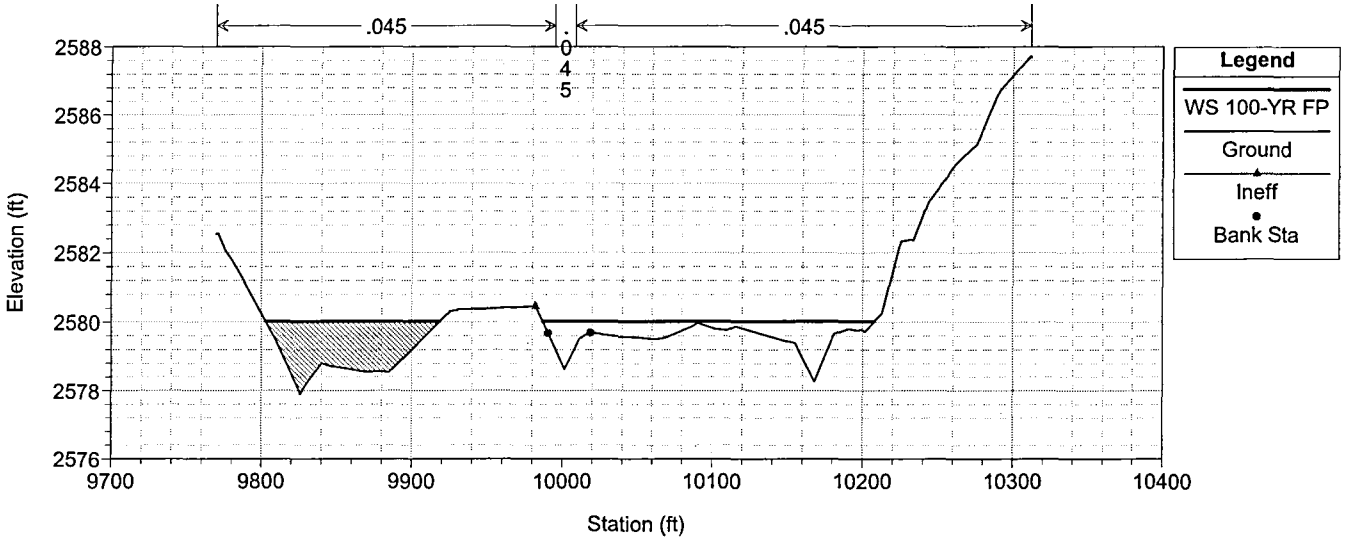
RV Wash K Trib 11 Plan: RV Wash K Trib 11 11/1/2007

River = RV WK T11 Reach = R1 RS = 1.511



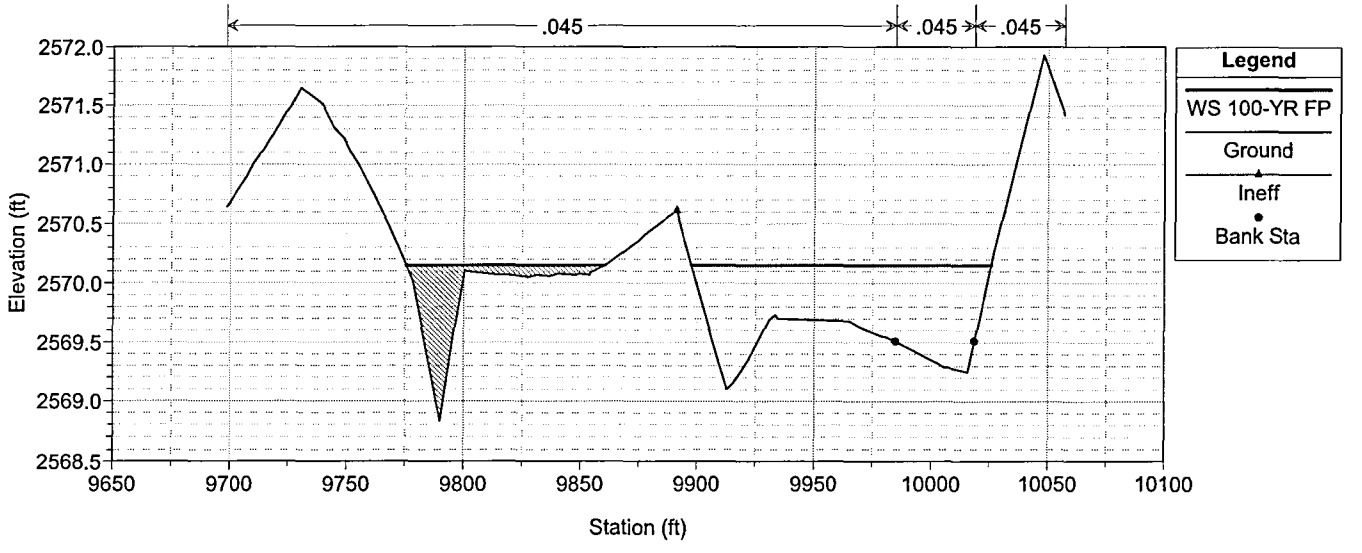
RV Wash K Trib 11 Plan: RV Wash K Trib 11 11/1/2007

River = RV WK T11 Reach = R1 RS = 1.384



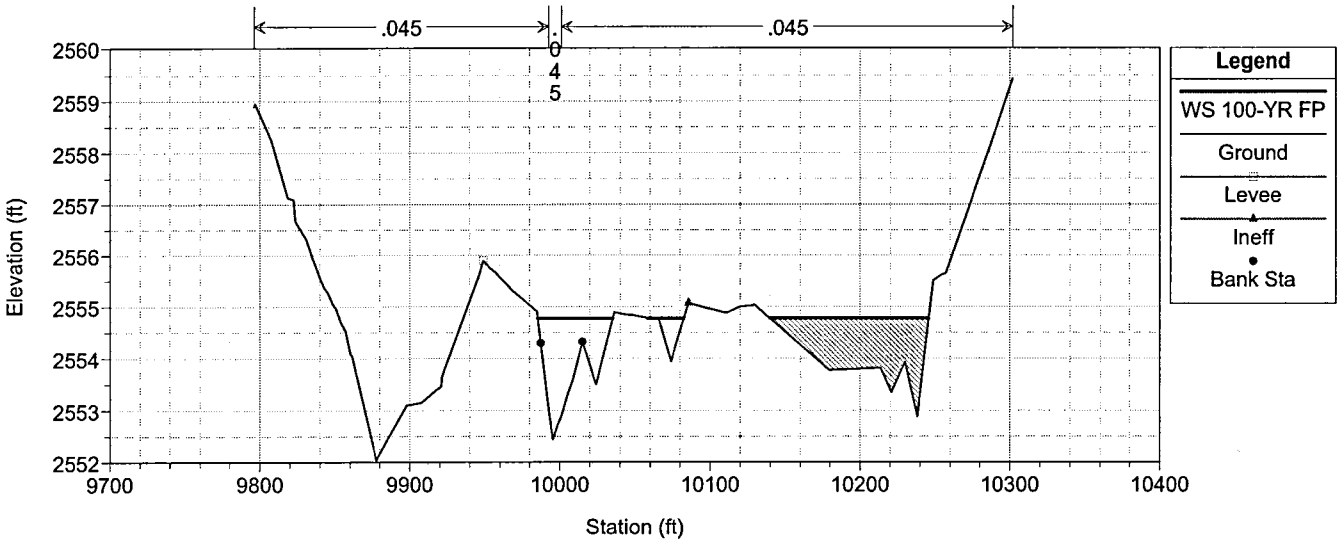
RV Wash K Trib 11 Plan: RV Wash K Trib 11 11/1/2007

River = RV WK T11 Reach = R1 RS = 1.312



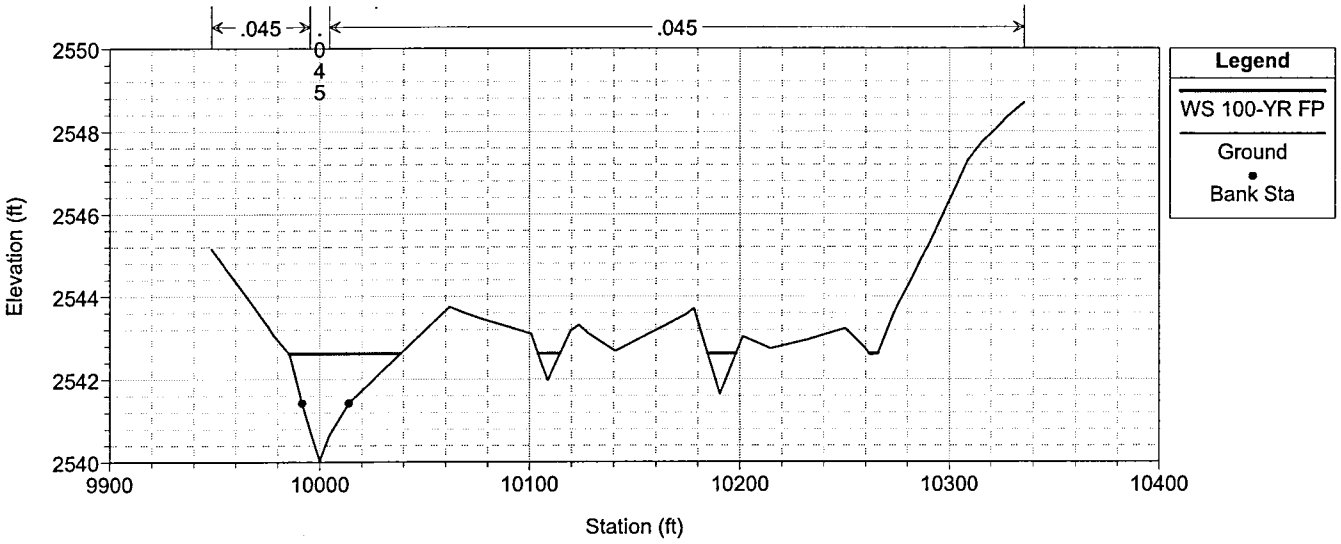
RV Wash K Trib 11 Plan: RV Wash K Trib 11 11/1/2007

River = RV WK T11 Reach = R1 RS = 1.204



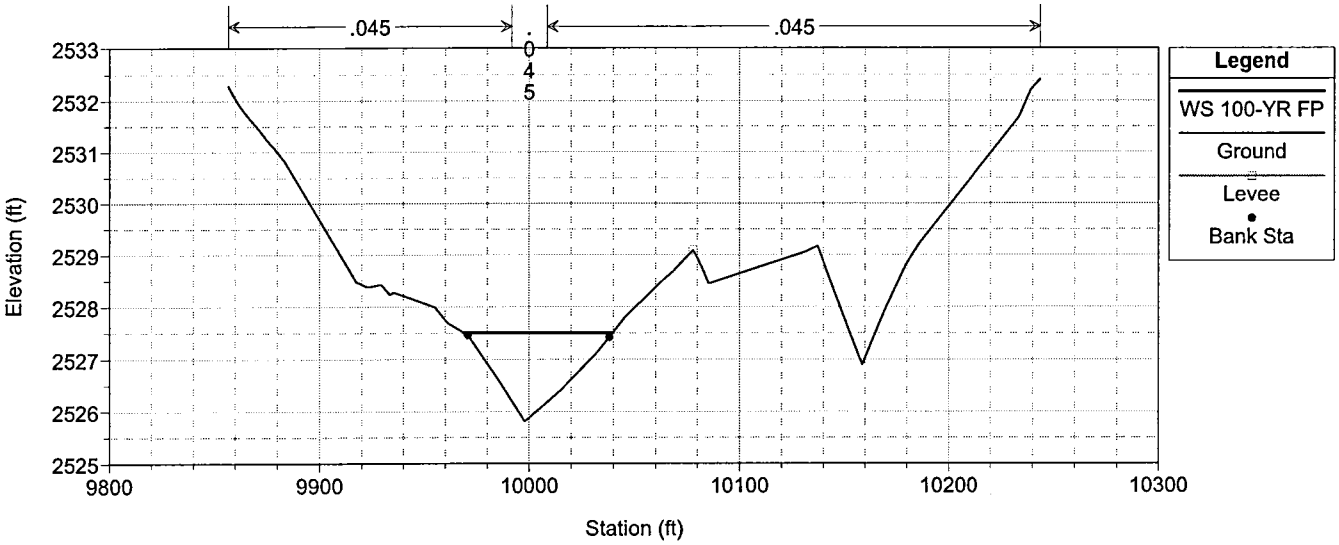
RV Wash K Trib 11 Plan: RV Wash K Trib 11 11/1/2007

River = RV WK T11 Reach = R1 RS = 1.114



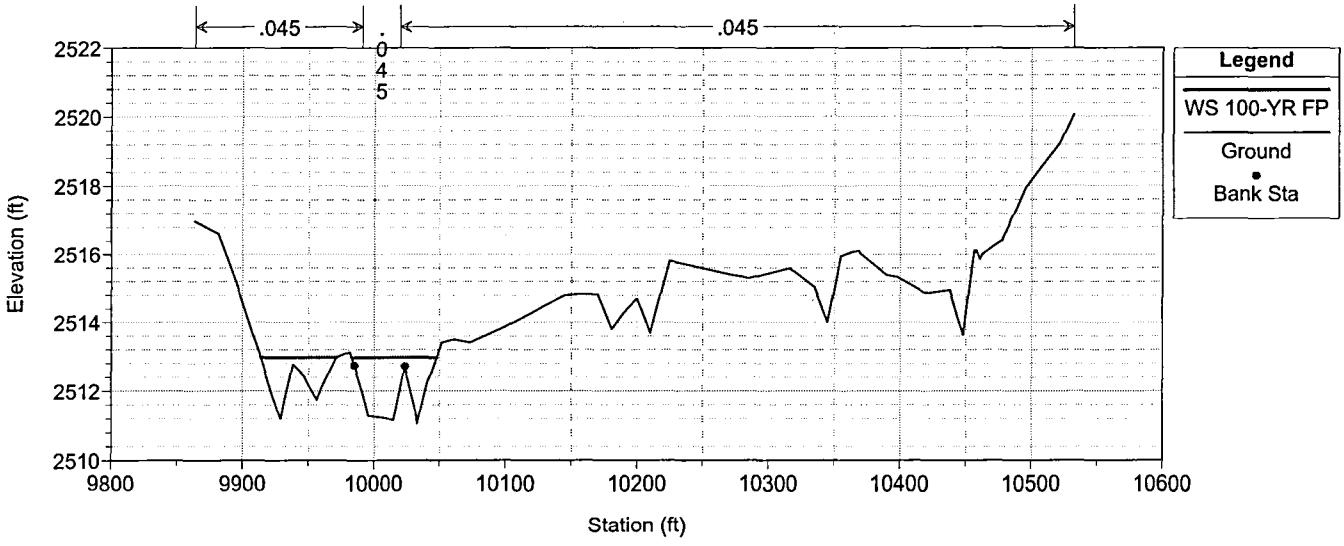
RV Wash K Trib 11 Plan: RV Wash K Trib 11 11/1/2007

River = RV WK T11 Reach = R1 RS = 1.004



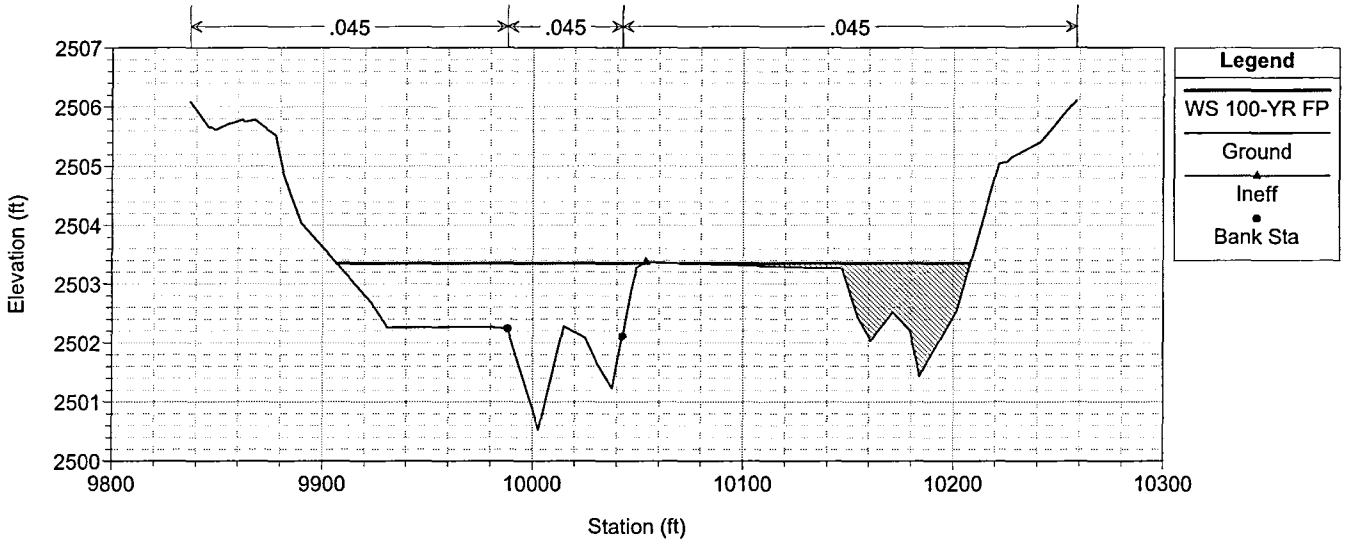
RV Wash K Trib 11 Plan: RV Wash K Trib 11 11/1/2007

River = RV WK T11 Reach = R1 RS = 0.895



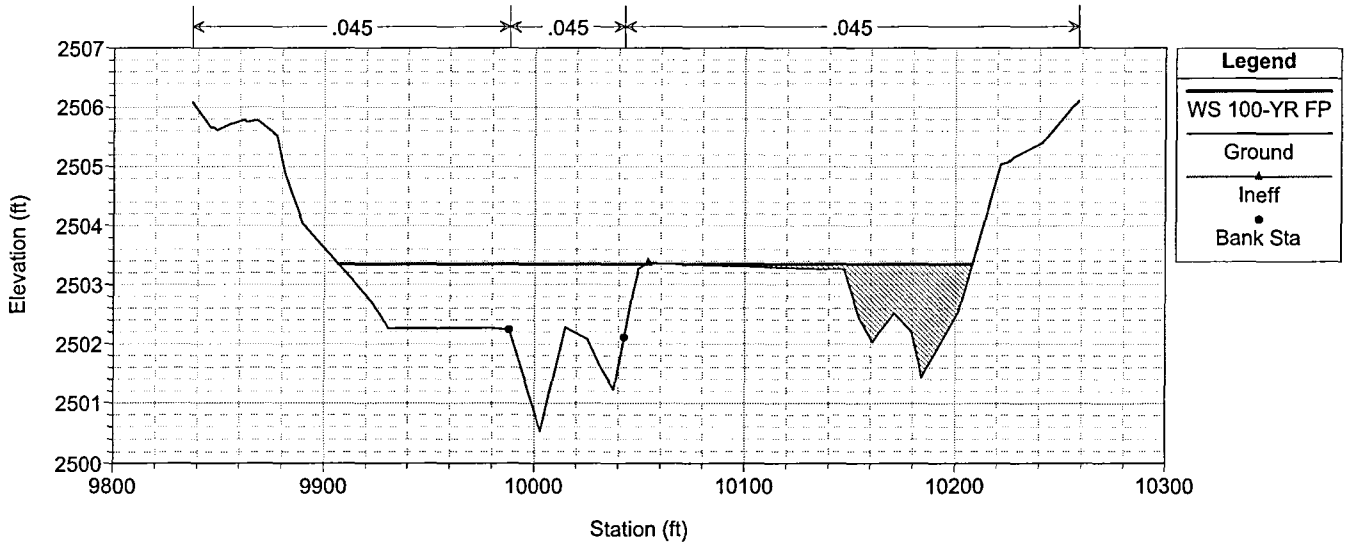
RV Wash K Trib 11 Plan: RV Wash K Trib 11 11/1/2007

River = RV WK T11 Reach = R2 RS = 0.808



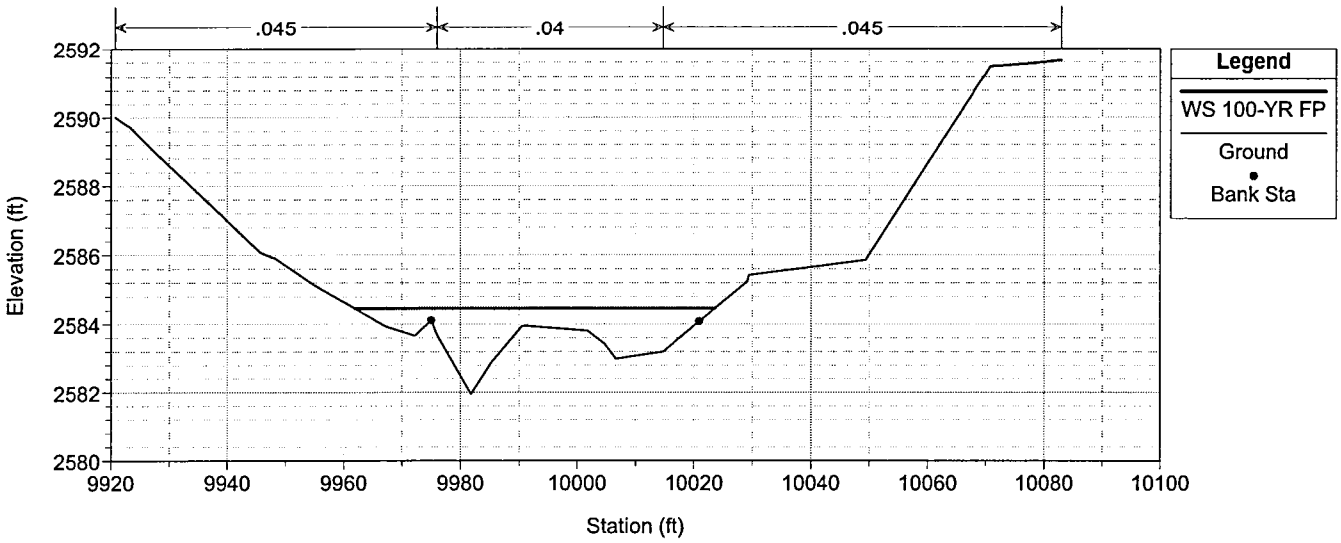
RV Wash K Trib 11 Plan: RV Wash K Trib 11 11/1/2007

River = RV WK T11 Reach = R2 RS = 0.807



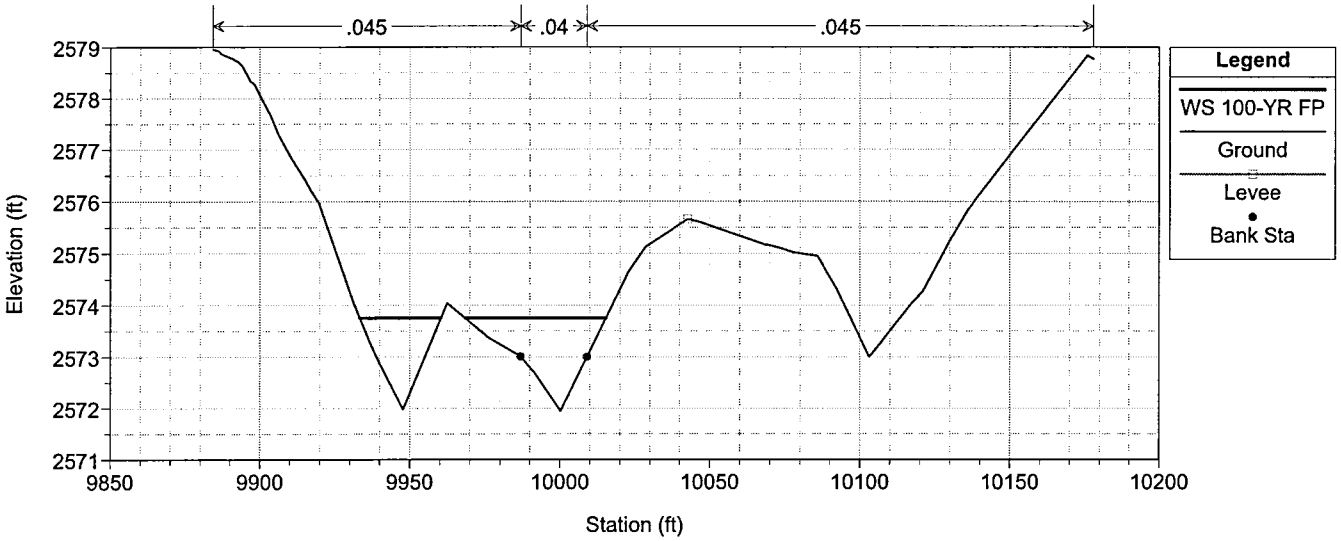
RV Wash K Trib 11 Plan: RV Wash K Trib 11 11/1/2007

River = RV WK T11B Reach = R1 RS = 0.627



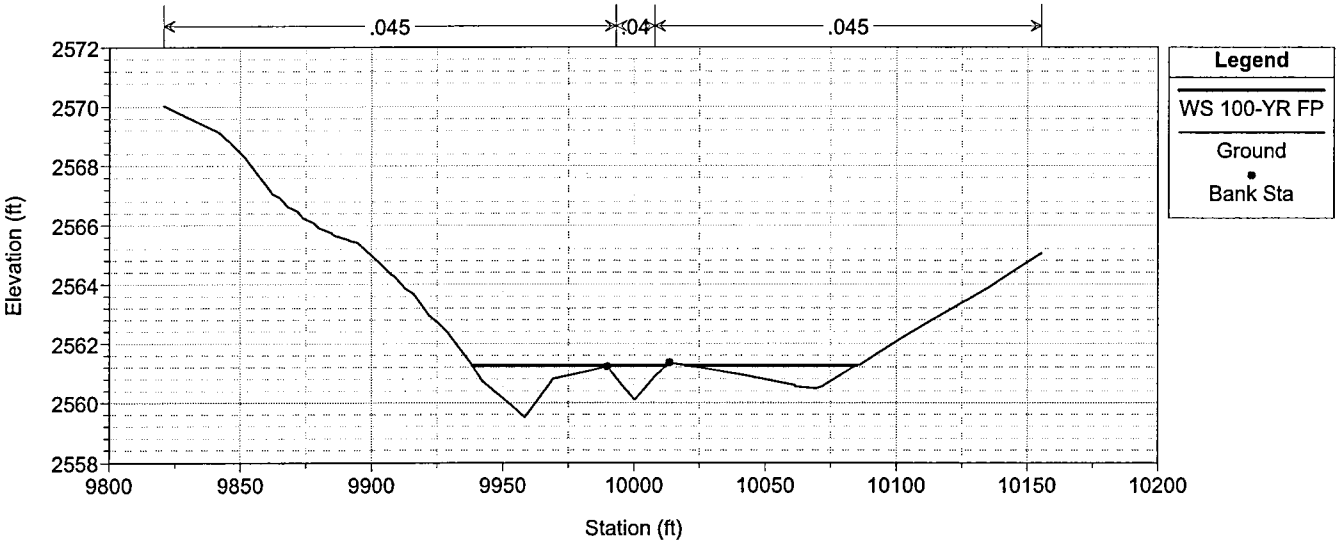
RV Wash K Trib 11 Plan: RV Wash K Trib 11 11/1/2007

River = RV WK T11B Reach = R1 RS = 0.547



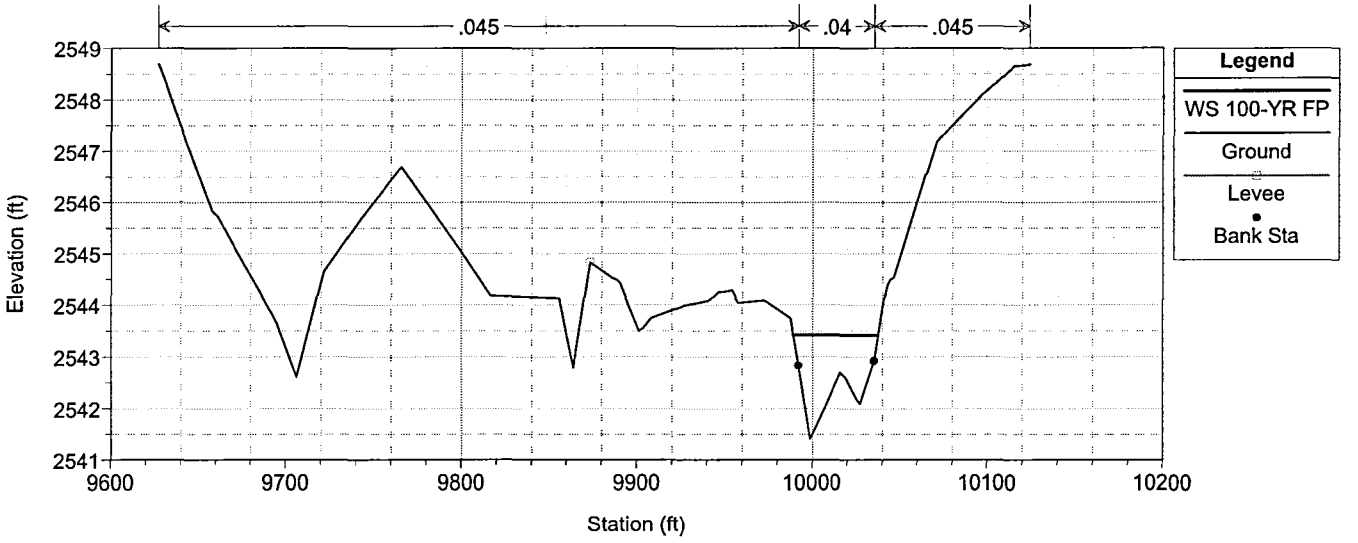
RV Wash K Trib 11 Plan: RV Wash K Trib 11 11/1/2007

River = RV WK T11B Reach = R1 RS = 0.452



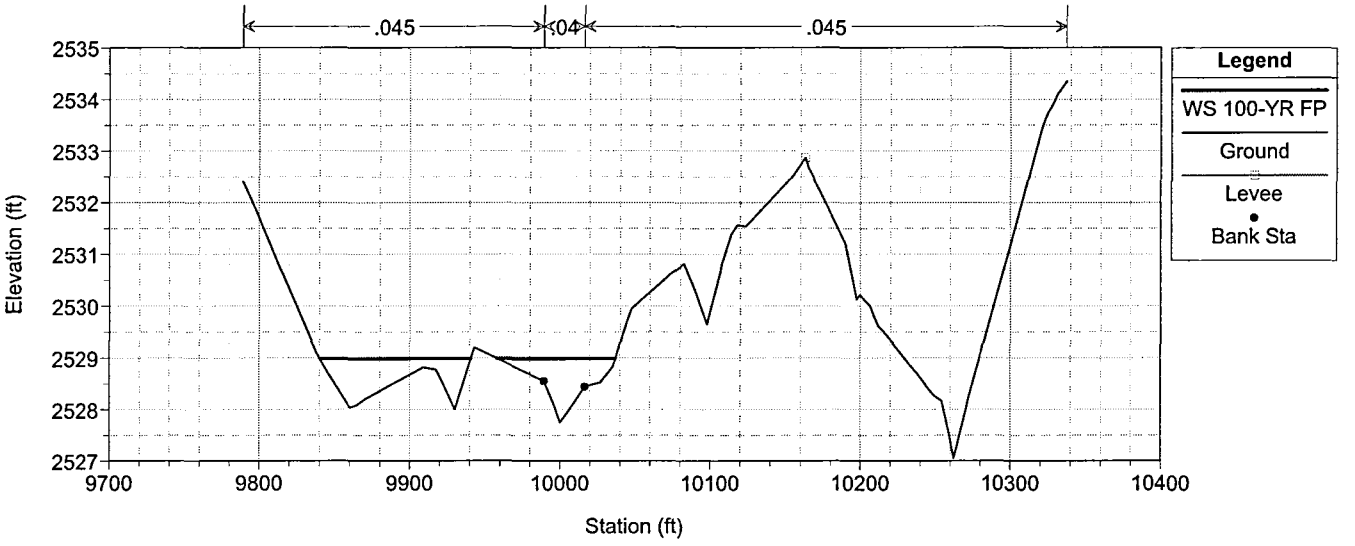
RV Wash K Trib 11 Plan: RV Wash K Trib 11 11/1/2007

River = RV WK T11B Reach = R1 RS = 0.322



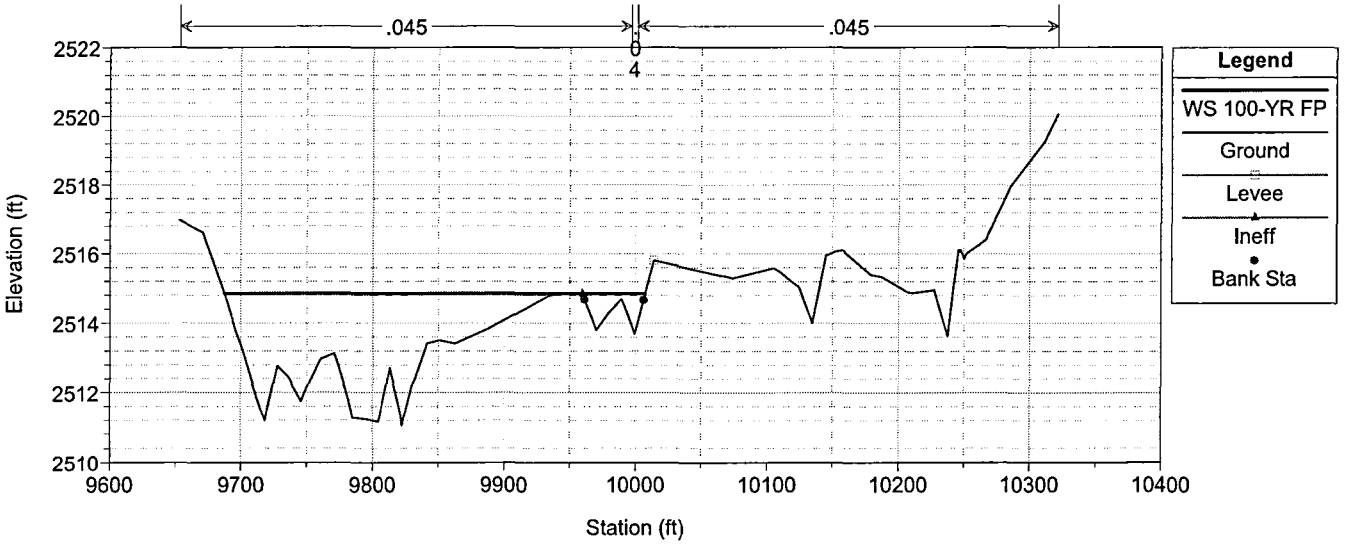
RV Wash K Trib 11 Plan: RV Wash K Trib 11 11/1/2007

River = RV WK T11B Reach = R1 RS = 0.205



RV Wash K Trib 11 Plan: RV Wash K Trib 11 11/1/2007

River = RV WK T11B Reach = R1 RS = 0.103

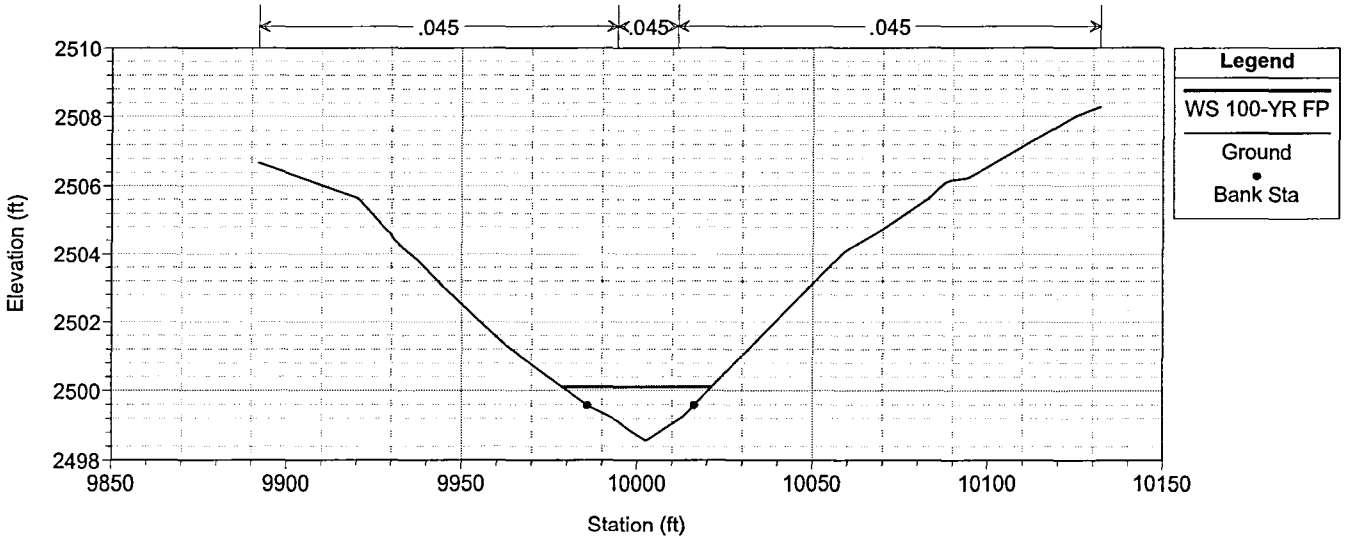


E.2.8 HEC-RAS Cross Section Plots

RV Wash K Trib 11A

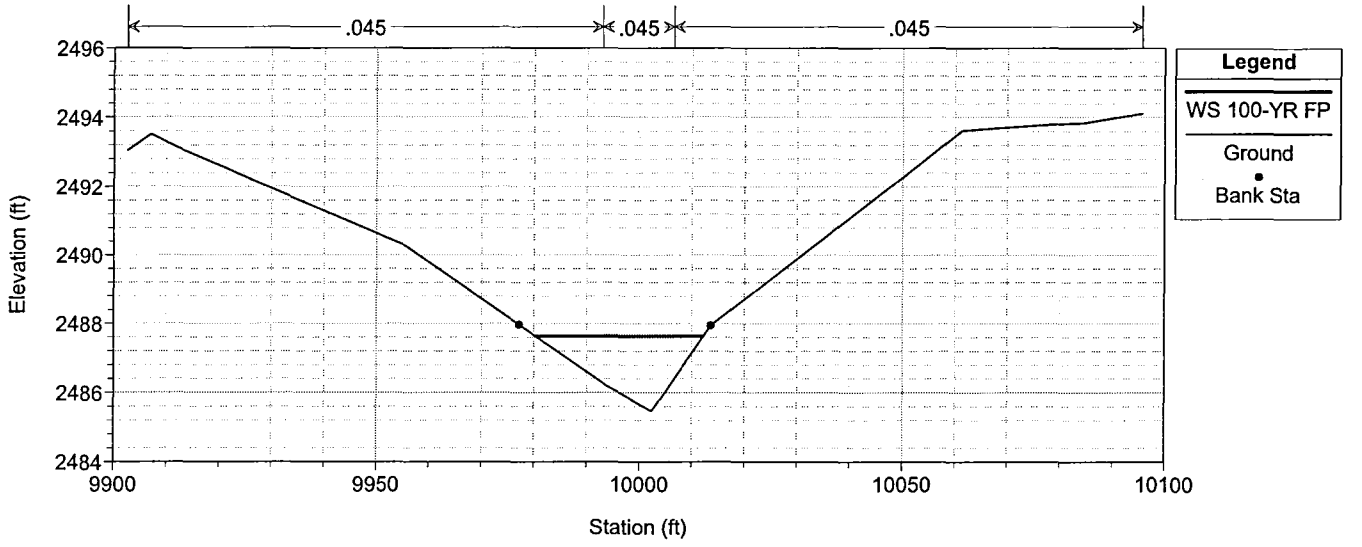
RV Wash K Trib 11A Plan: RV Wash K Trib 11A 11/1/2007

River = RV WK T11A Reach = R1 RS = 0.542



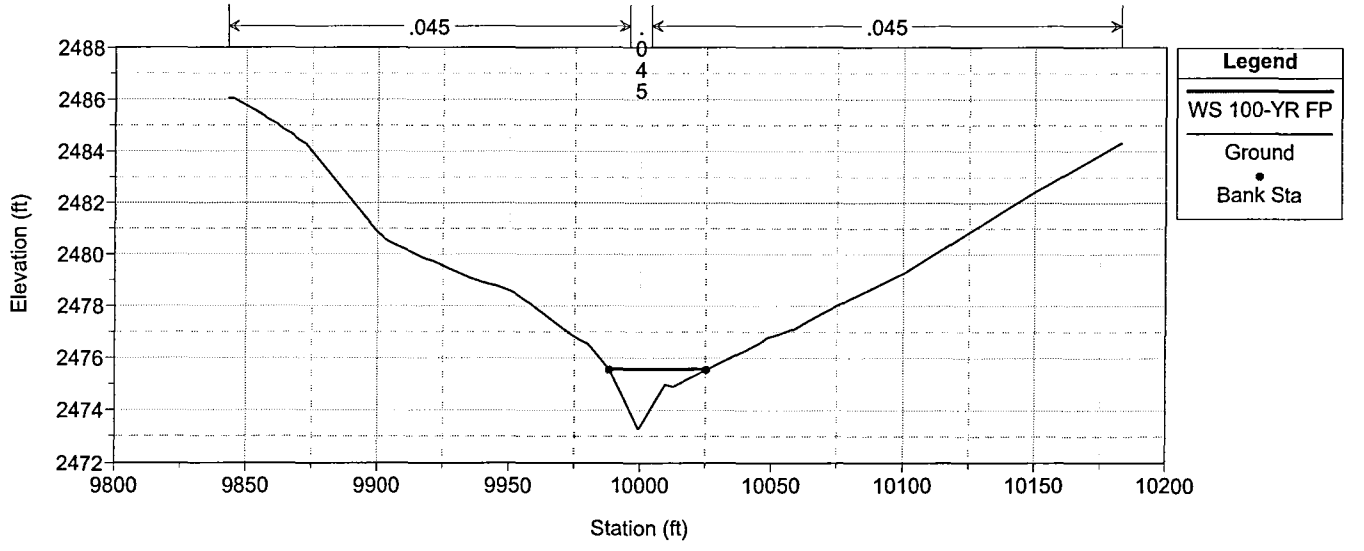
RV Wash K Trib 11A Plan: RV Wash K Trib 11A 11/1/2007

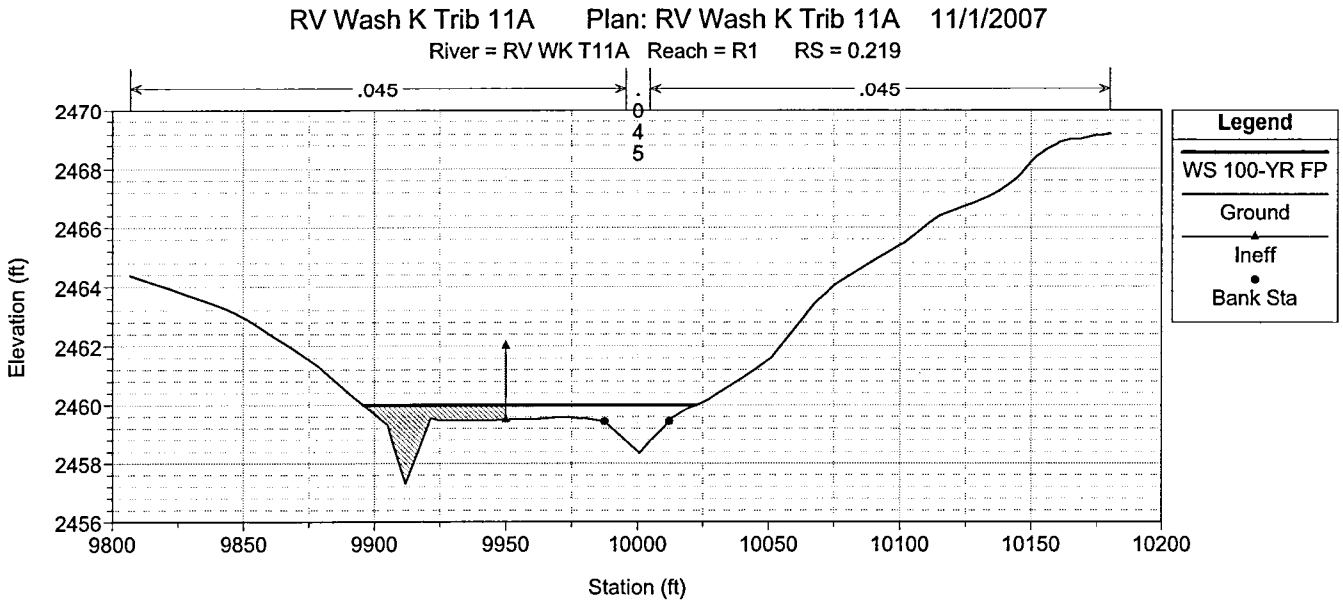
River = RV WK T11A Reach = R1 RS = 0.444

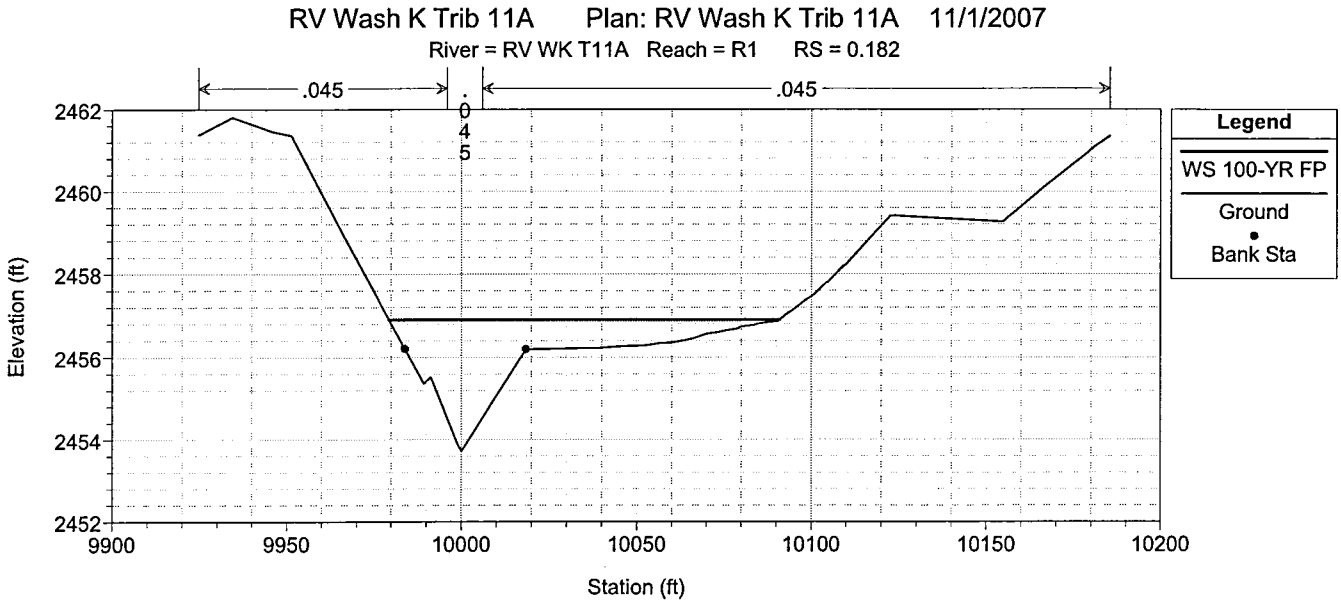


RV Wash K Trib 11A Plan: RV Wash K Trib 11A 11/1/2007

River = RV WK T11A Reach = R1 RS = 0.349




RV Wash K Trib 11A Plan: RV Wash K Trib 11A 11/1/2007
River = RV WK T11A Reach = R1 RS = 0.219
.045
.045
.045
Legend
WS 100-YR FP
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
2470
2468
2466
2464
2462
2460
2458
2456
9800
9850
9900
9950
10000
10050
10100
10150
10200

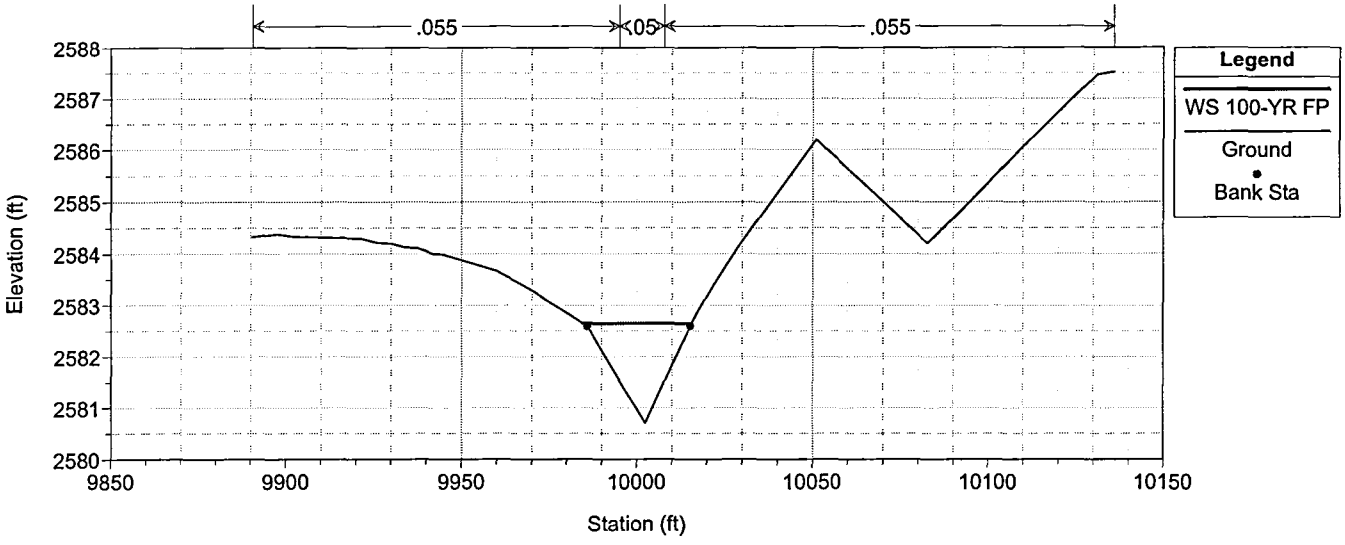

RV Wash K Trib 11A Plan: RV Wash K Trib 11A 11/1/2007
River = RV WK T11A Reach = R1 RS = 0.182
.045
.045
.045
Legend
WS 100-YR FP
Ground
Bank Sta
Elevation (ft)
Station (ft)
2462
2460
2458
2456
2454
2452
9900
9950
10000
10050
10100
10150
10200

E.2.9 HEC-RAS Cross Section Plots

RV Wash K Trib 6

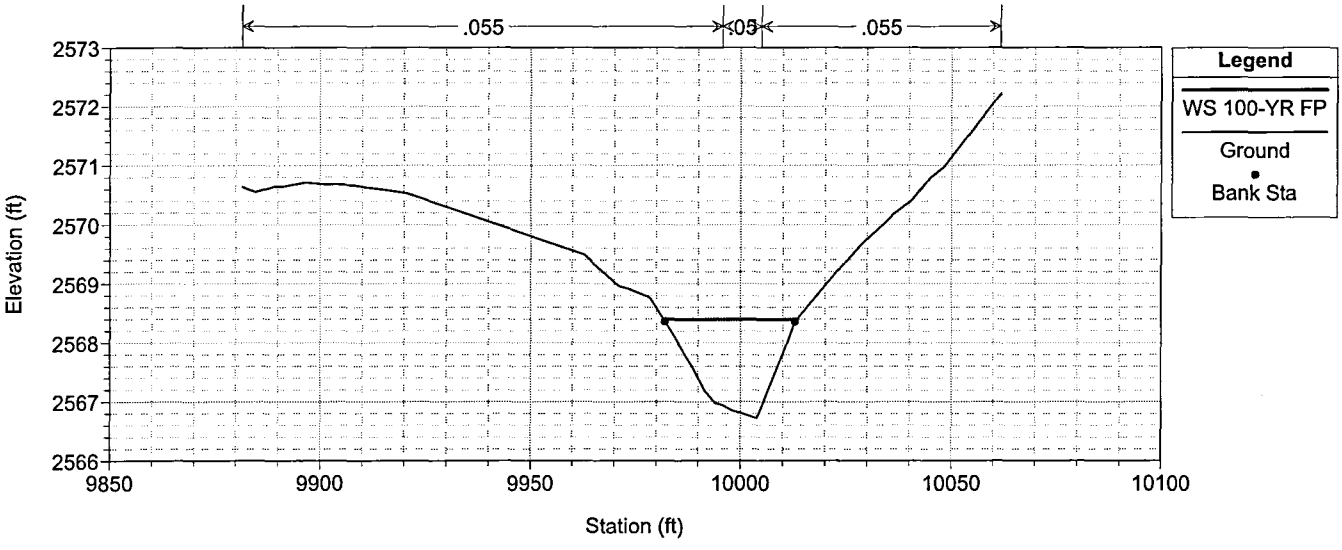
RV Wash K Trib 6 Plan: RV Wash K Trib 6 11/1/2007

River = RV WK T6 Reach = R1 RS = 5.986



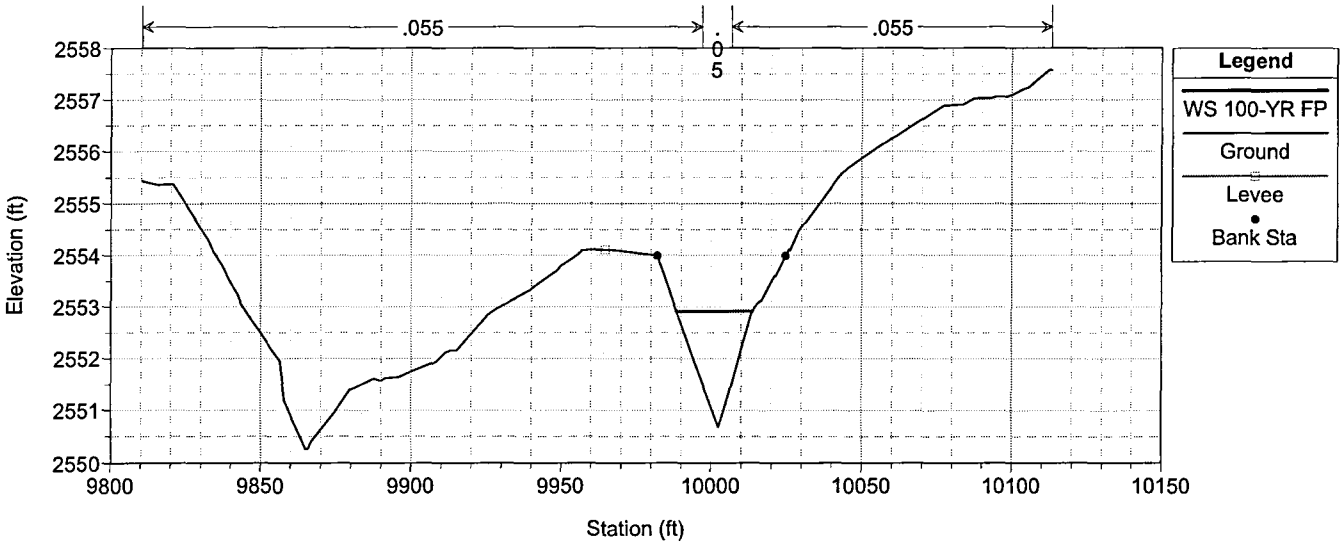
RV Wash K Trib 6 Plan: RV Wash K Trib 6 11/1/2007

River = RV WK T6 Reach = R1 RS = 5.873



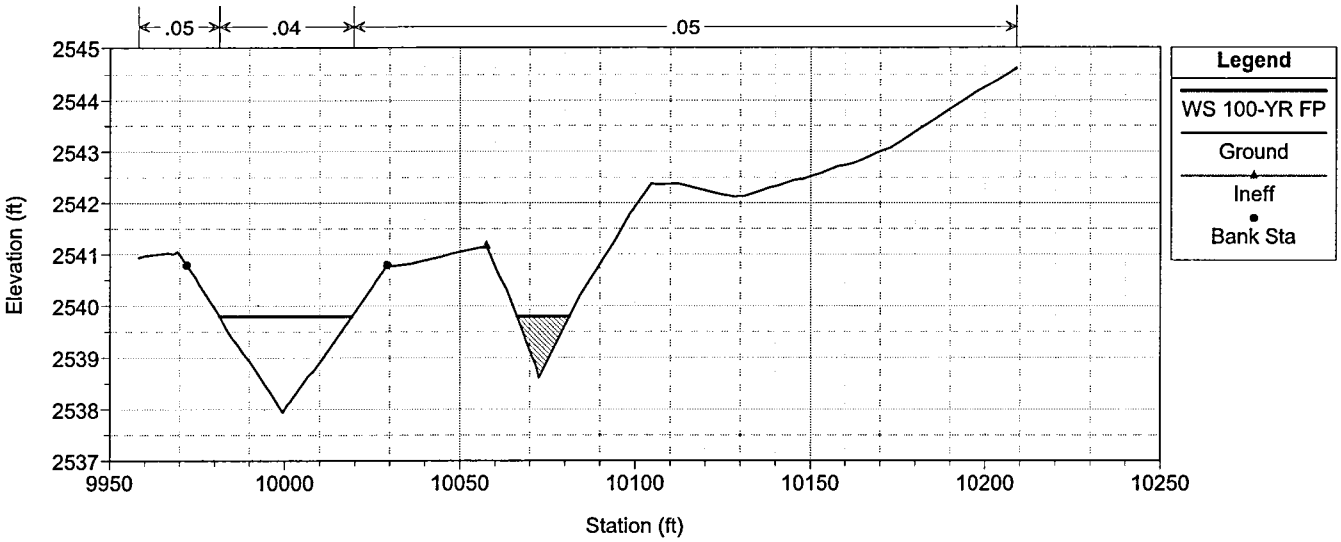
RV Wash K Trib 6 Plan: RV Wash K Trib 6 11/1/2007

River = RV WK T6 Reach = R1 RS = 5.744



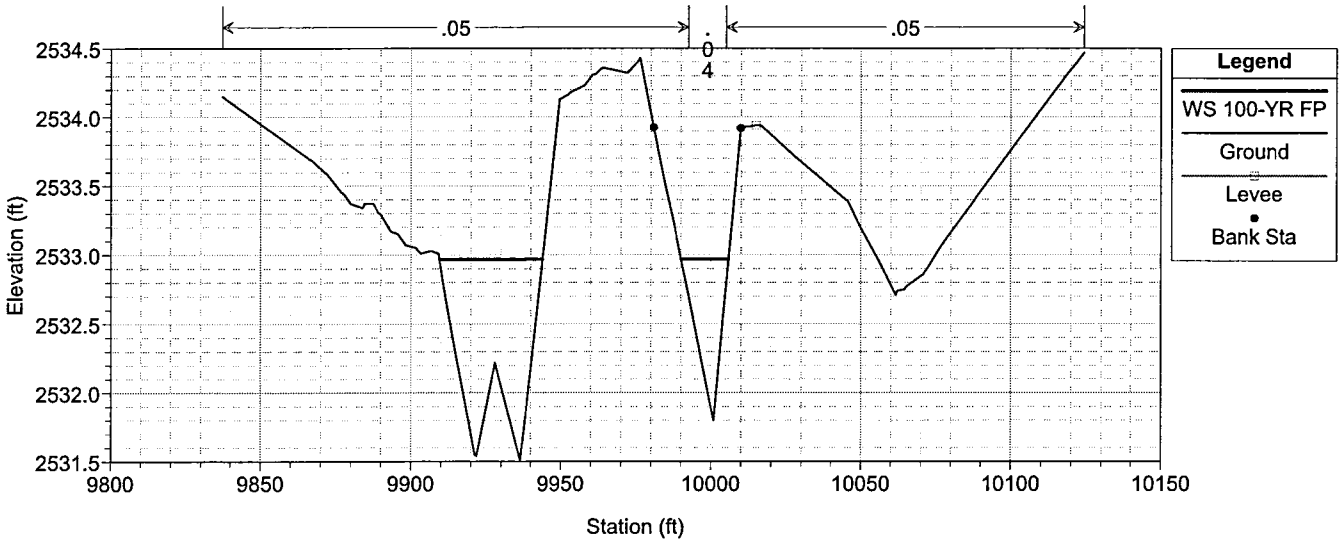
RV Wash K Trib 6 Plan: RV Wash K Trib 6 11/1/2007

River = RV WK T6 Reach = R1 RS = 5.622



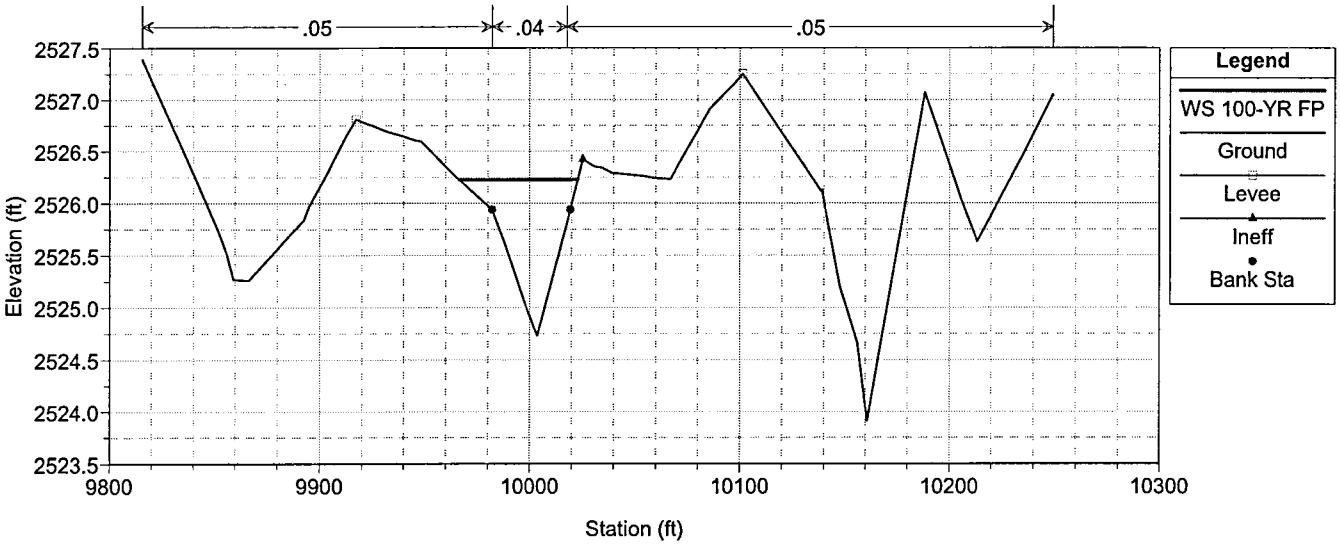
RV Wash K Trib 6 Plan: RV Wash K Trib 6 11/1/2007

River = RV WK T6 Reach = R1 RS = 5.562



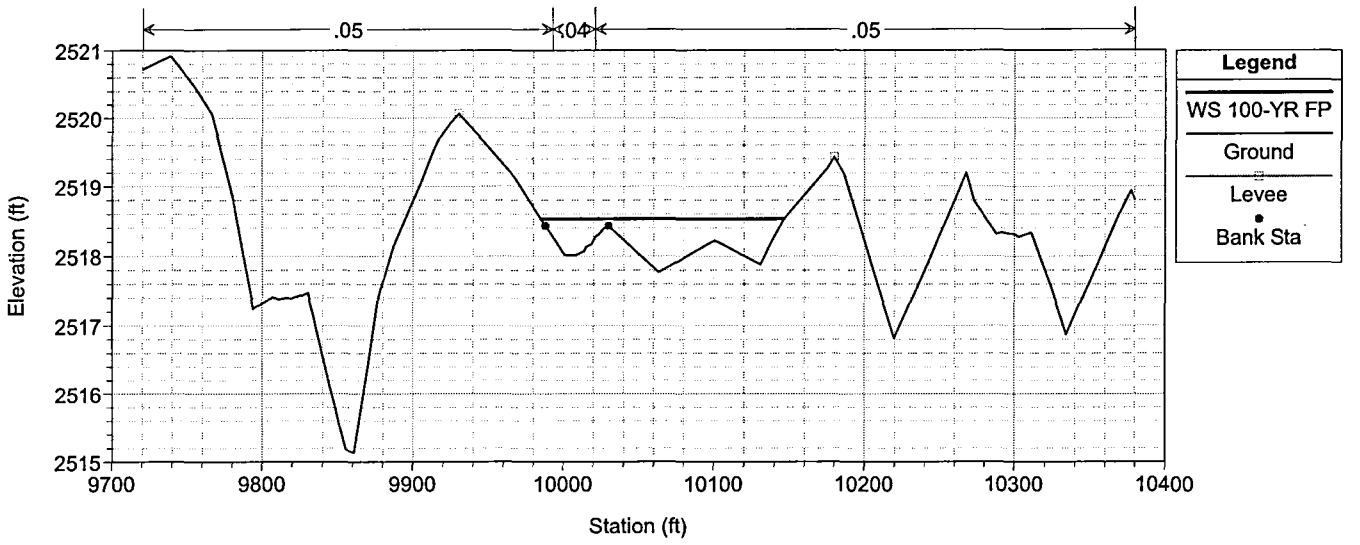
RV Wash K Trib 6 Plan: RV Wash K Trib 6 11/1/2007

River = RV WK T6 Reach = R1 RS = 5.506



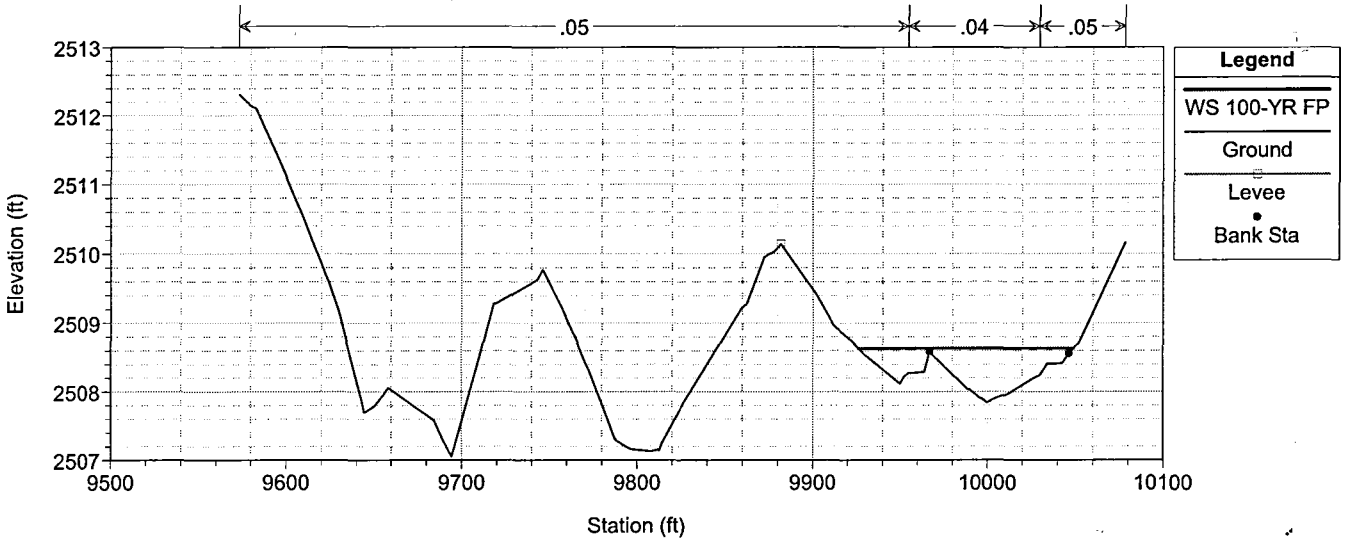
RV Wash K Trib 6 Plan: RV Wash K Trib 6 11/1/2007

River = RV WK T6 Reach = R1 RS = 5.448



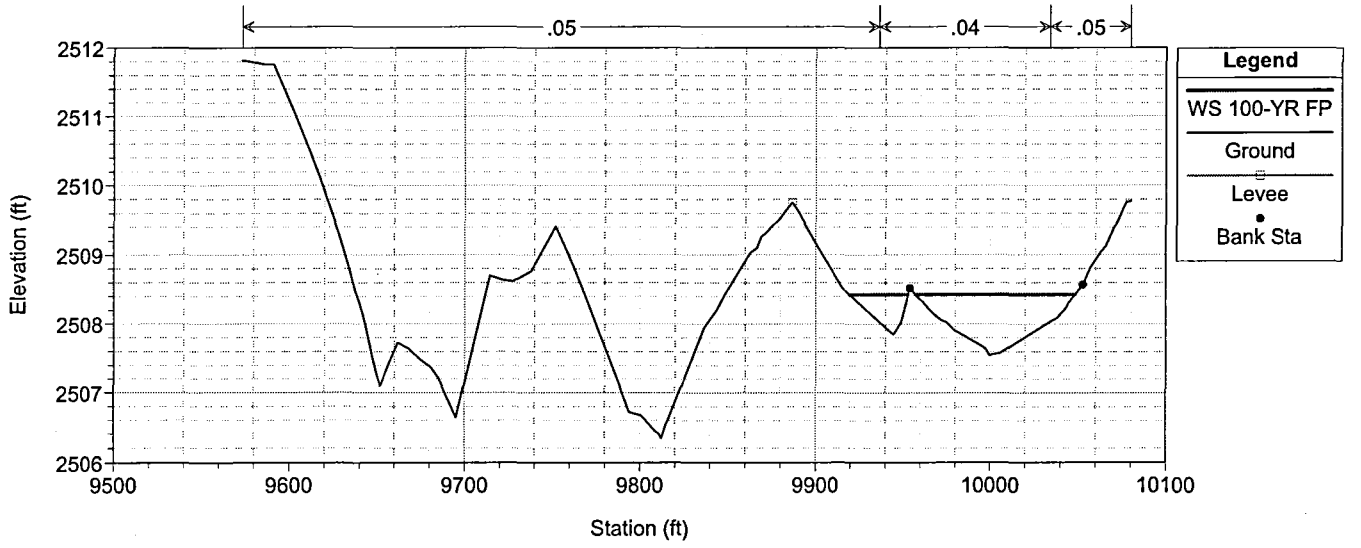
RV Wash K Trib 6 Plan: RV Wash K Trib 6 11/1/2007

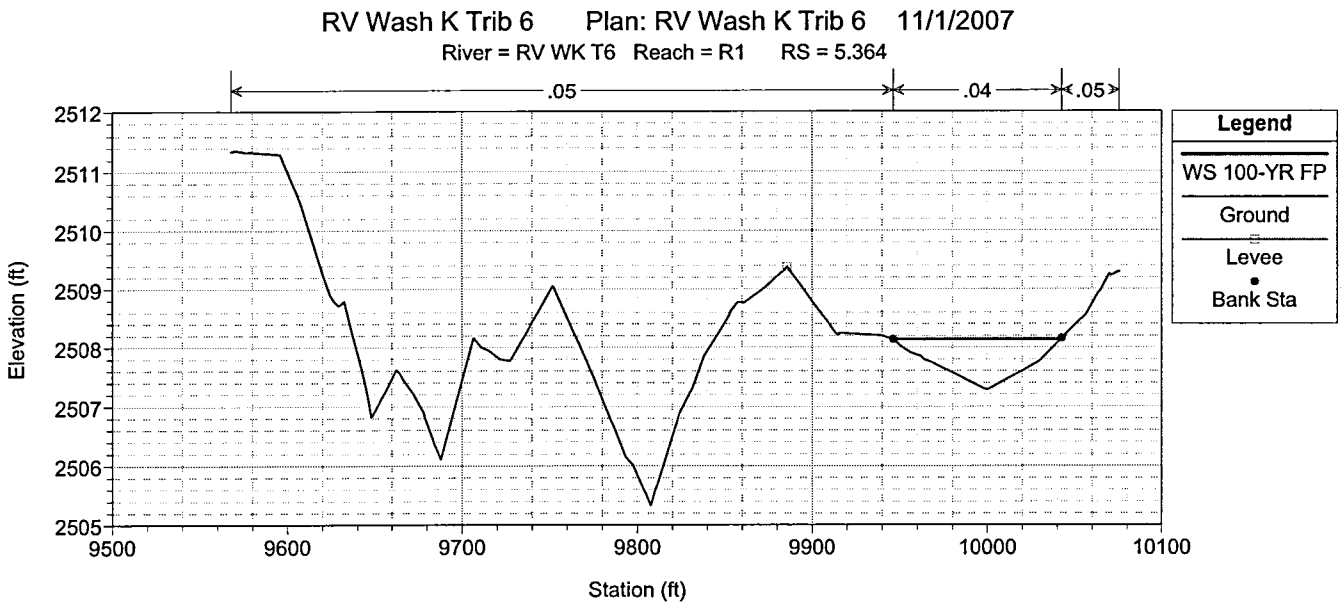
River = RV WK T6 Reach = R1 RS = 5.368



RV Wash K Trib 6 Plan: RV Wash K Trib 6 11/1/2007

River = RV WK T6 Reach = R1 RS = 5.366



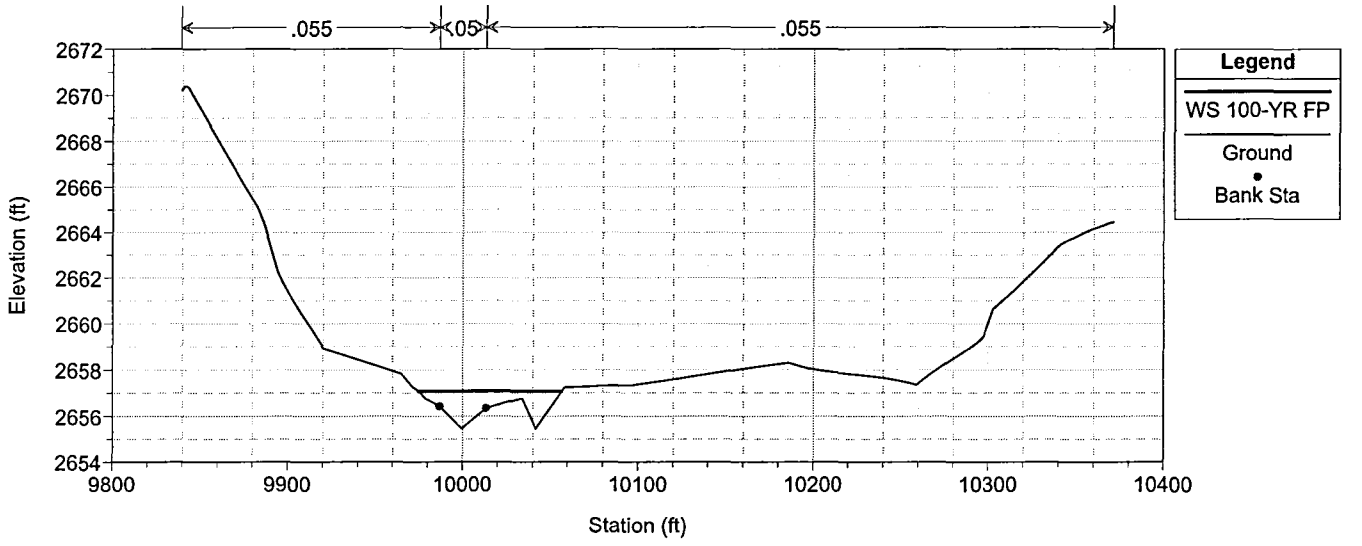

RV Wash K Trib 6 Plan: RV Wash K Trib 6 11/1/2007
River = RV WK T6 Reach = R1 RS = 5.364
.05
.04
.05
Legend
WS 100-YR FP
Ground
Levee
Bank Sta
Elevation (ft)
2512
2511
2510
2509
2508
2507
2506
2505
9500
9600
9700
9800
9900
10000
10100
Station (ft)

E.2.10 HEC-RAS Cross Section Plots

RV Wash K Trib 6D

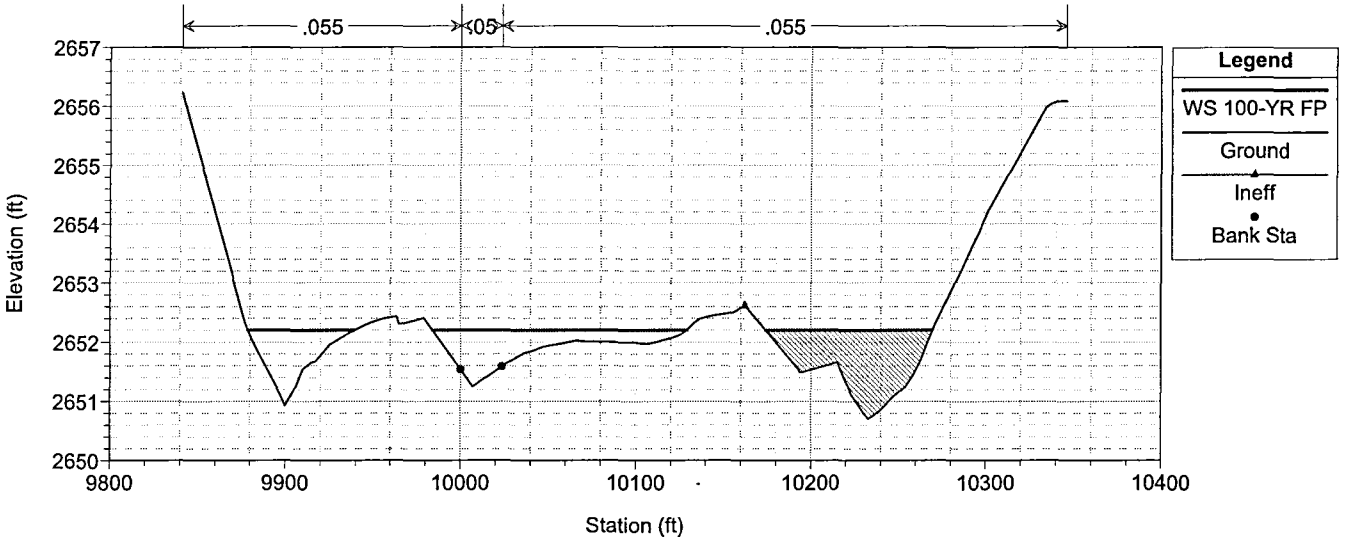
RV Wash K Trib 6D Plan: RV Wash K Trib 6D 11/1/2007

River = RV WK T6D Reach = R1 RS = 2.629



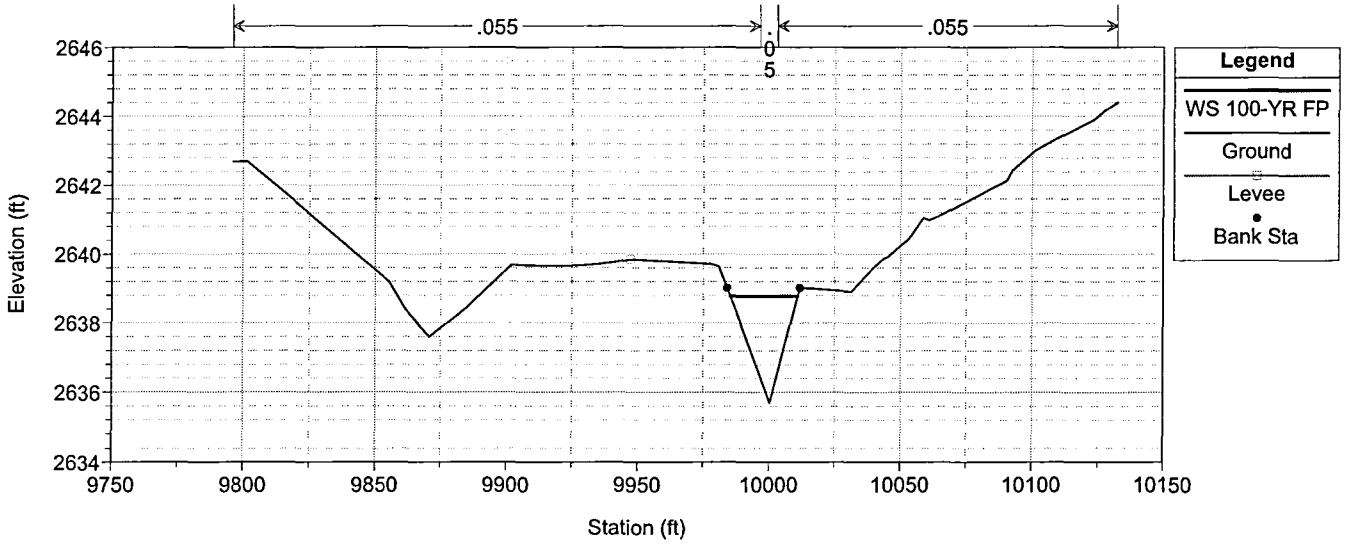
RV Wash K Trib 6D Plan: RV Wash K Trib 6D 11/1/2007

River = RV WK T6D Reach = R1 RS = 2.579



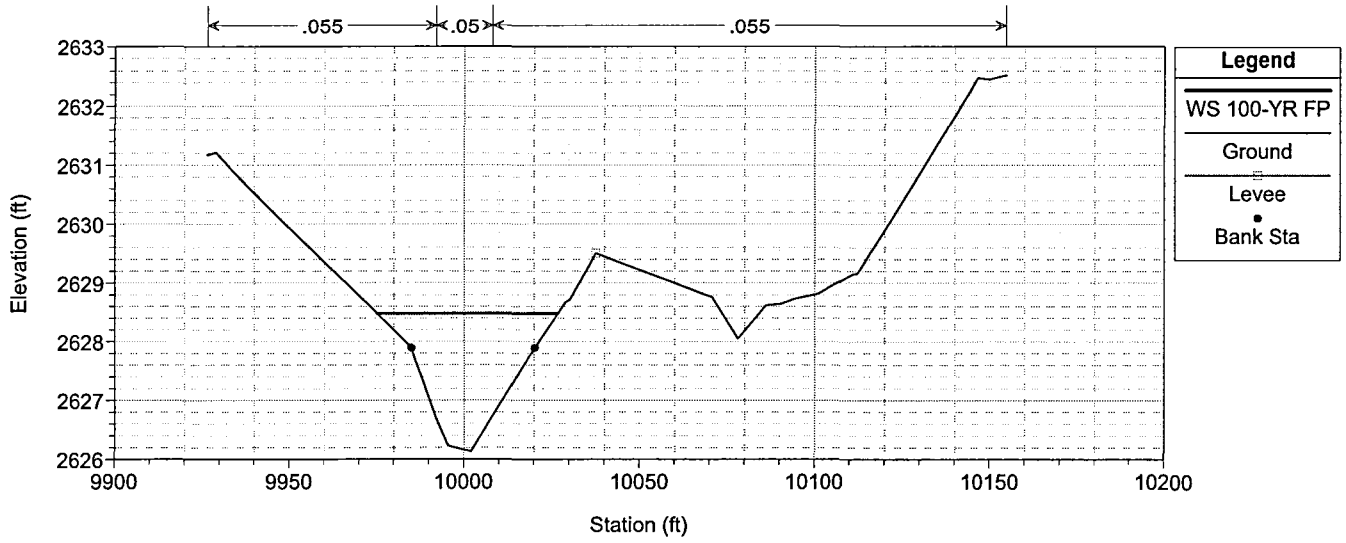
RV Wash K Trib 6D Plan: RV Wash K Trib 6D 11/1/2007

River = RV WK T6D Reach = R1 RS = 2.470



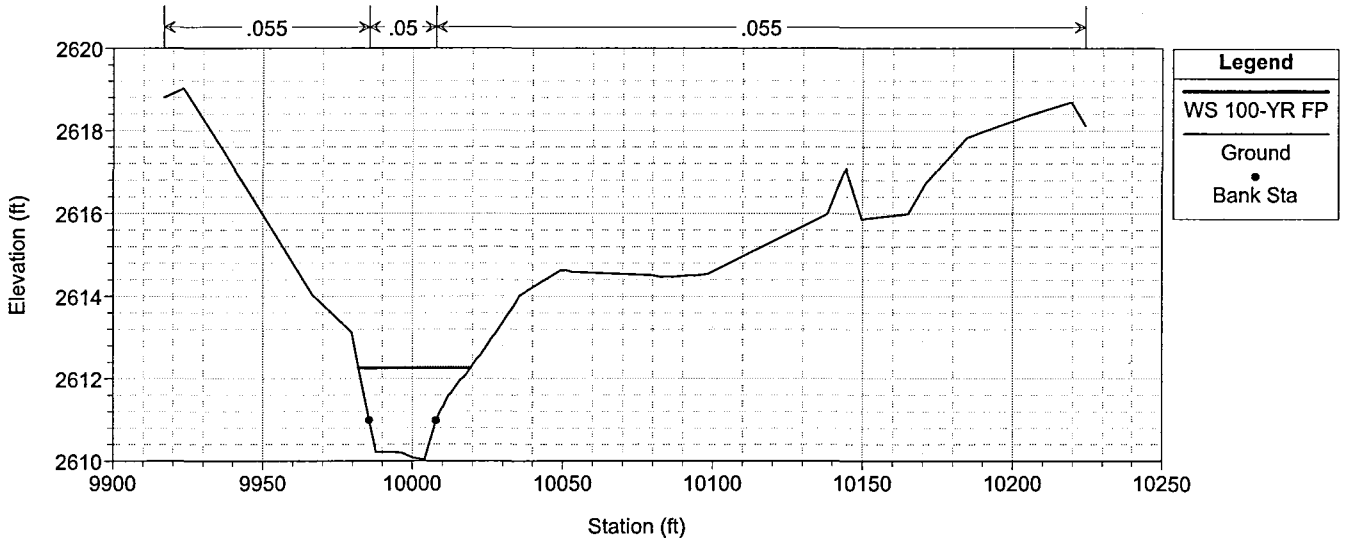
RV Wash K Trib 6D Plan: RV Wash K Trib 6D 11/1/2007

River = RV WK T6D Reach = R1 RS = 2.378



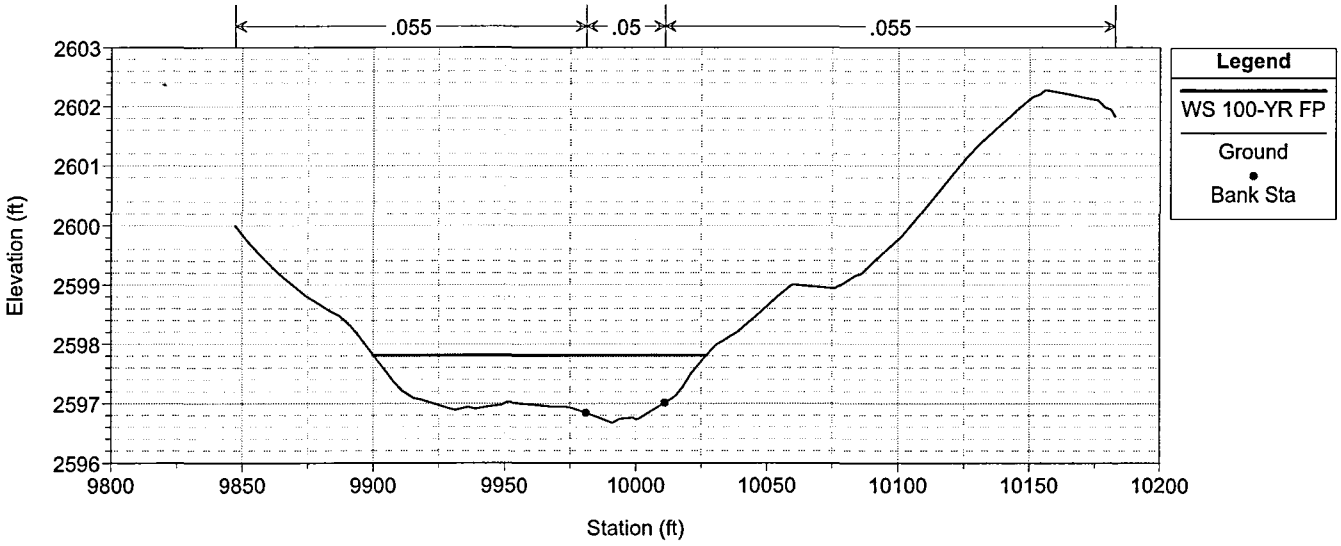
RV Wash K Trib 6D Plan: RV Wash K Trib 6D 11/1/2007

River = RV WK T6D Reach = R1 RS = 2.245



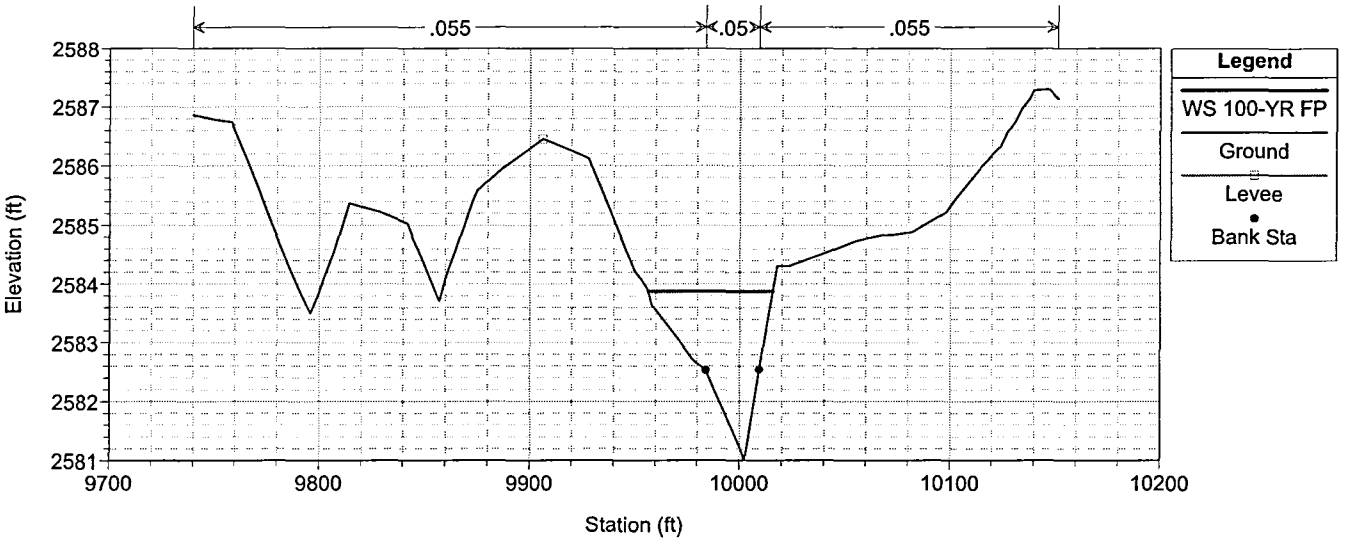
RV Wash K Trib 6D Plan: RV Wash K Trib 6D 11/1/2007

River = RV WK T6D Reach = R1 RS = 2.120



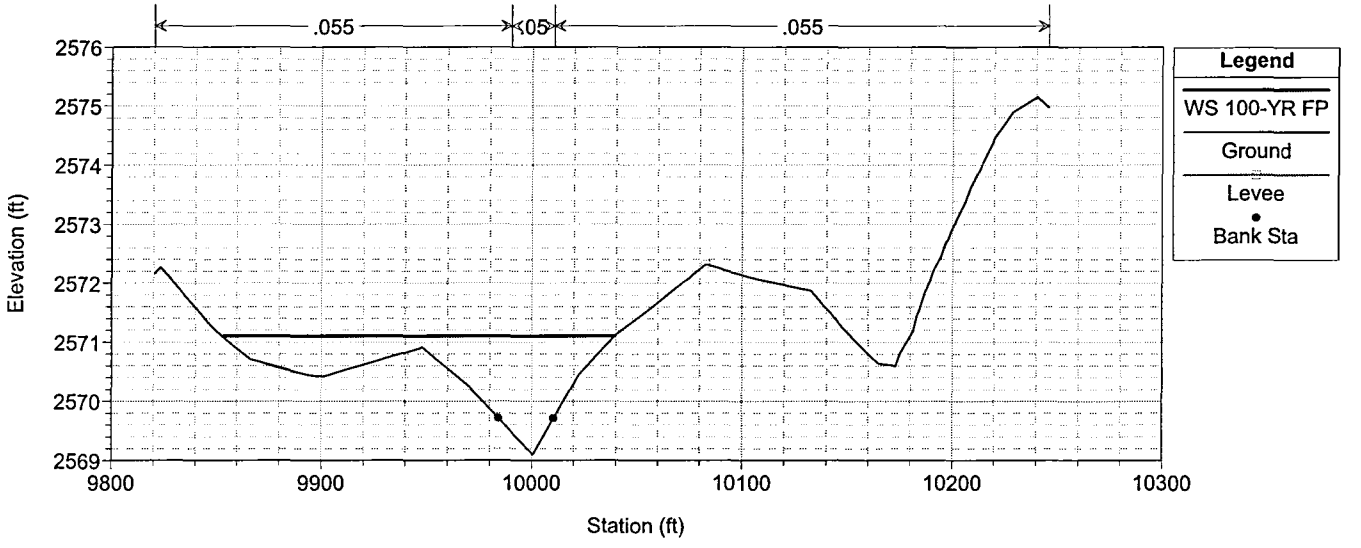
RV Wash K Trib 6D Plan: RV Wash K Trib 6D 11/1/2007

River = RV WK T6D Reach = R1 RS = 2.001



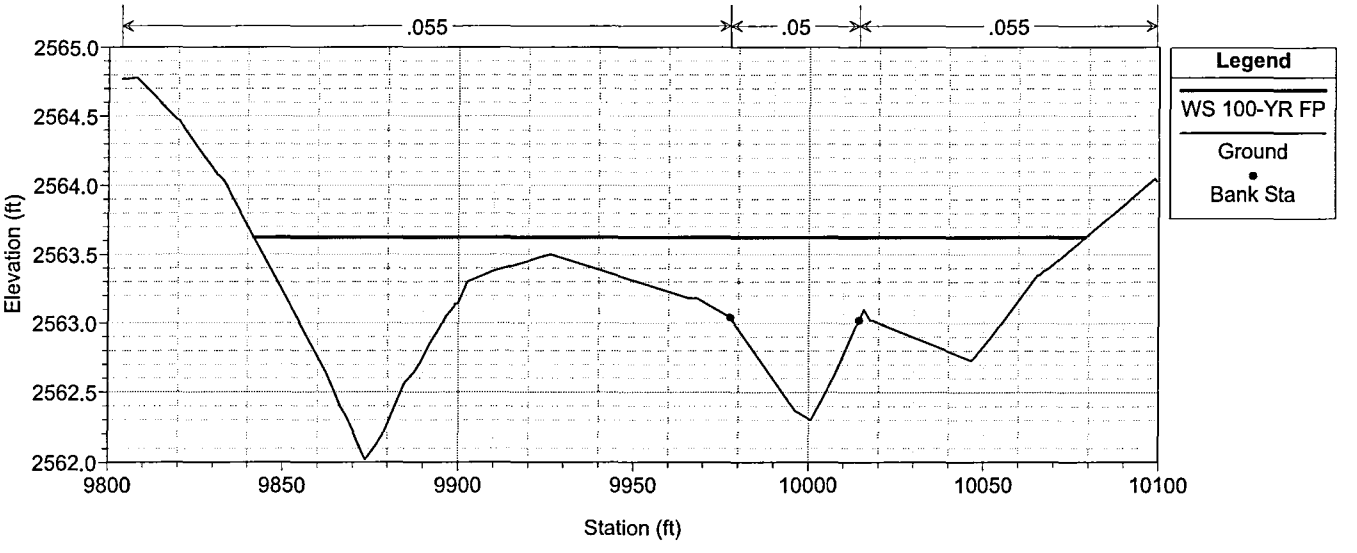
RV Wash K Trib 6D Plan: RV Wash K Trib 6D 11/1/2007

River = RV WK T6D Reach = R1 RS = 1.894



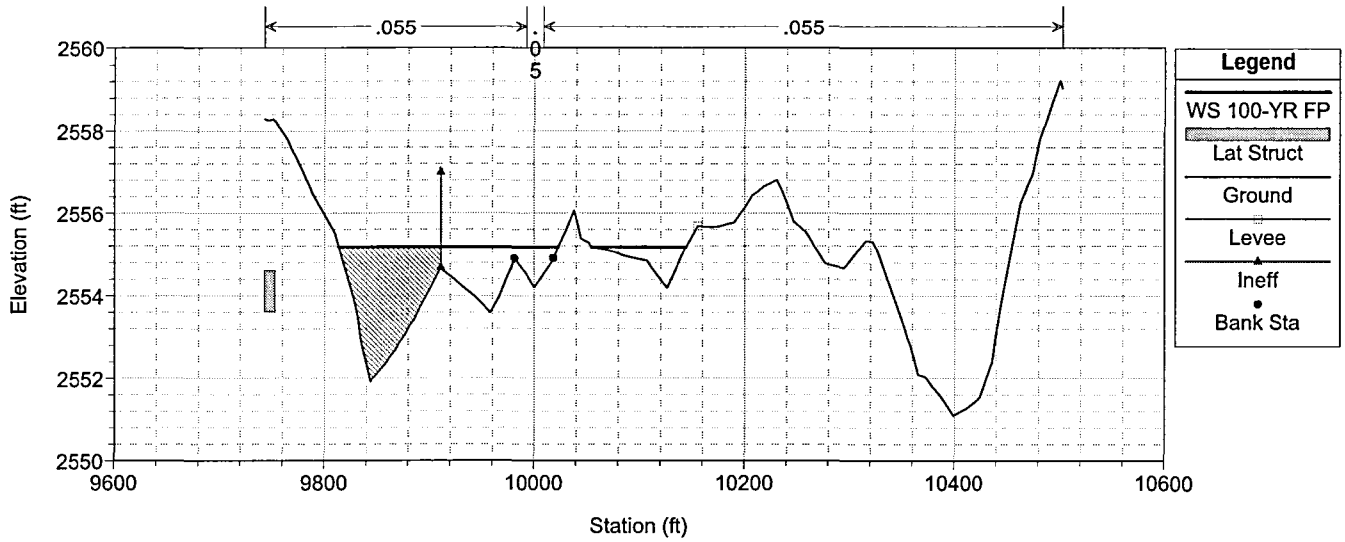
RV Wash K Trib 6D Plan: RV Wash K Trib 6D 11/1/2007

River = RV WK T6D Reach = R1 RS = 1.833



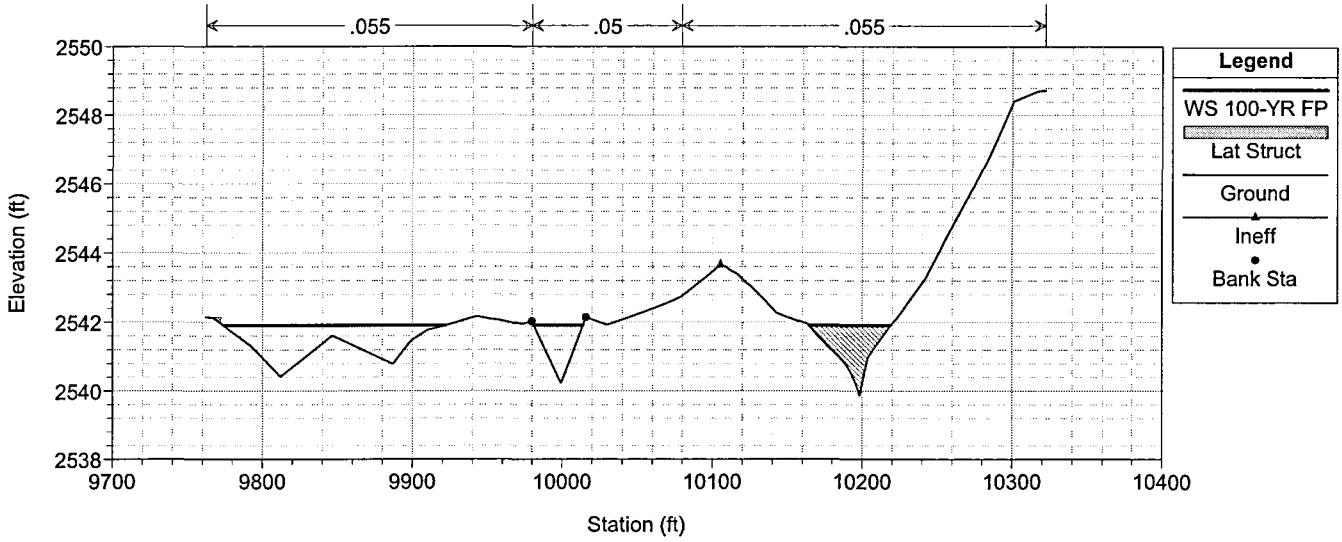
RV Wash K Trib 6D Plan: RV Wash K Trib 6D 11/1/2007

River = RV WK T6D Reach = R1 RS = 1.771



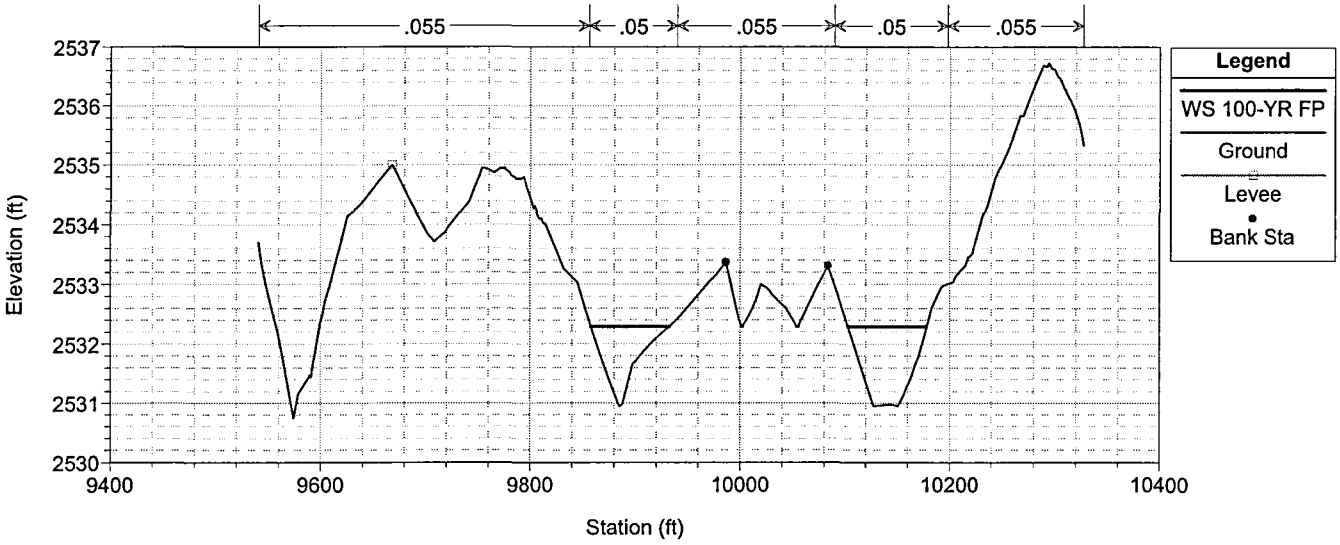
RV Wash K Trib 6D Plan: RV Wash K Trib 6D 11/1/2007

River = RV WK T6D Reach = R1 RS = 1.678



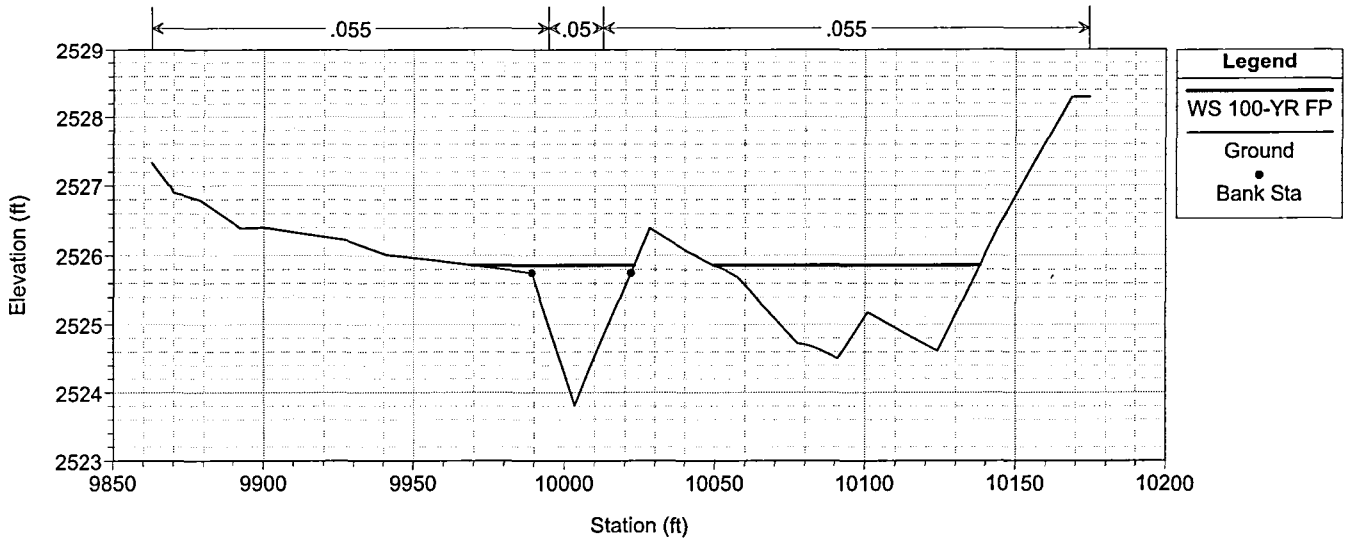
RV Wash K Trib 6D Plan: RV Wash K Trib 6D 11/1/2007

River = RV WK T6D Reach = R1 RS = 1.614



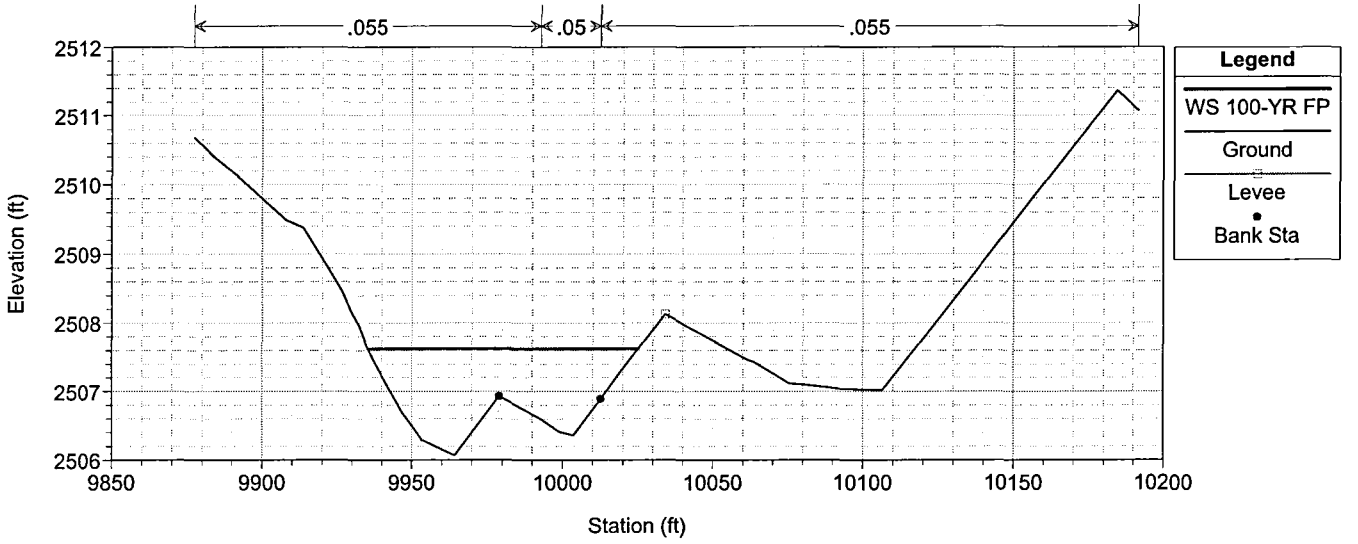
RV Wash K Trib 6D Plan: RV Wash K Trib 6D 11/1/2007

River = RV WK T6D Reach = R2 RS = 1.567



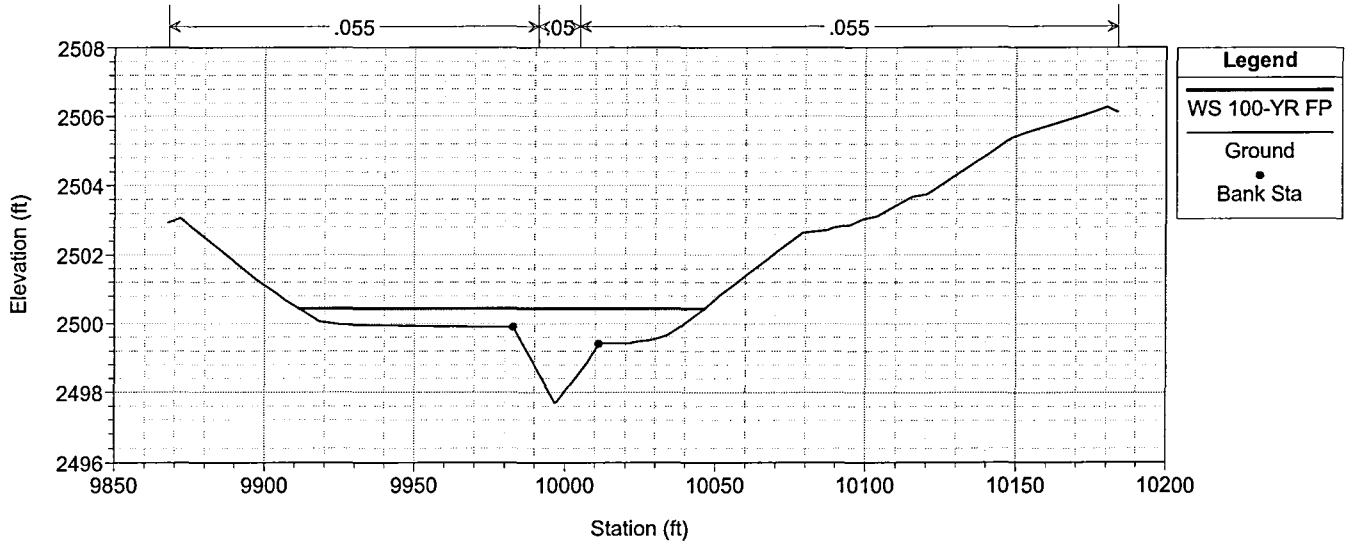
RV Wash K Trib 6D Plan: RV Wash K Trib 6D 11/1/2007

River = RV WK T6D Reach = R2 RS = 1.453



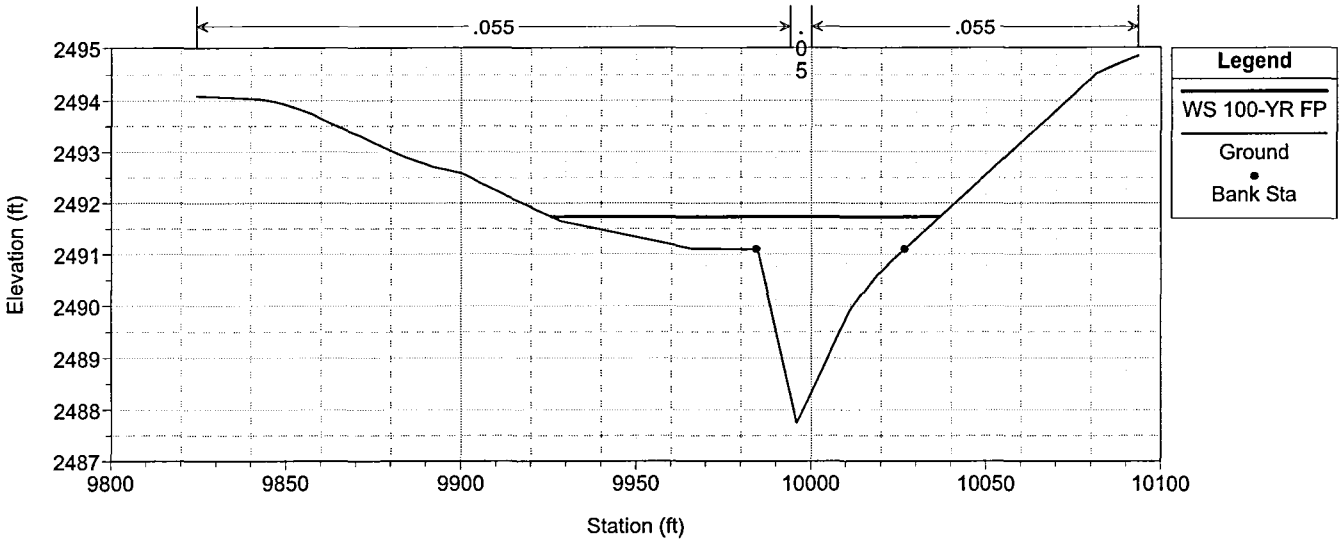
RV Wash K Trib 6D Plan: RV Wash K Trib 6D 11/1/2007

River = RV WK T6D Reach = R2 RS = 1.397



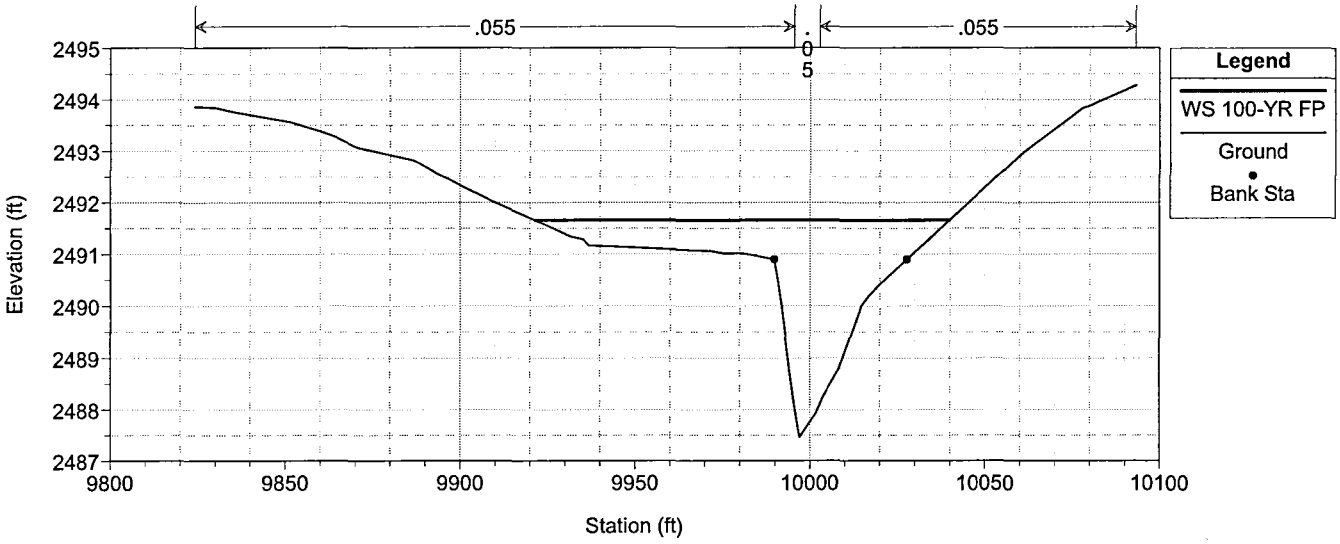
RV Wash K Trib 6D Plan: RV Wash K Trib 6D 11/1/2007

River = RV WK T6D Reach = R2 RS = 1.313



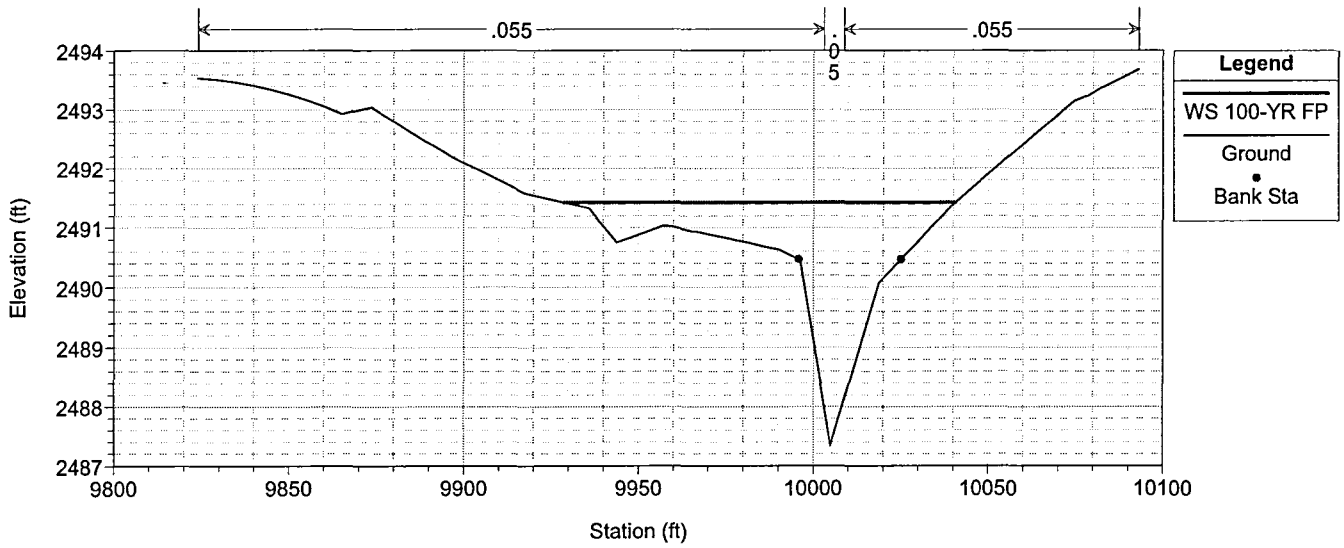
RV Wash K Trib 6D Plan: RV Wash K Trib 6D 11/1/2007

River = RV WK T6D Reach = R2 RS = 1.311



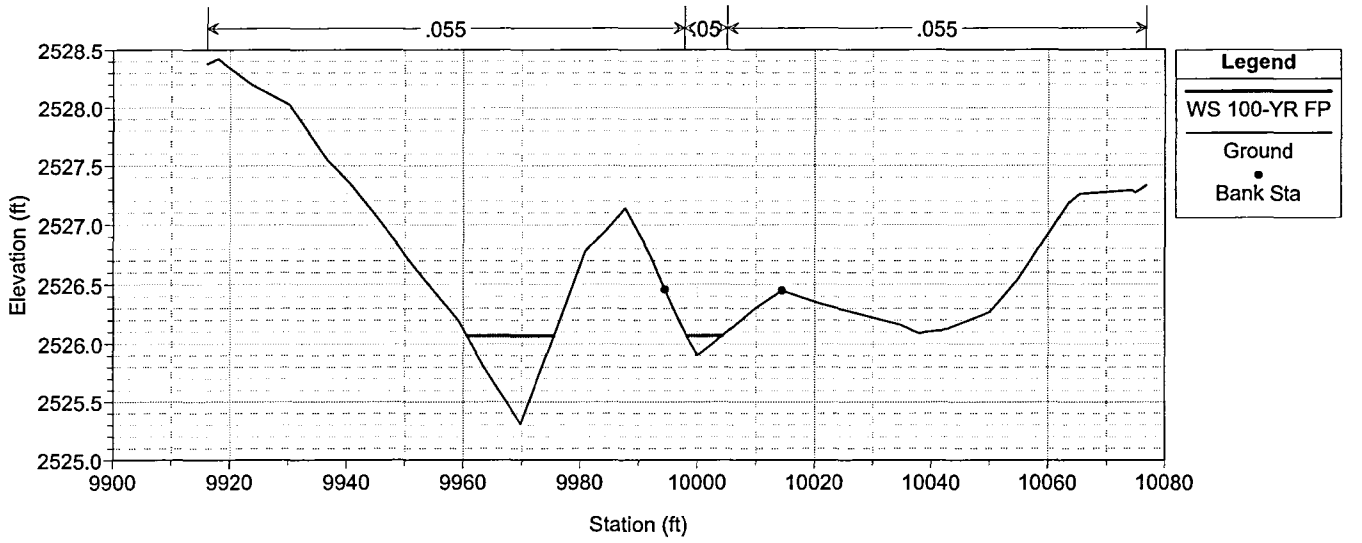
RV Wash K Trib 6D Plan: RV Wash K Trib 6D 11/1/2007

River = RV WK T6D Reach = R2 RS = 1.309



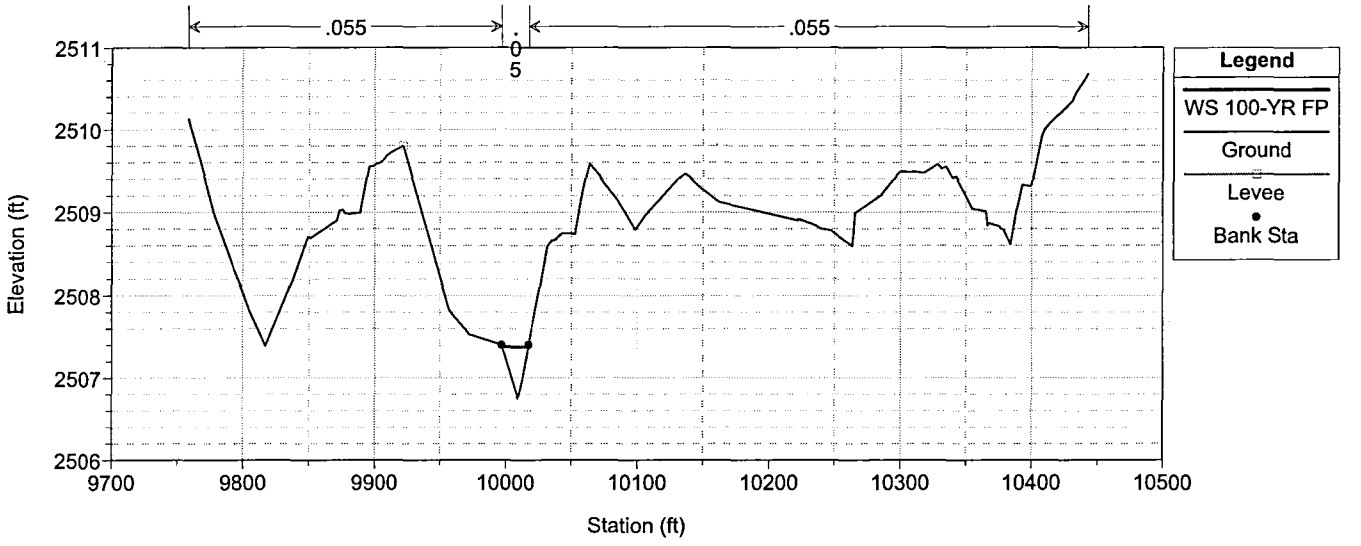
RV Wash K Trib 6D Plan: RV Wash K Trib 6D 11/1/2007

River = RV WK T6D S1 Reach = R1 RS = 0.522



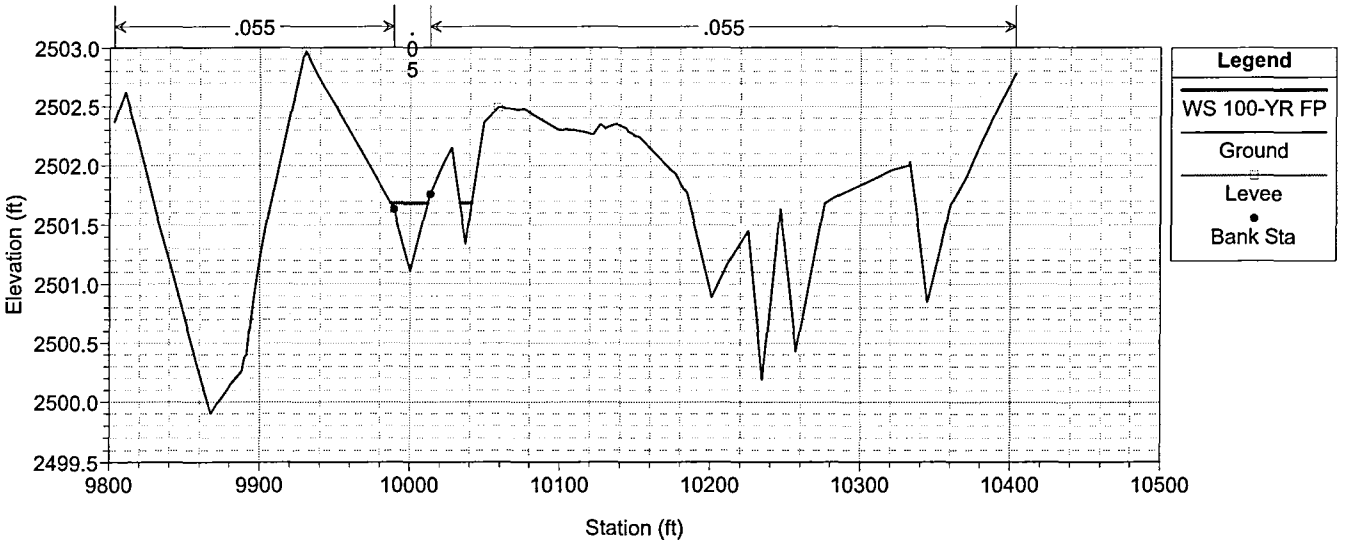
RV Wash K Trib 6D Plan: RV Wash K Trib 6D 11/1/2007

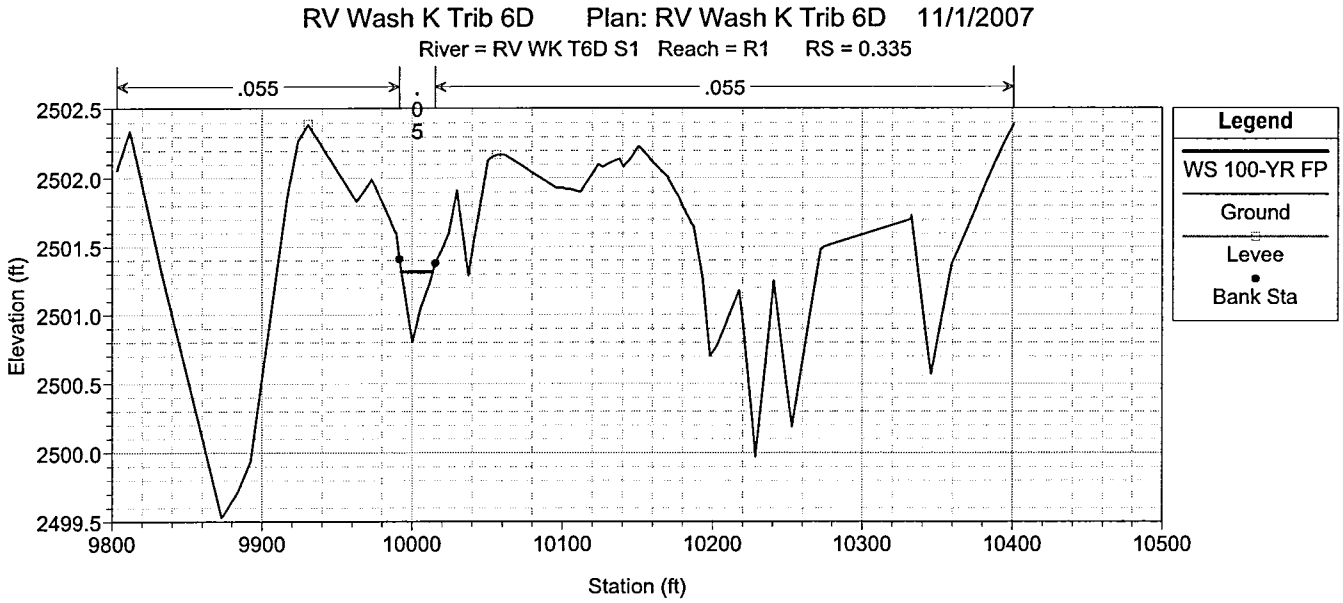
River = RV WK T6D S1 Reach = R1 RS = 0.387

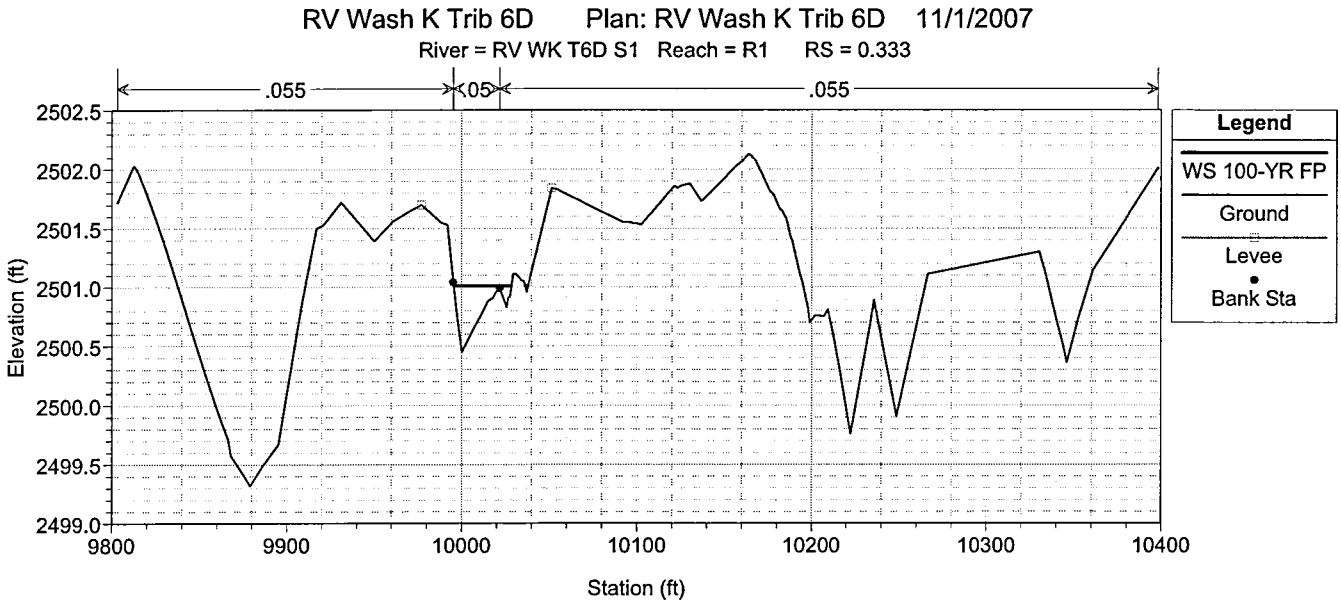


RV Wash K Trib 6D Plan: RV Wash K Trib 6D 11/1/2007

River = RV WK T6D S1 Reach = R1 RS = 0.337




RV Wash K Trib 6D Plan: RV Wash K Trib 6D 11/1/2007
River = RV WK T6D S1 Reach = R1 RS = 0.335
.055
.05
.055
Legend
WS 100-YR FP
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)

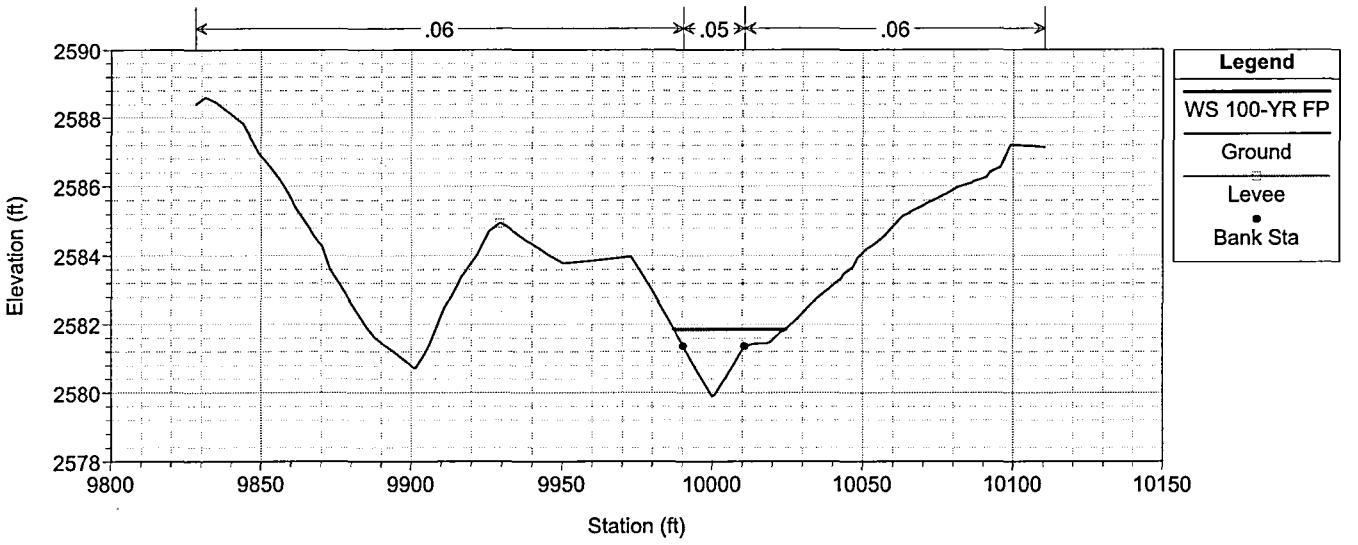

RV Wash K Trib 6D Plan: RV Wash K Trib 6D 11/1/2007
River = RV WK T6D S1 Reach = R1 RS = 0.333
.055
.05
.055
Legend
WS 100-YR FP
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)

E.2.11 HEC-RAS Cross Section Plots

RV Wash K Trib 6D1

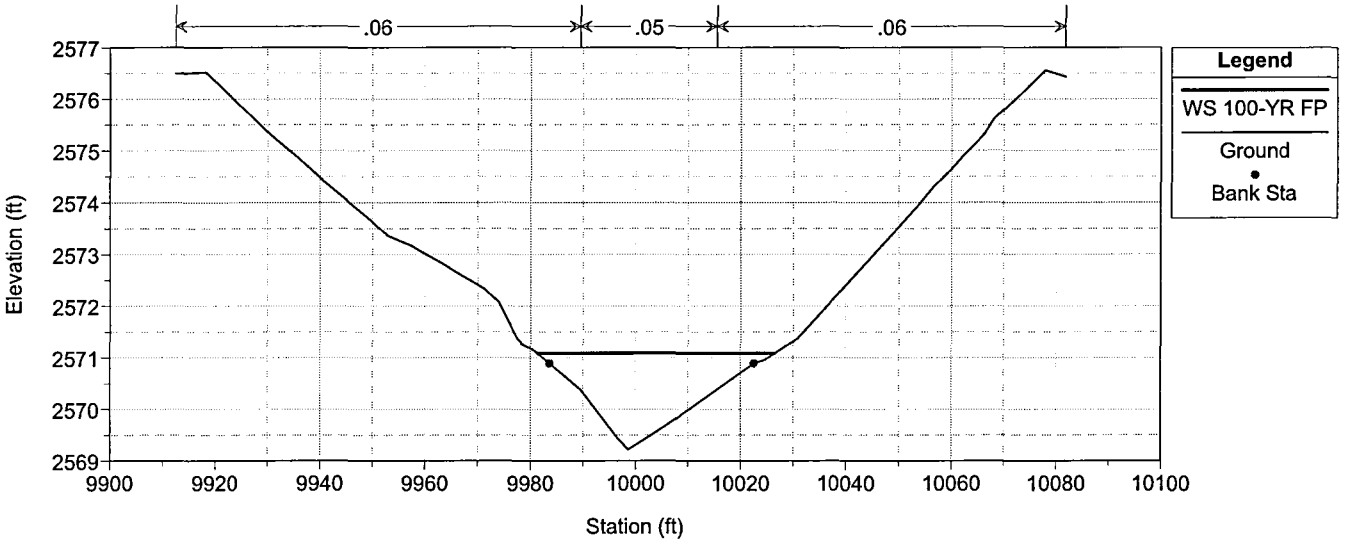
RV Wash K Trib 6D1 Plan: RV Wash K Trib 6D1 11/1/2007

River = RV WK T6D1 Reach = R1 RS = 1.085



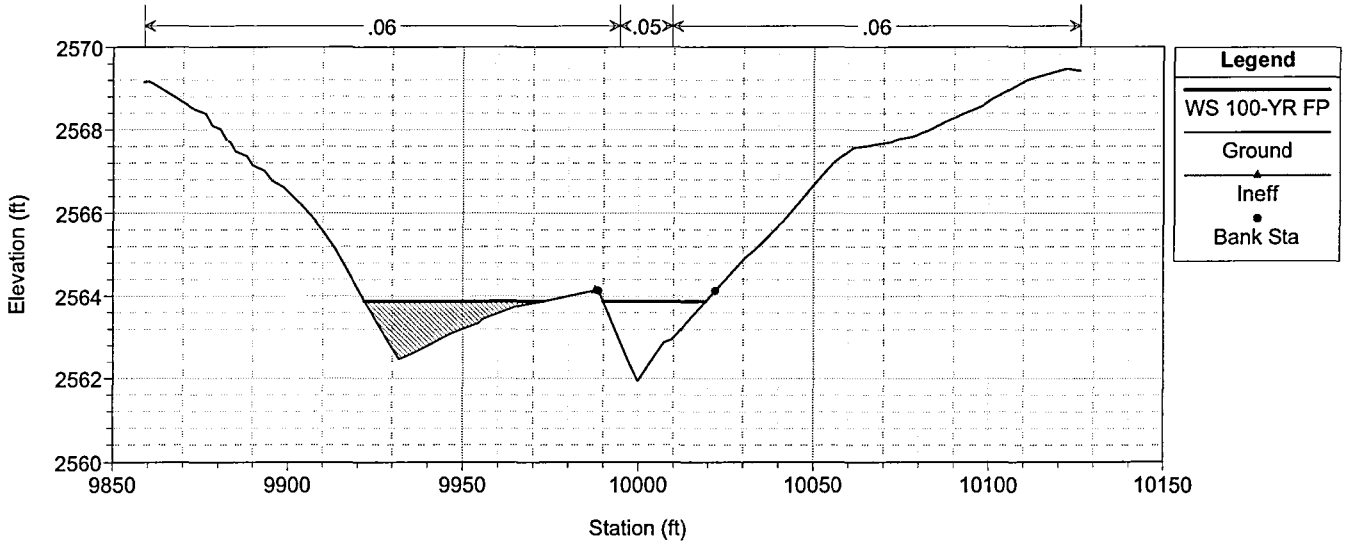
RV Wash K Trib 6D1 Plan: RV Wash K Trib 6D1 11/1/2007

River = RV WK T6D1 Reach = R1 RS = 0.998



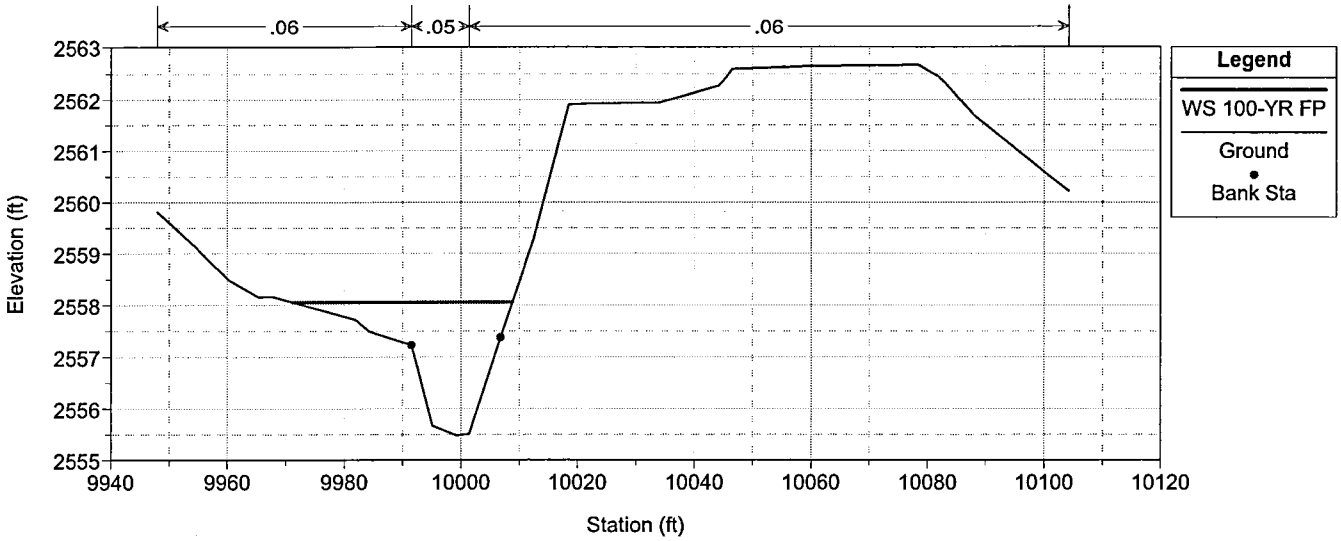
RV Wash K Trib 6D1 Plan: RV Wash K Trib 6D1 11/1/2007

River = RV WK T6D1 Reach = R1 RS = 0.940



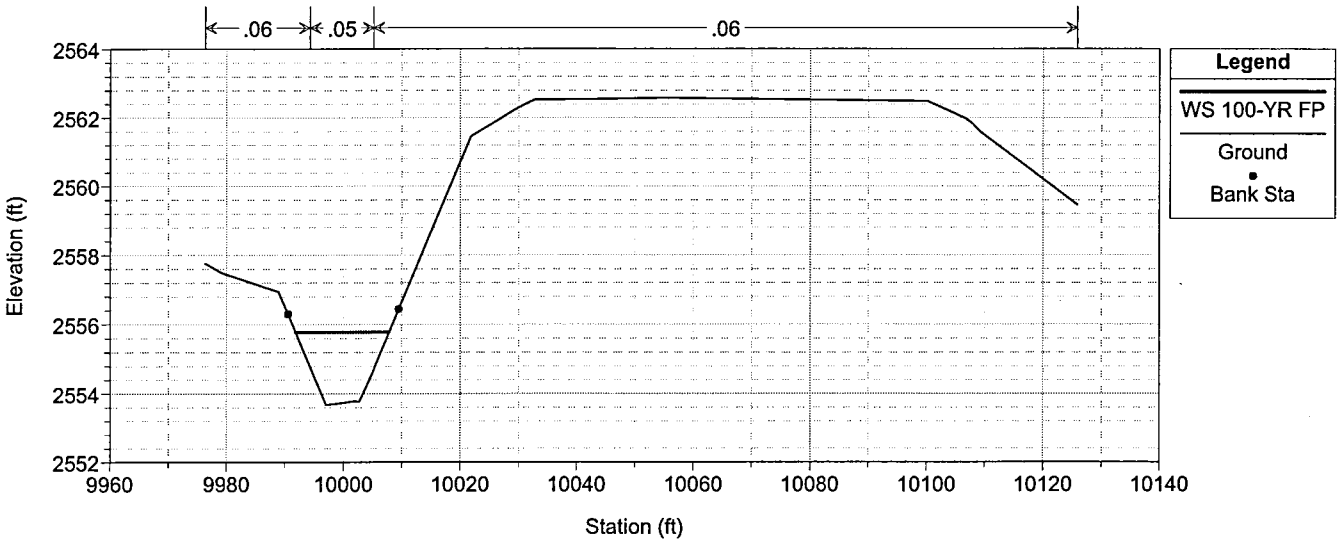
RV Wash K Trib 6D1 Plan: RV Wash K Trib 6D1 11/1/2007

River = RV WK T6D1 Reach = R1 RS = 0.890



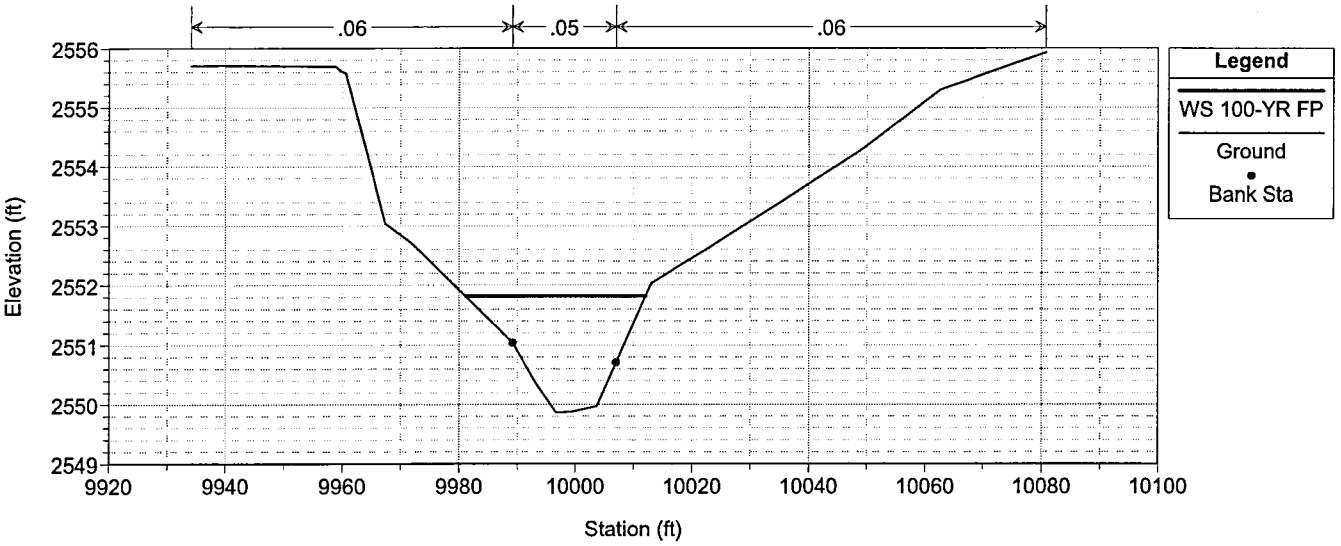
RV Wash K Trib 6D1 Plan: RV Wash K Trib 6D1 11/1/2007

River = RV WK T6D1 Reach = R1 RS = 0.870



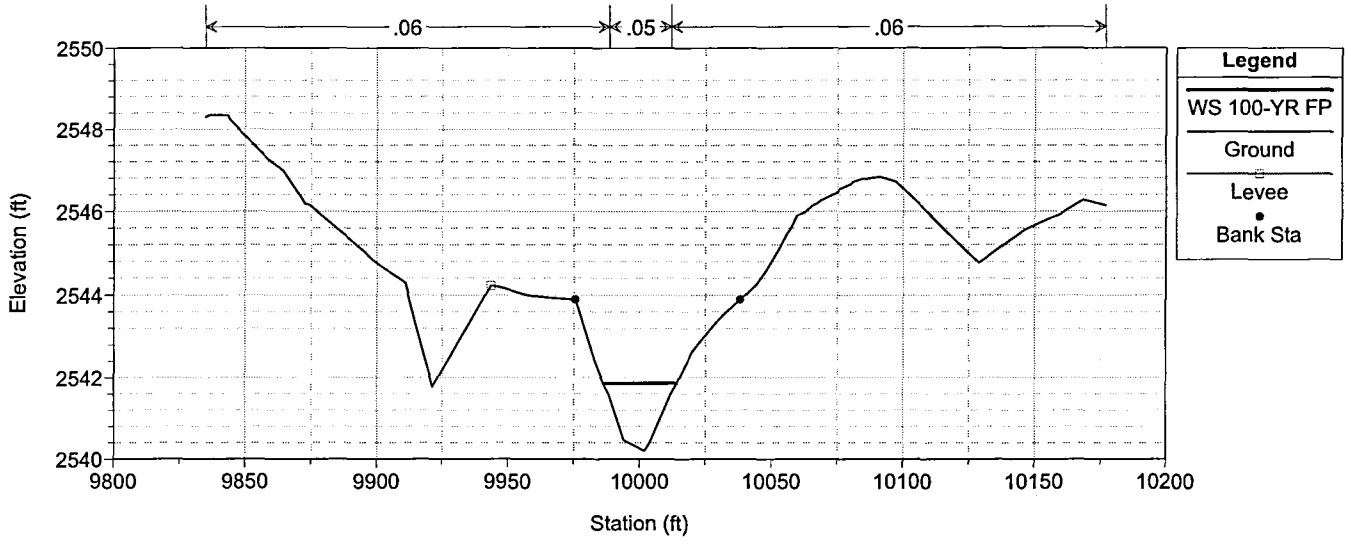
RV Wash K Trib 6D1 Plan: RV Wash K Trib 6D1 11/1/2007

River = RV WK T6D1 Reach = R1 RS = 0.838



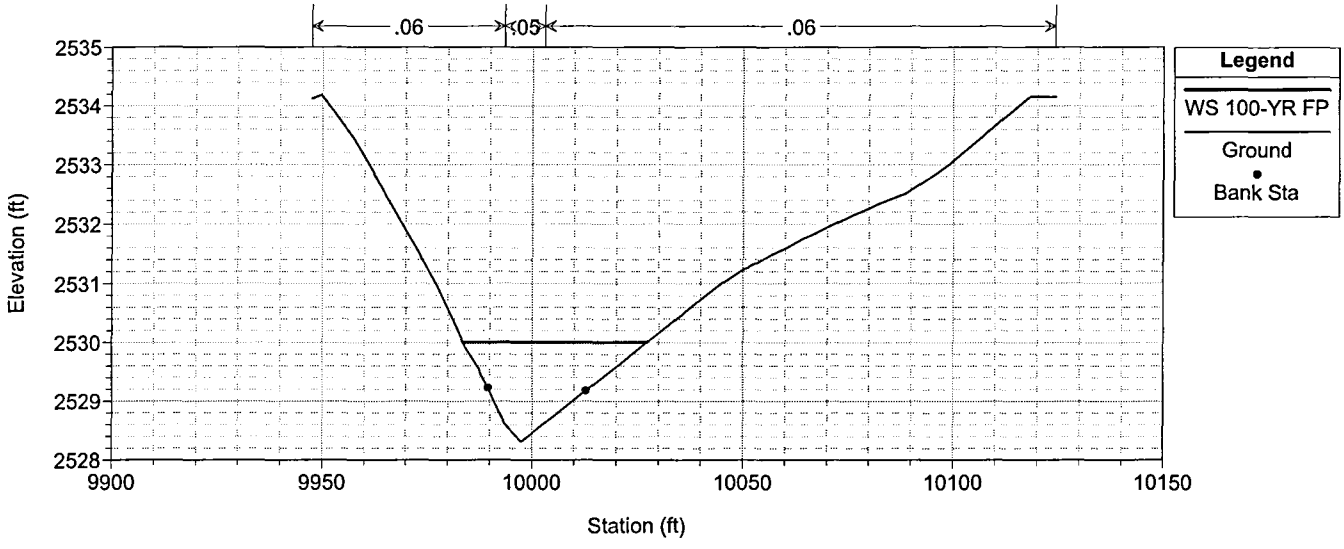
RV Wash K Trib 6D1 Plan: RV Wash K Trib 6D1 11/1/2007

River = RV WK T6D1 Reach = R1 RS = 0.745



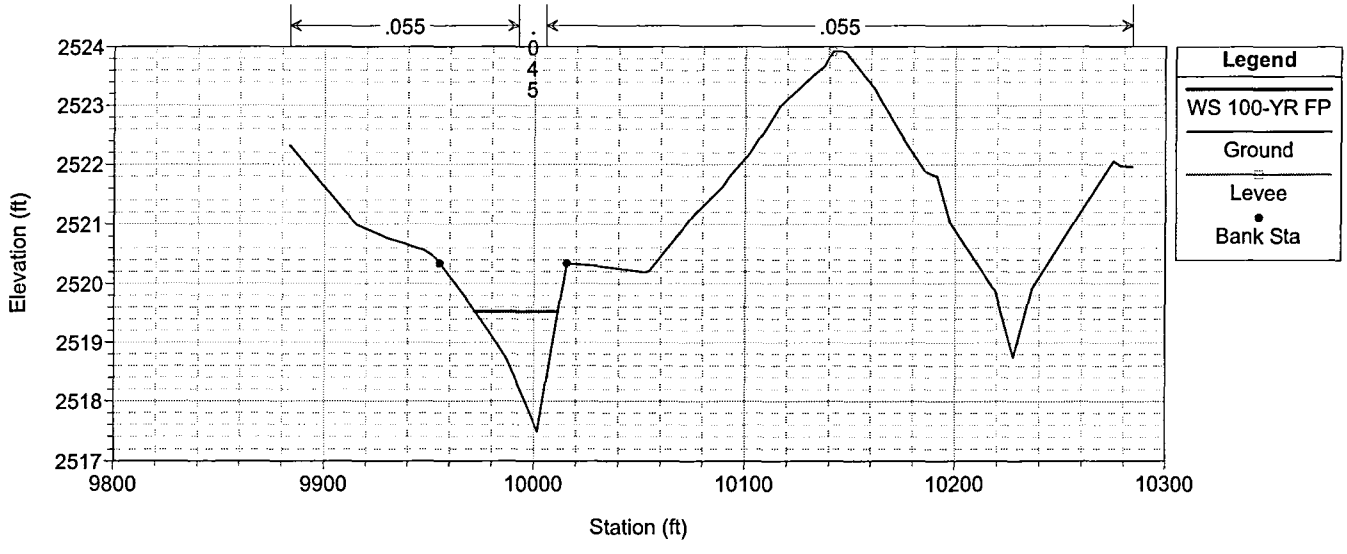
RV Wash K Trib 6D1 Plan: RV Wash K Trib 6D1 11/1/2007

River = RV WK T6D1 Reach = R1 RS = 0.649



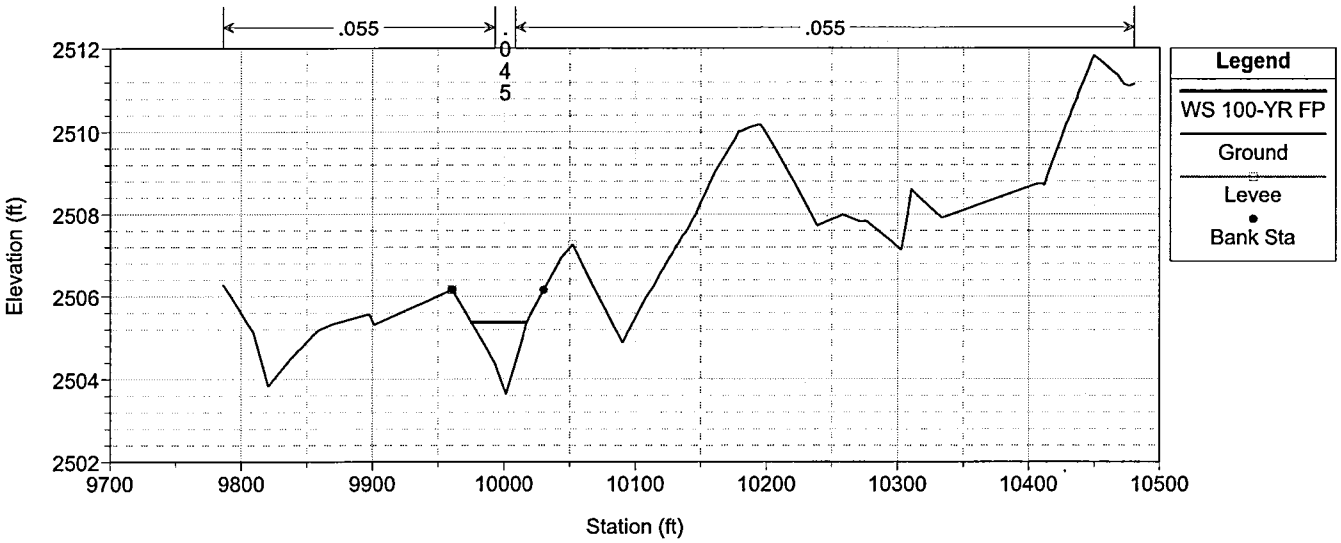
RV Wash K Trib 6D1 Plan: RV Wash K Trib 6D1 11/1/2007

River = RV WK T6D1 Reach = R1 RS = 0.552



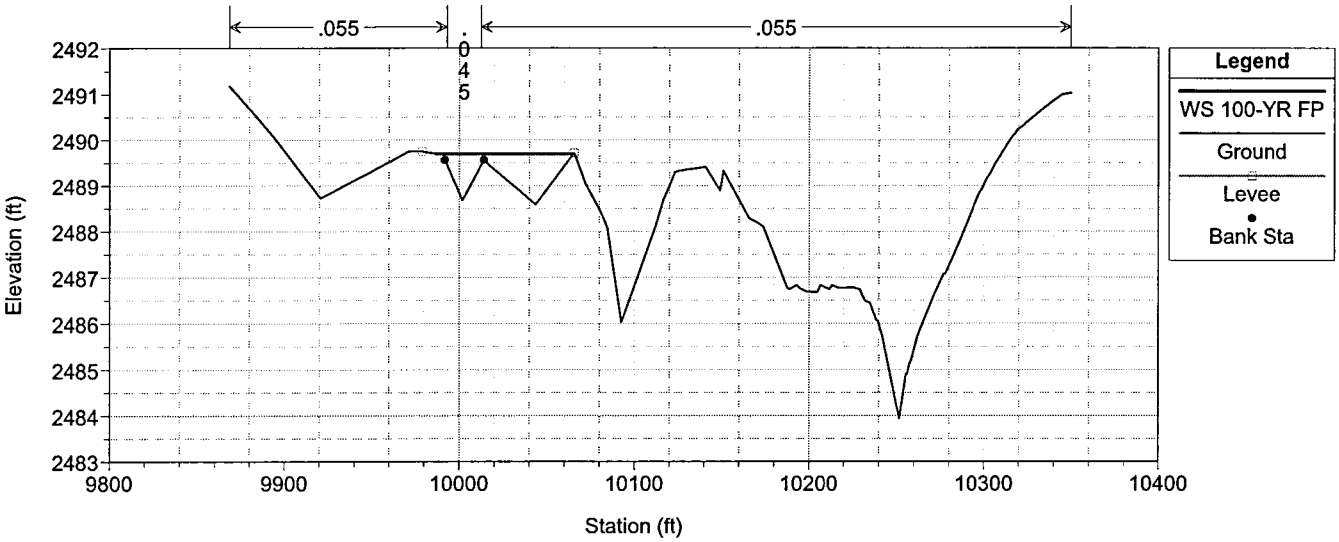
RV Wash K Trib 6D1 Plan: RV Wash K Trib 6D1 11/1/2007

River = RV WK T6D1 Reach = R1 RS = 0.424



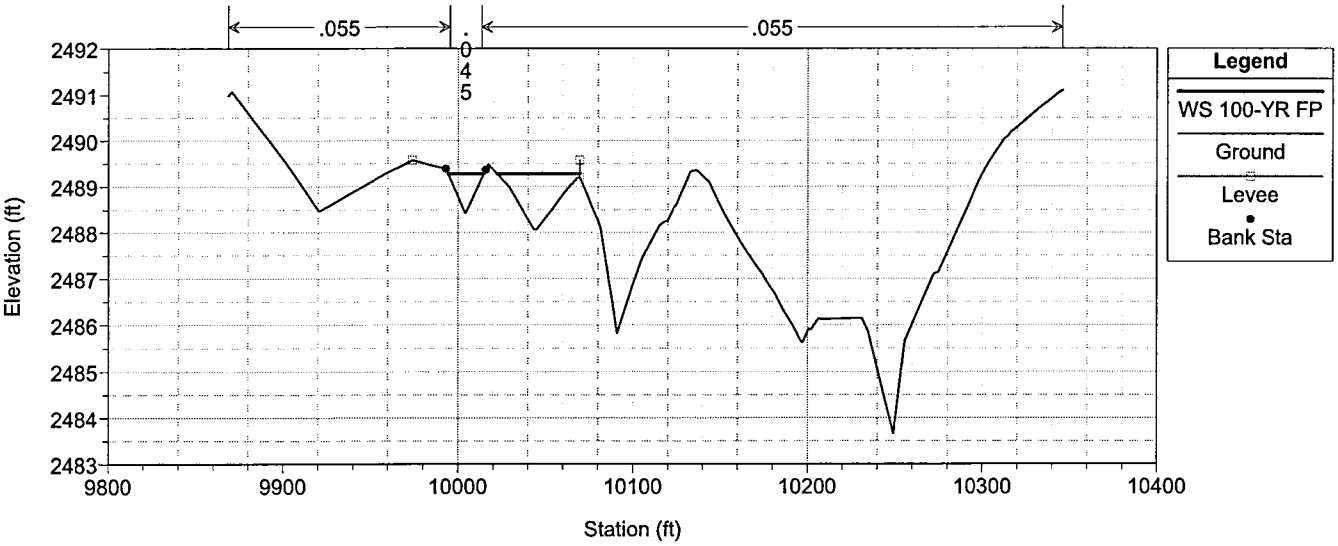
RV Wash K Trib 6D1 Plan: RV Wash K Trib 6D1 11/1/2007

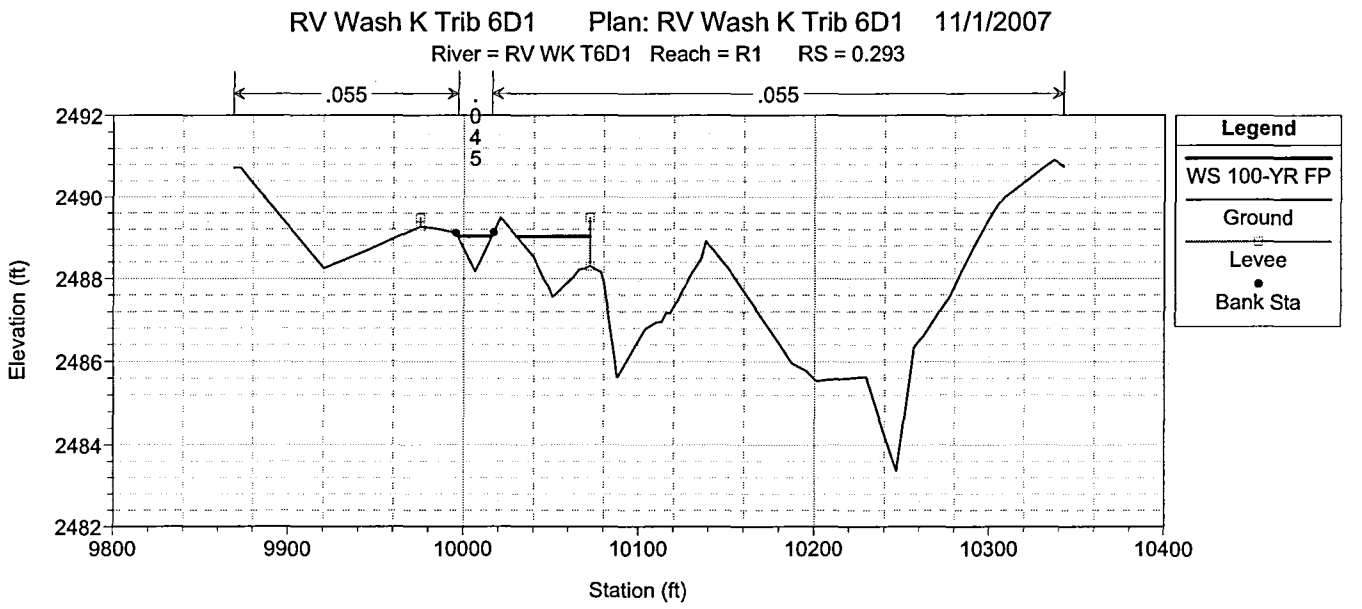
River = RV WK T6D1 Reach = R1 RS = 0.297



RV Wash K Trib 6D1 Plan: RV Wash K Trib 6D1 11/1/2007

River = RV WK T6D1 Reach = R1 RS = 0.295



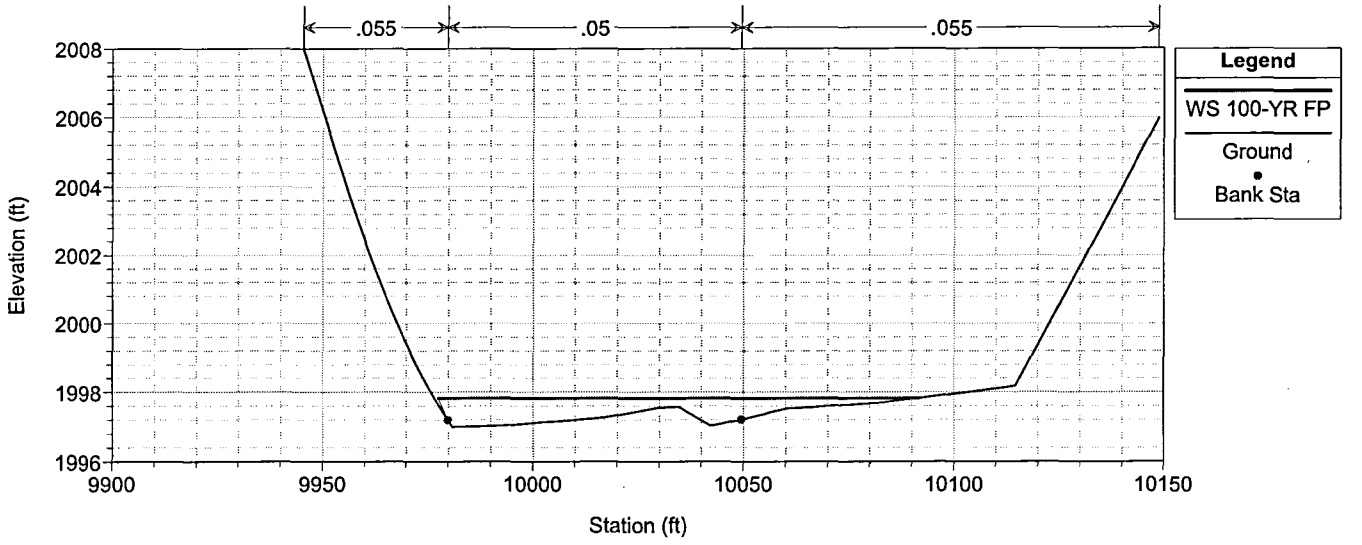

RV Wash K Trib 6D1 Plan: RV Wash K Trib 6D1 11/1/2007
River = RV WK T6D1 Reach = R1 RS = 0.293
.055
.045
.055
Legend
WS 100-YR FP
Ground
Levee
Bank Sta
Elevation (ft)
2492
2490
2488
2486
2484
2482
9800
9900
10000
10100
10200
10300
10400
Station (ft)

E.2.12 HEC-RAS Cross Section Plots

RV Wash P

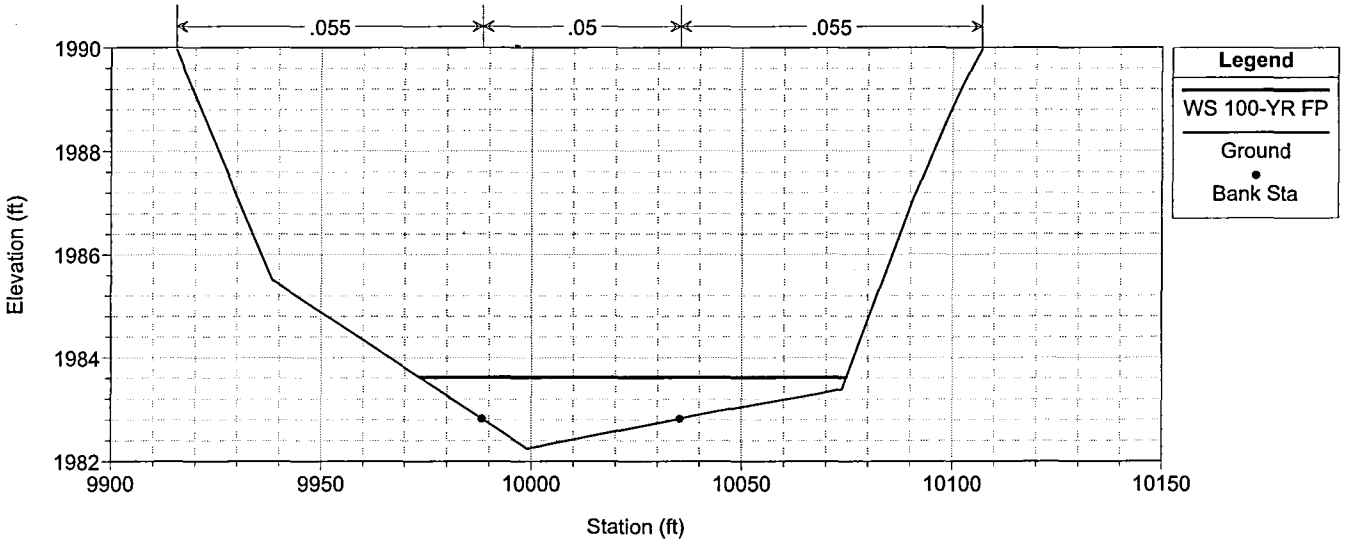
RV Wash P Plan: RV Wash P 11/1/2007

River = RV WP Reach = R1 RS = 2.650



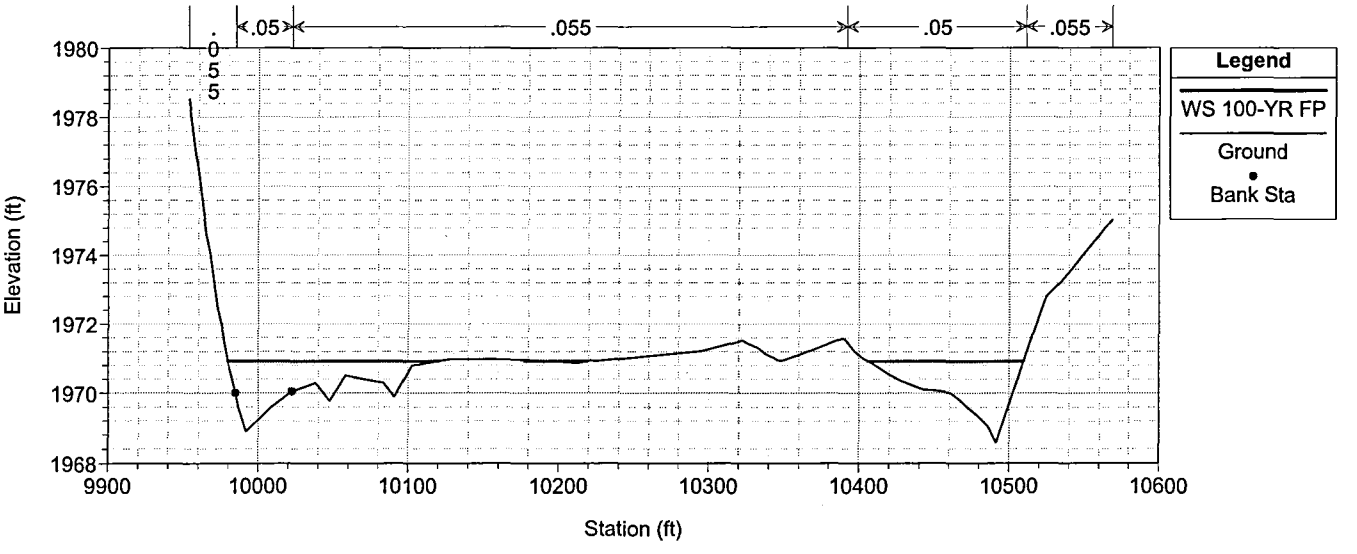
RV Wash P Plan: RV Wash P 11/1/2007

River = RV WP Reach = R1 RS = 2.547



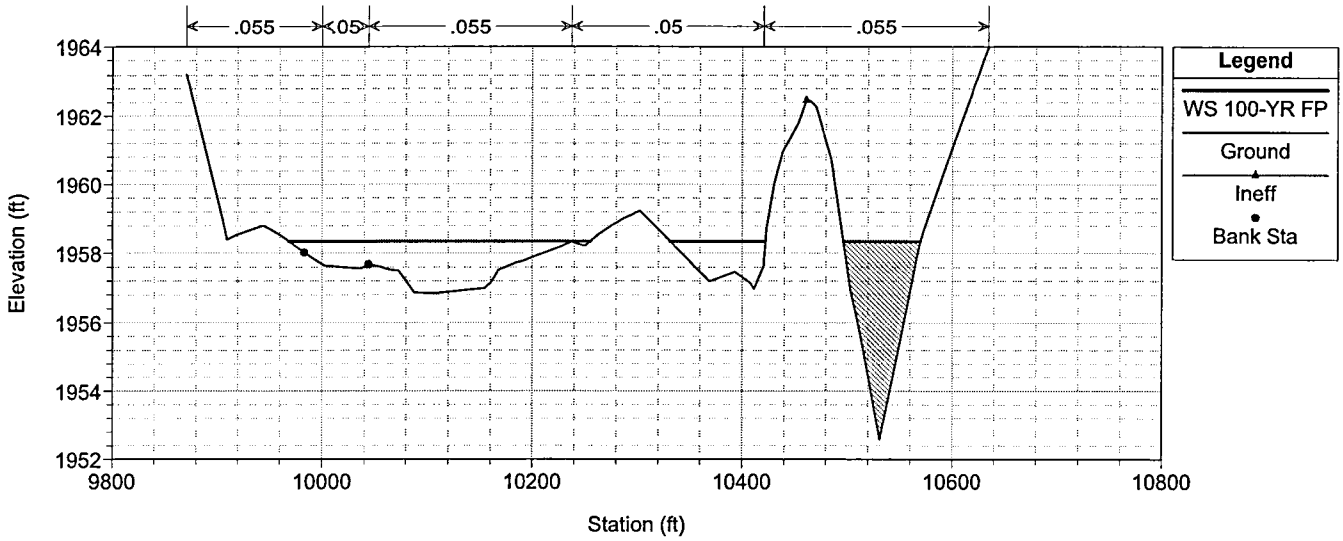
RV Wash P Plan: RV Wash P 11/1/2007

River = RV WP Reach = R2 RS = 2.450



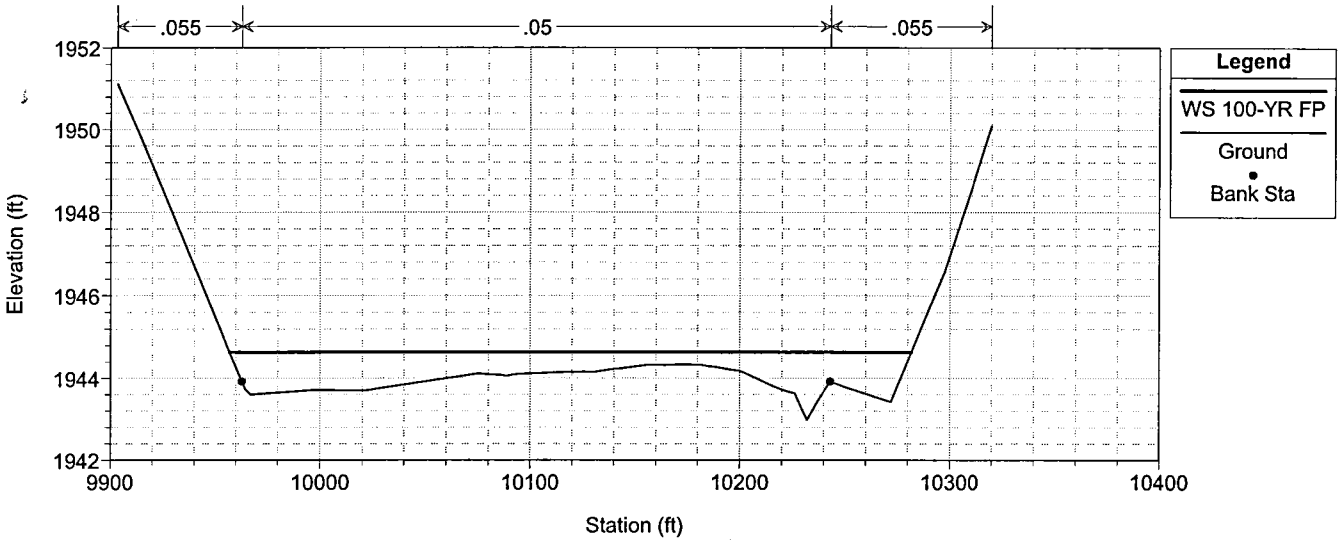
RV Wash P Plan: RV Wash P 11/1/2007

River = RV WP Reach = R2 RS = 2.359



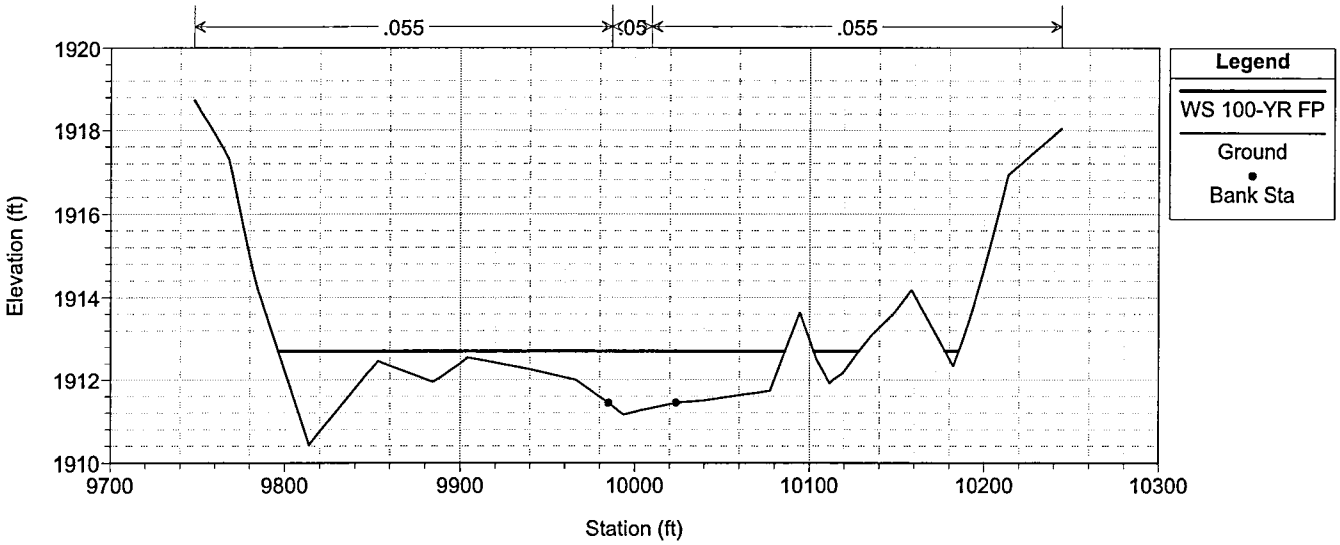
RV Wash P Plan: RV Wash P 11/1/2007

River = RV WP Reach = R2 RS = 2.261



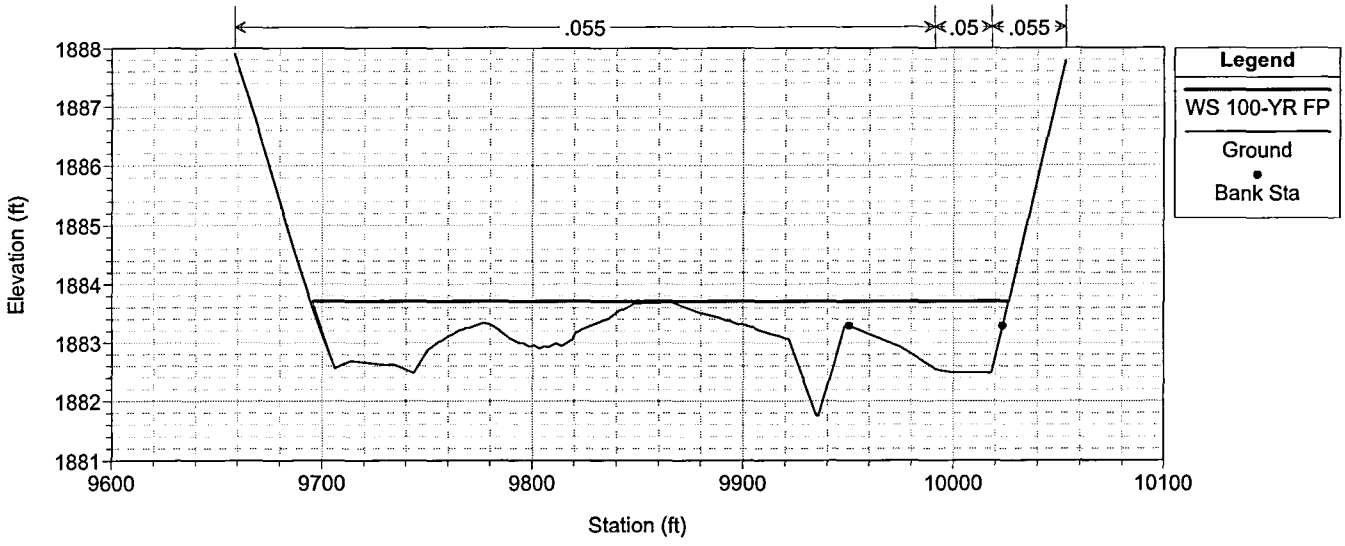
RV Wash P Plan: RV Wash P 11/1/2007

River = RV WP Reach = R3 RS = 2.064



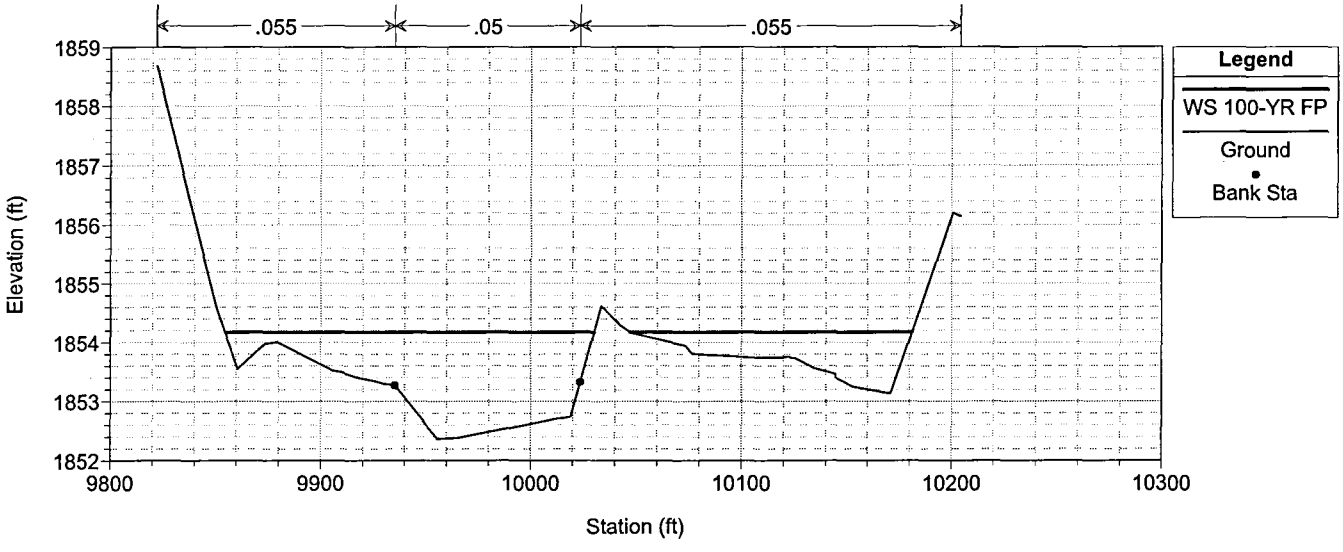
RV Wash P Plan: RV Wash P 11/1/2007

River = RV WP Reach = R3 RS = 1.882



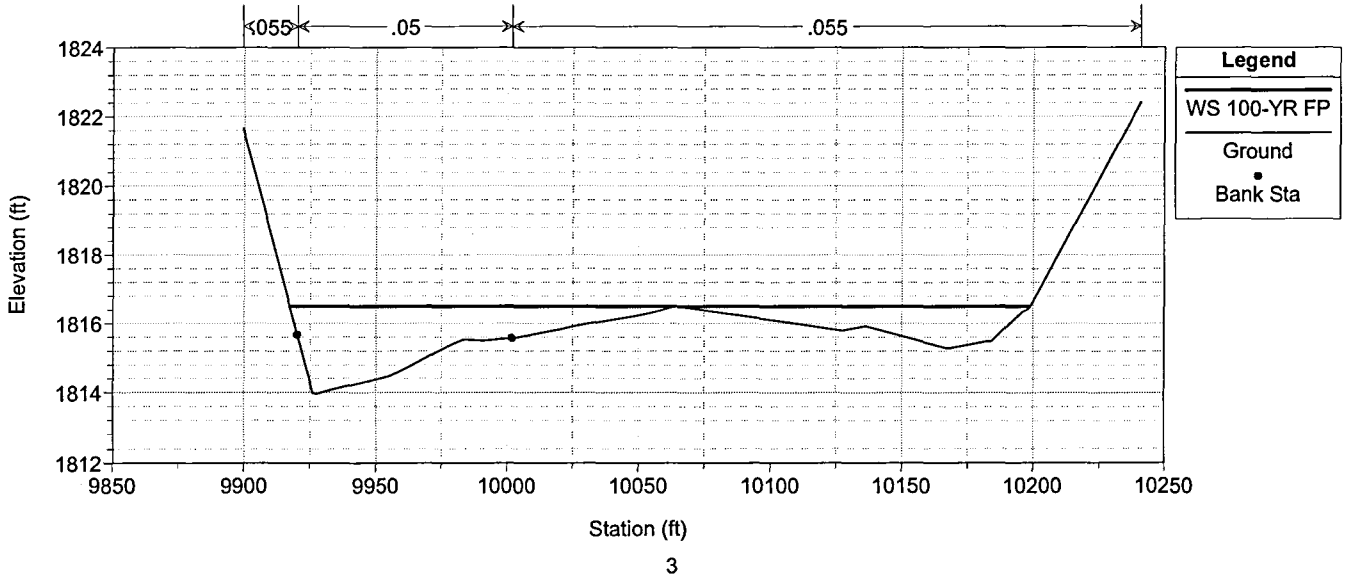
RV Wash P Plan: RV Wash P 11/1/2007

River = RV WP Reach = R3 RS = 1.703



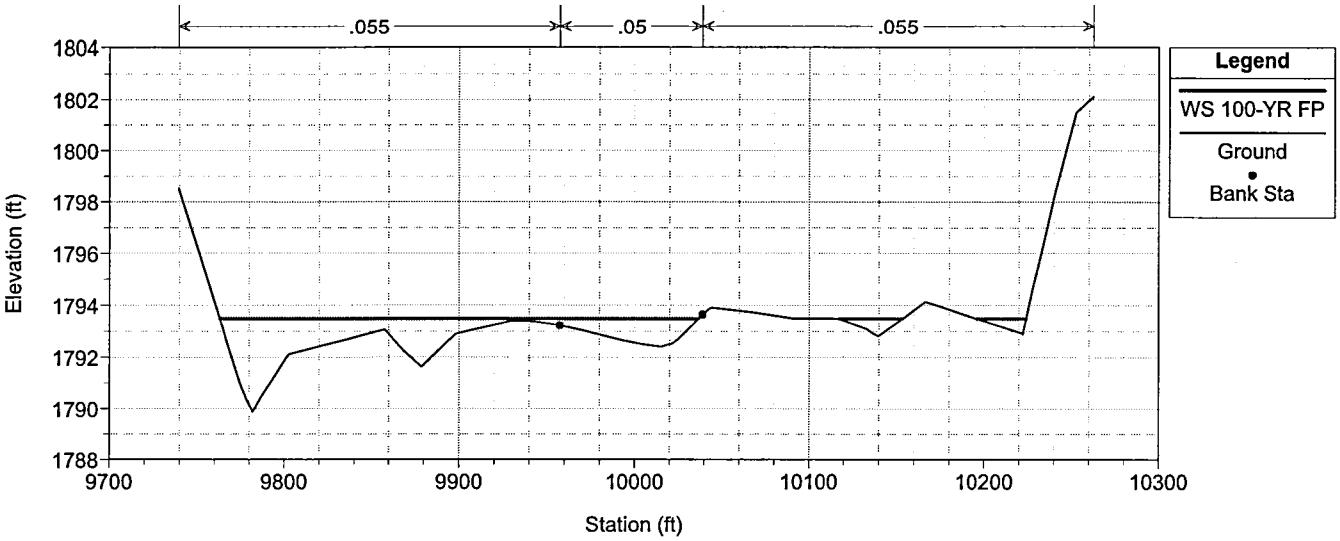
RV Wash P Plan: RV Wash P 11/1/2007

River = RV WP Reach = R3 RS = 1.493



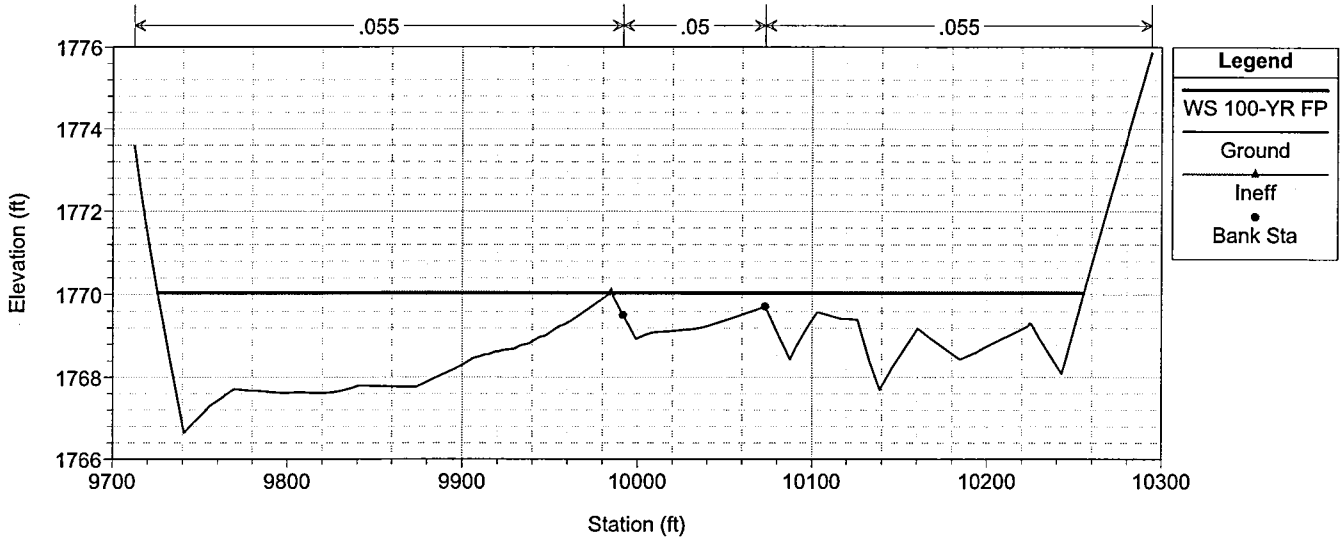
RV Wash P Plan: RV Wash P 11/1/2007

River = RV WP Reach = R3 RS = 1.368



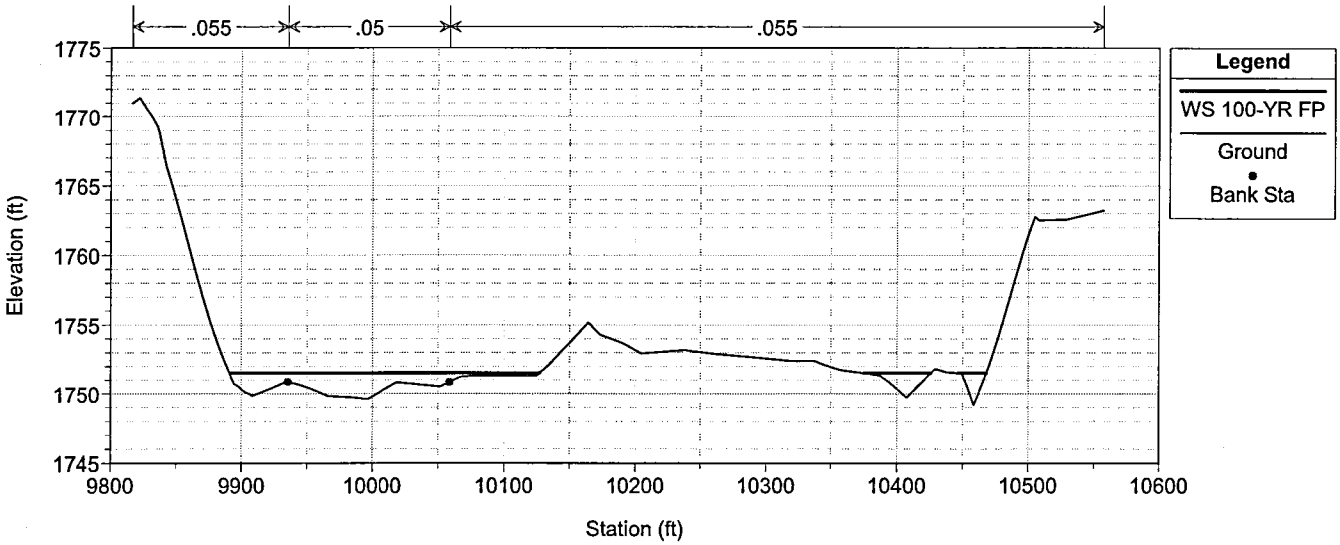
RV Wash P Plan: RV Wash P 11/1/2007

River = RV WP Reach = R3 RS = 1.229



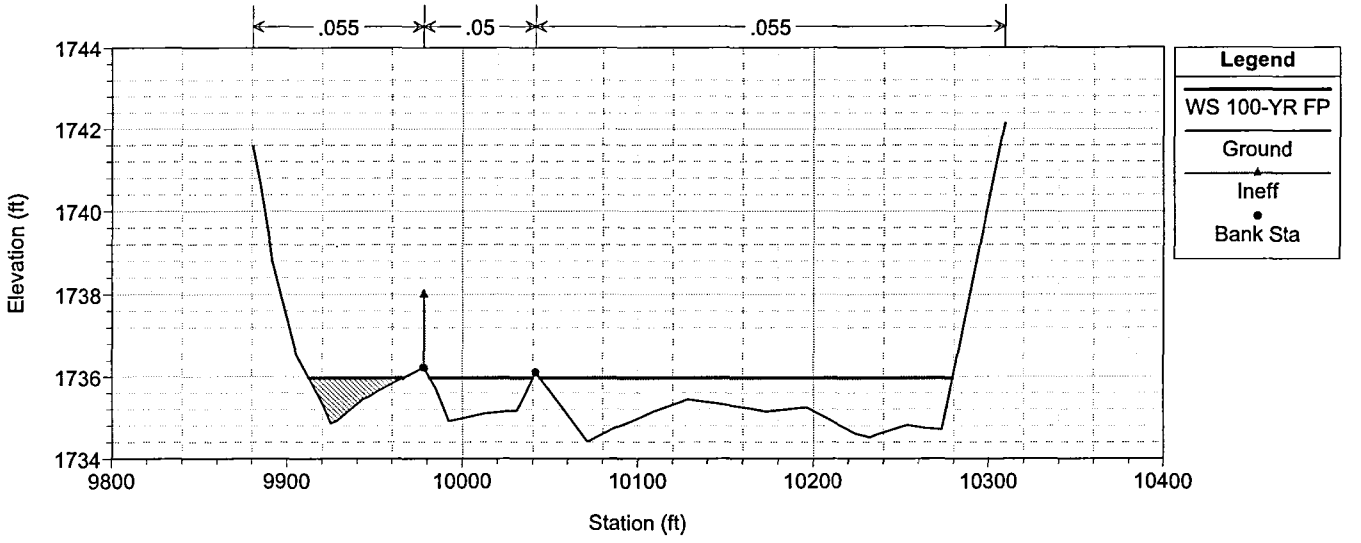
RV Wash P Plan: RV Wash P 11/1/2007

River = RV WP Reach = R3 RS = 1.126



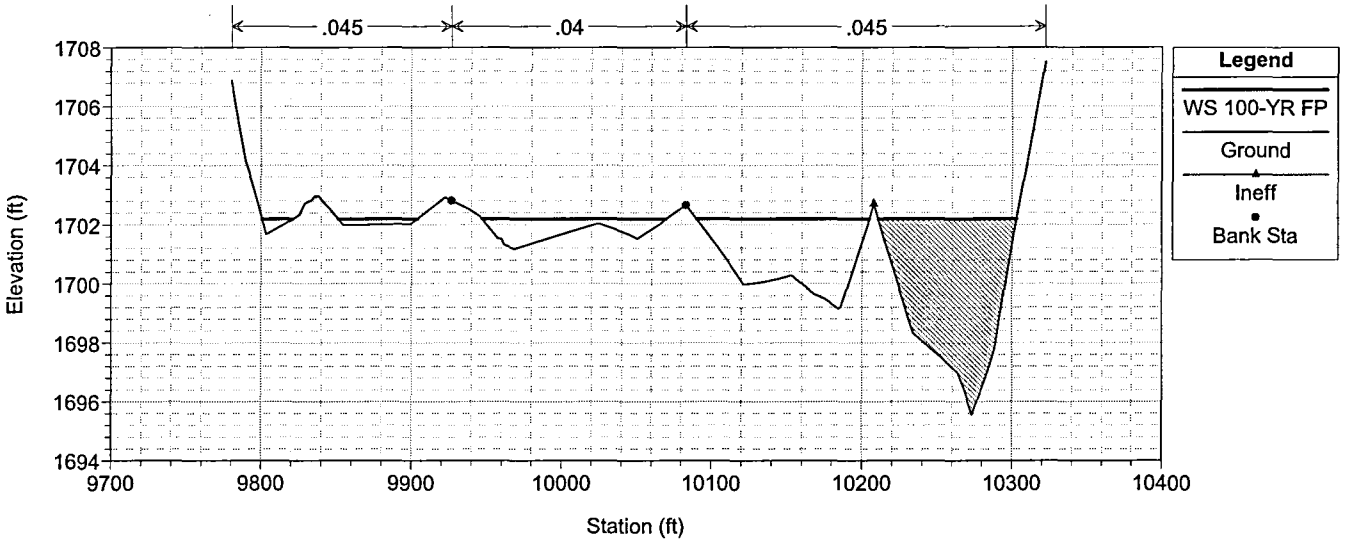
RV Wash P Plan: RV Wash P 11/1/2007

River = RV WP Reach = R3 RS = 1.048



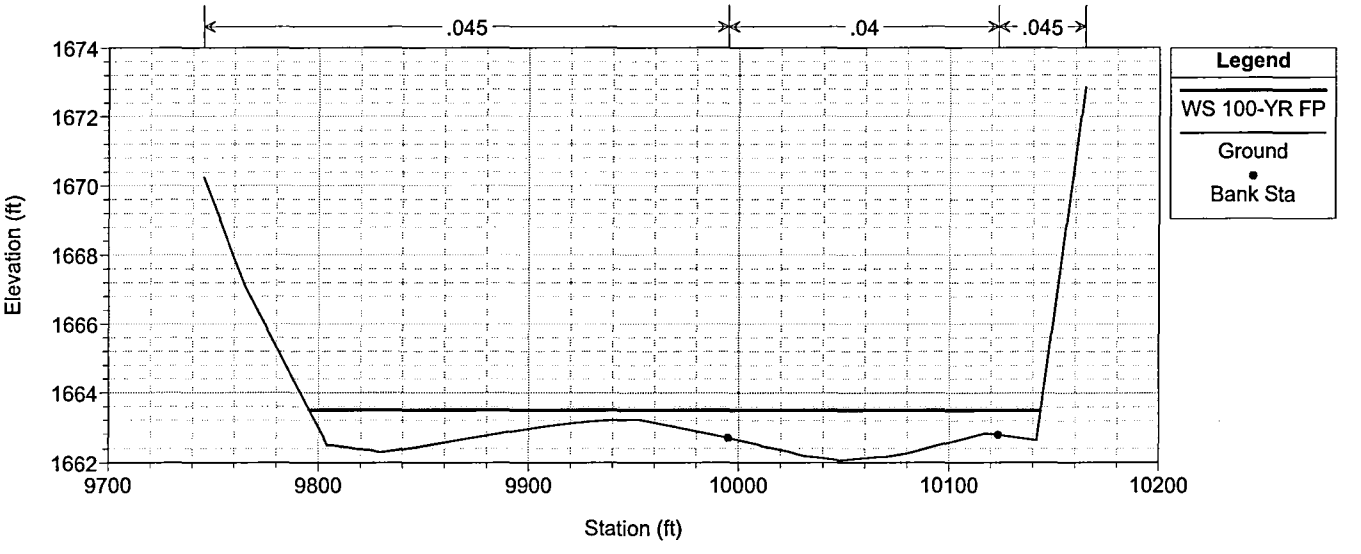
RV Wash P Plan: RV Wash P 11/1/2007

River = RV WP Reach = R3 RS = 0.853



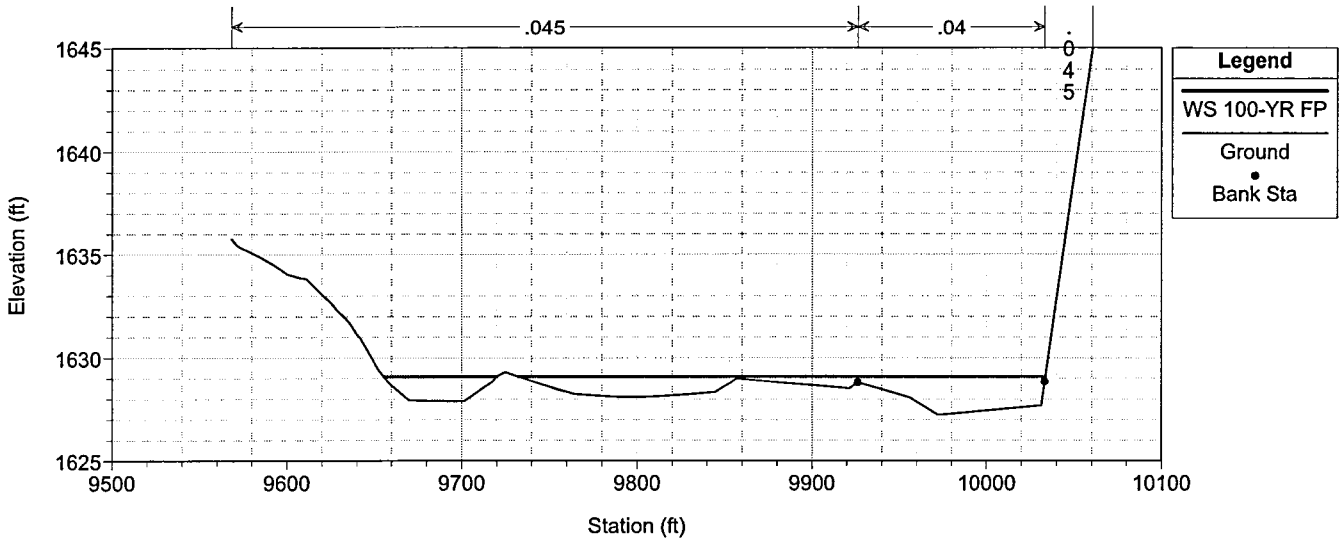
RV Wash P Plan: RV Wash P 11/1/2007

River = RV WP Reach = R3 RS = 0.659



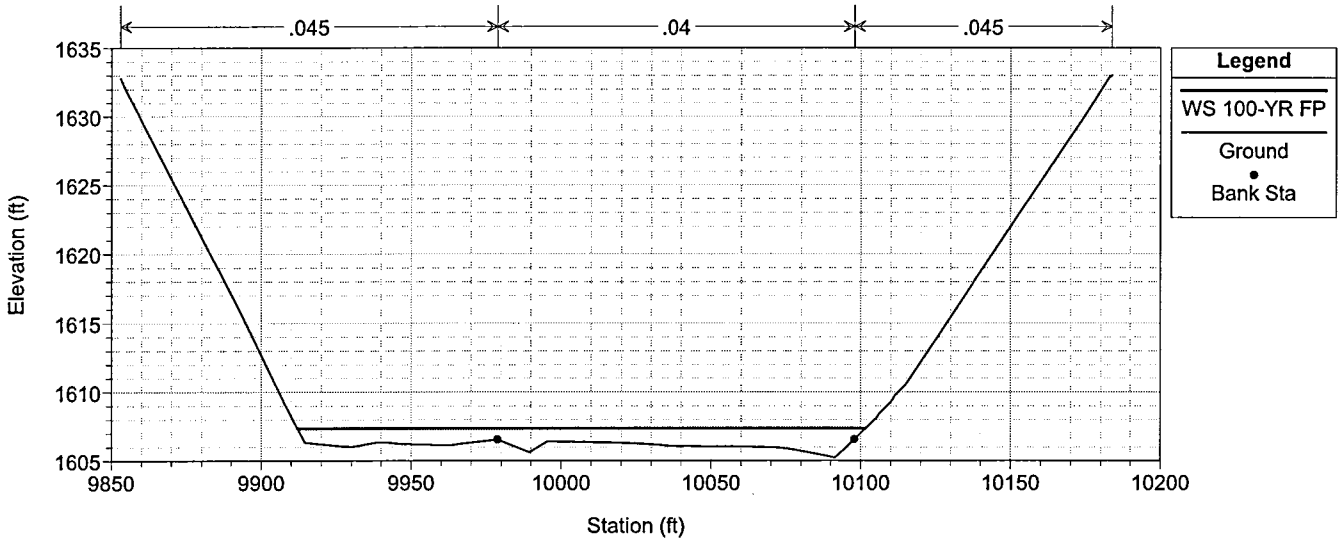
RV Wash P Plan: RV Wash P 11/1/2007

River = RV WP Reach = R3 RS = 0.484



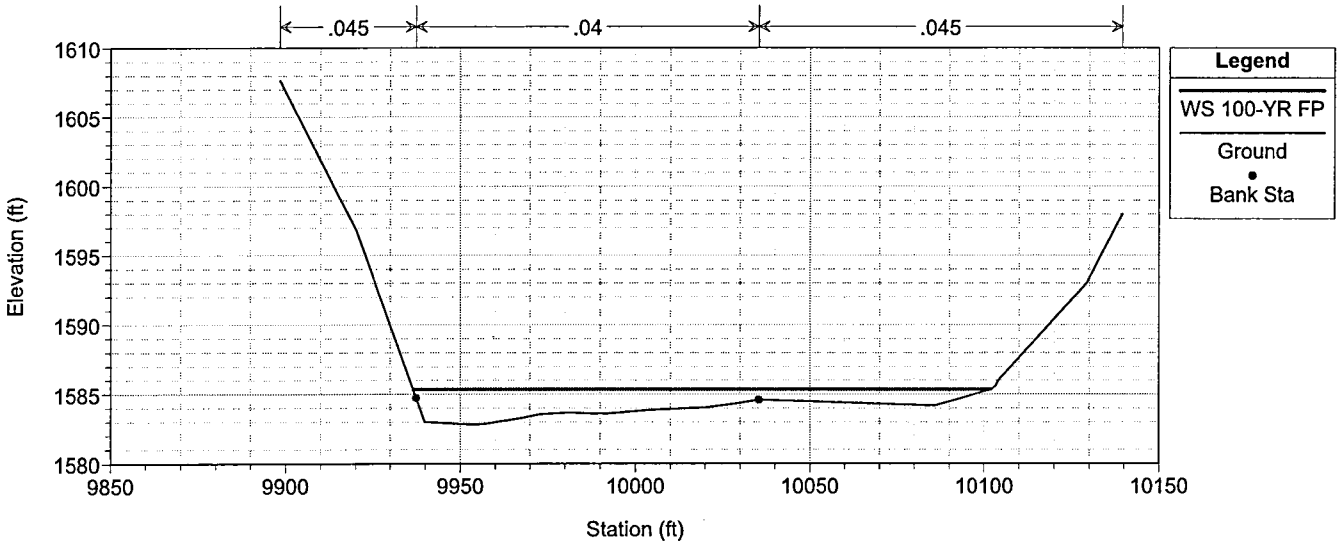
RV Wash P Plan: RV Wash P 11/1/2007

River = RV WP Reach = R3 RS = 0.373



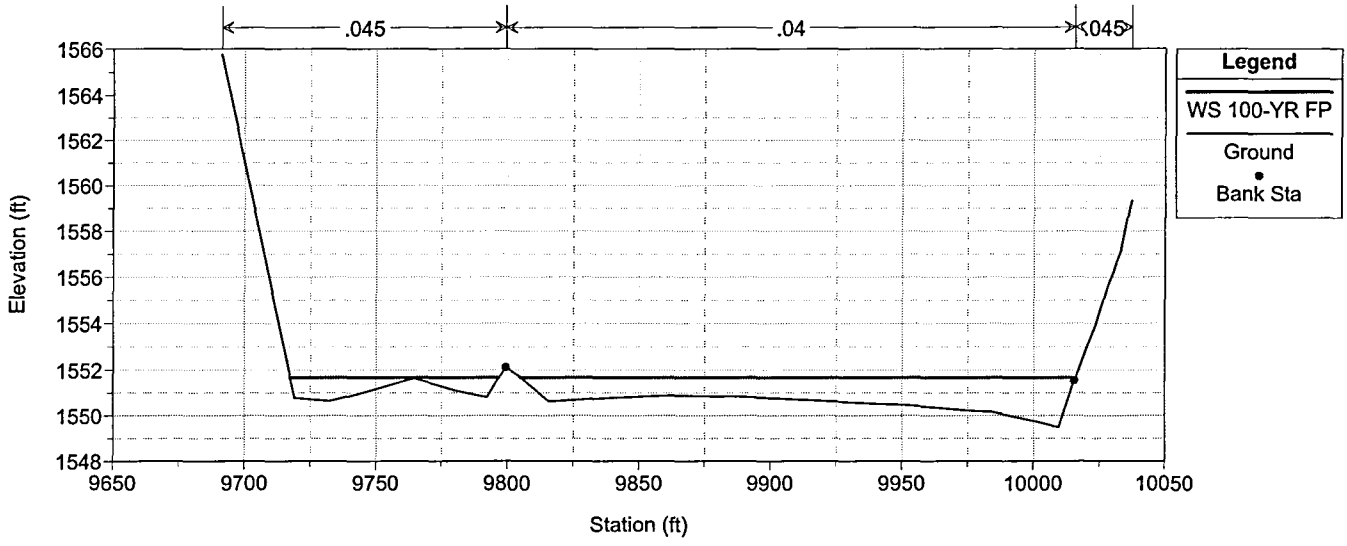
RV Wash P Plan: RV Wash P 11/1/2007

River = RV WP Reach = R3 RS = 0.267



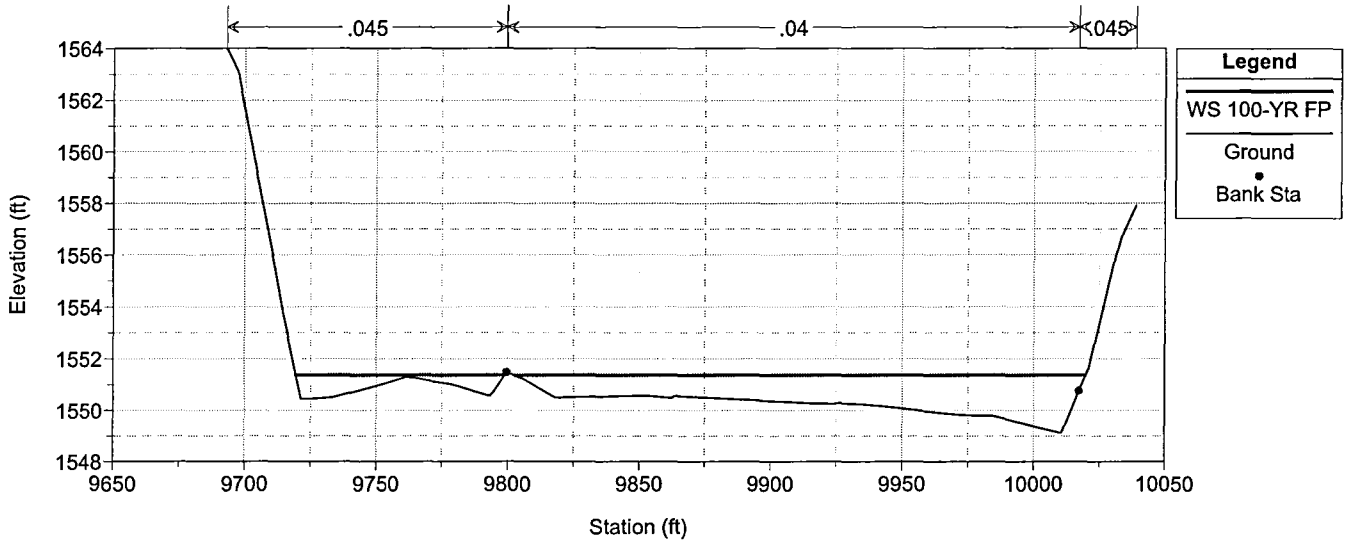
RV Wash P Plan: RV Wash P 11/1/2007

River = RV WP Reach = R3 RS = 0.088



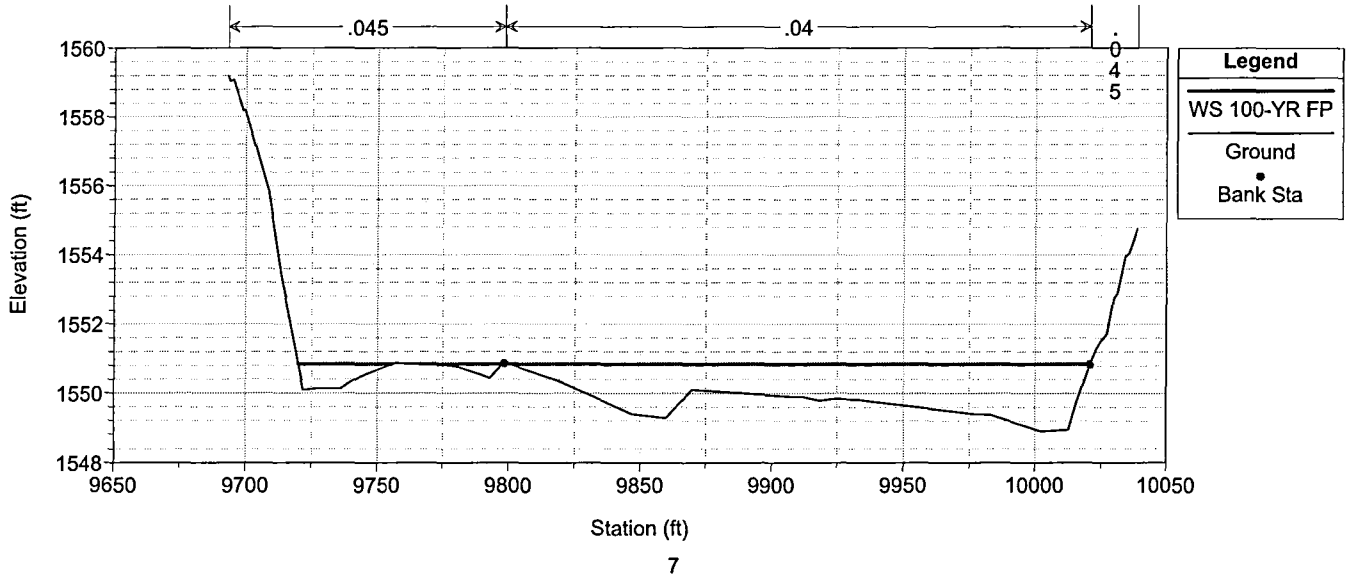
RV Wash P Plan: RV Wash P 11/1/2007

River = RV WP Reach = R3 RS = 0.086



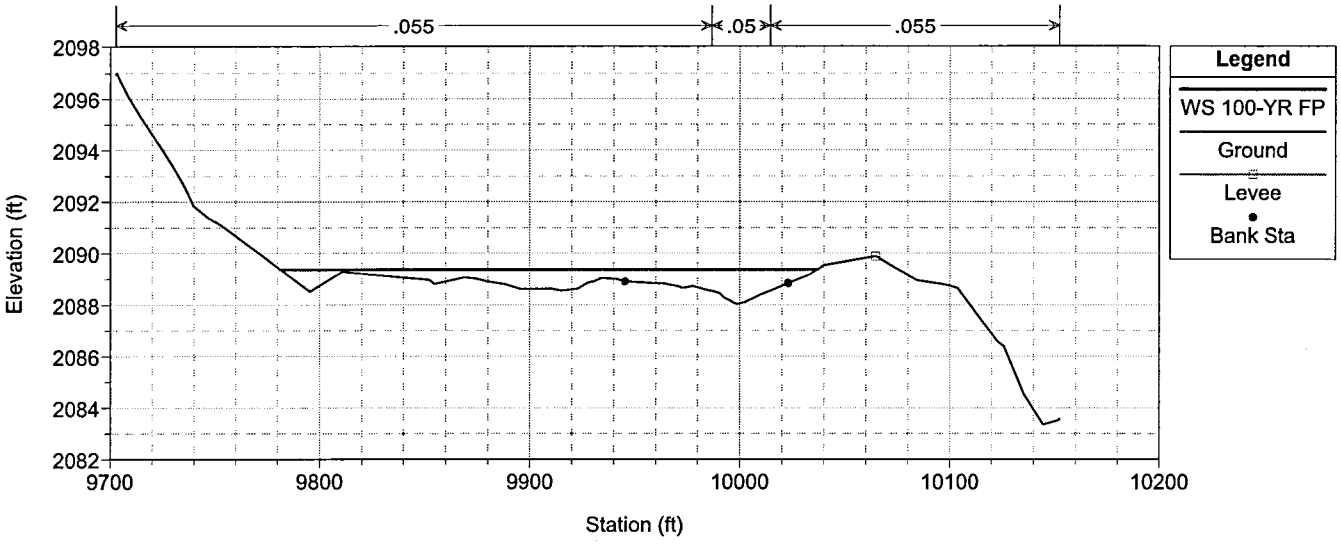
RV Wash P Plan: RV Wash P 11/1/2007

River = RV WP Reach = R3 RS = 0.084



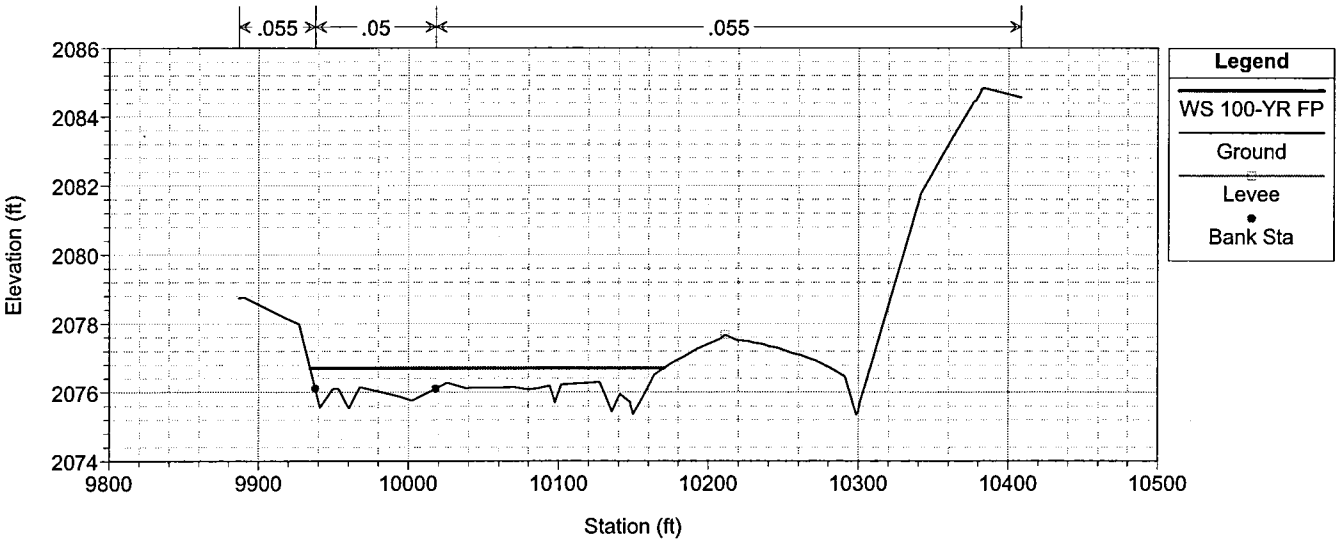
RV Wash P Plan: RV Wash P 11/1/2007

River = RV WP T1 Reach = R1 RS = 0.959



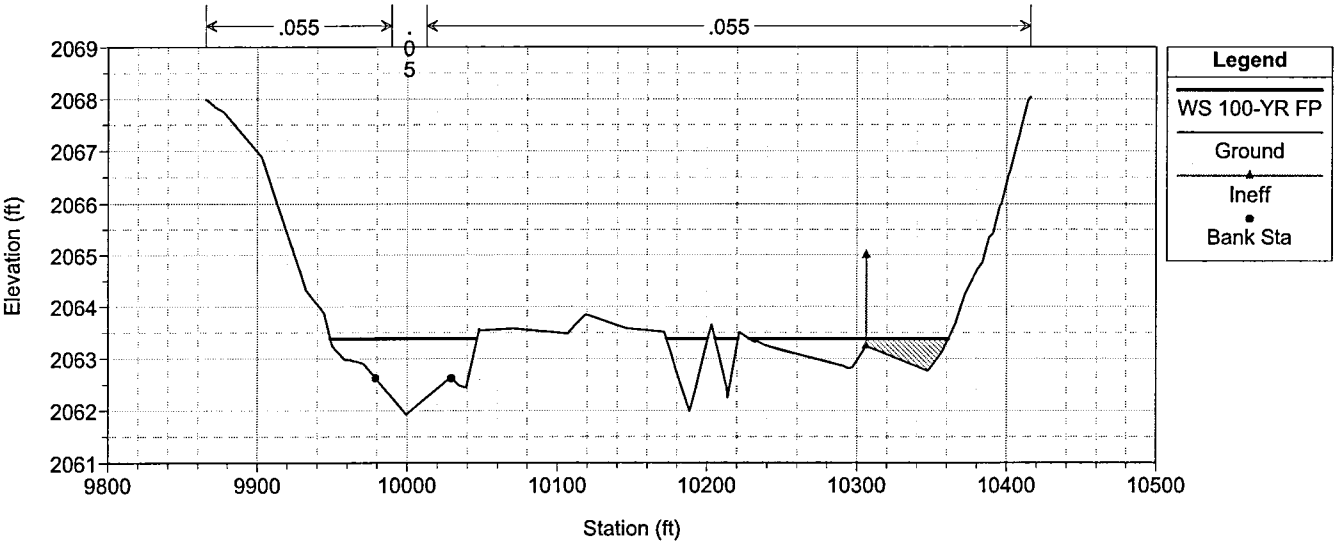
RV Wash P Plan: RV Wash P 11/1/2007

River = RV WP T1 Reach = R1 RS = 0.872



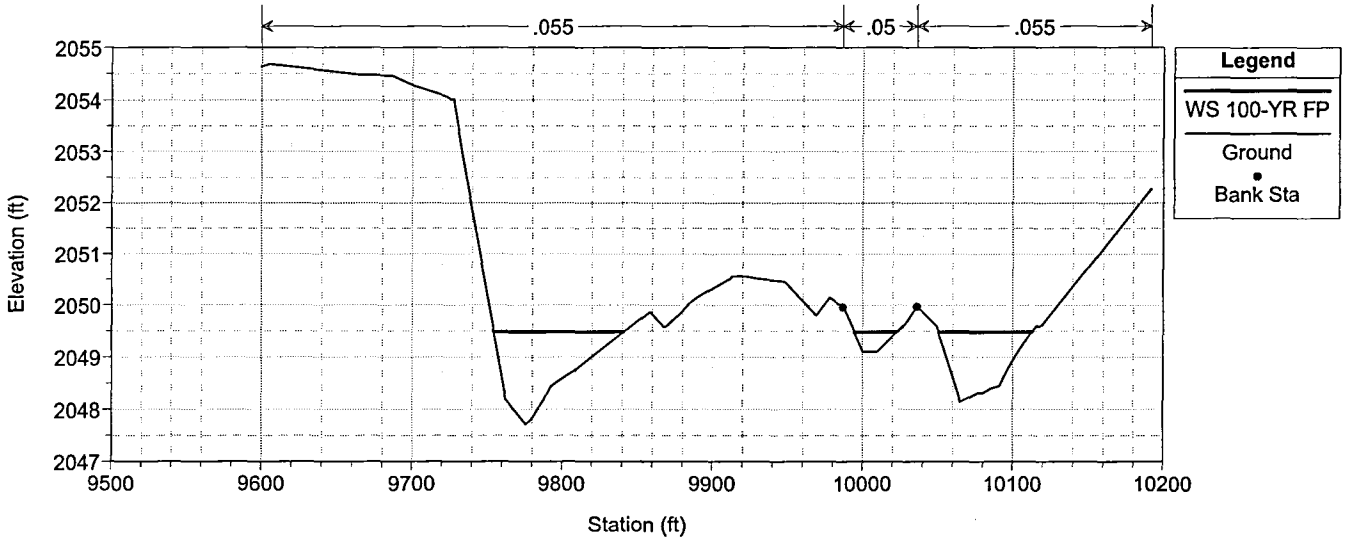
RV Wash P Plan: RV Wash P 11/1/2007

River = RV WP T1 Reach = R1 RS = 0.773



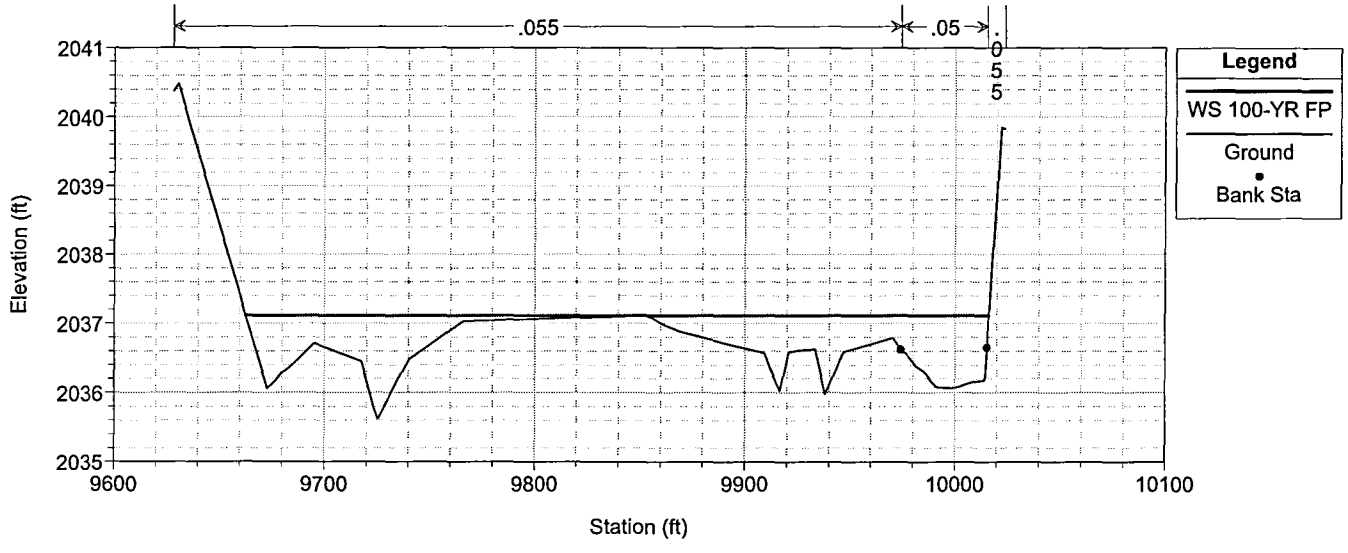
RV Wash P Plan: RV Wash P 11/1/2007

River = RV WP T1 Reach = R1 RS = 0.685



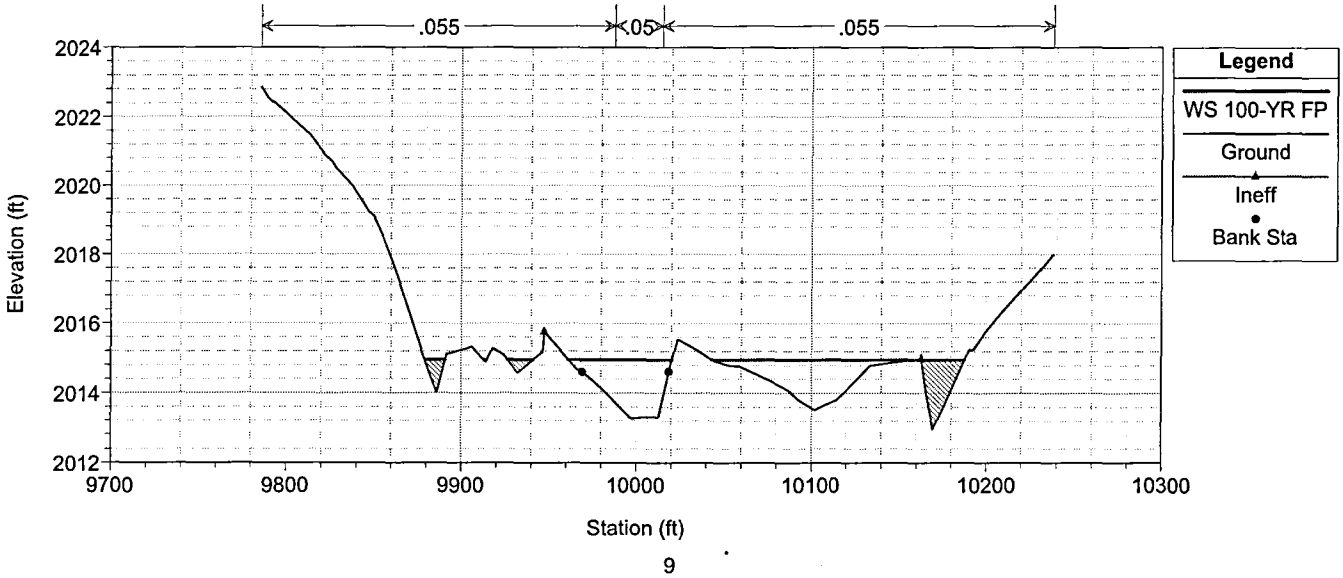
RV Wash P Plan: RV Wash P 11/1/2007

River = RV WP T1 Reach = R1 RS = 0.602



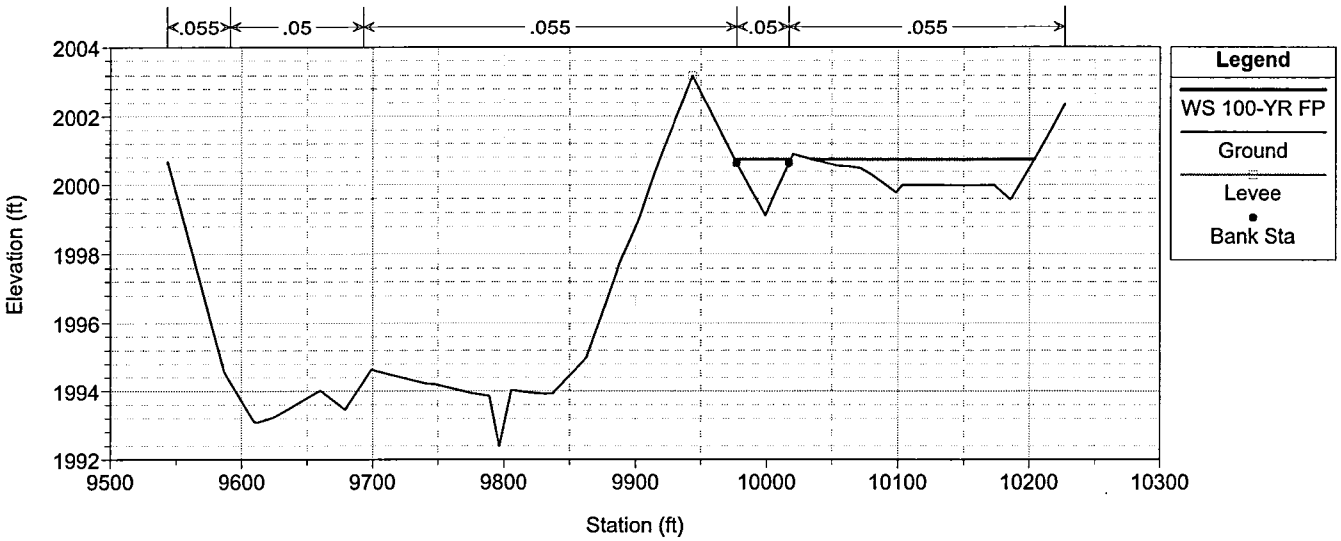
RV Wash P Plan: RV Wash P 11/1/2007

River = RV WP T1 Reach = R1 RS = 0.459



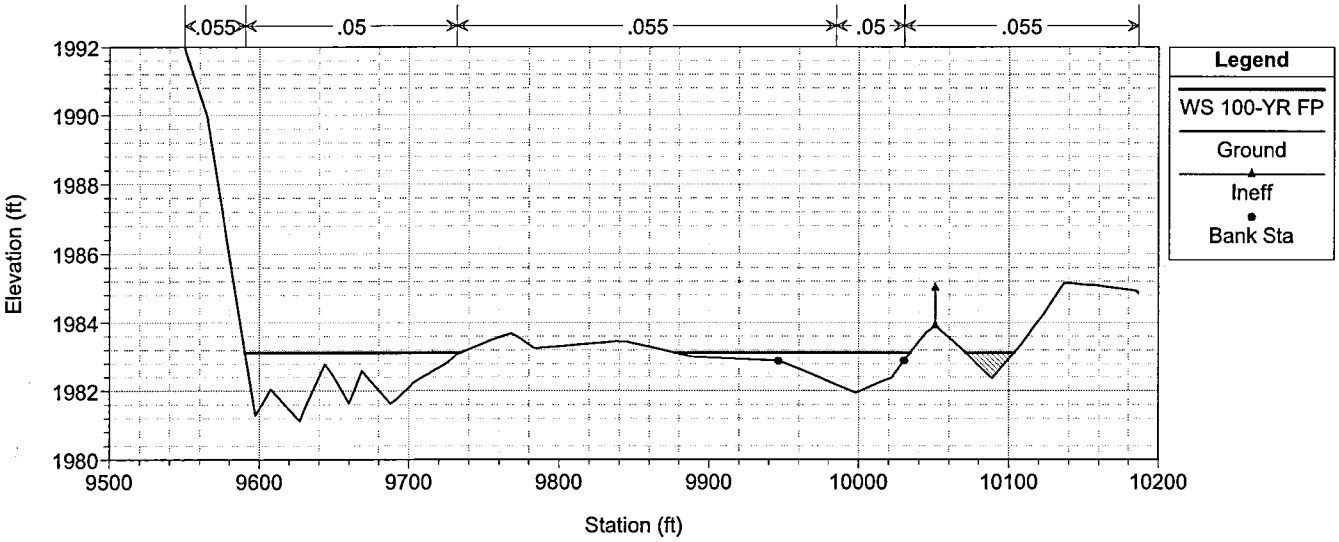
RV Wash P Plan: RV Wash P 11/1/2007

River = RV WP T1 Reach = R1 RS = 0.367



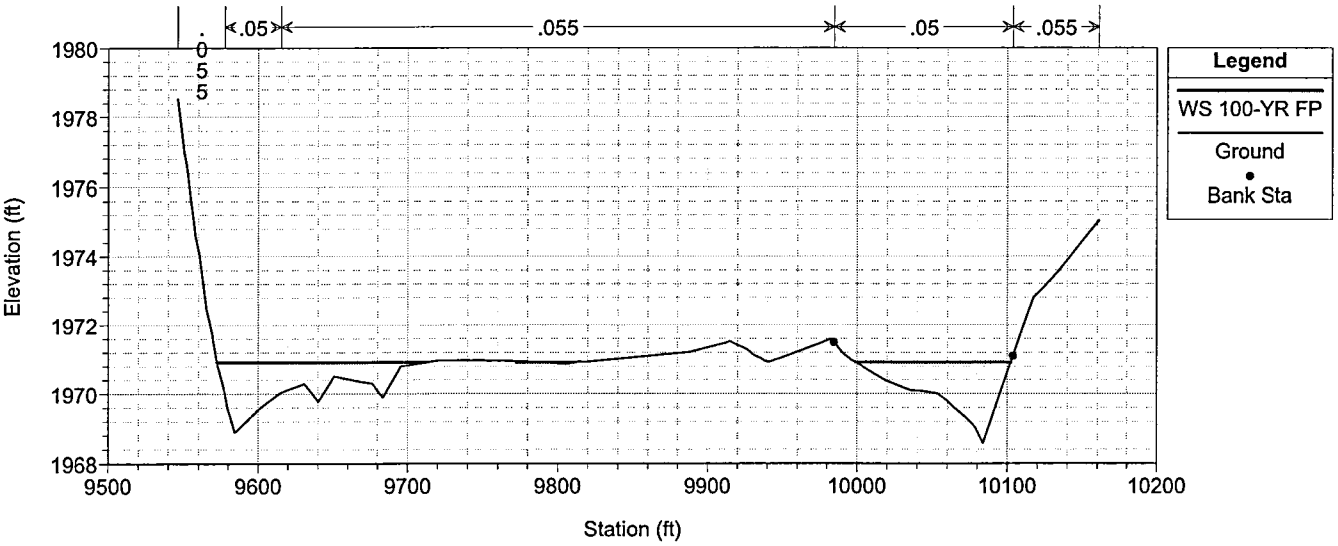
RV Wash P Plan: RV Wash P 11/1/2007

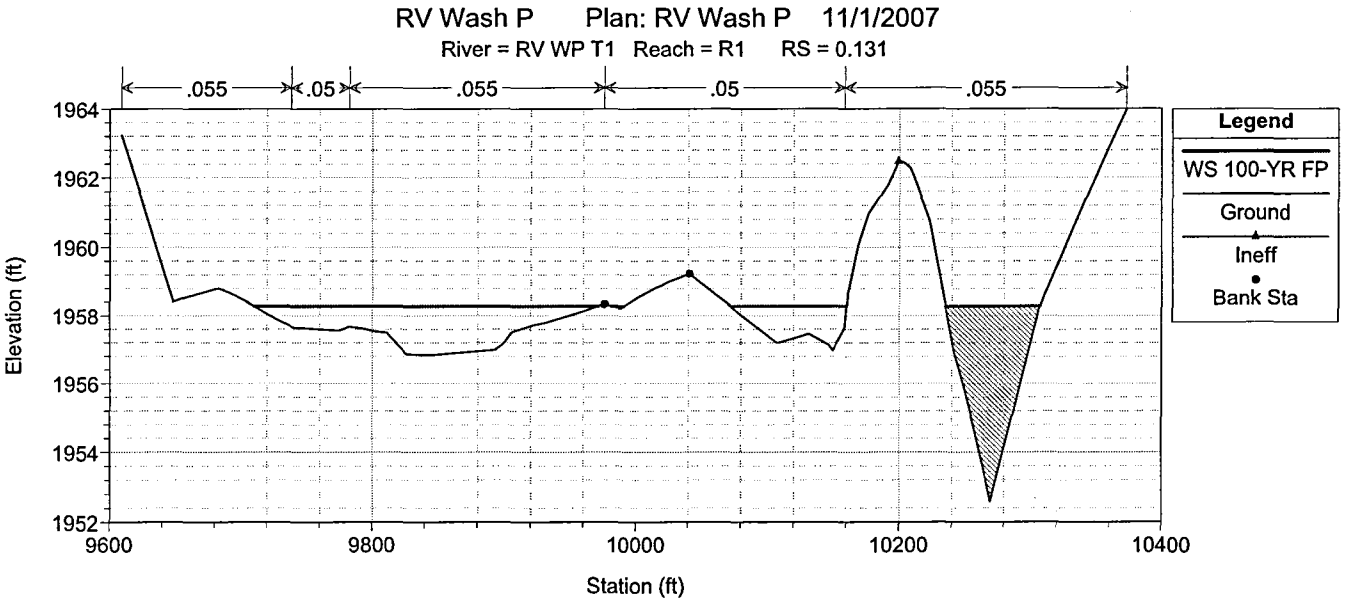
River = RV WP T1 Reach = R1 RS = 0.260

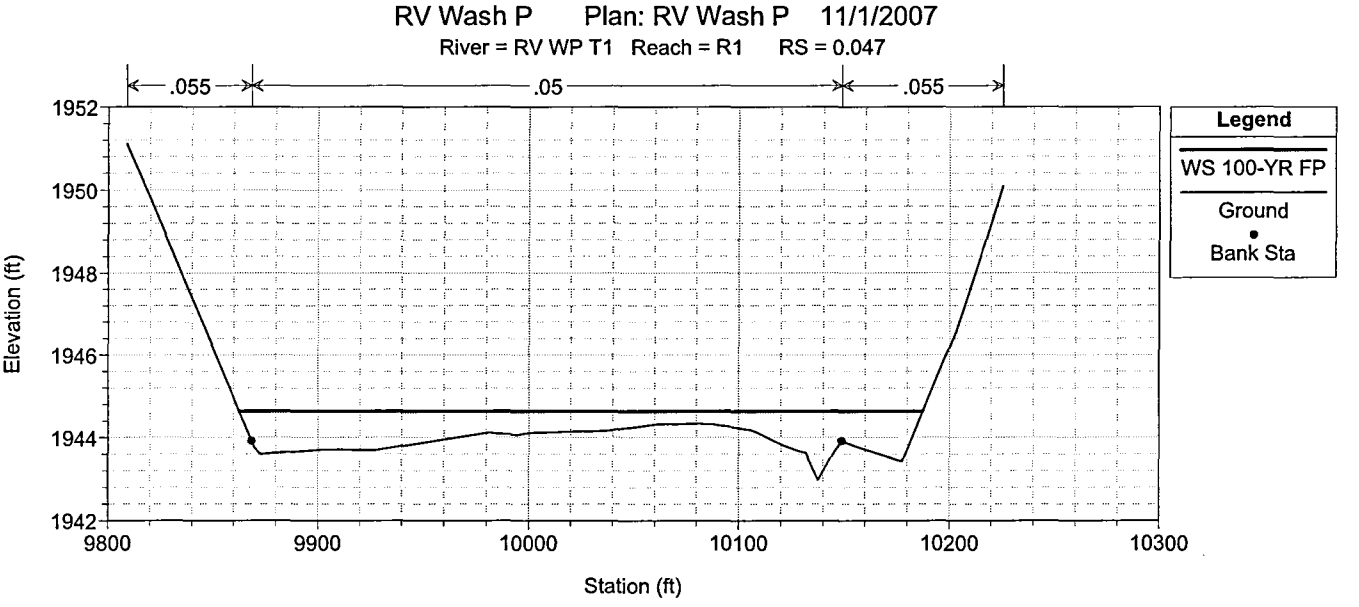


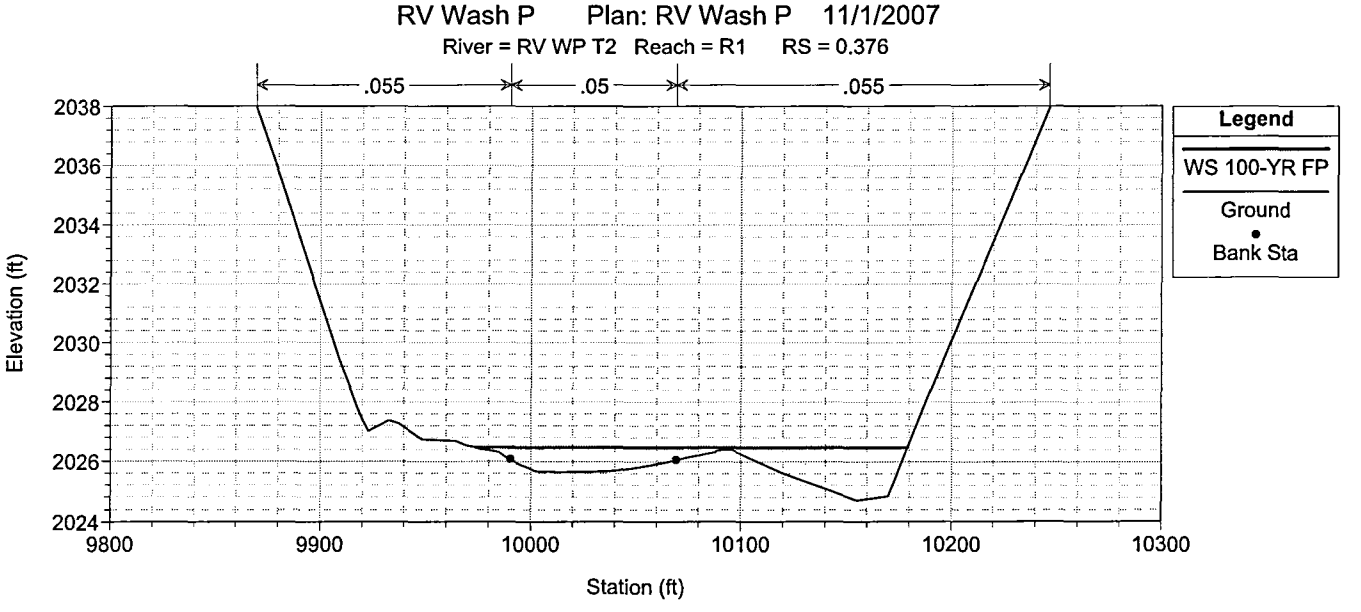
RV Wash P Plan: RV Wash P 11/1/2007

River = RV WP T1 Reach = R1 RS = 0.193



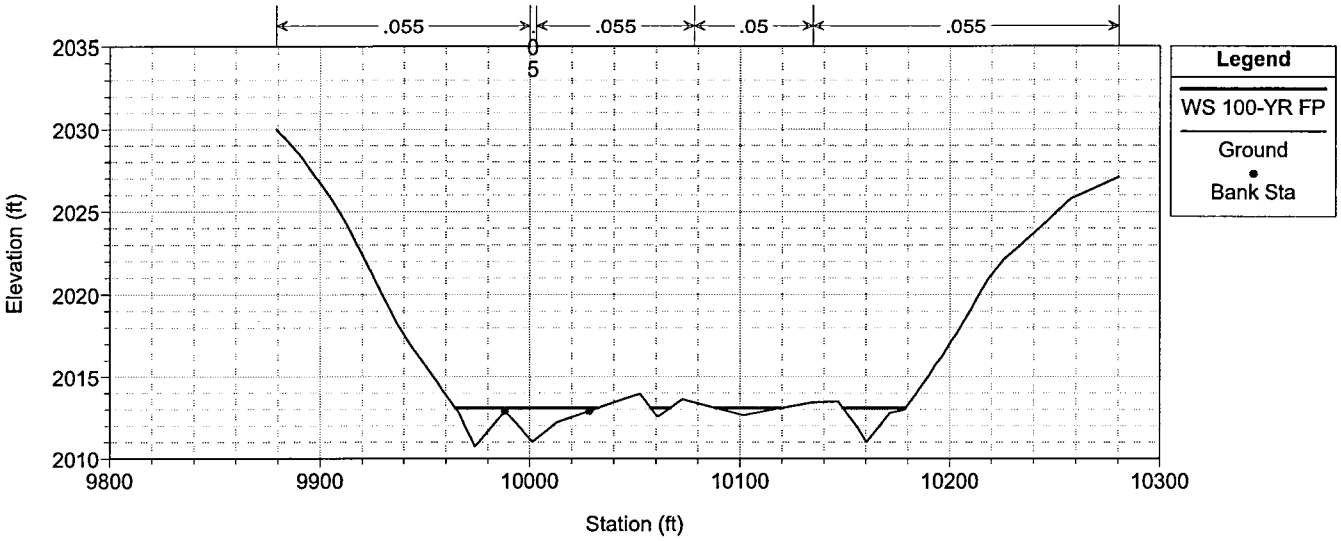

RV Wash P Plan: RV Wash P 11/1/2007
River = RV WP T1 Reach = R1 RS = 0.131
.055
.05
.055
.05
.055
Elevation (ft)
Station (ft)
Legend
WS 100-YR FP
Ground
Ineff
Bank Sta


RV Wash P Plan: RV Wash P 11/1/2007
River = RV WP T1 Reach = R1 RS = 0.047
.055
.05
.055
Elevation (ft)
Station (ft)
Legend
WS 100-YR FP
Ground
Bank Sta


RV Wash P Plan: RV Wash P 11/1/2007
River = RV WP T2 Reach = R1 RS = 0.376
.055
.05
.055
Elevation (ft)
Station (ft)
Legend
WS 100-YR FP
Ground
Bank Sta

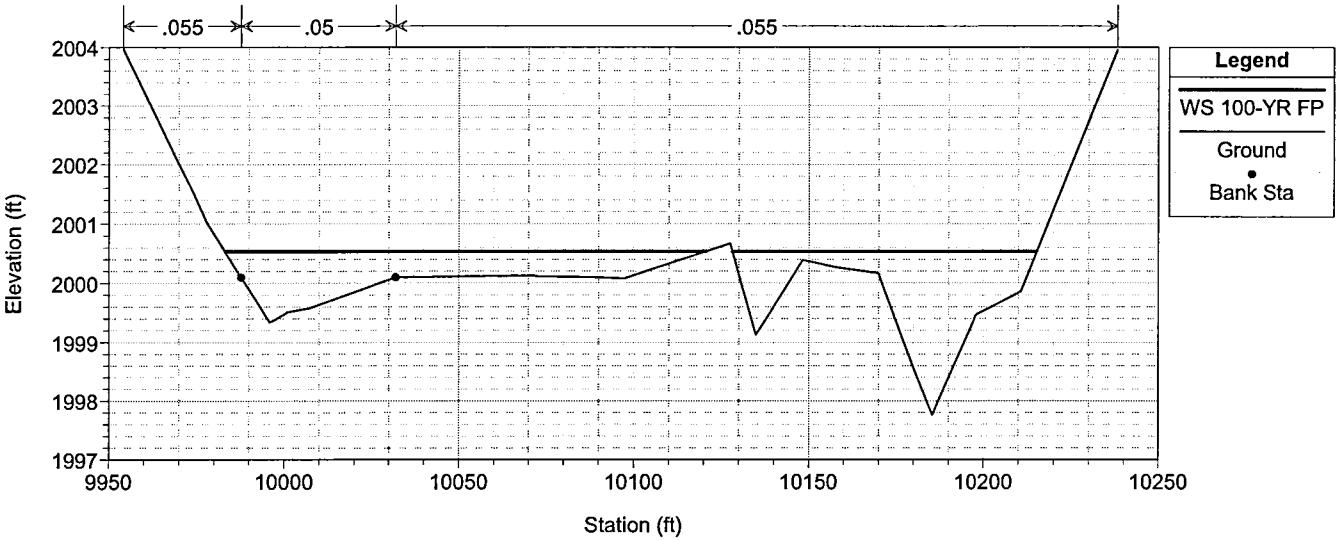
RV Wash P Plan: RV Wash P 11/1/2007

River = RV WP T2 Reach = R1 RS = 0.276



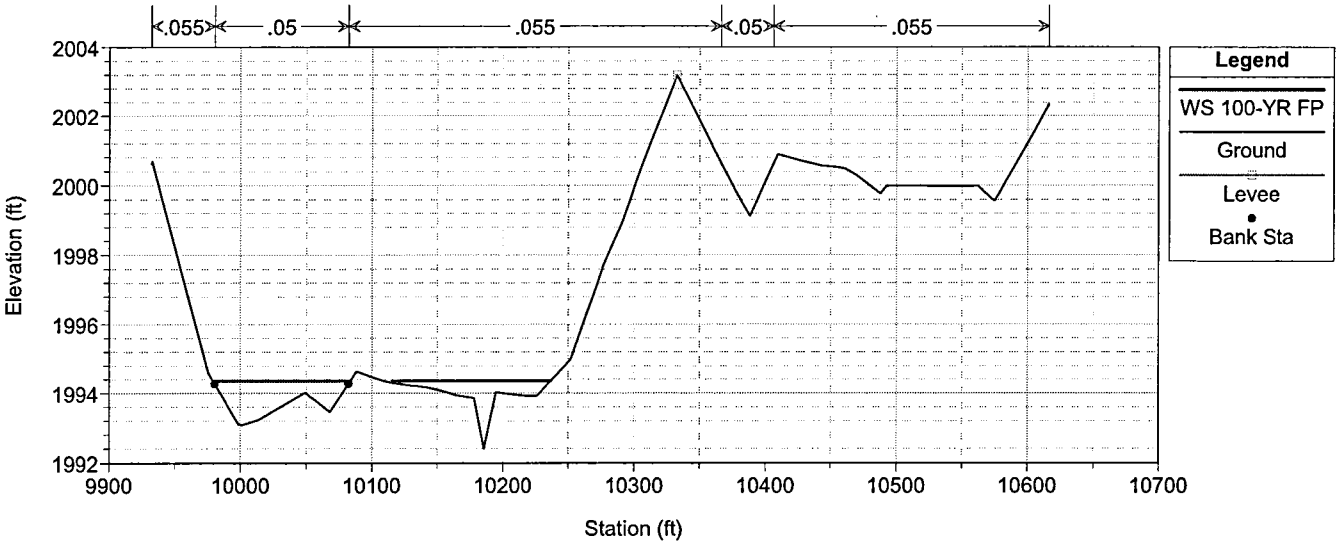
RV Wash P Plan: RV Wash P 11/1/2007

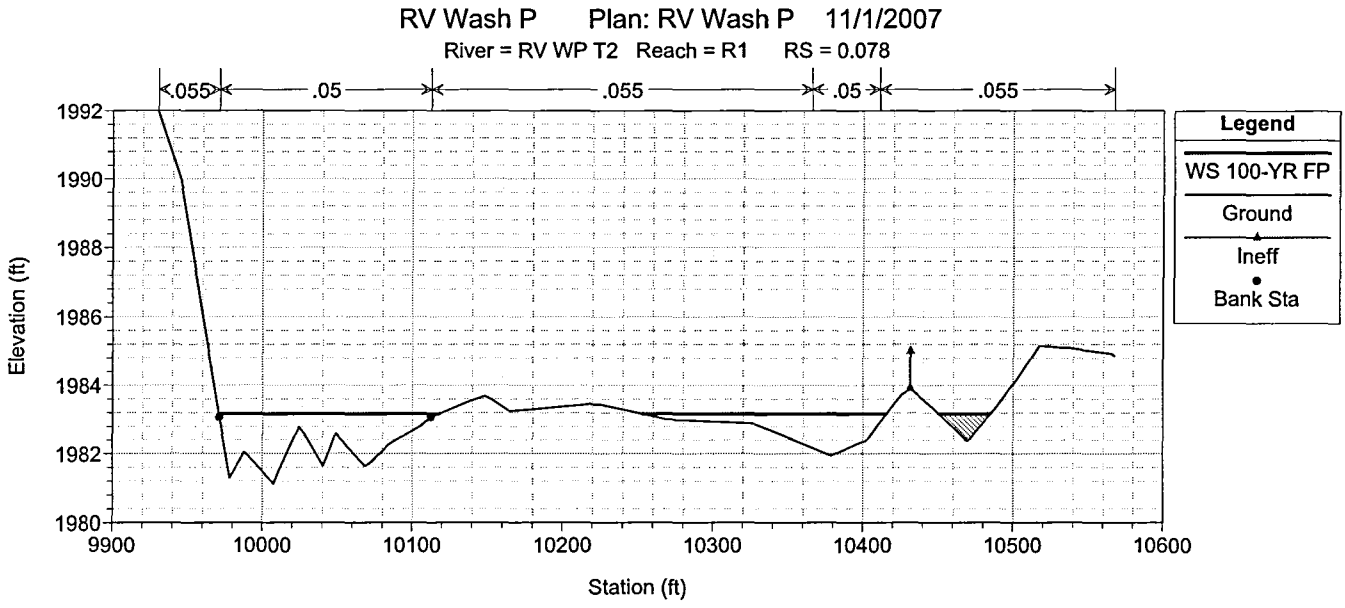
River = RV WP T2 Reach = R1 RS = 0.190



RV Wash P Plan: RV Wash P 11/1/2007

River = RV WP T2 Reach = R1 RS = 0.148




RV Wash P Plan: RV Wash P 11/1/2007
River = RV WP T2 Reach = R1 RS = 0.078
.055
.05
.055
.05
.055
Elevation (ft)
1992
1990
1988
1986
1984
1982
1980
9900
10000
10100
10200
10300
10400
10500
10600
Station (ft)
Legend
WS 100-YR FP
Ground
Ineff
Bank Sta

E.3 HEC-RAS Output

E.3.1 RV Wash 10
E.3.2 RV Wash 10 Trib 1
E.3.3 RV Wash 7
E.3.4 RV Wash A
E.3.5 RV Wash A Tank Spillway
E.3.6 RV Wash I
E.3.7 RV Wash K
E.3.8 RV Wash K Trib 11
E.3.9 RV Wash K Trib 11A
E.3.10 RV Wash K Trib 12
E.3.11 RV Wash K Trib 6
E.3.12 RV Wash K Trib 6D
E.3.13 RV Wash K Trib 6D1
E.3.14 RV Wash P

E.3.1 HEC-RAS Output

RV Wash 10

HEC-RAS Plan: RV Wash 10 Profile: 100-YR FP

River	Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
RV W10 T4	R1	0.373	100-YR FP	820.00	2574.38	2575.58	2575.52	2575.91	0.032156	5.17	180.54	400.51	1.01
RV W10 T4	R1	0.310	100-YR FP	820.00	2565.07	2567.01	2566.66	2567.30	0.020864	5.67	220.03	314.86	0.88
RV W10 T4	R1	0.222	100-YR FP	1840.00	2555.69	2559.03	2558.93	2559.58	0.015063	6.92	358.77	470.50	0.78
RV W10 T4	R1	0.145	100-YR FP	1840.00	2548.32	2550.16	2550.16	2550.67	0.034534	6.11	329.36	547.09	0.97
RV W10 T4	R1	0.034	100-YR FP	1840.00	2536.63	2538.80	2538.44	2539.00	0.011863	3.86	534.42	493.08	0.57
RV W10 T3	R1	0.615	100-YR FP	660.00	2523.23	2524.93	2524.93	2525.32	0.023686	5.27	147.80	221.90	0.85
RV W10 T3	R1	0.520	100-YR FP	660.00	2513.55	2514.78	2514.56	2514.92	0.017347	3.34	219.69	310.21	0.69
RV W10 T3	R1	0.438	100-YR FP	660.00	2504.48	2505.85	2505.78	2506.06	0.024819	4.00	187.79	300.43	0.79
RV W10 T3	R1	0.411	100-YR FP	660.00	2501.48	2502.96	2502.72	2503.15	0.016639	3.85	192.18	222.76	0.67
RV W10 T3	R1	0.357	100-YR FP	830.00	2494.83	2496.26	2496.26	2496.63	0.031161	4.95	175.12	238.56	0.90
RV W10 T3	R2	0.289	100-YR FP	830.00	2486.92	2489.39	2489.19	2489.65	0.013113	4.61	224.35	218.33	0.68
RV W10 T3	R2	0.259	100-YR FP	830.00	2483.97	2486.15	2486.15	2486.58	0.031563	6.05	163.13	189.37	1.03
RV W10 T3	R2	0.123	100-YR FP	2710.00	2470.75	2471.87	2471.87	2472.00	0.009841	2.77	922.28	883.59	0.53
RV W10 T2 S1	R1	0.138	100-YR FP	220.00	2509.33	2510.69	2510.57	2510.90	0.017302	4.03	66.72	101.07	0.72
RV W10 T2 S1	R1	0.104	100-YR FP	220.00	2505.35	2505.86	2505.86	2506.04	0.049346	2.91	65.95	180.16	1.02
RV W10 T2 S1	R1	0.068	100-YR FP	220.00	2499.97	2501.40	2501.07	2501.50	0.011116	2.61	84.25	113.44	0.53
RV W10 T2 S1	R1	0.026	100-YR FP	830.00	2494.99	2496.32	2496.25	2496.62	0.027084	4.73	190.36	241.35	0.97
RV W10 T2	R1	0.845	100-YR FP	630.00	2518.68	2521.40		2521.74	0.011874	5.10	162.41	187.41	0.69
RV W10 T2	R1	0.844	100-YR FP	630.00	2518.68	2521.28	2521.28	2521.73	0.016683	5.75	139.73	176.85	0.81
RV W10 T2	R2	0.747	100-YR FP	450.00	2509.87	2510.56	2510.41	2510.65	0.017224	2.57	191.85	401.55	0.68
RV W10 T2	R2	0.711	100-YR FP	450.00	2505.10	2505.91	2505.91	2506.08	0.034756	3.57	148.80	472.41	0.91
RV W10 T2	R2	0.684	100-YR FP	450.00	2501.55	2502.36	2502.22	2502.48	0.013708	2.96	176.47	332.75	0.64
RV W10 T2	R2	0.663	100-YR FP	450.00	2499.01	2499.98	2499.98	2500.16	0.032497	3.71	141.85	370.61	0.93
RV W10 T2	R2	0.581	100-YR FP	450.00	2489.96	2491.56	2491.00	2491.66	0.004300	2.83	190.60	151.52	0.40
RV W10 T2	R2	0.552	100-YR FP	450.00	2488.04	2489.78	2489.78	2490.27	0.026270	5.69	82.60	84.59	0.95
RV W10 T2	R2	0.465	100-YR FP	450.00	2481.50	2482.02	2481.73	2482.10	0.003443	0.97	216.55	181.01	0.26
RV W10 T2	R2	0.312	100-YR FP	420.00	2470.29	2474.51	2474.51	2475.70	0.037325	8.73	48.13	20.65	1.01
RV W10 T2	R2	0.193	100-YR FP	420.00	2449.93	2453.36		2453.84	0.013017	5.56	75.51	33.55	0.65
RV W10 T2	R2	0.143	100-YR FP	420.00	2444.51	2447.76	2447.76	2448.75	0.031052	8.01	52.41	26.93	1.01
RV W10 T2	R2	0.072	100-YR FP	3150.00	2437.85	2440.76	2440.33	2441.03	0.013277	4.77	786.50	708.09	0.63
RV W10	R1	9.689	100-YR FP	620.00	2623.58	2625.39	2625.26	2625.65	0.020846	4.78	167.12	217.81	0.79
RV W10	R1	9.564	100-YR FP	620.00	2612.55	2613.24	2613.06	2613.36	0.019030	2.66	219.91	345.31	0.64
RV W10	R1	9.429	100-YR FP	870.00	2596.47	2598.14	2598.06	2598.43	0.022494	4.79	220.89	279.65	0.77
RV W10	R1	9.252	100-YR FP	870.00	2578.51	2581.70	2581.70	2582.05	0.014277	5.99	236.71	267.80	0.69
RV W10	R1	9.176	100-YR FP	870.00	2571.49	2573.44	2573.32	2573.91	0.016111	6.08	177.56	189.49	0.81
RV W10	R1	9.175		Lat Struct									
RV W10	R1	9.104	100-YR FP	870.00	2564.05	2566.75	2566.74	2567.25	0.020951	7.04	171.39	291.41	0.92
RV W10	R1	9.103		Lat Struct									
RV W10	R1	9.012	100-YR FP	703.00	2553.74	2557.13	2557.03	2557.82	0.017628	6.71	109.15	120.19	0.88
RV W10	R1	9.011		Lat Struct									
RV W10	R1	8.937	100-YR FP	346.00	2547.34	2549.31	2549.31	2549.81	0.027451	5.67	61.01	62.00	1.01
RV W10	R1	8.936		Lat Struct									
RV W10	R1	8.826	100-YR FP	143.00	2537.68	2539.93		2539.98	0.001757	1.90	75.24	47.17	0.27
RV W10	R2	8.740	100-YR FP	1890.00	2529.51	2530.87	2530.73	2531.31	0.027806	5.46	357.24	287.75	0.87
RV W10	R2	8.586	100-YR FP	1890.00	2512.55	2515.78	2515.66	2516.05	0.013482	5.56	546.05	581.97	0.64
RV W10	R2	8.467	100-YR FP	1890.00	2500.54	2502.34	2502.29	2502.80	0.034640	6.23	354.05	352.78	0.96
RV W10	R2	8.354	100-YR FP	1890.00	2489.27	2492.05	2491.77	2492.25	0.011774	4.55	582.62	606.56	0.60
RV W10	R2	8.134	100-YR FP	2710.00	2470.09	2471.50	2471.39	2471.88	0.024310	5.34	561.27	504.28	0.87
RV W10	R3	7.984	100-YR FP	2710.00	2455.03	2458.53	2458.53	2459.04	0.011607	7.10	638.56	613.76	0.73
RV W10	R3	7.886	100-YR FP	2710.00	2447.14	2449.45	2449.45	2449.85	0.021060	7.78	636.72	649.66	0.95
RV W10	R3	7.784	100-YR FP	3150.00	2437.74	2440.81	2440.32	2441.09	0.011085	5.22	821.30	724.73	0.62
RV W10	R4	7.678	100-YR FP	3150.00	2428.26	2431.62	2431.62	2432.09	0.025227	8.29	640.78	576.24	0.94
RV W10	R4	7.611	100-YR FP	3150.00	2423.86	2426.94		2427.13	0.007078	4.83	986.82	660.17	0.54
RV W10	R4	7.596	100-YR FP	3150.00	2419.72	2425.00	2425.00	2426.20	0.016964	10.71	476.97	415.57	0.99
RV W10	R4	7.541	100-YR FP	3150.00	2414.08	2419.90	2419.90	2420.65	0.009800	8.75	602.33	614.58	0.88
RV W10	R4	7.491	100-YR FP	3150.00	2410.28	2415.26	2415.26	2416.06	0.016281	8.80	490.36	421.93	0.87
RV W10	R4	7.450	100-YR FP	3150.00	2407.15	2411.74	2411.74	2412.57	0.009196	8.31	551.50	534.16	0.77
RV W10	R4	7.382	100-YR FP	3150.00	2402.43	2405.69	2405.69	2406.37	0.013581	9.29	594.69	526.56	0.98
RV W10	R4	7.331	100-YR FP	3150.00	2398.01	2401.24	2400.88	2401.87	0.016787	9.38	585.87	489.39	1.06
RV W10	R4	7.283	100-YR FP	3150.00	2394.14	2397.37	2397.37	2398.22	0.012738	10.19	520.31	392.48	1.02
RV W10	R4	7.240	100-YR FP	3150.00	2391.21	2393.49	2393.19	2394.20	0.020634	9.80	540.27	398.75	1.21
RV W10	R4	7.215	100-YR FP	3150.00	2388.61	2390.90	2390.90	2391.45	0.019912	9.44	604.94	491.30	1.18
RV W10	R4	7.193	100-YR FP	3150.00	2386.89	2389.66		2389.87	0.004310	4.23	914.63	434.15	0.48
RV W10	R4	7.174	100-YR FP	3150.00	2385.44	2388.15	2388.15	2388.99	0.021236	8.38	499.18	388.49	0.95
RV W10	R4	7.155	100-YR FP	3150.00	2382.96	2386.08	2386.08	2386.62	0.016646	7.58	617.48	482.45	0.87
RV W10	R4	7.076	100-YR FP	3150.00	2375.87	2378.36	2378.27	2378.83	0.018235	7.41	617.55	646.63	0.91
RV W10	R4	6.982	100-YR FP	3150.00	2366.12	2369.15		2369.65	0.018458	7.96	618.27	483.77	0.92
RV W10	R4	6.977	100-YR FP	3150.00	2365.81	2368.92		2369.22	0.012429	6.19	752.45	477.51	0.66
RV W10	R4	6.849	100-YR FP	3150.00	2354.06	2355.83	2355.83	2356.33	0.032528	7.25	581.37	534.78	1.06
RV W10	R4	6.697	100-YR FP	3150.00	2342.24	2344.66	2343.38	2344.80	0.003778	2.58	1059.71	462.10	0.35

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


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

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

PROJECT DATA
Project Title: RV Wash 10
Project File : RV_Wash_10.prj
Run Date and Time: 11/1/2007 10:05:15 AM

Project in English units

Project Description:
Rio Verde ADMP, Project FCDMC 2001C056, river system including RV Wash 10, RV
Wash 10 Trib 2, RV Wash 10 Trib 2 Split 1, RV Wash 10 Trib 3, and RV Wash 10
Trib 4. Phase 3 RAS model started in May 2005, preliminary model completed in
June 2005.

RAS model is prepared by Dibble Engineering. Field reconnaissance
per report dated April 18, 2005.

For the study washes, the starting water
surface elevation is on RV Wash 10, and is taken from the starting water
surface elevation as provided by the Flood Control District of Maricopa
County.

RV Wash 10 Floodplain Delineation
From a point approximately 2,350
feet south and 350 feet east of the intersection of 144th Street and Rio Verde
Drive (River Mile 6.697) to a point approximately 1,800 feet north and 2,300
feet east of the intersection of 128th Street and Rio Verde Drive (River Mile
9.689), a distance of 2.992 river miles.

RV Wash 10 Trib 2 Floodplain
Delineation
From the confluence with RV Wash 10 (River Mile 0.000,
approximately 3,000 feet south and 900 feet east of the intersection of 136th
Street and Rio Verde Drive) to a point approximately 2,800 feet south and 50
feet west of the intersection of 132nd Street and Rio Verde Drive (River Mile
0.844), a distance of 0.844 river miles.

RV Wash 10 Trib 2 Split 1
Floodplain Delineation
From the confluence with RV Wash 10 Trib 3 (River Mile
0.000, approximately 2,300 feet south and 1,100 feet east of the intersection
of 132nd Street and Rio Verde Drive) to the divergence with RV Wash 10 Trib 2
(River Mile 0.187, approximately 2,700 feet south and 200 feet east of the
intersection of 132nd Street and Rio Verde Drive, a distance of 0.187 river
miles.

RV Wash 10 Trib 3 Floodplain Delineation
From the confluence with RV
Wash 10 (River Mile 0.000, approximately 1,900 feet south and 100 feet west of
the intersection of 136th Street and Rio Verde Drive) to a point approximately
1,900 feet south and 400 feet west of the intersection of 132nd Street and Rio
Verde Drive (River Mile 0.615), a distance of 0.615 river miles.

RV Wash 10
Trib 4 Floodplain Delineation
From the confluence with RV Wash 10 (River Mile
0.000, approximately 50 feet south and 800 feet west of the intersection of
132nd Street and Rio Verde Drive) to a point approximately 50 feet south and
200 feet west of the intersection of 128th Street and Rio Verde Drive (River
Mile 0.373), a distance of 0.373 river miles.

A lateral weir is modeled at
RM's 2.702, 2.627, & 2.516 to allow water to flow over Rio Verde Drive to RV
Wash 10 Trib 4. The methodology is as follows:

1) Model RV Wash 10 Trib 4
with the combined flow of the two watersheds and with cross sections that
extend north over Rio Verde Drive. The area north of Rio Verde Drive will be
modeled as ineffective.
2) Model RV Wash 10 with only the flow of its
contributing watershed (before combining with RV Wash 10 Trib 4 watershed) and
with a lateral weir at Rio Verde Drive.
3) The wider of the floodplains from
the two models will be used for the floodplain boundary north of Rio Verde
Drive; and RV Wash 10 Trib 4 model will be used for the floodplain boundary
south of Rio Verde Drive.

Topographic mapping is supplied by the Flood
Control District of Maricopa County.

The Cross-section data were generated
by INROADS, based on the DTM data. The mapped hydraulic base line represents
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the 10,000-station point of the HEC-RAS model.

Discharge data is from the
Rio Verde ADMP HEC-1 model. The original models are from the Flood Control District of Maricopa County, prepared for the Rio Verde South Floodplain Delineation, the Rio Verde South Extension Floodplain Delineation, the Rio Verde North Floodplain Delineation, and the Rio Verde North Extension Floodplain Delineation. The HEC-1 models were modified for the Rio Verde ADMP. The final HEC-1 files were reviewed in February 2004 and FCDMC approved the hydrology model.

Hydrologic concentration points are noted in cross-section descriptions using the corresponding HEC-1 ID's. The flow rates have been rounded to the nearest 10 cubic feet per second (cfs). Flow rates obtained from HEC-1 are applied at the downstream end of the relevant sub-basin and stepped upstream at cross-sections to meet the HEC-1 flow from the upstream sub-basin.

River Mile (RM) stationing is based upon the estimated tie in point with downstream receiving waters or the start of two-dimensional flow models. This point represents RM 0.000. The assumed starting WS Elevation is based upon normal depth in the study wash.

Horizontal and Vertical
Coordinate Basis for this project is as follows:
Horizontal--Arizona State
Plane, Central Region, NAD 1983
Vertical--NAVD 1988

RAS model river naming
corresponds to project river naming as follows:
RV W10 = RV Wash 10
RV W10
T2 = RV Wash 10 Trib 2
RV W10 T2 S1 = RV Wash 10 Trib 2 Split 1
RV W10 T3 =
RV Wash 10 Trib 3
RV W10 T4 = RV Wash 10 Trib 4

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PLAN DATA

Plan Title: RV Wash 10
Plan File : j:\2006\10-0606.1\Design Notebook\Drainage Design\HEC-RAS\RV_Wash_10.p01

Geometry Title: RV Wash 10
Geometry File : j:\2006\10-0606.1\Design Notebook\Drainage Design\HEC-RAS\RV_Wash_10.g01

Flow Title : RV Wash 10
Flow File : j:\2006\10-0606.1\Design Notebook\Drainage Design\HEC-RAS\RV_Wash_10.f01

Plan Summary Information:

Number of:	Cross Sections =	66	Multiple Openings =	0
	Culverts =	0	Inline Structures =	0
	Bridges =	0	Lateral Structures =	4

Computational Information
Water surface calculation tolerance = 0.01
Critical depth calculation tolerance = 0.01
Maximum number of iterations = 20
Maximum difference tolerance = 0.3
Flow tolerance factor = 0.001

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

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

River = RV W10 Reach = R2

RS	Profile	Method	Value1	Value2
8.740	PF 2	1	9996.0510135.78	
8.586	PF 2	1	996410069.34	
8.467	PF 2	1	9992.1910302.12	
8.354	PF 2	1	9972.8810256.04	
8.134	PF 2	1	9959.7210116.12	

River = RV W10 Reach = R3

RS	Profile	Method	Value1	Value2
7.984	PF 2	1	9974.0610191.62	
7.886	PF 2	1	9981.9810175.83	
7.784	PF 2	1	9846.9710122.58	

River = RV W10 Reach = R4

RS	Profile	Method	Value1	Value2
7.678	PF 2	1	9790.5410019.26	
7.611	PF 2	1	9833.510037.63	
7.596	PF 2	1	9915.8210020.89	
7.541	PF 2	1	9878.3210027.05	
7.491	PF 2	1	9888.2	10024.5
7.450	PF 2	1	9945.21	10028
7.382	PF 2	1	9886.1610056.78	
7.331	PF 2	1	9882.910020.24	

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7.283   PF 2                  1 9898.9210030.08
7.240   PF 2                  1 9873.5510022.12
7.215   PF 2                  1 9823.63 10017.3
7.193   PF 2                  1 9852.4810074.02
7.174   PF 2                  1    990010124.35
7.155   PF 2                  1 9949.5310122.47
7.076   PF 2                  1 9938.9810130.47
6.982   PF 2                  1 9959.8310136.72
6.977   PF 2                  1 9980.3510160.98
6.849   PF 2                  1    9950 10184.3
6.697   PF 2                  1 9680.8210022.05
6.483   PF 2                  1 9953.2710021.14

River = RV W10          Reach = R5
RS      Profile          Method  Value1  Value2
6.310   PF 2                  1 9979.0910021.99
6.308   PF 2                  1 9979.1810021.67
6.306   PF 2                  1 9979.2710021.76

River = RV W10 T4       Reach = R1
RS      Profile          Method  Value1  Value2
0.373   PF 2                  1 9980.4310071.23
0.310   PF 2                  1  9985.810110.22
0.222   PF 2                  1  9981.510070.71
0.145   PF 2                  1 9969.3910164.27
0.034   PF 2                  1 9973.3210215.06

River = RV W10 T1       Reach = R1
RS      Profile          Method  Value1  Value2
1.204   PF 2                  1 9777.4910009.86
1.197   PF 2                  1 9792.83 10007.9
1.187   PF 2                  1 9810.1810013.97
1.145   PF 2                  1 9978.7810012.59
1.123   PF 2                  1 9962.2610022.52
1.104   PF 2                  1 9974.9910023.41
1.096   PF 2                  1 9971.0210015.44
1.058   PF 2                  1 9982.27 10014.9
1.007   PF 2                  1 9984.1910029.44
0.991   PF 2                  1 9983.9210050.96
0.918   PF 2                  1 9977.1710012.93
0.873   PF 2                  1 9966.78   10007
0.839   PF 2                  1 9981.2510020.87
0.809   PF 2                  1 9970.6610014.43
0.787   PF 2                  1  9982.610066.22
0.767   PF 2                  1 9969.11   10024
0.748   PF 2                  1 9973.0110048.01
0.722   PF 2                  1 9957.3710022.15
0.698   PF 2                  1 9952.8310014.89
0.679   PF 2                  1 9950.36 10024.8
0.654   PF 2                  1 9941.9810016.82
0.622   PF 2                  1 9971.2810031.28
0.565   PF 2                  1 9969.7610030.25
0.545   PF 2                  1 9949.4710048.81
0.532   PF 2                  1 9942.4710027.92
0.494   PF 2                  1 9908.1810046.55
0.474   PF 2                  1  9923.410008.41
0.351   PF 2                  1 9919.8210012.45
0.288   PF 2                  1 9920.6410012.47
0.193   PF 2                  1  9987.810087.64
0.130   PF 2                  1 9946.87   10062

River = RV W10 T2       Reach = R1
RS      Profile          Method  Value1  Value2
0.845   PF 2                  1 9978.8610038.85
0.844   PF 2                  1 9978.8610038.85

River = RV W10 T2       Reach = R2
RS      Profile          Method  Value1  Value2
0.747   PF 2                  1 9974.76   10110
0.711   PF 2                  1 9957.0710152.61
0.684   PF 2                  1 9936.6910121.54
0.663   PF 2                  1 9959.7510150.99
0.581   PF 2                  1 9950.8110018.08
0.552   PF 2                  1 9955.4510040.04
0.465   PF 2                  1 9973.0710075.53
0.312   PF 2                  1 9987.65 10008.3
0.193   PF 2                  1 9976.2110009.77
0.143   PF 2                  1 9985.7310012.65
0.072   PF 2                  1 9700.3110007.87

River = RV W10 T2 S1    Reach = R1
RS      Profile          Method  Value1  Value2
0.138   PF 2                  1 9989.1110031.77
0.104   PF 2                  1 9945.45 10032.9
0.068   PF 2                  1 9949.7910063.23
0.026   PF 2                  1 9841.72 10035.8

River = RV W10 T3       Reach = R1
RS      Profile          Method  Value1  Value2
0.615   PF 2                  1 9954.9610050.23
0.520   PF 2                  1 9951.8410100.43
0.438   PF 2                  1 9919.2410082.12
0.411   PF 2                  1 9934.7710050.49
0.357   PF 2                  1 9922.25 10114.7

River = RV W10 T3       Reach = R2
RS      Profile          Method  Value1  Value2
0.289   PF 2                  1 9954.4910040.92
0.259   PF 2                  1 9954.0610030.21
0.123   PF 2                  1    9962   10084
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*****************************************************************************

FLOW DATA

Flow Title: RV Wash 10
Flow File : j:\2006\10-0606.1\Design Notebook\Drainage Design\HEC-RAS\RV_Wash_10.f01

Flow Data (cfs)
*************************************************************
* River          Reach          RS      *       100-YR FP *
* RV W10         R1             9.689   *             620 *
* RV W10         R1             9.429   *             870 *
* RV W10         R1             9.012   *             703 *
* RV W10         R1             8.937   *             346 *
* RV W10         R1             8.826   *             143 *
* RV W10         R2             8.740   *            1890 *
* RV W10         R2             8.134   *            2710 *
* RV W10         R3             7.984   *            2710 *
* RV W10         R3             7.784   *            3150 *
* RV W10         R4             7.678   *            3150 *
* RV W10 T2      R1             0.845   *             630 *
* RV W10 T2      R2             0.747   *             450 *
* RV W10 T2      R2             0.312   *             420 *
* RV W10 T2      R2             0.072   *            3150 *
* RV W10 T2 S1   R1             0.138   *             220 *
* RV W10 T2 S1   R1             0.026   *             830 *
* RV W10 T3      R1             0.615   *             660 *
* RV W10 T3      R1             0.357   *             830 *
* RV W10 T3      R2             0.289   *             830 *
* RV W10 T3      R2             0.123   *            2710 *
* RV W10 T4      R1             0.373   *             820 *
* RV W10 T4      R1             0.222   *            1840 *
*************************************************************

Boundary Conditions
*****************************************************************************************************
* River          Reach          Profile          *          Upstream                Downstream    *
*****************************************************************************************************
* RV W10         R4             100-YR FP        *                                Known WS = 2344.66 *
*****************************************************************************************************

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

GEOMETRY DATA

Geometry Title: RV Wash 10
Geometry File : j:\2006\10-0606.1\Design Notebook\Drainage Design\HEC-RAS\RV_Wash_10.g01

Reach Connection Table
*******************************************************************************
* River          Reach          *  Upstream Boundary  * Downstream Boundary *
*******************************************************************************
* RV W10         R1             *                     *   J1                *
* RV W10         R2             *   J1                *   J2                *
* RV W10         R3             *   J2                *   J3                *
* RV W10         R4             *   J3                *                     *
* RV W10 T2      R1             *                     *   J4                *
* RV W10 T2      R2             *   J4                *   J3                *
* RV W10 T2 S1   R1             *   J4                *   J5                *
* RV W10 T3      R1             *                     *   J5                *
* RV W10 T3      R2             *   J5                *   J2                *
* RV W10 T4      R1             *                     *   J1                *
*******************************************************************************

JUNCTION INFORMATION

Name: J1
Description: 11F South and 11F Confluence
Energy computation Method

    Length across Junction            Tributary
     River          Reach              River          Reach        Length   Angle
RV W10 T4      R1              to RV W10         R2               439.47
RV W10         R1              to RV W10         R2               454.04

Name: J2
Description: 11E North and 11F Confluence
Energy computation Method

    Length across Junction            Tributary
     River          Reach              River          Reach        Length   Angle
RV W10         R2              to RV W10         R3               790.37
RV W10 T3      R2              to RV W10         R3               777.83

Name: J3
Description: 11E South and 11F Confluence
Energy computation Method

    Length across Junction            Tributary
     River          Reach              River          Reach        Length   Angle
RV W10         R3              to RV W10         R4               560.09
RV W10 T2      R2              to RV W10         R4               499.74       0

Name: J4
Description: 11E South and 11E Split Divergence
Energy computation Method

    Length across Junction            Tributary
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     River           Reach              River           Reach        Length   Angle
RV W10 T2       R1               to RV W10 T2       R2                509.07
RV W10 T2       R1               to RV W10 T2 S1    R1                 513.4

Name: J5
Description: 11E Split and 11E North Confluence
Energy computation Method

    Length across Junction             Tributary
     River           Reach              River           Reach        Length   Angle
RV W10 T3       R1               to RV W10 T3       R2                359.79
RV W10 T2 S1    R1               to RV W10 T3       R2                381.47

CROSS SECTION


RIVER: RV W10
REACH: R1                 RS: 9.689

INPUT
Description: Q=620 cfs (511B1, 24 hr)
Station Elevation Data    num=      44
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
 9697.61  2635.9 9717.31 2630.11 9747.44 2627.22 9751.83 2626.68 9753.98 2626.57
 9756.04 2626.56 9786.68  2625.4 9793.66 2625.41 9798.84  2625.4 9829.44 2625.19
 9831.41 2625.16 9835.65    2625 9839.85 2624.83 9841.54 2624.76 9842.25 2624.77
 9845.97 2624.79 9855.12 2624.88  9855.8 2624.87 9858.63 2624.76 9864.38 2624.53
 9867.93 2624.59 9877.91 2624.67 9882.21 2624.69 9894.13 2624.53 9897.27 2624.44
 9898.95 2624.39 9903.65 2624.45 9905.58 2624.48 9929.36  2624.7 9936.99 2624.66
 9939.65 2624.65 9945.78 2624.61 9948.86 2624.61 9983.03 2624.12  9988.6 2624.01
 9999.73 2623.58   10000  2623.610004.782624.01610012.18 2624.6610017.26 2625.16
10038.81 2629.9810039.45  2630.1 10053.7 2632.6210061.28 2634.08

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9697.61    .055  9988.6    .04510004.78    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9948.8610017.26              600  659.59     575             .1       .3

CROSS SECTION


RIVER: RV W10
REACH: R1                 RS: 9.564

INPUT
Description:
Station Elevation Data    num=      42
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
 9883.58 2625.52 9892.69 2622.83 9902.53 2620.06  9906.5 2618.77 9918.48 2614.97
 9927.78 2613.59 9930.422613.088 9933.09 2612.58 9952.53 2612.56 9957.48 2612.55
 9964.38 2612.58 9990.75 2612.71 9992.87 2612.72   10000 2612.7510002.49 2612.76
10015.15 2612.8210018.88 2612.8310028.21  2613.110041.87 2612.8910060.43 2612.38
10069.98 2612.2910071.87 2612.2710083.67 2612.1510087.92 2612.2110132.06  2612.4
10137.92 2612.4410139.21 2612.4410156.74 2612.3910163.57  2612.410176.69 2612.34
10211.07 2612.7310216.11 2612.8310251.34 2612.8810268.82  2612.910273.63 2613.15
10281.38 2613.65 10302.2 2614.9610329.31 2619.4110334.32 2620.0510340.59 2620.25
 10346.4 2620.45 10348.9 2620.39

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9883.58    .055 9990.75    .04510018.88    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9930.4210028.21              710  714.34     710             .1       .3

CROSS SECTION


RIVER: RV W10
REACH: R1                 RS: 9.429

INPUT
Description: Q=870 cfs (CPB1B2, 24 hr)
Station Elevation Data    num=      53
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
 9719.44 2612.04 9727.58 2610.74 9729.53 2610.35 9729.56 2610.35 9729.62 2610.33
 9731.09 2610.02 9731.93 2609.87 9732.88 2609.71 9741.27  2608.2 9748.32 2606.93
 9752.59  2606.4 9755.76 2605.82  9761.7 2604.93 9764.27 2604.58 9789.62 2601.18
 9793.27 2600.81 9794.34 2600.67 9799.82 2599.98 9805.35 2599.66 9836.15 2597.93
 9847.08 2597.39 9860.86 2597.53 9872.76 2597.65 9888.14 2597.62 9902.76 2597.38
 9912.28 2597.23 9915.35 2597.25 9990.59 2596.63 9994.22 2596.83 9998.01 2596.47
 9999.97 2596.55   10000 2596.5510007.392596.83310025.54 2597.5310068.36 2599.01
10078.69 2599.0310093.18 2599.0610112.18 2598.8310134.16 2598.4610191.48 2597.31
10195.62 2597.3310208.27 2597.4510225.52 2598.56 10249.9 2599.9710275.12 2601.06
10290.87  2601.710297.09 2601.9410299.84 2602.0110313.92 2602.7510318.62 2602.97
10323.12 2603.1210324.71 2603.1710345.96 2603.98

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9719.44    .055 9994.22    .04510007.39    .055

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

```
       9915.3510025.54              875  932.45     925             .1       .3

CROSS SECTION


RIVER: RV W10
REACH: R1                  RS: 9.252

INPUT
Description:
Station Elevation Data    num=      24
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
 9937.52 2587.91 9948.01 2586.16 9956.67 2585.13 9976.83 2581.77 9986.22 2580.19
  9992.7  2579.5 9996.15 2579.15   10000 2578.7510002.25 2578.51 10004.3 2578.65
10020.73 2580.1910046.32 2580.6610089.69 2581.2610122.03 2581.2510150.32 2581.22
10157.21 2581.2110164.45  2581.210171.52 2581.1610192.35 2581.0610207.82 2580.99
10241.69 2581.0610260.37 2584.5710262.94 2585.2910267.62  2588.2

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9937.52    .055   10000    .045 10004.3    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9986.2210020.73           401.17  401.17  401.17             .1       .3

CROSS SECTION


RIVER: RV W10
REACH: R1                  RS: 9.176

INPUT
Description:
Station Elevation Data    num=      58
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
 9849.11 2584.03 9865.89 2580.18 9884.97  2577.3 9897.92  2575.4 9898.56  2575.4
 9901.01  2575.4 9963.86 2572.81 9975.37 2572.36 9980.91  2572.2 9985.96 2572.08
   10000 2571.5310000.06 2571.53   10001 2571.4910001.02 2571.4910001.08 2571.49
10039.08 2571.7610049.33 2571.8410076.11 2572.67 10110.6    257410147.66 2574.06
10178.53 2574.2210187.39  2574.310190.74 2574.2810194.53 2574.3710221.95 2574.93
10223.43 2574.9510224.67 2574.97   10229 2574.9810243.59 2574.8410247.25 2574.73
10249.16 2574.6810257.31  2574.910270.71 2575.4110283.28  2576.310289.79 2576.59
10299.32 2577.0310301.86 2577.1610303.46 2577.2210305.13 2577.1110319.88 2575.77
10326.23 2575.4110339.94 2574.5610341.72 2574.4310345.91  2574.110348.57 2573.95
10348.87 2573.9410380.75 2573.3410388.08 2573.0710391.35 2572.9410470.62 2574.44
10473.23 2574.4110511.71 2574.98 10516.7 2575.08 10518.6 2575.1110520.04 2575.18
 10538.2 2575.5610540.57 2575.6110550.01 2575.82

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9849.11    .055 9985.96    .04510049.33    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9985.9610049.33           335.01  381.01  334.74             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
10302.4110550.01 2584.38       F

LATERAL STRUCTURE


RIVER: RV W10
REACH: R1                  RS: 9.175

INPUT
Description:
Lateral structure position     = Right overbank
Distance from Upstream XS =      .01
Deck/Roadway Width        =       12
Weir Coefficient          =      2.5
Weir Flow Reference       = Energy Grade
 Weir Embankment Coordinates    num =       11
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
       0 2575.81   36.01 2574.91   36.25 2574.91   40.01 2574.83  188.81 2571.66
  201.01  2571.4  212.86 2571.15  216.97 2571.06  234.14 2570.69   236.3 2570.64
   334.72569.345

Weir crest shape                          = Broad Crested


CROSS SECTION


RIVER: RV W10
REACH: R1                  RS: 9.104

INPUT
Description:
Station Elevation Data    num=      53
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
 9887.42 2574.01 9905.66 2570.16 9946.36  2566.5 9951.96 2565.96 9952.14 2565.96
  9960.7 2566.21 9981.87 2566.77  9990.1 2565.95 9994.17 2565.57 9996.65 2565.38
 9998.81 2565.22   10000 2565.0810000.01 2565.0810002.54 2564.7710009.65 2564.05
 10014.3 2564.6310019.26 2565.2210021.44 2565.38 10026.3 2565.6710029.33 2565.75
```

```
10034.71 2565.6210040.34 2565.3310042.27 2565.2210043.75 2565.2110054.09 2564.81
10060.68 2565.21 10060.9 2565.2210062.42 2565.2810102.73 2566.0910122.95 2566.52
10130.95 2566.2810148.15 2565.7210155.82 2565.4910164.49 2565.2310169.13 2564.82
10174.37  2564.510179.82 2564.2110184.74 2564.87 10187.7 2565.2310192.91 2565.34
10193.14 2565.3410194.73 2565.3910215.94 2565.8510222.26 2566.1310224.12 2566.18
10250.55 2567.4610250.65 2567.4710255.61  2567.410307.64  2566.810318.25 2567.15
10333.68 2567.97   10340  2568.110345.56 2568.22

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9887.42    .055 9998.81    .04510019.26    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9994.17 10026.3              480  489.21  479.61             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
 9887.42 9982.55  2571.6       F
10123.1210345.56 2571.91       F

LATERAL STRUCTURE


RIVER: RV W10
REACH: R1                 RS: 9.103

INPUT
Description:
Lateral structure position     = Right overbank
Distance from Upstream XS =     .01
Deck/Roadway Width        =      12
Weir Coefficient          =     2.5
Weir Flow Reference       = Energy Grade
 Weir Embankment Coordinates    num =       11
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
     3352569.345  387.08 2566.89  402.59  2566.5  408.79 2566.36  557.79 2563.01
  568.66 2562.76  580.37 2562.49   756.7 2558.49  758.65 2558.44  762.89 2558.36
     815 2556.47

Weir crest shape                          = Broad Crested


CROSS SECTION


RIVER: RV W10
REACH: R1                 RS: 9.012

INPUT
Description: Q=703 cfs (This flow is the result of a lateral weir analysis
             between cross sections RM 9.176 and RM 8.826) See project summary
             for methodology.
Station Elevation Data    num=      26
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
 9795.22    2560 9801.82 2559.68 9844.46 2557.31 9862.24 2557.44 9863.66 2557.42
 9864.38  2557.4 9889.26  2556.5 9889.52 2556.51 9889.55 2556.51 9889.94 2556.51
 9891.51 2556.55 9939.39 2557.59 9945.72 2557.73 9968.98 2556.22  9986.6 2555.06
 9999.17 2553.82 9999.98 2553.75   10000 2553.7510000.19 2553.7410003.68 2554.29
10008.42 2555.0610013.28 2555.8510026.16 2557.06 10033.6 2557.2410037.64 2557.34
10037.97 2557.35

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9795.22    .055  9986.6    .04510008.42    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9968.9810026.16              401  393.84  401.48             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
 9795.22 9945.98 2559.92       F

LATERAL STRUCTURE


RIVER: RV W10
REACH: R1                 RS: 9.011

INPUT
Description:
Lateral structure position     = Right overbank
Distance from Upstream XS =     .01
Deck/Roadway Width        =      12
Weir Coefficient          =     2.5
Weir Flow Reference       = Energy Grade
 Weir Embankment Coordinates    num =        8
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
     815 2556.47  911.05 2555.45  911.32 2555.44 1061.04 2552.53 1065.08 2552.45
 1068.81 2552.39 1215.05 2549.78    1216 2549.72

Weir crest shape                          = Broad Crested


CROSS SECTION


RIVER: RV W10
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```
REACH: R1                    RS: 8.937

INPUT
Description: Q=346 cfs (This flow is the result of a lateral weir analysis
             between cross sections RM 9.176 and RM 8.826) See project summary
             for methodology.
Station Elevation Data    num=      17
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9868.52 2559.23 9874.03 2558.89  9898.4 2556.27 9906.65  2555.5 9907.67 2555.34
 9909.74 2555.18  9925.9 2552.58 9941.62 2550.13 9956.93 2549.39    9986    2548
 9999.79 2547.34   10000 2547.3610005.47 2547.8910022.98 2549.5410033.86 2549.76
10034.21 2549.7710034.98 2549.79

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9868.52    .055    9986    .04510005.47    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9956.9310022.98              577  586.12  577.05             .1       .3

LATERAL STRUCTURE


RIVER: RV W10
REACH: R1                    RS: 8.936

INPUT
Description:
Lateral structure position      = Right overbank
Distance from Upstream XS =      .01
Deck/Roadway Width        =       12
Weir Coefficient          =      2.5
Weir Flow Reference       = Energy Grade
 Weir Embankment Coordinates    num =       16
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
    12162549.718 1219.39  2549.7 1233.98 2549.44 1396.91 2546.36 1406.24 2546.18
 1409.86 2546.12 1423.36 2545.86 1425.22 2545.83 1505.81  2544.6 1512.94 2544.49
 1561.54 2543.75 1669.79 2542.02 1683.17  2541.8 1765.08 2538.74  1775.3 2538.36
 1792.95 2537.93

Weir crest shape                          = Broad Crested


CROSS SECTION


RIVER: RV W10
REACH: R1                    RS: 8.826

INPUT
Description: Q=143 cfs (This flow is the result of a lateral weir analysis
             between cross sections RM 9.176 and RM 8.826) See project summary
             for methodology.
Station Elevation Data    num=      23
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9861.74    2544 9884.05 2542.15  9894.7 2542.89 9897.81 2542.69 9903.68 2542.94
 9917.25 2542.14 9923.67 2541.95 9936.52 2541.81 9943.74 2541.47 9946.18 2541.38
 9947.91 2541.29 9949.57  2541.2 9950.25 2541.16 9961.08 2540.36 9963.12 2540.21
 9964.66 2539.92 9982.51 2538.18 9999.98 2537.69   10000 2537.6810000.02 2537.68
10010.04 2537.9310010.41 2537.93 10011.8 2537.97

Manning's n Values        num=       2
     Sta   n Val     Sta   n Val
*********************************
 9861.74    .055 9982.51    .045

Bank Sta: Left   Right    Coeff Contr.   Expan.
       9963.12 10011.8             .1       .3

CROSS SECTION


RIVER: RV W10
REACH: R2                    RS: 8.740

INPUT
Description: Q=1890 cfs (CP11F, 24 hr)
Station Elevation Data    num=      40
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9924.31 2535.99 9925.99 2535.94 9943.69 2535.16  9958.8 2532.97 9974.85 2530.08
 9991.43 2529.76 9996.05 2529.68   10000 2529.5110006.45 2529.5510010.31 2529.58
10015.43 2529.6110051.33 2529.7910059.15 2529.7810071.78 2529.7310116.74 2529.19
10126.53 2529.0810155.75 2529.4110168.25 2529.5910196.08 2529.8910201.89 2529.95
10208.12 2530.0210209.87 2530.0210213.81 2529.9510215.55 2529.9510222.82 2529.81
10229.69  2529.610242.42 2528.9110247.08 2529.4810252.05 2530.0610252.19 2530.08
10268.02 2532.1410278.85 2532.9410288.17 2533.8610301.32 2535.1610301.91 2535.16
10308.85 2535.1610311.74 2535.1610314.69  2535.310332.71 2536.7710338.69 2536.42

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9924.31    .055 9996.05    .04510010.31    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9996.0510051.33              805  815.33     810             .1       .3
```

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CROSS SECTION


RIVER: RV W10
REACH: R2                    RS: 8.586

INPUT
Description:
Station Elevation Data     num=      77
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9820.74 2524.24  9826.8 2522.45  9834.5 2520.05 9854.85 2517.38  9877.4 2515.07
 9878.25 2515.06 9879.23 2515.06 9880.63 2515.07 9889.18 2515.11 9893.89  2515.1
 9904.57 2515.12 9926.81 2515.15 9930.96 2515.16 9932.11 2515.16 9936.19 2515.18
 9938.59 2515.17 9939.02 2515.17 9946.29 2515.11    9964 2514.96 9979.52 2513.82
   10000 2512.5510009.04 2512.8610019.68 2513.1410019.82 2513.1510029.25 2513.72
10088.37 2514.4810110.07 2514.7910119.37 2514.9210121.81 2514.9410125.01 2514.96
10135.81 2515.0110144.82 2515.1310158.75  2515.210180.69 2515.1310210.31  2515.4
10214.49 2515.3410224.56  2515.210232.81 2515.06 10242.8 2514.8910273.95 2514.99
10275.29 2514.9910275.59    251510276.54 2515.0110308.56 2515.7510334.39 2515.32
10347.62 2514.9610358.75 2514.45 10358.9 2514.4410359.02 2514.4310359.09 2514.44
10368.69 2514.9610376.53 2514.9610379.65 2514.96 10396.3 2514.9610447.91 2515.74
10450.73 2515.7610475.11 2515.9710511.63 2515.6110534.47  2515.210546.08 2514.99
10549.29 2514.9610557.92 2514.9610559.28 2514.9510559.87 2514.9610568.07 2515.15
 10568.5 2515.1610574.44 2515.4310609.89 2516.9910620.76 2517.4610624.91 2517.64
 10627.7 2517.7310652.21 2519.0110659.45 2519.3410674.67 2520.0510678.36 2520.65
10689.64 2522.6910699.54  2524.3

Manning's n Values         num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9820.74    .055  9877.4    .045 9893.89    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          996410029.25              850  624.46     650             .1       .3
Right Levee     Station=10475.11      Elevation= 2515.97

CROSS SECTION


RIVER: RV W10
REACH: R2                    RS: 8.467

INPUT
Description:
Station Elevation Data     num=      42
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9911.55 2509.99 9916.33 2509.68 9919.04 2509.47 9925.22 2508.87 9964.19 2504.94
 9984.24 2503.12   10000 2501.5710005.92 2500.9910013.17  2501.210021.05  2501.4
10031.57 2501.2110065.46 2500.5410072.46 2500.6910073.54 2500.7210097.05 2501.55
10103.14 2501.6810174.66 2503.1410185.23  2503.210246.73 2502.9910246.78 2502.99
10247.23 2502.9810247.54 2502.9910251.36 2503.0310292.89 2503.4710302.12 2503.63
10320.48 2503.3210456.16 2501.6110475.08 2501.9210507.32 2501.3210536.51  2500.7
10562.55 2500.2510563.73 2500.2410568.06 2500.2310580.85 2500.19 10593.9 2501.25
10617.32 2503.0710629.89 2503.9910632.01 2504.1410640.97 2504.9410649.95  2506.1
10678.89 2510.0310679.38 2510.06

Manning's n Values         num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9911.55    .055   10000    .04510021.05    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         1000010097.05              595  598.93     525             .1       .3

CROSS SECTION


RIVER: RV W10
REACH: R2                    RS: 8.354

INPUT
Description:
Station Elevation Data     num=      40
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9919.48 2493.11 9938.87    2492 9951.53 2490.93 9961.35 2490.99 9972.88 2491.13
 9977.06 2490.63 9985.47 2489.98  9991.7 2489.37 9995.85 2489.27 9999.04 2489.34
   10000 2489.3710007.79 2489.65 10020.7 2489.98 10021.1 2489.9810025.44 2490.03
10071.93 2491.3810072.49 2491.4110103.07  2491.810106.31 2491.6710111.18 2491.79
10113.78 2491.8210189.08 2491.1910239.88 2491.7110264.81 2492.0110293.82 2492.37
10347.26 2491.24 10377.3 2490.6510383.18 2490.6710414.59 2490.7610448.72 2491.28
10488.62  2490.910543.14 2490.7310553.07 2490.6910554.54  2490.710567.54 2490.85
10605.91 2493.3910608.89 2493.5310624.13 2494.2410638.24 2494.5610639.72 2494.54

Manning's n Values         num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9919.48    .055  9991.7    .045   10000    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        9972.8810071.93             1100 1163.68    1175             .1       .3

CROSS SECTION


RIVER: RV W10
REACH: R2                    RS: 8.134
```

```
INPUT
Description: Q=2710 cfs (CPEF, 24Hr)  This cross section is identical to RM
             0.123 on RV W10 T3.
Station Elevation Data    num=      93
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9723.34 2478.07  9742.3 2476.87 9765.36 2474.92 9772.12 2474.55 9774.88 2474.39
 9781.02 2474.16    9808 2472.22 9817.28 2471.52 9821.11 2471.18 9829.18 2470.61
 9857.55  2471.1 9882.54 2470.97 9893.97 2470.88 9901.38 2470.91 9909.71 2470.84
 9912.91  2470.8 9918.31 2470.74 9918.35 2470.74 9938.26 2470.53 9940.94 2470.52
 9958.96 2470.34 9959.72 2470.32 9960.29 2470.31 9961.36 2470.31   10000 2470.09
10004.67  2470.110006.69  2470.110007.29  2470.110013.74 2470.1610070.76 2470.73
10082.79 2470.7210089.75 2470.6510127.76  2469.510135.47 2469.2610160.51 2470.28
10171.23 2470.69   10172 2470.6610172.02 2470.6610192.48  2469.710208.87 2470.05
10213.12 2470.12 10214.6 2470.1410219.52 2470.1710236.59 2469.9110237.37  2469.9
10246.33 2469.83   10250 2469.4910252.13 2469.2510254.94 2468.4310259.21 2469.07
10263.71 2469.8310266.56 2469.94 10284.7 2470.6810305.18 2470.9610307.49 2471.03
10318.72 2471.3910324.56 2471.5910328.28 2471.65 10355.5 2471.5910358.43 2471.62
10365.07 2471.6410381.88 2471.5510404.47 2471.1810439.75 2471.5510459.53 2471.72
10474.05 2471.8210478.13 2471.8510479.72 2471.8610481.37 2471.8610500.74 2471.85
10504.25 2471.8510508.11 2471.8310512.85 2471.7810518.32  2471.710527.33 2471.61
10560.86 2471.3310581.232470.99310594.74 2470.7710595.37 2470.7710595.62 2470.76
10596.03 2470.7510597.08 2470.7510637.272470.997 10637.7    247110669.77 2471.18
10679.03  2471.510689.38 2471.5110700.73  2472.110703.07 2472.2110703.47 2472.39
10714.81 2474.9110715.65 2475.4310721.37 2478.19

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
 9723.34    .055 9959.72    .04510013.74    .05510581.23    .04510637.27    .055

Bank Sta: Left   Right    Coeff Contr.   Expan.
       9959.7210070.76            .1       .3
Right Levee     Station=10328.28      Elevation= 2471.65

CROSS SECTION


RIVER: RV W10
REACH: R3                 RS: 7.984

INPUT
Description: Q=2710 cfs (CPEF, 24 Hr)
Station Elevation Data    num=      93
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9843.42 2462.19 9850.11 2461.93 9877.55  2460.9  9880.2 2460.77 9896.97 2458.93
 9912.96 2457.89 9931.03 2456.75 9944.08 2455.93 9949.09 2455.79 9957.04 2455.91
 9974.06 2456.33  9984.4  2455.8  9999.9 2455.03 9999.98 2455.03   10000 2455.03
10011.42 2455.0810016.21 2455.0810020.33 2455.1910029.92 2455.4310044.83 2456.86
10046.61 2457.0310047.01 2457.0310061.83 2457.2410068.32 2457.3310081.33 2457.76
10090.89 2457.98 10105.3 2458.1710113.88  2458.510124.78 2458.1410148.88 2458.07
10155.71 2458.0710179.26 2458.1110186.55  2458.110192.98  2458.110202.55 2458.09
10209.99  2457.910221.37 2458.0110222.54    245810237.59 2458.0110238.62    2458
10244.28 2458.7310245.14 2458.6410247.72 2457.8810252.94 2457.8310254.58  2457.9
10255.18 2457.8910259.21 2457.8610262.97 2457.8310267.68 2457.9810274.05  2458.1
10287.03 2458.14 10296.1 2458.1410307.44 2458.1110320.03 2458.0610322.68 2458.04
10326.72 2458.0410329.78 2458.0610330.28 2458.0610330.88 2458.0510349.47 2457.85
10357.13 2457.7510358.65 2457.6710375.87 2457.74   10376 2457.7410376.02 2457.75
10380.03 2458.0310381.44 2458.1610384.32  2458.2   10390 2458.2710398.85 2458.67
10409.29 2458.6710414.91  2458.610424.31 2458.5210428.34 2458.4410447.16  2458.3
10450.71 2458.2910459.16 2458.2510474.52 2458.0810488.16  2457.110492.86 2457.02
10501.46 2456.56 10507.1 2456.6610507.43 2456.6610507.94 2456.6710520.44 2456.95
10523.07 2457.1310524.67 2457.1310555.45 2459.0610562.55 2459.5910585.56 2463.24
10594.99 2464.8710596.52 2464.9310604.24 2465.11

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************
 9843.42    .055  9984.4    .04510029.92    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9974.0610044.83           511.25   514.1   486.9             .1       .3

CROSS SECTION


RIVER: RV W10
REACH: R3                 RS: 7.886

INPUT
Description: This cross section is identical to RM 0.143 on RV W10 T2.
Station Elevation Data    num=      78
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9892.99 2454.03 9894.13 2454.01 9899.63 2453.73 9912.69 2453.09 9932.92 2452.15
 9940.07 2451.61 9946.94 2450.67 9965.58 2448.35 9973.09  2447.4 9974.25 2447.53
 9981.98 2447.98 9991.55 2447.32   10000 2447.2310004.88 2447.1810017.38 2447.14
10021.59 2447.59 10025.7 2448.0210077.34 2447.9410078.39 2447.9410078.77 2447.93
10095.98 2447.5110100.96 2447.63 10138.3 2448.4410140.17 2448.4710144.17 2448.56
10208.13 2448.6910218.57 2448.7510223.23 2448.7310230.89 2448.7710237.43 2448.74
10339.13 2448.2210342.49 2448.22 10400.9 2448.9510420.95 2449.0810446.05 2449.37
 10458.6 2449.33 10487.2  2448.810495.14 2448.8110500.13 2448.41 10504.5 2448.18
10509.31 2448.2610517.15 2448.3210574.16  2448.910607.14 2449.4610610.53 2449.55
10617.05 2449.4510643.57 2449.3110675.98 2448.5810688.21 2448.1710697.042445.656
 10700.4  2444.710701.16 2444.5110701.88 2444.5110711.75 2445.68 10718.1  2448.4
10746.05 2448.4210773.15  2448.410776.62 2448.3410786.52 2448.3810808.52 2448.48
 10815.8  2448.610817.58  2448.610825.19 2448.5710839.68 2448.5110874.11 2448.76
10880.28  2448.810883.67 2448.74 10927.6 2447.9910937.49 2448.0310943.06 2448.14
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10948.03 2447.8210951.93 2447.5110967.97 2450.8610976.57 2453.1110993.14 2453.83
10993.81 2453.8610994.65 2453.9710995.13    2454

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*****************************************************************************
 9892.99    .055 9981.98    .045 10025.7    .05510697.04    .04510711.75    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9981.98 10025.7           538.75  541.76   513.1             .1       .3
Right Levee     Station=10610.53      Elevation= 2449.75

CROSS SECTION


RIVER: RV W10
REACH: R3                 RS: 7.784

INPUT
Description: Q=3150 cfs (CP11C7, 24 hr)  This cross section is identical to RM
             0.072 on RV W10 T2.
Station Elevation Data    num=      85
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
 9712.74 2446.02 9716.13 2445.57 9736.71 2443.23 9738.22    2443 9743.57  2442.2
 9768.08 2438.46 9777.84 2437.76  9795.2 2437.69 9803.83 2437.52 9818.39 2438.33
 9819.47 2438.41 9855.95 2438.71 9863.35 2438.77 9878.48 2438.47 9897.11 2438.66
 9911.46 2440.08 9914.76 2440.21 9919.14 2440.35  9927.6 2440.37 9962.13 2440.27
 9982.82 2439.86 9988.19 2439.84 9992.68 2439.16   10000 2438.0310001.88 2437.74
10009.01 2437.8610013.89 2437.8910037.46 2438.7410045.06 2439.03 10056.5 2438.79
10057.53 2438.6910065.55 2440.0410065.84 2440.0710072.62 2440.1610092.59 2440.32
10111.95 2439.8510112.21 2439.8110123.51  2438.710123.82 2438.7310133.05 2440.34
10152.73 2440.4410169.39 2440.6810192.05 2440.3210196.77 2440.2110197.32 2440.08
 10202.4  2439.6   10208 2439.0410209.93 2439.3110214.49 2440.0510219.84 2439.96
10236.88 2440.0610240.02  2439.610247.192438.30110249.68 2437.85 10251.1 2438.32
10252.28 2438.2710253.19 2437.9410253.862438.30510254.31 2438.5510261.06 2440.23
10278.67 2440.2610285.92 2440.4210288.61 2440.3310296.03 2440.3410305.18 2440.42
10342.11 2440.6910380.17 2440.93 10380.3 2440.9310380.38 2440.9310429.12 2440.31
10437.38 2440.1810445.79 2440.7210454.45 2441.1410460.84 2441.2410480.01 2441.39
10490.73 2441.18 10536.4 2440.4410537.93 2440.41 10556.5  2440.1 10559.1 2440.03
10589.09 2441.8610593.23 2441.9810599.11 2442.4910609.27 2443.9910624.12  2446.1

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*****************************************************************************
 9712.74    .055   10000    .04510013.89    .05510247.19    .04510253.86    .055

Bank Sta: Left   Right    Coeff Contr.   Expan.
       9988.1910065.55             .1       .3

CROSS SECTION


RIVER: RV W10
REACH: R4                 RS: 7.678

INPUT
Description: Q=3150 cfs (CP11C7, 24 hr)
Station Elevation Data    num=      65
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
 9418.47 2434.01 9432.49    2433 9457.36 2430.81 9473.88 2430.52 9477.92 2430.48
 9480.34  2430.5 9504.72 2430.71 9514.21 2430.71 9523.02 2430.76 9573.31 2430.79
 9588.77 2430.61 9621.12 2430.22 9641.05 2429.99 9653.26 2429.85 9663.76  2430.2
  9687.6  2431.5 9700.46  2431.6 9712.33 2431.74 9720.93 2432.27 9736.71 2433.09
 9750.08 2431.79 9762.61 2430.62 9763.82 2430.61  9765.1 2430.55 9782.71 2430.33
 9789.13 2430.25 9800.41    2430 9806.48 2430.06 9819.43 2431.22 9826.69 2431.32
  9839.6 2430.96 9847.31 2430.04 9849.21 2429.72 9854.86 2430.21 9858.54 2430.68
 9866.73 2430.14 9870.69 2429.93 9881.64 2430.65 9885.45 2430.88  9901.4 2430.22
  9905.1 2430.04 9932.18 2430.53 9944.07 2430.81 9950.25 2430.73 9955.33 2430.62
  9982.8 2430.08 9993.92 2429.49   10000 2429.1110000.04 2429.1110008.28 2428.61
10011.76  2428.310014.52 2428.2610016.342429.13910019.26 2430.5510020.66 2430.98
10024.06 2430.9210067.23 2430.6110068.98 2430.6310070.91 2430.9210080.57 2432.71
10102.49 2436.7110107.16 2437.6910110.24 2437.6910118.92 2437.6410119.96 2437.64

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*****************************************************
 9418.47    .055   10000    .04510016.34    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        9982.810019.26              275  353.47     325             .1       .3

CROSS SECTION


RIVER: RV W10
REACH: R4                 RS: 7.611

INPUT
Description:
Station Elevation Data    num=      77
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
 9326.73 2431.16 9326.86 2431.16 9330.87 2430.83 9344.84 2429.71 9353.14 2429.24
  9361.9 2428.67  9378.6 2427.59 9388.25 2427.12 9409.12 2425.97 9412.13 2425.76
 9414.64 2425.58 9421.53  2425.7 9430.82 2425.84 9433.98 2425.92 9440.06 2425.88
 9479.04 2426.13 9502.97 2426.17 9514.33 2426.22 9524.19 2426.31 9538.87 2426.16
  9548.4 2426.02 9581.82 2425.51 9587.64 2425.15 9589.89  2424.8  9595.2 2425.15
 9600.95 2425.46 9625.34 2425.73 9640.35 2425.85  9653.9 2425.61 9655.25 2425.55
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 9656.21 2425.56 9666.16 2425.71 9676.32 2425.82 9679.64 2425.71 9688.16 2425.37
 9692.45 2425.62 9698.42 2425.83 9709.19 2425.87 9736.58 2425.87 9744.94 2425.88
 9749.73 2425.92 9776.09 2425.41 9787.95 2425.32 9795.21 2425.31 9830.99 2424.97
 9832.52 2424.94 9848.83  2424.9 9856.73 2424.39 9873.72 2424.37 9877.25 2424.87
 9886.88 2425.08  9906.5 2424.54 9910.46  2424.5 9911.81  2424.5 9924.55  2424.5
 9931.48 2424.69 9941.38 2424.96 9952.57 2425.66 9955.11 2425.82 9958.05 2425.81
 9958.07 2425.81 9962.07  2425.8 9962.48  2425.8    9967 2425.42 9980.39 2424.22
 9990.83  2423.9   10000 2423.8610016.06 2424.1410020.53 2424.2110026.58 2424.67
10037.63 2425.4710056.98 2427.4810067.61 2428.8210080.31 2430.2710083.52 2430.55
10097.03 2430.7210099.65 2430.74

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9326.73    .055 9980.39    .04510016.06    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9962.0710037.63            80.12   80.12   80.12             .1       .3

CROSS SECTION


RIVER: RV W10
REACH: R4                 RS: 7.596

INPUT
Description:
Station Elevation Data    num=      73
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9430.12 2426.29 9435.65 2425.91 9444.09  2425.3 9454.29 2425.44 9458.32 2425.55
 9472.91 2425.62 9502.25 2425.72 9510.81 2425.71 9540.16 2425.75 9545.59 2425.79
 9567.46 2425.91 9581.21 2425.69 9612.41 2424.94 9616.22  2424.3 9617.04 2424.17
 9618.44 2424.25 9629.67 2424.95  9638.9 2424.97 9664.01 2424.92 9670.06 2425.06
  9675.9 2424.67 9679.64 2424.49 9682.69 2424.52  9684.9 2424.74 9707.11 2424.58
 9726.84 2424.65 9738.85 2424.28 9739.15 2424.27 9740.33 2424.33 9750.48 2424.72
 9753.41  2424.9  9779.6 2425.01 9813.18 2424.67 9824.57 2424.36 9846.77 2424.09
 9862.07 2423.74 9871.24 2423.83 9876.85 2422.61 9878.11 2422.56 9884.46 2423.59
 9890.31 2423.34 9895.88 2423.15 9899.97 2422.74 9908.64 2422.05 9920.54 2423.13
 9923.39 2422.82 9930.07 2421.96 9932.16  2422.4 9942.06 2423.61  9946.8 2423.65
 9962.26 2423.94 9971.07 2424.08 9977.23 2422.74 9986.61 2420.66 9991.59 2419.85
 9995.02 2419.99 9996.19 2419.96 9999.97 2419.73   10000 2419.7310000.15 2419.72
10004.05 2420.2910013.09 2421.7410016.71 2422.6410020.89 2423.3810037.24 2425.44
10043.77 2425.8510065.35 2428.0110071.48 2428.3610081.87 2428.1910106.96 2428.53
10108.91 2428.7610111.72 2429.02   10131 2431.02

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9430.12     .05 9986.61    .03510013.09     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9971.0710020.89           291.07  291.07  291.07             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
 9430.12 9567.46 2429.91       F

CROSS SECTION


RIVER: RV W10
REACH: R4                 RS: 7.541

INPUT
Description:
Station Elevation Data    num=      98
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9099.75 2424.86 9103.77 2424.56 9121.38 2423.41 9121.92 2423.39 9129.76 2423.02
 9147.21 2422.21 9148.24 2422.19 9152.19 2421.95 9166.82  2421.7 9177.19 2421.69
 9197.64 2420.78 9201.73 2420.73 9216.64 2420.19 9225.43 2419.45  9234.9 2419.63
 9248.44 2419.73 9275.01 2419.72 9285.21 2419.57 9325.07 2419.79 9326.81  2419.8
 9327.23  2419.8 9327.43 2419.79  9327.6 2419.79 9327.81 2419.79 9332.53 2419.66
 9371.29 2418.61 9372.64 2418.55 9374.91 2418.54 9378.58 2418.68 9389.49 2419.22
 9410.03 2419.71 9421.73 2420.03 9434.59 2420.25 9472.35 2420.98 9480.86 2420.94
 9513.53 2420.85 9544.77 2419.86 9548.37 2419.78 9551.51  2419.8 9568.33 2420.33
 9580.85  2420.1  9617.9 2419.58 9621.57 2419.34 9639.46 2418.17  9641.6 2418.48
 9643.94 2418.78 9657.11 2419.13 9668.39 2419.42 9672.44 2419.03  9678.1 2418.98
 9684.38 2419.78 9687.28 2420.12 9695.86 2420.18 9728.59 2419.96 9746.25 2419.65
 9767.63 2418.71 9784.83  2418.5 9805.68 2418.51 9813.72 2417.52 9817.36 2417.23
 9827.32 2418.98 9827.54 2419.02 9828.91    2419 9865.99 2418.06 9871.45 2416.88
 9879.53 2415.84 9882.65 2415.81 9888.74 2415.77 9892.08 2416.69  9897.6 2418.23
 9899.56 2418.69 9904.44  2418.7 9936.62 2419.23  9951.7 2419.01 9961.18 2418.76
 9973.61 2417.82 9974.75 2417.73 9975.52 2417.78 9975.89 2417.63 9990.08 2414.08
   10000 2416.0110000.05 2416.0210003.25 2416.6410008.59 2417.6110014.72 2416.86
10017.98 2416.7910021.54 2417.6310027.05 2419.0710033.52 2419.3710053.87 2420.13
10056.34 2420.3110087.02 2424.1510099.54 2425.6710102.23 2425.9610106.13 2426.47
10110.56 2426.9610114.38 2427.4210114.69 2427.43

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9099.75     .05 9961.18    .03510027.05     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9961.1810027.05           263.7   263.7   263.7             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
 9099.75 9472.35 2425.98       F
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CROSS SECTION


RIVER: RV W10
REACH: R4                    RS: 7.491

INPUT
Description:
Station Elevation Data    num=      80
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
  9263.2  2425.3 9280.39 2423.14 9281.43 2423.03 9284.93  2422.7 9307.47 2421.35
 9311.58 2420.71 9328.41 2419.06 9336.74  2418.5 9353.49 2417.36  9373.6 2416.18
 9380.88 2415.88 9387.16 2415.47 9408.56 2414.16 9416.19 2414.27 9435.91 2414.54
 9440.34 2414.72 9455.41 2414.95 9479.09 2415.08 9482.55 2415.12 9486.89    2415
  9503.2 2413.98 9509.27 2414.23 9524.36 2415.07 9530.04 2415.38 9531.94 2415.42
 9540.13 2415.32 9549.92 2415.24 9554.82 2415.18 9572.24 2415.24 9587.94 2415.66
 9617.77 2417.29 9641.62 2416.77 9677.82 2416.12 9693.52 2416.14 9740.94 2416.06
 9753.07  2416.1 9768.15    2415 9772.85 2414.65 9788.11 2413.09 9794.67 2412.49
 9805.69 2414.32 9814.11 2412.41 9818.69 2413.34 9823.42 2414.27  9839.3 2414.21
 9845.98  2414.3 9847.99 2414.06 9857.05 2413.16 9869.47 2413.74 9876.58 2414.15
 9880.65 2413.54 9888.42  2412.3 9905.05  2412.4  9905.4  2412.4 9908.17 2412.39
 9913.19 2413.28 9918.82 2414.55  9936.9 2414.52  9944.9  2414.5 9966.08 2414.11
 9976.42 2412.73 9989.18 2410.86 9996.75 2410.67   10000  2410.510000.02  2410.5
 10003.1 2410.3310004.72 2410.2810006.06  2410.610026.46 2415.7510035.19 2417.69
10042.07 2419.7510050.39 2420.8110059.55  2421.910070.07 2423.5810081.35 2424.65
10094.24  2425.610098.82 2425.8410100.02 2425.8410116.83 2425.3110129.34 2424.36

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
  9263.2     .05 9989.18    .03510006.06     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9966.0810026.46           213.61  213.61  213.61              .1       .3
Ineffective Flow     num=        1
   Sta L   Sta R    Elev  Permanent
  9263.2 9623.84 2422.17       F

CROSS SECTION


RIVER: RV W10
REACH: R4                    RS: 7.450

INPUT
Description:
Station Elevation Data    num=      75
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 9457.27 2414.06 9463.36  2413.3  9463.6 2413.29 9466.78  2413.1 9487.57 2411.86
 9490.12 2411.65 9499.17 2410.65  9514.2 2408.97 9517.69 2409.28 9524.65  2409.9
  9558.6 2410.37  9572.6 2410.58 9575.51 2410.62 9584.51 2410.48 9603.36 2410.18
 9609.85 2410.37 9633.42 2410.62 9666.02 2411.03 9681.58 2411.31 9697.72 2411.94
 9715.24  2411.9 9742.51 2411.42 9766.08 2410.86 9768.56 2410.65 9780.96 2410.11
 9783.17 2410.26 9793.58 2410.92    9808 2411.07 9837.98 2411.27  9859.1 2411.19
  9886.4 2410.84 9890.58 2410.59 9905.44 2409.81 9921.56 2408.95 9923.98 2409.03
 9942.99 2409.46 9946.08 2409.51 9949.79 2409.33 9950.08 2409.32 9962.16 2408.08
 9962.19 2408.08 9965.06 2408.05  9975.3 2407.94 9975.52 2407.98 9977.76 2407.94
 9983.92 2407.93 9986.44 2407.86   10000 2407.4710000.02 2407.4710007.23 2407.27
10010.56 2407.1510016.79 2408.32   10028 2410.2410039.33 2410.7310047.71 2410.99
10069.13  2413.110077.16 2413.7210082.66 2414.0610098.69 2415.5510108.56 2416.64
10120.79 2417.4710134.07 2418.6510141.48 2419.0510148.69  2420.110159.99 2420.74
10161.79 2420.6810163.51 2420.5110174.23  2419.810190.85  2418.610206.68 2419.23
10230.98 2420.2110235.78  2420.410237.97 2420.3710240.06 2420.3910247.18 2420.09

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9457.27     .05 9983.92    .03510016.79     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9949.79   10028           358.03  358.03  358.03              .1       .3
Ineffective Flow     num=        1
   Sta L   Sta R    Elev  Permanent
 9457.27  9699.2 2416.39       F

CROSS SECTION


RIVER: RV W10
REACH: R4                    RS: 7.382

INPUT
Description:
Station Elevation Data    num=      62
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 9499.37 2410.02 9508.65 2409.25 9527.27 2408.35 9537.55 2407.32 9548.07 2406.63
 9558.89 2405.96 9565.72 2406.14  9569.3  2406.3 9578.53  2404.8 9581.57 2404.49
 9591.64 2405.42 9595.67 2405.68 9596.67 2405.82 9653.15 2404.91  9655.7 2404.88
 9661.47 2404.85 9692.49 2405.35 9741.11 2406.08 9752.76 2405.96  9810.2 2405.13
 9811.14 2405.03  9832.3 2402.62 9839.84 2403.88 9842.63 2404.16  9893.9 2404.37
 9896.16 2404.39 9897.67 2404.38 9942.13 2404.64 9945.11 2404.44 9958.42 2402.95
 9970.12 2403.34 9980.32 2403.85 9988.28 2402.98    9998 2402.43   10000 2402.45
 10009.1 2402.5310014.62 2402.51 10018.9 2403.1410025.64 2404.0310031.67 2403.91
10041.15 2403.7210045.09 2403.9410054.23 2404.4210063.73 2404.4610071.16 2404.89
10093.27    2405 10093.5    2405 10093.9 2404.9810119.62 2403.3210120.32 2403.37
10135.13 2403.8910148.82 2404.8510149.77 2404.9210179.24 2406.4510185.85 2406.87
10192.58 2407.1410206.54 2408.4710226.47 2410.31 10246.5 2412.0910251.92 2412.03
```

```
10261.48    241210281.72 2411.97

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
 9499.37     .05 9988.28    .035 10018.9     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9980.3210025.64           273.58  273.58  273.58             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
 9499.37 9742.92  2408.7       F

CROSS SECTION


RIVER: RV W10
REACH: R4                 RS: 7.331

INPUT
Description:
Station Elevation Data    num=      64
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 9478.39 2403.73 9490.04 2403.45 9514.61 2402.46 9532.26 2401.97 9568.81 2401.23
 9586.25 2401.16 9609.95 2401.14 9613.41  2400.6 9620.08 2399.65  9626.4 2400.44
 9630.31 2400.87 9644.66 2401.06  9655.9 2401.26 9675.35 2401.04 9690.83 2401.15
 9700.87 2401.01 9737.98 2400.88 9754.58 2400.17 9787.95 2399.88 9789.05 2399.86
 9790.46 2399.87 9806.73 2399.23 9811.08 2399.05 9826.16 2399.89 9827.83 2399.96
 9828.31 2399.96  9847.1 2399.31 9854.33 2399.23 9860.32 2399.18 9862.11 2399.26
 9871.81 2399.73 9872.81 2399.77 9872.94 2399.77 9874.39 2399.78 9897.79 2399.98
 9902.56 2399.39 9910.18 2398.28 9913.28 2398.52 9928.54 2398.32 9939.32 2398.32
 9950.34 2398.76 9958.96  2399.2 9971.63 2399.32 9979.44 2399.41 9981.98 2399.21
 9993.39 2398.01 9998.41 2398.17   10000 2398.2110006.06 2398.3610020.24 2400.45
10020.46 2400.4610038.24 2401.26 10038.9 2401.26 10049.4 2400.8810057.13 2400.82
10063.68 2401.2510075.86 2401.8310081.91 2402.1710083.87 2402.48 10100.6 2403.84
10107.43 2404.4710122.03  2405.8   10128 2406.3610143.72 2407.34

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
 9478.39     .05 9981.98    .03510006.06     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9979.4410020.24           249.15  249.15  249.15             .1       .3

CROSS SECTION


RIVER: RV W10
REACH: R4                 RS: 7.283

INPUT
Description:
Station Elevation Data    num=      48
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 9559.13 2403.78 9560.15 2403.68 9570.74 2402.42 9593.45 2399.62 9596.67 2399.28
  9600.6 2398.85  9619.9 2396.99 9637.28 2396.63 9649.79 2396.29 9700.43 2397.15
 9702.77 2397.18 9703.95 2397.19 9705.55 2397.21 9754.32  2397.5 9782.91 2397.64
 9789.02 2397.49 9812.56 2396.82  9829.6 2396.32 9831.16  2396.1 9839.11 2395.09
  9845.3 2395.97 9847.79 2396.18 9856.42 2396.25  9874.3 2396.08 9890.46 2395.85
 9916.21 2395.74 9943.24 2395.33 9963.68 2395.04 9973.32 2394.55 9985.05 2394.44
 9996.06 2394.14   10000 2394.1610000.03 2394.1610007.77 2394.2210024.15 2394.41
10036.76 2394.8610038.59 2394.93 10044.3 2394.9910062.02 2395.1110079.94 2400.16
10085.82 2401.2410099.58  2402.110112.74 2402.4210122.35 2402.8110133.02 2403.74
   10150 2404.9910154.97 2405.7210156.88 2405.83

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
 9559.13     .05 9985.05    .03510024.15     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9985.0510024.15           227.87  227.87  227.87             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
 9559.13 9783.41 2402.58       F

CROSS SECTION


RIVER: RV W10
REACH: R4                 RS: 7.240

INPUT
Description:
Station Elevation Data    num=      37
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
  9619.5 2393.93  9641.8 2394.77 9644.51 2394.85 9658.41  2394.4 9660.21 2394.36
  9678.6 2393.78 9687.94 2393.46 9689.69 2393.35 9704.97 2392.32 9708.02 2392.33
  9712.4  2392.4 9749.37 2393.22 9782.25 2393.19 9805.65 2393.12 9817.08 2392.85
 9859.31 2391.66 9899.77 2391.31 9911.27 2391.24 9970.93 2391.75 9975.28 2391.79
 9976.69 2391.71 9989.72 2391.21   10000 2391.3710000.01 2391.3710022.12 2391.69
 10033.6 2391.8310038.54 2391.8210066.07 2391.8610068.88  2391.810105.64 2395.49
10106.28 2395.6510109.65 2395.8910121.82 2395.8410132.68 2395.8510136.88 2395.52
10158.68 2393.8210178.81 2395.06

Manning's n Values        num=       3
```

```
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
  9619.5     .05 9976.69    .03510022.12     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9976.6910022.12           133.47  133.47  133.47             .1       .3

CROSS SECTION


RIVER: RV W10
REACH: R4                  RS: 7.215

INPUT
Description:
Station Elevation Data    num=      50
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 9604.99 2392.12 9627.62 2391.52 9633.92 2391.22 9652.23  2390.9 9666.78 2390.63
 9683.28 2390.38 9702.41 2389.95 9704.75 2389.99 9728.41 2390.16  9746.3 2389.98
 9773.96  2389.8 9804.88 2389.14 9836.99 2388.52 9841.17 2388.69 9847.39 2389.17
  9874.7 2389.38  9881.7 2389.41 9910.82 2389.38 9911.95 2389.38 9932.08 2389.58
 9984.77 2389.57 9985.33 2389.56 9985.49 2389.56 9995.55 2388.61   10000 2388.64
10000.02 2388.64 10002.2 2388.6610013.81 2388.99 10017.32389.52410021.91 2390.23
10023.16 2390.4210024.53 2390.3910025.16 2390.3810034.16 2389.8910041.13 2390.01
10065.11 2390.08 10093.5 2389.6410098.24 2389.6210100.05  2389.610105.04 2389.61
10121.05 2389.6910136.33 2390.22 10140.4 2390.5910148.32  2391.410175.19 2393.18
10181.77 2393.7510194.79 2395.0810201.54 2395.1110205.91 2395.0510206.68 2395.03

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
 9604.99     .05 9985.33    .035 10017.3     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9985.33 10017.3           115.02  115.02  115.02             .1       .3

CROSS SECTION


RIVER: RV W10
REACH: R4                  RS: 7.193

INPUT
Description:
Station Elevation Data    num=      72
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
  9570.9 2394.68 9578.66 2394.07 9595.67 2395.58 9601.84 2395.75 9610.78  2396.7
 9626.22    2398 9641.72 2399.61 9660.25 2400.01 9661.47 2400.04  9661.8 2399.99
 9663.59 2399.86 9683.89 2397.16 9693.13 2396.31 9712.79 2393.94 9725.94 2391.95
 9726.15 2391.92 9726.36 2391.91 9745.48 2391.33 9754.07  2390.8 9768.87 2390.48
 9783.32 2389.63 9789.85 2389.23 9798.96 2388.75 9818.62 2386.82 9837.05 2385.35
 9837.45 2385.35 9846.98 2385.28 9852.86  2385.6 9865.88 2386.27 9893.27 2386.71
 9896.78 2386.75 9900.22 2386.81 9905.61 2386.85 9936.46 2387.03  9952.4 2387.26
 9971.15  2387.4 9982.85 2387.17 9996.71 2386.89 9999.97 2387.05   10000 2387.05
 10012.7 2387.6610014.69 2387.7210016.14 2387.7510017.31 2387.7610061.25 2388.23
10068.74 2388.3210079.73 2388.3310090.09 2388.1810103.79 2388.5910117.48 2388.68
10123.76 2388.6810133.32 2388.3510155.57 2387.4610167.77 2388.0710173.93 2388.32
10182.08 2387.9910189.47 2387.2610200.01  2388.710208.94 2389.2110229.42 2390.37
10232.96 2390.3910239.64 2390.7110249.84 2390.8410260.92 2390.6310272.47 2390.26
10277.26 2390.0610285.11 2390.0110303.38 2391.1610317.18 2392.0110326.04    2393
10331.64 2393.38 10339.7 2394.14

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
  9570.9     .05 9982.85    .035 9999.97     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9971.1510014.69            99.29   99.29   99.29             .1       .3

CROSS SECTION


RIVER: RV W10
REACH: R4                  RS: 7.174

INPUT
Description:
Station Elevation Data    num=      61
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 9655.64 2395.01 9656.52 2394.96 9673.45 2393.68  9676.5 2393.87 9682.58 2394.17
 9689.84 2394.55  9700.6  2395.4 9719.12 2397.09 9723.02 2397.47 9728.88 2397.73
 9736.55 2397.73 9749.97 2396.13 9764.74 2394.96 9771.37 2394.63 9795.66 2392.66
 9801.33 2392.48 9803.36 2392.47 9835.63  2389.8 9836.43 2389.77 9876.73 2387.74
 9876.94 2387.74 9882.17 2387.38 9900.322386.093 9907.41 2385.59 9909.54 2385.44
 9922.29 2385.57 9925.05 2385.59  9925.4  2385.6 9962.23 2385.65 9997.47 2385.95
 9999.98 2385.99   10000 2385.9910002.12 2386.0310007.89  2386.110038.77 2386.37
10040.12 2386.2910065.68 2386.7910069.37 2386.9210101.64 2387.5110102.79 2387.53
10132.52 2387.81   101442387.92710149.12 2387.98 10165.8 2388.1610179.77 2388.19
10195.18 2388.2210214.41 2388.1410222.02 2387.9610236.49 2387.4910244.86 2387.44
10273.44 2387.3410281.48 2387.4910300.35 2388.0710316.39 2388.6110343.04 2390.33
 10357.2 2391.2610375.68 2392.8710393.23 2394.1910409.41  2395.110419.03 2395.21
10423.75 2395.22

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
```

```
 9655.64     .05 9907.41    .035 9922.29     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9900.3210007.89           100.19  100.19  100.19            .1       .3

CROSS SECTION


RIVER: RV W10
REACH: R4                 RS: 7.155

INPUT
Description:
Station Elevation Data    num=      71
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9726.89 2394.83 9729.31 2394.48 9741.33 2392.58 9749.18 2392.65 9752.36 2392.91
  9753.4 2393.02 9760.59 2393.51 9771.69 2394.35 9775.49 2394.69 9790.03 2396.54
 9801.89 2396.36 9802.09 2396.35 9804.58 2396.17 9819.47 2395.02  9833.6 2393.41
 9845.32 2391.95 9846.52 2391.77 9848.36  2391.6  9867.7 2389.88 9877.57 2389.09
 9895.08 2387.58 9911.57  2386.3 9933.31 2384.98 9949.53 2384.18 9978.12 2383.28
 9982.86  2383.2 9986.71 2382.96 9994.08 2383.34 9998.33  2383.7 9999.98 2383.74
10000.01 2383.74 10030.8 2384.4310034.32 2384.5410035.95 2384.5610077.65 2384.73
10088.15 2385.0410097.33  2384.710101.14 2384.4710132.07 2384.9210154.75 2385.27
10181.16 2385.2610192.87 2385.3510204.35 2385.4610220.22 2385.4410237.81 2385.33
 10258.7 2385.2510276.12  2385.210290.41 2385.0810297.31 2384.8710305.09 2384.48
10311.34 2384.7110320.46 2384.1510331.82  2384.210341.56 2384.4910350.93 2384.84
 10356.2 2384.8910388.03 2385.83 10410.7 2386.4210412.81 2386.5310419.83 2386.96
10433.01 2387.8210439.72 2388.4510459.57 2390.4810472.96 2391.8310477.57 2392.18
10484.58 2392.6910492.48  2392.910503.25 2393.23 10504.8 2393.2510505.74 2393.24
10506.71 2393.25

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9726.89     .05 9982.86    .035 9998.33     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9949.53 10030.8           417.24  417.24  417.24            .1       .3

CROSS SECTION


RIVER: RV W10
REACH: R4                 RS: 7.076

INPUT
Description:
Station Elevation Data    num=      90
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9642.66    2384 9725.46 2378.31 9739.61 2377.85 9777.32 2376.58 9778.55 2376.56
 9780.64 2376.55 9814.73 2376.14 9828.82 2376.05 9848.98 2376.54 9855.79 2376.82
 9860.18 2377.03 9866.13 2377.18 9877.21 2377.01 9901.14 2376.49 9916.19    2376
 9928.62 2375.88 9951.14 2376.63  9954.1 2376.76 9968.25 2376.83 9968.78 2376.85
  9983.6 2376.07 9983.94 2376.04 9985.72 2376.09 9992.61 2376.32 9994.52  2376.2
 9997.22 2375.93 9999.99 2375.9310000.01 2375.9310000.43 2375.9310001.41 2375.87
10002.68 2376.1110007.16 2376.9210037.47 2376.9210043.09  2376.910044.28 2376.79
10049.14 2376.3910065.64 2376.9610076.99 2377.07 10077.2 2377.2110095.24 2377.06
10114.68 2376.5210114.88 2376.5110115.24 2376.5110115.86 2376.52 10128.9 2376.73
10133.08 2376.7810135.14 2376.8210135.93 2376.7310140.87 2376.3810145.33 2377.26
10146.82 2377.4610167.75 2377.5210182.26 2377.5410185.28 2377.5910186.68 2377.45
 10195.2 2376.6710198.72 2377.2910201.25  2377.710211.48 2377.8110220.59 2377.95
10227.14 2377.8910245.36 2377.9310246.01 2377.9110256.68 2377.6310259.24 2377.83
10270.02 2378.4410273.39 2378.3310278.53 2378.0710283.52 2377.8110291.58 2377.31
10295.95 2377.2410303.49 2377.2810309.27 2377.7910310.58 2377.9610312.81 2377.97
10322.57 2377.7210323.13 2377.66 10326.8 2377.8410327.99 2377.9210347.62 2378.39
10361.47 2378.6110371.54 2378.5210379.32 2377.91 10393.8 2377.7710398.89 2377.64
10403.55 2378.4410407.73 2379.03 10412.6 2379.8510426.68 2381.7510428.13 2381.93

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9642.66     .05 9992.61    .03510002.68     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9968.7810007.16           500.45  500.45  500.45            .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
 9642.66 9865.62 2380.09       F

CROSS SECTION


RIVER: RV W10
REACH: R4                 RS: 6.982

INPUT
Description:
Station Elevation Data    num=      75
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9848.51 2370.72 9854.69 2371.01 9862.68 2371.47 9880.84 2372.71 9891.39  2374.1
 9894.35 2374.16 9906.39 2373.71  9924.8 2372.63 9930.75 2372.09 9934.45 2371.58
 9944.34 2370.07 9959.83 2367.48 9962.41 2367.06 9966.05 2367.08 9982.28 2367.06
  9987.7 2366.71 9990.33 2366.39 9993.26 2366.26   10000 2366.1410000.01 2366.14
10001.13 2366.1210005.68 2367.0410007.41 2367.64 10025.9 2367.4110028.35 2367.36
10028.96  2367.410033.71 2367.5910038.25 2367.5610064.32 2367.6410079.14 2367.56
10097.77 2367.4910106.73 2367.0610109.09 2366.8710111.77 2367.2410116.45 2367.82
10129.86 2367.4610133.66 2367.3710136.46 2367.4610139.84 2367.6810144.08 2367.83
```

```
10148.89 2367.9710151.58 2368.1110164.02 2367.1910169.75 2366.9210173.15 2367.31
 10174.3 2367.4610199.36 2367.8110221.91 2367.9410228.62  2367.110232.64 2366.65
10233.98 2366.5510237.29 2366.6710242.13 2367.2710248.55 2367.8810286.01 2368.36
10293.13 2368.4210299.04 2368.3910324.13 2368.5510340.66 2368.27 10343.3  2368.6
10345.11 2368.8110366.33 2368.7110376.69 2368.5810386.75 2368.6310390.14 2368.73
10399.43 2368.9110400.89 2368.9410401.61 2368.9510405.92 2368.9710439.63 2369.19
10444.44 2369.2310446.68 2369.2110449.72  2369.310459.22 2370.8310464.81 2371.51

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
 9848.51     .05  9987.7    .03510005.68     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9959.8310007.41             24.5    24.5    24.5             .1       .3

CROSS SECTION


RIVER: RV W10
REACH: R4                 RS: 6.977

INPUT
Description:
Station Elevation Data    num=      59
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 9933.19 2371.83 9940.86 2370.63 9941.71  2370.5 9942.27  2370.4 9964.79 2366.77
 9971.35 2366.59 9980.35 2366.51 9984.19 2366.23 9996.71 2365.95   10000 2365.85
10001.38 2365.8110002.56    236610009.56 2367.18 10037.7 2366.7810039.49 2366.76
10040.38 2366.7610040.83 2366.7810045.23 2366.8210057.48 2366.8910070.49 2366.73
10092.97 2366.5610099.15 2366.2610106.86  2366.810110.64 2367.0310111.36 2367.01
 10132.9 2367.1310134.37 2367.1510146.17 2367.4410155.23 2366.89 10160.5  2366.5
10170.93  2366.310174.01 2366.6510179.48 2366.9910186.54 2367.1410216.03 2367.25
10222.14 2366.8110228.04 2366.0610231.72 2365.9310234.02 2366.0410245.11 2367.53
10247.85  2367.810277.19 2368.13 10283.6 2368.1910297.75  2368.110340.48 2367.76
10341.91 2367.6610342.57 2367.7710345.35 2368.1110372.51 2368.2110379.83 2368.21
10382.71 2368.24 10416.7 2368.7610426.77 2368.9110436.46 2368.97 10440.5 2369.07
10449.49 2369.0310456.74 2369.78 10469.4 2370.9310479.87 2371.14

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
 9933.19    .055 9996.71    .04510002.56    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9980.3510009.56            677.8   677.8   677.8             .1       .3

CROSS SECTION


RIVER: RV W10
REACH: R4                 RS: 6.849

INPUT
Description:
Station Elevation Data    num=      63
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 9610.73 2361.94 9611.98 2361.78 9613.43 2361.49 9627.41 2359.96 9630.12 2359.66
 9651.01  2357.3 9659.37 2356.55  9670.2 2356.06 9688.09 2355.28  9705.3 2354.03
 9708.95 2353.77 9733.23 2354.24 9739.71 2354.45 9783.54 2355.05 9785.54 2355.07
 9788.55 2355.08 9809.68 2355.12 9814.27 2354.96 9814.87 2354.97 9815.25 2354.99
 9826.03 2355.29 9826.98 2355.29 9843.94 2355.54 9849.59 2355.65 9853.74 2355.63
 9873.91  2355.4  9881.8 2355.27 9890.91 2355.09 9897.09 2354.57 9899.51 2354.29
 9911.74  2354.8 9932.86 2355.23 9940.45 2355.45 9974.17 2354.95 9975.07 2354.95
 9988.18 2354.87 9994.25 2354.45   10000 2354.0610018.58 2354.4510028.07 2354.62
10030.71  2354.610035.56 2354.5110042.52 2354.3810070.37 2354.4210084.68 2354.31
10091.54 2354.1610111.97 2354.0510116.48 2353.98 10119.8  2354.310129.24 2355.17
10134.66 2355.2610150.14 2355.2110157.25 2354.85 10163.5 2354.5310168.52 2353.81
10173.77 2352.9710179.93 2353.93 10184.3 2354.5410190.39 2354.2210196.79 2354.07
10202.12  2354.210216.86 2357.1710232.45 2359.94

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
 9610.73    .055 9994.25    .04510018.58    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9988.1810028.07            797.49  797.49  797.49             .1       .3

CROSS SECTION


RIVER: RV W10
REACH: R4                 RS: 6.697

INPUT
Description:
Station Elevation Data    num=      49
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 9539.44 2345.09 9564.02 2343.88 9564.88 2343.82 9584.48 2342.39 9589.53 2342.38
 9608.52 2342.44 9613.32 2342.58 9627.38 2340.86 9631.03 2340.38 9649.58 2340.28
 9653.75 2340.06 9656.64 2340.22 9677.47 2341.25 9679.89 2341.35 9697.39  2341.6
 9707.58 2341.58 9719.01 2341.51 9719.85  2341.5 9721.32 2341.62 9733.34 2342.72
 9772.62 2342.57 9776.82 2342.54 9777.89 2342.54 9822.14  2342.3    9837  2342.3
 9867.84 2342.45 9886.29 2342.46 9914.11 2342.01 9915.65 2342.01 9935.83  2345.1
 9940.75 2346.18 9941.13 2346.13 9960.17 2343.59 9960.94 2343.46 9977.74 2343.26
 9992.68 2343.07 9993.68 2343.07 9994.74 2343.07  9997.2  2342.9 9999.99 2342.78
```

```
   10000 2342.7810012.15 2342.2410017.23 2342.7210022.05 2343.6410036.74 2345.66
10039.32 2345.6510060.31 2347.2810065.83 2347.5810070.35    2348

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
 9539.44    .055   10000    .04510017.23    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9960.1710022.05          1131.65 1131.65 1131.65             .1       .3

CROSS SECTION


RIVER: RV W10 T2
REACH: R1                 RS: 0.845

INPUT
Description: Q=630 cfs (CP11C5, 24 hr)
Station Elevation Data    num=      20
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 9886.36 2522.33 9904.46 2521.87  9958.4 2520.74 9978.86 2520.09 9980.09 2520.05
 9981.76 2519.95 9996.95 2518.95   10000 2518.69 10000.1 2518.6810002.56 2518.82
10012.38 2519.6910019.69 2520.4110024.59 2520.3610034.19 2520.0510038.85  2520.2
10055.09 2520.9610081.81 2521.07 10101.1 2521.2110109.12 2521.2610151.43  2522.4

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
 9886.36    .055 9978.86    .04510038.85    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9978.8610038.85                 1       1       1             .1       .3

CROSS SECTION


RIVER: RV W10 T2
REACH: R1                 RS: 0.844

INPUT
Description: This cross section is added to the model to provide the minimum
             number of cross sections required for a junction reach. This cross
             section is not plotted on the work maps, nor is used in plotting
             the base flood elevations.
Station Elevation Data    num=      20
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 9886.36 2522.33 9904.46 2521.87  9958.4 2520.74 9978.86 2520.09 9980.09 2520.05
 9981.76 2519.95 9996.95 2518.95   10000 2518.69 10000.1 2518.6810002.56 2518.82
10012.38 2519.6910019.69 2520.4110024.59 2520.3610034.19 2520.0510038.85  2520.2
10055.09 2520.9610081.81 2521.07 10101.1 2521.2110109.12 2521.2610151.43  2522.4

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
 9886.36    .055 9978.86    .04510038.85    .055

Bank Sta: Left   Right    Coeff Contr.   Expan.
       9978.8610038.85             .1       .3

CROSS SECTION


RIVER: RV W10 T2
REACH: R2                 RS: 0.747

INPUT
Description: Q=450 cfs (DIC5C6, 24 Hr)  This cross section is identical to RM
             0.138 on RV W10 T2 S1.
Station Elevation Data    num=      81
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 9435.32 2511.89 9454.14 2512.03 9461.48 2512.05 9472.69 2511.94 9533.46 2510.13
 9539.95 2510.03 9547.26 2509.67 9551.34  2509.5 9560.39  2509.6 9569.97 2509.64
 9583.42 2509.64 9604.42 2510.01 9604.52 2510.01  9604.6 2510.01 9605.71 2510.03
 9631.85 2510.47 9639.27 2510.64 9651.57 2510.71 9668.55 2510.86 9688.65 2510.97
 9700.59 2510.95 9751.63  2510.1 9761.14 2510.03 9769.65 2509.66 9772.03 2509.53
 9775.77 2509.33 9788.14  2509.7  9803.8 2510.03 9809.98 2510.08 9817.27 2510.08
 9824.01 2510.03 9825.16 2510.01 9825.76    2510 9826.33 2510.01 9840.83 2509.91
 9847.45 2509.91 9850.98 2509.87 9861.68 2509.75 9869.12 2509.79 9888.18 2510.03
 9888.86 2510.04 9890.57 2510.04 9911.08 2510.16 9917.81 2510.15 9926.01 2510.08
 9926.49 2510.07 9930.13 2510.11 9948.11 2510.41  9957.4 2510.46 9974.76 2510.34
 9992.52 2510.1310004.62 2510.02 10009.4 2510.0210028.32 2510.0210029.41 2510.02
10039.86 2510.0410046.15 2509.87 10053.1 2510.0310053.79 2510.0310055.92 2510.02
10069.96 2509.9710071.53 2510.0210071.83 2510.0210072.25 2510.03 10073.3 2510.05
10077.88 2510.11   101102510.50110116.51 2510.5810145.78 2510.0410146.51 2510.02
10161.47 2509.3910162.81 2509.3710168.07 2509.4810193.71 2510.0210196.99 2510.09
 10211.2 2510.3810247.21 2511.0310261.29 2511.3210296.74    251210297.27 2512.01
10335.36  2512.5

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************************************************
 9435.32    .055 9769.65    .045 9788.14    .055 9992.52    .04510077.88    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9974.76   10110          192.72  192.72  192.72             .1       .3
Left Levee      Station= 9817.27      Elevation= 2510.58
```

CROSS SECTION

RIVER: RV W10 T2
REACH: R2 RS: 0.711

INPUT
Description: This cross section is identical to RM 0.104 on RV W10 T2 S1 and RM 0.438 on RV W10 T3.
Station Elevation Data num= 85

```
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9065.01 2510.02 9108.98 2507.14 9139.32 2505.53 9204.04 2504.97 9209.77 2504.94
  9209.82504.939 9211.57 2504.86 9216.17 2504.67 9219.49 2504.63 9220.03 2504.64
 9220.08 2504.64 9239.27 2504.94  9239.3 2504.94 9241.26 2504.95 9244.14 2504.94
 9246.34 2504.94 9255.06 2504.94 9261.03 2504.73 9263.72 2504.48 9274.86 2504.83
 9278.41 2504.94  9302.2 2505.52 9313.01 2505.74 9321.44 2505.73 9335.25 2505.56
 9362.68 2505.27 9385.54 2505.04 9390.27 2505.05  9392.9 2505.04 9393.15 2505.04
 9394.64 2505.06 9401.59  2505.2 9424.65 2505.67 9468.93 2506.53 9487.84 2506.45
 9492.13 2506.37 9533.83 2505.17 9542.49 2504.91 9545.29 2504.91 9547.12 2504.91
 9565.24 2505.31 9627.18    2506 9660.91  2505.6 9673.772505.464 9681.73 2505.38
 9682.82 2505.35 9690.232505.469 9715.33 2505.87 9753.92 2506.04 9771.78 2505.95
 9775.64 2505.92 9816.87 2505.83 9818.75 2505.82 9819.09 2505.81 9819.17 2505.81
 9819.81 2505.82 9820.65 2505.82 9821.08 2505.82 9915.54 2505.78 9932.62 2505.71
 9957.07 2505.83 9988.79 2505.66 9998.58  2505.610005.36 2505.5710073.96 2505.32
10079.99 2505.2210083.56 2505.2210088.32 2505.1610095.32  2505.110099.43 2505.13
10100.95 2505.1310103.33 2505.1410105.16 2505.1610106.13 2505.17 10130.1 2505.26
10152.61 2505.47 10170.7 2505.5610175.08  2505.610177.77 2505.6310224.53 2505.34
10256.63 2505.9410271.17 2506.4310286.44 2506.9510290.01 2507.0610292.84 2506.96
```

Manning's n Values num= 7

```
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
 9065.01    .055  9209.8    .045  9239.3    .055 9673.77    .045 9690.23    .055
10083.56    .045 10130.1    .055
```

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
9957.0710152.61 139.14 139.14 139.14 .1 .3
Left Levee Station= 9753.92 Elevation= 2506.04

CROSS SECTION

RIVER: RV W10 T2
REACH: R2 RS: 0.684

INPUT
Description: This cross section is identical to RM 0.068 on RV W10 T2 S1 and RM 0.411 on RV W10 T3.
Station Elevation Data num= 62

```
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
  9181.5    2510 9201.36 2507.72 9225.57 2504.94 9250.92 2503.49 9270.48 2502.37
 9314.14 2501.85 9329.58 2501.67 9335.68 2501.57 9335.71 2501.57  9341.7 2501.48
  9342.7 2501.51 9345.45 2501.57 9351.512501.676  9386.2 2502.28 9408.19 2501.81
 9412.38 2501.69 9417.56 2501.78 9427.74 2501.96 9456.12 2502.48 9487.79 2503.04
 9489.96 2503.04 9514.08  2502.2  9559.3 2500.43 9566.17 2500.31  9568.5 2500.22
 9569.77 2500.19 9574.822500.069 9577.69    2500 9579.37 2499.97  9583.4    2500
 9584.02    2500 9584.81 2500.02 9587.06 2500.07 9590.78 2500.24 9654.14 2501.52
 9665.77 2501.77 9671.13 2501.89 9678.63 2502.07 9680.27 2502.12 9680.96 2502.14
 9686.69 2502.31 9820.98  2502.5 9839.42 2502.54 9852.22 2502.39 9854.64 2502.36
 9899.32 2501.94 9936.69 2501.66 9995.69 2501.5510007.46 2501.6210037.55 2501.75
10054.19 2501.7710121.54 2501.7910141.81  2501.910151.01 2502.0110158.66 2502.06
 10175.7 2502.17 10189.8 2502.4110224.35    250310231.97 2503.1210236.96 2503.18
10284.92 2504.0210290.13 2504.02
```

Manning's n Values num= 7

```
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
  9181.5    .055 9329.58    .045 9351.51    .055 9574.82    .045 9587.06    .055
 9936.69    .04510121.54    .055
```

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
9936.6910121.54 114.61 114.61 114.61 .1 .3
Left Levee Station= 9839.42 Elevation= 2502.54

CROSS SECTION

RIVER: RV W10 T2
REACH: R2 RS: 0.663

INPUT
Description: This cross section is identical to RM 0.026 on RV W10 T2 S1 and RM 0.357 on RV W10 T3.
Station Elevation Data num= 114

```
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9342.48    2500 9383.93 2497.43 9397.67 2496.43 9402.41 2496.17 9437.88 2495.93
  9446.9 2495.89 9447.21 2495.88 9465.14 2495.37 9467.92 2495.21 9471.43 2495.16
 9492.42 2495.23  9496.5 2495.26 9496.94 2495.26 9498.54 2495.25 9512.772495.026
 9519.52 2494.92 9521.75 2494.83 9524.61 2494.88 9524.65 2494.88 9526.47 2494.92
 9527.54 2494.92 9530.48    2495 9530.522495.001 9568.31 2495.99 9576.77 2495.81
 9592.61 2495.36 9602.52 2495.12 9603.04 2495.11 9605.18 2495.06 9606.84 2494.99
 9622.73 2495.61 9646.29 2496.53 9682.38  2497.6  9689.8 2497.78 9692.92 2497.88
  9694.5 2497.94  9695.7 2497.97 9695.82 2497.98 9696.47 2497.99 9696.85    2498
    9698 2498.01 9698.58 2498.02 9784.62  2499.5 9796.45 2499.71 9804.15 2499.75
  9822.9 2499.82 9843.45 2499.89 9850.57 2499.92 9860.45 2499.91 9869.15 2499.87
  9877.3 2499.81 9888.34 2499.72  9897.7 2499.71 9898.51 2499.72 9915.33 2499.81
```

```
 9926.92  2499.8 9931.89 2499.82 9940.12 2499.77 9959.752499.498 9976.13 2499.27
 9980.07 2499.21 9982.09 2499.17 9986.36  2499.1 9989.37 2499.04 9990.36 2499.01
 9991.93 2499.01 9992.79 2499.03 9995.41 2499.09  9996.6 2499.11 9999.39 2499.15
10004.86 2499.22 10029.1 2499.6110038.72  2499.710048.29 2499.7210049.86 2499.72
10064.96 2499.6810072.72  2499.610085.42 2499.5510087.19 2499.5410117.19 2499.48
10143.98 2499.6210146.27 2499.6610150.99 2499.7110151.25  2499.610157.86 2499.67
10163.22 2499.6210189.26 2499.5510193.97  2499.510204.56  2499.510217.01 2499.88
10221.66 2499.9910230.93 2500.0410269.68 2500.3310290.25 2500.6510301.67 2500.65
10306.97 2500.7110313.39 2500.7210318.89 2500.71   10326 2500.6410347.93 2500.28
10356.29 2500.2210364.06 2499.9910368.04 2499.6110370.18 2499.4510373.59  2499.5
10395.12  2499.610396.56 2499.62   10399 2499.6210410.63 2499.9710411.65 2499.99
10441.76 2502.1110446.71 2502.45 10451.6 2502.37 10452.6 2502.36

Manning's n Values        num=       7
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*****************************************************************************
 9342.48    .055 9512.77    .045 9530.52    .055 9576.77    .045 9622.73    .055
 9959.75    .04510150.99    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9959.7510150.99           430.49  430.49  430.49            .1       .3
Left Levee      Station= 9850.57      Elevation= 2500.48
Right Levee     Station=10313.39      Elevation= 2500.72

CROSS SECTION


RIVER: RV W10 T2
REACH: R2                 RS: 0.581

INPUT
Description: This cross section is identical to RM 0.289 on RV W10 T3.
Station Elevation Data    num=      67
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
 9354.89 2494.58 9358.78 2494.49  9385.5 2492.49 9414.72 2489.98 9424.35 2489.51
 9428.06 2489.38 9444.25 2488.97 9474.41 2488.46 9484.65 2488.94 9489.55 2489.13
 9499.65  2488.8 9521.24 2487.98 9555.13 2488.54 9559.62 2488.63 9566.52 2488.29
  9589.52487.374 9600.89 2486.92  9605.1 2487.15 9605.13 2487.15 9610.052487.419
 9649.13 2489.56 9652.44 2489.72  9657.2 2489.94 9659.41 2489.98 9681.31 2490.34
 9681.95 2490.35 9682.01 2490.35 9686.17 2490.36 9700.13 2490.26 9721.38 2490.17
 9732.12 2490.06 9743.47 2489.98 9755.29 2489.92 9760.69 2489.95 9763.73 2489.98
 9772.49 2490.12 9782.62  2490.4  9802.2 2490.48 9812.76 2490.56  9814.1 2490.57
 9820.13 2490.55 9832.01 2490.41 9861.93 2489.98 9878.31 2489.69  9893.4 2489.59
 9895.85 2489.64 9902.83 2489.98 9923.75 2489.98 9932.34 2489.98 9950.81  2490.1
 9963.36 2490.09 9976.47 2490.02    9981 2489.99 9982.85 2489.98 9986.43 2489.96
10000.27 2489.9810002.71 2489.9810003.34 2489.9910018.08 2490.1210024.28 2490.18
10063.98  2490.5 10064.9 2490.5110065.03 2490.5110065.06 2490.5110065.22 2490.51
10065.45 2490.5110102.33 2491.01

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*****************************************************************************
 9354.89    .055  9589.5    .045 9610.05    .055 9950.81    .04510018.08    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9950.8110018.08           155.6   155.6   155.6            .1       .3
Left Levee      Station= 9950.81      Elevation=  2495.1

CROSS SECTION


RIVER: RV W10 T2
REACH: R2                 RS: 0.552

INPUT
Description: This cross section is identical to RM 0.259 on RV W10 T3.
Station Elevation Data    num=      51
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
 9416.47 2486.93 9421.28 2486.97 9491.34 2486.28 9502.56 2486.15  9508.5 2486.04
 9542.07 2485.39    9555 2486.29 9555.86 2486.36 9562.99 2485.67 9569.15 2485.09
 9570.08 2485.04 9583.55 2484.52 9587.29 2484.23 9591.44 2484.72 9596.56 2485.04
 9604.14 2485.23 9630.06 2485.57 9637.24 2485.42 9650.16 2485.04 9658.272484.543
 9662.39 2484.29 9666.78    2484 9667.05 2483.99 9667.07 2483.99 9667.28 2483.97
 9667.65 2483.99 9671.972484.476 9674.14 2484.72 9677.13 2485.04 9677.58 2485.06
 9700.05  2486.3 9720.54 2486.54 9740.49 2486.67 9748.38 2486.73 9808.26 2486.91
 9830.33 2487.07 9882.62  2487.1  9893.2  2487.1 9926.72 2486.69 9943.48 2488.13
 9955.45 2489.35 9995.15 2488.17 9999.14 2488.0410004.12 2488.3110012.79  2488.7
   100252489.10410034.83 2489.4310043.11 2489.9810056.18 2490.07 10067.1 2490.17
10068.17 2490.16

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*****************************************************************************
 9416.47    .055 9658.27    .045 9671.97    .055 9955.45    .045   10025    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9955.45   10025           458.08  458.08  458.08            .1       .3
Left Levee      Station= 9955.45      Elevation= 2489.85

CROSS SECTION


RIVER: RV W10 T2
REACH: R2                 RS: 0.465

INPUT
Description:
Station Elevation Data    num=      21
```

```
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9956.19 2483.27 9960.77 2483.36 9969.49 2482.22 9973.07 2481.77 9993.84 2481.57
   10000 2481.5210002.12  2481.510002.54  2481.510002.76  2481.510003.73  2481.5
 10020.7 2481.5510040.93 2481.7210070.48 2479.9110071.69 2479.84 10092.7 2479.57
10104.09 2479.4210116.12 2479.7510119.39 2479.8410152.96 2482.0810174.72 2483.58
10175.82 2483.55

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9956.19    .055 9973.07    .04510003.73    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9973.0710040.93           804.9   804.9   804.9             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
10040.9310175.82 2481.72       F

CROSS SECTION


RIVER: RV W10 T2
REACH: R2                 RS: 0.312

INPUT
Description: Q=420 cfs (CP11C6, 24 Hr)
Station Elevation Data    num=      16
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9976.33 2479.97 9979.15 2479.91  9981.8 2479.84 9982.77 2478.37 9986.53    2475
 9994.43 2471.57 9997.06 2471.18 9999.222470.441 9999.66 2470.29   10000 2470.45
10001.81 2471.3210006.04 2472.8610008.97    247510047.23 2479.04 10055.6 2479.94
10055.91 2479.96

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9976.33    .055 9999.22    .045   10000    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9986.5310008.97           630.75  630.75  630.75             .1       .3

CROSS SECTION


RIVER: RV W10 T2
REACH: R2                 RS: 0.193

INPUT
Description:
Station Elevation Data    num=      51
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9825.45 2464.14 9833.83 2464.27  9836.5 2464.33 9838.22 2464.23 9839.22 2464.19
 9846.22 2463.64  9854.8 2462.93 9865.93 2461.64 9875.96 2460.45 9886.26 2459.49
 9887.96 2459.05 9899.95 2458.24  9911.6 2457.32 9924.45 2456.43 9939.13 2455.77
 9949.66 2455.53 9960.33 2454.93 9973.07 2454.04 9984.26 2451.61 9990.29 2450.29
 9992.84 2450.02 9997.42 2449.93   10000 2449.9310000.02 2449.9310002.76 2449.93
10003.782450.42910013.56 2455.2110015.24 2455.7310015.44 2455.8510016.85 2455.88
10025.02 2455.78   10039 2455.6710049.24 2455.6310070.39 2455.4810074.06 2455.44
10104.19 2455.0610121.24 2454.7210132.62 2454.4710158.07 2453.5810163.98 2453.54
10176.28 2454.0410178.62 2454.1710212.23  2453.510218.49 2453.4110220.07 2453.44
10270.54 2454.9510281.72 2455.2210296.47 2456.6510304.59 2456.7410312.27 2457.23
10313.29  2457.2

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9825.45    .055 9990.29    .04510003.78    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9973.0710013.56           262.12  262.12  262.12             .1       .3

CROSS SECTION


RIVER: RV W10 T2
REACH: R2                 RS: 0.143

INPUT
Description: This cross section is identical to RM 7.886 on RV W10.
Station Elevation Data    num=      78
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9189.05 2454.03 9190.19 2454.01 9195.69 2453.73 9208.75 2453.09 9228.98 2452.15
 9236.13 2451.61    9243 2450.67 9261.64 2448.35 9269.15  2447.4 9270.31 2447.53
 9278.04 2447.98 9287.61 2447.32 9296.06 2447.23 9300.94 2447.18 9313.44 2447.14
 9317.65 2447.59 9321.76 2448.02  9373.4 2447.94 9374.45 2447.94 9374.83 2447.93
 9392.04 2447.51 9397.02 2447.63 9434.36 2448.44 9436.23 2448.47 9440.23 2448.56
 9504.19 2448.69 9514.63 2448.75 9519.29 2448.73 9526.95 2448.77 9533.49 2448.74
 9635.19 2448.22 9638.55 2448.22 9696.96 2448.95 9717.01 2449.08 9742.11 2449.37
 9754.66 2449.33 9783.26  2448.8  9791.2 2448.81 9796.19 2448.41 9800.56 2448.18
 9805.37 2448.26 9813.21 2448.32 9870.22  2448.9  9903.2 2449.46 9906.59 2449.55
 9913.11 2449.45 9939.63 2449.31 9972.04 2448.58 9984.27 2448.17 9993.122445.651
 9996.46  2444.7 9997.22 2444.51 9997.94 2444.5110007.81 2445.6810014.16  2448.4
10042.11 2448.4210069.21  2448.410072.68 2448.3410082.58 2448.3810104.58 2448.48
10111.86  2448.610113.64  2448.610121.25 2448.5710135.74 2448.5110170.17 2448.76
10176.34  2448.810179.73 2448.7410223.66 2447.9910233.55 2448.0310239.12 2448.14
10244.09 2447.8210247.99 2447.5110264.03 2450.8610272.63 2453.11 10289.2 2453.83
```

```
10289.87 2453.8610290.71 2453.9710291.19    2454

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
 9189.05    .055 9278.04    .045 9321.76    .055 9993.12    .04510007.81    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9972.0410014.16           378.08  378.08  378.08            .1       .3
Left Levee      Station= 9906.59      Elevation= 2449.75
Right Levee     Station=10014.16      Elevation=  2448.4

CROSS SECTION


RIVER: RV W10 T2
REACH: R2                 RS: 0.072

INPUT
Description: Q=3150 (CP11C7, 24 hr) This cross section is identical to RM 7.784
             on RV W10.
Station Elevation Data    num=      85
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9459.55 2446.02 9462.94 2445.57 9483.52 2443.23 9485.03    2443 9490.38  2442.2
 9514.89 2438.46 9524.65 2437.76 9542.01 2437.69 9550.64 2437.52  9565.2 2438.33
 9566.28 2438.41 9602.76 2438.71 9610.16 2438.77 9625.29 2438.47 9643.92 2438.66
 9658.27 2440.08 9661.57 2440.21 9665.95 2440.35 9674.41 2440.37 9708.94 2440.27
 9729.63 2439.86    9735 2439.84 9739.49 2439.16 9746.81 2438.03 9748.69 2437.74
 9755.82 2437.86  9760.7 2437.89 9784.27 2438.74 9791.87 2439.03 9803.31 2438.79
 9804.34 2438.69 9812.36 2440.04 9812.65 2440.07 9819.43 2440.16  9839.4 2440.32
 9858.76 2439.85 9859.02 2439.81 9870.32  2438.7 9870.63 2438.73 9879.86 2440.34
 9899.54 2440.44  9916.2 2440.68 9938.86 2440.32 9943.58 2440.21 9944.13 2440.08
 9949.21  2439.6 9954.81 2439.04 9956.74 2439.31  9961.3 2440.05 9966.65 2439.96
 9983.69 2440.06 9986.83  2439.6    99942438.301 9996.49 2437.85 9997.91 2438.32
 9999.09 2438.27   10000 2437.9410000.672438.30510001.12 2438.5510007.87 2440.23
10025.48 2440.2610032.73 2440.4210035.42 2440.3310042.84 2440.3410051.99 2440.42
10088.92 2440.6910126.98 2440.9310127.11 2440.9310127.19 2440.9310175.93 2440.31
10184.19 2440.18 10192.6 2440.7210201.26 2441.1410207.65 2441.2410226.82 2441.39
10237.54 2441.1810283.21 2440.4410284.74 2440.4110303.31  2440.110305.91 2440.03
 10335.9 2441.8610340.04 2441.9810345.92 2442.4910356.08 2443.9910370.93  2446.1

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
 9459.55    .055 9746.81    .045  9760.7    .055    9994    .04510000.67    .055

Bank Sta: Left   Right    Coeff Contr.   Expan.
       9983.6910007.87             .1       .3

CROSS SECTION


RIVER: RV W10 T2 S1
REACH: R1                 RS: 0.138

INPUT
Description: Q=220 cfs (DIC5E2, 24 Hr)  This cross section is identical to RM
             0.747 on RV W10 T2.
Station Elevation Data    num=      80
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9663.29 2511.89 9682.11 2512.03 9689.45 2512.05 9700.66 2511.94 9761.43 2510.13
 9767.92 2510.03 9775.23 2509.67 9779.31  2509.5 9788.36  2509.6 9797.94 2509.64
 9811.39 2509.64 9832.39 2510.01 9832.49 2510.01 9832.57 2510.01 9833.68 2510.03
 9859.82 2510.47 9867.24 2510.64 9879.54 2510.71 9896.52 2510.86 9916.62 2510.97
 9928.56 2510.95  9979.6  2510.1 9989.11 2510.03 9997.62 2509.66   10000 2509.53
10003.74 2509.3310016.11  2509.710031.77 2510.0310037.95 2510.0810045.24 2510.08
10051.98 2510.0310053.13 2510.0110053.73    2510 10054.3 2510.01 10068.8 2509.91
10075.42 2509.9110078.95 2509.8710089.65 2509.7510097.09 2509.7910116.15 2510.03
10116.83 2510.0410118.54 2510.0410139.05 2510.1610145.78 2510.1510153.98 2510.08
10154.46 2510.07 10158.1 2510.1110176.08 2510.4110185.37 2510.4610202.73 2510.34
10220.49 2510.1310232.59 2510.0210237.37 2510.0210256.29 2510.0210257.38 2510.02
10267.83 2510.0410274.12 2509.8710281.07 2510.0310281.76 2510.0310283.89 2510.02
10297.93 2509.97 10299.5 2510.02 10299.8 2510.0210300.22 2510.0310301.27 2510.05
10305.85 2510.1110344.48 2510.5810373.75 2510.0410374.48 2510.0210389.44 2509.39
10390.78 2509.3710396.04 2509.4810421.68 2510.0210424.96 2510.0910439.17 2510.38
10475.18 2511.0310489.26 2511.3210524.71    251210525.24 2512.0110563.33  2512.5

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
 9663.29    .055 9997.62    .04510016.11    .05510220.49    .04510305.85    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9989.1110031.77           177.55  177.55  177.55            .1       .3
Left Levee      Station= 9916.62      Elevation= 2510.97
Right Levee     Station=10045.24      Elevation= 2511.08

CROSS SECTION


RIVER: RV W10 T2 S1
REACH: R1                 RS: 0.104

INPUT
Description: This cross section is identical to 0.711 on RV W10 T2 and RM 0.438
             on RV W10 T3.
Station Elevation Data    num=      85
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
```

```
*****************************************************************************
 9383.28 2510.02 9427.25 2507.14 9457.59 2505.53 9522.31 2504.97 9528.04 2504.94
 9528.072504.939 9529.84 2504.86 9534.44 2504.67 9537.76 2504.63  9538.3 2504.64
 9538.35 2504.64 9557.54 2504.94 9557.57 2504.94 9559.53 2504.95 9562.41 2504.94
 9564.61 2504.94 9573.33 2504.94  9579.3 2504.73 9581.99 2504.48 9593.13 2504.83
 9596.68 2504.94 9620.47 2505.52 9631.28 2505.74 9639.71 2505.73 9653.52 2505.56
 9680.95 2505.27 9703.81 2505.04 9708.54 2505.05 9711.17 2505.04 9711.42 2505.04
 9712.91 2505.06 9719.86  2505.2 9742.92 2505.67  9787.2 2506.53 9806.11 2506.45
  9810.4 2506.37  9852.1 2505.17 9860.76 2504.91 9863.56 2504.91 9865.39 2504.91
 9883.51 2505.31 9945.45    2506 9979.18  2505.6 9992.042505.464   10000 2505.38
10001.09 2505.35 10008.52505.469 10033.6 2505.8710072.19 2506.0410090.05 2505.95
10093.91 2505.9210135.14 2505.8310137.02 2505.8210137.36 2505.8110137.44 2505.81
10138.08 2505.8210138.92 2505.8210139.35 2505.8210233.81 2505.7810250.89 2505.71
10275.34 2505.8310307.06 2505.6610316.85  2505.610323.63 2505.5710392.23 2505.32
10398.26 2505.2210401.83 2505.2210406.59 2505.1610413.59  2505.1 10417.7 2505.13
10419.22 2505.13 10421.6 2505.1410423.43 2505.16 10424.4 2505.1710448.37 2505.26
10470.88 2505.4710488.97 2505.5610493.35  2505.610496.04 2505.63 10542.8 2505.34
 10574.9 2505.9410589.44 2506.4310604.71 2506.9510608.28 2507.0610611.11 2506.96

Manning's n Values        num=       7
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*****************************************************************************
 9383.28    .055 9528.07    .045 9557.57    .055 9992.04    .045 10008.5    .055
10401.83    .04510448.37    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9945.45 10033.6           191.75  191.75  191.75            .1       .3
Left Levee      Station=  9787.2      Elevation= 2506.53
Right Levee     Station=10072.19      Elevation= 2506.04

CROSS SECTION


RIVER: RV W10 T2 S1
REACH: R1                 RS: 0.068

INPUT
Description: This cross section is identical to 0.684 on RV W10 T2 and RM 0.411
             on RV W10 T3.
Station Elevation Data    num=      62
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
 9596.69    2510 9616.55 2507.72 9640.76 2504.94 9666.11 2503.49 9685.67 2502.37
 9729.33 2501.85 9744.77 2501.67 9750.87 2501.57  9750.9 2501.57 9756.89 2501.48
 9757.89 2501.51 9760.64 2501.57  9766.72501.676 9801.39 2502.28 9823.38 2501.81
 9827.57 2501.69 9832.75 2501.78 9842.93 2501.96 9871.31 2502.48 9902.98 2503.04
 9905.15 2503.04 9929.27  2502.2 9974.49 2500.43 9981.36 2500.31 9983.69 2500.22
 9984.96 2500.19 9990.012500.069 9992.88    2500 9994.56 2499.97 9998.59    2500
 9999.21    2500   10000 2500.0210002.25 2500.0710005.97 2500.2410069.33 2501.52
10080.96 2501.7710086.32 2501.8910093.82 2502.0710095.46 2502.1210096.15 2502.14
10101.88 2502.3110236.17  2502.510254.61 2502.5410267.41 2502.3910269.83 2502.36
10314.51 2501.9410351.88 2501.6610410.88 2501.5510422.65 2501.6210452.74 2501.75
10469.38 2501.7710536.73 2501.79   10557  2501.9 10566.2 2502.0110573.85 2502.06
10590.89 2502.1710604.99 2502.4110639.54    250310647.16 2503.1210652.15 2503.18
10700.11 2504.0210705.32 2504.02

Manning's n Values        num=       7
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*****************************************************************************
 9596.69    .055 9744.77    .045  9766.7    .055 9990.01    .04510002.25    .055
10351.88    .04510536.73    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9929.2710101.88           224.61  224.61  224.61            .1       .3
Left Levee      Station= 9902.98      Elevation= 2503.04
Right Levee     Station=10254.61      Elevation= 2502.54

CROSS SECTION


RIVER: RV W10 T2 S1
REACH: R1                 RS: 0.026

INPUT
Description: Q=830 cfs (CP11EF, 24 Hr) This cross section is identical to 0.663
             on RV W10 T2 and RM 0.357 on RV W10 T3.
Station Elevation Data    num=     114
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
  9737.3    2500 9778.75 2497.43 9792.49 2496.43 9797.23 2496.17  9832.7 2495.93
 9841.72 2495.89 9842.03 2495.88 9859.96 2495.37 9862.74 2495.21 9866.25 2495.16
 9887.24 2495.23 9891.32 2495.26 9891.76 2495.26 9893.36 2495.25 9907.592495.026
 9914.34 2494.92 9916.57 2494.83 9919.43 2494.88 9919.47 2494.88 9921.29 2494.92
 9922.36 2494.92  9925.3    2495 9925.342495.001 9963.13 2495.99 9971.59 2495.81
 9987.43 2495.36 9997.34 2495.12 9997.86 2495.11   10000 2495.0610001.66 2494.99
10017.55 2495.6110041.11 2496.53 10077.2  2497.610084.62 2497.7810087.74 2497.88
10089.32 2497.9410090.52 2497.9710090.64 2497.9810091.29 2497.9910091.67    2498
10092.82 2498.01 10093.4 2498.0210179.44  2499.510191.27 2499.7110198.97 2499.75
10217.72 2499.8210238.27 2499.8910245.39 2499.9210255.27 2499.9110263.97 2499.87
10272.12 2499.8110283.16 2499.7210292.52 2499.7110293.33 2499.7210310.15 2499.81
10321.74  2499.810326.71 2499.8210334.94 2499.7710354.572499.49810370.95 2499.27
10374.89 2499.2110376.91 2499.1710381.18  2499.110384.19 2499.0410385.18 2499.01
10386.75 2499.0110387.61 2499.0310390.23 2499.0910391.42 2499.1110394.21 2499.15
10399.68 2499.2210423.92 2499.6110433.54  2499.710443.11 2499.7210444.68 2499.72
10459.78 2499.6810467.54  2499.610480.24 2499.5510482.01 2499.5410512.01 2499.48
 10538.8 2499.6210541.09 2499.6610545.81 2499.7110546.07  2499.610552.68 2499.67
10558.04 2499.6210584.08 2499.5510588.79  2499.510599.38  2499.510611.83 2499.88
10616.48 2499.9910625.75 2500.04 10664.5 2500.3310685.07 2500.6510696.49 2500.65
10701.79 2500.7110708.21 2500.7210713.71 2500.7110720.82 2500.6410742.75 2500.28
10751.11 2500.2210758.88 2499.9910762.86 2499.61   10765 2499.4510768.41  2499.5
```

```
10789.94  2499.610791.38 2499.6210793.82 2499.6210805.45 2499.9710806.47 2499.99
10836.58 2502.1110841.53 2502.4510846.42 2502.3710847.42 2502.36

Manning's n Values        num=       7
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*****************************************************************************
  9737.3    .055 9907.59    .045 9925.34    .055 9971.59    .04510017.55    .055
10354.57    .04510545.81    .055

Bank Sta: Left   Right    Coeff Contr.   Expan.
       9963.1310041.11             .1       .3

CROSS SECTION


RIVER: RV W10 T3
REACH: R1                 RS: 0.615

INPUT
Description: Q=660 cfs (CP11E2, 24 hr)
Station Elevation Data    num=      70
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
 9876.98 2528.89 9912.53 2526.51 9917.38 2526.18 9919.33 2526.04 9934.57 2524.99
 9947.02 2524.56 9954.96 2524.34  9965.6 2524.15 9999.98 2523.39   10000 2523.39
10004.65 2523.2910006.31 2523.2310011.04 2523.2410013.19 2523.2410022.29 2523.31
10024.842523.40410035.64  2523.810050.23  2524.410074.07 2524.99 10080.7 2525.04
10089.23 2525.0910095.62 2525.0910097.54 2525.0910110.47 2525.0110111.64 2525.01
10115.17 2524.9910127.66 2524.9310131.59 2524.8910165.17 2524.5410173.43 2524.44
10175.81 2524.4310176.53 2524.4410177.36 2524.4110194.06 2524.9910201.53 2525.14
10220.25 2525.4810230.24 2525.6110234.86 2525.6410237.94 2525.6510241.27 2525.65
10251.11 2525.54 10271.5 2525.1310276.77    252510277.29 2524.9910278.71 2524.94
10285.59 2524.7110294.13 2524.4210296.71 2524.5810302.66 2524.9910327.01 2525.74
10334.77 2525.9810336.92 2526.0210338.45 2526.0510338.75 2526.05 10339.8 2526.06
10342.48 2526.0310351.75 2525.7610367.59 2525.2810378.42 2524.9810378.67 2524.98
10379.04 2524.9710379.28 2524.9810393.42 2525.4310396.34  2525.510401.42 2525.52
10406.81 2525.6910412.24 2525.7910417.58 2525.9110462.23 2527.7910466.73 2527.93

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*****************************************
 9876.98    .055   10000    .04510024.84    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9954.9610050.23              500  501.11     500             .1       .3

CROSS SECTION


RIVER: RV W10 T3
REACH: R1                 RS: 0.520

INPUT
Description:
Station Elevation Data    num=      46
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
 9918.48 2516.61 9920.53 2516.73 9933.79 2515.57 9941.06 2514.96 9951.84  2514.6
 9951.952514.597 9983.942513.774 9991.89 2513.57 9994.48 2513.59  9997.7 2513.55
 9999.16  2513.6   10000 2513.6510002.22 2513.7610012.51  2514.110030.01 2514.59
 10035.9 2514.7710036.98 2514.7910045.27 2514.9610084.62 2515.3110111.52 2515.33
10117.11 2515.4310178.24 2515.3110182.92 2515.3210183.25 2515.3210183.66 2515.31
10199.98 2515.0310242.96 2514.22 10247.1 2514.1110283.12 2513.1410287.93 2513.01
10293.76 2513.14 10325.6 2513.8510328.45 2513.9110355.46 2514.4610359.31 2514.54
10363.27 2514.4810389.93 2514.0510429.59 2514.6810431.49 2514.7110433.71 2514.78
10486.18 2516.2910494.23 2516.5210494.31 2516.5210498.05 2516.5510545.38 2516.94
10547.46 2516.88

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*****************************************
 9918.48    .055 9983.94    .04510002.22    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9951.8410030.01              425   430.7     430             .1       .3

CROSS SECTION


RIVER: RV W10 T3
REACH: R1                 RS: 0.438

INPUT
Description: This cross section is identical to RM 0.711 on RV W10 T2 and RM
             0.104 on RV W10 T2 S1.
Station Elevation Data    num=      85
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
 9844.93 2510.02  9888.9 2507.14 9919.24 2505.53 9983.96 2504.97 9989.69 2504.94
 9989.722504.939 9991.49 2504.86 9996.09 2504.67 9999.41 2504.63 9999.95 2504.64
   10000 2504.6410019.19 2504.9410019.22 2504.9410021.18 2504.9510024.06 2504.94
10026.26 2504.9410034.98 2504.9410040.95 2504.7310043.64 2504.4810054.78 2504.83
10058.33 2504.9410082.12 2505.5210092.93 2505.7410101.36 2505.7310115.17 2505.56
 10142.6 2505.2710165.46 2505.0410170.19 2505.0510172.82 2505.0410173.07 2505.04
10174.56 2505.0610181.51  2505.210204.57 2505.6710248.85 2506.5310267.76 2506.45
10272.05 2506.3710313.75 2505.1710322.41 2504.9110325.21 2504.9110327.04 2504.91
10345.16 2505.31 10407.1    250610440.83  2505.610453.692505.46410461.65 2505.38
10462.74 2505.3510470.152505.46910495.25 2505.8710533.84 2506.04 10551.7 2505.95
10555.56 2505.9210596.79 2505.8310598.67 2505.8210599.01 2505.8110599.09 2505.81
10599.73 2505.8210600.57 2505.82   10601 2505.8210695.46 2505.7810712.54 2505.71
```

```
10736.99 2505.8310768.71 2505.66 10778.5  2505.610785.28 2505.5710853.88 2505.32
10859.91 2505.2210863.48 2505.2210868.24 2505.1610875.24  2505.110879.35 2505.13
10880.87 2505.1310883.25 2505.1410885.08 2505.1610886.05 2505.1710910.02 2505.26
10932.53 2505.4710950.62 2505.56   10955  2505.610957.69 2505.6311004.45 2505.34
11036.55 2505.9411051.09 2506.4311066.36 2506.9511069.93 2507.0611072.76 2506.96

Manning's n Values        num=       7
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*****************************************************************************
 9844.93    .055 9989.72    .04510019.22    .05510453.69    .04510470.15    .055
10863.48    .04510910.02    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9919.2410082.12           143.29  144.12  143.29            .1       .3
Right Levee     Station=10248.85      Elevation= 2506.53

CROSS SECTION


RIVER: RV W10 T3
REACH: R1                 RS: 0.411

INPUT
Description: This cross section is identical to RM 0.684 on RV W10 T2 and RM
             0.068 on RV W10 T2 S1.
Station Elevation Data    num=      62
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
 9845.79    2510 9865.65 2507.72 9889.86 2504.94 9915.21 2503.49 9934.77 2502.37
 9978.43 2501.85 9993.87 2501.67 9999.97 2501.57   10000 2501.5710005.99 2501.48
10006.99 2501.5110009.74 2501.57 10015.82501.67610050.49 2502.2810072.48 2501.81
10076.67 2501.6910081.85 2501.7810092.03 2501.9610120.41 2502.4810152.08 2503.04
10154.25 2503.0410178.37  2502.210223.59 2500.4310230.46 2500.3110232.79 2500.22
10234.06 2500.1910239.112500.06910241.98    250010243.66 2499.9710247.69    2500
10248.31    2500 10249.1 2500.0210251.35 2500.0710255.07 2500.2410318.43 2501.52
10330.06 2501.7710335.42 2501.8910342.92 2502.0710344.56 2502.1210345.25 2502.14
10350.98 2502.3110485.27  2502.510503.71 2502.5410516.51 2502.3910518.93 2502.36
10563.61 2501.9410600.98 2501.6610659.98 2501.5510671.75 2501.6210701.84 2501.75
10718.48 2501.7710785.83 2501.79 10806.1  2501.9 10815.3 2502.0110822.95 2502.06
10839.99 2502.1710854.09 2502.4110888.64    250310896.26 2503.1210901.25 2503.18
10949.21 2504.0210954.42 2504.02

Manning's n Values        num=       7
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*****************************************************************************
 9845.79    .055 9993.87    .045 10015.8    .05510239.11    .04510251.35    .055
10600.98    .04510785.83    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9934.7710050.49           281.71  283.35  281.71            .1       .3
Right Levee     Station=10152.08      Elevation= 2503.04

CROSS SECTION


RIVER: RV W10 T3
REACH: R1                 RS: 0.357

INPUT
Description: Q=830 cfs (CP11EF, 24 Hr)  This cross section is identical to RM
             0.663 on RV W10 T2 and RM 0.026 on RV W10 T2 S1.
Station Elevation Data    num=     114
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
 9817.83    2500 9859.28 2497.43 9873.02 2496.43 9877.76 2496.17 9913.23 2495.93
 9922.25 2495.89 9922.56 2495.88 9940.49 2495.37 9943.27 2495.21 9946.78 2495.16
 9967.77 2495.23 9971.85 2495.26 9972.29 2495.26 9973.89 2495.25 9988.122495.026
 9994.87 2494.92  9997.1 2494.83 9999.96 2494.88   10000 2494.8810001.82 2494.92
10002.89 2494.9210005.83    249510005.872495.00110043.66 2495.9910052.12 2495.81
10067.96 2495.3610077.87 2495.1210078.39 2495.1110080.53 2495.0610082.19 2494.99
10098.08 2495.6110121.64 2496.5310157.73  2497.610165.15 2497.7810168.27 2497.88
10169.85 2497.9410171.05 2497.9710171.17 2497.9810171.82 2497.99 10172.2    2498
10173.35 2498.0110173.93 2498.0210259.97  2499.5 10271.8 2499.71 10279.5 2499.75
10298.25 2499.82 10318.8 2499.8910325.92 2499.92 10335.8 2499.91 10344.5 2499.87
10352.65 2499.8110363.69 2499.7210373.05 2499.7110373.86 2499.7210390.68 2499.81
10402.27  2499.810407.24 2499.8210415.47 2499.77 10435.12499.49810451.48 2499.27
10455.42 2499.2110457.44 2499.1710461.71  2499.110464.72 2499.0410465.71 2499.01
10467.28 2499.0110468.14 2499.0310470.76 2499.0910471.95 2499.1110474.74 2499.15
10480.21 2499.2210504.45 2499.6110514.07  2499.710523.64 2499.7210525.21 2499.72
10540.31 2499.6810548.07  2499.610560.77 2499.5510562.54 2499.5410592.54 2499.48
10619.33 2499.6210621.62 2499.6610626.34 2499.71 10626.6  2499.610633.21 2499.67
10638.57 2499.6210664.61 2499.5510669.32  2499.510679.91  2499.510692.36 2499.88
10697.01 2499.9910706.28 2500.0410745.03 2500.33 10765.6 2500.6510777.02 2500.65
10782.32 2500.7110788.74 2500.7210794.24 2500.7110801.35 2500.6410823.28 2500.28
10831.64 2500.2210839.41 2499.9910843.39 2499.6110845.53 2499.4510848.94  2499.5
10870.47  2499.610871.91 2499.6210874.35 2499.6210885.98 2499.97   10887 2499.99
10917.11 2502.1110922.06 2502.4510926.95 2502.3710927.95 2502.36

Manning's n Values        num=       7
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*****************************************************************************
 9817.83    .055 9988.12    .04510005.87    .05510052.12    .04510098.08    .055
 10435.1    .045 10626.6    .055

Bank Sta: Left   Right    Coeff Contr.   Expan.
       9922.2510043.66            .1       .3

CROSS SECTION
```

```
RIVER: RV W10 T3
REACH: R2                    RS: 0.289

INPUT
Description: Q=830 cfs (CP11EF, 24 Hr)  This cross section is identical to RM
             0.581 on RV W10 T2.
Station Elevation Data    num=      67
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9749.76 2494.58 9753.65 2494.49 9780.37 2492.49 9809.59 2489.98 9819.22 2489.51
 9822.93 2489.38 9839.12 2488.97 9869.28 2488.46 9879.52 2488.94 9884.42 2489.13
 9894.52  2488.8 9916.11 2487.98    9950 2488.54 9954.49 2488.63 9961.39 2488.29
 9984.372487.374 9995.76 2486.92 9999.97 2487.15   10000 2487.1510004.922487.419
   10044 2489.5610047.31 2489.7210052.07 2489.9410054.28 2489.9810076.18 2490.34
10076.82 2490.3510076.88 2490.3510081.04 2490.36   10095 2490.2610116.25 2490.17
10126.99 2490.0610138.34 2489.9810150.16 2489.9210155.56 2489.95 10158.6 2489.98
10167.36 2490.1210177.49  2490.410197.07 2490.4810207.63 2490.5610208.97 2490.57
   10215 2490.5510226.88 2490.41 10256.8 2489.9810273.18 2489.6910288.27 2489.59
10290.72 2489.64 10297.7 2489.9810318.62 2489.9810327.21 2489.9810345.68  2490.1
10358.23 2490.0910371.34 2490.0210375.87 2489.9910377.72 2489.98 10381.3 2489.96
10395.14 2489.9810397.58 2489.9810398.21 2489.9910412.95 2490.1210419.15 2490.18
10458.85  2490.510459.77 2490.51 10459.9 2490.5110459.93 2490.5110460.09 2490.51
10460.32 2490.51 10497.2 2491.01

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
 9749.76    .055 9984.37    .04510004.92    .05510345.68    .04510412.95    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9954.49   10044              155  159.61     155             .1       .3

CROSS SECTION


RIVER: RV W10 T3
REACH: R2                    RS: 0.259

INPUT
Description: This cross section is identical to RM 0.552 on RV W10 T2.
Station Elevation Data    num=      51
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9749.42 2486.93 9754.23 2486.97 9824.29 2486.28 9835.51 2486.15 9841.45 2486.04
 9875.02 2485.39 9887.95 2486.29 9888.81 2486.36 9895.94 2485.67  9902.1 2485.09
 9903.03 2485.04  9916.5 2484.52 9920.24 2484.23 9924.39 2484.72 9929.51 2485.04
 9937.09 2485.23 9963.01 2485.57 9970.19 2485.42 9983.11 2485.04 9991.222484.543
 9995.34 2484.29 9999.73    2484   10000 2483.9910000.02 2483.9910000.23 2483.97
 10000.6 2483.9910004.922484.47610007.09 2484.7210010.08 2485.0410010.53 2485.06
   10033  2486.310053.49 2486.5410073.44 2486.6710081.33 2486.7310141.21 2486.91
10163.28 2487.0710215.57  2487.110226.15  2487.110259.67 2486.6910276.43 2488.13
 10288.4 2489.35 10328.1 2488.1710332.09 2488.0410337.07 2488.3110345.74  2488.7
10357.952489.10410367.78 2489.4310376.06 2489.9810389.13 2490.0710400.05 2490.17
10401.12 2490.16

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
 9749.42    .055 9991.22    .04510004.92    .055 10288.4    .04510357.95    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9963.01   10033              700   718.6     715             .1       .3

CROSS SECTION


RIVER: RV W10 T3
REACH: R2                    RS: 0.123

INPUT
Description: Q=2710 cfs (CPEF, 24 Hr)  This cross section is identical to RM
             8.134 on RV W10.
Station Elevation Data    num=      93
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9126.26 2478.07 9145.22 2476.87 9168.28 2474.92 9175.04 2474.55  9177.8 2474.39
 9183.94 2474.16 9210.92 2472.22  9220.2 2471.52 9224.03 2471.18  9232.1 2470.61
 9260.47  2471.1 9285.46 2470.97 9296.89 2470.88  9304.3 2470.91 9312.63 2470.84
 9315.83  2470.8 9321.23 2470.74 9321.27 2470.74 9341.18 2470.53 9343.86 2470.52
 9361.88 2470.34 9362.64 2470.32 9363.21 2470.31 9364.28 2470.31 9402.92 2470.09
 9407.59  2470.1 9409.61  2470.1 9410.21  2470.1 9416.66 2470.16 9473.68 2470.73
 9485.71 2470.72 9492.67 2470.65 9530.68  2469.5 9538.39 2469.26 9563.43 2470.28
 9574.15 2470.69 9574.92 2470.66 9574.94 2470.66  9595.4  2469.7 9611.79 2470.05
 9616.04 2470.12 9617.52 2470.14 9622.44 2470.17 9639.51 2469.91 9640.29  2469.9
 9649.25 2469.83 9652.92 2469.49 9655.05 2469.25 9657.86 2468.43 9662.13 2469.07
 9666.63 2469.83 9669.48 2469.94 9687.62 2470.68  9708.1 2470.96 9710.41 2471.03
 9721.64 2471.39 9727.48 2471.59  9731.2 2471.65 9758.42 2471.59 9761.35 2471.62
 9767.99 2471.64  9784.8 2471.55 9807.39 2471.18 9842.67 2471.55 9862.45 2471.72
 9876.97 2471.82 9881.05 2471.85 9882.64 2471.86 9884.29 2471.86 9903.66 2471.85
 9907.17 2471.85 9911.03 2471.83 9915.77 2471.78 9921.24  2471.7 9930.25 2471.61
 9963.78 2471.33 9984.152470.993 9997.66 2470.77 9998.29 2470.77 9998.54 2470.76
 9998.95 2470.75   10000 2470.7510040.192470.99710040.62    247110072.69 2471.18
10081.95  2471.5 10092.3 2471.5110103.65  2472.110105.99 2472.2110106.39 2472.39
10117.73 2474.9110118.57 2475.4310124.29 2478.19

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
 9126.26    .055 9362.64    .045 9416.66    .055 9984.15    .04510040.19    .055
```

```
Bank Sta: Left   Right    Coeff Contr.   Expan.
       9963.7810081.95            .1       .3
Left Levee      Station= 9882.64      Elevation= 2471.86

CROSS SECTION


RIVER: RV W10 T4
REACH: R1                 RS: 0.373

INPUT
Description: Q=820 cfs (CP11D, 24 hr)
Station Elevation Data    num=      45
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
  9968.6 2575.82 9979.48 2575.53 9980.43 2575.51 9982.71 2575.23 9992.94 2574.79
 9997.36 2574.53 9999.84 2574.3810008.34 2574.57 10024.8 2574.9510029.68 2574.96
10032.41 2574.97   10038 2574.9310058.08 2574.6510078.75 2574.2510092.38 2573.98
10102.23 2573.9210104.13  2573.9 10105.2  2573.9 10109.9 2574.0510139.42 2575.11
10147.04 2575.1110189.56 2575.3910193.13 2575.3810193.55 2575.3710199.01 2575.35
 10205.6 2575.3110228.79 2575.1110262.91 2574.0510283.26 2573.3310298.45 2573.34
10333.28  2573.410341.68 2573.3310362.93  2575.110363.07 2575.1110363.14 2575.11
10364.96 2575.1710399.29 2576.2610399.95 2576.2910407.36 2576.5110412.93 2576.64
10413.47 2576.6410432.07 2577.2210454.31 2577.8410456.57 2577.9410458.66    2578

Manning's n Values        num=       2
     Sta   n Val     Sta   n Val
*******************************
  9968.6    .045 10024.8    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9980.43 10024.8          336.21  336.21  336.21            .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
10192.0810458.66 2577.61       F

CROSS SECTION


RIVER: RV W10 T4
REACH: R1                 RS: 0.310

INPUT
Description:
Station Elevation Data    num=      38
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9970.38 2568.22 9977.55 2568.02 9982.26 2567.89 9992.62 2565.31 9995.75 2565.09
 9999.19 2565.09 9999.96 2565.09 10000.2 2565.0910000.35 2565.0710000.67 2565.09
10000.99 2565.0910001.82 2565.0910002.24 2565.0910003.39 2565.0910005.84 2565.09
 10009.7 2565.22 10012.7 2565.3910015.29 2565.5310023.04 2566.1110032.05 2566.99
10058.27 2566.9310078.21 2566.8910099.55 2566.8410155.19 2566.6710173.08 2566.46
10236.42 2565.3410248.98 2565.0910251.56 2565.0710253.27 2565.06   10255 2564.99
10256.74 2565.07 10257.6 2565.0910261.97 2565.1910269.88 2565.4410288.42 2565.91
10317.97 2568.5610331.65 2569.3910340.03 2569.99

Manning's n Values        num=       2
     Sta   n Val     Sta   n Val
*******************************
 9970.38    .04510032.05    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9982.2610032.05          464.94  464.94  464.94            .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
10270.0910340.03 2569.98       F

CROSS SECTION


RIVER: RV W10 T4
REACH: R1                 RS: 0.222

INPUT
Description: Q=1840 cfs (CP11DF, 24 Hr)  See project summary for lateral weir
             methodolgy.  This cross section includes the area covered by cross
             section RM 9.012 on RV W10.
Station Elevation Data    num=      49
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9726.59    2560 9733.19 2559.68 9775.83 2557.31 9793.61 2557.44 9795.03 2557.42
 9795.75  2557.4 9820.63  2556.5 9820.89 2556.51 9820.92 2556.51 9821.31 2556.51
 9822.88 2556.55 9870.76 2557.59 9877.09 2557.73 9900.35 2556.22 9917.97 2555.06
 9930.54 2553.82 9931.35 2553.75 9931.37 2553.75 9931.56 2553.74 9935.05 2554.29
 9939.79 2555.06 9944.65 2555.85 9957.53 2557.06 9964.97 2557.24 9969.01 2557.34
 9969.34 2557.35 9977.57 2557.22 9981.95 2557.16 9986.14 2556.49  9987.1 2556.27
 9989.06 2556.08 9993.51 2555.86 9995.88  2555.9 9999.76 2555.7310003.42 2555.69
10009.08 2556.1110009.81 2556.1210046.53 2557.8210094.14 2557.5810100.12 2557.48
10100.17 2557.4810104.48  2557.610133.66 2558.4810160.92 2557.7310163.22 2557.71
10187.65  2558.1 10237.1 2559.77 10238.1 2559.8110248.33 2560.03

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
 9726.59    .055 9917.97    .045 9939.79    .055 9969.34    .04510009.08    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9981.9510046.53          407.14  407.14  407.14            .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
```

```
 9726.59 9969.01 2562.34       F

CROSS SECTION


RIVER: RV W10 T4
REACH: R1                  RS: 0.145

INPUT
Description: This cross section includes the area covered by cross section RM
             8.937 on RV W10.
Station Elevation Data    num=      70
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9802.93 2559.23 9808.44 2558.89 9832.81 2556.27 9841.06  2555.5 9842.08 2555.34
 9844.15 2555.18 9860.31 2552.58 9876.03 2550.13 9891.34 2549.39 9920.41    2548
  9934.2 2547.34 9934.41 2547.36 9939.88 2547.89 9957.39 2549.54 9968.27 2549.76
 9968.62 2549.77 9969.39 2549.79 9969.73 2549.78 9970.12 2549.77 9981.33 2549.54
 9996.24 2548.54 9996.352548.532  9999.4 2548.3210021.62 2548.6410052.69 2549.06
10077.79 2548.84 10115.1 2548.5910124.71  2548.910129.64 2548.9810131.96 2549.04
10151.37 2549.3510164.27 2549.6410171.13 2549.4310184.31 2548.9510189.15 2548.79
10189.62 2548.7910192.81  2548.810213.32 2549.1110255.27 2549.7510259.46 2549.81
10261.54 2549.8510262.29 2549.8610264.23 2549.8710265.34 2549.8810278.85 2549.97
 10280.8 2549.9810283.19 2549.9710291.67    255010292.52    255010304.72 2550.01
10305.68 2550.02 10315.9 2550.0210329.46 2550.0310331.88 2550.0210334.87 2549.94
10335.37 2549.9410335.46 2549.9310335.82 2549.9310346.06 2549.8210355.07 2549.66
10364.63 2549.5110393.01 2548.8410394.18 2548.8910394.78 2548.9110422.43 2550.13
 10424.5 2550.2310484.86 2554.7610488.58 2555.0610499.74 2555.8210501.17 2555.97

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
 9802.93    .055 9920.41    .045 9939.88    .055 9969.39    .04510021.62    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9969.3910164.27           582.53  582.53  582.53              .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
 9802.93 9969.39 2554.79       F
10281.7510501.17 2554.98       F

CROSS SECTION


RIVER: RV W10 T4
REACH: R1                  RS: 0.034

INPUT
Description: This cross section includes the area covered by cross section RM
             8.826 on RV W10.
Station Elevation Data    num=      50
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9823.26    2544 9845.57 2542.15 9856.22 2542.89 9859.33 2542.69  9865.2 2542.94
 9878.77 2542.14 9885.19 2541.95 9898.04 2541.81 9905.26 2541.47  9907.7 2541.38
 9909.43 2541.29 9911.09  2541.2 9911.77 2541.16  9922.6 2540.36 9924.64 2540.21
 9926.18 2539.92 9944.03 2538.18  9961.5 2537.69 9961.52 2537.68 9961.54 2537.68
 9971.56 2537.93 9971.93 2537.93 9973.32 2537.97 9975.09 2537.93  9985.1 2537.69
10010.14  2537.810045.12 2537.7810046.79 2537.7910146.63 2536.6610149.56 2536.63
10157.62 2536.7410215.06 2537.6410227.47  2537.410245.27 2536.96 10272.5 2537.58
10275.44 2537.6410299.09 2538.11 10342.1 2538.24 10358.1 2538.2910360.72 2538.24
 10385.4 2537.8110398.62 2538.32   10404 2538.3610437.91 2538.9210438.87 2538.92
10448.96 2538.9810458.66 2539.0810462.77 2539.15 10483.5  2539.710495.75 2540.01

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
 9823.26    .055 9973.32    .04510010.14    .055

Bank Sta: Left   Right    Coeff Contr.   Expan.
       9973.3210215.06              .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
 9823.26 9973.32 2541.97       F

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

SUMMARY OF MANNING'S N VALUES

River:RV W10
*******************************************************************************
*     Reach      *   River Sta.   *   n1    *   n2    *   n3    *   n4    *   n5    *
*******************************************************************************
*R1               *    9.689       *     .055*     .045*     .055*         *         *
*R1               *    9.564       *     .055*     .045*     .055*         *         *
*R1               *    9.429       *     .055*     .045*     .055*         *         *
*R1               *    9.252       *     .055*     .045*     .055*         *         *
*R1               *    9.176       *     .055*     .045*     .055*         *         *
*R1               *    9.175       *Lat Struct*        *         *         *         *
*R1               *    9.104       *     .055*     .045*     .055*         *         *
*R1               *    9.103       *Lat Struct*        *         *         *         *
*R1               *    9.012       *     .055*     .045*     .055*         *         *
*R1               *    9.011       *Lat Struct*        *         *         *         *
*R1               *    8.937       *     .055*     .045*     .055*         *         *
*R1               *    8.936       *Lat Struct*        *         *         *         *
*R1               *    8.826       *     .055*     .045*         *         *         *
*R2               *    8.740       *     .055*     .045*     .055*         *         *
*R2               *    8.586       *     .055*     .045*     .055*         *         *
*R2               *    8.467       *     .055*     .045*     .055*         *         *
*R2               *    8.354       *     .055*     .045*     .055*         *         *
```

*R2	8.134	.055*	.045*	.055*	.045*	.055*	
*R3	7.984	.055*	.045*	.055*	*	*	
*R3	7.886	.055*	.045*	.055*	.045*	.055*	
*R3	7.784	.055*	.045*	.055*	.045*	.055*	
*R4	7.678	.055*	.045*	.055*	*	*	
*R4	7.611	.055*	.045*	.055*	*	*	
*R4	7.596	.05*	.035*	.05*	*	*	
*R4	7.541	.05*	.035*	.05*	*	*	
*R4	7.491	.05*	.035*	.05*	*	*	
*R4	7.450	.05*	.035*	.05*	*	*	
*R4	7.382	.05*	.035*	.05*	*	*	
*R4	7.331	.05*	.035*	.05*	*	*	
*R4	7.283	.05*	.035*	.05*	*	*	
*R4	7.240	.05*	.035*	.05*	*	*	
*R4	7.215	.05*	.035*	.05*	*	*	
*R4	7.193	.05*	.035*	.05*	*	*	
*R4	7.174	.05*	.035*	.05*	*	*	
*R4	7.155	.05*	.035*	.05*	*	*	
*R4	7.076	.05*	.035*	.05*	*	*	
*R4	6.982	.05*	.035*	.05*	*	*	
*R4	6.977	.055*	.045*	.055*	*	*	
*R4	6.849	.055*	.045*	.055*	*	*	
*R4	6.697	.055*	.045*	.055*	*	*	

River:RV W10 T2

Reach	River Sta.	n1	n2	n3	n4	n5	n6	n7
*R1	0.845	.055*	.045*	.055*	*	*	*	*
*R1	0.844	.055*	.045*	.055*	*	*	*	*
*R2	0.747	.055*	.045*	.055*	.045*	.055*	*	*
*R2	0.711	.055*	.045*	.055*	.045*	.055*	.045*	.055*
*R2	0.684	.055*	.045*	.055*	.045*	.055*	.045*	.055*
*R2	0.663	.055*	.045*	.055*	.045*	.055*	.045*	.055*
*R2	0.581	.055*	.045*	.055*	.045*	.055*	*	*
*R2	0.552	.055*	.045*	.055*	.045*	.055*	*	*
*R2	0.465	.055*	.045*	.055*	*	*	*	*
*R2	0.312	.055*	.045*	.055*	*	*	*	*
*R2	0.193	.055*	.045*	.055*	*	*	*	*
*R2	0.143	.055*	.045*	.055*	.045*	.055*	*	*
*R2	0.072	.055*	.045*	.055*	.045*	.055*	*	*

River:RV W10 T2 S1

Reach	River Sta.	n1	n2	n3	n4	n5	n6	n7
*R1	0.138	.055*	.045*	.055*	.045*	.055*	*	*
*R1	0.104	.055*	.045*	.055*	.045*	.055*	.045*	.055*
*R1	0.068	.055*	.045*	.055*	.045*	.055*	.045*	.055*
*R1	0.026	.055*	.045*	.055*	.045*	.055*	.045*	.055*

River:RV W10 T3

Reach	River Sta.	n1	n2	n3	n4	n5	n6	n7
*R1	0.615	.055*	.045*	.055*	*	*	*	*
*R1	0.520	.055*	.045*	.055*	*	*	*	*
*R1	0.438	.055*	.045*	.055*	.045*	.055*	.045*	.055*
*R1	0.411	.055*	.045*	.055*	.045*	.055*	.045*	.055*
*R1	0.357	.055*	.045*	.055*	.045*	.055*	.045*	.055*
*R2	0.289	.055*	.045*	.055*	.045*	.055*	*	*
*R2	0.259	.055*	.045*	.055*	.045*	.055*	*	*
*R2	0.123	.055*	.045*	.055*	.045*	.055*	*	*

River:RV W10 T4

Reach	River Sta.	n1	n2	n3	n4	n5
*R1	0.373	.045*	.055*	*	*	*
*R1	0.310	.045*	.055*	*	*	*
*R1	0.222	.055*	.045*	.055*	.045*	.055*
*R1	0.145	.055*	.045*	.055*	.045*	.055*
*R1	0.034	.055*	.045*	.055*	*	*

SUMMARY OF REACH LENGTHS

River: RV W10

Reach	River Sta.	Left	Channel	Right
*R1	9.689	600*	659.59*	575*
*R1	9.564	710*	714.34*	710*
*R1	9.429	875*	932.45*	925*
*R1	9.252	401.17*	401.17*	401.17*
*R1	9.176	335.01*	381.01*	334.74*
*R1	9.175	*Lat Struct*	*	*
*R1	9.104	480*	489.21*	479.61*
*R1	9.103	*Lat Struct*	*	*
*R1	9.012	401*	393.84*	401.48*
*R1	9.011	*Lat Struct*	*	*
*R1	8.937	577*	586.12*	577.05*
*R1	8.936	*Lat Struct*	*	*
*R1	8.826	*	*	*

*R2	8.740	805*	815.33*	810*
*R2	8.586	850*	624.46*	650*
*R2	8.467	595*	598.93*	525*
*R2	8.354	1100*	1163.68*	1175*
*R2	8.134	*	*	*
*R3	7.984	511.25*	514.1*	486.9*
*R3	7.886	538.75*	541.76*	513.1*
*R3	7.784	*	*	*
*R4	7.678	275*	353.47*	325*
*R4	7.611	80.12*	80.12*	80.12*
*R4	7.596	291.07*	291.07*	291.07*
*R4	7.541	263.7*	263.7*	263.7*
*R4	7.491	213.61*	213.61*	213.61*
*R4	7.450	358.03*	358.03*	358.03*
*R4	7.382	273.58*	273.58*	273.58*
*R4	7.331	249.15*	249.15*	249.15*
*R4	7.283	227.87*	227.87*	227.87*
*R4	7.240	133.47*	133.47*	133.47*
*R4	7.215	115.02*	115.02*	115.02*
*R4	7.193	99.29*	99.29*	99.29*
*R4	7.174	100.19*	100.19*	100.19*
*R4	7.155	417.24*	417.24*	417.24*
*R4	7.076	500.45*	500.45*	500.45*
*R4	6.982	24.5*	24.5*	24.5*
*R4	6.977	677.8*	677.8*	677.8*
*R4	6.849	797.49*	797.49*	797.49*
*R4	6.697	1131.65*	1131.65*	1131.65*

River: RV W10 T2

Reach	River Sta.	Left	Channel	Right
*R1	0.845	1*	1*	1*
*R1	0.844	*	*	*
*R2	0.747	192.72*	192.72*	192.72*
*R2	0.711	139.14*	139.14*	139.14*
*R2	0.684	114.61*	114.61*	114.61*
*R2	0.663	430.49*	430.49*	430.49*
*R2	0.581	155.6*	155.6*	155.6*
*R2	0.552	458.08*	458.08*	458.08*
*R2	0.465	804.9*	804.9*	804.9*
*R2	0.312	630.75*	630.75*	630.75*
*R2	0.193	262.12*	262.12*	262.12*
*R2	0.143	378.08*	378.08*	378.08*
*R2	0.072	*	*	*

River: RV W10 T2 S1

Reach	River Sta.	Left	Channel	Right
*R1	0.138	177.55*	177.55*	177.55*
*R1	0.104	191.75*	191.75*	191.75*
*R1	0.068	224.61*	224.61*	224.61*
*R1	0.026	*	*	*

River: RV W10 T3

Reach	River Sta.	Left	Channel	Right
*R1	0.615	500*	501.11*	500*
*R1	0.520	425*	430.7*	430*
*R1	0.438	143.29*	144.12*	143.29*
*R1	0.411	281.71*	283.35*	281.71*
*R1	0.357	*	*	*
*R2	0.289	155*	159.61*	155*
*R2	0.259	700*	718.6*	715*
*R2	0.123	*	*	*

River: RV W10 T4

Reach	River Sta.	Left	Channel	Right
*R1	0.373	336.21*	336.21*	336.21*
*R1	0.310	464.94*	464.94*	464.94*
*R1	0.222	407.14*	407.14*	407.14*
*R1	0.145	582.53*	582.53*	582.53*
*R1	0.034	*	*	*

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: RV W10

Reach	River Sta.	Contr.	Expan.
*R1	9.689	.1*	.3*
*R1	9.564	.1*	.3*
*R1	9.429	.1*	.3*
*R1	9.252	.1*	.3*
*R1	9.176	.1*	.3*
*R1	9.175	*Lat Struct*	*
*R1	9.104	.1*	.3*
*R1	9.103	*Lat Struct*	*
*R1	9.012	.1*	.3*

```
*R1              *    9.011   *Lat Struct*          *
*R1              *    8.937   *       .1*       .3*
*R1              *    8.936   *Lat Struct*          *
*R1              *    8.826   *       .1*       .3*
*R2              *    8.740   *       .1*       .3*
*R2              *    8.586   *       .1*       .3*
*R2              *    8.467   *       .1*       .3*
*R2              *    8.354   *       .1*       .3*
*R2              *    8.134   *       .1*       .3*
*R3              *    7.984   *       .1*       .3*
*R3              *    7.886   *       .1*       .3*
*R3              *    7.784   *       .1*       .3*
*R4              *    7.678   *       .1*       .3*
*R4              *    7.611   *       .1*       .3*
*R4              *    7.596   *       .1*       .3*
*R4              *    7.541   *       .1*       .3*
*R4              *    7.491   *       .1*       .3*
*R4              *    7.450   *       .1*       .3*
*R4              *    7.382   *       .1*       .3*
*R4              *    7.331   *       .1*       .3*
*R4              *    7.283   *       .1*       .3*
*R4              *    7.240   *       .1*       .3*
*R4              *    7.215   *       .1*       .3*
*R4              *    7.193   *       .1*       .3*
*R4              *    7.174   *       .1*       .3*
*R4              *    7.155   *       .1*       .3*
*R4              *    7.076   *       .1*       .3*
*R4              *    6.982   *       .1*       .3*
*R4              *    6.977   *       .1*       .3*
*R4              *    6.849   *       .1*       .3*
*R4              *    6.697   *       .1*       .3*
*****************************************************
River: RV W10 T2

*****************************************************
*     Reach      *   River Sta.   * Contr.  * Expan.  *
*****************************************************
*R1               *    0.845   *       .1*       .3*
*R1               *    0.844   *       .1*       .3*
*R2               *    0.747   *       .1*       .3*
*R2               *    0.711   *       .1*       .3*
*R2               *    0.684   *       .1*       .3*
*R2               *    0.663   *       .1*       .3*
*R2               *    0.581   *       .1*       .3*
*R2               *    0.552   *       .1*       .3*
*R2               *    0.465   *       .1*       .3*
*R2               *    0.312   *       .1*       .3*
*R2               *    0.193   *       .1*       .3*
*R2               *    0.143   *       .1*       .3*
*R2               *    0.072   *       .1*       .3*
*****************************************************
River: RV W10 T2 S1

*****************************************************
*     Reach      *   River Sta.   * Contr.  * Expan.  *
*****************************************************
*R1               *    0.138   *       .1*       .3*
*R1               *    0.104   *       .1*       .3*
*R1               *    0.068   *       .1*       .3*
*R1               *    0.026   *       .1*       .3*
*****************************************************
River: RV W10 T3

*****************************************************
*     Reach      *   River Sta.   * Contr.  * Expan.  *
*****************************************************
*R1               *    0.615   *       .1*       .3*
*R1               *    0.520   *       .1*       .3*
*R1               *    0.438   *       .1*       .3*
*R1               *    0.411   *       .1*       .3*
*R1               *    0.357   *       .1*       .3*
*R2               *    0.289   *       .1*       .3*
*R2               *    0.259   *       .1*       .3*
*R2               *    0.123   *       .1*       .3*
*****************************************************
River: RV W10 T4

*****************************************************
*     Reach      *   River Sta.   * Contr.  * Expan.  *
*****************************************************
*R1               *    0.373   *       .1*       .3*
*R1               *    0.310   *       .1*       .3*
*R1               *    0.222   *       .1*       .3*
*R1               *    0.145   *       .1*       .3*
*R1               *    0.034   *       .1*       .3*
*****************************************************

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

ERRORS WARNINGS AND NOTES
Errors Warnings and Notes for Plan : RV Wash 7

River: RV W7  Reach: R1     RS: 8.325     Profile: 100-YR FP
     Warning:The energy equation could not be balanced within the specified number of iterations.  The program used critical depth
             for the water surface and continued on with the calculations.
     Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
             the need for additional cross sections.
     Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
             water surface came back below critical depth.  This indicates that there is not a valid subcritical answer.  The
             program defaulted to critical depth.
```

```
    Note:  Multiple critical depths were found at this location.  The critical depth with the lowest, valid, water surface was
           used.
River: RV W7  Reach: R1     RS: 8.252     Profile: 100-YR FP
    Warning:The energy equation could not be balanced within the specified number of iterations.  The program used critical depth
           for the water surface and continued on with the calculations.
    Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
           This may indicate the need for additional cross sections.
    Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
           the need for additional cross sections.
    Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
           water surface came back below critical depth.  This indicates that there is not a valid subcritical answer.  The
           program defaulted to critical depth.
    Note:  Multiple critical depths were found at this location.  The critical depth with the lowest, valid, water surface was
           used.
River: RV W7  Reach: R1     RS: 8.162     Profile: 100-YR FP
    Warning:The energy equation could not be balanced within the specified number of iterations.  The program used critical depth
           for the water surface and continued on with the calculations.
    Warning:Divided flow computed for this cross-section.
    Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
           the need for additional cross sections.
    Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
           water surface came back below critical depth.  This indicates that there is not a valid subcritical answer.  The
           program defaulted to critical depth.
    Note:  Multiple critical depths were found at this location.  The critical depth with the lowest, valid, water surface was
           used.
River: RV W7  Reach: R1     RS: 8.087     Profile: 100-YR FP
    Warning:Divided flow computed for this cross-section.
    Warning:The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for additional cross sections.
    Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
           This may indicate the need for additional cross sections.
    Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
           the need for additional cross sections.
River: RV W7  Reach: R1     RS: 8.037     Profile: 100-YR FP
    Warning:The energy equation could not be balanced within the specified number of iterations.  The program used critical depth
           for the water surface and continued on with the calculations.
    Warning:Divided flow computed for this cross-section.
    Warning:The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for additional cross sections.
    Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
           This may indicate the need for additional cross sections.
    Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
           the need for additional cross sections.
    Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
           water surface came back below critical depth.  This indicates that there is not a valid subcritical answer.  The
           program defaulted to critical depth.
    Note:  Multiple critical depths were found at this location.  The critical depth with the lowest, valid, water surface was
           used.
River: RV W7  Reach: R1     RS: 7.974     Profile: 100-YR FP
    Warning:The energy equation could not be balanced within the specified number of iterations.  The program used critical depth
           for the water surface and continued on with the calculations.
    Warning:Divided flow computed for this cross-section.
    Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
           the need for additional cross sections.
    Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
           water surface came back below critical depth.  This indicates that there is not a valid subcritical answer.  The
           program defaulted to critical depth.
    Note:  Manning's n values were composited to a single value in the main channel.
    Note:  Multiple critical depths were found at this location.  The critical depth with the lowest, valid, water surface was
           used.
River: RV W7  Reach: R1     RS: 7.910     Profile: 100-YR FP
    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.
River: RV W7  Reach: R1     RS: 7.825     Profile: 100-YR FP
    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.
    Note:  Multiple critical depths were found at this location.  The critical depth with the lowest, valid, water surface was
           used.
River: RV W7  Reach: R1     RS: 7.730     Profile: 100-YR FP
    Warning:The energy equation could not be balanced within the specified number of iterations.  The program used critical depth
           for the water surface and continued on with the calculations.
    Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
           This may indicate the need for additional cross sections.
    Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
           the need for additional cross sections.
    Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
           water surface came back below critical depth.  This indicates that there is not a valid subcritical answer.  The
           program defaulted to critical depth.
    Note:  Multiple critical depths were found at this location.  The critical depth with the lowest, valid, water surface was
           used.
River: RV W7  Reach: R1     RS: 7.620     Profile: 100-YR FP
    Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
           This may indicate the need for additional cross sections.
    Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
           the need for additional cross sections.
    Note:  Multiple critical depths were found at this location.  The critical depth with the lowest, valid, water surface was
           used.
River: RV W7  Reach: R1     RS: 7.554     Profile: 100-YR FP
    Warning:The energy equation could not be balanced within the specified number of iterations.  The program used critical depth
           for the water surface and continued on with the calculations.
    Warning:Divided flow computed for this cross-section.
    Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
           This may indicate the need for additional cross sections.
    Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
           the need for additional cross sections.
    Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
           water surface came back below critical depth.  This indicates that there is not a valid subcritical answer.  The
           program defaulted to critical depth.
River: RV W7  Reach: R1     RS: 7.413     Profile: 100-YR FP
    Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
```

```
            This may indicate the need for additional cross sections.
     Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
            the need for additional cross sections.
     Note:   Manning's n values were composited to a single value in the main channel.
     Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, water surface was
            used.
River: RV W7  Reach: R1     RS: 7.318     Profile: 100-YR FP
     Warning:Divided flow computed for this cross-section.
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
            This may indicate the need for additional cross sections.
     Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
            the need for additional cross sections.
     Note:   Manning's n values were composited to a single value in the main channel.
     Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, water surface was
            used.
River: RV W7  Reach: R1     RS: 7.273     Profile: 100-YR FP
     Warning:Divided flow computed for this cross-section.
River: RV W7  Reach: R1     RS: 7.271     Profile: 100-YR FP
     Warning:Divided flow computed for this cross-section.
River: RV W7  Reach: R1     RS: 7.269     Profile: 100-YR FP
     Warning:Divided flow computed for this cross-section.
```

E.3.2 HEC-RAS Output

RV Wash 10 Trib 1

HEC-RAS Plan: RV Wash 10T1 River: RV W10 T1 Reach: R1 Profile: 100-YR FP

River	Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
RV W10 T1	R1	1.204	100-YR FP	590.00	2439.51	2442.34	2442.31	2442.63	0.011238	5.29	168.35	210.40	1.08
RV W10 T1	R1	1.197	100-YR FP	590.00	2439.14	2440.87	2440.87	2441.81	0.046721	9.28	79.17	71.70	1.84
RV W10 T1	R1	1.187	100-YR FP	590.00	2438.12	2440.41	2439.80	2440.56	0.009267	3.57	214.59	234.99	0.57
RV W10 T1	R1	1.145	100-YR FP	590.00	2435.26	2437.95	2437.95	2438.56	0.011630	7.02	118.09	97.70	0.89
RV W10 T1	R1	1.123	100-YR FP	590.00	2433.68	2435.57	2435.57	2436.30	0.016095	6.83	86.42	60.26	1.00
RV W10 T1	R1	1.104	100-YR FP	590.00	2431.02	2433.71	2433.71	2434.51	0.014385	7.18	83.74	58.72	0.97
RV W10 T1	R1	1.096	100-YR FP	590.00	2430.00	2432.77	2432.77	2433.64	0.014789	7.48	78.85	44.42	0.99
RV W10 T1	R1	1.058	100-YR FP	590.00	2425.05	2428.87	2428.87	2429.95	0.014194	8.32	70.96	32.62	0.99
RV W10 T1	R1	1.007	100-YR FP	590.00	2421.29	2424.32	2424.15	2425.05	0.011486	6.87	85.83	45.26	0.88
RV W10 T1	R1	0.991	100-YR FP	590.00	2420.26	2423.25	2423.25	2423.92	0.016276	6.55	90.02	67.03	1.00
RV W10 T1	R1	0.918	100-YR FP	590.00	2413.16	2416.35	2416.35	2417.38	0.014721	8.14	72.52	46.87	1.01
RV W10 T1	R1	0.873	100-YR FP	590.00	2409.37	2412.56	2412.56	2413.29	0.016126	7.43	98.24	71.51	1.02
RV W10 T1	R1	0.839	100-YR FP	590.00	2406.70	2409.50	2409.50	2410.45	0.014836	7.84	75.24	39.63	1.00
RV W10 T1	R1	0.809	100-YR FP	590.00	2403.68	2406.49	2406.49	2407.37	0.014828	7.53	78.31	43.77	0.99
RV W10 T1	R1	0.787	100-YR FP	590.00	2402.13	2404.33		2404.71	0.008698	4.97	118.60	83.62	0.74
RV W10 T1	R1	0.767	100-YR FP	590.00	2400.40	2402.73	2402.71	2403.48	0.015276	6.97	84.59	54.89	0.99
RV W10 T1	R1	0.748	100-YR FP	590.00	2399.20	2401.20	2401.20	2401.82	0.016840	6.34	93.04	90.37	1.00
RV W10 T1	R1	0.722	100-YR FP	590.00	2396.93	2398.80	2398.80	2399.49	0.016267	6.65	88.67	64.78	1.00
RV W10 T1	R1	0.698	100-YR FP	590.00	2394.94	2397.07	2396.84	2397.60	0.010203	5.88	100.30	62.06	0.82
RV W10 T1	R1	0.679	100-YR FP	590.00	2393.70	2395.70	2395.70	2396.33	0.017066	6.39	92.36	74.44	1.01
RV W10 T1	R1	0.654	100-YR FP	590.00	2390.48	2393.00	2392.55	2393.36	0.006504	4.77	123.77	74.84	0.65
RV W10 T1	R1	0.622	100-YR FP	590.00	2387.87	2390.92	2390.92	2391.79	0.013657	7.47	80.78	194.44	0.96
RV W10 T1	R1	0.565	100-YR FP	590.00	2382.85	2385.28	2385.28	2385.99	0.015466	6.75	87.43	168.58	0.99
RV W10 T1	R1	0.545	100-YR FP	590.00	2380.42	2382.98	2382.98	2383.68	0.010381	6.99	108.10	185.25	0.86
RV W10 T1	R1	0.532	100-YR FP	590.00	2379.63	2381.43	2381.43	2382.04	0.015910	6.28	94.76	127.54	0.98
RV W10 T1	R1	0.494	100-YR FP	590.00	2376.50	2377.60		2377.75	0.023558	2.90	188.25	266.39	0.75
RV W10 T1	R1	0.474	100-YR FP	590.00	2374.77	2376.60	2376.31	2376.78	0.013992	3.82	183.10	210.04	0.67
RV W10 T1	R1	0.351	100-YR FP	590.00	2360.33	2361.75	2361.75	2362.17	0.042301	5.31	113.82	141.90	1.05
RV W10 T1	R1	0.288	100-YR FP	980.00	2353.89	2355.44	2354.90	2355.64	0.010474	3.86	273.06	190.46	0.55

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


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

****

PROJECT DATA
Project Title: RV Wash 10 Trib 1
Project File : RV_Wash_10_Trib_1.prj
Run Date and Time: 11/1/2007 10:05:43 AM

Project in English units

Project Description:
Rio Verde ADMP, Project FCDMC 2001C056, RV Wash 10 Trib 1. Phase 3 RAS model started in May 2005, preliminary model completed in June 2005.

RAS model is prepared by Dibble Engineering. Field reconnaissance per report dated April 18, 2005.

For the study washes, the starting water surface elevation is on RV Wash 10 Trib 1, and is taken from the starting water surface elevation as provided by the Flood Control District of Maricopa County.

RV Wash 10 Trib 1
Floodplain Delineation
From a point approximately 1,000 feet south and 50 feet west of the intersection of 144th Street and Rio Verde Drive (RM 0.288) to a point approximately 1,100 feet south and 350 feet west of the intersection of 138th Street and Rio Verde Drive (River Mile 1.221), a distance of 0.933 river miles.

Topographic mapping is supplied by the Flood Control District of Maricopa County.

The Cross-section data were generated by INROADS, based on the DTM data. The mapped hydraulic base line represents the 10,000-station point of the HEC-RAS model.

Discharge data is from the Rio Verde ADMP HEC-1 model. The original models are from the Flood Control District of Maricopa County, prepared for the Rio Verde South Floodplain Delineation, the Rio Verde South Extension Floodplain Delineation, the Rio Verde North Floodplain Delineation, and the Rio Verde North Extension Floodplain Delineation. The HEC-1 models were modified for the Rio Verde ADMP. The final HEC-1 files were reviewed in February 2004 and FCDMC approved the hydrology model.

Hydrologic concentration points are noted in cross-section descriptions using the corresponding HEC-1 ID's. The flow rates have been rounded to the nearest 10 cubic feet per second (cfs). Flow rates obtained from HEC-1 are applied at the downstream end of the relevant sub-basin and stepped upstream at cross-sections to meet the HEC-1 flow from the upstream sub-basin.

River Mile (RM) stationing is based upon the estimated tie in point with downstream receiving waters or the start of two-dimensional flow models. This point represents RM 0.000. The assumed starting WS Elevation is based upon normal depth in the study wash.

Horizontal and Vertical Coordinate Basis for this project is as follows:
Horizontal--Arizona State Plane, Central Region, NAD 1983
Vertical--NAVD 1988

RAS model river naming corresponds to project river naming as follows:
RV W10 T1 = RV Wash 10 Trib 1

****

PLAN DATA

Plan Title: RV Wash 10 Trib 1
Plan File : j:\2006\10-0606.1\Design Notebook\Drainage Design\HEC-RAS\RV_Wash_10_Trib_1.p01

Geometry Title: RV Wash 10 Trib 1
Geometry File : j:\2006\10-0606.1\Design Notebook\Drainage Design\HEC-RAS\RV_Wash_10_Trib_1.g01

Flow Title : RV Wash 10 Trib 1
Flow File : j:\2006\10-0606.1\Design Notebook\Drainage Design\HEC-RAS\RV_Wash_10_Trib_1.f01

Plan Summary Information:
Number of: Cross Sections = 29 Multiple Openings = 0

```
          Culverts        =    0    Inline Structures  =    0
          Bridges         =    0    Lateral Structures =    0

Computational Information
    Water surface calculation tolerance  =  0.01
    Critical depth calculation tolerance =  0.01
    Maximum number of iterations         =  20
    Maximum difference tolerance         =  0.3
    Flow tolerance factor                =  0.001

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

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

River = RV W10           Reach = R2
RS      Profile           Method  Value1  Value2
8.740   PF 2                   1 9996.0510135.78
8.586   PF 2                   1    996410069.34
8.467   PF 2                   1 9992.1910302.12
8.354   PF 2                   1 9972.8810256.04
8.134   PF 2                   1 9959.7210116.12

River = RV W10           Reach = R3
RS      Profile           Method  Value1  Value2
7.984   PF 2                   1 9974.0610191.62
7.886   PF 2                   1 9981.9810175.83
7.784   PF 2                   1 9846.9710122.58

River = RV W10           Reach = R4
RS      Profile           Method  Value1  Value2
7.678   PF 2                   1 9790.5410019.26
7.611   PF 2                   1  9833.510037.63
7.596   PF 2                   1 9915.8210020.89
7.541   PF 2                   1 9878.3210027.05
7.491   PF 2                   1  9888.2 10024.5
7.450   PF 2                   1 9945.21   10028
7.382   PF 2                   1 9886.1610056.78
7.331   PF 2                   1  9882.910020.24
7.283   PF 2                   1 9898.9210030.08
7.240   PF 2                   1 9873.5510022.12
7.215   PF 2                   1 9823.63 10017.3
7.193   PF 2                   1 9852.4810074.02
7.174   PF 2                   1    990010124.35
7.155   PF 2                   1 9949.5310122.47
7.076   PF 2                   1 9938.9810130.47
6.982   PF 2                   1 9959.8310136.72
6.977   PF 2                   1 9980.3510160.98
6.849   PF 2                   1    9950 10184.3
6.697   PF 2                   1 9680.8210022.05
6.483   PF 2                   1 9953.2710021.14

River = RV W10           Reach = R5
RS      Profile           Method  Value1  Value2
6.310   PF 2                   1 9979.0910021.99
6.308   PF 2                   1 9979.1810021.67
6.306   PF 2                   1 9979.2710021.76

River = RV W10 T4        Reach = R1
RS      Profile           Method  Value1  Value2
0.373   PF 2                   1 9980.4310071.23
0.310   PF 2                   1  9985.810110.22
0.222   PF 2                   1  9981.510070.71
0.145   PF 2                   1 9969.3910164.27
0.034   PF 2                   1 9973.3210215.06

River = RV W10 T1        Reach = R1
RS      Profile           Method  Value1  Value2
1.204   PF 2                   1 9777.4910009.86
1.197   PF 2                   1 9792.83 10007.9
1.187   PF 2                   1 9810.1810013.97
1.145   PF 2                   1 9978.7810012.59
1.123   PF 2                   1 9962.2610022.52
1.104   PF 2                   1 9974.9910023.41
1.096   PF 2                   1 9971.0210015.44
1.058   PF 2                   1 9982.27 10014.9
1.007   PF 2                   1 9984.1910029.44
0.991   PF 2                   1 9983.9210050.96
0.918   PF 2                   1 9977.1710012.93
0.873   PF 2                   1 9966.78   10007
0.839   PF 2                   1 9981.2510020.87
0.809   PF 2                   1 9970.6610014.43
0.787   PF 2                   1  9982.610066.22
0.767   PF 2                   1 9969.11   10024
0.748   PF 2                   1 9973.0110048.01
0.722   PF 2                   1 9957.3710022.15
0.698   PF 2                   1 9952.8310014.89
0.679   PF 2                   1 9950.36 10024.8
0.654   PF 2                   1 9941.9810016.82
0.622   PF 2                   1 9971.2810031.28
0.565   PF 2                   1 9969.7610030.25
0.545   PF 2                   1 9949.4710048.81
0.532   PF 2                   1 9942.4710027.92
0.494   PF 2                   1 9908.1810046.55
```

```
0.474   PF 2                    1  9923.410008.41
0.351   PF 2                    1 9919.8210012.45
0.288   PF 2                    1 9920.6410012.47
0.193   PF 2                    1  9987.810087.64
0.130   PF 2                    1 9946.87   10062

River = RV W10 T2        Reach = R1
RS      Profile           Method  Value1  Value2
0.845   PF 2                    1 9978.8610038.85
0.844   PF 2                    1 9978.8610038.85

River = RV W10 T2        Reach = R2
RS      Profile           Method  Value1  Value2
0.747   PF 2                    1 9974.76   10110
0.711   PF 2                    1 9957.0710152.61
0.684   PF 2                    1 9936.6910121.54
0.663   PF 2                    1 9959.7510150.99
0.581   PF 2                    1 9950.8110018.08
0.552   PF 2                    1 9955.4510040.04
0.465   PF 2                    1 9973.0710075.53
0.312   PF 2                    1 9987.65 10008.3
0.193   PF 2                    1 9976.2110009.77
0.143   PF 2                    1 9985.7310012.65
0.072   PF 2                    1 9700.3110007.87

River = RV W10 T2 S1     Reach = R1
RS      Profile           Method  Value1  Value2
0.138   PF 2                    1 9989.1110031.77
0.104   PF 2                    1 9945.45 10032.9
0.068   PF 2                    1 9949.7910063.23
0.026   PF 2                    1 9841.72 10035.8

River = RV W10 T3        Reach = R1
RS      Profile           Method  Value1  Value2
0.615   PF 2                    1 9954.9610050.23
0.520   PF 2                    1 9951.8410100.43
0.438   PF 2                    1 9919.2410082.12
0.411   PF 2                    1 9934.7710050.49
0.357   PF 2                    1 9922.25 10114.7

River = RV W10 T3        Reach = R2
RS      Profile           Method  Value1  Value2
0.289   PF 2                    1 9954.4910040.92
0.259   PF 2                    1 9954.0610030.21
0.123   PF 2                    1    9962   10084


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

FLOW DATA

Flow Title: RV Wash 10 Trib 1
Flow File : j:\2006\10-0606.1\Design Notebook\Drainage Design\HEC-RAS\RV_Wash_10_Trib_1.f01

Flow Data (cfs)
*************************************************************
* River          Reach          RS      *       100-YR FP *
* RV W10 T1      R1             1.204   *             590 *
* RV W10 T1      R1             0.288   *             980 *
*************************************************************

Boundary Conditions
*****************************************************************************************************
* River          Reach          Profile          *          Upstream                  Downstream    *
*****************************************************************************************************
* RV W10 T1      R1             100-YR FP        *                                Known WS = 2355.44 *
*****************************************************************************************************

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

GEOMETRY DATA

Geometry Title: RV Wash 10 Trib 1
Geometry File : j:\2006\10-0606.1\Design Notebook\Drainage Design\HEC-RAS\RV_Wash_10_Trib_1.g01

CROSS SECTION


RIVER: RV W10 T1
REACH: R1                RS: 1.204

INPUT
Description: Q=590 cfs (CP11G2, 24 hr)
Station Elevation Data    num=      42
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
 9692.41  2444.9 9698.38 2444.89 9704.93  2444.7 9727.74 2443.45 9729.17 2443.33
 9731.77  2442.9 9745.19  2441.1 9748.37 2440.36 9755.34 2439.32 9759.05    2440
 9766.69  2441.3    97712441.357 9783.21 2441.52 9801.32 2441.57 9827.69 2441.93
 9848.86 2442.21 9867.68 2442.52 9880.54 2442.72  9894.2 2442.85 9907.59 2443.05
 9912.53 2442.83 9928.95 2441.79 9932.22 2441.83 9937.88 2441.89 9952.53 2442.18
 9969.88 2442.21 9982.25 2442.13 9986.18 2441.42 9995.56  2439.8   10000 2439.65
10000.02 2439.6510004.27 2439.5110004.61 2439.5110004.75  2439.610006.37 2440.41
10009.862442.13510020.69 2447.4910026.26 2447.7910026.97 2447.7810027.48 2447.78
10040.43 2448.1610051.79 2448.16

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*************************************************
 9692.41     .06 9982.25    .03510009.86     .06
```

```
Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9912.5310009.86            37.23   37.23   37.23             .1       .3

CROSS SECTION


RIVER: RV W10 T1
REACH: R1                 RS: 1.197

INPUT
Description:
Station Elevation Data    num=      42
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 9706.68 2445.22 9706.95  2445.2 9714.61 2444.74 9737.26 2443.33 9748.97 2442.14
 9752.27 2441.61 9766.05 2439.31 9772.14 2438.99 9775.55 2438.62 9780.93 2438.86
 9788.24 2439.55 9794.87 2440.75 9795.87 2440.91 9803.89 2440.93 9824.06  2440.9
 9841.44 2441.17 9860.17 2441.51    9875 2441.92 9884.17  2441.9 9899.82 2441.95
 9915.64 2441.86 9922.86  2441.9 9933.88 2441.09 9941.87 2440.54 9945.15 2440.62
 9954.31 2441.14 9965.17 2441.65 9966.34 2441.56 9970.17 2441.75  9985.3 2441.36
 9993.34 2439.56 9995.41 2439.17 9999.99 2439.15   10000 2439.1510002.38 2439.14
10002.81 2439.1410004.27 2439.7410008.62 2441.0910022.59 2445.3910034.28 2446.86
10039.67 2446.9710052.66 2447.23

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9706.68     .06  9985.3    .03510008.62     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9922.8610008.62            51.94   51.94   51.94             .1       .3

CROSS SECTION


RIVER: RV W10 T1
REACH: R1                 RS: 1.187

INPUT
Description:
Station Elevation Data    num=      57
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 9683.54 2446.83 9686.72 2446.67 9689.02 2446.51 9691.23  2446.4 9704.93 2444.86
 9724.25 2443.66 9733.99 2443.08 9738.68 2442.91 9747.18 2441.89 9755.08 2441.84
 9757.36 2441.72 9772.62 2441.55 9785.05 2439.46 9796.89 2437.39 9803.17 2437.66
    98082437.925 9808.83 2437.97 9817.43 2439.27 9818.91 2439.46 9823.52 2439.52
 9855.41 2440.19 9861.15 2440.35 9870.83 2440.37  9889.7  2440.2 9899.29 2440.18
 9922.42 2440.35 9926.23 2440.39 9935.28 2439.54 9939.41 2439.16 9941.13 2439.07
 9948.35 2439.26  9960.4 2439.48 9961.75 2439.52 9962.45 2439.47 9972.34  2438.7
 9982.65 2439.11 9989.11 2439.76 9995.89 2438.92 9998.09 2438.46  9999.2 2438.47
   10000 2438.4310007.61 2438.1210013.97 2440.2910020.61 2442.1510032.27 2442.87
10049.51 2443.0110051.22 2443.0310052.14 2442.97   10068  2442.810073.98 2442.69
10088.47 2443.8610112.14 2445.6110119.97 2446.0810122.02 2446.1710140.65 2446.67
10148.59 2447.09 10156.7 2447.19

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9683.54     .06 9989.11    .03510013.97     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9926.2310013.97              100  223.49  223.49             .1       .3

CROSS SECTION


RIVER: RV W10 T1
REACH: R1                 RS: 1.145

INPUT
Description:
Station Elevation Data    num=      47
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 9789.75 2450.88 9789.76 2450.88 9797.23 2450.81 9800.67 2450.54 9823.46 2448.07
 9826.49 2447.66 9840.69  2445.9 9842.98 2445.65 9844.65 2445.54 9860.33  2444.3
  9870.5 2444.23 9881.86 2444.11 9888.78    2444 9895.88  2443.9 9900.84 2443.39
 9912.64 2441.99 9921.05 2439.11 9928.74 2435.97 9930.94 2435.65  9933.3 2436.23
  9939.2 2436.87 9955.68 2437.15 9974.34  2437.5 9978.78 2437.56 9980.38 2437.22
 9990.81 2435.26   10000 2435.4310001.52 2435.4610004.73 2435.4110006.02 2435.89
10012.59 2437.6210027.76 2438.1710044.77 2438.7810049.04 2438.9510050.61 2438.97
10059.16 2439.1310073.92 2439.4110079.14  2439.410101.12 2439.3410106.99  2439.3
10108.21  2439.3 10143.9 2439.3610146.37 2439.4510151.62 2439.4910161.42 2440.83
10171.18 2442.02 10177.1  2442.6

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9789.75     .06 9978.78    .03510012.59     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9978.7810012.59            114.76  114.76  114.76             .1       .3

CROSS SECTION


RIVER: RV W10 T1
REACH: R1                 RS: 1.123
```

```
INPUT
Description:
Station Elevation Data    num=      48
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 9821.27 2446.98 9830.07  2446.1 9841.28 2445.05 9847.93 2444.41 9863.02 2443.82
  9866.5 2443.57 9884.38 2442.64 9886.08 2442.57  9891.9  2442.3 9903.45 2441.29
 9905.91  2441.1 9922.32  2439.5 9927.08 2439.15 9947.16 2437.25 9959.79 2435.84
 9978.15 2433.84 9984.32 2433.86 9997.97 2433.68 9999.98  2433.7   10000  2433.7
10015.14 2433.8410022.32 2435.5310023.09 2435.6910026.05 2435.7610069.12 2436.91
10073.73 2436.9210100.43  2437.110103.67 2437.1210104.21 2437.1210105.45 2437.11
10113.91 2437.0710145.64 2436.9110152.28 2437.6110164.93 2438.8310169.25 2439.41
 10172.6 2439.9610190.12  2442.610193.97 2443.1610194.55 2443.2310197.43 2443.59
10221.25 2446.6810228.78 2446.9510235.28 2447.37   10248 2446.4610269.77 2444.67
10270.05 2444.6510270.15 2444.6410281.44 2443.36

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9821.27     .06 9959.79    .03510023.09     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9959.7910023.09           101.84  101.84  101.84             .1       .3

CROSS SECTION


RIVER: RV W10 T1
REACH: R1                 RS: 1.104

INPUT
Description:
Station Elevation Data    num=      50
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 9795.08 2442.64 9795.31 2442.61 9816.13 2441.07 9833.08 2439.97 9855.93 2439.13
 9861.11 2439.02 9870.71 2439.56  9877.1 2439.94 9897.94 2439.71 9905.13 2439.83
 9916.34 2438.88 9935.57 2436.84 9936.18 2436.79 9937.21 2436.67 9951.29 2434.38
  9968.3 2433.99 9973.82 2433.94 9975.392433.634 9982.54 2432.24 9989.97 2431.28
 9997.97  2431.1   10000 2431.0810005.51 2431.0210015.03 2432.5410019.62 2433.58
10027.92 2433.8710035.39 2433.5410039.48 2433.3510050.05 2435.0210051.83 2435.11
10065.49 2435.1810092.39 2435.2910093.73 2435.2610103.89 2434.8810107.92 2434.73
10108.74 2434.7610143.46 2435.95 10154.4 2436.7910167.13 2437.51 10173.2 2437.96
10179.08 2438.4310189.91 2439.2910206.95 2441.9810207.94 2442.0810210.13 2442.26
10224.33    244310238.01 2442.9110246.53  2442.810249.37 2442.7610255.18 2442.72

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9795.08     .06 9973.82    .03510027.92     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9973.8210027.92            41.76   41.76   41.76             .1       .3

CROSS SECTION


RIVER: RV W10 T1
REACH: R1                 RS: 1.096

INPUT
Description:
Station Elevation Data    num=      50
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 9780.09 2441.95 9793.07 2441.38 9793.56 2441.36 9793.93 2441.32 9811.93 2439.68
  9821.3 2439.07 9833.54  2438.3 9848.55 2437.04  9851.9 2436.97 9854.43 2437.13
 9860.73 2437.72 9874.09 2438.61 9882.81 2439.42 9884.04 2439.43 9898.84 2438.05
 9915.08 2435.82 9921.65 2434.78 9927.17 2433.54 9935.17 2433.47 9968.78 2433.25
 9981.98 2430.43 9983.37    2430  9991.1 2430.83 9991.88 2430.84 9996.68 2430.97
 9998.07 2430.97   10000 2430.7810004.58 2430.3310009.12 2430.5810017.97 2433.65
10021.35 2434.7810026.89 2434.6410041.35 2434.4810056.44  2434.310067.36 2434.05
10070.29 2433.9810074.18 2434.0610107.55 2434.59   10114 2434.6510121.96 2435.06
10141.26 2436.0110153.45 2436.7910165.01 2437.2510172.47 2438.0610182.41 2438.14
10187.87 2438.4910193.85 2438.5110227.74 2439.4210234.74  2440.110240.25 2440.74

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9780.09     .06 9968.78    .03510017.97     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9968.7810017.97           198.25  198.25  198.25             .1       .3

CROSS SECTION


RIVER: RV W10 T1
REACH: R1                 RS: 1.058

INPUT
Description:
Station Elevation Data    num=      36
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 9916.12  2432.4 9916.22  2432.4 9920.46 2432.05 9942.16 2431.36 9955.47 2430.89
  9962.5 2430.74  9979.4 2429.91  9981.32429.223 9982.97 2428.62  9993.5 2425.05
   10000 2425.5110000.17 2425.5310000.91 2425.5510004.04 2426.3210016.38 2429.22
10025.56 2429.5210031.46  2429.610042.37 2429.6210044.14 2429.5810056.13 2430.47
```

```
10064.53 2431.1310072.58 2431.05 10086.4 2430.9210089.19 2430.9210122.51 2430.39
10151.62 2429.6210158.26  2429.510162.08 2429.1410170.26 2428.3410176.36 2429.59
10176.68 2429.6510178.12 2429.6310220.81 2429.7310221.71 2429.7310223.83 2429.84
10236.06 2430.79

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
 9916.12     .06  9981.3    .03510016.38     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        9981.310016.38           274.21  274.21  274.21            .1       .3
Right Levee     Station=10064.53      Elevation= 2431.13

CROSS SECTION


RIVER: RV W10 T1
REACH: R1                 RS: 1.007

INPUT
Description:
Station Elevation Data    num=      25
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 9936.21 2426.43 9948.01 2425.85 9964.37 2425.41 9981.21 2424.97 9996.47 2421.63
 9997.86 2421.29 9999.43 2421.48   10000 2421.5510009.31 2422.7210013.11 2422.18
10017.35 2421.4710019.46 2421.3210029.68 2424.3910031.72 2424.9610032.73 2424.95
10092.89 2425.0110093.62    242510097.55 2424.5910108.62 2423.5410111.57 2423.82
10119.42 2424.5410126.35 2424.9410133.72 2425.05 10142.2 2426.3610153.02 2428.44

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
 9936.21     .06 9981.21    .03510031.72     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        9981.2110031.72           81.87   81.87    115            .1       .3
Right Levee     Station=10092.89      Elevation= 2425.01

CROSS SECTION


RIVER: RV W10 T1
REACH: R1                 RS: 0.991

INPUT
Description:
Station Elevation Data    num=      45
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 9863.27 2428.06 9867.22  2427.9 9884.23 2426.76 9890.31 2426.27 9909.85 2425.74
 9915.72 2425.33 9931.21  2424.6 9942.47 2424.18 9947.45 2424.07 9983.47 2423.36
 9992.49 2421.22 9996.88 2420.37  9999.1 2420.29   10000 2420.2910000.02 2420.29
10004.56 2420.26 10009.9 2420.6310011.61 2420.6810017.78 2422.3410018.83  2422.5
10023.09 2422.5610047.95 2422.8910051.792423.353   10056 2423.8610057.15 2424.03
10060.44  2424.110070.48 2423.9910092.93 2423.7310103.02 2423.66   10112 2423.22
 10124.5 2422.5210133.37 2422.0910137.31 2421.7210143.89 2421.1810154.77 2422.15
10167.21 2423.2910175.68  2424.210186.67 2425.0810195.25 2426.0910206.15 2427.86
10217.17 2430.1810223.85 2430.1410236.72  2430.810244.22 2430.7610247.14 2431.04

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
 9863.27     .06 9983.47    .03510051.79     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        9983.4710051.79           383.09  383.09    230            .1       .3
Right Levee     Station=10060.44      Elevation=  2424.1

CROSS SECTION


RIVER: RV W10 T1
REACH: R1                 RS: 0.918

INPUT
Description:
Station Elevation Data    num=      38
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 9856.82 2421.05  9866.3 2420.29 9878.64 2419.05 9903.21 2416.96 9908.47 2415.87
 9910.24  2415.1 9915.11 2415.93 9920.25 2416.95  9933.9 2416.97 9942.32 2417.03
 9955.36 2417.43 9969.46 2418.08 9973.132417.257 9979.14 2415.91 9989.34 2413.16
 9999.92 2413.52   10000 2413.5210000.01 2413.5210002.32 2413.6210004.31 2414.04
10016.28 2417.25 10022.5 2417.47 10040.3 2417.9310059.91 2418.3510068.91 2418.58
10085.91 2418.7110097.75 2418.4710123.67 2418.8610169.67 2418.3510181.29 2418.19
10185.43 2417.7610197.43 2416.3310201.35 2416.8910203.51  2417.310208.86  2417.6
10231.39  2419.110234.86  2419.310255.42 2420.53

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
 9856.82     .06 9973.13    .03510016.28     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        9973.1310016.28           241.35  241.35  241.35            .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
 9856.82 9969.46 2423.08       F
```

```
Right Levee     Station=10123.67      Elevation= 2418.86

CROSS SECTION


RIVER: RV W10 T1
REACH: R1                 RS: 0.873

INPUT
Description:
Station Elevation Data    num=      35
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
  9782.8 2416.14 9803.25 2413.96 9814.13 2413.24 9820.53  2413.5 9824.32 2413.63
 9827.67 2413.63 9865.78 2413.94 9877.22 2413.79 9907.97 2413.84 9918.91 2413.73
 9924.94 2413.72 9938.34 2411.53 9945.17 2410.53 9946.53 2410.31 9957.66 2412.11
 9958.16 2412.21 9958.55 2412.23 9966.78  2412.7 9970.21 2412.18 9976.67 2411.38
 9986.97 2411.16 9987.66 2411.16 9988.91 2410.91 9995.76 2409.37 9998.24 2409.49
   10000 2409.6410003.12 2409.8910005.13  2411.110008.36 2413.6110019.75 2414.12
 10042.4 2415.0710053.51  2415.610072.76 2417.0810081.38 2417.5310101.08 2419.55

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
  9782.8     .06 9966.78    .03510008.36     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9966.7810008.36              150  178.16  178.16             .1       .3
Left Levee      Station= 9907.97      Elevation= 2413.84

CROSS SECTION


RIVER: RV W10 T1
REACH: R1                 RS: 0.839

INPUT
Description:
Station Elevation Data    num=      51
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9679.43 2421.33 9690.94 2420.61 9705.53 2419.88  9742.8 2417.19 9743.08 2417.17
 9743.27 2417.16 9761.15 2417.15  9774.3  2416.5 9789.05 2415.74 9795.08 2415.27
 9816.96 2414.05 9823.65 2413.47 9840.94 2412.26 9848.67 2411.96  9859.3 2411.76
 9869.17 2411.59 9882.29 2410.58 9886.53 2410.76 9891.94 2411.31 9924.94 2410.82
 9927.35 2410.78 9928.61 2410.71 9931.07 2410.82 9946.13 2411.05 9954.77 2410.93
 9966.79  2410.7 9976.35  2410.5 9978.38 2410.47 9980.54 2409.71 9990.62  2406.7
   10000    240710003.12  2407.110007.53 2407.2210012.66 2407.5310014.29 2407.84
10026.67 2410.9610038.15  2411.210053.91 2411.6310076.91 2411.3110102.05 2410.64
10141.42 2411.0510155.04 2411.1810163.83 2411.32 10200.3 2411.4810202.27 2411.61
10238.48  2414.210244.41 2414.5810268.85 2416.1310282.87 2416.7310287.36 2417.09
10305.89 2417.45

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9679.43     .06 9869.17    .03510053.91     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9976.3510026.67            156.53  156.53  156.53             .1       .3

CROSS SECTION


RIVER: RV W10 T1
REACH: R1                 RS: 0.809

INPUT
Description:
Station Elevation Data    num=      36
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9927.51 2412.76 9929.49 2412.83 9944.25 2412.65 9947.18 2412.19 9954.42  2411.5
 9960.44 2410.66 9968.172407.502 9974.32 2404.99 9975.38 2404.69 9982.29 2404.85
 9985.52 2404.77  9989.3 2403.68 9998.82 2404.05   10000  2404.110000.01  2404.1
10004.25 2404.29 10011.2  2405.910011.85 2406.0810020.95 2407.5110028.06 2407.45
10029.42 2407.4810032.86  2407.310042.99 2406.4910049.45 2407.1310058.43 2408.16
10069.77 2408.4310092.01 2408.6210110.76 2408.7110132.52 2408.7310143.13 2408.74
10177.04  2408.310198.38 2409.1810200.12  2409.310202.54 2409.47 10229.6  2411.1
10245.18 2412.06

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9927.51     .06 9968.17    .03510020.95     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9968.1710020.95            119.38  119.38  119.38             .1       .3
Right Levee     Station=10020.95      Elevation= 2407.51

CROSS SECTION


RIVER: RV W10 T1
REACH: R1                 RS: 0.787

INPUT
Description:
Station Elevation Data    num=      36
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
```

```
*****************************************************************************
 9907.61  2409.6 9912.46 2409.57 9915.09 2409.58 9932.88 2408.19  9954.9  2406.6
 9976.93 2405.55 9978.53 2405.51 9980.112405.067 9980.92 2404.84 9989.78 2402.13
 9994.27 2402.14   10000 2402.1710000.01 2402.1710012.48 2402.2210013.96 2402.52
10018.73 2403.3610025.22 2403.2910038.57 2403.1910060.37 2402.9710065.36 2404.08
10068.712405.04610072.68 2406.1910083.22 2406.2310104.15 2406.1110115.25 2406.08
10128.29 2405.9710135.89 2404.7810137.28 2404.6110138.17 2404.7210144.43  2405.7
10157.22  2406.610163.74 2407.1210174.77 2408.2110195.13 2410.2410200.43 2410.68
10207.58 2411.01

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9907.61     .06 9980.11    .03510068.71     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9980.1110068.71           105.71  105.71  105.71             .1       .3

CROSS SECTION


RIVER: RV W10 T1
REACH: R1                 RS: 0.767

INPUT
Description:
Station Elevation Data    num=      46
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
 9726.33 2408.77 9748.86 2406.97 9757.61 2406.54 9783.44 2405.31 9795.24 2405.09
 9831.81 2403.83 9832.27 2403.81 9833.25 2403.88 9838.16 2404.22  9842.3 2404.54
 9851.16 2404.84 9868.21 2405.48 9872.35 2405.55 9897.29 2405.21 9898.71  2405.2
 9902.78 2405.02 9912.66 2404.49 9947.21 2404.03 9953.42 2403.95 9953.78 2403.92
 9968.59 2402.79 9972.44 2402.32 9982.96 2400.69 9997.11 2400.55   10000 2400.51
10006.98  2400.410019.14 2402.15 10027.9 2403.1910035.622403.94810040.94 2404.47
10066.35 2404.58 10070.8 2404.5810072.51 2404.3210084.76 2402.4410090.22 2403.42
10093.34 2403.9410100.06 2404.4610108.03 2404.8210114.61 2405.3310134.19 2406.44
10158.55 2409.1310164.22 2409.8310170.57 2410.2310176.39 2410.5610182.87  2410.7
10191.12 2410.81

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9726.33     .06 9953.42    .03510035.62     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9953.4210035.62           101.31  101.31  101.31             .1       .3
Right Levee     Station=10066.35      Elevation= 2404.58

CROSS SECTION


RIVER: RV W10 T1
REACH: R1                 RS: 0.748

INPUT
Description:
Station Elevation Data    num=      56
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
  9669.4 2409.77 9690.82 2410.79 9693.54 2410.97 9709.25 2411.44 9711.42 2411.44
 9715.16  2411.2 9729.76 2410.16 9736.13 2409.39 9748.49 2407.96  9757.8 2406.29
 9767.54 2404.91  9786.3 2403.94 9798.41 2402.29 9805.15 2401.79 9819.29 2401.09
  9829.9 2400.87 9832.86 2401.07 9842.41 2401.69 9887.47  2402.5 9887.61  2402.5
 9887.67  2402.5 9887.85  2402.5  9922.4  2402.7 9943.98 2402.28 9953.67 2402.24
 9966.95 2402.71 9967.14 2402.71 9967.84 2402.54  9972.22401.406 9980.56 2399.23
  9998.3  2399.2   10000 2399.2110000.02 2399.2110009.46 2399.2210018.98 2400.49
10018.99 2400.49 10035.1 2400.51 10048.1  2401.210052.09 2401.3810053.08 2401.42
10053.74 2401.2810061.45 2399.4310062.95 2399.6610070.81 2401.5110075.85 2401.89
10082.34 2402.4810107.28 2403.4210126.22 2404.3510146.16 2404.8310147.91 2404.89
 10150.4 2405.0710176.24 2407.3510181.08 2407.3810189.16 2407.7110196.53  2407.4
 10202.8 2407.02

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
  9669.4     .06  9972.2    .03510053.08     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        9972.210053.08           134.35  134.35  134.35             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
10052.87 10202.8 2403.32       F
Left Levee      Station= 9966.95      Elevation= 2402.71

CROSS SECTION


RIVER: RV W10 T1
REACH: R1                 RS: 0.722

INPUT
Description:
Station Elevation Data    num=      41
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
 9679.83 2409.97 9699.56 2409.33 9717.06  2407.6  9717.5 2407.56 9718.05 2407.49
 9744.83 2402.98 9762.75 2401.05 9775.16 2400.37 9784.98 2399.08 9799.47  2399.9
 9802.35  2400.1 9806.93 2400.16 9833.93 2400.69 9862.26 2401.06  9872.8 2401.35
 9893.68 2401.43 9918.58  2401.4 9939.29 2400.18 9940.91  2400.1 9942.67 2400.04
```

```
 9944.73 2399.78 9961.87 2398.45 9976.54  2397.3 9978.29 2397.15 9983.58 2397.12
   10000 2397.0210015.38 2396.9310023.39 2399.1410028.33 2400.1910045.45 2401.31
10053.33 2402.0810071.48 2404.02   10077 2404.8710090.64 2406.6210099.97 2406.79
10103.28 2406.8610107.19 2406.3710117.56 2405.22 10130.3 2404.1310136.81  2403.3
10141.49 2402.85

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
 9679.83     .06 9939.29    .03510028.33     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9939.2910028.33           128.29  128.29  128.29             .1       .3

CROSS SECTION


RIVER: RV W10 T1
REACH: R1                 RS: 0.698

INPUT
Description:
Station Elevation Data    num=      48
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 9621.29 2399.06  9634.7 2399.49 9660.93 2400.35 9666.97 2400.55 9668.64 2400.61
 9670.33 2400.63 9701.17 2399.34 9709.98 2399.07 9717.97 2398.45 9732.77 2398.72
 9734.63  2398.8 9737.88 2398.82 9744.98 2398.84 9755.15 2398.77 9767.27 2398.29
 9775.62 2397.76 9783.22  2397.2 9795.64  2396.2 9801.25 2396.73 9810.17 2397.49
 9839.33 2397.39 9844.44 2397.39 9846.41  2397.5 9858.87 2398.28 9878.35 2398.38
 9884.09 2398.37 9887.67 2398.41  9933.2 2398.01 9945.59  2397.8 9954.37 2396.91
 9973.56 2394.94 9998.13 2394.99   10000    239510000.02    239510007.23 2395.03
 10009.4 2395.5710016.26 2397.4410034.63 2397.82 10034.7 2397.8210048.13 2399.02
10053.82  2399.410063.09 2399.71 10074.8 2400.4310085.84 2401.4310102.64 2403.59
10108.22 2404.2210112.04 2404.77 10123.1 2404.78

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
 9621.29     .06 9945.59    .035 10034.7     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9945.59 10034.7            97.33   97.33   97.33             .1       .3
Left Levee      Station= 9887.67      Elevation= 2398.41

CROSS SECTION


RIVER: RV W10 T1
REACH: R1                 RS: 0.679

INPUT
Description:
Station Elevation Data    num=      52
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 9643.42 2400.83 9658.07 2399.89  9661.1 2399.69 9662.03  2399.6 9680.31 2397.76
 9696.44 2395.76 9702.71 2395.65 9718.02 2395.07 9723.22 2394.56 9733.21 2395.27
 9734.36 2395.35 9754.37 2395.68 9774.44 2395.41 9791.48 2395.43 9801.05 2394.82
 9802.68 2394.75 9803.71 2394.74 9813.69 2394.54 9822.51 2394.45 9833.22 2395.82
  9855.6 2396.14 9861.41 2396.31 9875.42 2396.79 9887.41 2396.74 9905.91 2396.93
 9922.89  2396.8 9933.26 2396.04  9941.8 2396.22 9956.21 2395.34  9974.6 2394.48
 9981.12  2393.7 9982.99  2393.7 9996.08 2393.91   10000 2394.1410005.78 2394.48
10012.22 2394.0110016.46 2394.0510027.522396.23410032.26 2397.1710032.96 2397.35
10033.66 2397.44 10044.8 2398.3410060.82  2400.710067.36 2401.4810073.46 2402.17
10080.65 2402.7110087.52  2403.110100.45 2403.7910112.13 2404.2910116.89 2404.36
10134.63 2404.5810144.75  2404.3

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
 9643.42     .06  9941.8    .03510027.52     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        9941.810027.52             120  134.32  134.32             .1       .3
Left Levee      Station= 9905.91      Elevation= 2396.93

CROSS SECTION


RIVER: RV W10 T1
REACH: R1                 RS: 0.654

INPUT
Description:
Station Elevation Data    num=      42
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 9733.12  2397.8 9736.92 2397.45 9763.16 2395.45 9764.32 2395.34 9764.57 2395.32
 9765.81 2395.23 9771.87 2394.76 9789.49 2393.38 9790.33 2393.37 9791.17 2393.31
  9800.5 2391.67 9800.54 2391.66 9804.12 2392.14 9817.18 2393.85 9817.34 2393.86
 9817.51  2393.9 9836.55  2394.5 9840.01 2394.57 9844.32 2394.61  9883.2 2394.38
 9903.19 2394.42 9928.99 2393.85 9936.25 2393.83 9954.82 2391.15 9958.01 2390.48
 9959.36 2390.64 9972.59  2391.1 9973.39 2391.06 9974.56 2391.12 9980.41 2391.63
 9992.32 2391.09 9994.06 2390.94 9999.42 2391.03 9999.93 2391.05   10000 2391.05
10009.61 2391.1410019.43 2393.6810021.88 2394.32   10030 2394.4110065.37 2395.01
10079.74 2395.4610105.03  2396.6

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
```

```
**********************************************
 9733.12     .06 9936.25    .03510019.43     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9936.2510019.43           166.87  166.87  166.87             .1       .3
Left Levee      Station= 9844.32      Elevation= 2394.61

CROSS SECTION


RIVER: RV W10 T1
REACH: R1                 RS: 0.622

INPUT
Description:
Station Elevation Data    num=      49
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
**********************************************************************************
 9845.37 2393.59 9855.16    2393 9864.31 2392.25 9872.06 2391.61 9882.96 2390.11
  9895.7 2388.39 9903.22 2389.35 9909.66  2390.1 9922.59 2391.17 9941.67 2391.73
 9942.63 2391.77 9942.96 2391.78 9943.81 2391.76 9972.38 2390.89  9973.82390.697
 9975.03 2390.53 9989.02 2388.66 9992.53 2387.87 9995.28 2387.94 9999.99 2388.04
   10000 2388.0410003.08  2388.110015.36 2390.5910015.93 2390.6910018.02 2390.72
10054.53 2391.2810065.49  2391.310090.91 2390.85 10103.8 2390.6910112.77    2390
10125.55 2389.2310130.67 2389.3410146.06 2389.7610157.73 2390.03 10162.9 2390.15
10205.07 2392.2210206.55  2392.310226.34 2392.7110231.43 2392.8510240.49 2392.46
10259.07 2391.9710286.07 2393.1710290.56 2393.4410299.52 2393.8210310.62 2394.38
10320.88 2394.43 10333.6 2394.4410336.19 2394.3610350.69 2393.77

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
 9845.37     .06  9973.8    .03510015.93     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        9973.810015.93           300.43  300.43  300.43             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
 9845.37 9942.96 2396.78       F
10065.4910350.69  2396.3       F

CROSS SECTION


RIVER: RV W10 T1
REACH: R1                 RS: 0.565

INPUT
Description:
Station Elevation Data    num=      37
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
**********************************************************************************
 9963.23  2386.1 9964.75    2386  9969.72385.293 9978.41 2384.05 9985.78 2382.85
 9990.33 2382.98   10000 2383.1110005.41 2383.1810010.35 2383.6910011.35 2383.77
10016.18 2384.1910029.99 2385.2810040.49 2385.45 10056.1 2385.5310060.38 2385.59
10081.34 2385.5810111.25 2385.6910118.98 2385.7910141.41 2384.8810156.77 2384.36
10172.52 2384.8110180.04    238510207.42 2385.5510208.39 2385.55   10217 2384.76
10224.88    238410227.92 2384.3110233.64 2384.5710240.64 2384.3210258.07 2385.37
10263.03 2385.5310272.79 2385.4210276.37 2385.4210293.45 2386.4110302.87 2387.08
10313.72 2387.6310316.54 2387.78

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
 9963.23     .06  9969.7    .03510029.99     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        9969.710029.99           108.72  108.72  108.72             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
10118.9810316.54 2390.79       F

CROSS SECTION


RIVER: RV W10 T1
REACH: R1                 RS: 0.545

INPUT
Description:
Station Elevation Data    num=      35
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
**********************************************************************************
 9929.58 2385.17  9931.8 2385.09 9931.86 2385.09 9932.07 2385.06 9954.74 2382.35
 9959.39 2382.39 9974.01 2381.92 9979.62 2381.11 9983.08 2380.47 9996.77 2380.43
 9998.48 2380.42 9999.32  2380.5   10000 2380.5910011.22  2382.110024.49 2382.52
10058.85 2383.1710076.24 2383.4610099.49 2383.8110104.35 2383.8810113.12  2383.6
10155.98 2381.9910162.95 2381.9910171.04 2382.2410173.06 2382.3310188.76 2382.52
10195.44 2382.5710200.33 2382.2910202.78 2382.1710217.42 2383.1110227.47 2383.43
10237.62 2384.1210250.99 2385.2210261.49 2385.7510276.12 2386.67 10294.3 2386.91

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
 9929.58     .06 9974.01    .03510011.22     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9974.0110011.22            67.13   67.13   67.13             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
```

```
10104.35 10294.3 2388.88       F

CROSS SECTION


RIVER: RV W10 T1
REACH: R1                  RS: 0.532

INPUT
Description:
Station Elevation Data    num=      36
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 9920.84 2383.26 9925.83 2382.93 9932.07  2382.2 9937.82 2381.81 9941.68 2381.54
 9943.512381.287 9946.96 2380.81 9950.39 2380.53 9955.28 2379.76 9957.55 2379.63
 9960.38 2379.71 9975.22 2379.91  9980.7 2379.94 9985.08 2380.06 9986.15 2380.21
 9992.38 2380.21 9993.75 2380.04 9998.96 2379.87   10000 2379.8210001.08 2379.77
10001.56 2379.8310016.66 2381.2610017.13 2381.2710062.81 2381.9510065.85    2382
10082.32 2382.1710097.15 2382.3510105.64 2382.0510148.82 2380.4610167.94 2381.64
 10177.4 2382.24 10196.4 2383.1910202.24 2383.4610210.61 2383.8410229.28 2384.77
10237.09 2384.77

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9920.84     .06 9943.51    .03510017.13     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9943.5110017.13           201.53  201.53  201.53             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
10097.1510237.09 2382.35       F

CROSS SECTION


RIVER: RV W10 T1
REACH: R1                  RS: 0.494

INPUT
Description:
Station Elevation Data    num=      50
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 9680.59 2380.76 9681.49 2380.71 9693.64  2379.5 9703.38 2378.68 9715.37 2377.85
 9720.45 2377.73 9744.19 2377.48 9764.16 2377.08 9769.83 2377.01 9776.77 2376.84
 9800.16 2376.43 9807.54 2375.23 9808.11 2375.15 9813.18  2375.3 9818.23 2375.43
 9818.67 2375.46 9819.27 2375.48 9821.91 2375.59  9842.7 2377.13 9853.48 2376.75
 9873.42 2377.04 9893.09 2377.41  9906.6 2377.26 9911.91 2377.07 9922.99 2376.83
 9924.11 2376.84 9927.65 2376.88 9942.93 2377.04 9947.89 2377.49 9951.77 2377.69
 9962.44  2377.6 9973.69 2377.68 9983.84  2377.7  9990.8 2377.15 9998.71 2376.67
   10000 2376.9910003.09 2377.7610005.35 2377.9310012.09 2377.73 10017.8  2377.4
 10023.8 2377.46 10031.7 2376.6410033.38  2376.510035.04 2376.6510048.29 2377.78
10061.28    237910067.19 2379.5810071.19 2380.1310083.89 2381.7710091.68 2382.43

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9680.59     .06 9983.84    .03510003.09     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9983.8410048.29                28  106.54  106.54             .1       .3

CROSS SECTION


RIVER: RV W10 T1
REACH: R1                  RS: 0.474

INPUT
Description:
Station Elevation Data    num=      52
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 9685.54 2382.33 9688.27 2382.39 9701.35 2381.75 9730.25    2380 9730.44 2379.98
 9731.45  2379.9 9754.65 2377.64 9771.49 2377.16 9786.69 2376.88 9803.79 2376.48
 9825.01 2375.99 9837.86 2375.74 9844.36  2375.1 9847.16 2374.64 9851.98 2374.65
 9854.09  2374.7 9860.09 2375.09 9862.54 2375.16 9862.56 2375.16 9868.46 2375.32
 9875.11  2375.6 9882.38 2375.73    98852375.816 9896.12 2376.18 9916.11 2376.44
  9923.4 2376.44 9933.98 2376.12 9950.21 2375.56 9964.06 2375.47 9965.09 2375.46
 9965.27 2375.47 9971.61 2375.77  9978.3 2375.45 9987.25 2375.19 9993.01 2374.99
10002.36 2374.77   100062375.845 10006.92376.11110009.57  2376.910018.45 2379.82
10034.93 2380.7410042.18 2380.6910047.31 2380.6210055.61 2380.5110080.97 2377.58
10096.01 2376.0710124.47 2377.2210153.12 2378.1110153.59  2378.110177.45 2378.03
10182.31 2377.6810184.74 2377.45

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9685.54    .055 9971.61    .04510009.57    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        9923.410009.57            646.3   646.3   646.3             .1       .3
Right Levee     Station=10034.93      Elevation= 2380.74

CROSS SECTION


RIVER: RV W10 T1
REACH: R1                  RS: 0.351
```

```
INPUT
Description:
Station Elevation Data    num=      40
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9776.35 2366.76 9780.52 2366.38 9806.96 2364.91 9820.68 2364.05  9832.5 2363.73
    9857 2362.99 9868.66 2362.17 9872.49 2361.82 9876.352361.336 9878.15 2361.11
  9885.1 2360.82 9907.31 2360.69 9919.322361.055 9919.82 2361.07 9929.89 2360.87
   99302360.871 9938.15 2360.93  9951.72361.042  9951.92361.044 9974.37 2361.23
 9979.06 2361.26 9980.03 2361.26 9980.59 2361.26 9984.13 2361.13   10000 2360.62
10009.35 2360.3310012.452361.11310020.32  2363.110025.84 2364.3910035.86 2364.81
10054.74  2364.610072.95 2364.8510096.34 2363.6710111.22 2363.0710117.33 2362.71
 10127.6 2362.5810135.72 2362.6610138.36 2362.6610141.55 2362.6310155.08 2362.49

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9776.35    .055 9979.06    .04510012.45    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9919.8210012.45           333.58  333.58  333.58             .1       .3

CROSS SECTION


RIVER: RV W10 T1
REACH: R1                 RS: 0.288

INPUT
Description: Q=980 cfs (CPG-G4, 24 hr)
Station Elevation Data    num=      37
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9721.36 2362.65 9725.99 2362.53 9748.01 2361.51 9760.22 2360.87 9780.16 2359.26
 9809.54 2357.13 9818.33 2356.42 9819.56 2356.38 9826.92 2355.71 9846.29 2353.78
 9855.41 2353.19 9856.96 2353.04 9860.51 2353.04 9863.08 2353.46 9865.38    2354
 9869.08 2354.31 9874.81 2354.13 9887.01 2354.14 9898.58 2354.18 9911.06 2353.98
 9913.91 2353.99 9915.25 2353.98 9951.29 2353.92 9957.49  2353.9    99802353.895
   10000 2353.8910000.02 2353.8910010.73 2353.8910012.47 2354.0810014.36 2354.16
10025.05 2356.5510039.63 2359.8210046.92 2359.9410081.47 2361.9210082.59 2361.97
10082.76 2361.98 10082.8 2361.99

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9721.36    .055   10000    .04510012.47    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9951.2910012.47                 0       0       0             .1       .3

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

SUMMARY OF MANNING'S N VALUES

River:RV W10 T1
*****************************************************************
*     Reach       *   River Sta.   *   n1    *   n2    *   n3    *
*****************************************************************
*R1              *    1.204       *     .06*     .035*      .06*
*R1              *    1.197       *     .06*     .035*      .06*
*R1              *    1.187       *     .06*     .035*      .06*
*R1              *    1.145       *     .06*     .035*      .06*
*R1              *    1.123       *     .06*     .035*      .06*
*R1              *    1.104       *     .06*     .035*      .06*
*R1              *    1.096       *     .06*     .035*      .06*
*R1              *    1.058       *     .06*     .035*      .06*
*R1              *    1.007       *     .06*     .035*      .06*
*R1              *    0.991       *     .06*     .035*      .06*
*R1              *    0.918       *     .06*     .035*      .06*
*R1              *    0.873       *     .06*     .035*      .06*
*R1              *    0.839       *     .06*     .035*      .06*
*R1              *    0.809       *     .06*     .035*      .06*
*R1              *    0.787       *     .06*     .035*      .06*
*R1              *    0.767       *     .06*     .035*      .06*
*R1              *    0.748       *     .06*     .035*      .06*
*R1              *    0.722       *     .06*     .035*      .06*
*R1              *    0.698       *     .06*     .035*      .06*
*R1              *    0.679       *     .06*     .035*      .06*
*R1              *    0.654       *     .06*     .035*      .06*
*R1              *    0.622       *     .06*     .035*      .06*
*R1              *    0.565       *     .06*     .035*      .06*
*R1              *    0.545       *     .06*     .035*      .06*
*R1              *    0.532       *     .06*     .035*      .06*
*R1              *    0.494       *     .06*     .035*      .06*
*R1              *    0.474       *    .055*     .045*     .055*
*R1              *    0.351       *    .055*     .045*     .055*
*R1              *    0.288       *    .055*     .045*     .055*
*****************************************************************

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

SUMMARY OF REACH LENGTHS

River: RV W10 T1
*****************************************************************
*     Reach       *   River Sta.   *  Left   * Channel *  Right  *
*****************************************************************
*R1              *    1.204       *   37.23*    37.23*    37.23*
*R1              *    1.197       *   51.94*    51.94*    51.94*
```

*R1	*	1.187	* 100*	223.49*	223.49*
*R1	*	1.145	* 114.76*	114.76*	114.76*
*R1	*	1.123	* 101.84*	101.84*	101.84*
*R1	*	1.104	* 41.76*	41.76*	41.76*
*R1	*	1.096	* 198.25*	198.25*	198.25*
*R1	*	1.058	* 274.21*	274.21*	274.21*
*R1	*	1.007	* 81.87*	81.87*	115*
*R1	*	0.991	* 383.09*	383.09*	230*
*R1	*	0.918	* 241.35*	241.35*	241.35*
*R1	*	0.873	* 150*	178.16*	178.16*
*R1	*	0.839	* 156.53*	156.53*	156.53*
*R1	*	0.809	* 119.38*	119.38*	119.38*
*R1	*	0.787	* 105.71*	105.71*	105.71*
*R1	*	0.767	* 101.31*	101.31*	101.31*
*R1	*	0.748	* 134.35*	134.35*	134.35*
*R1	*	0.722	* 128.29*	128.29*	128.29*
*R1	*	0.698	* 97.33*	97.33*	97.33*
*R1	*	0.679	* 120*	134.32*	134.32*
*R1	*	0.654	* 166.87*	166.87*	166.87*
*R1	*	0.622	* 300.43*	300.43*	300.43*
*R1	*	0.565	* 108.72*	108.72*	108.72*
*R1	*	0.545	* 67.13*	67.13*	67.13*
*R1	*	0.532	* 201.53*	201.53*	201.53*
*R1	*	0.494	* 28*	106.54*	106.54*
*R1	*	0.474	* 646.3*	646.3*	646.3*
*R1	*	0.351	* 333.58*	333.58*	333.58*
*R1	*	0.288	* 0*	0*	0*

****

****

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: RV W10 T1

Reach	River Sta.	Contr.	Expan.
*R1	1.204	.1	.3
*R1	1.197	.1	.3
*R1	1.187	.1	.3
*R1	1.145	.1	.3
*R1	1.123	.1	.3
*R1	1.104	.1	.3
*R1	1.096	.1	.3
*R1	1.058	.1	.3
*R1	1.007	.1	.3
*R1	0.991	.1	.3
*R1	0.918	.1	.3
*R1	0.873	.1	.3
*R1	0.839	.1	.3
*R1	0.809	.1	.3
*R1	0.787	.1	.3
*R1	0.767	.1	.3
*R1	0.748	.1	.3
*R1	0.722	.1	.3
*R1	0.698	.1	.3
*R1	0.679	.1	.3
*R1	0.654	.1	.3
*R1	0.622	.1	.3
*R1	0.565	.1	.3
*R1	0.545	.1	.3
*R1	0.532	.1	.3
*R1	0.494	.1	.3
*R1	0.474	.1	.3
*R1	0.351	.1	.3
*R1	0.288	.1	.3

****

****

ERRORS WARNINGS AND NOTES
Errors Warnings and Notes for Plan : RV Wash 7

River: RV W7 Reach: R1 RS: 8.325 Profile: 100-YR FP
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
River: RV W7 Reach: R1 RS: 8.252 Profile: 100-YR FP
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
River: RV W7 Reach: R1 RS: 8.162 Profile: 100-YR FP
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:Divided flow computed for this cross-section.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate

the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
River: RV W7 Reach: R1 RS: 8.087 Profile: 100-YR FP
Warning:Divided flow computed for this cross-section.
Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
River: RV W7 Reach: R1 RS: 8.037 Profile: 100-YR FP
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:Divided flow computed for this cross-section.
Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
River: RV W7 Reach: R1 RS: 7.974 Profile: 100-YR FP
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:Divided flow computed for this cross-section.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
River: RV W7 Reach: R1 RS: 7.910 Profile: 100-YR FP
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.
River: RV W7 Reach: R1 RS: 7.825 Profile: 100-YR FP
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.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
River: RV W7 Reach: R1 RS: 7.730 Profile: 100-YR FP
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
River: RV W7 Reach: R1 RS: 7.620 Profile: 100-YR FP
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
River: RV W7 Reach: R1 RS: 7.554 Profile: 100-YR FP
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:Divided flow computed for this cross-section.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
River: RV W7 Reach: R1 RS: 7.413 Profile: 100-YR FP
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
River: RV W7 Reach: R1 RS: 7.318 Profile: 100-YR FP
Warning:Divided flow computed for this cross-section.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
River: RV W7 Reach: R1 RS: 7.273 Profile: 100-YR FP
Warning:Divided flow computed for this cross-section.
River: RV W7 Reach: R1 RS: 7.271 Profile: 100-YR FP
Warning:Divided flow computed for this cross-section.

```
River: RV W7  Reach: R1     RS: 7.269     Profile: 100-YR FP
     Warning:Divided flow computed for this cross-section.
```

E.3.3 HEC-RAS Output

RV Wash 7

HEC-RAS Plan: RV Wash 7 River: RV W7 Reach: R1 Profile: 100-YR FP

River	Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
RV W7	R1	8.325	100-YR FP	480.00	2481.05	2482.27	2482.27	2482.51	0.013731	4.83	149.85	338.72	0.79
RV W7	R1	8.252	100-YR FP	670.00	2471.58	2472.38	2472.38	2472.68	0.024528	4.79	160.05	328.32	0.98
RV W7	R1	8.162	100-YR FP	670.00	2459.61	2462.28	2462.28	2462.83	0.010112	6.60	139.99	168.31	0.83
RV W7	R1	8.087	100-YR FP	670.00	2450.87	2452.59	2452.36	2452.89	0.012669	5.45	165.83	155.77	0.87
RV W7	R1	8.037	100-YR FP	670.00	2445.08	2447.15	2447.15	2447.95	0.031084	8.12	104.14	158.00	1.34
RV W7	R1	7.974	100-YR FP	670.00	2437.77	2440.15	2440.15	2440.41	0.011829	5.32	229.98	413.70	0.73
RV W7	R1	7.910	100-YR FP	670.00	2430.87	2431.48	2431.41	2431.75	0.022976	2.77	177.54	283.06	0.91
RV W7	R1	7.825	100-YR FP	670.00	2421.52	2422.99	2422.69	2423.07	0.014466	2.77	301.77	452.09	0.56
RV W7	R1	7.730	100-YR FP	670.00	2411.43	2413.27	2413.27	2413.63	0.025739	5.85	166.84	375.55	0.86
RV W7	R1	7.620	100-YR FP	670.00	2400.99	2402.81	2402.40	2402.88	0.007613	2.70	348.90	596.70	0.40
RV W7	R1	7.554	100-YR FP	670.00	2396.25	2397.66	2397.66	2398.01	0.033709	5.14	158.72	237.64	0.95
RV W7	R1	7.413	100-YR FP	670.00	2380.11	2383.47	2382.65	2383.84	0.011604	4.91	143.63	86.18	0.55
RV W7	R1	7.318	100-YR FP	670.00	2371.32	2374.34	2374.05	2374.79	0.031572	6.60	149.49	168.75	0.84
RV W7	R1	7.273	100-YR FP	670.00	2367.99	2369.77		2369.89	0.013785	3.21	241.76	318.25	0.62
RV W7	R1	7.271	100-YR FP	670.00	2367.87	2369.56		2369.73	0.019459	3.85	217.64	290.70	0.73
RV W7	R1	7.269	100-YR FP	670.00	2367.54	2369.19	2369.13	2369.46	0.034162	4.50	161.66	242.26	1.02

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

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

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

PROJECT DATA
Project Title: RV Wash 7
Project File : RV_Wash_7.prj
Run Date and Time: 11/1/2007 10:05:53 AM

Project in English units

Project Description:
Rio Verde ADMP, Project FCDMC 2001C056, RV Wash 7. Phase 3 RAS model started in
May 2005, preliminary model completed in June 2005.

RAS model is prepared by
Dibble Engineering. Field reconnaissance per report dated April 18,
2005.

For the study wash, the starting water surface elevation is taken from
normal depth for three cross sections repeated at ten-foot intervals. The
slope-area method is the same as the normal depth method.

RV Wash 7
Floodplain Delineation
From a point approximately 5,000 feet south and 700
feet east of the intersection of 140th Street and Rio Verde Drive (River Mile
7.255) to a point approximately 4,000 feet south and 1,900 feet east of the
intersection of 132nd Street and Rio Verde Drive (River Mile 8.325), a distance
of 1.070 river miles.

Topographic mapping is supplied by the Flood Control
District of Maricopa County.

The Cross-section data were generated by
INROADS, based on the DTM data. The mapped hydraulic base line represents the
10,000-station point of the HEC-RAS model.

Discharge data is from the Rio
Verde ADMP HEC-1 model. The original models are from the Flood Control District
of Maricopa County, prepared for the Rio Verde South Floodplain Delineation,
the Rio Verde South Extension Floodplain Delineation, the Rio Verde North
Floodplain Delineation, and the Rio Verde North Extension Floodplain
Delineation. The HEC-1 models were modified for the Rio Verde ADMP. The final
HEC-1 files were reviewed in February 2004 and FCDMC approved the hydrology
model.

Hydrologic concentration points are noted in cross-section
descriptions using the corresponding HEC-1 ID's. The flow rates have been
rounded to the nearest 10 cubic feet per second (cfs). Flow rates obtained from
HEC-1 are applied at the downstream end of the relevant sub-basin and stepped
upstream at cross-sections to meet the HEC-1 flow from the upstream
sub-basin.

River Mile (RM) stationing is based upon the estimated tie in
point with downstream receiving waters or the start of two-dimensional flow
models. This point represents RM 0.000. The assumed starting WS Elevation is
based upon normal depth in the study wash.

Horizontal and Vertical
Coordinate Basis for this project is as follows:
          Horizontal--Arizona State
Plane, Central Region, NAD 1983
          Vertical--NAVD 1988

RAS model river naming
corresponds to project river naming as follows:
          RV W7 = RV Wash 7

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

PLAN DATA

Plan Title: RV Wash 7
Plan File : j:\2006\10-0606.1\Design Notebook\Drainage Design\HEC-RAS\RV_Wash_7.p01

           Geometry Title: RV Wash 7
           Geometry File : j:\2006\10-0606.1\Design Notebook\Drainage Design\HEC-RAS\RV_Wash_7.g01

           Flow Title    : RV Wash 7
           Flow File     : j:\2006\10-0606.1\Design Notebook\Drainage Design\HEC-RAS\RV_Wash_7.f01

Plan Summary Information:
Number of:  Cross Sections =   16    Multiple Openings  =    0
```

```
          Culverts        =    0    Inline Structures  =    0
          Bridges         =    0    Lateral Structures =    0

Computational Information
    Water surface calculation tolerance  =  0.01
    Critical depth calculation tolerance =  0.01
    Maximum number of iterations         =  20
    Maximum difference tolerance         =  0.3
    Flow tolerance factor                =  0.001

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

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

River = RV W7            Reach = R1
RS      Profile           Method  Value1  Value2
8.325   PF 2                   1  9992.9   10040
8.252   PF 2                   1 9947.99   10021
8.162   PF 2                   1    9967 10008.3
8.087   PF 2                   1 9989.0810054.61
8.037   PF 2                   1    9990 10039.7
7.974   PF 2                   1 9947.7210012.99
7.910   PF 2                   1  9972.410139.76
7.825   PF 2                   1 9941.6510055.86
7.730   PF 2                   1 9976.4210027.28
7.620   PF 2                   1 9986.0910067.62
7.554   PF 2                   1  9910.9 10044.4
7.413   PF 2                   1 9968.3410023.35
7.318   PF 2                   1 9972.9110012.04
7.273   PF 2                   1 9928.78 10049.1
7.271   PF 2                   1 9956.06 10044.5
7.269   PF 2                   1 9957.5310057.76


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

FLOW DATA

Flow Title: RV Wash 7
Flow File : j:\2006\10-0606.1\Design Notebook\Drainage Design\HEC-RAS\RV_Wash_7.f01

Flow Data (cfs)
*************************************************************
* River           Reach           RS      *       100-YR FP *
* RV W7           R1              8.325   *             480 *
* RV W7           R1              8.252   *             670 *
* RV W7           R1              7.554   *             670 *
*************************************************************

Boundary Conditions
*****************************************************************************************************
* River           Reach           Profile          *            Upstream                 Downstream    *
*****************************************************************************************************
* RV W7           R1              100-YR FP        *                                  Normal S = 0.0341 *
*****************************************************************************************************


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

GEOMETRY DATA

Geometry Title: RV Wash 7
Geometry File : j:\2006\10-0606.1\Design Notebook\Drainage Design\HEC-RAS\RV_Wash_7.g01

CROSS SECTION


RIVER: RV W7
REACH: R1                 RS: 8.325

INPUT
Description: Q=480 cfs (CP09A2, 24 hr)
Station Elevation Data    num=      62
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
 9522.64 2488.04 9524.04 2488.06 9542.95 2487.83 9583.48 2486.48 9624.42 2485.02
 9632.21 2484.55 9643.82  2483.8 9656.19 2482.97 9665.61 2483.72 9686.36 2485.01
 9686.37 2485.01 9692.22 2485.16 9695.98 2485.22 9701.38 2485.31 9707.63 2485.33
 9712.28 2485.37 9733.43 2485.08 9735.23 2485.09  9735.7 2485.08 9737.79 2485.09
  9738.7 2485.08 9752.58 2485.14  9758.5 2485.02 9758.62 2485.01 9761.14 2484.87
  9762.2 2484.77 9778.63 2483.82 9802.23 2482.43 9820.68 2481.92 9826.87 2481.96
 9836.41  2481.9 9851.93 2481.89 9884.02 2481.86 9885.66 2481.86 9927.72 2481.87
 9934.74  2481.9  9944.4 2481.92  9946.9 2481.92 9968.09 2481.96  9992.9 2481.27
 9999.73 2481.0810000.24 2481.0710026.73 2481.0610030.15 2481.0510030.81 2481.06
   100402481.26910041.79 2481.3110073.67 2482.0410076.07 2481.9510091.82 2481.18
10113.55 2480.1710116.18 2480.0610118.27 2479.9510118.96 2479.9210119.46  2479.9
10121.35 2479.88 10123.4 2479.9210133.67 2480.9810160.51 2483.6310168.03 2484.22
10177.79 2485.0110182.56 2486.02

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
 9522.64    .045  9992.9     .04   10040    .045
```

```
Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        9992.9   10040           388.93  388.93  388.93             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
10073.6710182.56 2482.37       F

CROSS SECTION


RIVER: RV W7
REACH: R1                  RS: 8.252

INPUT
Description: Q=670 cfs (CP09A4, 24 hr)
Station Elevation Data    num=      39
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 9751.46 2484.08 9767.71 2479.93 9775.46 2478.69 9781.26 2477.88 9789.08 2476.93
  9795.2 2476.31 9804.88 2475.17 9806.78 2474.99  9808.9 2474.99 9813.34 2474.94
 9837.63 2472.78 9842.72  2472.8 9855.98 2472.36 9875.15 2471.25 9877.04 2471.03
  9877.5 2471.03 9884.23 2471.15 9909.01 2471.54 9941.87 2471.83 9951.09 2471.56
 9977.98 2471.57    99812471.578 9999.98 2471.63   10000 2471.6310016.24 2471.68
   10021 2471.7210060.92 2472.0610089.58 2472.24 10095.2 2472.2710110.19 2472.37
10130.84 2472.0410149.17 2472.0410180.05 2471.9710198.55 2474.1110206.19 2474.98
10222.35 2479.8610222.53 2479.92 10222.7 2479.97 10222.8    2480

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9751.46    .045    9981     .04   10021    .045

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          9981   10021             500  473.54     480             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
 10110.2 10222.8 2472.71       F

CROSS SECTION


RIVER: RV W7
REACH: R1                  RS: 8.162

INPUT
Description:
Station Elevation Data    num=      48
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 9895.34 2470.21 9903.08 2471.03 9904.21 2471.08  9910.5 2471.25 9913.32 2471.23
 9919.56 2470.27 9942.76 2466.62 9944.31 2466.18 9947.73 2465.64    99672461.537
 9974.97 2459.84 9979.14 2460.05 9991.92 2460.52 9993.24 2460.57  9993.7 2460.52
   10000 2459.8610000.03 2459.8610002.42 2459.6110005.81 2460.72 10008.3 2461.53
10024.73 2461.4710029.88 2461.4710035.29 2461.3710043.37 2461.4210075.47 2461.61
10078.29 2461.7810089.92 2462.2310110.95 2462.9710121.86 2463.0610149.24 2462.94
10175.55 2462.8910189.26  2463.2 10223.4 2462.3610226.82 2462.2910233.67 2462.15
10243.13 2461.9310243.17    246210247.98 2461.9810270.97 2462.3310294.14 2463.33
 10298.3 2463.5910311.07 2464.1210311.09 2464.1110312.01 2464.1610331.06 2465.08
10344.92 2465.5710357.78 2465.5210363.43 2466.23

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9895.34     .05    9967    .035 10008.3     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          9967 10008.3            395.98  395.98  395.98             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
10189.7610363.43 2463.72       F

CROSS SECTION


RIVER: RV W7
REACH: R1                  RS: 8.087

INPUT
Description:
Station Elevation Data    num=      40
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 9734.87 2459.98 9758.77 2456.65 9773.04 2456.13 9793.09 2455.17  9809.6 2454.71
 9824.74  2454.3 9838.31 2454.34 9859.23 2454.35 9869.43 2453.97 9887.46  2454.1
 9904.68  2453.8 9935.99 2451.79 9938.54 2451.59 9939.41 2451.65 9951.71 2453.67
 9954.13 2453.67 9961.05  2453.5 9982.41 2453.03 9989.08 2452.02    9990 2451.86
 9993.96 2451.17   10000 2450.9810003.75 2450.8710013.24 2451.37   100202451.843
10024.83 2452.1810035.22  2451.710037.68 2451.6110050.12 2451.7110060.62 2451.61
10076.74 2451.4510083.66  2451.410086.32 2451.3610099.66 2450.5910105.83 2450.27
10107.11  2450.410133.62 2455.1210137.42 2456.1810142.68 2456.3410154.44 2456.75

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9734.87     .05 9989.08    .03510024.83     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9989.0810024.83           262.91  262.91     250             .1       .3

CROSS SECTION
```

```
RIVER: RV W7
REACH: R1                    RS: 8.037

INPUT
Description:
Station Elevation Data    num=      64
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 9461.98 2449.12 9467.16 2449.21 9480.15 2448.63 9490.36 2448.23 9504.28 2447.72
 9507.26 2447.55 9510.16 2447.37 9530.91 2446.33 9552.21 2443.61 9562.34 2442.34
 9565.01 2442.12  9570.5 2442.27 9574.87 2442.53 9594.71 2444.74 9598.16 2445.06
 9601.75  2445.4  9623.7  2446.7 9625.89 2446.84 9632.43 2446.85 9664.77 2446.64
 9669.13 2446.61  9675.8  2446.6 9706.94 2446.75 9724.94 2446.68 9729.68 2446.58
 9734.47  2446.7 9744.93  2446.9 9765.38  2447.1 9783.94 2447.26    9844  2447.3
  9851.2 2447.32 9853.36 2447.33  9857.4 2447.29 9885.41 2447.07 9902.88 2447.17
 9923.56 2447.03 9939.08 2447.16 9942.99  2446.4 9958.13 2445.33 9962.24  2446.8
 9965.08 2447.06 9971.94 2446.34 9975.25 2446.17 9989.92 2446.52    99902446.507
  9996.6 2445.45   10000 2445.1610000.97 2445.0810008.34 2446.1110011.67 2446.47
10015.31 2446.5310020.31 2446.64 10023.2 2446.38 10033.2 2445.51 10039.72446.503
10047.67 2447.7210053.45 2449.1310063.82 2449.9110076.39 2450.8710083.65 2451.31
10095.66 2452.4610100.65 2452.56 10104.5 2452.6410124.34    2454

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9461.98     .05    9990    .035 10039.7     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          9990 10039.7           335.06  335.06     290             .1       .3
Left Levee      Station=  9851.2      Elevation= 2447.32

CROSS SECTION


RIVER: RV W7
REACH: R1                    RS: 7.974

INPUT
Description:
Station Elevation Data    num=      85
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 9581.88 2444.39 9595.47 2443.69 9601.51 2443.43 9626.92 2441.72 9627.25 2441.69
 9627.49 2441.67  9631.1 2441.29 9645.34  2439.7  9647.2 2439.53  9664.2 2437.73
 9671.54 2438.43 9675.27 2438.81 9695.15 2439.25  9718.7 2439.79 9732.37 2439.88
 9786.68 2440.22 9808.06 2440.03  9826.4 2439.87 9836.33 2439.52 9847.16 2438.83
 9870.99 2439.41  9877.4 2439.49 9932.21 2439.69 9937.48 2439.73 9942.88 2439.76
 9973.86 2439.89  9986.22438.498 9989.64 2438.11 9989.85 2438.08 9991.38 2438.05
 9999.95 2437.89   10000 2437.8910006.32 2437.77 10008.72438.47110008.73 2438.48
10012.99 2440.19 10029.5 2440.0810032.32 2440.0110043.08 2439.89 10063.5 2439.93
10075.14 2439.8410089.09 2439.3310092.98 2439.14 10095.6 2439.1110104.62  2438.9
10109.88 2438.7510127.45 2439.7410132.07 2440.0410133.78 2440.0110158.15 2439.79
10170.41 2440.0410178.31 2440.3210195.44  2440.1 10207.5 2440.0610218.41 2440.14
10228.36 2440.0310233.02 2440.2510239.88 2440.5410254.31 2440.4510256.82 2440.31
10268.29 2439.8910270.35 2439.8410274.62 2439.8210278.03 2439.8710285.64 2439.78
10289.29 2439.5510300.08 2440.0810301.76 2440.2910321.81 2440.7310327.86 2440.64
 10344.1 2440.2810359.77 2440.0510365.18 2440.1510369.33 2439.7910379.37 2439.29
10399.33  2439.910405.31 2440.1910409.23 2440.0710424.32 2439.7210428.57 2439.24
10437.65 2438.2110448.55 2440.4210452.12 2441.3510454.47 2441.8510463.62    2444

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9581.88     .05  9986.2    .035 10008.7     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9973.8610012.99          336.77  336.77     400             .1       .3
Left Levee      Station= 9786.09      Elevation= 2440.22
Right Levee     Station=10239.88      Elevation= 2440.54

CROSS SECTION


RIVER: RV W7
REACH: R1                    RS: 7.910

INPUT
Description:
Station Elevation Data    num=      55
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 9763.93 2436.85 9782.06  2435.3 9793.51 2435.86 9796.41 2436.17 9799.67 2435.82
 9813.16 2433.58 9821.95 2432.42  9844.6 2430.68  9847.1 2430.54  9870.6  2429.7
 9870.76  2429.7 9870.85 2429.68  9888.8 2429.93 9889.94 2430.03 9906.66 2430.86
 9907.86 2430.91 9929.27  2432.1 9930.03  2432.1 9960.64 2432.04  9972.4 2431.77
 9981.21 2431.52    99942431.026 9997.52 2430.89 9998.27 2430.87   10000 2430.92
10003.83 2431.02   100042431.02510017.82  2431.410018.42 2431.4110021.28 2431.45
10040.01 2431.7110056.47 2431.6510079.01 2431.8510092.43 2431.61 10125.4 2431.47
10135.35 2431.4410166.75 2431.1510173.02 2431.1910177.07 2431.1910201.31  2431.2
10202.03  2431.210208.45 2431.0310233.85 2430.42 10240.6 2430.3810254.31 2430.75
10255.95  2430.6   10270 2430.7510279.05 2431.2210290.38 2432.1110312.94 2433.94
10315.98 2434.2410323.25 2434.57 10343.1 2435.62 10348.2 2435.8710350.71 2435.84

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9763.93     .05    9994    .035   10004     .05

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

```
        9972.410040.01              520  450.22  450.22            .1       .3

CROSS SECTION


RIVER: RV W7
REACH: R1                  RS: 7.825

INPUT
Description:
Station Elevation Data    num=      58
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9642.52 2426.84 9657.06 2426.79 9667.66  2426.3 9686.45 2425.19 9699.63 2424.26
 9722.05 2422.95  9729.2 2422.39 9734.37 2421.89 9744.79 2422.42 9748.56  2422.6
 9759.28 2422.67 9792.48 2422.94 9803.53 2423.03 9837.67 2422.75 9842.13 2422.71
  9848.1 2422.58 9885.57 2422.46 9892.23 2422.36 9903.95 2421.83 9909.42 2421.66
 9915.24 2422.06 9922.31  2422.4 9933.07  2422.5 9941.65 2422.57 9959.71 2422.42
 9962.52  2422.4  9967.1 2422.35 9989.63 2422.18  9991.52422.091 9999.46 2421.71
 9999.98 2421.69   10000 2421.6910003.89 2421.5210006.84 2421.84 10008.62422.095
 10012.7 2422.6910035.73 2422.2410036.79 2422.2310037.29 2422.2210042.79 2422.12
10060.93  2421.8 10061.9 2421.8210076.92 2422.31 10090.7 2422.6910096.44 2422.91
 10118.5  2423.110124.77 2423.0210137.82 2423.0210174.66 2422.5710190.12  2422.3
10219.55 2421.8610244.15 2421.9110274.37 2421.7510283.62 2422.0810319.59 2425.16
   10324 2425.5210324.92 2425.5810342.22 2426.93

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9642.52    .065  9991.5     .05 10008.6    .065

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9941.65 10012.7            498.62  498.62  498.62            .1       .3
Left Levee      Station= 9803.53      Elevation= 2423.03

CROSS SECTION


RIVER: RV W7
REACH: R1                  RS: 7.730

INPUT
Description:
Station Elevation Data    num=      61
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9548.91 2419.08 9562.61 2419.19 9564.23 2419.14 9592.21 2417.91 9598.59 2417.72
 9617.41 2416.88 9634.79 2416.28 9681.44 2415.33 9683.41 2415.29 9684.34 2415.27
 9701.31 2414.31 9711.91 2413.28  9725.3 2412.36 9743.82 2410.95 9751.44 2411.16
 9761.72 2411.48 9767.03 2411.65    9788 2412.45  9790.9 2412.57 9796.76 2411.87
  9805.6 2410.83 9812.98 2411.71  9817.2 2412.17 9847.45 2412.81 9860.35 2413.08
 9873.01 2413.18 9898.98    2413 9903.23 2412.99 9904.93 2412.98  9942.7 2412.82
 9951.43 2412.82 9963.07 2412.82 9985.47 2412.34 9987.23 2412.21  9990.32412.002
 9994.33 2411.73 9998.73 2411.48 9999.45 2411.43 9999.99 2411.44   10000 2411.44
10002.87  2411.5 10019.42412.00110027.28 2412.2410035.53 2412.1510043.22 2412.24
10052.32 2412.2910058.06 2412.36 10064.6 2411.4510066.68 2411.1410069.05 2411.58
10072.65 2412.27 10085.7 2413.15 10096.3 2413.8410106.35 2414.6110119.91 2415.57
10127.89  2416.410147.77 2418.4210159.47 2419.0310165.86 2419.3110168.87 2419.04
10170.85 2418.93

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9548.91    .065  9990.3     .05 10019.4    .065

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9985.4710027.28            582.81  582.81  582.81            .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
 9548.91 9873.06 2413.86       F

CROSS SECTION


RIVER: RV W7
REACH: R1                  RS: 7.620

INPUT
Description:
Station Elevation Data    num=      54
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9553.23 2403.15 9558.28  2403.1 9563.49 2403.04 9570.25 2402.75 9603.99  2401.5
 9608.46 2401.53 9632.98 2401.77 9659.84 2402.26  9693.9 2402.47 9732.64 2402.64
 9772.66 2402.56 9794.87 2402.45 9823.59 2402.41 9846.79 2402.25  9882.5 2402.15
 9895.19 2402.06 9922.87 2402.02 9949.73 2401.91 9956.36 2401.87  9968.3 2401.81
  9989.4  2401.7  9991.12401.619 9993.38 2401.51  9995.5 2401.47 9999.57 2401.57
   10000 2401.5710000.01 2401.57   10010 2401.6210010.06 2401.6210016.84 2401.28
10033.86 2400.9910058.35 2401.5110067.62 2401.7210075.35 2401.6410099.95 2402.08
10116.68 2401.8610128.47 2401.6910133.33 2401.6610157.33 2402.3410165.14 2402.76
10197.72 2406.1410198.79 2406.2410199.08 2406.2610199.87 2406.3210218.33 2407.48
10222.11  2407.610229.47 2407.56   10233 2407.5510241.21 2408.0910251.08  2408.1
10259.81 2409.4410267.23 2409.7810281.35 2410.4210283.36 2410.35

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9553.23    .065  9991.1     .05   10010    .065

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

```
        9989.410067.62          346.67  346.67  346.67            .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
 9553.23 9732.99 2404.73       F

CROSS SECTION


RIVER: RV W7
REACH: R1                  RS: 7.554

INPUT
Description: Q=670 cfs (CP09A6, 24 hr)
Station Elevation Data    num=      84
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9383.02 2404.41 9396.41  2403.7 9402.02  2403.5 9437.69 2401.79 9439.36 2401.75
 9467.83 2400.42 9474.11 2399.78 9488.69 2399.71 9494.29 2399.59 9497.28 2399.57
 9501.54 2399.45 9519.15 2398.98 9550.68 2398.54 9561.83 2398.19 9580.22 2398.04
 9602.99 2397.41 9614.34 2397.36 9637.24 2397.27 9641.45 2397.21 9643.24 2397.16
 9658.09 2396.88 9661.67 2396.83 9668.32 2396.86 9680.57 2397.04 9702.42 2397.51
 9711.47 2397.74 9725.21 2397.74 9755.16 2397.66 9794.87 2398.37 9798.27 2398.38
 9809.76 2398.35 9840.01 2397.78 9857.54  2401.2 9860.88 2401.53 9862.96  2401.5
 9867.46 2401.88 9878.75  2401.7 9885.31 2401.44 9894.31 2401.58 9898.74 2400.89
 9902.16  2400.4  9910.92398.411 9919.21 2396.52 9929.63 2396.25 9947.89  2396.4
 9988.29 2396.77 9996.47 2396.82 10003.4 2396.9210017.68 2397.42 10026.3 2397.64
   10028 2397.6310037.77 2398.07 10044.42398.39910046.03 2398.4810050.12 2397.63
10055.73 2396.7710062.84 2400.1410070.92 2402.7110076.75 2402.3810079.99 2402.27
10091.51 2402.3510105.89 2402.4910124.81 2402.4910146.63  2402.110167.68 2402.13
10193.53 2402.2810225.61 2402.3410243.46 2402.4210268.18 2402.3910291.94 2402.29
10306.85 2402.2910324.03 2402.5210331.63 2402.7410345.35 2401.9810346.77 2401.89
10349.44 2401.9510368.04 2402.4510371.74 2402.5410378.77 2403.0210388.44 2403.94
10414.45 2405.1310417.03 2405.2910429.03 2405.0310436.04 2404.88

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
 9383.02    .065  9910.9     .05 10044.4    .065

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        9910.9 10044.4            743.7   743.7   743.7            .1       .3

CROSS SECTION


RIVER: RV W7
REACH: R1                  RS: 7.413

INPUT
Description:
Station Elevation Data    num=      48
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9816.56 2387.04  9817.1 2386.99 9826.67 2385.93 9834.85  2386.3 9840.55 2386.22
 9849.24 2385.75 9863.47 2385.09 9869.13 2384.66 9884.82 2383.96 9894.33 2383.59
 9898.07 2383.38 9900.81 2383.16 9909.99 2383.15 9913.63 2383.34 9935.51 2383.93
 9946.01 2384.24 9965.45 2383.09 9968.34 2382.85 9976.07 2382.13    99892380.344
 9989.32  2380.3   10000 2380.1810000.02 2380.1810004.83 2380.1210012.03 2380.11
   100132380.34510016.78 2381.2610023.35 2382.9510033.23  2383.110058.15 2383.87
10070.54 2383.8910116.79 2384.1710117.57 2384.1710118.04 2384.1810121.31 2384.15
10154.04 2383.7510155.47 2383.7310166.79  2383.110168.31 2383.0310181.14 2382.18
10184.14    238210184.33 2382.0210190.62 2382.2310198.81 2382.5210199.61 2382.54
10216.36  2382.9 10224.6 2382.2510230.55  2381.9

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
 9816.56    .065    9989     .05   10013    .065

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9968.3410023.35            502.4   502.4   502.4            .1       .3
Left Levee      Station= 9946.01      Elevation= 2384.24
Right Levee     Station=10116.79      Elevation= 2384.17

CROSS SECTION


RIVER: RV W7
REACH: R1                  RS: 7.318

INPUT
Description:
Station Elevation Data    num=      65
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9699.74     2378 9707.45 2377.91 9714.49 2377.58 9724.83 2377.29 9757.05  2375.8
 9768.56 2375.11 9774.54 2374.54 9795.95 2374.74 9803.67 2375.08  9809.9  2371.9
 9810.87 2371.54 9818.67 2373.91 9819.42 2374.05 9822.03 2374.06  9841.6 2374.16
 9849.53 2373.95 9854.79 2374.02  9860.7 2374.17 9865.08  2373.9 9883.04 2372.81
 9886.82 2373.74 9889.56 2374.47 9903.56  2374.9 9923.34 2374.64 9929.91  2374.5
    9940 2374.08 9951.05 2373.77 9966.86 2373.26 9980.65 2373.33 9985.78 2373.21
 9993.24  2372.4  9997.22371.896 9998.51 2371.73   10000 2371.6210000.97 2371.54
10004.61 2371.32 10006.52371.89910009.18 2372.7210012.04 2373.8210032.37  2375.4
10033.32 2375.4710034.14 2375.4310041.21 2375.3710055.07 2375.2110056.35 2375.03
10062.36  2374.110064.44 2374.8310064.78  2374.910086.63 2374.9510088.79 2374.94
10101.47 2375.1510116.41 2375.2710117.99 2375.3510126.71 2375.2410144.06 2375.08
10152.31 2375.3210165.58 2375.8610175.38 2376.3710193.56 2377.4210204.34 2378.19
10231.28  2380.210234.53 2380.4310236.41 2380.5410260.02 2381.3110282.32 2382.02

Manning's n Values        num=       3
```

```
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
 9699.74    .065  9997.2     .05 10006.5    .065

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9980.6510012.04           240.02  240.02  240.02             .1       .3
Left Levee      Station= 9803.67      Elevation= 2375.08
Right Levee     Station=10032.37      Elevation=  2375.4

CROSS SECTION


RIVER: RV W7
REACH: R1                 RS: 7.273

INPUT
Description:
Station Elevation Data    num=      43
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
**********************************************************************************
 9662.34  2372.3 9670.98 2372.21 9680.08 2371.98  9719.4 2370.66 9720.98  2370.6
 9721.96 2370.57 9757.45 2369.57  9778.5 2369.18 9792.82 2368.92 9795.39 2368.74
 9802.53 2368.44 9807.31 2368.76 9827.16 2369.13 9849.97 2369.76 9870.35 2369.77
 9875.65 2369.78 9885.96 2368.05 9905.77 2366.86 9915.69 2367.79 9931.21 2369.19
 9956.41 2369.75 9959.44 2369.86 9963.28 2369.77 9979.68 2369.19 9983.73 2368.64
    9987 2368.23 9998.51 2368.11   10000 2368.0810000.01 2368.0810003.62 2367.99
 10005.5 2368.2410006.86 2368.4210012.47 2368.9410030.38 2369.2110036.27 2369.27
10039.08  2369.4 10049.1 2370.0110051.84  2369.910074.52 2369.4510084.26 2369.58
 10096.2 2369.57 10112.2 2370.55 10149.3 2373.25

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
 9662.34    .065    9987     .05 10005.5    .065

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9959.44 10049.1               10      10      10             .1       .3

CROSS SECTION


RIVER: RV W7
REACH: R1                 RS: 7.271

INPUT
Description: This cross section is one of two cross sections added to the
             downstream end of the model to establish the starting water
             surface elevation using the normal depth calculations. This cross
             section is not plotted on the work maps, nor is used in plotting
             the base flood elevations.
Station Elevation Data    num=      43
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
**********************************************************************************
  9664.4 2372.19 9674.38 2372.09 9676.42 2372.03 9685.29 2371.74 9722.89 2370.33
 9746.09 2369.68 9763.71 2369.18 9785.79 2368.78 9793.57 2368.77 9795.88 2368.56
  9804.2  2368.2 9813.34 2368.81 9851.35 2369.53 9860.16 2369.77 9868.04 2369.78
 9877.41 2369.79 9881.36 2369.12 9915.05 2367.09 9916.14 2367.19 9938.75 2369.23
 9949.11 2369.46 9965.13 2369.53 9978.29  2369.1 9983.29 2368.92 9984.14 2368.81
 9989.84  2368.1   10000    236810002.86 2367.9710003.27 2367.9610006.96 2367.87
10010.42 2368.1110016.92 2368.7110029.37 2368.9110038.68 2369.17 10044.52369.521
 10046.3 2369.6310054.74 2370.0410071.97  2369.710078.81 2369.2710091.02 2369.26
10100.86 2369.8610127.05 2371.7710146.65 2373.29

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
  9664.4    .065 9989.84     .0510010.42    .065

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9965.13 10044.5               10      10      10             .1       .3

CROSS SECTION


RIVER: RV W7
REACH: R1                 RS: 7.269

INPUT
Description: This cross section is one of two cross sections added to the
             downstream end of the model to establish the starting water
             surface elevation using the normal depth calculations. This cross
             section is not plotted on the work maps, nor is used in plotting
             the base flood elevations.
Station Elevation Data    num=      46
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
**********************************************************************************
 9680.08 2371.81 9690.82  2371.7 9707.91 2371.21 9738.41 2370.07 9783.03 2368.81
 9783.49  2368.8 9783.63  2368.8  9783.8  2368.8 9784.27  2368.8 9810.52 2368.77
 9816.16 2368.17 9817.37 2368.06 9819.49 2367.97 9832.98 2368.87 9873.88 2369.64
 9880.83  2369.7 9884.37 2369.66 9894.49 2369.66  9922.9 2367.69 9934.64 2366.79
 9947.37 2367.98 9957.53 2369.29 9967.14 2369.07 9984.15 2369.15 9994.81  2368.8
 9999.46 2368.34   10000 2368.2910004.45 2367.9210006.79 2367.8510007.75 2367.84
10019.32 2367.5710020.39 2367.5410024.69 2367.8410031.57 2368.3210034.17 2368.66
10053.66  2369.110054.18 2369.0910054.67 2369.1110057.76 2369.2710074.93 2370.11
10077.49 2370.0610094.85 2368.9510099.45 2368.9510103.14 2369.1710112.99 2369.89
10139.28 2371.93

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
```

```
 9680.08    .06510007.75     .0510024.69    .065

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9957.5310057.76          38380.3 38380.3 38380.3             .1       .3

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

SUMMARY OF MANNING'S N VALUES

River:RV W7
*****************************************************************
*     Reach       *   River Sta.   *   n1    *   n2    *   n3    *
*****************************************************************
*R1              *    8.325       *    .045*      .04*     .045*
*R1              *    8.252       *    .045*      .04*     .045*
*R1              *    8.162       *     .05*     .035*      .05*
*R1              *    8.087       *     .05*     .035*      .05*
*R1              *    8.037       *     .05*     .035*      .05*
*R1              *    7.974       *     .05*     .035*      .05*
*R1              *    7.910       *     .05*     .035*      .05*
*R1              *    7.825       *    .065*      .05*     .065*
*R1              *    7.730       *    .065*      .05*     .065*
*R1              *    7.620       *    .065*      .05*     .065*
*R1              *    7.554       *    .065*      .05*     .065*
*R1              *    7.413       *    .065*      .05*     .065*
*R1              *    7.318       *    .065*      .05*     .065*
*R1              *    7.273       *    .065*      .05*     .065*
*R1              *    7.271       *    .065*      .05*     .065*
*R1              *    7.269       *    .065*      .05*     .065*
*****************************************************************

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

SUMMARY OF REACH LENGTHS

River: RV W7
*****************************************************************
*     Reach       *   River Sta.   *  Left   * Channel *  Right  *
*****************************************************************
*R1              *    8.325       *  388.93*  388.93*  388.93*
*R1              *    8.252       *     500*  473.54*     480*
*R1              *    8.162       *  395.98*  395.98*  395.98*
*R1              *    8.087       *  262.91*  262.91*     250*
*R1              *    8.037       *  335.06*  335.06*     290*
*R1              *    7.974       *  336.77*  336.77*     400*
*R1              *    7.910       *     520*  450.22*  450.22*
*R1              *    7.825       *  498.62*  498.62*  498.62*
*R1              *    7.730       *  582.81*  582.81*  582.81*
*R1              *    7.620       *  346.67*  346.67*  346.67*
*R1              *    7.554       *   743.7*   743.7*   743.7*
*R1              *    7.413       *   502.4*   502.4*   502.4*
*R1              *    7.318       *  240.02*  240.02*  240.02*
*R1              *    7.273       *      10*      10*      10*
*R1              *    7.271       *      10*      10*      10*
*R1              *    7.269       * 38380.3* 38380.3* 38380.3*
*****************************************************************

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

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: RV W7

*******************************************************
*     Reach       *   River Sta.   * Contr.  * Expan.  *
*******************************************************
*R1              *    8.325   *       .1*       .3*
*R1              *    8.252   *       .1*       .3*
*R1              *    8.162   *       .1*       .3*
*R1              *    8.087   *       .1*       .3*
*R1              *    8.037   *       .1*       .3*
*R1              *    7.974   *       .1*       .3*
*R1              *    7.910   *       .1*       .3*
*R1              *    7.825   *       .1*       .3*
*R1              *    7.730   *       .1*       .3*
*R1              *    7.620   *       .1*       .3*
*R1              *    7.554   *       .1*       .3*
*R1              *    7.413   *       .1*       .3*
*R1              *    7.318   *       .1*       .3*
*R1              *    7.273   *       .1*       .3*
*R1              *    7.271   *       .1*       .3*
*R1              *    7.269   *       .1*       .3*
*******************************************************

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

ERRORS WARNINGS AND NOTES
Errors Warnings and Notes for Plan : RV Wash 7

River: RV W7  Reach: R1     RS: 8.325     Profile: 100-YR FP
     Warning:The energy equation could not be balanced within the specified number of iterations.  The program used critical depth
             for the water surface and continued on with the calculations.
     Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
             the need for additional cross sections.
     Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
             water surface came back below critical depth.  This indicates that there is not a valid subcritical answer.  The
             program defaulted to critical depth.
     Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, water surface was
             used.
River: RV W7  Reach: R1     RS: 8.252     Profile: 100-YR FP
     Warning:The energy equation could not be balanced within the specified number of iterations.  The program used critical depth
```

for the water surface and continued on with the calculations.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
River: RV W7 Reach: R1 RS: 8.162 Profile: 100-YR FP
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:Divided flow computed for this cross-section.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
River: RV W7 Reach: R1 RS: 8.087 Profile: 100-YR FP
Warning:Divided flow computed for this cross-section.
Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
River: RV W7 Reach: R1 RS: 8.037 Profile: 100-YR FP
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:Divided flow computed for this cross-section.
Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
River: RV W7 Reach: R1 RS: 7.974 Profile: 100-YR FP
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:Divided flow computed for this cross-section.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
River: RV W7 Reach: R1 RS: 7.910 Profile: 100-YR FP
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.
River: RV W7 Reach: R1 RS: 7.825 Profile: 100-YR FP
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.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
River: RV W7 Reach: R1 RS: 7.730 Profile: 100-YR FP
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
River: RV W7 Reach: R1 RS: 7.620 Profile: 100-YR FP
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
River: RV W7 Reach: R1 RS: 7.554 Profile: 100-YR FP
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:Divided flow computed for this cross-section.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
River: RV W7 Reach: R1 RS: 7.413 Profile: 100-YR FP
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Manning's n values were composited to a single value in the main channel.

```
     Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, water surface was
             used.
River: RV W7  Reach: R1     RS: 7.318     Profile: 100-YR FP
     Warning:Divided flow computed for this cross-section.
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
     Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
             the need for additional cross sections.
     Note:   Manning's n values were composited to a single value in the main channel.
     Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, water surface was
             used.
River: RV W7  Reach: R1     RS: 7.273     Profile: 100-YR FP
     Warning:Divided flow computed for this cross-section.
River: RV W7  Reach: R1     RS: 7.271     Profile: 100-YR FP
     Warning:Divided flow computed for this cross-section.
River: RV W7  Reach: R1     RS: 7.269     Profile: 100-YR FP
     Warning:Divided flow computed for this cross-section.
```

E.3.4 HEC-RAS Output

RV Wash A

HEC-RAS Plan: RV Wash A Profile: 100-YR FP

River	Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
RV WA T2	R1	1.920	100-YR FP	400.00	2618.49	2622.53	2621.40	2622.88	0.009988	4.77	85.73	44.19	0.51
RV WA T2	R1	1.765	100-YR FP	400.00	2607.79	2610.30	2610.05	2610.57	0.025198	5.02	100.48	110.96	0.78
RV WA T2	R1	1.627	100-YR FP	400.00	2594.05	2595.94	2595.69	2596.14	0.016340	4.26	131.75	170.64	0.64
RV WA T2	R1	1.467	100-YR FP	400.00	2576.08	2577.56	2577.53	2577.89	0.029810	4.84	94.90	180.25	0.85
RV WA T2	R1	1.251	100-YR FP	400.00	2553.91	2555.44	2555.04	2555.56	0.013865	3.13	155.40	204.12	0.56
RV WA T2	R1	1.084	100-YR FP	400.00	2534.66	2535.17	2535.10	2535.40	0.044269	2.94	106.14	165.39	0.80
RV WA T2	R1	0.924	100-YR FP	400.00	2515.97	2517.03	2516.61	2517.15	0.012759	2.95	146.21	147.17	0.51
RV WA T2	R1	0.817	100-YR FP	400.00	2505.03	2506.04	2505.86	2506.20	0.032489	3.42	124.67	192.21	0.79
RV WA T2	R1	0.762	100-YR FP	400.00	2497.64	2500.56	2500.23	2500.72	0.012463	4.14	140.68	266.73	0.57
RV WA T2	R1	0.715	100-YR FP	510.00	2493.18	2495.03	2494.99	2495.51	0.034984	6.11	100.99	97.69	0.88
RV WA T2	R1	0.642	100-YR FP	510.00	2484.98	2487.53	2487.07	2487.78	0.012836	4.19	135.71	309.73	0.55
RV WA T2	R1	0.547	100-YR FP	510.00	2473.90	2475.80	2475.80	2476.21	0.052016	6.02	103.33	124.39	1.08
RV WA T2	R1	0.473	100-YR FP	510.00	2464.75	2467.55	2466.85	2467.77	0.010908	4.17	142.00	102.87	0.51
RV WA T2	R1	0.366	100-YR FP	510.00	2454.24	2455.83	2455.83	2456.28	0.049445	6.13	97.62	105.90	1.07
RV WA T2	R1	0.264	100-YR FP	510.00	2443.74	2445.81		2445.89	0.005186	2.78	241.65	191.15	0.37
RV WA T2	R1	0.219	100-YR FP	2260.00	2438.97	2440.60	2440.60	2441.09	0.033065	6.18	402.99	409.46	1.07
RV WA T2	R1	0.145	100-YR FP	2260.00	2430.76	2431.62	2431.62	2431.96	0.015283	2.08	513.32	675.00	0.66
RV WA T2	R1	0.065	100-YR FP	2260.00	2419.57	2421.59	2421.59	2422.13	0.022714	6.21	388.92	390.62	1.01
RV WA T1	R1	3.405	100-YR FP	790.00	2793.87	2797.10	2796.57	2797.39	0.013892	4.67	218.70	196.64	0.53
RV WA T1	R1	3.329	100-YR FP	790.00	2784.76	2787.64	2787.64	2788.54	0.038721	7.75	110.82	70.48	0.92
RV WA T1	R1	3.143	100-YR FP	790.00	2760.88	2763.09	2762.58	2763.30	0.014781	4.17	226.85	267.09	0.54
RV WA T1	R1	3.000	100-YR FP	790.00	2743.98	2746.30	2746.18	2746.79	0.035863	5.67	148.16	129.71	0.81
RV WA T1	R1	2.881	100-YR FP	790.00	2731.54	2733.19	2732.49	2733.38	0.013909	3.46	230.16	142.93	0.51
RV WA T1	R1	2.760	100-YR FP	790.00	2716.45	2719.01	2719.01	2719.75	0.036157	7.55	129.48	90.73	0.91
RV WA T1	R1	2.541	100-YR FP	790.00	2687.32	2690.90	2690.33	2691.38	0.015870	6.01	160.15	80.25	0.61
RV WA T1	R1	2.344	100-YR FP	790.00	2665.66	2669.60	2669.04	2670.04	0.027320	5.35	148.83	84.10	0.66
RV WA T1	R1	2.133	100-YR FP	790.00	2641.57	2644.71		2644.93	0.018888	4.26	232.90	200.26	0.55
RV WA T1	R1	1.994	100-YR FP	790.00	2626.37	2628.90	2628.63	2629.22	0.024320	4.93	192.77	157.47	0.65
RV WA T1	R1	1.867	100-YR FP	790.00	2611.40	2614.82	2614.49	2615.20	0.018133	5.31	182.94	135.95	0.62
RV WA T1	R1	1.638	100-YR FP	790.00	2587.58	2589.36	2588.98	2589.59	0.025060	3.82	208.64	169.18	0.60
RV WA T1	R1	1.476	100-YR FP	620.00	2568.97	2572.24	2571.57	2572.50	0.015416	4.07	152.38	92.43	0.56
RV WA T1	R1	1.304	100-YR FP	620.00	2550.40	2552.73	2552.73	2553.44	0.030012	6.79	91.24	64.99	1.01
RV WA T1	R1	1.140	100-YR FP	620.00	2532.33	2534.90	2534.64	2535.15	0.014704	4.53	187.83	181.39	0.61
RV WA T1	R1	0.935	100-YR FP	620.00	2511.27	2512.92	2512.69	2513.14	0.029918	4.44	173.60	180.48	0.70
RV WA T1	R1	0.780	100-YR FP	620.00	2492.25	2494.64	2494.36	2494.79	0.016548	3.81	221.04	376.14	0.66
RV WA T1	R1	0.592	100-YR FP	620.00	2472.69	2474.52	2474.39	2474.68	0.030699	4.07	211.42	303.69	0.64
RV WA T1	R1	0.515	100-YR FP	620.00	2463.70	2466.04	2465.88	2466.37	0.014238	5.05	162.30	149.78	0.70
RV WA T1	R1	0.402	100-YR FP	620.00	2451.62	2454.27	2454.27	2454.70	0.029988	6.76	150.14	158.67	0.86
RV WA T1	R1	0.200	100-YR FP	620.00	2430.32	2432.24	2431.56	2432.38	0.013304	3.77	221.77	286.03	0.53
RV WA T1	R1	0.122	100-YR FP	620.00	2421.59	2422.89	2422.89	2423.26	0.042958	6.06	151.24	370.64	1.08
RV WA	R1	9.834	100-YR FP	1550.00	2675.70	2678.57	2678.57	2678.90	0.015243	7.02	432.73	544.17	0.80
RV WA	R1	9.648	100-YR FP	1550.00	2659.03	2661.87	2661.62	2662.13	0.014941	5.35	397.72	421.48	0.74
RV WA	R1	9.518	100-YR FP	1550.00	2648.03	2651.12	2651.12	2651.59	0.015890	6.87	338.76	327.23	0.78
RV WA	R1	9.372	100-YR FP	1550.00	2634.03	2636.96	2636.92	2637.52	0.013448	6.36	302.10	304.25	0.74
RV WA	R1	9.197	100-YR FP	1550.00	2622.58	2624.04	2623.75	2624.30	0.014979	4.17	384.28	339.95	0.68
RV WA	R1	9.065	100-YR FP	2090.00	2611.80	2612.76		2613.06	0.017057	4.01	473.72	405.51	0.73
RV WA	R1	8.893	100-YR FP	2090.00	2593.08	2594.83	2594.83	2595.32	0.022406	6.33	409.82	405.90	0.92
RV WA	R1	8.807	100-YR FP	2090.00	2582.33	2584.99	2584.99	2585.65	0.015923	7.52	376.28	275.40	0.85
RV WA	R1	8.613	100-YR FP	2090.00	2563.61	2564.57	2564.36	2564.94	0.016952	3.13	443.09	385.42	0.76
RV WA	R1	8.415	100-YR FP	2090.00	2543.54	2545.15	2544.99	2545.48	0.020527	4.98	452.70	423.34	0.86
RV WA	R1	8.262	100-YR FP	2090.00	2528.60	2530.36	2530.08	2530.66	0.016415	4.75	487.85	432.99	0.74
RV WA	R1	8.060	100-YR FP	2090.00	2506.99	2509.22	2509.11	2509.69	0.023958	6.02	383.52	316.75	0.92
RV WA	R1	7.925	100-YR FP	2090.00	2493.42	2494.87	2494.74	2495.17	0.017521	4.87	508.61	953.73	0.78
RV WA	R1	7.828	100-YR FP	2090.00	2482.75	2484.22	2484.22	2484.74	0.023642	3.06	379.66	412.80	0.77
RV WA	R1	7.636	100-YR FP	2090.00	2462.91	2466.16	2465.98	2466.42	0.012624	4.92	552.44	536.69	0.66
RV WA	R1	7.554	100-YR FP	2090.00	2455.30	2458.58	2458.58	2459.67	0.019173	8.38	251.91	124.68	0.99
RV WA	R1	7.414	100-YR FP	2090.00	2440.39	2444.28	2444.28	2445.44	0.017409	8.95	255.88	114.98	0.95
RV WA	R1	7.390	100-YR FP	2260.00	2438.75	2440.73	2440.59	2441.11	0.022074	5.22	456.50	412.73	0.86
RV WA	R1	7.292	100-YR FP	2260.00	2428.64	2431.56	2431.56	2431.98	0.014353	6.24	469.59	637.39	0.90
RV WA	R1	7.184	100-YR FP	2260.00	2419.57	2421.61	2421.61	2422.13	0.020710	6.23	394.96	394.15	1.01
RV WA	R2	7.052	100-YR FP	2820.00	2405.67	2410.20	2408.98	2410.36	0.002424	3.91	979.65	424.17	0.35
RV WA	R2	7.051	100-YR FP	2820.00	2405.53	2410.20	2408.82	2410.34	0.002114	3.69	1030.74	431.05	0.33
RV WA	R3	7.050	100-YR FP	2820.00	2405.41	2410.20	2408.67	2410.33	0.001815	3.46	1090.83	439.68	0.31
RV WA	R3	7.049	100-YR FP	2820.00	2405.41	2410.20	2408.67	2410.33	0.001815	3.46	1090.83	439.68	0.31

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

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

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

PROJECT DATA
Project Title: RV Wash A
Project File : RV_Wash_A.prj
Run Date and Time: 11/1/2007 10:07:12 AM

Project in English units

Project Description:
Rio Verde ADMP, Project FCDMC 2001C056, river system including RV Wash A, RV
Wash A Trib 1, and RV Wash A Trib 2. Phase 3 RAS model started in May 2005,
preliminary model completed in June 2005.

RAS model is prepared by Dibble
Engineering. Field reconnaissance per report dated April 18, 2005.

This wash
models the condition in which Black Hills Tank is removed, allowing all flow to
continue without diversion. RV Wash A Tank Spillway in
RV_Wash_A_Tank_Spillway.prj models the condition in which Black Hills Tank (a
stock tank) remains in place, and the existing spillway diverts flow to RV Wash
A Tank Spillway. A Hydraulic connection is not modeled between RV Wash A and RV
Wash A Tank Spillway. See Report for more information.

For the study washes,
the starting water surface elevation is on RV Wash A, and is taken from the
starting water surface elevation as provided by the Flood Control District of
Maricopa County.

RV Wash A Floodplain Delineation
From the confluence with
RV Wash A Trib 1 (River Mile 7.050, approximately 2,200 feet north and 1,300
feet west of the intersection of 144th Street and Rio Verde Drive) to a point
approximately 1,800 feet north and 1,100 feet east of the intersection of 122nd
Street and Dixileta Drive (River Mile 9.834), a distance of 2.784 river
miles.

RV Wash A Trib 1 Floodplain Delineation
From the confluence with RV
Wash A (River Mile 0.000, approximately 2,200 feet north and 1,500 feet west of
the intersection of 144th Street and Rio Verde Drive) to a point approximately
650 feet north and 250 feet east of the intersection of 122nd Street and Lone
Mountain Road (River Mile 3.405), a distance of 3.405 river miles.

RV Wash A
Trib 2 Floodplain Delineation
From the confluence with RV Wash A (River Mile
0.000, approximately 2,100 feet north and 1,800 feet west of the intersection
of 144th Street and Rio Verde Drive) to a point approximately 700 feet north
and 4,100 feet east of the intersection of 128th Street and Dixileta Drive
(River Mile 1.920), a distance of 1.920 river miles.

Topographic mapping is
supplied by the Flood Control District of Maricopa County.

The
Cross-section data were generated by INROADS, based on the DTM data. The mapped
hydraulic base line represents the 10,000-station point of the HEC-RAS model.


Discharge data is from the Rio Verde ADMP HEC-1 model. The original models
are from the Flood Control District of Maricopa County, prepared for the Rio
Verde South Floodplain Delineation, the Rio Verde South Extension Floodplain
Delineation, the Rio Verde North Floodplain Delineation, and the Rio Verde
North Extension Floodplain Delineation. The HEC-1 models were modified for the
Rio Verde ADMP. The final HEC-1 files were reviewed in February 2004 and FCDMC
approved the hydrology model.

Hydrologic concentration points are noted in
cross-section descriptions using the corresponding HEC-1 ID's. The flow rates
have been rounded to the nearest 10 cubic feet per second (cfs). Flow rates
obtained from HEC-1 are applied at the downstream end of the relevant sub-basin
and stepped upstream at cross-sections to meet the HEC-1 flow from the upstream
sub-basin.

River Mile (RM) stationing is based upon the estimated tie in
point with downstream receiving waters or the start of two-dimensional flow
models. This point represents RM 0.000. The assumed starting WS Elevation is
based upon normal depth in the study wash.

Horizontal and Vertical
Coordinate Basis for this project is as follows:
```

```
          Horizontal--Arizona State
Plane, Central Region, NAD 1983
          Vertical--NAVD 1988

RAS model river naming
corresponds to project river naming as follows:
          RV WA = RV Wash A
          RV WA T1
= RV Wash A Trib 1
          RV WA T2 = RV Wash A Trib 2


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

PLAN DATA

Plan Title: RV Wash A
Plan File : j:\2006\10-0606.1\Design Notebook\Drainage Design\HEC-RAS\RV_Wash_A.p01

           Geometry Title: RV Wash A
           Geometry File : j:\2006\10-0606.1\Design Notebook\Drainage Design\HEC-RAS\RV_Wash_A.g01

           Flow Title    : RV Wash A
           Flow File     : j:\2006\10-0606.1\Design Notebook\Drainage Design\HEC-RAS\RV_Wash_A.f01

Plan Summary Information:
Number of:  Cross Sections =   64    Multiple Openings  =    0
            Culverts       =    0    Inline Structures  =    0
            Bridges        =    0    Lateral Structures =    0

Computational Information
    Water surface calculation tolerance  =  0.01
    Critical depth calculation tolerance =  0.01
    Maximum number of iterations         =  20
    Maximum difference tolerance         =  0.3
    Flow tolerance factor                =  0.001

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

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

River = RV WA T2          Reach = R1
RS      Profile            Method  Value1  Value2
0.762   PF 2                    1 9989.7610031.45
0.715   PF 2                    1 9980.3310022.08
0.642   PF 2                    1 9970.3310032.23
0.547   PF 2                    1 9951.8110017.48
0.473   PF 2                    1  9981.210024.17
0.366   PF 2                    1 9971.7310024.73
0.264   PF 2                    1 9971.8310026.75
0.219   PF 2                    1 9932.7110021.74
0.145   PF 2                    1 9951.9410288.69
0.065   PF 2                    1 9989.3610176.86

River = RV WA T1          Reach = R1
RS      Profile            Method  Value1  Value2
1.140   PF 2                    1 9971.4510028.16
0.935   PF 2                    1 9993.5910065.98
0.780   PF 2                    1 9952.6910034.04
0.592   PF 2                    1 9983.6310049.75
0.515   PF 2                    1 9973.8610035.24
0.402   PF 2                    1 9957.74 9999.27
0.200   PF 2                    1 9964.2410022.43
0.122   PF 2                    1 9983.8910036.26

River = RV WA             Reach = R2
RS      Profile            Method  Value1  Value2
7.052   PF 2                    1 9954.2810089.62
7.051   PF 2                    1 9952.7110098.52

River = RV WA             Reach = R3
RS      Profile            Method  Value1  Value2
7.050   PF 2                    1 9949.5710114.06
7.048   PF 2                    1 9949.38 10097.2
7.046   PF 2                    1 9919.0810046.75


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

FLOW DATA

Flow Title: RV Wash A
Flow File : j:\2006\10-0606.1\Design Notebook\Drainage Design\HEC-RAS\RV_Wash_A.f01

Flow Data (cfs)
*************************************************************
* River           Reach           RS      *       100-YR FP *
* RV WA           R1              9.834   *            1550 *
* RV WA           R1              9.065   *            2090 *
* RV WA           R1              7.390   *            2260 *
* RV WA           R1              7.292   *            2260 *
* RV WA           R2              7.052   *            2820 *
* RV WA           R3              7.050   *            2820 *
```

```
* RV WA T1        R1              3.405   *             790 *
* RV WA T1        R1              1.476   *             620 *
* RV WA T2        R1              1.920   *             400 *
* RV WA T2        R1              0.715   *             510 *
* RV WA T2        R1              0.264   *             510 *
* RV WA T2        R1              0.219   *            2260 *
* RV WA T2        R1              0.145   *            2260 *
*************************************************************

Boundary Conditions
*****************************************************************************************************
* River           Reach           Profile          *            Upstream                  Downstream    *
*****************************************************************************************************
* RV WA           R3              100-YR FP        *                                 Known WS = 2410.2 *
*****************************************************************************************************

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

GEOMETRY DATA

Geometry Title: RV Wash A
Geometry File : j:\2006\10-0606.1\Design Notebook\Drainage Design\HEC-RAS\RV_Wash_A.g01

Reach Connection Table
*****************************************************************************
* River           Reach           *  Upstream Boundary  * Downstream Boundary *
*****************************************************************************
* RV WA           R1              *                     *   J1                *
* RV WA           R2              *   J1                *   J2                *
* RV WA           R3              *   J2                *                     *
* RV WA T1        R1              *                     *   J2                *
* RV WA T2        R1              *                     *   J1                *
*****************************************************************************

JUNCTION INFORMATION

Name: J1
Description:
Energy computation Method

    Length across Junction            Tributary
     River          Reach               River          Reach        Length   Angle
RV WA          R1              to RV WA          R2                696.73
RV WA T2       R1              to RV WA          R2                676.15

Name: J2
Description:
Energy computation Method

    Length across Junction            Tributary
     River          Reach               River          Reach        Length   Angle
RV WA          R2              to RV WA          R3                     5
RV WA T1       R1              to RV WA          R3                647.84

CROSS SECTION


RIVER: RV WA
REACH: R1                RS: 9.834

INPUT
Description: Q=1550 cfs (CP2223, 24 hr)
Station Elevation Data    num=      89
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
 9534.93    2680  9542.4 2679.58 9552.85 2679.16 9564.37 2678.58 9567.73 2678.16
 9570.23 2678.05 9592.04 2677.71 9603.51 2677.78 9606.26  2677.2 9609.89  2676.7
 9616.03 2677.31 9617.25 2677.44 9627.84 2677.42  9640.3 2677.42 9650.79 2677.48
 9651.67 2677.47 9675.94 2678.05 9679.62 2678.16 9684.91  2678.3 9706.94  2678.4
 9729.25  2678.2 9729.81 2678.19  9730.1 2678.19 9734.14  2678.2 9759.41  2678.2
 9764.37 2678.23  9780.8 2678.25 9787.71  2677.6 9795.19 2677.32 9796.82 2677.49
 9799.38 2677.79 9809.74 2677.87 9825.54 2678.17 9828.51 2678.19 9829.26 2678.19
 9829.77 2678.15  9830.9 2678.12 9844.37 2677.53  9850.4 2677.77 9856.17 2677.89
 9885.21 2677.89  9886.8  2677.9 9888.24 2677.89 9888.69 2677.87 9889.54 2677.83
  9900.8 2677.33 9903.04 2677.27 9907.31 2677.24 9910.47 2677.34 9919.99  2677.5
 9941.54 2678.18 9950.41 2678.34 9972.66 2677.45 9986.43 2677.05 9990.52 2676.42
 9993.642675.867 9994.58  2675.7   10000 2675.8610000.02 2675.86 10000.2 2675.86
 10000.6 2675.8710001.68 2675.8910008.32 2675.9710013.31 2676.6110016.572677.051
10020.27 2677.5510029.44 2677.9810033.35 2678.1810037.58 2677.9710042.82 2677.78
10053.99 2677.3710056.23 2677.3810057.92 2677.3510061.26 2677.6210064.53 2677.87
10068.03  2677.910069.33  2677.910076.84  2677.910085.22 2678.0610100.77 2678.42
10115.35 2678.6910124.46 2678.9110132.15 2679.2710148.65    268010163.82 2680.73
 10173.2 2681.2910180.51 2681.8310203.55 2683.39 10204.1 2683.37

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
 9534.93     .05 9993.64     .04 10000.2     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9986.4310016.57           982.87  982.87  982.87             .1       .3

CROSS SECTION


RIVER: RV WA
REACH: R1                RS: 9.648

INPUT
Description:
```

```
Station Elevation Data    num=     121
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
  9442.9 2665.39 9445.99 2665.43 9448.14 2665.28 9459.98 2665.18 9461.83 2665.12
 9467.35 2665.22 9475.05 2665.09 9480.79 2664.87  9484.7 2664.87 9485.77 2664.83
 9489.64 2664.66 9497.49 2664.52 9504.79 2664.25 9510.24 2664.34 9515.86 2664.07
 9520.36 2663.66 9527.96 2663.12 9531.89 2662.94  9532.7 2662.91 9535.39 2662.83
 9539.61 2662.85 9549.19 2662.56 9553.18 2662.68 9554.13 2662.74 9556.73 2662.89
  9561.5 2663.23 9568.16 2663.62  9573.4 2663.89 9579.99 2664.23 9580.67 2664.26
 9581.34 2664.29  9592.6 2662.94 9597.58 2662.27 9599.23 2662.06 9609.35 2660.88
 9612.81 2660.19 9613.49 2660.03 9615.21 2659.78 9621.76 2659.69 9630.08 2659.75
 9635.77 2659.85 9642.39 2659.94 9660.98 2660.91 9667.37 2661.03 9675.72 2661.31
 9690.82 2661.87 9693.68 2661.95 9700.13 2662.24  9711.6 2662.13 9721.46 2661.95
 9738.34 2661.78 9771.13 2661.58  9781.2  2661.6 9792.93 2661.55 9796.55 2661.52
 9812.48 2661.35 9829.32 2661.39 9836.49 2661.31 9842.59 2661.34 9848.32 2660.86
 9851.23 2660.61 9852.22  2660.5 9857.99 2659.63 9860.17  2660.1 9873.35 2661.76
  9879.2 2661.71 9896.77 2662.87 9906.43 2663.71 9918.53 2664.89 9934.02 2666.45
 9934.71 2666.52  9934.9 2666.48 9963.51 2662.33 9966.04 2661.98 9969.04 2661.52
 9974.42 2661.09 9975.97 2661.04 9982.572660.302 9985.18 2660.01  9985.3 2659.99
 9985.77 2659.99 9991.08 2660.03 9991.83 2660.09 9994.13 2660.29 9997.38 2659.57
 9999.122659.206 9999.96 2659.03   10000 2659.0310003.24 2659.2110007.26 2659.59
 10010.32660.30710015.78  2661.610015.97 2661.6410016.09 2661.6410023.67  2661.4
10051.57 2660.4610060.92 2660.2510065.94 2660.3310071.22 2660.4410076.39 2660.55
10085.18 2660.6610092.63  2660.610096.14 2660.64 10097.6 2660.6610100.49 2660.71
10109.87  2660.310118.05 2660.6610121.58 2660.3810126.02  2661.110126.57 2661.14
   10127 2661.2310137.61  2661.610151.47 2662.0110156.38 2662.6210164.39 2663.55
10172.43 2664.8310175.74 2665.1710179.52 2665.5510197.69 2666.6110201.45 2666.79
10202.71 2666.85

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*************************************************
  9442.9     .05 9999.12     .0410003.24     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9969.0410015.97           682.43  682.43  682.43             .1       .3

CROSS SECTION


RIVER: RV WA
REACH: R1                 RS: 9.518

INPUT
Description:
Station Elevation Data    num=     130
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 9364.88 2660.06 9371.88 2659.58 9378.24 2659.21 9381.59    2659 9394.88 2658.54
 9401.12 2658.26 9406.73  2658.2 9411.97 2657.81 9420.43 2657.19 9424.36 2656.92
 9427.11 2656.49 9432.91 2656.21 9437.69 2656.12 9440.96 2655.94 9446.93 2655.71
 9452.79 2655.45 9458.43 2655.26 9461.75 2655.01 9466.49 2655.18 9471.51 2655.05
 9476.48 2655.24 9485.96 2654.79 9487.44 2654.78  9487.9 2654.74 9489.21 2654.68
 9490.35 2654.59 9494.56 2654.08 9508.78 2652.24 9510.95  2651.7 9514.57 2650.96
  9519.8  2649.9 9523.85 2649.98 9532.64 2649.98 9536.51 2650.18 9537.83 2650.27
 9551.99 2651.55 9566.65 2652.36 9569.92 2652.52 9577.35  2652.9 9591.23 2652.46
 9604.47 2652.07 9612.64 2651.74 9623.61 2651.76 9627.24 2651.69 9642.54 2651.72
 9660.78 2651.66 9666.29 2651.53 9666.97 2651.53 9677.58 2651.31 9701.76 2650.86
 9703.93 2650.89 9705.89 2650.58 9711.05 2649.87 9715.11 2649.94 9716.71 2649.95
 9727.28 2650.62 9738.03 2651.28 9758.07 2652.43 9759.05  2652.5 9812.62 2652.18
 9813.53 2652.17 9815.17 2652.16 9849.87 2651.98 9858.38 2651.46 9872.43 2650.65
  9875.5 2650.72 9879.42 2650.85 9884.02 2650.28 9884.61 2650.22 9885.77  2650.5
 9888.59 2650.95 9895.69 2650.85  9906.3 2650.51 9907.72 2650.41 9912.77 2650.01
 9916.61  2650.2  9920.7 2650.33 9922.85 2650.23 9928.12 2649.66  9932.8 2649.65
 9936.95 2650.25 9939.97 2650.67 9948.29 2650.65 9955.03  2650.5 9959.01 2650.48
 9963.512650.001 9971.23 2649.18 9976.07 2648.65 9978.68 2648.56 9982.02 2648.61
 9983.82  2648.6 9985.91 2648.62 9989.05 2648.63 9992.41 2648.41 9993.63 2648.55
 9994.76 2648.21   10000 2648.0710000.02 2648.0710001.19 2648.0310006.52 2648.04
10006.63 2648.0710010.53 2649.1210013.77    265010043.54 2650.0510044.09 2650.05
10044.15 2650.0510044.19 2650.05 10063.1 2649.8510076.77 2649.8710090.14 2650.05
10093.96 2650.11 10096.9 2650.2710105.71  2650.810137.83 2652.8710143.91 2653.07
10145.67  2653.110148.82 2653.0910166.09 2653.1510174.82 2653.0110183.37  2652.6
 10207.5 2651.8310209.27 2651.7410216.56 2651.5310227.21  2652.510241.22 2653.67
10254.27 2654.9310255.43 2655.0410263.66 2655.2210271.96 2655.3710292.46 2655.98

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*************************************************
 9364.88     .05   10000     .0410006.63     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9963.5110013.77           772.29  772.29  772.29             .1       .3

CROSS SECTION


RIVER: RV WA
REACH: R1                 RS: 9.372

INPUT
Description:
Station Elevation Data    num=      69
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 9475.32 2640.34 9478.42 2640.31 9487.49  2640.1 9488.47  2640.1 9494.25 2639.71
 9503.02 2639.07  9506.1  2638.8 9507.85 2638.69 9509.11 2638.63  9510.1 2638.59
  9510.4 2638.59  9517.2 2638.42 9527.49  2638.2 9561.55 2637.41 9572.57 2637.38
 9608.95 2637.24 9627.99 2636.29 9636.83 2635.98 9657.71 2636.64 9673.39 2637.16
 9690.37 2636.89 9698.75 2636.74 9707.71 2636.89 9718.91 2637.03 9730.45 2637.17
 9757.84 2636.72 9771.45  2636.5 9793.12 2636.93 9825.39 2637.54 9847.37 2637.68
```

```
 9868.38 2637.92  9874.8 2638.16 9876.75 2638.23 9883.84 2638.07 9885.12 2638.04
 9895.57 2637.92 9916.91 2637.61 9935.66 2637.32 9951.95 2636.39  9962.2 2635.83
 9970.25 2635.39 9977.25    2635  9998.3 2634.05 9998.67 2634.03 9998.96 2634.03
 9999.03 2634.03 9999.98 2634.03   10000 2634.0310011.762634.05410024.56 2634.08
 10037.8 2634.7710042.25    263510048.65 2635.4510055.51 2635.8410061.01 2635.96
10066.76  2636.110073.28 2636.2110080.51 2636.3210084.48 2636.3510112.08 2636.82
10122.45 2637.7210142.07 2640.0810147.35 2641.2410158.71 2644.5410169.56 2647.47
10174.14 2648.6510176.97 2649.3510179.83 2650.1110187.52 2651.64

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
 9475.32     .05  9998.3     .0410011.76     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        9962.210055.51           926.62  926.62  926.62             .1       .3

CROSS SECTION


RIVER: RV WA
REACH: R1                 RS: 9.197

INPUT
Description:
Station Elevation Data    num=      45
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
**********************************************************************************
 9654.04 2626.32 9655.74 2626.32 9660.41 2626.33 9670.88  2626.3 9674.76 2626.34
 9686.74 2626.28 9695.05 2626.36 9714.69  2626.2 9715.45 2626.21 9715.94 2626.21
 9719.12 2626.17 9737.07 2625.61 9743.98 2625.46 9754.96 2625.18 9762.94 2623.54
 9775.04  2621.4 9792.68 2621.54 9822.41 2621.83 9835.79 2621.97 9869.59 2623.37
 9872.43 2623.49 9883.04 2623.93 9891.54 2623.88  9975.7 2623.45 9990.38 2623.06
    9997 2622.87 9999.98 2622.85   10000 2622.8510029.24 2622.6910042.36 2622.61
10049.22 2622.5810051.252622.60610075.73 2622.92 10088.52623.45710094.53 2623.71
10120.71 2625.1710163.14 2625.62 10178.8  2625.810198.81 2628.7510207.94 2630.07
10209.81  2630.4 10248.6 2639.7910250.13 2640.0910259.77 2641.9810281.81 2646.16

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
 9654.04     .0510042.36     .0410051.25     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        9975.7 10088.5           696.33  696.33  696.33             .1       .3

CROSS SECTION


RIVER: RV WA
REACH: R1                 RS: 9.065

INPUT
Description: Q=2090 cfs (CP2B6, 24 hr)
Station Elevation Data    num=      28
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
**********************************************************************************
 9484.25 2620.29 9498.71 2620.26 9509.32 2620.24 9562.79 2618.05 9620.66 2615.15
 9637.35 2614.29 9714.18  2611.1 9786.94 2611.01 9802.25 2610.97 9811.32 2611.08
 9871.35 2611.71 9894.29 2611.74 9960.06 2611.81 9979.29  2611.8   10000 2611.81
10000.01 2611.8110006.21 2611.8210030.33 2611.8310072.01 2612.0110072.87 2612.01
10073.46 2612.0210074.27 2612.0110097.63 2615.1310097.67 2615.1310100.35 2615.65
10124.17 2620.2210124.71  2620.310167.36 2629.44

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
 9484.25     .05 9979.29     .04   10000     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9960.0610030.33           911.5   911.5   911.5             .1       .3

CROSS SECTION


RIVER: RV WA
REACH: R1                 RS: 8.893

INPUT
Description: This portion of RV Wash A models the condition in which Black
             Hills Tank (a stock tank) is removed, allowing all flow to
             continue without diversion. However, the floodplain at cross
             section RM 8.893 is drawn to match the elevation of RM 1.378 of
             Wash A Tank Spillway as if the stock tank is in place, resulting
             in a more conservative floodplain. See Report for more information.
Station Elevation Data    num=      55
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
**********************************************************************************
 9697.41  2620.2 9698.12 2620.07 9709.84 2616.61 9731.35 2610.19 9742.34 2606.04
 9758.39 2600.16 9773.73 2597.71 9792.11 2595.08 9800.91 2594.58 9832.01 2593.99
 9836.54 2593.98 9844.31 2593.96 9867.09 2594.33 9887.44 2594.09 9891.61 2594.08
 9891.94 2594.08 9895.98 2594.08 9917.96 2593.79 9919.56 2593.79 9942.41 2593.54
 9942.85 2593.54 9956.05 2593.42 9968.73 2593.34  9969.1 2593.34 9994.63 2593.16
 9995.04 2593.16  9998.4 2593.14    9999 2593.1510002.34 2593.1410002.36 2593.14
10013.67 2593.1110017.81 2593.0810039.24 2593.1710071.38 2593.7810073.81 2593.78
10089.99 2594.0110093.76 2594.0110100.77 2594.1410105.66 2594.1410126.94 2593.84
10151.12  2593.910157.18 2593.9110185.57 2594.2410189.56 2594.3610196.09 2594.57
10208.17 2595.0610223.87 2599.2310227.64 2600.1510278.78 2619.7910279.83  2620.2
10279.86 2620.2110280.42 2620.3510297.19 2624.7510298.57 2625.1310304.95 2625.86
```

```
Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
 9697.41     .05 9994.63     .0410039.24     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9919.5610071.38           451.49  451.49  451.49             .1       .3

CROSS SECTION


RIVER: RV WA
REACH: R1                 RS: 8.807

INPUT
Description:
Station Elevation Data    num=      47
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 9725.47 2600.14 9748.84  2595.8  9751.8 2595.22 9755.99 2595.03  9764.3 2594.62
 9772.97 2594.15  9778.5  2593.7 9784.03 2593.54 9793.37 2592.75  9795.6 2592.61
 9801.74  2592.2  9815.1 2591.13 9831.36 2590.13 9844.52 2586.81 9848.43 2585.71
 9851.15 2585.04 9861.06 2584.42 9862.67 2584.27 9875.63 2584.41 9878.41 2584.41
 9901.14  2584.4 9915.55 2584.44 9957.16  2583.5 9960.33 2583.42 9981.29  2582.9
 9995.392582.523   10000  2582.410002.63 2582.3310007.07 2582.3710011.81 2582.41
   100262582.51810053.99 2582.7310057.66 2582.9210060.05 2582.9810062.43 2583.02
10085.09  2583.810093.96 2584.0110111.93  2584.610119.35 2584.8810128.41 2585.01
 10129.1 2585.0310140.24 2586.8210156.73 2590.1210160.02 2591.3110183.18 2600.14
10199.26 2606.3710206.11 2609.11

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
 9725.47     .05 9995.39     .04   10026     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9981.2910057.66          1024.38 1024.38 1024.38             .1       .3

CROSS SECTION


RIVER: RV WA
REACH: R1                 RS: 8.613

INPUT
Description:
Station Elevation Data    num=      46
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 9579.59 2577.44 9587.67 2576.48 9596.93 2575.15 9615.85 2571.02 9620.68 2570.06
 9637.56 2566.55 9643.45 2565.12 9649.65    2564 9672.81 2560.72 9726.72 2562.73
 9755.91 2563.89 9757.37 2563.98 9759.38    2564 9772.37 2563.87 9792.27 2563.65
 9836.48 2563.29 9852.55 2563.11 9856.01 2563.28 9878.41  2563.9 9904.28 2564.72
 9909.65 2564.73 9911.74  2564.7 9920.22 2564.67 9926.92 2564.65 9979.62 2564.01
 9982.96 2563.97    9999 2563.61 9999.98 2563.62   10000 2563.6210017.91 2563.85
10025.78 2563.9510047.85 2563.9410051.49 2563.9410062.04 2564.41 10077.6 2565.12
10091.91 2565.2810096.14 2565.3210099.29 2565.3410112.01 2566.6410144.67  2570.2
10158.05 2575.5310168.01 2580.0810196.29 2590.1510223.55 2600.12 10240.4 2608.02
10258.55 2615.88

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
 9579.59     .05 9982.96     .0410025.78     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9926.92 10077.6          1044.54 1044.54 1044.54             .1       .3

CROSS SECTION


RIVER: RV WA
REACH: R1                 RS: 8.415

INPUT
Description:
Station Elevation Data    num=      58
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 9520.74 2558.01 9530.68 2557.03 9552.17 2555.11 9569.71 2553.07 9599.27 2550.02
 9601.61 2549.81 9608.78 2549.26 9657.68 2545.25 9660.83 2545.05 9664.03 2544.94
 9677.54 2544.03 9687.66 2543.56 9717.69 2543.72 9742.29 2543.85 9755.32  2544.5
 9757.09 2544.57 9764.24 2544.14 9793.45 2542.33 9809.82 2542.84 9825.12 2543.29
 9846.34 2543.91 9866.58 2544.56 9875.23 2544.69  9893.1 2544.91  9893.5 2544.91
 9898.35 2544.94  9902.4 2544.96 9904.93 2544.95 9909.01 2544.94 9915.62 2544.92
 9917.01 2544.91 9923.85 2544.84 9931.94 2544.78 9937.62 2544.73 9953.07 2544.56
 9967.23 2544.37  9969.8 2544.33 9986.97 2543.95 9991.412543.859 9998.22 2543.72
   10000 2543.6810000.03 2543.6810005.44 2543.5410014.24 2543.8610043.35 2544.57
 10043.5 2544.5710043.59 2544.5710043.65 2544.5710043.84 2544.5710045.28 2544.55
 10070.1 2544.2610079.66 2544.8710080.76 2544.9510084.77 2545.3710132.63 2550.03
10152.39 2553.2910162.76 2555.1210175.46 2556.12

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
 9520.74     .05 9991.41     .0410014.24     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9953.0710043.35           810.03  810.03  810.03             .1       .3
```

CROSS SECTION

RIVER: RV WA
REACH: R1 RS: 8.262

INPUT
Description:
Station Elevation Data num= 54

```
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9805.94 2531.86 9809.34 2531.94 9815.63 2531.52 9825.09 2530.93 9840.39 2530.12
 9859.05 2528.96 9878.77 2527.56 9894.88 2528.37 9899.79 2528.47 9935.62 2529.53
 9936.83 2529.53 9941.47 2529.51 9944.26 2529.51 9946.97 2529.49 9983.32 2528.88
 9990.45 2528.76 9996.36  2528.6 9999.99 2528.72   10000 2528.7210001.08 2528.76
 10004.3 2528.8810011.35 2529.0410029.26 2529.5510038.64  2529.710050.87 2529.82
   10062 2529.8910072.83 2529.9110080.75 2529.9910082.29 2530.0210091.13 2530.06
10093.07 2530.08 10098.3 2530.1210099.23 2530.1310100.95 2530.1210110.62 2530.12
10116.44 2530.1210120.91 2530.1210123.21 2530.1210148.11 2529.2110172.45  2528.3
10177.66 2528.6710183.08 2528.9110189.19 2529.2710198.04 2529.4410209.23 2529.28
10214.19 2529.2310214.95 2529.1910218.98    252910238.69 2528.5910240.62 2528.49
10243.41 2528.3310248.78 2528.7510267.08 2530.1310282.29 2532.03
```

Manning's n Values num= 3

```
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9805.94     .05 9990.45     .0410001.08     .05
```

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
9946.9710029.26 1065.85 1065.85 1065.85 .1 .3

CROSS SECTION

RIVER: RV WA
REACH: R1 RS: 8.060

INPUT
Description:
Station Elevation Data num= 48

```
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
  9548.1    2526 9559.37 2525.16 9562.55 2524.39 9579.02 2519.92 9589.71 2517.68
 9602.19 2515.14 9622.15 2513.62 9684.69  2509.9 9704.99    2509 9713.28 2508.62
 9720.59 2508.21 9732.22 2508.46 9754.95 2509.04    9778 2507.83 9792.31 2507.21
 9803.87  2507.4 9814.68 2507.64 9831.15 2507.28 9838.62 2507.04 9847.98 2507.37
 9892.36 2509.35 9930.89 2508.01 9966.52 2507.36 9967.59  2507.4 9974.68 2507.62
  9993.9 2507.24   10000 2507.1210001.57 2507.0910004.22 2507.0410006.25 2506.99
10008.23 2507.2410011.212507.617   10014 2507.9710024.88 2509.3510029.29 2509.91
10032.05 2511.5110039.12 2514.9210040.45    251510042.79 2515.14 10056.2 2515.74
10059.14 2515.8510060.04 2515.8710081.56 2516.8410081.91 2516.8510083.67  2516.9
10084.46 2516.9110096.69 2517.4810107.59 2518.03
```

Manning's n Values num= 3

```
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
  9548.1     .05  9993.9     .0410008.23     .05
```

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
9892.3610024.88 710.844 710.844 710.844 .1 .3

CROSS SECTION

RIVER: RV WA
REACH: R1 RS: 7.925

INPUT
Description: This cross section is identical to RM 0.355 on Wash A Spillway in
RV_Wash_A_Tank_Spillway.prj.
Station Elevation Data num= 185

```
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9139.39 2498.38 9141.67  2498.4 9147.39 2498.35 9149.19 2498.35 9151.56 2498.33
 9161.93 2497.87 9165.86 2497.84 9171.01 2497.76  9172.9 2497.72  9179.2 2497.62
 9179.97 2497.61  9182.3 2497.57 9182.62 2497.57 9184.68 2497.56 9185.93 2497.48
 9189.15 2497.29 9189.21 2497.29 9191.89 2497.13 9198.97 2496.58 9203.65 2496.26
 9207.79 2495.98  9211.6 2495.72 9215.03  2495.5 9229.31 2494.82 9246.35 2493.67
 9247.45 2493.72 9250.62 2493.85 9252.22 2493.91 9254.39 2493.87 9258.85 2493.77
 9274.41 2492.78 9274.74 2492.79  9275.7 2492.65  9276.7 2492.48 9278.74 2492.55
 9281.55 2492.64  9281.8 2492.61 9283.21 2492.42 9284.79 2492.51 9285.08 2492.47
 9286.35 2492.42 9289.86 2492.27 9290.65 2492.26 9294.61 2492.09  9295.1 2492.08
 9295.23 2492.08 9299.71 2491.87 9299.75 2491.87 9299.96 2491.86 9301.78 2491.54
 9302.38 2491.47 9304.96 2491.16 9307.39 2490.89 9309.19 2490.67 9309.24 2490.66
 9315.15 2489.86 9315.46 2489.81 9321.43 2489.92 9322.78 2489.95 9323.98 2489.97
 9329.38 2490.06 9330.74 2490.09 9332.76 2490.15 9337.79 2490.24 9339.26 2490.26
 9341.95 2490.32 9349.02 2490.45 9355.97 2490.59 9357.73 2490.62 9363.46 2490.74
 9364.07 2490.76 9364.47 2490.77 9376.22 2491.17 9435.36 2492.87 9445.36 2493.05
 9446.33 2493.06  9446.4 2493.06 9448.13 2493.06 9449.13 2493.06 9449.91 2493.08
 9451.62 2493.15 9453.24 2493.21 9454.05 2493.24  9462.6 2493.11 9463.55 2493.15
 9465.37 2493.24 9465.83 2493.26 9520.01  2492.2 9527.51 2492.12 9538.56 2490.71
  9540.9  2490.4 9547.46 2491.21 9550.22 2491.54 9553.67 2491.98 9558.13 2492.02
 9561.83 2491.99 9566.09    2492 9572.31  2491.9 9574.32 2492.04 9575.17  2492.1
 9578.81 2492.35 9582.38  2492.6 9586.62 2492.92 9590.37 2493.18 9594.39 2493.49
 9598.13 2493.78 9598.28 2493.79 9598.62 2493.82 9612.36    2494 9616.48 2494.07
 9626.53 2494.21  9635.2 2494.38 9640.48 2494.46 9653.69 2494.73 9653.86 2494.74
 9654.05 2494.74 9654.89 2494.77 9674.05 2494.57 9680.84 2494.47 9680.92 2494.47
  9695.7 2494.26 9709.52 2494.05 9733.16 2493.73 9735.82 2493.71 9746.08 2493.56
 9752.61 2493.55 9758.24 2493.54 9762.37 2493.54 9766.32 2493.58 9802.69  2494.1
 9860.22 2494.49 9866.44 2494.49 9894.25 2494.44 9895.92 2494.45 9898.17 2494.47
```

```
 9900.77 2494.49 9903.75 2494.47 9907.29 2494.44 9911.59 2494.39  9916.9 2494.32
 9923.69  2494.2 9932.74 2494.05 9945.41 2493.83    9958 2493.69 9958.07 2493.68
 9966.64 2493.74 9971.88 2493.78 9973.04 2493.79 9975.46 2493.81 9976.02 2493.84
 9978.32 2493.95 9983.83 2494.23 9991.152493.773 9993.76 2493.61  9997.2 2493.42
 9999.95 2493.43   10000 2493.4310007.152493.47510009.52 2493.4910014.45  2493.5
10018.76 2493.6110024.98 2493.7710028.76 2493.7310035.83 2493.6510040.92 2493.61
10073.23 2493.84 10074.9 2493.7410098.86 2493.2810106.63  2493.210122.84 2493.06
 10128.7 2493.07 10129.8 2493.0610130.09 2493.0610131.27 2493.0610132.28 2493.05
10142.06 2492.8210175.65 2494.4610179.49  2494.710182.95 2494.9410188.12 2495.41
10209.23 2497.8810227.63 2500.0210230.13 2499.7310243.03 2499.5910244.72 2499.93

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
 9139.39     .05 9993.76     .0410018.76     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9983.8310073.23           514.55  514.55  514.55             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
 9139.39 9654.73 2495.23       F

CROSS SECTION


RIVER: RV WA
REACH: R1                 RS: 7.828

INPUT
Description: This cross section is identical to RM 0.266 on Wash A Spillway in
             RV_Wash_A_Tank_Spillway.prj.
Station Elevation Data    num=     205
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
 9218.17 2494.15 9223.26 2493.79 9228.57 2493.41 9230.12  2493.3 9230.51 2493.27
 9232.03 2493.12 9232.37 2493.05 9234.72 2492.69 9239.62 2492.01 9248.83 2491.33
 9258.12 2490.94  9263.1 2490.77 9263.91 2490.74 9267.81 2490.56 9268.49 2490.55
  9279.5 2490.42 9291.08 2488.62 9296.74 2487.75 9299.78 2487.28 9301.19 2487.06
  9301.7 2486.97 9303.08 2486.74 9315.59  2484.4 9315.93 2484.33 9318.11 2483.85
 9322.43  2482.9 9328.08 2481.66 9335.15 2481.62 9344.73 2481.61 9349.28 2481.57
 9349.47  2481.6 9350.33 2481.66 9361.59 2482.44  9368.6  2482.9    9397 2482.88
 9422.95 2483.02 9428.22 2483.04  9433.9 2483.08 9440.88 2481.88 9443.58 2481.41
 9444.39 2481.53 9446.31 2481.79 9451.03 2482.44 9456.48  2483.1 9456.54 2483.11
 9456.94 2483.11  9457.2  2483.1 9457.46 2483.07 9459.29 2483.08 9464.22 2483.04
 9466.49 2483.02  9569.7 2484.91 9576.37 2485.15 9577.16 2485.18 9580.34  2485.3
 9591.19 2486.06 9594.82 2486.28 9603.93  2486.9 9612.94 2487.43 9617.21  2487.7
 9635.87 2488.78 9639.65 2489.01 9646.65 2489.41 9647.12 2489.44 9649.23 2489.32
 9683.35 2487.37 9705.65 2486.15 9708.91 2486.02 9708.96 2486.01 9718.64 2485.55
 9724.64 2485.25 9726.87 2485.25 9736.42 2485.23  9736.6 2485.23 9743.35 2485.17
 9758.62 2485.03 9804.36 2484.79 9808.25 2484.66 9809.73 2484.61 9812.72 2484.37
 9818.42  2483.9 9822.72 2483.55 9824.99 2483.36 9838.03 2484.33  9842.4 2484.62
 9850.53 2484.44 9858.49 2484.27 9863.15 2484.17 9866.22  2484.1  9868.4 2484.06
 9869.59 2484.03 9870.02 2484.02 9885.54 2483.88 9887.08 2483.86 9887.35 2483.87
 9889.99 2483.93 9900.05 2484.17 9907.75 2484.34 9911.61  2484.5 9912.53 2484.54
 9919.66 2483.82    9927 2482.75 9927.39 2482.78 9928.61 2482.89 9936.53 2483.62
 9939.88 2484.05 9942.31 2484.12  9944.5 2484.14  9960.4 2484.44  9964.7  2484.2
 9969.37 2484.23 9976.84 2484.45 9976.85  2484.5 9978.93 2484.34 9991.47 2483.38
 9999.08 2483.88   10000 2483.9410000.02 2483.94 10006.2 2484.3410007.59 2484.43
 10007.6 2484.4310010.39 2484.51 10010.9 2484.5110012.042484.53610015.34 2484.61
10016.57  2484.610064.99 2484.2710068.51 2484.2410068.85 2484.2410070.33 2484.24
 10072.2 2484.2310078.04 2484.2110080.08  2484.210082.18 2484.2110084.35 2484.22
   10116 2484.32 10121.4 2484.34 10121.9 2484.3310124.95 2484.3110128.07 2484.29
10131.29 2484.27 10134.6 2484.2410134.87 2484.2510139.86 2484.3710143.32 2484.35
10144.87 2484.33 10148.4  2484.310149.21  2484.310150.68 2484.2810153.48 2484.26
10154.89 2484.2410162.47 2483.7810165.58 2483.76 10168.8 2483.7410172.14 2483.72
10180.71 2483.5710183.46 2483.4410184.75 2483.4310188.41 2483.2110188.52 2483.21
10188.59 2483.2110188.69  2483.210183.56 2483.1710194.69 2483.0710203.93 2482.88
10205.26    248310225.77 2485.0910226.65 2485.1410227.73 2485.29 10231.4 2485.51
10232.54 2485.6510236.63 2485.8810237.41 2485.9710241.84 2486.2110242.33 2486.26
10247.05 2486.4910247.28 2486.5210252.25 2486.7510263.24 2487.0110265.33 2487.14
10267.37 2487.2910268.26 2487.3910272.53 2487.7210279.19 2489.0510280.27  2489.1
10281.72 2489.16 10284.9 2489.3210287.16 2489.4210289.54 2489.54 10292.6 2489.66
 10294.2 2489.7410297.52 2489.8710298.02 2489.8910298.86 2489.9310303.45 2490.11
10303.51 2490.12 10303.9 2490.1310308.45 2490.63 10308.6 2490.6410313.42 2491.17
10313.57 2491.1810313.75 2491.1910318.39 2491.6810318.88 2491.6910323.07 2492.12

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*****************************************************************************
 9218.17     .05 9328.08     .04 9350.33     .05 9978.93     .04 10006.2     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9912.5310012.04           1012.46 1012.46 1012.46             .1       .3

CROSS SECTION


RIVER: RV WA
REACH: R1                 RS: 7.636

INPUT
Description: This cross section is identical to RM 0.098 on Wash A Spillway in
             RV_Wash_A_Tank_Spillway.prj.
Station Elevation Data    num=     167
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
 9223.21 2474.17 9226.68 2473.95 9229.17 2473.79 9230.22 2473.71 9230.88 2473.62
 9273.06 2469.03 9280.89 2468.17 9286.48 2467.64 9286.67 2467.62 9291.23 2467.25
 9296.23 2466.85 9314.79 2465.32 9318.78 2464.98 9320.76 2464.83  9320.8 2464.82
 9326.08 2464.33 9327.74 2464.24 9329.92  2464.1 9334.61 2463.79 9336.32 2463.65
```

```
 9339.25 2464.29 9342.48 2464.75 9345.46 2465.28 9347.14 2465.48 9350.31 2465.84
 9353.07  2465.9 9355.49 2465.95 9357.09 2465.94 9360.83 2465.91 9364.24 2465.89
 9367.37 2465.87  9369.5 2465.86 9422.13 2467.42 9434.04 2467.58 9457.47 2467.17
 9458.26 2467.15 9462.17  2467.1 9468.05 2467.01 9477.77 2466.87 9491.14 2466.67
 9498.382465.799 9500.12 2465.59 9510.39 2464.23  9510.8 2464.18 9511.08 2464.14
  9519.7 2464.57 9523.76 2464.78 9534.432465.799 9541.66 2466.49 9542.68 2466.75
 9542.81 2466.75 9543.03 2466.75 9543.18 2466.77 9543.59  2466.8 9546.82    2467
 9548.43  2467.1 9549.31 2467.11 9610.85 2465.84 9615.33 2465.79 9616.79 2465.78
 9618.55 2465.71 9620.99 2465.63 9622.78 2465.56  9622.9 2465.56 9624.42 2465.55
 9624.89 2465.55 9637.91 2465.33 9638.55 2465.36 9639.64 2465.41 9641.83  2465.5
 9645.85 2465.68 9649.74 2465.13 9655.49 2464.32 9660.93 2464.95 9666.96  2465.5
 9698.29 2465.31 9698.69 2465.31 9714.07 2465.26 9720.36 2465.24 9723.78 2465.22
 9725.92 2465.22 9727.41 2465.21 9728.53 2465.21 9729.41 2465.21 9730.11 2465.21
  9730.7 2465.21 9731.19 2465.21 9731.61 2465.21 9731.98 2465.21 9735.82 2465.21
  9797.7 2465.46 9820.92 2465.41 9822.03 2465.38 9823.02 2465.35 9823.91 2465.33
 9835.55 2465.28 9843.08 2465.25 9843.35 2465.24 9844.61 2465.21 9846.15 2465.18
 9847.32 2465.15 9848.14 2465.16 9850.81 2465.21 9853.15 2465.25 9854.42 2465.24
 9859.46 2465.22 9866.65 2465.18  9877.7 2465.13 9896.77 2465.04  9896.8 2465.04
 9896.82 2465.03 9902.45 2464.17 9907.46  2463.5 9907.69 2463.46 9907.94 2463.43
  9909.3 2463.25 9914.46 2464.09 9917.01  2464.5 9924.76 2464.62 9938.32 2464.87
 9939.27  2464.7 9939.66 2464.63 9945.95 2463.53 9949.42 2462.91 9954.88 2463.46
 9964.72 2464.43 9965.09 2464.42 9967.45 2464.32 9967.67 2464.32 9981.53 2465.19
 9985.05 2465.37 9988.84 2465.51 9989.43 2465.54 9990.63 2465.57  9993.5 2465.19
 9996.362464.812 9996.83 2464.75 9999.98 2464.33   10000 2464.3310001.37 2464.15
10005.52 2464.6110005.912464.65910010.12 2465.1910016.91 2465.2210025.15 2465.25
10025.71 2465.25 10030.7 2465.31 10034.7 2465.3610035.01 2465.3610073.23 2465.41
10076.41 2465.4310102.51 2466.9610118.36  2467.910121.73  2468.110127.95 2468.46
10142.22 2469.1810144.63  2469.310144.94 2469.3210145.95 2469.3710146.46 2469.39
10149.54 2469.62   10150 2469.6710150.86 2469.76   10151 2469.7710153.27 2469.96
10167.11 2471.1510167.18 2471.14

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*****************************************************************************
 9223.21     .05 9498.38     .04 9534.43     .05 9996.83     .0410005.91     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9896.7710010.12         432.9453432.9453432.9453             .1       .3
Left Levee      Station= 9434.36      Elevation= 2467.58

CROSS SECTION


RIVER: RV WA
REACH: R1                 RS: 7.554

INPUT
Description: This cross section is identical to RM 0.017 on Wash A Spillway in
             RV_Wash_A_Tank_Spillway.prj.
Station Elevation Data    num=      75
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
 9823.95  2460.9  9825.2  2460.9 9829.61 2460.92  9834.5 2460.94 9839.98 2460.97
  9840.4 2460.96 9846.19  2460.9 9846.66  2460.9 9851.14  2460.8 9851.59  2460.8
 9855.96 2460.71  9856.9 2460.69 9860.78 2460.61 9862.21  2460.6 9865.59 2460.53
 9867.52  2460.5 9870.39 2460.45 9872.85 2460.42 9873.41 2460.41 9873.55 2460.41
 9875.36 2460.31 9878.15 2460.23 9880.05 2460.12 9883.44 2460.04 9884.89 2459.97
 9888.75 2459.88 9889.73 2459.83 9894.05 2459.74 9894.56 2459.71 9899.37 2459.63
 9899.44 2459.63 9899.54 2459.62 9905.66 2459.13 9906.33  2459.1 9911.54 2458.71
 9915.56  2458.4 9918.76 2458.16 9921.35 2457.95  9926.82456.922  9930.1  2456.3
 9931.93  2456.1 9933.03 2455.98 9933.38 2455.95 9934.54 2455.86  9935.5 2455.77
 9936.73 2455.73 9939.03 2455.66 9941.14 2455.49 9963.23 2455.32 9968.59  2455.3
 9970.03 2455.49 9980.34 2456.85 9981.06 2456.93 9981.49 2456.89 9982.84 2456.87
 9983.49 2456.88 9986.47 2456.83 9991.672456.753 9996.362456.684   10000 2456.63
10000.01 2456.6310003.77 2456.5710004.65 2456.5710005.912456.60910006.91 2456.64
 10013.32456.75310019.89 2456.8710021.36 2456.9110034.18 2458.21   10090 2463.79
10090.09 2463.7910091.35 2464.0110093.12 2463.8710095.98 2463.6610098.04  2463.5

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*****************************************************************************
 9823.95     .05 9941.14     .04 9970.03     .05 9991.67     .04 10013.3     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9921.3510034.18         740.3017740.3017740.3017             .1       .3

CROSS SECTION


RIVER: RV WA
REACH: R1                 RS: 7.414

INPUT
Description:
Station Elevation Data    num=      64
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
 9932.42 2448.53 9933.04  2448.6 9933.11 2448.59 9941.48 2445.93 9953.732441.919
  9958.4 2440.39 9965.89 2440.74 9976.78 2441.26 9983.16 2441.51 9992.16 2441.78
 9994.19 2441.92   10000 2441.9210000.03 2441.9210004.62 2441.9210015.94 2441.94
10024.22 2441.9410026.86 2441.95 10031.6 2441.9610039.64 2442.6110042.49 2442.82
10043.66 2442.9110054.43 2443.7610059.93 2444.16   10066 2444.6310077.31 2445.44
10086.93 2446.1210086.96 2446.12 10087.1 2446.1210108.43 2446.2710110.96 2446.33
 10123.2 2446.4510127.55 2446.5710137.91 2446.6910142.69 2446.8310144.17 2446.86
10150.87 2446.2810159.12  2446.310184.38 2446.2410192.11 2447.5310200.18 2447.81
10208.22 2448.0410208.26 2448.0510228.02 2447.7910263.02 2447.3410282.36 2446.78
10293.66 2446.4410295.52 2446.4810301.72 2446.7410308.79 2447.0710314.05  2447.3
10314.47 2447.3110316.23 2447.3710319.52 2447.56 10321.9 2447.5110356.47 2447.65
10392.03 2447.7310396.04 2447.6710401.56 2447.6510409.74 2447.6110435.82 2449.73
10442.46 2450.2210471.62 2452.3510475.93 2452.68 10477.4 2452.78
```

```
Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
 9932.42     .05 9953.73     .04 9994.19     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9953.73 10031.6          124.8931124.8931124.8931             .1       .3

CROSS SECTION


RIVER: RV WA
REACH: R1                 RS: 7.390

INPUT
Description: Q=2260 cfs (CP8B2, 24 hr)  This cross section is identical to RM
             0.219 on RV WA T2.
Station Elevation Data    num=      98
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9580.15 2441.96 9583.38 2441.82  9585.6 2441.69 9596.49 2441.19 9599.77 2440.97
 9605.05 2440.71 9616.23 2439.87 9616.84 2439.84 9618.34 2439.71    9651 2439.55
 9662.34 2439.52  9664.5 2439.41 9668.86 2439.18  9671.1 2439.16 9675.25  2439.1
 9685.07 2438.98  9685.8 2438.97 9685.92 2438.97 9686.22 2438.97 9686.58 2439.03
 9687.43 2439.16 9696.28 2440.51 9705.63  2440.3 9711.92 2440.18  9729.6  2439.8
 9750.57 2439.39 9753.76 2439.33 9753.85 2439.32 9759.84 2439.21 9763.07 2438.66
 9765.53 2438.19 9768.51  2438.5  9772.7 2438.82 9776.55 2439.16 9777.05  2439.2
 9780.66 2439.44  9781.3 2439.27 9781.85 2439.21  9783.5 2439.04  9784.5 2438.92
 9785.17 2438.85  9806.6 2439.46 9807.31 2439.47 9812.97 2439.47 9814.72  2439.5
 9815.32 2439.51  9820.6 2439.52 9825.38 2439.53 9826.68 2439.53 9828.34 2439.55
 9830.96 2439.59 9833.19 2439.62 9872.25  2439.7 9872.77 2439.74 9875.11 2439.92
 9876.22 2440.01 9877.65 2440.02 9880.36 2440.05  9881.8 2440.06 9883.21 2440.03
 9886.17 2439.98 9914.63 2440.02 9915.98 2440.04 9917.83 2439.98  9918.1 2439.97
 9918.51    2440 9919.38 2440.01 9920.01 2440.05 9922.86 2440.03 9922.96 2440.04
 9923.36 2440.03 9931.31 2439.35 9935.38 2439.01 9938.42 2438.75 9947.69 2439.02
 9957.77 2439.18 9958.26 2439.16 9959.16 2439.24 9959.91 2439.27 9970.94 2439.84
  9976.5 2440.12 9977.75 2440.19 9988.62 2439.93 9991.62 2439.82 9996.43 2439.84
   10000 2439.7610000.02 2439.76 10006.4 2439.6310010.26 2440.0310011.772440.186
10012.29 2440.2410016.14 2440.6110017.25 2440.7110024.07  2441.410032.81  2442.2
 10034.7 2442.1710040.86 2442.0610041.01 2442.06

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
 9580.15     .05  9671.1     .04 9687.43     .05 9977.75     .0410011.77     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9920.0110011.77          519.4431519.4431519.4431             .1       .3

CROSS SECTION


RIVER: RV WA
REACH: R1                 RS: 7.292

INPUT
Description: This cross section is identical to RM 0.145 on RV WA T2.
Station Elevation Data    num=     125
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9403.42 2433.82  9408.3 2433.53 9413.79  2433.2 9428.84 2432.29 9464.57 2430.13
 9467.14 2430.02 9470.07 2429.88  9473.4 2429.72 9477.06 2429.51 9481.43 2429.27
 9486.56 2428.98 9492.86  2428.6 9494.17 2428.52 9494.28 2428.51 9494.44  2428.5
 9500.69 2427.84 9504.29 2427.45 9512.45 2428.81 9513.47 2428.97 9516.89 2429.09
 9522.28 2429.19 9522.46  2429.2 9570.83 2430.24 9573.31 2430.29 9576.07 2430.35
 9579.18 2430.42 9581.31 2430.47  9582.7 2430.51 9586.71 2430.62  9591.3 2430.71
 9596.73 2430.81 9603.27 2430.99 9604.85 2431.04  9608.9 2430.75 9613.31 2430.36
  9614.2 2430.29 9615.11 2430.21 9620.75  2430.7  9624.6 2431.07 9626.08 2431.22
 9627.45 2431.35 9628.79 2431.49 9642.79 2431.57 9647.56 2431.58 9660.32 2431.64
 9671.51 2431.64 9688.94  2431.5 9693.57 2431.63 9694.66 2431.54 9704.04 2430.76
 9708.61 2430.86 9720.79 2431.49  9721.2 2431.47 9721.58 2431.46 9734.88 2431.13
 9735.61 2431.15 9757.95 2431.96 9767.21 2432.16 9777.83 2431.07 9780.71 2430.77
 9796.49  2431.6 9799.58 2431.77 9800.51 2431.69 9813.73 2431.57 9824.38 2431.41
 9860.74 2431.52 9866.39 2431.31 9901.29 2431.06  9902.2 2431.04 9908.93 2430.96
 9920.12 2430.82 9938.08 2430.59 9958.69 2430.33 9965.91 2430.42 9970.31 2430.45
  9972.5  2430.5 9974.31 2430.28 9980.66 2429.53 9983.95 2429.36 9990.24 2428.94
 9998.29 2428.64   10000 2428.8710001.44 2429.0710011.68  2430.510013.18 2430.71
10029.74 2430.7210050.34 2430.7410051.77 2430.7410055.94 2430.7510057.73 2430.75
10058.52 2430.75 10058.7 2430.75 10059.3 2430.7510059.71 2430.75 10062.8 2430.77
10062.99 2430.7710063.23 2430.7810063.63 2430.7910063.74  2430.810088.32 2431.27
10089.78 2431.2510091.43 2431.2210093.34  2431.210094.24 2431.1810095.53 2431.19
10098.14 2431.1910101.28 2431.2110105.14 2431.2210116.88 2431.2610127.16 2431.31
 10127.9 2431.3110143.65 2431.39 10143.8 2431.37 10143.9 2431.3610144.02 2431.35
10153.91 2430.36 10159.6 2429.6910164.13    243110168.49 2432.2910181.29 2436.07
10181.92 2436.1210182.43 2436.1710189.92 2436.7510200.35 2437.5510204.94 2437.97

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
 9403.42     .04  9972.5     .0410011.68     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9920.1210013.18          567.5543567.5543567.5543             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
 9403.42 9507.92 2437.33       F

CROSS SECTION
```

```
RIVER: RV WA
REACH: R1                    RS: 7.184

INPUT
Description: This cross section is identical to RM 0.219 on RV WA T2.  The
             overbank n values equal the main channel n value due to land
             cleared of vegetation per arial photo.
Station Elevation Data    num=     130
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9499.34 2424.47 9501.94 2424.47 9502.57 2424.46 9503.22 2424.45 9503.41 2424.44
 9504.59 2424.39 9506.06 2424.32 9507.94 2424.24 9510.41 2424.14  9511.1 2424.11
 9514.02 2424.04 9520.02 2423.91 9529.42 2423.71 9530.17  2423.7 9530.95 2423.68
 9531.01 2423.68 9531.06 2423.68 9535.44 2423.58 9535.66 2423.57 9540.66 2423.45
 9541.08 2423.44 9569.23 2422.51 9577.45 2422.26 9583.11 2422.09 9587.24 2421.96
  9590.4 2421.87 9591.13 2421.85 9592.94 2421.78 9594.97  2421.7 9596.56 2421.64
 9596.62 2421.64 9597.98 2421.62 9599.11  2421.6 9600.05 2421.58 9600.55 2421.57
 9600.87 2421.56 9601.57 2421.53  9602.2  2421.5 9612.39 2421.29 9612.76 2421.28
 9614.42 2421.23 9614.51 2421.23 9616.93 2421.12 9619.06 2421.02  9620.7 2420.99
 9626.67 2420.86 9637.56 2420.62 9655.04 2420.31 9656.91 2420.24 9657.74 2420.21
 9665.16 2419.95 9669.38 2419.79 9673.29 2419.65 9673.44 2419.65 9673.56 2419.64
 9681.35 2419.29 9682.59 2419.24  9682.7 2419.22 9684.56 2419.33 9685.71  2419.4
 9690.17  2419.8 9690.44 2419.82  9695.7  2420.1 9701.57 2420.48 9704.51 2420.56
 9706.04 2420.55 9710.17 2420.53 9712.37 2420.52 9773.78 2421.54 9808.85 2422.07
 9809.15 2422.07 9809.67 2422.06  9809.8 2422.06 9820.56 2421.97  9821.7 2421.96
 9826.25 2421.92  9832.1 2421.84 9853.83 2421.56 9869.99 2421.35 9877.29 2420.13
 9880.56 2419.57 9891.01 2420.31 9902.03 2421.26 9910.66 2421.12 9912.26  2421.1
 9944.22  2420.7 9954.47 2420.61 9961.36  2420.6 9964.21 2420.58 9972.25 2420.58
 9973.95 2420.57 9983.14 2420.57 9983.68 2420.57 9983.77 2420.57 9984.13 2420.56
 9988.18 2420.58 9992.47 2420.43 9995.35 2420.29 9998.51 2420.16 9999.97 2420.08
   10000 2420.0810007.47 2419.6910008.53  2419.710008.92  2419.710019.57 2419.75
10024.13 2419.7410028.79 2419.7310034.85 2419.7410039.34 2419.7710040.78 2419.77
10046.83  2419.810050.85 2420.4110052.022420.58610057.49 2421.41 10060.3 2421.48
10066.78 2421.6710073.41 2421.8510075.47 2421.9110080.06 2422.5110092.91 2424.19
10113.45 2426.77 10114.1 2426.8510114.69 2426.9210114.71 2426.92 10129.1  2427.2
10134.93 2427.37 10141.9 2427.5110143.94 2427.55 10154.9 2427.74 10156.2 2427.77

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9499.34     .04 9988.18     .0410057.49     .04

Bank Sta: Left   Right    Coeff Contr.   Expan.
       9869.9910057.49             .1       .3

CROSS SECTION


RIVER: RV WA
REACH: R2                    RS: 7.052

INPUT
Description: Q=2820 cfs (CP9B, 24 hr)  This cross section is added to the model
             to provide the minimum number of cross sections required for a
             junction reach. This cross section is not plotted on the work
             maps, nor is used in plotting the base flood elevations.
Station Elevation Data    num=     126
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9633.14  2413.3 9635.06 2413.13 9641.22 2412.57  9654.5 2411.39 9657.78 2411.08
 9668.65 2411.22 9674.18 2411.34 9686.39 2411.54  9689.6 2411.62 9694.16  2411.7
 9704.24 2411.98 9708.36 2411.52 9709.68 2411.36 9714.95 2410.77 9721.45 2409.91
 9724.81 2410.18  9726.8  2410.3 9734.69 2410.88 9742.12 2411.29  9744.9 2411.43
 9746.22 2411.49 9750.58 2411.75 9755.38 2411.63 9764.21 2411.42 9771.15 2411.25
 9776.73 2411.11 9781.31    2411 9785.14 2410.91 9788.39 2410.82 9798.53 2410.59
 9800.75 2410.55 9834.12  2409.8 9834.38 2409.81 9869.48 2408.57 9875.46 2408.46
 9875.47 2408.46 9878.08 2408.18 9878.09 2408.18 9878.14 2408.17 9878.16 2408.17
 9878.17 2408.18  9878.2 2408.18 9883.55 2408.33 9884.03 2408.37 9884.32 2408.39
 9888.61 2408.66 9889.16  2408.7 9891.85 2408.91 9892.24 2408.94 9911.71 2407.29
 9912.14 2407.23 9912.52 2407.34 9918.47 2409.06 9936.41 2408.44 9954.28 2407.83
 9957.76  2407.5 9962.46 2407.05 9970.78 2406.25 9974.95 2405.86 9976.59  2405.7
 9976.722405.687 9976.89 2405.67 9982.74  2405.7 9988.17  2405.7 9993.88 2405.71
 9999.97 2405.69   10000 2405.6910000.27 2405.69 10000.7 2405.7110003.71 2405.85
10005.22 2405.9410012.29 2406.3510016.42 2406.5110024.75 2406.6810026.14 2406.62
10027.24  2406.610027.51 2406.5910028.02 2406.5810039.74  2406.210040.95 2406.16
10041.23 2406.15 10050.3 2407.76 10057.3 2409.0810069.03  2408.710083.78 2408.22
10086.87 2408.1210087.95 2408.08 10089.9    240810091.04 2407.9610091.78 2407.93
10092.31 2407.9110095.51 2407.86 10095.8 2407.8610096.14 2407.8710096.54 2407.88
10097.69 2407.88 10098.5 2407.8810098.83 2407.8910099.85 2407.8910102.32  2407.9
10108.31 2407.9110126.74  2407.910127.36 2407.9110131.39 2407.9810132.87 2407.77
10141.96 2406.3510144.88 2406.6810157.04 2408.1410169.35  2407.8 10181.7 2407.55
10188.93 2406.9810192.02 2406.7610192.08 2406.76 10197.5 2407.2210203.27 2407.61
   10205 2407.7210209.91 2408.05 10212.5 2408.2110216.58 2408.48   10220 2408.69
10223.34 2408.94 10223.8 2408.9710227.95 2409.2210230.46 2409.3810235.32 2409.65
10240.63 2409.93

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9633.14     .05 9976.59     .04 10000.7     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9954.28 10050.3               5       5       5             .1       .3
Left Levee      Station= 9750.58      Elevation= 2411.75

CROSS SECTION


RIVER: RV WA
```

```
REACH: R2                    RS: 7.051

INPUT
Description: This cross section is added to the model to provide the minimum
             number of cross sections required for a junction reach. This cross
             section is not plotted on the work maps, nor is used in plotting
             the base flood elevations.
Station Elevation Data    num=     114
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9635.25 2413.45 9637.21 2413.26 9648.43 2412.22    9652 2411.87 9661.51 2410.95
 9670.34  2411.1 9671.33 2411.12 9682.71 2411.32 9692.27 2411.58 9697.15 2411.68
 9707.87 2412.03 9707.99 2412.01 9708.15 2411.99 9712.45 2411.45 9719.02 2410.63
  9724.7  2409.8 9727.86 2410.03 9729.64 2410.13 9738.05 2410.57 9742.03 2410.75
 9748.06  2411.1 9748.31 2411.12  9750.1  2411.2 9755.22 2411.53 9758.29 2411.46
 9766.37 2411.26 9772.86  2411.1 9778.21 2410.97 9782.67 2410.86 9786.46 2410.76
 9798.28  2410.5 9800.86 2410.44 9839.75 2409.57 9839.93 2409.58 9871.06 2408.48
 9871.83 2408.48 9875.59 2408.47  9875.8 2408.47 9877.81 2408.37 9880.07 2408.37
 9880.23 2408.37 9884.99 2408.33 9886.15 2408.31 9887.58 2408.29 9888.05 2408.27
 9889.35 2408.26 9892.79 2408.54 9893.39 2408.59  9902.6 2407.81 9910.82 2406.99
  9915.4 2407.09 9915.58 2407.14 9915.67 2407.17 9922.05 2408.96 9922.11 2408.97
 9925.45 2408.81 9952.71 2407.81  9954.5 2407.69 9958.89 2407.28 9964.81 2406.72
 9971.91 2406.04  9976.52405.595 9977.17 2405.53 9983.83 2405.56 9989.76 2405.57
  9992.4 2405.58 9994.96 2405.59   10000 2405.59 10000.7 2405.5910006.26 2405.87
10012.47 2406.1510012.57 2406.1510012.71 2406.1610017.37 2406.42 10024.7 2406.69
10027.06 2406.5810028.85 2406.5310034.41 2406.3110041.72 2406.13   10042 2406.18
10042.36 2406.2510044.53 2406.6310051.28 2407.7910057.84 2408.98 10072.9 2408.56
10097.41  2407.810099.55 2407.6810124.44 2407.6610124.88 2407.6710128.41 2407.73
10134.62 2407.8310135.78 2407.65 10145.1 2406.2210147.42 2406.5110159.73  2408.1
10180.96 2407.4310183.29 2407.3610184.19 2407.2510185.73 2407.1110190.18  2406.7
10192.28 2406.5210199.29 2407.1410205.27 2407.65 10209.9 2407.9710212.76 2408.14
10216.56  2408.410220.27 2408.6210223.25 2408.8210227.77  2409.110230.01 2409.27
10230.32 2409.2910235.53  2409.610236.99 2409.6910242.74 2410.01

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9635.25     .05  9976.5     .04 10000.7     .05

Bank Sta: Left   Right    Coeff Contr.   Expan.
       9952.7110051.28            .1       .3
Left Levee      Station= 9755.22      Elevation= 2411.53

CROSS SECTION


RIVER: RV WA
REACH: R3                    RS: 7.050

INPUT
Description: Q=2820 cfs (CP9B, 24 hr)
Station Elevation Data    num=     124
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9636.11  2413.5 9638.12 2413.31 9661.92 2411.07    9664 2410.83 9670.01 2410.94
 9672.72 2411.01 9684.45 2411.25 9690.73 2411.45 9705.83 2411.85 9706.82 2411.86
 9711.05 2411.97 9712.41  2411.8 9713.82 2411.59 9714.65 2411.47 9722.12 2410.43
 9727.66  2409.6 9727.74 2409.59 9729.94  2409.7 9736.58 2410.01 9739.51 2410.18
 9740.19 2410.22 9744.95 2410.44 9750.41 2410.79  9752.6 2410.91 9756.84 2411.11
  9758.6 2411.31 9760.34 2411.27 9767.75 2411.08 9773.85 2410.94 9778.95 2410.81
 9783.28  2410.7 9796.77  2410.4 9799.72 2410.34 9844.12 2409.34 9844.21 2409.34
 9860.56 2408.77 9860.97 2408.77 9862.94 2408.76 9869.43 2408.66 9877.18 2408.53
 9877.61 2408.52 9881.94 2408.42 9887.39 2408.36 9889.71 2408.35 9893.86 2408.29
 9894.96 2408.03 9908.01 2406.74 9910.51 2406.79 9917.36 2406.95  9917.4 2406.95
 9917.67 2407.02 9924.99 2408.96    9928 2408.78  9930.1 2408.65 9932.29 2408.55
 9945.99 2408.05 9948.29 2407.89 9949.57 2407.82 9950.93 2407.76 9951.75 2407.73
 9953.87 2407.62 9954.88 2407.32 9955.37 2407.18 9968.75 2406.11 9971.77 2405.82
 9975.252405.492 9975.522405.467 9976.13 2405.41 9983.58 2405.44 9990.17 2405.46
 9992.072405.468 9994.76 2405.48 9999.86 2405.49   10000  2405.510006.02 2405.82
10011.33 2406.0810017.03  2406.410019.09 2406.5110023.39  2406.710026.44 2406.54
10028.73 2406.4610033.96 2406.2210040.64 2406.0110041.62 2406.1710042.86 2406.39
   10051 2407.8110057.12  2408.9 10057.4 2408.6110083.76 2407.7710099.76  2407.8
10103.24 2407.6110106.35 2407.4310120.88 2407.4210121.13 2407.4310123.19 2407.46
10127.48 2407.5310136.57  2407.710137.48 2407.5610147.06  2406.1 10152.3 2406.44
10159.03 2407.4410161.15 2408.0610161.44 2408.0810172.38 2407.7310184.16 2407.32
10190.39 2406.4710191.87  2406.310191.92 2406.3110198.99    240710200.67 2407.12
10207.27  2407.710211.78 2408.0810215.28 2408.3210219.28 2408.5610221.95 2408.75
10226.78 2409.0410228.66 2409.1610234.27 2409.5110235.43  2409.610235.58 2409.61
10241.84 2409.9810242.25    2410 10243.6 2410.0810245.62  2410.2

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9636.11     .05 9975.25     .04 9999.86     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9949.57   10051              .01     .01     .01             .1       .3
Left Levee      Station=  9758.6      Elevation= 2411.31

CROSS SECTION


RIVER: RV WA
REACH: R3                    RS: 7.049

INPUT
Description: This cross section is added to the model to provide the minimum
             number of cross sections required for a junction reach. This cross
             section is not plotted on the work maps, nor is used in plotting
             the base flood elevations.
```

```
Station Elevation Data    num=     124
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9636.11  2413.5 9638.12 2413.31 9661.92 2411.07    9664 2410.83 9670.01 2410.94
 9672.72 2411.01 9684.45 2411.25 9690.73 2411.45 9705.83 2411.85 9706.82 2411.86
 9711.05 2411.97 9712.41  2411.8 9713.82 2411.59 9714.65 2411.47 9722.12 2410.43
 9727.66  2409.6 9727.74 2409.59 9729.94  2409.7 9736.58 2410.01 9739.51 2410.18
 9740.19 2410.22 9744.95 2410.44 9750.41 2410.79  9752.6 2410.91 9756.84 2411.11
  9758.6 2411.31 9760.34 2411.27 9767.75 2411.08 9773.85 2410.94 9778.95 2410.81
 9783.28  2410.7 9796.77  2410.4 9799.72 2410.34 9844.12 2409.34 9844.21 2409.34
 9860.56 2408.77 9860.97 2408.77 9862.94 2408.76 9869.43 2408.66 9877.18 2408.53
 9877.61 2408.52 9881.94 2408.42 9887.39 2408.36 9889.71 2408.35 9893.86 2408.29
 9894.96 2408.03 9908.01 2406.74 9910.51 2406.79 9917.36 2406.95  9917.4 2406.95
 9917.67 2407.02 9924.99 2408.96    9928 2408.78  9930.1 2408.65 9932.29 2408.55
 9945.99 2408.05 9948.29 2407.89 9949.57 2407.82 9950.93 2407.76 9951.75 2407.73
 9953.87 2407.62 9954.88 2407.32 9955.37 2407.18 9968.75 2406.11 9971.77 2405.82
 9975.252405.492 9975.522405.467 9976.13 2405.41 9983.58 2405.44 9990.17 2405.46
 9992.072405.468 9994.76 2405.48 9999.86 2405.49   10000  2405.510006.02 2405.82
10011.33 2406.0810017.03  2406.410019.09 2406.5110023.39  2406.710026.44 2406.54
10028.73 2406.4610033.96 2406.2210040.64 2406.0110041.62 2406.1710042.86 2406.39
   10051 2407.8110057.12  2408.9 10057.4 2408.6110083.76 2407.7710099.76  2407.8
10103.24 2407.6110106.35 2407.4310120.88 2407.4210121.13 2407.4310123.19 2407.46
10127.48 2407.5310136.57  2407.710137.48 2407.5610147.06  2406.1 10152.3 2406.44
10159.03 2407.4410161.15 2408.0610161.44 2408.0810172.38 2407.7310184.16 2407.32
10190.39 2406.4710191.87  2406.310191.92 2406.3110198.99    240710200.67 2407.12
10207.27  2407.710211.78 2408.0810215.28 2408.3210219.28 2408.5610221.95 2408.75
10226.78 2409.0410228.66 2409.1610234.27 2409.5110235.43  2409.610235.58 2409.61
10241.84 2409.9810242.25    2410 10243.6 2410.0810245.62  2410.2

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9636.11     .05 9975.25     .04 9999.86     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9949.57   10051                 0       0       0             .1       .3
Left Levee      Station=  9758.6      Elevation= 2411.31

CROSS SECTION


RIVER: RV WA T1
REACH: R1                 RS: 3.405

INPUT
Description: Q=790 cfs (1B1, 24 hr)
Station Elevation Data    num=     116
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9555.28 2807.67 9559.04 2807.78 9559.54 2807.72 9564.89 2807.25 9571.34 2806.08
 9571.55 2806.04 9571.57 2806.03 9577.43 2804.71 9582.33 2803.43 9582.72  2803.4
 9583.47 2803.32 9589.36 2802.85  9593.5 2802.45  9601.8 2801.26 9604.41 2801.15
 9609.55 2800.71 9612.25 2800.26 9614.93 2799.93 9618.28  2799.7 9620.01 2799.68
 9623.41 2799.62 9627.96  2799.4 9640.99 2798.84 9650.95 2798.38 9652.01 2798.36
 9656.86 2798.34 9664.46 2798.32 9668.47 2798.25  9674.3 2798.07  9679.6 2798.11
 9682.65 2798.02 9692.63    2798  9716.3  2797.5 9724.15 2797.24 9733.07 2796.97
 9741.91  2796.9  9757.4 2796.37 9760.74 2796.32 9770.06  2796.3 9778.69 2796.25
 9782.46  2796.3 9791.11 2796.47 9801.38 2796.43 9824.22 2796.43  9832.5 2796.16
 9840.67 2795.81 9845.99 2795.84 9853.62  2795.8 9856.71 2796.23 9857.18 2796.28
 9857.28 2796.27 9858.31 2796.24 9870.28 2795.84 9871.73 2795.73 9873.71 2795.59
 9876.47 2796.01 9883.95 2797.06  9917.2 2796.52  9920.5 2796.46 9924.82 2796.54
 9951.82 2796.85 9966.69 2796.69 9974.98 2796.58 9983.48 2796.39 9988.31 2796.28
 9991.01 2795.59 9994.77 2794.34 9996.362794.049 9996.372794.047 9996.392794.043
 9996.412794.039 9997.23 2793.89 9997.53 2793.87 9997.76 2793.87 9998.58 2793.89
   10000 2793.8910000.03 2793.8910013.05 2793.9610016.412794.041 10022.2 2794.18
10022.32  2794.210027.92 2794.9410033.15 2795.5410035.37 2795.7110038.06 2795.63
10045.49 2796.1410048.14 2795.9510052.39 2795.8510056.81 2795.7310062.04 2795.81
10063.51 2795.7510071.05 2795.8610071.26 2795.8610077.28 2796.8310079.95 2797.05
10087.98 2797.7210092.83 2797.7910106.02 2798.5410107.79 2798.6710111.99 2799.07
10115.71 2799.3910116.77 2799.5710118.24 2799.8110125.56 2800.6810131.59 2801.33
10141.56 2802.4510154.52 2804.26 10158.4 2804.89 10162.3 2805.7110167.49 2806.44
10178.07 2807.7610182.54 2808.53 10201.9  2811.610203.81 2811.8210207.02  2812.2
10207.08  2812.2

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9555.28    .075 9996.41     .0510016.41    .075

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9988.3110045.49           404.09  404.09  404.09             .1       .3
Left Levee      Station= 9883.94      Elevation= 2797.77

CROSS SECTION


RIVER: RV WA T1
REACH: R1                 RS: 3.329

INPUT
Description:
Station Elevation Data    num=      22
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9924.72 2791.28 9929.65 2790.83 9950.96 2788.71 9956.96 2788.35 9975.79 2786.56
 9981.04 2786.02 9983.26 2785.83 9990.652785.003  9991.32784.931 9992.83 2784.76
   10000 2784.8910000.82 2784.9110010.24    278510013.34 2785.64   10020 2786.74
10047.27 2788.39 10052.5 2788.6210054.85 2788.87 10069.5  2790.510093.87 2793.72
10105.59 2795.1810106.35 2795.22
```

```
Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
 9924.72    .075  9991.3     .0510000.82    .075

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9975.79   10020           983.41  983.41     950              .1       .3

CROSS SECTION


RIVER: RV WA T1
REACH: R1                 RS: 3.143

INPUT
Description:
Station Elevation Data    num=      54
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
**********************************************************************************
 9665.66 2766.51 9668.49 2766.58 9668.75 2766.57 9673.29 2766.35 9682.43 2765.86
 9695.68 2764.86 9714.59 2764.27 9718.39 2764.24 9724.65 2764.31 9730.79 2764.34
  9739.3 2764.43 9743.67 2764.34    9753 2764.06 9754.74 2763.93 9756.68 2763.89
 9758.01 2763.83  9765.4 2763.55 9771.33 2762.93 9772.65 2762.84 9784.65  2761.3
 9792.88 2760.71 9795.85 2760.35 9801.26 2760.11  9815.2 2760.22 9827.12  2760.4
 9829.48 2760.35 9837.92 2760.85 9850.62 2761.51 9875.98 2762.75 9879.95 2762.94
 9884.93 2762.72 9917.88 2761.24 9941.61 2761.65 9962.16 2761.98 9968.98 2761.68
 9974.25 2761.35 9984.34 2760.92 9987.25 2760.97 9993.89 2761.25   10000 2761.12
 10004.2 2761.0310004.82 2761.03 10005.1 2761.0310011.97  2761.210016.75 2760.88
10016.92 2760.8910026.952761.99510040.42 2763.4810056.17 2765.88 10068.3  2767.7
10072.98 2768.3110080.51  2769.310081.67 2769.3410083.12 2769.49

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
 9665.66    .075 9993.89     .0510011.97    .075

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9962.1610026.95           751.82  751.82  751.82              .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
 9665.66 9879.82 2768.14       F

CROSS SECTION


RIVER: RV WA T1
REACH: R1                 RS: 3.000

INPUT
Description:
Station Elevation Data    num=      64
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
**********************************************************************************
 9830.96 2752.52 9832.49 2752.65 9832.69 2752.66 9833.33 2752.61 9854.65 2750.66
 9868.56 2749.22 9881.75 2748.34 9886.97 2747.85 9888.18 2747.77 9890.24 2747.55
 9893.96 2747.12 9906.94 2746.31 9912.02 2746.11 9914.07 2745.79 9931.04 2746.05
  9933.3 2746.11 9934.09 2746.13 9935.08 2746.08 9946.46 2745.82 9948.24 2745.38
 9948.36 2745.34 9948.99 2745.28 9956.14 2744.53 9958.18 2744.66 9961.36 2744.96
 9963.46 2745.13 9966.39 2745.15 9972.31 2745.19 9985.49 2744.76 9985.61 2744.75
  9985.7 2744.75 9986.15 2744.72 9991.16 2744.42 9991.922744.375 9998.54 2743.98
   10000 2744.0710004.68 2744.3610006.04 2744.4210012.47 2744.2310014.64 2744.27
10029.97 2745.3210031.93 2745.3710034.88 2746.0110046.74 2747.7810053.93 2748.57
10054.62 2748.7110062.15 2749.9610063.38 2750.0610063.56 2750.0710063.86 2750.09
10076.16 2750.4710078.91 2750.5910086.82 2750.4510093.48 2750.6610096.23 2750.63
10105.26 2751.1510107.33 2751.2510108.04 2751.3410117.21  2752.310118.39 2752.36
10122.12 2752.8810132.16 2754.22 10139.2 2754.4310148.05 2754.95

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
 9830.96    .075 9991.92     .0510004.68    .075

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9946.4610034.88           630.53  630.53  630.53              .1       .3

CROSS SECTION


RIVER: RV WA T1
REACH: R1                 RS: 2.881

INPUT
Description:
Station Elevation Data    num=      52
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
**********************************************************************************
 9836.93 2743.87 9841.41 2742.99 9849.44 2741.64 9859.68 2738.11 9865.02 2737.63
  9869.7    2737  9874.5 2736.53 9879.76 2735.56 9885.09 2735.03 9888.52 2734.61
 9892.73 2733.84 9899.06  2733.3 9901.96 2732.95 9907.05 2732.79 9913.49 2731.78
 9918.51 2731.18 9922.13 2730.54 9922.39 2730.51 9922.84 2730.52 9930.56 2730.24
 9932.42  2730.3 9951.98  2731.2 9962.78 2731.46 9983.75 2731.78 9984.77 2731.86
 9987.93 2732.07 9990.02 2732.01 9990.42 2731.98 9995.48 2731.78 9997.57 2731.58
   10000 2731.5710010.32 2731.5410012.22 2731.6210014.99  2731.710019.372731.785
10031.54 2732.0210034.74 2732.2310041.93 2732.9710045.64  2733.810051.73 2734.34
10058.73 2735.3210063.72 2735.9410070.23 2737.2710074.48 2737.7410079.37 2739.49
10085.47 2741.7910088.44 2742.4210101.14 2743.7610106.46 2744.3210108.75 2745.34
10118.33 2747.56 10129.1 2749.61

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
```

```
**********************************************
 9836.93    .075 9997.57     .0510010.32    .075

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9987.9310034.74           640.21  640.21  640.21             .1       .3

CROSS SECTION


RIVER: RV WA T1
REACH: R1                  RS: 2.760

INPUT
Description:
Station Elevation Data    num=      25
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
**********************************************************************************
 9905.65 2720.51 9923.04 2720.36 9931.38 2720.23 9941.14 2719.43 9955.29 2718.31
 9958.49 2718.17 9961.72 2718.14 9987.18 2717.34 9993.51 2716.84 9999.99 2716.71
   10000 2716.7110000.96 2716.6910002.39 2716.6410003.26 2716.5910013.65 2716.45
10015.07 2716.5910016.022716.71210025.41 2717.9210031.96 2718.4610039.12 2719.22
10045.63 2720.0710061.27 2721.7210079.76 2723.9410084.81 2724.5910097.76 2725.97

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
 9905.65    .07510003.26     .0510015.07    .075

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9987.1810025.41          1151.69 1151.69 1151.69             .1       .3

CROSS SECTION


RIVER: RV WA T1
REACH: R1                  RS: 2.541

INPUT
Description:
Station Elevation Data    num=      29
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
**********************************************************************************
 9948.35 2692.13 9952.31 2692.21 9953.98 2692.26 9967.48 2690.15 9980.71 2688.63
 9984.89 2688.15  9987.52687.965  9987.72687.951 9987.85 2687.94 9992.65  2687.6
 9995.152687.435 9996.88 2687.32   10000 2687.3810000.01 2687.38 10003.3 2687.44
10006.79 2687.85 10007.52687.913 10007.72687.93110007.852687.94410015.83 2688.65
10029.57 2689.6910036.03 2690.2310044.85 2691.0810072.15 2690.7510084.73 2690.58
10086.19 2690.5610086.62 2690.5610087.74 2690.5210095.38 2690.11

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
 9948.35    .075 9995.15     .05 10003.3    .075

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9980.7110015.83          1043.3  1043.3  1043.3             .1       .3
Right Levee     Station=10044.85      Elevation= 2691.08

CROSS SECTION


RIVER: RV WA T1
REACH: R1                  RS: 2.344

INPUT
Description:
Station Elevation Data    num=      26
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
**********************************************************************************
 9886.09 2671.62 9886.68 2671.65 9887.81 2671.68 9891.21 2671.66 9901.34  2671.6
 9909.18  2671.1 9937.04 2669.57 9938.47 2669.49 9939.58 2669.43 9956.67 2668.29
 9964.47 2667.84 9969.25 2667.53  9977.7 2666.97 9981.28 2666.85 9989.32 2666.69
 9991.67 2666.59 9996.22 2666.08   10000 2665.7210000.63 2665.6610001.882666.085
10003.66 2666.6910007.13 2667.8710011.94  2669.310032.29 2669.99 10066.2 2670.88
10067.02 2670.95

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
 9886.09    .075 9996.22     .0510001.88    .075

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9939.5810011.94          1112.06 1112.06 1112.06             .1       .3

CROSS SECTION


RIVER: RV WA T1
REACH: R1                  RS: 2.133

INPUT
Description:
Station Elevation Data    num=      39
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
**********************************************************************************
 9723.68 2647.09  9725.3 2646.97 9732.48 2646.51 9751.56 2645.37 9752.02 2645.37
 9767.84 2645.45 9780.73 2645.51 9785.34  2645.5 9796.34 2645.55 9805.39  2645.2
 9832.45 2644.47 9832.67 2644.47 9833.63 2644.46 9859.65 2644.34 9862.24 2644.34
 9878.16  2644.4 9885.68 2644.14 9909.01  2643.2 9910.54 2643.15 9910.69 2643.15
 9911.32 2643.11 9938.82 2643.06 9957.09 2642.98 9971.33 2642.85 9994.03  2642.9
```

```
 9995.65 2642.49  9996.72642.195 9998.93 2641.57   10000 2641.7810002.26 2642.21
10005.532642.89910006.96  2643.210026.29 2644.9210030.38 2645.0910036.88 2645.39
10060.57 2646.8510064.24 2647.1810070.05 2647.4310071.81 2647.32

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
 9723.68    .075  9996.7     .0510002.26    .075

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9938.8210006.96            735.6   735.6   735.6             .1       .3

CROSS SECTION


RIVER: RV WA T1
REACH: R1                 RS: 1.994

INPUT
Description:
Station Elevation Data    num=      34
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
**********************************************************************************
 9833.27 2631.75 9836.33 2632.01 9837.36 2631.97  9868.9 2630.55  9885.6 2629.64
 9910.76 2628.12 9945.83 2627.86 9952.26 2627.83 9956.91 2627.72 9975.81 2627.32
 9981.11 2626.85 9983.452626.642 9986.06 2626.41 9989.82 2626.54 9992.48 2626.64
 9995.58 2626.53 9996.57 2626.49 9997.54 2626.49   10000 2626.4310002.34 2626.37
10003.352626.49110004.572626.63710009.02 2627.1710011.01 2627.4310025.47 2627.72
10036.49 2627.9510039.95 2628.1210055.95 2628.9410069.13 2629.5110100.72 2631.46
10116.28 2632.78 10129.4 2633.3310160.62 2634.3810165.59 2634.07

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
 9833.27    .075 9997.54     .0510003.35    .075

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9956.9110025.47            670.63  670.63  670.63             .1       .3

CROSS SECTION


RIVER: RV WA T1
REACH: R1                 RS: 1.867

INPUT
Description:
Station Elevation Data    num=      57
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
**********************************************************************************
  9867.8  2619.1 9872.58 2619.62 9891.09 2618.46 9902.82 2617.71 9904.85 2617.58
 9906.65 2617.47 9913.82 2616.86  9920.2 2616.56 9925.46 2616.23 9926.01 2616.12
 9932.13 2615.29 9935.49 2614.83 9938.29  2614.4 9941.49 2614.12 9953.01 2613.82
 9954.48 2613.79 9954.92 2613.86 9956.73 2614.08 9960.84 2614.55 9967.55 2613.83
 9969.56 2613.69 9978.83 2613.34 9985.17 2612.86 9990.97 2612.38 9992.35 2612.18
  9993.8 2611.97 9996.35  2611.6 9998.51  2611.4 9999.99  2611.6   10000  2611.6
10002.69 2611.9710004.82 2612.1810009.37  2612.210012.12 2612.2210018.24 2612.26
10018.51 2612.2610018.89 2612.3410023.56 2613.2610025.63 2613.5610048.57 2614.02
10060.82 2614.4410076.02 2614.9810090.64 2615.6810110.39 2617.4510115.53 2617.93
10117.52 2618.1710122.39 2618.5210139.72 2618.3610155.73 2618.4710164.23 2618.46
10167.37 2618.4510175.67 2618.53 10184.5 2618.9110188.88 2619.1210213.18    2620
10220.88 2620.42 10224.8 2620.81

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
  9867.8    .075  9993.8     .0510002.69    .075

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9969.5610025.63           1207.38 1207.38 1207.38             .1       .3

CROSS SECTION


RIVER: RV WA T1
REACH: R1                 RS: 1.638

INPUT
Description:
Station Elevation Data    num=      35
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
**********************************************************************************
 9772.26  2594.9  9773.9 2595.01 9781.46 2595.21 9791.34 2594.33 9801.69 2593.19
 9854.34 2590.44 9859.82  2590.2 9875.33 2588.46 9883.76 2587.44 9885.55 2587.45
 9889.54 2587.47 9897.87  2587.5 9903.51 2587.53 9940.37 2588.38 9942.59 2588.42
 9950.05 2588.65  9988.32587.876  9988.52587.872    99892587.862    99902587.842
   10000 2587.64 10000.3 2587.6310001.97 2587.6110002.75 2587.5810003.88 2587.64
 10008.32587.874 10008.52587.885   100092587.911   100102587.96410022.952588.649
10037.52 2589.42 10052.5  2590.210078.44 2591.1910096.19 2591.8610101.09 2591.65

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
 9772.26    .075   10000     .0510003.88    .075

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9950.0510022.95            857.04  857.04  857.04             .1       .3

CROSS SECTION
```

```
RIVER: RV WA T1
REACH: R1                    RS: 1.476

INPUT
Description: Q=620 cfs (CP1214, 24 hr)
Station Elevation Data    num=      35
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 9890.05 2574.65  9892.3 2574.67 9896.14 2574.71 9898.85 2574.62 9927.32 2573.64
 9943.31 2572.64 9949.37  2572.3 9983.82 2570.15  9986.8 2569.77    9987 2569.75
  9987.1 2569.74  9987.3 2569.72 9990.962569.354 9994.81 2568.97 9999.77 2569.33
   10000 2569.35 10006.82569.709   100072569.719 10007.2 2569.73 10007.32569.735
10013.65 2570.0710014.67 2570.1310015.09 2570.1410031.57 2571.0410043.85 2572.36
10058.27 2573.2610067.28 2574.4510068.91 2574.63 10069.8 2574.71 10071.1 2574.84
10073.88 2575.2310094.73 2576.0910122.17  2577.610124.84 2577.51 10126.7 2577.49

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9890.05    .075 9990.96     .05   10000    .075

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9949.3710043.85           908.86  908.86  908.86             .1       .3

CROSS SECTION


RIVER: RV WA T1
REACH: R1                    RS: 1.304

INPUT
Description:
Station Elevation Data    num=      29
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 9928.93 2558.07 9930.09 2557.99 9960.77 2555.34 9973.792552.937 9982.12  2551.4
 9983.482551.172  9987.9 2550.43 9994.36 2550.43   10000 2550.41 10001.2  2550.4
10014.12 2551.1610043.76 2552.9610066.22 2553.1210081.35 2553.2410085.64 2553.48
10088.13 2553.5810091.26 2553.71   10123  2555.110125.02 2555.14   10136 2555.33
10140.76 2555.4210146.12 2555.5410150.28 2555.6410150.59 2555.6410150.93 2555.66
10155.26 2555.7910176.24  2556.810186.74 2557.31 10199.1 2557.98

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9928.93    .075 9983.48     .0510014.12    .075

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9973.7910043.76           864.88  864.88  864.88             .1       .3

CROSS SECTION


RIVER: RV WA T1
REACH: R1                    RS: 1.140

INPUT
Description:
Station Elevation Data    num=      47
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 9860.27 2540.05 9861.15 2540.06 9865.23 2540.01    9866    2540 9868.27  2539.9
 9871.47 2539.69 9893.47 2537.18 9910.35 2534.99 9916.78 2534.66 9923.29  2534.4
 9926.69 2534.25  9940.4 2533.75 9962.73 2533.88 9971.45 2533.97  9989.72532.921
  9989.82532.915  9989.92532.909    99932532.731 9999.28 2532.37   10000 2532.33
   10072532.753 10009.72532.916 10009.82532.922 10009.92532.92810028.16 2534.03
 10035.3 2534.4710045.61 2534.1710056.64 2533.8710066.83 2534.1410087.39 2534.73
10093.88 2534.9110096.93 2534.9810097.95 2535.0410106.89 2535.4610109.05 2535.52
10113.22 2535.6210117.06 2535.5910127.53 2535.3710138.22 2534.9810146.32 2534.49
10169.18 2532.5910170.29  2532.510170.81 2532.4510191.22 2534.2610201.08 2534.98
10223.77 2537.9410237.89 2539.79

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9860.27    .075  9989.7     .05 10009.7    .075

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9971.4510028.16          1082.43 1082.43 1082.43             .1       .3
Right Levee     Station=10113.22      Elevation= 2535.62

CROSS SECTION


RIVER: RV WA T1
REACH: R1                    RS: 0.935

INPUT
Description:
Station Elevation Data    num=      72
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 9860.67 2516.03 9868.84 2516.11 9871.33 2515.94 9871.55 2515.93 9871.84 2515.92
 9879.08 2515.47 9881.01 2515.39 9886.91 2515.04 9890.04 2514.93 9923.79 2513.52
 9925.34 2513.48 9926.64  2513.5 9928.29 2513.45 9930.61 2513.39 9934.12  2513.3
 9936.92  2513.2 9937.15 2513.21 9937.33  2513.2 9937.59 2513.19 9942.79 2512.91
 9943.28 2512.89 9947.54 2512.67 9953.46 2512.44  9953.6 2512.42 9957.54 2512.18
 9959.01 2512.17 9959.86 2512.07    9964 2512.01 9964.69 2512.03 9969.37 2511.97
 9970.77    2512 9972.98 2511.99 9973.23 2511.99 9975.82 2512.01 9977.34 2512.04
```

```
 9980.01  2512.1 9983.69 2512.12 9985.33 2512.15 9990.04 2512.15 9990.63 2512.16
 9993.59 2512.15 9997.12 2511.99 9997.76 2511.97   10000 2511.8710004.86 2511.67
10007.23 2511.6110012.16 2511.4210012.652511.41310016.81 2511.3510016.92 2511.35
10018.77 2511.2810021.75 2511.2710022.03 2511.2710023.17 2511.3510024.172511.421
10024.87 2511.4710027.962511.60910039.73 2512.1410041.09 2512.1110051.69 2512.09
10068.31 2511.8810068.46 2511.8810077.11 2511.7910080.41 2511.7510082.15 2511.73
10083.22 2511.7210103.45 2511.6310103.92 2511.6410127.65 2513.2210152.86 2514.91
10156.15 2515.1510180.59 2516.25

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
 9860.67    .07510016.81     .0510023.17    .075

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9993.5910039.73              900  816.33     850             .1       .3

CROSS SECTION


RIVER: RV WA T1
REACH: R1                 RS: 0.780

INPUT
Description:
Station Elevation Data    num=     192
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
**********************************************************************************
 9684.38 2500.13 9686.09 2500.12 9689.67    2500 9690.47 2499.97 9696.05 2499.78
 9713.23  2498.8 9715.07  2498.9 9717.26 2499.02 9718.66 2498.85 9718.76 2498.84
 9718.87 2498.83 9723.17 2498.33 9723.94 2498.29 9726.51 2498.01 9727.59 2497.97
 9728.78 2497.96 9730.34 2497.81 9734.12 2497.45 9735.72 2497.45 9739.08 2497.15
 9774.53 2494.38 9781.11 2493.84 9782.01 2493.73 9809.52 2492.01 9814.26 2491.63
    9827 2492.04 9840.35 2492.43 9843.99  2492.6 9846.63 2492.73 9855.44 2493.15
 9871.97 2494.01 9874.56 2494.15 9879.49  2494.4 9898.46 2494.61    9900 2494.63
 9902.09 2494.65 9912.23 2494.65 9915.36 2494.61 9922.38 2493.93 9933.74 2492.88
 9939.07 2493.29 9945.33 2493.87 9951.78 2494.48 9951.91 2494.46 9952.69  2494.5
 9954.91 2494.47 9958.78 2494.36  9976.2 2493.95  9983.52493.739 9984.52 2493.71
 9989.82 2493.57   10000 2493.27 10002.1  2493.210003.59 2493.09   100052492.983
10011.482492.49310014.69 2492.25 10019.32492.98410020.66  2493.210027.51 2494.29
 10027.6  2494.310028.13 2494.3410046.74 2494.0910059.93 2493.9510063.13 2493.92
10065.42  2493.910066.14 2493.8910067.16 2493.8910068.54 2493.8810069.65 2493.88
10083.82 2493.7310085.76 2493.72 10089.8 2493.72 10090.8 2493.7110091.62 2493.56
10092.44  2493.4 10097.3 2492.4410102.53 2491.4210103.29 2491.5610103.43 2491.59
10105.28 2491.9310112.52 2493.2710116.01 2493.92 10124.6 2494.0710125.78 2494.08
10137.58 2494.2810146.18 2494.4210147.29 2494.4410153.88 2494.5410159.26 2494.62
10173.69 2495.0910179.38 2495.1110179.74 2495.1210181.67 2495.1410188.05 2495.17
10188.11 2495.1710190.62 2495.1810196.09  2495.210199.58 2495.2210205.92 2495.58
10208.23 2495.7310215.95  2496.210224.93 2496.5510228.98 2496.9410235.48 2497.54
10236.19 2497.51 10249.4 2496.9610255.13  2496.710262.66 2496.3810274.14 2495.78
10275.08 2495.7310277.57 2495.5910321.77 2493.63 10323.8 2493.5510325.64 2493.51
10338.58 2493.19   10347 2493.8710353.65 2494.4210373.33 2496.1910374.86 2496.18
10376.51 2496.1710378.26 2496.1510380.11 2496.1310382.09 2496.1110383.72 2496.19
10384.81 2496.1810387.93 2496.33 10389.2 2496.3410391.88 2496.3710394.72 2496.49
10401.28 2496.5510403.77 2496.6410407.81 2496.69 10409.8 2496.6910414.37 2496.76
10415.82 2496.7410420.94 2496.8410421.82 2496.8410422.02 2496.8410427.48 2496.88
10427.76 2496.8810430.45 2496.8910432.54 2497.0310434.47 2497.1510440.44 2497.54
10441.07 2497.58   10446 2497.9410447.93 2498.0610452.16 2498.3810454.76 2498.54
10458.33  2498.810461.26 2498.9710464.49 2499.1710466.89 2499.2910467.49 2499.32
10468.98 2499.4110470.85 2499.5210472.59 2499.5810474.24 2499.6410475.79 2499.69
10477.31 2499.68 10499.6 2500.6110503.39 2500.9210505.23 2501.01 10509.4 2501.36
10510.88 2501.4310515.42 2501.8310516.51 2501.8810521.45 2502.3210521.81 2502.34
10523.52 2502.49 10527.3 2502.7410527.46 2502.7510531.34 2502.9910535.33  2503.2
10535.56 2503.21 10536.4 2503.26 10546.5 2503.7910551.38 2504.0810557.56 2504.42
10561.08 2504.63 10563.9 2504.7910569.09 2505.0910569.35  2505.1 10569.9 2505.13
10573.06 2505.1710573.84 2505.1810586.08 2505.7710601.44 2506.5310608.37 2506.88
10613.47 2506.83 10625.4 2506.71

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
 9684.38    .075 10002.1     .0510020.66    .075

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9952.6910028.13              790  992.24  992.24             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
 9684.38 9902.66 2502.47       F
Right Levee     Station=10235.47      Elevation= 2497.55

CROSS SECTION


RIVER: RV WA T1
REACH: R1                 RS: 0.592

INPUT
Description:
Station Elevation Data    num=     121
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
**********************************************************************************
 9599.91 2483.36 9636.24 2481.49 9638.58 2481.35 9641.03  2481.2  9643.6 2481.04
 9645.43 2480.76 9647.74  2480.4 9650.39 2480.25 9653.16 2480.09 9653.37 2480.07
 9655.75 2479.91 9657.14 2479.83 9687.14 2478.72 9687.24 2478.71 9687.47  2478.7
 9687.72 2478.69    9688 2478.68 9688.31 2478.67 9688.67 2478.66 9689.09 2478.64
 9689.15 2478.64 9695.16 2478.27 9699.15 2478.06  9711.8 2477.38 9747.41 2475.46
 9747.67 2475.47 9747.73 2475.47 9750.08 2475.24 9750.91 2475.16 9751.68 2475.08
 9752.32 2475.03 9757.13 2474.52 9762.15 2474.16 9767.52 2473.84 9770.03 2473.59
 9771.18 2473.63 9771.47 2473.65 9776.18 2473.72 9777.04 2473.76  9780.9 2473.83
 9781.45 2473.84 9783.57  2473.9 9786.78 2473.97 9795.26 2474.06 9795.46 2474.07
```

```
 9796.61 2474.07 9798.21 2474.07 9801.41  2473.9 9803.43 2473.91 9805.38 2473.81
 9807.82 2473.83 9808.65 2473.86 9808.75 2473.87 9811.82 2473.95 9813.88 2474.03
 9817.68 2474.13 9817.98 2474.15  9819.1 2474.19 9823.13 2474.38  9823.7 2474.39
 9824.67 2474.37 9824.87 2474.37 9824.99 2474.37 9833.71  2474.3 9834.52 2474.29
 9835.15 2474.28 9836.26 2474.27 9837.75 2474.27 9846.63 2474.25 9849.66 2474.24
 9857.64 2474.22 9862.51 2474.22 9868.51  2474.2 9875.45 2474.19 9885.92  2474.1
  9887.7  2474.1  9893.1 2474.03 9897.56 2473.41 9905.03 2472.23 9908.89 2472.75
 9916.86 2473.78 9933.12 2473.73 9938.04 2473.74 9938.52 2473.74 9957.07  2473.8
 9967.29 2473.84 9973.75 2473.86 9976.72 2473.87    99902473.927 9990.76 2473.93
 9993.01 2473.93   10000  2473.910000.01  2473.910002.762473.88610004.12 2473.88
10005.04 2473.9310005.97 2473.9810008.37 2473.8910010.36  2473.810014.39 2473.62
10018.06 2473.4510026.65 2473.0310028.29 2472.9910038.27 2472.6910047.18 2473.61
10049.75 2473.8610059.89 2474.4710066.02 2474.8110073.02 2475.2310085.96 2475.94
10086.84 2475.9910088.97  2476.110092.39 2476.3410095.41 2476.5510095.92 2476.59
10097.76 2476.6810126.35 2479.1210137.47 2479.86 10139.2 2479.9910143.95 2480.28
10146.18 2480.13

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9599.91    .075 9993.01     .0510005.04    .075

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
      10008.3710049.75              415  408.13  408.13             .1       .3

CROSS SECTION


RIVER: RV WA T1
REACH: R1                 RS: 0.515

INPUT
Description:
Station Elevation Data    num=     100
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9525.59 2469.53 9553.47 2468.59 9556.44 2468.48    9561 2468.29 9563.94 2468.18
 9567.57 2467.89 9568.39 2467.85 9575.04 2467.35 9576.87 2467.25 9577.61 2467.22
 9582.01 2467.03 9586.82 2466.72 9594.42 2466.42 9595.79 2466.34 9598.99 2466.23
 9606.95 2465.87 9614.45 2465.58 9617.45 2465.46 9620.04 2465.37  9630.6 2465.41
 9643.04 2465.37 9644.28 2465.37 9645.32 2465.37 9645.38 2465.35  9650.1 2465.28
 9684.24 2464.67 9685.65 2464.63 9691.46  2464.8 9699.01 2465.15 9703.72 2465.33
 9706.62  2465.5 9714.07 2465.52 9721.67 2465.55 9727.43 2465.56 9739.45 2465.69
 9773.29 2465.58 9783.84 2465.89 9801.13 2465.99 9803.51 2465.98 9806.18 2465.99
  9809.4 2466.01  9813.4 2466.02 9818.48 2466.05 9825.12 2466.08 9825.81 2466.08
 9829.16  2466.1 9832.46 2465.89 9836.91 2465.57 9838.18 2465.49    9839 2465.43
 9855.63 2465.68 9858.58 2465.73 9876.89 2466.05 9881.22 2466.12 9885.58  2466.2
  9897.7 2465.07 9904.78 2464.45 9916.81 2464.84 9923.55 2465.08  9927.1  2465.2
 9929.67 2465.29 9937.34 2465.42 9939.96 2465.44 9946.86 2465.55 9952.41  2465.6
 9956.53 2465.65 9964.79 2465.71 9966.01 2465.73 9967.41 2465.74 9967.46 2465.74
 9968.27 2465.74 9973.86 2465.82  9975.4 2465.68 9976.65 2465.52 9982.18 2464.93
 9984.272464.633 9987.52 2464.17 9989.17 2464.12  9990.3 2464.09 9997.43 2463.89
 9999.99 2463.83   10000 2463.8310004.96 2463.7310005.43 2463.7110006.17  2463.7
 10012.3 2463.9210014.21 2463.97 10021.7 2464.25   100252464.63310035.24 2465.82
 10037.4 2466.0710040.17  2466.410041.73 2466.5810041.82 2466.5910041.86 2466.59
10042.15  2466.610042.68 2466.6410061.69 2467.8210077.26 2468.7810081.89 2468.58

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9525.59    .075 9984.27     .05   10025    .075

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9973.8610035.24            599.85  599.85     530             .1       .3
Left Levee      Station= 9885.58      Elevation=  2466.2

CROSS SECTION


RIVER: RV WA T1
REACH: R1                 RS: 0.402

INPUT
Description:
Station Elevation Data    num=     124
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9931.36 2456.54 9938.67 2456.58 9938.72 2456.58 9952.17 2454.11 9957.722453.097
 9957.732453.095 9957.742453.093 9962.812452.168 9965.81 2451.62 9968.97  2451.9
    99722452.167 9982.47 2453.09 9995.96 2453.22   10000 2453.2610015.97 2453.42
10022.38 2453.4910022.58 2453.4910025.92 2453.5710027.68 2453.5910038.02 2453.72
10039.27  2453.710039.85 2453.7610040.19 2453.7710046.42 2453.8910047.93 2453.91
10053.04 2454.0210055.64 2454.0610059.73 2454.1410063.36  2454.210064.84 2454.23
10066.49 2454.2810071.06 2454.3610071.97 2454.3810077.03 2454.3710078.82 2454.41
10086.01 2454.3710086.58 2454.38 10090.4 2454.3510093.81 2453.9210096.25  2453.6
10100.46 2453.0610101.46 2452.9310102.12 2452.8810102.47 2452.8610102.92 2452.79
10127.42 2453.3610127.62 2453.3710127.69 2453.3810127.87  2453.410139.74 2454.88
10144.44 2455.46 10150.2 2455.3410157.57 2455.1910163.16 2455.0710165.02 2455.03
10167.54    245510211.05  2455.710217.57 2455.7510219.23  2455.810220.99 2455.86
10237.33 2455.32 10244.8 2455.1610265.26 2454.4810278.51 2454.4110294.03 2455.12
10317.69 2454.8410319.44 2454.84 10321.5 2454.8410322.68 2454.8410323.99 2454.81
10326.99 2454.7510330.75 2454.6810335.59 2454.5710345.34 2454.4710348.53 2454.37
10352.12  2454.110352.94 2454.0410358.47 2453.4910361.93 2453.4110362.04  2453.4
10363.81 2453.3510367.15 2453.1510373.14 2452.7610374.16  2452.710376.88 2452.52
10377.08  2452.510380.55 2452.2510383.37 2452.4910384.02 2452.4810384.24 2452.48
10385.04 2452.52 10390.5 2452.8510405.51 2454.4710408.19 2454.5410411.23 2454.64
10412.03 2454.6610414.75 2454.7610419.05 2454.9310420.28 2455.0210425.31 2455.19
10426.12 2455.24 10431.8 2455.4110431.93 2455.4210431.97 2455.4210433.48 2455.45
10434.65 2455.5410434.69 2455.5410437.82 2455.8210439.79 2455.9110446.95 2456.44
10452.83 2456.8710457.79 2457.23   10462 2457.5510465.31 2457.7910465.62 2457.81
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10468.83 2458.0110471.71 2458.1910474.28 2458.3510491.39 2459.2910493.83 2459.44
   10498 2459.5410503.18 2459.6610504.54 2459.7310509.07  2459.9

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
 9931.36    .075 9962.81     .05    9972    .075

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9957.74 9982.47          1062.83 1062.83 1062.83            .1       .3
Right Levee     Station=10220.99      Elevation= 2455.86

CROSS SECTION


RIVER: RV WA T1
REACH: R1                 RS: 0.200

INPUT
Description:
Station Elevation Data    num=      86
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 9618.62 2434.68 9629.09 2434.13 9643.57 2433.44 9647.48 2433.34 9649.23  2433.3
 9652.68  2433.2  9659.7 2433.01  9664.3 2432.86 9668.25 2432.81 9669.29  2432.8
 9679.44  2431.4 9686.56 2430.41 9687.37  2430.3 9688.62 2430.48 9695.93 2431.57
 9699.24  2432.1 9699.28  2432.1 9708.48 2432.32 9713.13 2432.37 9722.34 2432.55
 9735.18 2432.62 9735.72 2432.59 9738.22 2432.44  9774.9 2431.68 9776.35 2431.64
 9778.09 2431.61 9793.79 2431.16 9797.06 2431.05 9808.97 2430.77 9817.85 2430.96
 9818.86 2430.98 9829.43 2431.16 9842.01 2431.31 9843.71 2431.34 9846.43 2431.36
 9851.35 2431.33 9856.01 2431.29 9859.59 2431.27 9918.14 2431.45 9922.85 2431.56
 9934.27    2431 9938.37 2430.94 9947.57 2430.75 9947.87  2430.8 9949.02 2430.76
 9951.37 2430.59 9956.16 2430.25 9959.14 2430.01 9960.71 2429.88 9971.72 2430.65
 9974.16 2430.82 9974.34 2430.82 9975.47 2430.84 9983.55 2430.97 9986.91 2431.03
 9988.79 2431.07 9997.59 2430.64    99992430.581 9999.99 2430.54   10000 2430.54
10002.38 2430.4510002.87 2430.4310003.56 2430.3910003.85 2430.3810004.96 2430.32
   10011 2430.5810022.43 2431.0710025.45  2431.210034.91 2432.3710036.97 2432.65
10048.49 2434.3710049.61  2434.510051.19  2434.7 10052.3 2434.8310053.65 2434.87
10057.86    243510059.67 2435.1410064.84 2435.2210065.63 2435.2210065.67 2435.22
10066.11 2435.2210072.12 2435.2510075.63 2435.2610078.08 2435.2710078.62 2435.26
10081.52 2435.27

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
 9618.62    .075    9999     .05   10011    .075

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9988.7910022.43           413.8   413.8   413.8            .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
 9618.62    9850    2433       T
Left Levee      Station= 9735.18      Elevation= 2432.62

CROSS SECTION


RIVER: RV WA T1
REACH: R1                 RS: 0.122

INPUT
Description:
Station Elevation Data    num=      51
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 9810.06 2422.06 9812.61 2422.04 9812.88 2422.01 9815.09 2422.02  9822.1 2421.63
 9825.02 2421.51 9828.68 2421.32 9833.15 2421.22 9833.58  2421.2 9834.65 2421.18
 9843.27  2420.8  9845.6  2420.1 9853.42 2419.33 9864.72 2419.82 9881.47 2421.05
 9901.09 2421.46 9906.74 2421.66 9920.77 2422.57 9929.14 2423.09 9953.42 2422.25
 9959.69 2422.05 9980.83 2422.24 9998.66 2421.59 9999.99 2421.61   10000 2421.61
10008.15 2421.7210011.05 2421.7810017.68 2421.8810027.16 2422.0510038.02 2422.27
10046.42  2421.910054.97  2421.510072.63 2422.5910078.53 2422.9410095.05 2422.86
10099.02 2422.8310113.18 2422.7510121.24  2422.810127.85 2422.7710140.13 2422.89
10142.85  2422.810147.39 2422.5810157.82 2422.1210164.61 2421.7210167.61 2421.82
10169.03 2421.8810183.81 2422.4110189.56 2422.5810208.92 2423.0210241.02 2422.91
10250.38 2423.08

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
 9810.06    .075 9980.83     .0510038.02    .075

Bank Sta: Left   Right    Coeff Contr.   Expan.
       9980.8310038.02            .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
 9810.06 9929.14 2423.09       F
Left Levee      Station= 9810.06      Elevation= 2423.09

CROSS SECTION


RIVER: RV WA T2
REACH: R1                 RS: 1.920

INPUT
Description: Q=400 cfs (4B1, 24 hr)
Station Elevation Data    num=      53
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
```

```
 9784.04 2630.25 9790.84 2629.82 9796.56 2629.37 9799.82 2629.22 9820.06 2628.55
 9831.22 2627.84 9833.07 2627.77 9835.24 2627.77 9845.29 2627.42 9846.66 2627.38
 9848.44 2627.33 9851.51 2627.32 9863.88 2627.23 9866.85 2627.09 9881.11 2626.67
 9882.23 2626.62  9883.5 2626.56 9895.51 2626.19 9896.15 2626.13 9905.17 2625.88
 9905.58 2625.88 9906.01 2625.87 9917.86 2625.46 9918.19 2625.46 9931.13 2625.02
 9931.17 2625.02 9945.64 2624.28 9945.86 2624.27 9954.15 2623.88 9955.13 2623.83
 9955.18 2623.82 9970.36 2622.95 9971.04 2622.93 9971.56 2622.91 9973.69  2622.8
  9988.9 2622.24  9991.1 2622.41 9992.06 2622.07 9994.33 2621.19  9997.32619.917
 9998.81 2619.27   10000  2619.210001.21 2619.1410010.83 2618.5110011.18 2618.49
10012.52 2618.69   100162619.909 10022.8 2622.29 10046.2 2624.5610052.27 2625.22
10054.56 2625.3410069.94 2626.0410070.27 2626.03

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
 9784.04    .065  9997.3    .055   10016    .065

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9992.06 10022.8              820  815.99  815.99             .1       .3

CROSS SECTION


RIVER: RV WA T2
REACH: R1                 RS: 1.765

INPUT
Description:
Station Elevation Data    num=      57
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
**********************************************************************************
 9676.49 2613.25 9695.78 2611.84 9716.34 2610.24 9721.38 2609.59 9734.05 2609.52
 9739.85 2609.23 9749.48 2609.95  9752.9  2610.2 9753.73 2610.24 9778.01 2610.78
 9783.78 2611.03 9824.73 2610.29 9826.72 2610.24 9853.88 2608.25 9856.16 2608.06
 9859.67 2608.39 9878.01 2610.24 9879.12 2610.28 9901.47 2610.97 9921.12 2610.32
 9923.91 2610.24 9927.51 2610.04 9935.76  2609.6 9939.33 2609.75 9947.63 2610.24
 9953.94 2610.51 9965.91 2611.16 9980.36 2610.44    9986 2610.24    99912609.298
 9995.34 2608.48  9999.4 2607.79 9999.98 2607.92   10000 2607.9310001.52 2608.27
 10004.12608.81710010.81 2610.2410033.54 2610.9610052.49 2611.5210059.01  2611.4
 10104.4 2610.5510106.12 2610.5410106.59 2610.5310107.13 2610.5410127.31 2611.71
10130.42 2611.8910134.73  2612.110136.05 2612.1610144.14 2612.4910151.68 2612.54
10153.54 2612.5610158.03 2612.8110160.71 2612.9910174.28 2613.8910193.62 2615.17
 10194.5 2615.2210207.01    2616

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
 9676.49    .065    9986    .05510010.81    .065

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          998610010.81              700  730.73  730.73             .1       .3
Left Levee      Station= 9783.78      Elevation= 2611.03
Right Levee     Station=10052.49      Elevation= 2611.52

CROSS SECTION


RIVER: RV WA T2
REACH: R1                 RS: 1.627

INPUT
Description:
Station Elevation Data    num=      43
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
**********************************************************************************
 9741.49 2605.34 9751.61 2605.18 9754.25 2605.15 9757.65 2604.88 9763.05 2604.41
 9795.45 2601.57 9810.95 2600.21 9841.06 2597.55 9867.66 2595.27 9876.08 2594.68
 9876.27 2594.67 9876.64  2594.7 9881.15 2595.08  9883.7 2595.27 9900.01 2595.57
 9918.34 2595.87 9946.29 2596.14 9977.16 2595.27 9977.51 2595.26 9977.82 2595.25
 9980.832595.091  9994.82594.354 9999.98 2594.08   10000 2594.0810000.62 2594.05
 10005.62594.35210017.75 2595.0910023.02 2595.2610025.63 2595.31 10028.7 2595.29
10029.15 2595.2610040.85 2594.0610044.44 2593.8310046.91 2594.7910048.57 2595.26
10051.63 2595.4710059.07 2596.0510081.68 2597.6710096.13 2598.8410119.04 2599.61
 10135.7  2600.210153.97 2601.4510193.99 2604.14

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
 9741.49    .065 9980.83    .05510017.75    .065

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9980.8310017.75            845.13  845.13  845.13             .1       .3

CROSS SECTION


RIVER: RV WA T2
REACH: R1                 RS: 1.467

INPUT
Description:
Station Elevation Data    num=      38
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
**********************************************************************************
 9730.17 2583.95 9749.13 2582.87 9752.59 2582.69 9759.24 2582.31 9770.01 2581.71
 9795.71 2580.16 9814.78 2578.53  9843.4 2576.36 9882.19 2577.64 9899.69 2578.14
 9920.64 2577.68 9931.27 2577.37 9934.42 2577.35 9938.02 2577.31 9944.61 2577.25
 9952.35 2577.14 9979.82 2576.87  9990.6 2576.61 9996.81 2576.46 9999.99  2576.4
   10000  2576.410013.42 2576.1410020.27 2576.0910023.94 2576.08 10034.2 2576.61
10054.75 2577.6710072.12 2578.5210121.61 2577.7610132.19 2577.61 10140.2 2578.01
```

```
10179.76 2580.1510198.99 2582.0110208.63 2582.9710225.45 2584.1310236.48 2584.62
10251.39 2585.2310257.37 2585.2310257.49 2585.23

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
 9730.17    .065  9990.6    .055 10034.2    .065

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9979.8210054.75          1136.05 1136.05 1136.05             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
 9730.17 9899.12 2582.31       F
Right Levee     Station=10072.12      Elevation= 2578.52

CROSS SECTION


RIVER: RV WA T2
REACH: R1                 RS: 1.251

INPUT
Description:
Station Elevation Data    num=      42
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
**********************************************************************************
 9849.93 2560.27 9854.08 2560.09 9855.31 2560.03 9878.94 2559.07 9881.99 2558.94
 9882.98 2558.91 9909.36  2557.6 9909.79 2557.58 9928.22 2556.69 9933.11 2556.53
 9955.04 2555.65 9961.13 2555.37 9962.63  2555.3 9963.59  2555.2 9971.05    2555
  9989.22554.479 9999.98 2554.17   10000 2554.1710008.96 2553.91 10030.22554.481
10052.13 2555.0710058.66 2555.22 10063.4  2555.310064.19 2555.3110066.15 2555.33
10073.99 2555.3310078.99 2555.3410084.12  2555.310093.63 2554.9910097.54 2554.76
10115.76 2553.9210122.46  2553.610124.47  2553.710154.24  2555.3 10165.5 2555.47
10178.96 2555.6410185.86 2555.7310194.62 2556.5810228.23 2560.08 10245.1 2560.82
10257.95 2561.4610263.35 2561.23

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
 9849.93    .065  9989.2    .055 10030.2    .065

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9971.0510052.13          883.72  883.72  883.72             .1       .3

CROSS SECTION


RIVER: RV WA T2
REACH: R1                 RS: 1.084

INPUT
Description:
Station Elevation Data    num=      48
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
**********************************************************************************
 9872.06 2544.97 9872.77 2544.96 9873.46 2544.93 9875.42 2544.74 9888.97  2543.9
 9910.62  2542.2  9914.9 2541.86    9930 2540.81    9936 2540.47 9943.31 2540.02
 9961.11 2538.33 9990.31 2534.96 9992.25 2534.93  9999.62534.759   10000 2534.75
10000.02 2534.75 10003.8 2534.6610015.65 2534.73 10019.7 2534.7610023.78 2534.79
10036.44 2534.7210037.87 2534.7310039.42 2534.7410042.29 2534.7410045.76 2534.68
10072.05 2534.48 10078.5  2534.410086.66 2534.2810089.17 2534.2610096.51 2534.18
10102.96 2534.1610113.54 2534.0810114.55 2534.0910117.77 2534.0710140.74 2534.58
10151.44 2534.9510157.73 2535.5310186.79 2538.0510206.32 2540.0210232.74 2542.17
10267.73 2544.6810270.34 2544.8710270.68  2544.910271.67 2544.9510286.92 2545.28
10301.27 2545.5910303.01 2545.6410307.54  2545.7

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
 9872.06    .065  9999.6    .055 10019.7    .065

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9990.3110042.29          842.98  842.98  842.98             .1       .3

CROSS SECTION


RIVER: RV WA T2
REACH: R1                 RS: 0.924

INPUT
Description:
Station Elevation Data    num=      28
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
**********************************************************************************
  9772.1 2526.42 9774.56 2526.37 9789.25 2525.48 9795.02 2525.23 9815.74  2522.8
 9832.32 2520.76 9840.79 2519.99 9872.19 2517.04 9890.32  2515.5 9899.07 2515.65
 9914.49 2515.86 9925.05 2516.06 9931.11    2516 9936.16 2515.95  9950.5    2516
 9965.65 2515.97 9983.81    2516 9992.57 2516.04   10000 2516.0410002.44 2516.04
 10063.1 2519.5810071.58 2519.99   10095 2522.1610101.83 2522.8110125.83 2525.07
10130.63 2525.5910153.26  2528.510153.66 2528.44

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
  9772.1    .065  9950.5    .055 9983.81    .065

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        9950.510002.44          567.38  567.38  567.38             .1       .3
```

```
CROSS SECTION


RIVER: RV WA T2
REACH: R1                    RS: 0.817

INPUT
Description:
Station Elevation Data    num=     102
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 9850.37 2514.37 9851.58 2514.35 9851.71 2514.34 9853.25 2514.32 9857.59 2514.05
 9857.74 2514.04 9862.95 2513.71 9863.62 2513.66 9868.43 2513.36 9869.48 2513.28
 9873.88 2513.13    9876 2513.22    9880 2513.12 9882.65 2513.06  9883.6 2513.07
 9886.89  2513.1  9889.9 2513.14 9893.24 2512.77 9896.05 2512.79 9896.28 2512.78
 9898.41 2512.69 9899.69 2512.63 9899.87 2512.61 9900.75 2512.58 9913.45 2512.06
 9916.07  2511.9 9918.42 2511.81 9921.23 2511.64  9923.4 2511.56 9926.42 2511.38
 9928.36 2511.31 9931.62  2511.1  9933.3 2511.03 9936.85  2510.8 9938.23 2510.75
 9939.75 2510.68  9943.2 2510.44 9946.47  2510.2  9947.4 2510.16 9952.54 2509.91
 9955.06 2509.78 9960.45 2509.18 9964.14 2508.76 9965.36  2508.6 9971.48 2507.75
 9982.06 2506.29  9985.62506.009  9987.1 2505.89 9991.67 2505.57 9995.78 2505.27
 9999.35 2505.03   10000 2505.0510000.02 2505.0510012.51 2505.3910012.95  2505.4
10013.52 2505.4110014.74 2505.48 10022.42506.00810029.53  2506.510036.84 2504.71
10039.34 2504.1810043.63 2505.16 10049.4 2506.5310056.05 2506.3810059.52 2506.33
10062.09 2506.2910078.34 2505.9910092.65 2505.8310098.79 2505.7310111.27 2505.62
10117.77 2505.2410123.82 2504.8910134.74 2505.26   10139  2505.410146.68 2505.61
10146.75 2505.6110146.95 2505.6210147.37 2505.6310160.78 2505.5810171.93 2505.49
10174.72 2505.4810177.57 2505.4510186.21 2504.64 10186.6 2504.5910186.71 2504.58
10187.96 2504.4110188.68 2504.3310189.04 2504.3310190.03 2504.3110190.91 2504.25
10209.46 2505.6310216.32 2506.1810231.06 2507.3910240.22 2508.1310244.66 2508.77
10247.83 2509.2210247.88 2509.2210248.53 2509.3210248.83 2509.3710252.35 2509.75
 10254.7 2509.9510295.57 2513.94

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9850.37    .065  9985.6    .055 10022.4    .065

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        9985.6 10022.4           288.51  288.51  288.51             .1       .3

CROSS SECTION


RIVER: RV WA T2
REACH: R1                    RS: 0.762

INPUT
Description:
Station Elevation Data    num=     128
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 9856.39 2509.51 9869.87 2509.91 9872.48 2509.99 9876.44 2509.77 9880.48 2509.55
 9924.47 2505.14 9926.09 2505.01 9927.64 2504.88 9929.11 2504.77 9930.52 2504.65
 9930.56 2504.65 9931.84 2504.51 9935.65 2504.15 9936.88 2504.01 9940.78 2503.65
 9941.93 2503.53 9943.03 2503.41 9946.98 2503.05 9948.97 2502.87 9951.05 2502.58
 9952.02 2502.48  9956.2 2501.88 9957.05  2501.8 9960.32 2501.34 9965.19 2500.75
 9966.07 2500.71 9969.88 2500.54 9973.81 2500.36 9978.32 2500.45 9981.32 2500.29
 9981.53 2500.28 9983.42 2500.29 9989.26 2500.28 9989.35 2500.28 9989.48 2500.24
 9989.762500.164  9996.32498.393 9999.08 2497.64 9999.99 2497.81   10000 2497.81
   100032498.39810007.71 2499.3210012.37 2500.1610012.53 2500.1410026.95 2499.66
10038.62 2499.2610041.76 2499.5310050.08 2500.2410091.52 2499.7210093.32  2499.7
10093.69 2499.6910102.31 2499.5110108.12 2500.4910109.95 2500.7910110.61  2500.9
10110.87 2500.9610111.47 2500.7910122.45 2497.4410125.85 2498.5410131.87 2500.64
10138.35 2500.0810145.38  2499.7 10147.2  2499.610152.34 2499.2610155.25 2499.11
10158.89 2498.9310158.94 2498.9310159.12 2498.9210162.02 2498.7810164.31 2498.73
10164.62 2498.7410168.99 2498.66 10169.9 2498.6710173.69  2498.610175.16 2498.62
10176.63  2498.6 10177.7 2498.6110178.52 2498.6210180.42 2498.6110181.59 2498.63
10184.23 2498.6310186.25 2498.6310199.48 2498.9810201.35 2499.1310208.56 2498.53
10216.21 2497.9410223.34 2499.1210229.11 2499.9510229.68 2499.9610245.31 2500.78
 10251.3  2501.1   10254 2501.2310254.67 2501.2710255.99 2501.34 10259.5 2501.53
10259.55 2501.5310259.76 2501.5310261.44 2501.6110261.75 2501.6410266.03 2501.84
10266.94 2501.9210273.34 2502.6710279.61 2503.1910282.23 2503.4110284.22 2503.62
10287.68 2503.9810306.37 2506.32   10308 2506.4810309.67 2506.63 10311.4  2506.8
10312.16 2506.8710313.18 2507.0610315.02 2507.4110316.92 2507.7710332.57 2509.43
10334.65 2509.8310337.49 2509.9710340.43 2510.1110343.47 2510.2610343.98 2510.29
10362.55  2511.310370.58 2512.2710372.31 2512.4310375.65 2512.6310376.96 2512.71
10378.64 2512.6810385.86 2512.5110388.29 2512.44

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9856.39    .065 9989.76    .05510012.37    .065

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9989.7610012.37           249.21  249.21  249.21             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
10131.8810388.29 2505.39       F

CROSS SECTION


RIVER: RV WA T2
REACH: R1                    RS: 0.715

INPUT
Description: Q=510 cfs (CP4B2, 24 hr)
Station Elevation Data    num=     171
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
```

```
*******************************************************************************
 9831.58 2502.06 9831.91 2502.04 9832.06 2502.04 9832.18 2502.03 9836.69 2501.84
 9836.79 2501.83 9836.98 2501.82 9839.02 2501.67 9841.87 2501.42 9842.46 2501.38
 9846.85    2501 9848.37  2500.9 9851.87 2500.62 9854.18 2500.47 9856.89 2500.26
 9858.61 2500.16 9860.63    2500 9861.93 2499.95 9865.54  2499.8 9866.99 2499.69
 9867.62 2499.65 9871.66 2499.49 9872.05  2499.5 9872.77 2499.51 9877.08 2499.32
 9882.13  2499.1 9882.85 2499.07 9886.78 2498.87 9886.97 2498.86  9887.3 2498.83
 9892.05 2498.54 9892.41 2498.52 9896.98 2498.24 9897.37 2498.23 9897.51 2498.22
  9901.9 2497.95 9902.62 2497.91 9906.81 2497.66 9907.73 2497.61 9911.73 2497.37
 9912.85 2497.32 9916.64  2497.1 9917.96 2497.03 9918.44    2497 9921.54 2496.86
 9923.07 2496.78 9926.43 2496.63 9927.86 2496.56 9928.19 2496.53 9931.33 2496.39
  9933.3 2496.25 9936.23 2496.11 9938.41 2495.95 9941.14 2495.83 9943.52 2495.64
 9946.04 2495.52 9948.64 2495.32 9950.05 2495.25 9952.87 2495.04 9953.76 2494.99
 9955.84 2494.88 9958.88 2494.64 9959.12 2494.62 9960.97 2494.52    9964 2494.41
 9965.63 2494.32 9969.11  2494.2 9970.54 2494.12 9974.24 2493.99 9975.43 2493.93
 9979.35  2493.8 9979.73 2493.78 9980.33 2493.78 9984.47 2493.63 9985.22 2493.62
  9988.42493.511 9989.59 2493.47 9990.98 2493.42 9991.47 2493.41 9993.03 2493.18
 9995.56 2493.26 9999.88 2493.38   10000 2493.3810002.01 2493.4410004.49 2493.43
10004.63 2493.4410005.61 2493.5110011.02 2493.6110015.57  2493.710019.44 2493.77
10019.95 2493.7910020.97 2493.8210022.08 2493.8810024.53 2493.9410024.96 2493.95
10026.92    249410029.96 2494.0810032.19 2494.14 10034.7 2494.2110034.96 2494.22
   10038 2494.3810039.95 2494.4410043.59 2494.6510044.94 2494.6910049.23 2494.96
10049.93 2494.9810052.16 2495.1210052.38 2495.13 10054.9 2495.2110054.92 2495.22
10055.44 2495.2310059.97 2495.1910064.07 2495.1510067.42 2495.12 10067.5 2495.13
10068.47 2495.2210071.98 2495.2110072.83 2495.2710076.42 2495.2810077.21 2495.32
10079.54 2495.3310083.28 2495.3910084.91 2495.4110089.25 2495.4510093.45  2495.5
10097.52 2495.5410103.16 2495.6610104.16 2495.6710108.49 2495.7210109.65 2495.74
10113.77 2495.7910114.21 2495.7910115.19 2495.8110119.06 2495.8510119.14 2495.85
10120.86 2495.8810124.36 2495.9410126.43 2495.9610129.64 2496.0110132.66 2496.06
10135.06 2496.1410137.74 2496.1910140.53 2496.2910142.77 2496.3310146.05 2496.46
10147.76 2496.4910151.62 2496.6510152.62 2496.66 10154.2 2496.7410154.27 2496.74
10155.02 2496.7810157.75 2496.8810158.32  2496.910162.92 2497.0810163.21 2497.09
10168.07 2497.2710168.16 2497.2710171.23 2497.4510171.53 2497.4510171.81 2497.45
10171.82 2497.4510172.07 2497.4610181.96 2498.2910184.88 2498.4510187.61 2498.58
10197.07 2499.8110200.42 2500.0110203.62 2500.21 10205.4 2500.3710208.55 2500.56
10212.79 2501.13

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9831.58    .065  9988.4    .05510005.61    .065

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9980.3310022.08           384.78  384.78  384.78             .1       .3

CROSS SECTION


RIVER: RV WA T2
REACH: R1                 RS: 0.642

INPUT
Description:
Station Elevation Data    num=      75
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9706.96 2489.76 9709.32 2489.66 9709.74 2489.63  9716.4 2489.35  9717.9 2489.24
 9718.42  2489.2 9724.14 2488.93 9726.07 2488.81 9730.55  2488.6 9734.24 2488.36
 9734.91 2488.33 9739.95    2488 9742.41 2487.86 9748.97 2487.42 9750.51 2487.34
 9750.59 2487.33 9758.69 2486.98 9758.73 2486.98 9758.87 2486.98 9773.32 2487.08
 9775.47 2487.09 9779.51 2487.12 9787.15 2487.17 9795.86 2487.19 9812.01 2487.32
  9814.7 2487.34 9819.88 2487.39 9830.07 2487.08 9833.12 2486.99 9853.24 2486.38
 9860.82 2486.15 9871.13 2485.87 9879.33 2485.64 9892.61 2486.06 9901.78 2486.35
 9905.57 2486.54 9915.28  2486.8 9917.94 2487.18 9921.05 2487.22 9927.08 2487.26
 9932.85 2487.26 9941.18 2487.21 9948.08 2487.22 9953.03 2487.19 9963.28 2487.21
 9970.33  2487.2  9970.4  2487.2  9979.9 2485.38 9980.71  2485.2 9985.31  2485.6
 9993.39 2485.62 9996.62 2485.38   10000 2485.1210001.89 2484.98 10006.2  2485.3
10006.92  2485.310007.65  2485.310009.14 2485.3810013.61 2485.6210014.17 2485.65
10016.04 2485.7510021.54 2485.9810029.27 2486.4510032.23 2486.5210038.96 2486.68
10040.65 2486.7110044.42  2486.810050.94 2486.9110054.94    248710054.98    2487
10057.84 2487.7310059.64 2488.0710064.87 2489.2610069.47 2490.09   10070 2490.21

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9706.96    .065 9993.39    .05510013.61    .065

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9970.3310032.23           504.17  504.17  504.17             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
 9706.96 9948.46 2488.94       F

CROSS SECTION


RIVER: RV WA T2
REACH: R1                 RS: 0.547

INPUT
Description:
Station Elevation Data    num=      75
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9829.38 2485.02 9831.56 2485.02  9833.2 2485.01 9835.37 2484.98  9841.5 2484.91
 9841.67 2484.91 9855.41    2483 9864.21 2481.78 9864.59 2481.73 9870.72 2480.89
 9876.23  2480.2 9880.63  2479.6 9887.87 2478.72 9890.53 2478.36    9893 2478.07
 9893.42 2478.01 9894.72 2477.85 9900.38 2477.05 9901.15 2476.95 9907.13 2476.11
 9908.56 2475.98 9911.52 2475.69 9912.06 2475.64 9927.76 2475.29 9930.72 2475.22
 9934.21 2475.18 9938.82 2474.34 9945.21 2473.17 9957.11 2474.98 9960.92 2475.58
```

```
 9973.65 2475.87 9980.02 2476.02  9980.42475.974 9981.25 2475.87 9982.97 2475.68
 9992.26 2474.61 9999.42  2473.9 9999.99 2473.96   10000 2473.9610000.74 2474.02
10005.79 2474.6110007.24 2474.7810014.24 2475.59 10017.2 2475.9310017.41 2475.96
10017.45 2475.9610017.48 2475.9710017.52 2475.9710017.71 2475.9710017.75 2475.97
10017.86 2475.96 10018.2 2475.9210033.81 2474.49 10034.5 2474.5610036.62 2474.73
10041.04 2475.0910046.56 2475.5410050.13 2475.84   10066 2476.1710074.66 2476.32
10079.54 2476.1810084.18 2476.0610087.21 2475.9810090.14 2475.9110093.23 2476.03
 10095.4 2476.1310096.53 2476.0810101.42 2475.8510104.67 2475.7110121.23 2475.29
10158.63 2476.2510173.77 2476.4610175.21 2476.4510176.76 2476.4410177.16 2476.43

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9829.38    .065  9980.4    .05510017.48    .065

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        9980.410017.48           387.86  387.86  387.86            .1       .3
Right Levee     Station=10074.66      Elevation= 2476.32

CROSS SECTION


RIVER: RV WA T2
REACH: R1                 RS: 0.473

INPUT
Description:
Station Elevation Data    num=      31
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
  9895.7 2472.43 9895.92 2472.43 9897.11 2472.48 9902.67 2471.86 9909.92 2471.04
    9914 2470.57 9915.28 2470.36 9956.78 2466.19 9957.41 2466.15 9961.89  2465.8
 9969.19 2465.26 9973.99 2465.47  9980.7 2465.77 9984.13 2465.91 9990.97 2466.26
 9995.742465.261 9996.65 2465.07 9997.69 2464.86   10000 2464.8410002.58 2464.81
10006.53 2464.7710010.36 2464.7510013.08 2465.2610018.232466.26310024.17 2467.42
10028.34 2467.4410029.47 2467.4410029.64 2467.44 10039.3 2467.4810042.54 2467.49
10071.98 2468.02

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
  9895.7    .065 9995.74    .05510013.08    .065

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9990.9710024.17           567.88  567.88  567.88            .1       .3

CROSS SECTION


RIVER: RV WA T2
REACH: R1                 RS: 0.366

INPUT
Description:
Station Elevation Data    num=      56
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9859.08 2461.35  9861.6 2461.34 9862.11 2461.33 9867.94 2461.34 9867.99 2461.33
 9868.48 2461.33 9868.59 2461.33  9870.1 2461.22  9870.2 2461.22 9870.31  2461.2
 9873.98 2460.79    9874 2460.79 9874.46 2460.75 9879.96 2460.15 9881.31    2460
 9882.46 2459.92 9883.79 2459.82 9885.44 2459.69 9889.48 2459.21 9891.95 2458.96
 9895.24 2458.53 9900.19 2457.94 9904.81 2457.42 9905.52 2457.34  9912.1 2456.59
 9922.52 2455.41 9924.27 2455.21 9967.39  2454.8 9985.84 2454.63 9990.08 2454.47
 9993.52 2454.34 9996.44 2454.24   10000 2454.3610003.49 2454.4710006.172454.626
10009.33 2454.8110023.55 2455.7510034.78 2456.49 10036.1 2456.5810037.37 2456.66
10038.34 2456.6610039.45 2456.6810040.32  2456.710041.48 2456.7310042.35 2456.74
10042.36 2456.7610043.59 2456.7610044.47 2456.7710091.05 2456.9110097.22 2456.94
10102.26 2456.9610104.37 2456.9610106.49 2456.9910110.03 2457.0310113.04 2457.06
10117.24 2457.09

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9859.08    .065 9990.08    .05510003.49    .065

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9985.8410037.37           539.32  539.32  539.32            .1       .3

CROSS SECTION


RIVER: RV WA T2
REACH: R1                 RS: 0.264

INPUT
Description: Q=510 cfs (CP8B2A, 24 hr)
Station Elevation Data    num=      75
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9871.44 2450.72 9891.83 2449.65 9903.43 2449.06 9921.59 2448.28 9926.74 2448.09
 9927.57 2448.05 9932.64 2447.73 9937.02 2447.45 9940.83  2447.2 9944.19 2446.99
    9961 2445.68 9961.01 2445.68 9961.42 2445.64 9971.22 2444.66 9971.832444.599
 9980.22 2443.76 9982.04 2443.76  9988.8 2443.74 9996.44 2443.97   10000 2444.08
10011.41 2444.4210013.14 2444.4910013.18 2444.4910013.47 2444.4910016.13  2444.6
10025.05  2444.410032.23 2444.2110035.66 2444.6610039.21 2445.1310048.71 2444.81
10083.97  2444.210084.17  2444.310085.79  2443.910085.86 2443.8810089.72    2443
10095.98 2443.7710099.49 2444.3310099.62 2444.3510099.68 2444.3610100.19 2444.33
10100.51 2444.3710101.92  2444.410102.93 2444.4610107.56 2444.61 10109.7 2444.73
10111.86 2444.7910120.24 2444.9310123.32 2444.9910124.63 2445.0110132.37 2445.18
10133.26 2445.1910136.73  2445.310137.95 2445.3310140.28 2445.3610141.12 2445.41
```

```
10143.52 2445.4310144.68 2445.5110158.75 2446.2410159.79 2446.3510161.09  2446.3
10161.67 2446.3310165.44 2446.2110167.34 2446.32 10167.5 2446.3110169.81 2446.43
10172.55 2446.3410175.32 2446.5110176.31 2446.5710178.73 2446.6810179.41 2446.71
10183.77 2446.89 10186.5 2447.0410191.83 2447.2410193.57 2447.3310196.47 2447.44

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
 9871.44    .065 9971.83    .05510011.41    .065

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9971.8310016.13           235.83  235.83  235.83             .1       .3

CROSS SECTION


RIVER: RV WA T2
REACH: R1                 RS: 0.219

INPUT
Description: Q=2260 cfs (CP8B2, 24 hr)  This cross section is identical to RM
             7.390 on RV WA.
Station Elevation Data    num=      99
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
**********************************************************************************
 9905.61 2441.96 9908.84 2441.82 9911.06 2441.69 9921.95 2441.19 9925.23 2440.97
 9930.51 2440.71 9932.712440.545 9941.69 2439.87  9942.3 2439.84  9943.8 2439.71
 9976.46 2439.55  9987.8 2439.52 9989.96 2439.41 9994.32 2439.18 9996.56 2439.16
 9999.98 2439.11   10000 2439.1110000.71  2439.110010.53 2438.9810011.26 2438.97
10011.38 2438.9710011.68 2438.9710012.04 2439.0310012.89 2439.1610015.262439.521
10021.74 2440.5110031.09  2440.310037.38 2440.1810055.06  2439.810076.03 2439.39
10079.22 2439.3310079.31 2439.32 10085.3 2439.2110088.53 2438.6610090.99 2438.19
10093.97  2438.510098.16 2438.8210102.01 2439.1610102.51  2439.210106.12 2439.44
10106.76 2439.2710107.31 2439.2110108.96 2439.0410109.96 2438.9210110.63 2438.85
10132.06 2439.4610132.77 2439.4710138.43 2439.4710140.18  2439.510140.78 2439.51
10146.06 2439.5210150.84 2439.5310152.14 2439.53 10153.8 2439.5510156.42 2439.59
10158.65 2439.6210197.71  2439.710198.23 2439.7410200.57 2439.9210201.68 2440.01
10203.11 2440.0210205.82 2440.0510207.26 2440.0610208.67 2440.0310211.63 2439.98
10240.09 2440.0210241.44 2440.0410243.29 2439.9810243.56 2439.9710243.97    2440
10244.84 2440.0110245.47 2440.0510248.32 2440.0310248.42 2440.0410248.82 2440.03
10256.77 2439.3510260.84 2439.0110263.88 2438.7510273.15 2439.0210283.23 2439.18
10283.72 2439.1610284.62 2439.2410285.37 2439.27 10296.4 2439.8410301.96 2440.12
10303.21 2440.1910314.08 2439.9310317.08 2439.8210321.89 2439.8410331.86 2439.63
10337.232440.18610337.75 2440.24 10341.6 2440.6110342.71 2440.7110349.53  2441.4
10358.27  2442.210360.16 2442.1710366.32 2442.0610366.47 2442.06

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************************************************
 9905.61     .05 9996.56     .0410012.89     .0510303.21     .0410337.23     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9932.7110021.74           389.84  389.84  389.84             .1       .3

CROSS SECTION


RIVER: RV WA T2
REACH: R1                 RS: 0.145

INPUT
Description: This cross section is identical to RM 7.292 on RV WA.
Station Elevation Data    num=     126
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
**********************************************************************************
 9717.39 2433.82 9722.27 2433.53 9727.76  2433.2 9742.81 2432.29 9778.54 2430.13
 9781.11 2430.02 9784.04 2429.88 9787.37 2429.72 9791.03 2429.51  9795.4 2429.27
 9800.53 2428.98 9806.83  2428.6 9808.14 2428.52 9808.25 2428.51 9808.41  2428.5
 9814.66 2427.84 9818.26 2427.45 9826.42 2428.81 9827.44 2428.97 9830.86 2429.09
 9836.25 2429.19 9836.43  2429.2  9884.8 2430.24 9887.28 2430.29 9890.04 2430.35
 9893.15 2430.42 9895.28 2430.47 9896.67 2430.51 9900.68 2430.62 9905.27 2430.71
  9910.7 2430.81 9917.24 2430.99 9918.82 2431.04 9922.87 2430.75 9927.28 2430.36
 9928.17 2430.29 9929.08 2430.21 9934.72  2430.7 9938.57 2431.07 9940.05 2431.22
 9941.42 2431.35 9942.76 2431.49 9956.76 2431.57 9961.53 2431.58 9974.29 2431.64
 9985.48 2431.64   10000 2431.5210000.04 2431.5210002.91  2431.510007.54 2431.63
10008.63 2431.5410018.01 2430.7610022.58 2430.8610034.76 2431.4910035.17 2431.47
10035.55 2431.4610048.85 2431.1310049.58 2431.1510062.572431.62110071.92 2431.96
10081.18 2432.16 10091.8 2431.0710094.68 2430.7710110.46  2431.610113.55 2431.77
10114.48 2431.69 10127.7 2431.5710138.35 2431.4110174.71 2431.5210180.36 2431.31
10215.26 2431.0610216.17 2431.04 10222.9 2430.9610234.09 2430.8210252.05 2430.59
10272.66 2430.3310279.88 2430.4210284.28 2430.4510286.47  2430.510288.28 2430.28
10294.63 2429.5310297.92 2429.3610304.21 2428.9410312.26 2428.6410315.41 2429.07
10327.15 2430.7110343.71 2430.7210364.31 2430.7410365.74 2430.7410369.91 2430.75
 10371.7 2430.7510372.49 2430.7510372.67 2430.7510373.27 2430.7510373.68 2430.75
10376.77 2430.7710376.96 2430.77 10377.2 2430.78 10377.6 2430.7910377.71  2430.8
10402.29 2431.2710403.75 2431.25 10405.4 2431.2210407.31  2431.210408.21 2431.18
 10409.5 2431.1910412.11 2431.1910415.25 2431.2110419.11 2431.2210430.85 2431.26
10441.13 2431.3110441.87 2431.3110457.62 2431.3910457.77 2431.3710457.87 2431.36
10457.99 2431.3510467.88 2430.3610473.57 2429.69 10478.1    243110482.46 2432.29
10495.26 2436.0710495.89 2436.12 10496.4 2436.1710503.89 2436.7510514.32 2437.55
10518.91 2437.97

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
 9717.39     .04 9985.48     .0410062.57     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9985.4810062.57           424.74  424.74  424.74             .1       .3
Ineffective Flow     num=       1
```

```
   Sta L   Sta R    Elev  Permanent
 9717.39    9820    2433       F

CROSS SECTION


RIVER: RV WA T2
REACH: R1                  RS: 0.065

INPUT
Description: This cross section is identical to RM 7.184 on RV WA.
Station Elevation Data    num=     240
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
 9016.24  2416.9 9025.53 2418.01 9027.94 2418.29 9035.13 2419.09 9035.42 2419.13
 9036.38 2419.23 9044.71 2419.94 9047.18 2420.15 9053.82  2420.7 9054.59 2420.77
 9058.85 2421.09 9062.91 2421.45 9065.66 2421.66 9071.95 2422.23 9073.24 2422.33
 9077.93 2422.78 9078.03 2422.78 9078.24  2422.8 9078.46 2422.81 9080.68 2422.84
 9080.72 2422.84 9086.86  2422.6  9088.5 2422.53 9089.14 2422.54 9093.01 2422.52
 9097.83 2422.48 9099.15  2422.5 9102.65 2422.49 9104.41 2422.53 9106.56 2422.58
  9107.5 2422.56 9108.57 2422.58 9110.27 2422.61 9114.32 2422.56 9115.76 2422.54
 9119.43 2422.63 9124.14 2422.74 9125.69 2422.78 9131.76 2422.92 9133.41 2422.97
 9140.69 2423.12 9141.17 2423.13 9144.56 2423.19 9144.66 2423.21 9146.56 2423.15
 9148.11 2423.09 9152.55 2422.88 9155.62 2422.75 9155.77 2422.74 9157.62 2422.65
 9159.13 2422.57 9185.79 2422.22 9190.87 2422.23 9196.99 2422.23 9199.65 2422.22
 9212.07 2422.14 9212.54 2422.12 9212.63 2422.12  9216.6 2422.03 9218.32 2421.99
 9226.92 2421.22  9232.3 2420.97  9234.1 2421.03 9237.41 2421.15 9245.15 2421.42
 9245.25 2421.41 9245.28 2421.41 9250.61 2421.14 9251.61 2421.13 9254.07 2421.02
 9257.86 2421.06 9257.96 2421.05 9258.87 2421.04 9261.31 2421.08 9264.56 2421.22
 9269.18 2421.43 9272.14 2421.57  9272.5 2421.58 9274.25 2421.58 9275.85 2421.58
 9278.05 2421.72 9290.75 2421.96 9292.01 2421.97  9293.7 2422.02 9296.12 2422.09
 9298.18 2422.16 9299.93 2422.21 9316.87 2422.85 9316.97 2422.85 9323.72 2423.24
 9325.27 2423.33 9339.95 2422.74 9356.79 2422.11 9358.48 2422.12 9379.42 2422.28
 9383.79  2422.1 9394.36 2421.67 9395.68 2421.62 9395.75 2421.62 9396.36 2421.59
 9397.57 2421.61  9397.6 2421.61 9408.54 2421.76 9414.66 2421.86 9421.06 2421.96
  9421.3 2421.96 9433.86 2422.19  9433.9 2422.19 9434.28 2422.17 9447.79 2421.53
 9449.52 2421.45 9451.26 2421.37 9471.56 2422.65 9472.84 2422.73 9472.88 2422.73
 9478.13 2422.63 9478.21 2422.64  9534.5 2422.32 9536.41 2422.25 9537.81 2422.42
 9537.88 2422.41 9537.94 2422.41 9537.98 2422.41 9538.11 2422.39 9538.24 2422.38
 9538.35 2422.37 9538.87 2422.32  9539.6 2422.25 9541.68 2422.05 9553.67 2420.89
 9567.58 2421.35 9582.91  2421.9 9583.41 2421.92 9584.33 2421.95 9633.61  2421.6
 9634.72  2421.6 9636.12 2421.58 9672.75 2422.68 9672.97 2422.69  9705.2 2421.89
 9705.69 2421.88 9713.06 2421.73 9713.97 2421.71 9714.34  2421.7 9715.93 2421.64
 9715.99 2421.64 9717.35 2421.62 9718.48  2421.6 9719.42 2421.58 9719.92 2421.57
 9720.24 2421.56 9720.94 2421.53 9721.57  2421.5 9731.77 2421.29 9732.13 2421.28
 9733.79 2421.23 9733.88 2421.23  9736.3 2421.12 9738.43 2421.02 9740.07 2420.99
 9746.04 2420.86 9756.93 2420.62 9774.41 2420.31 9776.28 2420.24 9777.12 2420.21
 9784.53 2419.95 9788.75 2419.79 9792.67 2419.65 9792.81 2419.65 9792.93 2419.64
 9800.72 2419.29 9801.96 2419.24 9802.07 2419.22 9803.93 2419.33 9805.08  2419.4
 9809.54  2419.8 9809.81 2419.82 9815.07  2420.1 9820.94 2420.48 9823.88 2420.56
 9825.41 2420.55 9829.54 2420.53 9831.74 2420.52 9893.15 2421.54 9928.22 2422.07
 9928.52 2422.07 9929.04 2422.06 9929.17 2422.06 9939.93 2421.97 9941.07 2421.96
 9945.62 2421.92 9951.47 2421.84  9973.2 2421.56 9989.36 2421.35 9989.882421.263
 9996.66 2420.13 9999.93 2419.5710010.38 2420.31 10021.4 2421.2610030.03 2421.12
10031.63  2421.110063.59  2420.710073.84 2420.6110080.73  2420.610083.58 2420.58
10091.62 2420.5810093.32 2420.5710102.51 2420.5710103.06 2420.5710103.14 2420.57
 10103.5 2420.5610107.55 2420.5810111.84 2420.4310114.72 2420.2910117.88 2420.16
10126.84 2419.69 10127.9  2419.710128.29  2419.710138.94 2419.75 10143.5 2419.74
10148.16 2419.7310154.22 2419.7410158.71 2419.7710160.15 2419.77 10166.2  2419.8
10170.23 2420.4110176.86 2421.4110179.67 2421.4810186.15 2421.6710192.78 2421.85
10194.85 2421.9110212.28 2424.1910232.82 2426.7710233.47 2426.8510234.06 2426.92
10234.08 2426.9210248.47  2427.210254.31 2427.3710261.27 2427.5110263.32 2427.55

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
 9016.24     .04 9989.88     .04 10021.4     .04

Bank Sta: Left   Right    Coeff Contr.   Expan.
       9989.3610176.86              .1       .3
Left Levee      Station= 9672.95      Elevation= 2422.69

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

SUMMARY OF MANNING'S N VALUES

River:RV WA
*****************************************************************************
*     Reach       *   River Sta.   *   n1    *   n2    *   n3    *   n4    *   n5    *
*****************************************************************************
*R1                *    9.834       *      .05*      .04*      .05*         *         *
*R1                *    9.648       *      .05*      .04*      .05*         *         *
*R1                *    9.518       *      .05*      .04*      .05*         *         *
*R1                *    9.372       *      .05*      .04*      .05*         *         *
*R1                *    9.197       *      .05*      .04*      .05*         *         *
*R1                *    9.065       *      .05*      .04*      .05*         *         *
*R1                *    8.893       *      .05*      .04*      .05*         *         *
*R1                *    8.807       *      .05*      .04*      .05*         *         *
*R1                *    8.613       *      .05*      .04*      .05*         *         *
*R1                *    8.415       *      .05*      .04*      .05*         *         *
*R1                *    8.262       *      .05*      .04*      .05*         *         *
*R1                *    8.060       *      .05*      .04*      .05*         *         *
*R1                *    7.925       *      .05*      .04*      .05*         *         *
*R1                *    7.828       *      .05*      .04*      .05*      .04*      .05*
*R1                *    7.636       *      .05*      .04*      .05*      .04*      .05*
*R1                *    7.554       *      .05*      .04*      .05*      .04*      .05*
*R1                *    7.414       *      .05*      .04*      .05*         *         *
*R1                *    7.390       *      .05*      .04*      .05*      .04*      .05*
*R1                *    7.292       *      .04*      .04*      .04*         *         *
*R1                *    7.184       *      .04*      .04*      .04*         *         *
```

*R2	*	7.052	*	.05*	.04*	.05*	*	*
*R2	*	7.051	*	.05*	.04*	.05*	*	*
*R3	*	7.050	*	.05*	.04*	.05*	*	*
*R3	*	7.049	*	.05*	.04*	.05*	*	*

River:RV WA T1

Reach	River Sta.	n1	n2	n3
*R1	3.405	.075*	.05*	.075*
*R1	3.329	.075*	.05*	.075*
*R1	3.143	.075*	.05*	.075*
*R1	3.000	.075*	.05*	.075*
*R1	2.881	.075*	.05*	.075*
*R1	2.760	.075*	.05*	.075*
*R1	2.541	.075*	.05*	.075*
*R1	2.344	.075*	.05*	.075*
*R1	2.133	.075*	.05*	.075*
*R1	1.994	.075*	.05*	.075*
*R1	1.867	.075*	.05*	.075*
*R1	1.638	.075*	.05*	.075*
*R1	1.476	.075*	.05*	.075*
*R1	1.304	.075*	.05*	.075*
*R1	1.140	.075*	.05*	.075*
*R1	0.935	.075*	.05*	.075*
*R1	0.780	.075*	.05*	.075*
*R1	0.592	.075*	.05*	.075*
*R1	0.515	.075*	.05*	.075*
*R1	0.402	.075*	.05*	.075*
*R1	0.200	.075*	.05*	.075*
*R1	0.122	.075*	.05*	.075*

River:RV WA T2

Reach	River Sta.	n1	n2	n3	n4	n5
*R1	1.920	.065*	.055*	.065*	*	*
*R1	1.765	.065*	.055*	.065*	*	*
*R1	1.627	.065*	.055*	.065*	*	*
*R1	1.467	.065*	.055*	.065*	*	*
*R1	1.251	.065*	.055*	.065*	*	*
*R1	1.084	.065*	.055*	.065*	*	*
*R1	0.924	.065*	.055*	.065*	*	*
*R1	0.817	.065*	.055*	.065*	*	*
*R1	0.762	.065*	.055*	.065*	*	*
*R1	0.715	.065*	.055*	.065*	*	*
*R1	0.642	.065*	.055*	.065*	*	*
*R1	0.547	.065*	.055*	.065*	*	*
*R1	0.473	.065*	.055*	.065*	*	*
*R1	0.366	.065*	.055*	.065*	*	*
*R1	0.264	.065*	.055*	.065*	*	*
*R1	0.219	.05*	.04*	.05*	.04*	.05*
*R1	0.145	.04*	.04*	.04*	*	*
*R1	0.065	.04*	.04*	.04*	*	*

SUMMARY OF REACH LENGTHS

River: RV WA

Reach	River Sta.	Left	Channel	Right
*R1	9.834	982.87*	982.87*	982.87*
*R1	9.648	682.43*	682.43*	682.43*
*R1	9.518	772.29*	772.29*	772.29*
*R1	9.372	926.62*	926.62*	926.62*
*R1	9.197	696.33*	696.33*	696.33*
*R1	9.065	911.5*	911.5*	911.5*
*R1	8.893	451.49*	451.49*	451.49*
*R1	8.807	1024.38*	1024.38*	1024.38*
*R1	8.613	1044.54*	1044.54*	1044.54*
*R1	8.415	810.03*	810.03*	810.03*
*R1	8.262	1065.85*	1065.85*	1065.85*
*R1	8.060	710.844*	710.844*	710.844*
*R1	7.925	514.55*	514.55*	514.55*
*R1	7.828	1012.46*	1012.46*	1012.46*
*R1	7.636	432.9453*	432.9453*	432.9453*
*R1	7.554	740.3017*	740.3017*	740.3017*
*R1	7.414	124.8931*	124.8931*	124.8931*
*R1	7.390	519.4431*	519.4431*	519.4431*
*R1	7.292	567.5543*	567.5543*	567.5543*
*R1	7.184	*	*	*
*R2	7.052	5*	5*	5*
*R2	7.051	*	*	*
*R3	7.050	.01*	.01*	.01*
*R3	7.049	0*	0*	0*

River: RV WA T1

Reach	River Sta.	Left	Channel	Right
*R1	3.405	404.09*	404.09*	404.09*
*R1	3.329	983.41*	983.41*	950*
*R1	3.143	751.82*	751.82*	751.82*
*R1	3.000	630.53*	630.53*	630.53*

*R1	2.881	640.21*	640.21*	640.21*
*R1	2.760	1151.69*	1151.69*	1151.69*
*R1	2.541	1043.3*	1043.3*	1043.3*
*R1	2.344	1112.06*	1112.06*	1112.06*
*R1	2.133	735.6*	735.6*	735.6*
*R1	1.994	670.63*	670.63*	670.63*
*R1	1.867	1207.38*	1207.38*	1207.38*
*R1	1.638	857.04*	857.04*	857.04*
*R1	1.476	908.86*	908.86*	908.86*
*R1	1.304	864.88*	864.88*	864.88*
*R1	1.140	1082.43*	1082.43*	1082.43*
*R1	0.935	900*	816.33*	850*
*R1	0.780	790*	992.24*	992.24*
*R1	0.592	415*	408.13*	408.13*
*R1	0.515	599.85*	599.85*	530*
*R1	0.402	1062.83*	1062.83*	1062.83*
*R1	0.200	413.8*	413.8*	413.8*
*R1	0.122	*	*	*

River: RV WA T2

Reach	River Sta.	Left	Channel	Right
*R1	1.920	820*	815.99*	815.99*
*R1	1.765	700*	730.73*	730.73*
*R1	1.627	845.13*	845.13*	845.13*
*R1	1.467	1136.05*	1136.05*	1136.05*
*R1	1.251	883.72*	883.72*	883.72*
*R1	1.084	842.98*	842.98*	842.98*
*R1	0.924	567.38*	567.38*	567.38*
*R1	0.817	288.51*	288.51*	288.51*
*R1	0.762	249.21*	249.21*	249.21*
*R1	0.715	384.78*	384.78*	384.78*
*R1	0.642	504.17*	504.17*	504.17*
*R1	0.547	387.86*	387.86*	387.86*
*R1	0.473	567.88*	567.88*	567.88*
*R1	0.366	539.32*	539.32*	539.32*
*R1	0.264	235.83*	235.83*	235.83*
*R1	0.219	389.84*	389.84*	389.84*
*R1	0.145	424.74*	424.74*	424.74*
*R1	0.065	*	*	*

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: RV WA

Reach	River Sta.	Contr.	Expan.
*R1	9.834	.1*	.3*
*R1	9.648	.1*	.3*
*R1	9.518	.1*	.3*
*R1	9.372	.1*	.3*
*R1	9.197	.1*	.3*
*R1	9.065	.1*	.3*
*R1	8.893	.1*	.3*
*R1	8.807	.1*	.3*
*R1	8.613	.1*	.3*
*R1	8.415	.1*	.3*
*R1	8.262	.1*	.3*
*R1	8.060	.1*	.3*
*R1	7.925	.1*	.3*
*R1	7.828	.1*	.3*
*R1	7.636	.1*	.3*
*R1	7.554	.1*	.3*
*R1	7.414	.1*	.3*
*R1	7.390	.1*	.3*
*R1	7.292	.1*	.3*
*R1	7.184	.1*	.3*
*R2	7.052	.1*	.3*
*R2	7.051	.1*	.3*
*R3	7.050	.1*	.3*
*R3	7.049	.1*	.3*

River: RV WA T1

Reach	River Sta.	Contr.	Expan.
*R1	3.405	.1*	.3*
*R1	3.329	.1*	.3*
*R1	3.143	.1*	.3*
*R1	3.000	.1*	.3*
*R1	2.881	.1*	.3*
*R1	2.760	.1*	.3*
*R1	2.541	.1*	.3*
*R1	2.344	.1*	.3*
*R1	2.133	.1*	.3*
*R1	1.994	.1*	.3*
*R1	1.867	.1*	.3*
*R1	1.638	.1*	.3*
*R1	1.476	.1*	.3*
*R1	1.304	.1*	.3*
*R1	1.140	.1*	.3*
*R1	0.935	.1*	.3*
*R1	0.780	.1*	.3*
*R1	0.592	.1*	.3*

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*R1              *    0.515   *       .1*       .3*
*R1              *    0.402   *       .1*       .3*
*R1              *    0.200   *       .1*       .3*
*R1              *    0.122   *       .1*       .3*
*******************************************************
River: RV WA T2

*******************************************************
*     Reach      *   River Sta.   * Contr.  * Expan.  *
*******************************************************
*R1               *    1.920   *       .1*       .3*
*R1               *    1.765   *       .1*       .3*
*R1               *    1.627   *       .1*       .3*
*R1               *    1.467   *       .1*       .3*
*R1               *    1.251   *       .1*       .3*
*R1               *    1.084   *       .1*       .3*
*R1               *    0.924   *       .1*       .3*
*R1               *    0.817   *       .1*       .3*
*R1               *    0.762   *       .1*       .3*
*R1               *    0.715   *       .1*       .3*
*R1               *    0.642   *       .1*       .3*
*R1               *    0.547   *       .1*       .3*
*R1               *    0.473   *       .1*       .3*
*R1               *    0.366   *       .1*       .3*
*R1               *    0.264   *       .1*       .3*
*R1               *    0.219   *       .1*       .3*
*R1               *    0.145   *       .1*       .3*
*R1               *    0.065   *       .1*       .3*
*******************************************************

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

ERRORS WARNINGS AND NOTES
Errors Warnings and Notes for Plan : RV Wash 7

River: RV W7  Reach: R1     RS: 8.325     Profile: 100-YR FP
     Warning:The energy equation could not be balanced within the specified number of iterations.  The program used critical depth
             for the water surface and continued on with the calculations.
     Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
             the need for additional cross sections.
     Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
             water surface came back below critical depth.  This indicates that there is not a valid subcritical answer.  The
             program defaulted to critical depth.
     Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, water surface was
             used.
River: RV W7  Reach: R1     RS: 8.252     Profile: 100-YR FP
     Warning:The energy equation could not be balanced within the specified number of iterations.  The program used critical depth
             for the water surface and continued on with the calculations.
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
     Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
             the need for additional cross sections.
     Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
             water surface came back below critical depth.  This indicates that there is not a valid subcritical answer.  The
             program defaulted to critical depth.
     Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, water surface was
             used.
River: RV W7  Reach: R1     RS: 8.162     Profile: 100-YR FP
     Warning:The energy equation could not be balanced within the specified number of iterations.  The program used critical depth
             for the water surface and continued on with the calculations.
     Warning:Divided flow computed for this cross-section.
     Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
             the need for additional cross sections.
     Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
             water surface came back below critical depth.  This indicates that there is not a valid subcritical answer.  The
             program defaulted to critical depth.
     Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, water surface was
             used.
River: RV W7  Reach: R1     RS: 8.087     Profile: 100-YR FP
     Warning:Divided flow computed for this cross-section.
     Warning:The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for additional cross sections.
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
     Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
             the need for additional cross sections.
River: RV W7  Reach: R1     RS: 8.037     Profile: 100-YR FP
     Warning:The energy equation could not be balanced within the specified number of iterations.  The program used critical depth
             for the water surface and continued on with the calculations.
     Warning:Divided flow computed for this cross-section.
     Warning:The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for additional cross sections.
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
     Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
             the need for additional cross sections.
     Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
             water surface came back below critical depth.  This indicates that there is not a valid subcritical answer.  The
             program defaulted to critical depth.
     Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, water surface was
             used.
River: RV W7  Reach: R1     RS: 7.974     Profile: 100-YR FP
     Warning:The energy equation could not be balanced within the specified number of iterations.  The program used critical depth
             for the water surface and continued on with the calculations.
     Warning:Divided flow computed for this cross-section.
     Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
             the need for additional cross sections.
     Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
             water surface came back below critical depth.  This indicates that there is not a valid subcritical answer.  The
             program defaulted to critical depth.
     Note:   Manning's n values were composited to a single value in the main channel.
     Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, water surface was
```

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            used.
River: RV W7  Reach: R1     RS: 7.910     Profile: 100-YR FP
     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.
River: RV W7  Reach: R1     RS: 7.825     Profile: 100-YR FP
     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.
     Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, water surface was
             used.
River: RV W7  Reach: R1     RS: 7.730     Profile: 100-YR FP
     Warning:The energy equation could not be balanced within the specified number of iterations.  The program used critical depth
             for the water surface and continued on with the calculations.
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
     Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
             the need for additional cross sections.
     Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
             water surface came back below critical depth.  This indicates that there is not a valid subcritical answer.  The
             program defaulted to critical depth.
     Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, water surface was
             used.
River: RV W7  Reach: R1     RS: 7.620     Profile: 100-YR FP
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
     Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
             the need for additional cross sections.
     Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, water surface was
             used.
River: RV W7  Reach: R1     RS: 7.554     Profile: 100-YR FP
     Warning:The energy equation could not be balanced within the specified number of iterations.  The program used critical depth
             for the water surface and continued on with the calculations.
     Warning:Divided flow computed for this cross-section.
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
     Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
             the need for additional cross sections.
     Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
             water surface came back below critical depth.  This indicates that there is not a valid subcritical answer.  The
             program defaulted to critical depth.
River: RV W7  Reach: R1     RS: 7.413     Profile: 100-YR FP
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
     Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
             the need for additional cross sections.
     Note:   Manning's n values were composited to a single value in the main channel.
     Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, water surface was
             used.
River: RV W7  Reach: R1     RS: 7.318     Profile: 100-YR FP
     Warning:Divided flow computed for this cross-section.
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
     Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
             the need for additional cross sections.
     Note:   Manning's n values were composited to a single value in the main channel.
     Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, water surface was
             used.
River: RV W7  Reach: R1     RS: 7.273     Profile: 100-YR FP
     Warning:Divided flow computed for this cross-section.
River: RV W7  Reach: R1     RS: 7.271     Profile: 100-YR FP
     Warning:Divided flow computed for this cross-section.
River: RV W7  Reach: R1     RS: 7.269     Profile: 100-YR FP
     Warning:Divided flow computed for this cross-section.
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E.3.5 HEC-RAS Output

RV Wash A Tank Spillway

HEC-RAS Plan: HEC-RAS Plan: Wash A Spill River: RV WA TS Reach: R1 Profile: 100-YR FP

River	Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
RV WA TS	R1	1.378	100-YR FP	760.00	2608.55	2610.82	2610.82	2611.40	0.019028	6.14	127.88	130.18	0.97
RV WA TS	R1	1.266	100-YR FP	760.00	2592.97	2596.34	2596.26	2597.03	0.016343	6.95	125.38	91.29	0.82
RV WA TS	R1	1.058	100-YR FP	760.00	2569.82	2573.08	2573.08	2574.01	0.027898	7.73	98.28	53.02	1.00
RV WA TS	R1	0.858	100-YR FP	760.00	2542.39	2546.06	2546.06	2547.03	0.021802	7.92	95.96	49.37	1.00
RV WA TS	R1	0.663	100-YR FP	760.00	2518.63	2521.10	2520.65	2521.45	0.011582	4.78	159.11	96.23	0.65
RV WA TS	R1	0.481	100-YR FP	760.00	2502.45	2504.69	2504.59	2505.22	0.027004	5.86	129.79	99.68	0.90
RV WA TS	R1	0.355	100-YR FP	760.00	2489.81	2492.18	2491.99	2492.66	0.013950	5.70	147.23	118.82	0.76
RV WA TS	R1	0.266	100-YR FP	760.00	2481.57	2483.52	2483.07	2484.06	0.024914	6.92	149.75	174.00	0.98
RV WA TS	R1	0.098	100-YR FP	760.00	2464.14	2467.30	2467.30	2468.03	0.013548	6.95	119.81	658.52	0.90
RV WA TS	R1	0.017	100-YR FP	760.00	2455.30	2457.42	2457.42	2458.03	0.020061	6.25	121.64	102.25	1.01
RV WA TS	R1	0.015	100-YR FP	760.00	2455.00	2456.92	2456.92	2457.56	0.022983	6.39	118.89	95.69	1.01
RV WA TS	R1	0.013	100-YR FP	760.00	2454.70	2456.51	2456.51	2457.16	0.023928	6.48	117.27	90.89	1.01

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

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

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PROJECT DATA
Project Title: RV Wash A Tank Spillway
Project File : RV_Wash_A_Tank_Spillway.prj
Run Date and Time: 11/1/2007 10:07:46 AM

Project in English units

Project Description:
Rio Verde ADMP, Project FCDMC 2001C056, RV Wash A Tank Spillway. Phase 3 RAS
model started in May 2005, preliminary model completed in June 2005.

RAS
model is prepared by Dibble Engineering. Field reconnaissance per report dated
April 18, 2005.

This wash models the condition in which Black Hills Tank (a
stock tank) remains in place, and the existing spillway diverts flow to RV Wash
A Tank Spillway. RV Wash A in RV_Wash_A.prj models the condition in which Black
Hills Tank is removed, allowing all flow to continue without diversion. A
Hydraulic connection is not modeled between RV Wash A and RV Wash A Tank
Spillway. See the report for more information.

For the study washes, the
starting water surface elevation is taken from normal depth for three cross
sections repeated at ten-foot intervals. The slope-area method is the same as
the normal depth method.

RV Wash A Tank Spillway Floodplain
Delineation
From the confluence with RV Wash A in RV_Wash_A.prj (River Mile
0.000, approximately 1,800 feet north and 3,800 feet west of the intersection
of 144th Street and Rio Verde Drive) to a point approximately 380 feet upstream
of the Black Hills Tank dam (River Mile 1.463), a distance of 1.463 river
miles.

Topographic mapping is supplied by the Flood Control District of
Maricopa County.

The Cross-section data were generated by INROADS, based on
the DTM data. The mapped hydraulic base line represents the 10,000-station
point of the HEC-RAS model.

Discharge data is from the Rio Verde ADMP HEC-1
model. The original models are from the Flood Control District of Maricopa
County, prepared for the Rio Verde South Floodplain Delineation, the Rio Verde
South Extension Floodplain Delineation, the Rio Verde North Floodplain
Delineation, and the Rio Verde North Extension Floodplain Delineation. The
HEC-1 models were modified for the Rio Verde ADMP. The final HEC-1 files were
reviewed in February 2004 and FCDMC approved the hydrology model.

Hydrologic
concentration points are noted in cross-section descriptions using the
corresponding HEC-1 ID's. The flow rates have been rounded to the nearest 10
cubic feet per second (cfs). Flow rates obtained from HEC-1 are applied at the
downstream end of the relevant sub-basin and stepped upstream at cross-sections
to meet the HEC-1 flow from the upstream sub-basin.

River Mile (RM)
stationing is based upon the estimated tie in point with downstream receiving
waters or the start of two-dimensional flow models. This point represents RM
0.000. The assumed starting WS Elevation is based upon normal depth in the
study wash.

Horizontal and Vertical Coordinate Basis for this project is as
follows:
          Horizontal--Arizona State Plane, Central Region, NAD
1983
          Vertical--NAVD 1988

RAS model river naming corresponds to project
river naming as follows:
          RV WA TS = RV Wash A Tank Spillway

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

PLAN DATA

Plan Title: RV Wash A Tank Spillway
Plan File : j:\2006\10-0606.1\Design Notebook\Drainage Design\HEC-RAS\RV_Wash_A_Tank_Spillway.p01
```

```
          Geometry Title: RV Wash A Tank Spillway
          Geometry File : j:\2006\10-0606.1\Design Notebook\Drainage Design\HEC-RAS\RV_Wash_A_Tank_Spillway.g01

          Flow Title    : RV Wash A Tank Spillway
          Flow File     : j:\2006\10-0606.1\Design Notebook\Drainage Design\HEC-RAS\RV_Wash_A_Tank_Spillway.f01

Plan Summary Information:
Number of:  Cross Sections =   12    Multiple Openings  =    0
            Culverts       =    0    Inline Structures  =    0
            Bridges        =    0    Lateral Structures =    0

Computational Information
    Water surface calculation tolerance  =  0.01
    Critical depth calculation tolerance =  0.01
    Maximum number of iterations         =  20
    Maximum difference tolerance         =  0.3
    Flow tolerance factor                =  0.001

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

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

River = RV WA TS         Reach = R1
RS      Profile          Method  Value1  Value2
0.355   PF 2                   110000.54 10071.8
0.266   PF 2                   1 9978.4110024.58
0.098   PF 2                   1 9971.7210029.01
0.017   PF 2                   1 9963.5210065.76
0.015   PF 2                   1 9959.61 10055.3
0.013   PF 2                   1 9956.91 10047.8


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

FLOW DATA

Flow Title: RV Wash A Tank Spillway
Flow File : j:\2006\10-0606.1\Design Notebook\Drainage Design\HEC-RAS\RV_Wash_A_Tank_Spillway.f01

Flow Data (cfs)
*************************************************************
* River           Reach           RS      *       100-YR FP *
* RV WA TS        R1              1.378   *             760 *
*************************************************************

Boundary Conditions
*****************************************************************************************************
* River           Reach           Profile          *            Upstream                 Downstream    *
*****************************************************************************************************
* RV WA TS        R1              100-YR FP        *                                Normal S = 0.0292 *
*****************************************************************************************************

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

GEOMETRY DATA

Geometry Title: RV Wash A Tank Spillway
Geometry File : j:\2006\10-0606.1\Design Notebook\Drainage Design\HEC-RAS\RV_Wash_A_Tank_Spillway.g01

CROSS SECTION


RIVER: RV WA TS
REACH: R1                RS: 1.378

INPUT
Description: Q=760 cfs (RS2B6, 24 hr, NS_24E HEC-1 Model)
Station Elevation Data    num=      56
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
 9714.34 2615.41 9728.74 2615.29 9734.98  2615.3 9738.33 2615.29 9753.86 2615.15
 9758.59 2615.15 9761.05 2615.14  9761.1 2615.14 9764.36 2615.05 9766.01 2614.99
 9780.98 2614.66 9793.31 2614.25  9797.4 2614.23 9820.74 2613.73 9826.65 2613.57
 9837.52 2613.22 9854.84 2613.02 9863.33  2612.8  9885.1 2612.47 9904.91 2611.84
 9933.12 2610.94 9949.46 2610.71 9964.64 2610.49 9970.65 2610.36 9976.26 2610.18
 9978.13  2610.2  9987.7 2609.94   10000 2609.4710000.02 2609.4710001.16 2609.43
10025.25 2608.5510043.062609.43110049.52 2609.7510054.74 2610.0410057.07  2610.2
 10059.9 2610.3510060.73 2610.4110062.65 2610.5510080.78 2611.0910084.31 2611.38
10090.41 2611.6810096.12 2612.1210121.75 2614.9410122.78 2615.0110123.84 2615.09
10124.29 2615.13 10126.5 2615.4310135.77 2616.4910154.15 2618.8910159.24  2619.7
10161.02 2620.0710180.27 2622.33 10183.2 2622.6310189.26 2623.4610197.46 2624.33
10204.49 2625.08

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
 9714.34     .0510001.16     .0410043.06     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9964.6410062.65           592.07  592.07  592.07             .1       .3

CROSS SECTION
```

```
RIVER: RV WA TS
REACH: R1                  RS: 1.266

INPUT
Description:
Station Elevation Data     num=      26
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9921.78 2598.55 9948.69 2596.86 9973.63 2595.24 9986.352594.016 9987.86 2593.87
 9993.682593.308 9997.18 2592.97   10000 2593.3110004.38 2593.8210005.56 2593.94
10006.352594.01710018.94 2595.2410046.45 2596.2810047.46 2596.32 10050.2 2596.42
10051.35 2596.4610059.79 2596.7710061.93 2596.8310077.03 2597.2610101.25 2597.93
10112.12 2598.7310131.75 2600.1710159.97 2602.1910167.47 2602.6810198.76 2605.11
10206.88 2606.03

Manning's n Values         num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9921.78     .05 9993.68     .04   10000     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9973.6310018.94          1096.34 1096.34 1096.34             .1       .3

CROSS SECTION


RIVER: RV WA TS
REACH: R1                  RS: 1.058

INPUT
Description:
Station Elevation Data     num=      24
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9875.84 2576.68 9898.08 2577.13 9915.41 2576.29 9939.96 2575.17  9942.4  2574.9
 9944.46 2574.72 9969.19 2572.21  9984.52570.779  9984.7 2570.76 9984.752570.755
 9985.77 2570.66 9991.21 2570.08 9995.82 2569.85 9996.48 2569.82 9998.47 2569.84
   10000 2569.9510001.84 2570.08 10004.5 2570.68 10004.72570.72510004.752570.736
10009.64 2571.8410020.36 2575.1710040.11 2577.7710057.09 2579.95

Manning's n Values         num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9875.84     .05 9991.21     .0410001.84     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9939.9610020.36          1059.06 1059.06 1059.06             .1       .3

CROSS SECTION


RIVER: RV WA TS
REACH: R1                  RS: 0.858

INPUT
Description:
Station Elevation Data     num=      33
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9939.19 2554.11 9951.97 2551.69  9959.6 2550.02 9973.93 2546.13 9979.27 2544.93
  9989.1 2543.76  9989.22543.748 9995.91 2542.95 9999.98 2542.43   10000 2542.43
10000.34 2542.3910001.69 2542.5510004.192542.957 10009.12543.755 10009.22543.771
10016.33 2544.9310045.45 2549.4310049.47 2549.8610052.01 2550.0210055.42 2550.14
10057.45  2550.310089.59 2552.8810091.19 2553.0210093.84 2553.3210096.18 2553.84
10103.72 2555.2510116.18 2557.0610127.64 2558.6210139.18 2560.0410149.19 2561.02
10185.99 2565.1210199.17 2565.7710202.08 2565.92

Manning's n Values         num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9939.19     .05 9995.91     .0410004.19     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        9959.610052.01          1028.96 1028.96 1028.96             .1       .3

CROSS SECTION


RIVER: RV WA TS
REACH: R1                  RS: 0.663

INPUT
Description:
Station Elevation Data     num=      35
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9916.93 2527.11 9920.71 2527.22 9925.15 2526.84 9950.89 2525.06 9964.63 2523.21
 9986.62 2519.93 9992.43 2519.46  9996.72518.935  9996.82518.923  9996.92518.911
    99972518.899  9997.52518.838 9998.032518.773  9999.2 2518.63   10000 2518.64
10007.03 2518.77 10016.72518.925 10016.82518.927 10016.92518.929   100172518.931
 10017.52518.93910022.49 2519.0210027.07 2519.0810039.66 2519.35   10044 2519.44
10048.85 2519.5210060.66 2519.7510068.76 2519.9310074.13 2520.9110093.88 2525.17
10108.23 2527.0110132.14  2530.110139.52 2531.3710153.17 2533.7610187.86 2539.84

Manning's n Values         num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9916.93     .05  9996.7     .0410007.03     .05
```

```
Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9950.8910093.88            958.8   958.8   958.8             .1       .3

CROSS SECTION


RIVER: RV WA TS
REACH: R1                  RS: 0.481

INPUT
Description:
Station Elevation Data    num=      48
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
 9807.68  2513.7 9821.47 2511.98  9839.1 2509.89 9851.04 2509.07 9856.27 2508.83
 9869.05 2507.64 9869.88 2507.58 9874.84 2507.07 9877.49 2506.87 9901.75 2505.28
 9904.41  2505.1  9906.9 2504.94 9910.75  2504.7 9911.26 2504.67 9915.19 2504.46
 9918.12 2504.28 9925.67 2503.93 9980.952502.802  9981.22502.797  9981.52502.791
 9982.01 2502.78 9996.23 2502.49 9999.01 2502.45 9999.36 2502.45 9999.69 2502.45
   10000 2502.5210000.01 2502.5210000.952502.726 10001.22502.781 10001.52502.846
10002.012502.958 10002.2    250310012.75 2505.1110027.49 2508.3910034.65 2509.89
10041.29 2510.8210051.28 2512.1310052.71 2512.2610059.51 2513.2910061.43 2513.58
10072.54 2515.1310086.03 2516.9510087.42 2517.1310089.69 2517.3910090.28 2517.43
10091.26 2517.6610092.88  2517.910096.01 2518.32

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*************************************************
 9807.68     .05 9996.23     .0410000.01     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9901.7510012.75            664.25  664.25  664.25             .1       .3

CROSS SECTION


RIVER: RV WA TS
REACH: R1                  RS: 0.355

INPUT
Description: This cross section is identical to RM 7.925 on RV Wash A in
             RV_Wash_A.prj. The wider of the two resulting floodplains is shown
             on the work maps.
Station Elevation Data    num=     188
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
 9834.97 2498.38 9837.25  2498.4 9842.97 2498.35 9844.77 2498.35 9847.14 2498.33
 9857.51 2497.87 9861.44 2497.84 9866.59 2497.76 9868.48 2497.72 9874.78 2497.62
 9875.55 2497.61 9877.88 2497.57  9878.2 2497.57 9880.26 2497.56 9881.51 2497.48
 9884.73 2497.29 9884.79 2497.29 9887.47 2497.13 9894.55 2496.58 9899.23 2496.26
 9903.37 2495.98 9907.18 2495.72 9910.61  2495.5 9924.89 2494.82 9941.93 2493.67
 9943.03 2493.72  9946.2 2493.85  9947.8 2493.91 9949.97 2493.87 9954.43 2493.77
 9969.99 2492.78 9970.32 2492.79 9971.28 2492.65 9972.28 2492.48 9974.32 2492.55
 9977.13 2492.64 9977.38 2492.61 9978.79 2492.42 9980.37 2492.51 9980.66 2492.47
 9981.93 2492.42 9985.44 2492.27 9986.23 2492.26 9990.19 2492.09 9990.68 2492.08
 9990.81 2492.08 9995.29 2491.87 9995.33 2491.87 9995.54 2491.86 9997.36 2491.54
 9997.96 2491.47 9999.97 2491.23   10000 2491.2310000.54 2491.1610002.97 2490.89
10004.77 2490.6710004.82 2490.6610008.532490.15810010.29 2489.9210010.73 2489.86
10011.04 2489.8110017.01 2489.9210018.36 2489.9510019.56 2489.9710024.96 2490.06
10025.662490.07510026.32 2490.0910028.34 2490.15 10028.9 2490.1610033.37 2490.24
10033.732490.24510034.84 2490.2610037.53 2490.32 10044.6 2490.4510051.55 2490.59
10053.31 2490.6210059.04 2490.7410059.65 2490.7610060.05 2490.77 10071.8 2491.17
10130.94 2492.8710140.94 2493.0510141.91 2493.0610141.98 2493.0610143.71 2493.06
10144.71 2493.0610145.49 2493.08 10147.2 2493.1510148.82 2493.2110149.63 2493.24
10158.18 2493.1110159.13 2493.1510160.95 2493.2410161.41 2493.2610215.59  2492.2
10223.09 2492.1210234.14 2490.7110236.48  2490.410243.04 2491.21 10245.8 2491.54
10249.25 2491.9810253.71 2492.0210257.41 2491.9910261.67    249210267.89  2491.9
 10269.9 2492.0410270.75  2492.110274.39 2492.3510277.96  2492.6 10282.2 2492.92
10285.95 2493.1810289.97 2493.4910293.71 2493.7810293.86 2493.79 10294.2 2493.82
10307.94    249410312.06 2494.0710322.11 2494.2110330.78 2494.3810336.06 2494.46
10349.27 2494.7310349.44 2494.7410349.63 2494.7410350.47 2494.7710369.63 2494.57
10376.42 2494.47 10376.5 2494.4710391.28 2494.26 10405.1 2494.0510428.74 2493.73
 10431.4 2493.7110441.66 2493.5610448.19 2493.5510453.82 2493.5410457.95 2493.54
 10461.9 2493.5810498.27  2494.1 10555.8 2494.4910562.02 2494.4910589.83 2494.44
 10591.5 2494.4510593.75 2494.4710596.35 2494.4910599.33 2494.4710602.87 2494.44
10607.17 2494.3910612.48 2494.3210619.27  2494.210628.32 2494.0510640.99 2493.83
10653.58 2493.6910653.65 2493.6810662.22 2493.7410667.46 2493.7810668.62 2493.79
10671.04 2493.81 10671.6 2493.84 10673.9 2493.9510679.41 2494.2310689.34 2493.61
10692.78 2493.42 10705.1 2493.4910710.03  2493.510714.34 2493.6110720.56 2493.77
10724.34 2493.7310731.41 2493.65 10736.5 2493.6110768.81 2493.8410770.48 2493.74
10794.44 2493.2810802.21  2493.210818.42 2493.0610824.28 2493.0710825.38 2493.06
10825.67 2493.0610826.85 2493.0610827.86 2493.0510837.64 2492.8210871.23 2494.46
10875.07  2494.710878.53 2494.94 10883.7 2495.4110904.81 2497.8810923.21 2500.02
10925.71 2499.7310938.61 2499.59 10940.3 2499.93

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*************************************************
 9834.97     .0510008.53     .04 10028.9     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
      10000.54 10071.8           469.85  469.85  469.85             .1       .3
Right Levee     Station=10161.41      Elevation= 2493.26

CROSS SECTION


RIVER: RV WA TS
REACH: R1                  RS: 0.266
```

```
INPUT
Description: This cross section is identical to RM 7.828 on RV Wash A in
             RV_Wash_A.prj. The wider of the two resulting floodplains is shown
             on the work maps.
Station Elevation Data    num=     204
     Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev
*****************************************************************************************
 9874.15 2494.15 9879.24 2493.79 9884.55 2493.41  9886.1  2493.3 9886.49 2493.27
 9888.01 2493.12 9888.35 2493.05  9890.7 2492.69  9895.6 2492.01 9904.81 2491.33
  9914.1 2490.94 9919.08 2490.77 9919.89 2490.74 9923.79 2490.56 9924.47 2490.55
 9935.48 2490.42 9947.06 2488.62 9952.72 2487.75 9955.76 2487.28 9957.17 2487.06
 9957.68 2486.97 9959.06 2486.74 9971.57  2484.4 9971.91 2484.33 9974.09 2483.85
 9978.41  2482.9 9981.862482.143 9984.06 2481.66 9991.13 2481.62   10000 2481.61
10000.04 2481.6110000.71 2481.6110005.26 2481.5710005.45  2481.610006.31 2481.66
10017.57 2482.4410024.58  2482.910052.98 2482.8810078.93 2483.02 10084.2 2483.04
10089.88 2483.0810096.86 2481.8810099.56 2481.4110100.37 2481.5310102.29 2481.79
10107.01 2482.4410112.46  2483.110112.52 2483.1110112.92 2483.1110113.18  2483.1
10113.44 2483.0710115.27 2483.08 10120.2 2483.0410122.47 2483.0210225.68 2484.91
10232.35 2485.1510233.14 2485.1810236.32  2485.310247.17 2486.06 10250.8 2486.28
10259.91  2486.910268.92 2487.4310273.19  2487.710291.85 2488.7810295.63 2489.01
10302.63 2489.41 10303.1 2489.4410305.21 2489.3210339.33 2487.3710361.63 2486.15
10364.89 2486.0210364.94 2486.0110374.62 2485.5510380.62 2485.2510382.85 2485.25
 10392.4 2485.2310392.58 2485.2310399.33 2485.17 10414.6 2485.0310460.34 2484.79
10464.23 2484.6610465.71 2484.61 10468.7 2484.37 10474.4  2483.9 10478.7 2483.55
10480.97 2483.3610494.01 2484.3310498.38 2484.6210506.51 2484.4410514.47 2484.27
10519.13 2484.17 10522.2  2484.110524.38 2484.0610525.57 2484.03   10526 2484.02
10541.52 2483.8810543.06 2483.8610543.33 2483.8710545.97 2483.9310556.03 2484.17
10563.73 2484.3410567.59  2484.510568.51 2484.5410575.64 2483.8210582.98 2482.75
10583.37 2482.7810584.59 2482.8910592.51 2483.6210595.86 2484.0510598.29 2484.12
10600.48 2484.1410616.38 2484.4410620.68  2484.210625.35 2484.2310632.82 2484.45
10632.83  2484.510634.91 2484.3410647.45 2483.3810655.06 2483.8810662.18 2484.34
10663.57 2484.4310666.37 2484.5110666.88 2484.5110671.32 2484.6110672.55  2484.6
10720.97 2484.2710724.49 2484.2410724.83 2484.2410726.31 2484.2410728.18 2484.23
10734.02 2484.2110736.06  2484.210738.16 2484.2110740.33 2484.2210771.98 2484.32
10777.38 2484.3410777.88 2484.3310780.93 2484.3110784.05 2484.2910787.27 2484.27
10790.58 2484.2410790.85 2484.2510795.84 2484.37 10799.3 2484.3510800.85 2484.33
10804.38  2484.310805.19  2484.310806.66 2484.2810809.46 2484.2610810.87 2484.24
10818.45 2483.7810821.56 2483.7610824.78 2483.7410828.12 2483.7210836.69 2483.57
10839.44 2483.4410840.73 2483.4310844.39 2483.21 10844.5 2483.2110844.57 2483.21
10844.67  2483.210845.54 2483.1710850.67 2483.0710859.91 2482.8810861.24    2483
10881.75 2485.0910882.63 2485.1410883.71 2485.2910887.38 2485.5110888.52 2485.65
10892.61 2485.8810893.39 2485.9710897.82 2486.2110898.31 2486.2610903.03 2486.49
10903.26 2486.5210908.23 2486.7510919.22 2487.0110921.31 2487.1410923.35 2487.29
10924.24 2487.3910928.51 2487.7210935.17 2489.0510936.25  2489.1 10937.7 2489.16
10940.88 2489.3210943.14 2489.4210945.52 2489.5410948.58 2489.6610950.18 2489.74
 10953.5 2489.87   10954 2489.8910954.84 2489.9310959.43 2490.1110959.49 2490.12
10959.88 2490.1310964.43 2490.6310964.58 2490.64 10969.4 2491.1710969.55 2491.18
10969.73 2491.1910974.37 2491.6810974.86 2491.6910979.05 2492.12

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*****************************************************************************************
 9874.15     .05 9984.06     .0410006.31     .0510634.91     .0410662.18     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9978.4110024.58           891.41  891.41  891.41             .1       .3
Right Levee     Station=10302.63      Elevation= 2489.41

CROSS SECTION


RIVER: RV WA TS
REACH: R1                 RS: 0.098

INPUT
Description: This cross section is identical to RM 7.636 on RV Wash A in
             RV_Wash_A.prj. The wider of the two resulting floodplains is shown
             on the work maps.
Station Elevation Data    num=     166
     Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev      Sta     Elev
*****************************************************************************************
 9703.79 2474.17 9707.26 2473.95 9709.75 2473.79  9710.8 2473.71 9711.46 2473.62
 9753.64 2469.03 9761.47 2468.17 9767.06 2467.64 9767.25 2467.62 9771.81 2467.25
 9776.81 2466.85 9795.37 2465.32 9799.36 2464.98 9801.34 2464.83 9801.38 2464.82
 9806.66 2464.33 9808.32 2464.24  9810.5  2464.1 9815.19 2463.79  9816.9 2463.65
 9819.83 2464.29 9823.06 2464.75 9826.04 2465.28 9827.72 2465.48 9830.89 2465.84
 9833.65  2465.9 9836.07 2465.95 9837.67 2465.94 9841.41 2465.91 9844.82 2465.89
 9847.95 2465.87 9850.08 2465.86 9902.71 2467.42 9914.62 2467.58 9938.05 2467.17
 9938.84 2467.15 9942.75  2467.1 9948.63 2467.01 9958.35 2466.87 9971.72 2466.67
 9978.962465.799  9980.7 2465.59 9990.97 2464.23 9991.38 2464.18 9991.66 2464.14
   10000 2464.5610000.28 2464.5710004.34 2464.7810007.782465.10910015.012465.799
10022.24 2466.4910022.932466.66610023.26 2466.7510023.39 2466.7510023.61 2466.75
10023.76 2466.7710024.17  2466.8 10027.4    246710029.01  2467.110029.89 2467.11
10091.43 2465.8410095.91 2465.7910097.37 2465.7810099.13 2465.7110101.57 2465.63
10103.36 2465.5610103.48 2465.56   10105 2465.5510105.47 2465.5510118.49 2465.33
10119.13 2465.3610120.22 2465.4110122.41  2465.510126.43 2465.6810130.32 2465.13
10136.07 2464.3210141.51 2464.9510147.54  2465.510178.87 2465.3110179.27 2465.31
10194.65 2465.2610200.94 2465.2410204.36 2465.22 10206.5 2465.2210207.99 2465.21
10209.11 2465.2110209.99 2465.21 10210.7 2465.2110211.28 2465.2110211.77 2465.21
10212.19 2465.2110212.56 2465.21 10216.4 2465.2110278.28 2465.46 10301.5 2465.41
10302.61 2465.38 10303.6 2465.3510304.49 2465.3310316.13 2465.2810323.66 2465.25
10323.93 2465.2410325.19 2465.2110326.73 2465.18 10327.9 2465.1510328.72 2465.16
10331.39 2465.2110333.73 2465.25   10335 2465.2410340.04 2465.2210347.23 2465.18
10358.28 2465.1310377.35 2465.0410377.38 2465.04 10377.4 2465.0310383.03 2464.17
10388.04  2463.510388.27 2463.4610388.52 2463.4310389.88 2463.2510395.04 2464.09
10397.59  2464.510405.34 2464.62 10418.9 2464.8710419.85  2464.710420.24 2464.63
10426.53 2463.53   10430 2462.9110435.46 2463.46 10445.3 2464.4310445.67 2464.42
10448.03 2464.3210448.25 2464.3210462.11 2465.1910465.63 2465.3710469.42 2465.51
10470.01 2465.5410471.21 2465.5710477.41 2464.7510481.95 2464.15 10486.1 2464.61
10486.492464.659 10490.7 2465.1910497.49 2465.2210505.73 2465.2510506.29 2465.25
```

```
10511.28 2465.3110515.28 2465.3610515.59 2465.3610553.81 2465.4110556.99 2465.43
10583.09 2466.9610598.94  2467.910602.31  2468.110608.53 2468.46 10622.8 2469.18
10625.21  2469.310625.52 2469.3210626.53 2469.3710627.04 2469.3910630.12 2469.62
10630.58 2469.6710631.44 2469.7610631.58 2469.7710633.85 2469.9610647.69 2471.15
10647.76 2471.14

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*****************************************************************************
 9703.79     .05 9978.96     .0410015.01     .0510477.41     .0410486.49     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9971.7210029.01           422.92  422.92  422.92             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
10029.9510647.76 2467.46       F
Left Levee      Station= 9914.63      Elevation= 2467.58

CROSS SECTION


RIVER: RV WA TS
REACH: R1                 RS: 0.017

INPUT
Description: This cross section is identical to RM 7.554 on RV Wash A in
             RV_Wash_A.prj. The wider of the two resulting floodplains is shown
             on the work maps.
Station Elevation Data    num=      71
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
 9863.31  2460.9 9864.56  2460.9 9868.97 2460.92 9873.86 2460.94 9879.34 2460.97
 9879.76 2460.96 9885.55  2460.9 9886.02  2460.9  9890.5  2460.8 9890.95  2460.8
 9895.32 2460.71 9896.26 2460.69 9900.14 2460.61 9901.57  2460.6 9904.95 2460.53
 9906.88  2460.5 9909.75 2460.45 9912.21 2460.42 9912.77 2460.41 9912.91 2460.41
 9914.72 2460.31 9917.51 2460.23 9919.41 2460.12  9922.8 2460.04 9924.25 2459.97
 9928.11 2459.88 9929.09 2459.83 9933.41 2459.74 9933.92 2459.71 9938.73 2459.63
  9938.8 2459.63  9938.9 2459.62 9945.02 2459.13 9945.69  2459.1  9950.9 2458.71
 9954.92  2458.4 9958.12 2458.16 9960.71 2457.95 9969.46  2456.3 9971.29  2456.1
 9972.39 2455.98 9972.74 2455.95  9973.9 2455.86 9974.86 2455.77 9976.09 2455.73
 9978.39 2455.66  9980.5 2455.49   10000 2455.3410002.59 2455.3210007.95  2455.3
10009.39 2455.49 10019.7 2456.8510020.42 2456.9310020.85 2456.89 10022.2 2456.87
10022.85 2456.8810025.83 2456.8310031.032456.75210043.13 2456.5710044.01 2456.57
10046.27 2456.6410052.662456.75310059.25 2456.8710060.72 2456.9110073.54 2458.21
10129.36 2463.7910129.45 2463.7910130.71 2464.0110132.48 2463.8710135.34 2463.66
 10137.4  2463.5

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*****************************************************************************
 9863.31     .05  9980.5     .0410009.39     .0510031.03     .0410052.66     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9960.7110073.54               10      10      10             .1       .3

CROSS SECTION


RIVER: RV WA TS
REACH: R1                 RS: 0.015

INPUT
Description: This cross section is one of two cross sections added to the
             downstream end of the model to establish the starting water
             surface elevation using the normal depth calculations. This cross
             section is not plotted on the work maps, nor is used in plotting
             the base flood elevations. Attempts to remove the negative
             surcharge of the floodway profile were unsuccessful.
Station Elevation Data    num=      60
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
 9856.33 2460.56 9859.41 2460.56 9861.11 2460.54 9864.24 2460.54 9866.42 2460.52
 9869.07 2460.52 9871.72 2460.49  9873.9 2460.49 9876.89 2460.45 9877.02 2460.45
 9877.16 2460.45 9878.72 2460.42 9882.34 2460.36 9883.52 2460.33 9887.66 2460.27
 9888.33 2460.25 9892.99 2460.18 9893.12 2460.18 9894.38 2460.16 9896.45 2460.22
 9898.79 2460.28 9907.37 2459.87  9913.9 2459.72 9914.23 2459.72 9919.68 2459.53
 9925.01 2459.35 9929.98 2459.18 9937.97 2459.07 9941.73 2458.95  9945.2 2458.77
 9947.56  2458.7 9952.63 2458.41  9952.7  2458.4 9952.82 2458.39 9953.13 2458.34
  9954.4 2458.05 9964.79  2455.8 9966.96 2455.24  9981.9 2455.06  9992.9 2455.02
   10000 2455.0110001.63    245510002.22 2455.0110003.83    245510004.382455.059
10011.09 2455.7810011.43  2455.810019.71 2456.3410022.45 2456.2610025.05 2456.17
10035.58 2455.81 10043.3 2456.0810044.682456.16810054.96 2456.8210054.98 2456.89
10070.57  2458.410086.27 2459.9210122.73 2463.3510125.58 2463.1410130.43  2462.9

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*****************************************************************************
 9856.33     .05  9981.9     .0410004.38     .0510025.05     .0410044.68     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9952.6310070.57            11.74   11.74   11.74             .1       .3

CROSS SECTION


RIVER: RV WA TS
REACH: R1                 RS: 0.013

INPUT
Description: This cross section is one of two cross sections added to the
```

downstream end of the model to establish the starting water surface elevation using the normal depth calculations. This cross section is not plotted on the work maps, nor is used in plotting the base flood elevations.

```
Station Elevation Data    num=      59
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9850.17 2460.19  9853.2 2460.16 9853.31 2460.16 9853.33 2460.16 9853.34 2460.16
 9858.23 2460.24 9859.33 2460.28 9863.16 2460.36  9865.3 2460.45 9868.08 2460.52
 9871.17 2460.66 9872.87 2460.71 9872.94 2460.71 9874.17 2460.74 9875.05 2460.77
 9875.73 2460.78 9876.27  2460.8  9876.7 2460.81 9920.18 2458.74 9924.27 2458.65
 9924.48 2458.64  9927.9 2458.53 9931.24 2458.41 9934.35 2458.31 9950.85 2458.07
 9950.96 2458.08 9951.36 2458.11 9959.18 2455.85 9960.29 2455.56 9961.75 2455.14
 9963.44 2454.73 9964.09  2454.8 9970.28 2454.78 9972.29 2454.78 9979.78 2454.82
 9984.78 2454.79 9989.11 2454.81 9997.31 2454.73   10000 2454.7110000.54  2454.7
10002.68 2454.8310007.77 2455.1210015.03 2455.3710017.47 2455.4710019.68 2455.57
10023.15  2455.410027.32 2455.2110032.942455.566 10044.7 2456.3110050.21 2456.66
10050.27 2456.6710065.74 2458.1110097.42 2461.0610103.11 2461.5710116.65  2462.8
 10116.9 2462.8310119.17 2462.7210123.08 2462.5910124.28 2462.53

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
 9850.17     .05 9979.78     .0410002.68     .0510019.68     .0410032.94     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9951.3610065.74                 0       0       0              .1       .3

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

SUMMARY OF MANNING'S N VALUES

River:RV WA TS
*******************************************************************************
*     Reach       *   River Sta.   *   n1    *   n2    *   n3    *   n4    *   n5    *
*******************************************************************************
*R1                *    1.378       *      .05*      .04*      .05*         *         *
*R1                *    1.266       *      .05*      .04*      .05*         *         *
*R1                *    1.058       *      .05*      .04*      .05*         *         *
*R1                *    0.858       *      .05*      .04*      .05*         *         *
*R1                *    0.663       *      .05*      .04*      .05*         *         *
*R1                *    0.481       *      .05*      .04*      .05*         *         *
*R1                *    0.355       *      .05*      .04*      .05*         *         *
*R1                *    0.266       *      .05*      .04*      .05*      .04*      .05*
*R1                *    0.098       *      .05*      .04*      .05*      .04*      .05*
*R1                *    0.017       *      .05*      .04*      .05*      .04*      .05*
*R1                *    0.015       *      .05*      .04*      .05*      .04*      .05*
*R1                *    0.013       *      .05*      .04*      .05*      .04*      .05*
*******************************************************************************

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

SUMMARY OF REACH LENGTHS

River: RV WA TS
*****************************************************************
*     Reach       *   River Sta.   *  Left    * Channel *  Right  *
*****************************************************************
*R1                *    1.378       *   592.07*   592.07*   592.07*
*R1                *    1.266       *  1096.34*  1096.34*  1096.34*
*R1                *    1.058       *  1059.06*  1059.06*  1059.06*
*R1                *    0.858       *  1028.96*  1028.96*  1028.96*
*R1                *    0.663       *    958.8*    958.8*    958.8*
*R1                *    0.481       *   664.25*   664.25*   664.25*
*R1                *    0.355       *   469.85*   469.85*   469.85*
*R1                *    0.266       *   891.41*   891.41*   891.41*
*R1                *    0.098       *   422.92*   422.92*   422.92*
*R1                *    0.017       *       10*       10*       10*
*R1                *    0.015       *    11.74*    11.74*    11.74*
*R1                *    0.013       *        0*        0*        0*
*****************************************************************

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

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: RV WA TS

*******************************************************
*     Reach       *   River Sta.   * Contr.  * Expan.  *
*******************************************************
*R1                *    1.378   *       .1*       .3*
*R1                *    1.266   *       .1*       .3*
*R1                *    1.058   *       .1*       .3*
*R1                *    0.858   *       .1*       .3*
*R1                *    0.663   *       .1*       .3*
*R1                *    0.481   *       .1*       .3*
*R1                *    0.355   *       .1*       .3*
*R1                *    0.266   *       .1*       .3*
*R1                *    0.098   *       .1*       .3*
*R1                *    0.017   *       .1*       .3*
*R1                *    0.015   *       .1*       .3*
*R1                *    0.013   *       .1*       .3*
*******************************************************

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

ERRORS WARNINGS AND NOTES
Errors Warnings and Notes for Plan : Wash A Spill

River: RV WA TS  Reach: R1     RS: 1.378     Profile: 100-YR FP
```

```
    Warning:The energy equation could not be balanced within the specified number of iterations.  The program used critical depth
            for the water surface and continued on with the calculations.
    Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
            the need for additional cross sections.
    Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
            water surface came back below critical depth.  This indicates that there is not a valid subcritical answer.  The
            program defaulted to critical depth.
River: RV WA TS  Reach: R1     RS: 1.266     Profile: 100-YR FP
    Warning:The energy loss was 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: RV WA TS  Reach: R1     RS: 1.058     Profile: 100-YR FP
    Warning:The energy equation could not be balanced within the specified number of iterations.  The program used critical depth
            for the water surface and continued on with the calculations.
    Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
            the need for additional cross sections.
    Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
            water surface came back below critical depth.  This indicates that there is not a valid subcritical answer.  The
            program defaulted to critical depth.
    Note:   Manning's n values were composited to a single value in the main channel.
River: RV WA TS  Reach: R1     RS: 0.858     Profile: 100-YR FP
    Warning:The energy equation could not be balanced within the specified number of iterations.  The program used critical depth
            for the water surface and continued on with the calculations.
    Warning:The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for additional cross sections.
    Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
            the need for additional cross sections.
    Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
            water surface came back below critical depth.  This indicates that there is not a valid subcritical answer.  The
            program defaulted to critical depth.
River: RV WA TS  Reach: R1     RS: 0.663     Profile: 100-YR FP
    Warning:The conveyance ratio (upstream 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: RV WA TS  Reach: R1     RS: 0.481     Profile: 100-YR FP
    Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
            the need for additional cross sections.
    Note:   Manning's n values were composited to a single value in the main channel.
River: RV WA TS  Reach: R1     RS: 0.355     Profile: 100-YR FP
    Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
            the need for additional cross sections.
    Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, water surface was
            used.
River: RV WA TS  Reach: R1     RS: 0.266     Profile: 100-YR FP
    Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
            the need for additional cross sections.
    Note:   Manning's n values were composited to a single value in the main channel.
    Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, water surface was
            used.
River: RV WA TS  Reach: R1     RS: 0.098     Profile: 100-YR FP
    Warning:The energy equation could not be balanced within the specified number of iterations.  The program used critical depth
            for the water surface and continued on with the calculations.
    Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
            the need for additional cross sections.
    Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
            water surface came back below critical depth.  This indicates that there is not a valid subcritical answer.  The
            program defaulted to critical depth.
    Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, water surface was
            used.
River: RV WA TS  Reach: R1     RS: 0.017     Profile: 100-YR FP
    Warning:The energy equation could not be balanced within the specified number of iterations.  The program selected the water
            surface that had the least amount of error between computed and assumed values.
    Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
            water surface came back below critical depth.  This indicates that there is not a valid subcritical answer.  The
            program defaulted to critical depth.
River: RV WA TS  Reach: R1     RS: 0.015     Profile: 100-YR FP
    Warning:The energy equation could not be balanced within the specified number of iterations.  The program selected the water
            surface that had the least amount of error between computed and assumed values.
    Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
            water surface came back below critical depth.  This indicates that there is not a valid subcritical answer.  The
            program defaulted to critical depth.
River: RV WA TS  Reach: R1     RS: 0.013     Profile: 100-YR FP
    Warning:Slope too steep for slope area to converge during supercritical flow calculations (normal depth is below critical
            depth). Water surface set to critical depth.
```

E.3.6 HEC-RAS Output

RV Wash I

HEC-RAS Plan: Wash I Profile: 100-YR FP

River	Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
RV WI T3	R1	0.797	100-YR FP	430.00	2552.69	2555.16	2555.06	2555.72	0.020472	6.15	75.89	66.55	0.84
RV WI T3	R1	0.760	100-YR FP	430.00	2548.94	2550.29	2550.27	2550.71	0.032531	5.16	83.59	98.00	0.96
RV WI T3	R1	0.656	100-YR FP	500.00	2535.41	2538.35	2538.35	2538.79	0.016106	6.09	119.99	143.58	0.75
RV WI T3	R1	0.552	100-YR FP	500.00	2523.27	2525.47	2525.43	2526.12	0.027110	6.50	76.90	55.13	0.97
RV WI T3	R1	0.475	100-YR FP	500.00	2513.82	2517.01	2517.01	2517.48	0.016785	5.82	105.13	272.39	0.77
RV WI T3	R1	0.380	100-YR FP	500.00	2504.00	2505.83	2505.66	2506.07	0.024488	4.53	136.92	213.30	0.83
RV WI T3	R1	0.277	100-YR FP	500.00	2490.17	2492.92	2492.92	2493.21	0.021137	5.10	144.04	285.92	0.80
RV WI T3	R1	0.186	100-YR FP	510.00	2479.84	2481.66	2481.53	2481.98	0.024593	5.42	116.01	120.02	0.84
RV WI T3	R1	0.098	100-YR FP	510.00	2468.21	2470.79	2470.71	2471.29	0.020734	5.90	97.67	90.29	0.82
RV WI	R1	7.262	100-YR FP	360.00	2565.38	2567.42	2567.30	2567.67	0.019905	4.58	97.74	137.10	0.76
RV WI	R1	7.217	100-YR FP	360.00	2559.26	2560.99	2560.99	2561.41	0.031775	5.21	69.79	180.33	0.99
RV WI	R1	7.127	100-YR FP	600.00	2547.70	2550.51	2550.51	2550.93	0.017305	5.94	140.09	153.30	0.76
RV WI	R1	7.042	100-YR FP	600.00	2536.99	2539.59	2539.59	2539.95	0.021386	5.93	148.77	190.03	0.82
RV WI	R1	6.961	100-YR FP	600.00	2527.98	2529.10	2528.99	2529.28	0.020240	3.88	186.93	312.69	0.73
RV WI	R1	6.898	100-YR FP	600.00	2519.61	2521.46	2521.46	2521.80	0.030010	5.74	142.85	209.15	0.98
RV WI	R1	6.797	100-YR FP	600.00	2504.78	2506.76	2506.76	2507.19	0.024056	6.08	130.15	148.17	0.88
RV WI	R1	6.681	100-YR FP	600.00	2489.23	2490.86	2490.66	2491.09	0.019037	3.70	155.46	179.54	0.72
RV WI	R1	6.613	100-YR FP	600.00	2480.09	2481.83	2481.80	2482.18	0.034009	5.47	131.32	172.81	1.01
RV WI	R1	6.526	100-YR FP	600.00	2468.64	2470.18	2470.01	2470.41	0.019823	4.38	162.20	185.98	0.72
RV WI	R2	6.453	100-YR FP	1110.00	2457.26	2459.72	2459.72	2460.50	0.029642	7.11	159.27	211.99	0.97
RV WI	R2	6.446	100-YR FP	1110.00	2454.45	2458.40	2456.84	2458.79	0.005172	5.06	225.85	263.92	0.45
RV WI	R2	6.439		Culvert									
RV WI	R2	6.435	100-YR FP	1110.00	2453.62	2456.67	2456.03	2457.32	0.011868	6.54	174.30	130.67	0.67
RV WI	R2	6.423	100-YR FP	1110.00	2453.24	2456.11	2455.72	2456.49	0.011623	5.82	242.17	152.44	0.65

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

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

****

PROJECT DATA
Project Title: RV Wash I
Project File : RV_Wash_I.prj
Run Date and Time: 11/1/2007 10:08:07 PM

Project in English units

Project Description:
Rio Verde ADMP, Project FCDMC 2001C056, river system including RV Wash I and RV Wash I Trib 3. Phase 3 RAS model started in June 2005, preliminary model completed in August 2005.

RAS model is prepared by Dibble Engineering. Field reconnaissance per report dated April 18, 2005.

For the study washes, the starting water surface elevation is on RV Wash I, and is taken from the starting water surface elevation as provided by the Flood Control District of Maricopa County.

RV Wash I Floodplain Delineation
From a point approximately 1,100 feet south and 1,500 feet west of the intersection of 144th Street and Lone Mountain Road (River Mile 6.418) to a point approximately 3,100 feet north and 450 feet west of the intersection of 136th Street and Lone Mountain Road (River Mile 7.262), a distance of 0.844 river miles.

RV Wash I
Trib 3 Floodplain Delineation
From the confluence with RV Wash I at the culvert crossing 142nd Street (River Mile 0.000, approximately 1,200 feet south and 1,600 feet west of the intersection of 144th Street and Lone Mountain Road) to a point approximately 400 feet south and 200 feet west of the intersection of 136th Street and Westland Drive (River Mile 0.797), a distance of 0.797 river miles.

The Cross-section data were generated by INROADS. The mapped hydraulic base line represents the 10,000-station point of the HEC-RAS model.

Topographic mapping is supplied by the Flood Control District of Maricopa County.

Discharge data is from the Rio Verde ADMP HEC-1 model. The original models are from the Flood Control District of Maricopa County, prepared for the Rio Verde South Floodplain Delineation, the Rio Verde South Extension Floodplain Delineation, the Rio Verde North Floodplain Delineation, and the Rio Verde North Extension Floodplain Delineation. The HEC-1 models were modified for the Rio Verde ADMP. The final HEC-1 files were received in February 2004 and FCDMC approved the hydrology model.

Hydrologic concentration points are noted in cross-section descriptions using the corresponding HEC-1 ID's. The flow rates have been rounded to the nearest 10 cubic feet per second (cfs). Flow rates obtained from HEC-1 are applied at the downstream end of the relevant sub-basin and stepped upstream at cross-sections to meet the HEC-1 flow from the upstream sub-basin.

Flowrates were modified from the approved hydrology model to accurately depict flowrates in the two separate washes which are both contained in basin 4N. The additional flow from this basin was proportioned to RV Wash I and RV Wash I Trib 3 based on their tributary areas.

River Mile (RM) stationing is based upon the estimated tie in point with downstream receiving waters or the start of two-dimensional flow models. This point represents RM 0.000. The assumed starting WS Elevation is based upon normal depth in the study wash.

Horizontal and Vertical Coordinate Basis for this project is as follows:
Horizontal--Arizona State Plane, Central Region, NAD 1983
Vertical--NAVD 1988

RAS model river naming corresponds to project river naming as follows:
RV WI = RV Wash I
RV WI T3 = RV Wash I Trib 3

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PLAN DATA

Plan Title: RV Wash I
Plan File : j:\2006\10-0606.1\Design Notebook\Drainage Design\HEC-RAS\RV_Wash_I.p01

          Geometry Title: RV Wash I
          Geometry File : j:\2006\10-0606.1\Design Notebook\Drainage Design\HEC-RAS\RV_Wash_I.g01

          Flow Title    : RV Wash I
          Flow File     : j:\2006\10-0606.1\Design Notebook\Drainage Design\HEC-RAS\RV_Wash_I.f01

Plan Summary Information:
Number of:  Cross Sections =   23    Multiple Openings  =    0
            Culverts       =    1    Inline Structures  =    0
            Bridges        =    0    Lateral Structures =    0

Computational Information
    Water surface calculation tolerance  =  0.01
    Critical depth calculation tolerance =  0.01
    Maximum number of iterations         =  20
    Maximum difference tolerance         =  0.3
    Flow tolerance factor                =  0.001

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

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

River = RV WI            Reach = R1
RS      Profile           Method  Value1  Value2
7.262   PF 2                   1 9971.8710018.58
7.217   PF 2                   1  9969.310049.04
7.127   PF 2                   1 9982.9810020.88
7.042   PF 2                   1 9982.8910032.92
6.961   PF 2                   1 9964.5610042.14
6.898   PF 2                   1 9978.0610044.79
6.797   PF 2                   1 9971.8410016.39
6.681   PF 2                   1  9981.910053.49
6.613   PF 2                   1 9952.1110024.62
6.526   PF 2                   1 9953.2510017.19

River = RV WI            Reach = R2
RS      Profile           Method  Value1  Value2
6.453   PF 2                   1 9982.2610075.83
6.446   PF 2                   1 9983.8710037.96
6.435   PF 2                   1 9985.1310045.03
6.423   PF 2                   1 9975.3610031.01
6.421   PF 2                   1 9967.07 10022.1
6.418   PF 2                   1 9966.6510034.16

River = RV WI T3         Reach = R1
RS      Profile           Method  Value1  Value2
0.797   PF 2                   1 9983.94 10024.1
0.760   PF 2                   1 9932.9510026.09
0.656   PF 2                   1 9984.2910013.75
0.552   PF 2                   1 9967.3910022.52
0.475   PF 2                   1 9977.12 10019.2
0.380   PF 2                   1 9979.4410055.76
0.277   PF 2                   1    9966 10016.3
0.186   PF 2                   1 9969.9210007.89
0.098   PF 2                   1 9970.8610019.45


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

FLOW DATA

Flow Title: RV Wash I
Flow File : j:\2006\10-0606.1\Design Notebook\Drainage Design\HEC-RAS\RV_Wash_I.f01

Flow Data (cfs)
*************************************************************
* River           Reach           RS      *       100-YR FP *
* RV WI           R1              7.262   *             360 *
* RV WI           R1              7.127   *             600 *
* RV WI           R2              6.453   *            1110 *
* RV WI T3        R1              0.797   *             430 *
* RV WI T3        R1              0.656   *             500 *
* RV WI T3        R1              0.186   *             510 *
*************************************************************

Boundary Conditions
*****************************************************************************************************
* River           Reach           Profile          *            Upstream                 Downstream    *
*****************************************************************************************************
* RV WI           R1              100-YR FP        *              Critical                             *
* RV WI           R2              100-YR FP        *                                 Known WS = 2456.11 *
* RV WI T3        R1              100-YR FP        *              Critical                             *
*****************************************************************************************************

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GEOMETRY DATA

Geometry Title: RV Wash I
Geometry File : j:\2006\10-0606.1\Design Notebook\Drainage Design\HEC-RAS\RV_Wash_I.g01

Reach Connection Table

River	Reach	Upstream Boundary	Downstream Boundary
RV WI	R1		J1
RV WI	R2	J1	
RV WI T3	R1		J1

JUNCTION INFORMATION

Name: J1
Description:
Energy computation Method

Length across Junction River	Reach	Tributary River	Reach	Length	Angle
RV WI	R1	to RV WI	R2	386.33	
RV WI T3	R1	to RV WI	R2	409.01	

CROSS SECTION

RIVER: RV WI
REACH: R1 RS: 7.262

INPUT
Description: Q=360 cfs (2N, 24 hr)
Station Elevation Data num= 90

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9911.18	2568.06	9911.28	2568.05	9912.62	2568	9912.87	2567.99	9913.23	2567.98
9913.73	2567.97	9914.72	2567.93	9915.09	2567.92	9915.4	2567.91	9916.45	2567.89
9928.5	2567.39	9930.8	2567.3	9937.36	2567.08	9937.96	2567.06	9943.61	2566.8
9943.74	2566.79	9945.7	2566.8	9946.94	2566.71	9946.99	2566.71	9947.12	2566.7
9947.32	2566.69	9947.54	2566.68	9947.79	2566.66	9952.46	2566.35	9952.76	2566.33
9953.28	2566.3	9957.37	2566	9957.52	2566	9957.57	2566	9957.7	2566
9957.74	2566	9958.2	2565.96	9959	2565.9	9961.47	2565.71	9962.45	2565.92
9962.83	2566	9963.77	2566.17	9968.59	2567.16	9971.87	2567.046	9975.77	2566.91
9976.74	2566.88	9977.83	2566.84	9986.01	2566.51	9989.21	2566.28	9990.6	2566.18
9993.15	2566	9993.2	2566	9995.66	2565.82	9995.91	2565.8	9997.36	2565.7
9998.28	2565.64	10002	2565.38	10005.85	2565.77	10006.83	2565.87	10008.09	2566
10008.1	2566	10014.67	2566.67	10016.13	2566.82	10016.78	2566.88	10017.19	2566.92
10018.58	2567.05	10023.04	2567.01	10023.19	2567.01	10023.31	2567.01	10034.55	2566.98
10034.77	2566.98	10035.01	2566.98	10036.7	2566.99	10071.96	2567.52	10071.97	2567.52
10073.01	2567.49	10074.48	2567.55	10074.65	2567.55	10074.94	2567.56	10075.26	2567.56
10076.76	2567.61	10080.38	2567.74	10081.13	2567.75	10084.2	2567.82	10085.35	2567.84
10087.61	2567.91	10089.14	2567.93	10094.55	2568	10094.64	2568	10094.75	2568
10094.89	2568	10095.03	2568	10095.13	2568	10100.4	2568.11	10100.59	2568.11

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9911.18	.055	9995.66	.05	10006.83	.055

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9971.87	10018.58	350.67	236.11	240.18	.1	.3

CROSS SECTION

RIVER: RV WI
REACH: R1 RS: 7.217

INPUT
Description:
Station Elevation Data num= 319

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9757.95	2564.07	9758.19	2564.07	9758.63	2564.07	9758.66	2564.07	9758.71	2564.07
9759.16	2564.07	9759.98	2564.09	9761.11	2564.12	9762.01	2564.12	9762.9	2564.14
9763.65	2564.15	9764.19	2564.16	9765.02	2564.17	9766.08	2564.19	9767.55	2564.2
9768.33	2564.21	9768.87	2564.22	9769.32	2564.22	9769.72	2564.23	9770.5	2564.24
9771.52	2564.26	9773.09	2564.22	9773.77	2564.23	9774.11	2564.23	9774.14	2564.23
9776.87	2564.28	9779.24	2564.2	9781.77	2564.24	9784.36	2564.15	9789.41	2564.02
9790.62	2564.01	9790.79	2564.01	9791.64	2564	9792.01	2563.99	9792.95	2563.98
9793.65	2563.97	9794.11	2564	9794.77	2564	9795.34	2564	9796.19	2563.94
9797.19	2563.93	9798.13	2563.92	9801.28	2563.87	9804.91	2563.82	9806.15	2563.8
9809.61	2563.75	9810.05	2563.73	9814.86	2563.44	9815.15	2563.44	9816.15	2563.38
9816.16	2563.38	9817.19	2563.61	9818.55	2563.97	9818.79	2563.98	9819.41	2563.94
9819.8	2563.92	9820.04	2563.91	9820.23	2563.9	9820.37	2563.9	9820.55	2563.89
9823.44	2563.73	9824.01	2563.7	9824.56	2563.67	9824.94	2563.65	9825.23	2563.64
9825.47	2563.63	9825.65	2563.62	9829.16	2563.43	9829.39	2563.42	9829.56	2563.42
9829.68	2563.41	9829.82	2563.41	9829.91	2563.4	9830.04	2563.4	9830.2	2563.39
9830.32	2563.39	9830.39	2563.39	9830.51	2563.38	9833.98	2563.19	9834.25	2563.18
9834.3	2563.17	9837.11	2563.11	9837.25	2563.09	9841.7	2562.49	9844.45	2563.06
9847.26	2563.01	9849.7	2562.97	9852.44	2562.84	9854.67	2562.8	9857.59	2562.65
9859.16	2562.62	9859.4	2562.61	9859.58	2562.61	9859.75	2562.6	9860	2562.6
9860.48	2562.58	9863.3	2562.44	9863.93	2562.43	9864.45	2562.42	9864.82	2562.41
9865.02	2562.4	9865.26	2562.4	9865.54	2562.38	9865.87	2562.37	9866.25	2562.35
9868.52	2562.24	9868.84	2562.23	9869.21	2562.22	9869.67	2562.2	9870.28	2562.18
9871.1	2562.13	9871.65	2562.1	9871.99	2562.09	9872.88	2562.05	9873.41	2562.03
9873.97	2562.01	9874.25	2562	9874.91	2561.97	9876.01	2561.92	9876.72	2561.9
9878.3	2561.83	9879.17	2561.8	9879.58	2561.78	9879.61	2561.78	9879.64	2561.78

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 9881.75 2561.67 9883.36 2561.62  9884.6 2561.61    9888 2561.57  9889.6 2561.52
 9890.67 2561.51 9892.27 2561.46 9893.05 2561.44 9897.61 2560.47 9899.19 2560.49
  9899.2 2560.49 9899.22 2560.49 9899.24 2560.49 9899.26 2560.49 9902.47 2560.54
 9906.12 2561.06  9910.1 2561.21 9911.48 2561.22 9912.97 2561.23 9916.41 2561.35
 9918.05 2561.36 9921.35 2561.47 9923.14 2561.48 9926.28 2561.59 9927.28 2561.59
 9928.22 2561.59 9930.45 2561.66  9931.2 2561.68 9931.73 2561.69 9933.57 2561.67
 9934.16 2561.69 9935.09 2561.72 9935.85 2561.74 9936.39 2561.75 9936.65 2561.75
 9938.16 2561.74 9938.59 2561.74 9939.22 2561.76 9940.09 2561.79 9940.85  2561.8
 9941.47 2561.81 9941.89  2561.8 9943.09 2561.79 9943.52 2561.79 9943.95  2561.8
 9944.38 2561.81 9944.81 2561.81 9945.22 2561.81 9945.58 2561.79 9945.96 2561.78
 9946.36 2561.77 9946.78 2561.77 9948.22 2561.76 9948.79 2561.74 9949.46 2561.72
 9950.17 2561.68 9950.69 2561.67 9951.07 2561.66 9951.32 2561.65 9953.54 2561.63
 9953.96 2561.62 9954.51  2561.6 9955.13 2561.58 9955.96 2561.57 9956.37 2561.56
 9956.62 2561.55 9956.67 2561.55 9956.73 2561.55 9958.89  2561.4 9958.97  2561.4
 9959.21 2561.39 9959.58 2561.37 9960.04 2561.35 9960.33 2561.34 9964.27 2561.09
 9964.36 2561.08  9964.4 2561.08 9964.43 2561.08 9964.49 2561.07 9964.51 2561.07
 9965.12 2561.05  9969.3 2560.74 9969.73 2560.73 9969.76 2560.73 9974.52 2560.58
 9974.81 2560.57 9979.31 2560.42 9979.86 2560.39  9984.1 2560.25 9984.91 2560.21
 9986.96 2560.11 9987.46 2560.09 9989.19 2560.01 9989.28    2560 9989.31    2560
 9989.33    2560 9989.34    2560 9989.35    2560 9989.42 2559.99 9992.11 2559.79
 9993.02 2559.72 9995.01 2559.62 9998.62 2559.3510000.07 2559.3910000.87 2559.41
10002.98 2559.2610003.36 2559.2710003.93 2559.2910005.23 2559.3710005.46 2559.38
10005.89 2559.3910006.54 2559.4110009.49 2559.5810009.99 2559.5910010.59 2559.62
10010.97 2559.6410011.54 2559.6610012.35 2559.6810014.44  2559.810015.12 2559.82
10015.82 2559.8510016.57 2559.8910016.94 2559.9110017.46 2559.9410018.48 2559.98
10018.67 2559.9910019.06    256010019.45 2560.0110020.46 2560.05 10021.1 2560.06
10021.15 2560.0610022.65 2560.1210022.75 2560.1210024.19 2560.1810025.96 2560.22
10029.52 2560.3710030.33 2560.3910032.61 2560.4410035.37 2560.5110037.46 2560.56
10040.42 2560.6210042.33 2560.6710045.46 2560.7410047.31 2560.7810049.04 2560.82
 10050.5 2560.7810052.09 2560.8210055.52 2560.7210056.37 2560.7410059.87 2560.63
10060.54 2560.6110061.94 2560.5810065.56 2560.4710066.87 2560.4410070.58 2560.33
10075.99 2560.1710078.59 2560.0910080.11 2560.0510081.76    256010083.28 2559.95
10084.85 2559.9110087.35 2559.8310091.67 2559.6810095.63 2559.5610096.57 2559.53
10097.59 2559.4910100.61 2559.4710101.18 2559.4410101.64 2559.4610105.59 2559.43
10106.64 2559.4610110.56 2559.4310111.65 2559.4610115.51 2559.6110117.63  2559.6
10123.28 2559.9510123.49 2559.9510123.93 2559.9610124.08    256010124.22 2560.01
10124.41 2560.0410124.47 2560.0510127.29 2560.2610141.73 2561.4810146.06 2561.78
10150.16    256210173.21 2563.09 10176.1 2563.2210177.54 2563.1610177.63 2563.16
10177.76 2563.1610178.48 2563.1410178.72 2563.1410179.07 2563.13

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**************************************************
 9757.95    .055 9987.46     .0510016.94    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        9969.310049.04           541.85  475.74  467.51             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
 9757.95    9940    2563       F
10052.0910179.07    2563       F

CROSS SECTION


RIVER: RV WI
REACH: RI                 RS: 7.127

INPUT
Description: Q=600 cfs (2N, 24 hr) This flowrate was modified from the
             hydrology report to include flow from Basin 4N. The additional
             flow from this basin was proportioned to RV WI and RV WI T3 based
             on their tributary areas.
Station Elevation Data    num=     114
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
**********************************************************************************
 9834.96 2551.63 9849.77 2551.45 9858.57 2551.34 9865.71 2551.28 9871.87 2551.12
 9883.92 2550.86 9893.87  2551.3 9900.24 2551.59 9902.48 2551.65 9903.44 2551.68
 9904.45 2551.71  9905.4 2551.74 9907.19  2551.8 9910.08 2551.89 9912.44 2551.97
 9913.61    2552 9914.68 2552.03 9915.86 2552.05  9916.1 2552.06 9917.25 2552.09
 9920.83 2552.19 9923.07 2552.25 9930.21 2552.47 9934.95  2552.3 9935.99 2552.27
 9936.87 2552.24 9937.67  2552.2 9939.44 2552.14 9940.75 2552.09 9943.38    2552
 9943.39    2552 9944.78 2551.93 9945.04 2551.93 9946.12 2551.87 9949.52 2551.72
  9950.4 2551.68 9951.22 2551.65 9960.61 2551.38 9966.59 2551.17 9968.99 2551.07
 9970.06 2551.03 9970.87 2551.01 9977.59 2550.72 9979.99 2550.62 9980.91 2550.42
 9982.982550.018 9987.14 2549.21 9991.82 2548.31 9993.71 2548.24  9994.1 2548.22
 9994.73  2548.2 9995.84 2548.16 9997.78 2548.08 9999.96    2548 10000.9 2547.96
 10002.5  2547.9 10003.6 2547.8610004.39 2547.8310004.65 2547.8210007.62  2547.7
10009.12 2547.9710009.26    254810010.11 2548.1510012.96 2548.6710015.48 2549.13
10020.01 2549.9710020.71    255010020.88 2550.0110023.08    255010027.32    2550
10028.69    255010029.33    255010031.59    255010032.71    255010033.69    2550
 10034.5    255010035.85    255010054.49 2549.6510055.11 2549.64 10060.3 2549.57
10063.42 2549.6910064.16 2549.7210065.22 2549.7510066.84 2549.8110069.52  2549.9
 10072.5    255010075.06 2550.0910077.98 2550.19 10078.4  2550.210079.86 2550.25
10091.87 2550.1610094.78 2550.1310094.82 2550.1310094.91 2550.1310094.95 2550.13
10095.26 2550.1310107.02 2550.1210107.25  2550.1 10107.5 2550.0710108.06 2550.02
10108.27    255010109.13 2549.9210110.47  2549.810111.24 2549.7210117.48  2549.2
10120.37 2549.4210121.15 2549.4810122.89 2549.6310127.54    255010128.51 2550.08
10130.73 2550.2610136.81 2550.7610151.45  2550.710153.34 2550.69

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**************************************************
 9834.96    .055 9987.14     .0510004.65    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        9982.9810020.88           460.49  447.38   465.5             .1       .3

CROSS SECTION
```

```
RIVER: RV WI
REACH: R1                    RS: 7.042

INPUT
Description:
Station Elevation Data     num=      97
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 9869.64 2540.32 9886.15 2540.06 9887.37 2540.05    9888 2540.04 9888.14 2540.03
 9889.59    2540 9891.41 2539.95 9891.67 2539.95 9891.92 2539.95 9893.58 2539.92
 9908.67 2539.68 9910.76 2539.63  9912.5 2539.65 9914.88 2539.57 9917.65 2539.48
 9918.18 2539.48 9918.31 2539.49 9919.85 2539.52 9924.02 2539.49  9926.7 2539.47
 9930.88 2539.42 9932.08 2539.38 9938.07 2539.28 9941.57 2539.18  9941.7 2539.18
 9949.71 2538.94 9951.39  2538.9 9952.16 2538.88 9952.53 2538.88 9952.59 2538.87
 9953.43 2538.86 9953.47 2538.86 9953.48 2538.86 9953.53 2538.86 9953.57 2538.86
 9953.63 2538.86 9953.71 2538.86 9953.81 2538.86 9956.63 2538.85 9958.85 2538.87
  9961.7 2538.91 9972.96 2539.02 9982.89 2539.12 9983.59 2539.13 9985.16  2538.9
 9985.55 2538.84 9985.73 2538.82 9986.07 2538.77 9986.76 2538.68 9991.58 2538.03
 9991.69 2538.02  9991.9    2538 9991.93    2538 9992.07 2537.99 9992.16 2537.98
 9994.43 2537.82 9995.94 2537.7210005.28 2537.0610006.26 2536.9910008.44 2537.42
10009.61 2537.6510011.36    253810012.42 2538.2110015.33 2538.7810015.63 2538.84
   10016 2538.9210016.85 2539.0810017.27 2539.17 10017.6 2539.2310018.59 2539.42
10021.24 2539.3710026.59 2539.2710032.27 2539.1610036.51 2539.0510039.76 2538.95
10068.92 2538.5710071.38 2538.42 10072.7 2538.3410075.16 2538.3610076.99 2538.38
10080.18 2538.2710080.75 2538.2510081.51 2538.2410082.16 2538.2410095.82 2539.06
10096.35 2539.0910097.89 2539.1910098.02 2539.1910100.03 2539.31 10101.1 2539.38
10111.44 2540.0210112.45 2540.0810123.69 2540.0210124.82 2540.0210124.98 2540.02
10126.07 2540.0210127.03 2540.01

Manning's n Values         num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
************************************************
 9869.64    .055 9992.16     .0510005.28    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9982.8910017.27           437.48  432.18  434.33             .1       .3

CROSS SECTION


RIVER: RV WI
REACH: R1                    RS: 6.961

INPUT
Description:
Station Elevation Data     num=     159
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 9852.11 2532.23 9853.91 2532.09 9854.08 2532.07 9854.97    2532 9857.93 2531.84
 9862.74 2531.11 9867.17 2530.61 9869.45 2530.04 9869.61    2530 9869.68    2530
 9869.69    2530 9878.87 2528.14 9878.93 2528.12 9879.09 2528.09 9879.56    2528
 9879.76 2527.96 9879.82 2527.94 9879.87 2527.93 9880.03 2527.93 9880.05 2527.93
 9902.78 2527.57 9902.99 2527.56 9907.67 2527.52  9907.8 2527.52    9908 2527.52
 9908.27 2527.51 9908.58 2527.51 9911.23 2527.49 9917.89 2527.76 9918.46 2527.78
 9919.72 2527.83 9921.78 2527.88 9923.64 2527.93 9926.15    2528 9926.52 2528.01
 9928.17 2528.06 9929.15 2528.09 9929.71  2528.1 9930.32 2528.12 9930.95 2528.14
  9931.6 2528.16 9934.96 2528.26 9935.47 2528.27 9936.05 2528.29 9939.39 2528.39
 9941.43 2528.44 9956.08 2528.63 9958.27 2528.65 9964.56  2528.8 9967.06 2528.66
 9969.96 2528.49 9974.79 2528.22 9976.69  2528.1 9982.15 2528.07  9983.8 2528.06
 9986.14 2528.05 9988.33 2528.04 9991.55 2528.03 9992.35 2528.03 9995.35 2528.04
 9997.78 2528.02 9998.01 2528.02 9999.83 2528.0110000.85    252810001.31    2528
10002.06    252810003.08 2527.9910004.33 2527.9910005.75 2527.9910006.37    2528
 10007.2 2527.9810007.32 2527.9810007.63    252810007.67    252810008.14 2528.02
10009.77 2528.0910013.95 2528.2710016.86  2528.410025.72  2528.810028.16 2528.91
10036.85 2528.8410041.69  2528.810041.74  2528.810043.33 2528.8110043.63 2528.73
10048.78 2528.6510052.84 2528.6610055.45 2528.6310057.03 2528.6210062.56 2528.56
 10064.4 2528.54 10067.1  2528.510095.08 2528.6610098.17 2528.5610099.56  2528.6
10101.91 2528.6710103.07 2528.6310103.19 2528.6510103.67 2528.7210104.14 2528.73
 10104.5 2528.7410107.93 2528.5310109.49 2528.5610111.86 2528.5110113.33 2528.53
10126.36 2528.4810128.26 2528.51 10129.7 2528.5310130.73 2528.5410131.35 2528.54
10131.94 2528.5510132.49 2528.5610136.25 2528.6210136.78 2528.6210137.59 2528.64
10138.63 2528.6610139.89 2528.6910142.64 2528.7310169.87 2529.2410170.08 2529.24
10170.61 2529.25 10171.7 2529.2510173.51 2529.24 10178.3 2528.8910178.73 2528.86
10178.79 2528.8610179.61  2528.810180.55 2528.7310181.85 2528.6210184.69 2528.39
10186.95  2528.210189.53    252810189.59    252810189.65    252810196.95 2528.75
10199.31    252910201.85 2529.2610204.72 2529.5610208.89    2530 10208.9    2530
10209.38 2530.0510211.53 2530.2710211.97 2530.3210212.34 2530.3510212.47 2530.35
10212.53 2530.3510214.41 2530.32 10215.2 2530.3410222.54  2530.510228.76 2530.59
10229.75  2530.610234.34 2530.6710237.02 2530.7110239.35 2530.7510243.18 2530.82
10247.01 2530.8810256.97 2531.1410263.79 2531.2310267.09 2531.23

Manning's n Values         num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
************************************************
 9852.11    .055 9969.96     .0510008.14    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9964.5610025.72           338.67  332.56  262.02             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
 9852.11    9900    2530       F

CROSS SECTION


RIVER: RV WI
REACH: R1                    RS: 6.898

INPUT
```

```
Description:
Station Elevation Data    num=     161
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 9962.46  2522.4 9963.74 2522.48  9963.9 2522.49 9964.75 2522.55 9964.92 2522.56
 9965.05 2522.55 9965.11 2522.55 9965.28 2522.53 9965.34 2522.52 9968.74 2522.19
 9970.69    2522 9970.76    2522 9970.79    2522  9970.8    2522 9970.91    2522
    9971    2522 9978.062521.294  9982.7 2520.83 9985.11 2520.59 9985.34 2520.56
 9989.88 2520.07 9990.04 2520.05  9990.5    2520 9990.51    2520 9991.29 2519.92
  9993.4  2519.7 9993.84 2519.66 9994.28 2519.61  9995.4 2519.66 9998.31 2519.79
 10003.1    252010003.75 2520.0310017.03 2520.7410017.26 2520.7510020.33 2520.99
10024.22  2521.310027.12 2521.3410027.69 2521.3310034.74 2521.3910036.75 2521.36
10039.73 2521.3310049.77 2521.3110052.61 2521.2710052.89 2521.2710057.14 2521.24
10059.21  2521.210064.58 2521.1910065.34 2521.1810069.01 2521.1910072.22 2520.94
10073.05 2520.8610077.09 2520.5410079.89 2520.3210081.67 2520.18 10090.7 2520.53
10097.55  2520.810115.58 2521.62   10118 2521.7510120.98  2521.910121.77 2521.94
10122.88    252210124.43 2522.0810125.29 2522.1210126.22 2522.1710127.15 2522.22
10128.06 2522.2710131.47 2522.4410132.09 2522.4710132.47 2522.4910132.72  2522.5
10132.98 2522.5110133.25 2522.5310133.51 2522.54 10133.8 2522.55 10134.1 2522.57
10136.76  2522.710165.31 2522.3510171.82 2522.2510171.92 2522.2510171.99 2522.25
10172.03 2522.2510172.22 2522.25 10173.1 2522.25   10174 2522.2410174.23 2522.24
 10174.5 2522.2410174.86 2522.2410192.48 2522.3410203.28 2522.3110206.09 2522.28
10211.49 2522.2310218.91 2522.1710227.73 2522.0810232.93 2522.0510233.48 2522.05
 10234.7 2522.0410237.67 2522.0210239.84 2522.0110239.85 2522.0110239.86 2522.01
10239.87 2522.0110240.19    252210240.96 2521.9710242.53 2521.9210244.38 2521.86
10247.19 2521.7810248.38 2521.7410249.26 2521.7210249.67  2521.710250.18 2521.69
10253.52 2521.6110259.22 2521.6310266.64 2521.5710270.94 2521.5510273.59 2521.52
10290.77 2521.1210312.62 2520.6210314.38 2520.5810314.41 2520.5810314.42 2520.58
 10321.7    252010321.82    252010321.83    252010321.84    252010322.08 2519.98
10322.72 2519.93 10323.3 2519.8910326.56 2519.9910327.04    252010327.08    2520
10327.21 2520.0110328.77 2520.0510330.24 2520.0910331.85 2520.1410333.64 2520.19
10335.31 2520.2310338.85 2520.3210339.49 2520.3410340.64 2520.3810343.02 2520.69
10344.91 2520.9110349.46 2521.4510354.05    252210354.06    2522 10354.5 2522.05
10354.62 2522.0710354.67 2522.0710354.78 2522.0710354.82 2522.0710354.84 2522.07
 10358.6 2522.0510360.55 2522.0510361.13 2522.0710364.02 2522.16 10376.7 2522.32
10385.57 2522.29 10386.8  2522.310388.17 2522.3210388.28 2522.32 10389.7 2522.32
10402.54 2522.26

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9962.46    .055 9985.34     .0510017.03    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9978.0610024.22           523.25   530.5  557.79             .1       .3

CROSS SECTION


RIVER: RV WI
REACH: R1                 RS: 6.797

INPUT
Description:
Station Elevation Data    num=     268
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 9886.66 2509.46    9888 2509.55 9894.71 2509.18 9923.39 2508.34 9923.85 2508.34
 9924.56 2508.33  9926.7 2508.28 9927.39 2508.27 9928.37 2508.25 9930.89 2508.19
  9931.2 2508.19 9931.42 2508.19 9931.66 2508.18 9931.74 2508.18  9932.6  2508.2
 9936.27 2508.03 9936.85    2508 9940.85 2507.81 9952.36 2507.32 9955.22 2507.11
 9957.58 2506.93 9958.16 2506.89 9966.34    2506  9966.6    2506 9966.95    2506
  9967.4    2506 9969.52 2506.17 9970.11 2506.13 9971.45 2506.01 9971.59    2506
 9971.84 2505.98 9978.53 2505.42 9982.99 2505.05 9987.22 2504.78 9994.48 2504.78
 9995.56 2504.79 9997.27 2504.8810000.56 2505.0810008.23 2505.5610014.67 2505.96
10014.84 2505.9710016.39 2505.9910019.34 2505.9910020.01 2505.9910024.25 2505.97
10024.71 2505.9710026.21 2505.9710031.55 2505.9410036.77 2505.9210038.35 2505.93
10039.45 2505.9210044.26  2505.910044.49  2505.910047.46 2505.89 10049.8 2505.88
10050.59 2505.8810050.86 2505.8810051.11 2505.8810052.07  2505.910053.02 2505.98
10053.18 2505.9910053.34    250610053.35    250610058.25 2506.43 10058.8 2506.48
10060.08 2506.5910061.87 2506.7510063.04 2506.8410065.03 2507.0210067.38 2507.22
10069.23 2507.3510073.26 2507.6810073.37 2507.6910073.68 2507.7210073.82 2507.73
10075.75 2507.8810075.86 2507.8910075.97 2507.89 10076.1 2507.9110077.45    2508
10085.54 2508.7410085.69 2508.7610085.71 2508.7610085.72 2508.7610085.73 2508.76
10085.75 2508.7610085.76 2508.7610090.19 2508.7910090.82 2508.7910096.37 2508.61
10098.04 2508.5910099.87 2508.5110100.51 2508.4810102.37 2508.4210102.94  2508.4
10104.17 2508.3610110.55 2508.1910110.96 2508.1810111.25 2508.1710111.61 2508.16
10111.89 2508.1510112.06 2508.15 10112.1 2508.1510112.14 2508.1510112.19 2508.15
10112.25 2508.1510112.33 2508.1510112.41 2508.1510112.45 2508.1610112.48 2508.16
10112.64 2508.1710112.91 2508.1910113.19 2508.2110113.32 2508.22 10114.4  2508.3
10114.53 2508.3110126.75 2508.95 10127.3 2508.9310132.95 2509.22 10137.4 2509.07
10149.89 2509.4410153.36 2509.4310154.07 2509.3610157.37 2509.1110159.35  2509.1
 10163.5 2508.7510165.66 2508.6810169.42 2508.27   10170 2508.2210170.99 2508.12
10171.29 2508.0910171.77 2508.05 10172.2 2508.01 10172.3    250810173.04 2507.91
 10173.5 2507.8610173.62 2507.8510173.69 2507.8410173.72 2507.8410173.74 2507.84
10173.83 2507.83 10173.9 2507.8210176.66 2507.5810177.34 2507.5210179.18  2507.4
10180.35 2507.3510184.36 2507.0510187.46 2506.6410187.59 2506.6310189.47 2506.57
10192.37 2506.4910192.44 2506.4910194.36 2506.3710197.42 2506.2810199.15 2506.23
10200.22 2506.1910201.11 2506.16   10202 2506.1210202.75 2506.0710203.18 2506.06
10203.93 2506.0310205.05    250610205.09    250610205.94 2505.9810206.36 2505.97
10206.57 2505.9710206.74 2505.9710206.92 2505.97 10207.1 2505.9610207.58 2505.95
10208.08 2505.9510208.75    250610209.49    250610210.08    250610211.37 2505.94
10211.79 2505.9410212.08 2505.9310213.04    250610214.61    250610215.17    2506
10216.44 2505.9710216.75 2505.9810217.08 2505.9910217.57 2505.9910218.16    2506
10218.78 2506.0110218.95 2506.0310220.88  2506.110220.96  2506.110221.01 2506.11
10222.31 2506.1610222.34 2506.1610222.37 2506.1610223.05 2506.1910223.12  2506.2
10223.22 2506.2110228.08  2506.510228.28 2506.5210228.42 2506.53 10228.5 2506.54
10228.77 2506.56 10232.9 2506.8110234.36 2506.9310237.65 2507.1410239.72  2507.3
10241.45 2507.4210242.87 2507.51 10248.5 2507.5210248.91 2507.5310251.27 2507.63
10251.99 2507.6710254.14 2507.7810254.58 2507.81 10254.7 2507.8210254.79 2507.82
```

```
10255.35 2507.8610255.59 2507.8610255.61 2507.8610256.14 2507.8710256.99 2507.89
10257.14 2507.8910257.31 2507.8910258.32  2507.910260.01 2507.9310260.89 2507.94
10263.34 2507.9810263.42 2507.9810264.33    250810265.63 2508.0210266.95 2508.05
10273.38 2508.1510278.72 2508.1410285.02 2508.1310285.91 2508.1210286.23 2508.11
10288.04 2508.0910290.02 2508.0110290.16    250810290.18    2508 10290.2    2508
10291.52    250810292.51    250810293.15    250810302.47 2507.4910304.28 2507.42
10309.53  2507.410309.76 2507.4310310.73 2507.4810310.81 2507.4910315.71 2507.64
 10316.9 2507.6710317.16 2507.68 10318.1  2507.710320.76 2507.7210320.95 2507.72
10324.17 2507.8510325.43 2507.86   10326  2507.9 10327.3    250810329.15 2508.14
 10329.4 2508.1710330.48 2508.2610332.69 2508.4310336.43 2508.8410336.87 2508.87
10339.52 2509.1610340.94 2509.11 10343.7 2509.05

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9886.66    .055 9978.53     .0510008.23    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9971.8410016.39           613.78  613.64  630.41             .1       .3

CROSS SECTION


RIVER: RV WI
REACH: R1                 RS: 6.681

INPUT
Description:
Station Elevation Data    num=     184
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9948.49 2492.71 9948.91 2492.74 9949.06 2492.76 9949.26 2492.78 9949.48 2492.79
 9949.69 2492.81 9950.48 2492.88 9951.27 2492.84 9951.39 2492.84 9952.07  2492.8
 9952.71 2492.76 9953.89 2492.69  9962.5 2492.21 9964.22  2492.1 9965.91    2492
 9965.96    2492 9966.02    2492 9966.07    2492 9966.13 2491.99 9968.75 2491.84
 9970.54 2491.73 9971.76 2491.65 9972.47 2491.61 9976.21 2491.37 9981.03 2490.94
 9982.82 2490.78 9983.69  2490.7 9984.67 2490.61 9985.49 2490.54    9986 2490.49
 9987.05  2490.4 9989.55 2490.17 9991.44    2490 9992.13 2489.94 9993.46 2489.82
 9999.89 2489.2310002.39 2489.5910003.57 2489.7610005.27    249010005.77 2490.07
10007.01 2490.2410012.47 2490.9910015.21 2490.8710015.56 2490.8610015.88 2490.84
10017.15  2490.810018.06 2490.7610024.83 2490.4910026.07 2490.4410027.05  2490.4
 10031.2 2490.2410035.44 2490.0710035.85 2490.0510037.04 2490.02 10037.2    2490
10037.36 2489.9910038.62 2489.9510039.42 2489.93 10039.9 2489.9110040.12  2489.9
10040.22  2489.910063.94 2488.33   10066 2488.1810067.53 2488.3910067.83 2488.43
10068.45  2488.510070.52 2488.7710075.42 2489.4210081.45    249010081.49    2490
10081.54    249010081.62    249010081.65    249010084.06 2490.2710084.84 2490.34
 10085.3 2490.3810085.47  2490.410085.83 2490.43 10091.5 2490.5110096.13 2490.53
10103.09 2490.3610103.79 2490.34 10105.4  2490.310106.37 2490.2810107.62 2490.24
10108.85 2490.1810110.55 2490.15 10112.8 2490.1110113.56 2490.0810114.16 2490.07
10116.23 2490.05 10117.5 2490.0210117.54 2490.0210118.86 2490.0110119.77    2490
10119.86    2490 10120.6 2489.9910121.92 2489.9610122.82 2489.9410124.04 2489.92
10124.56 2489.9110124.86 2489.9110125.28 2489.9310126.73 2489.9710127.99    2490
10128.86 2490.0210129.39 2490.0510130.86 2490.09 10131.9 2490.1310132.66 2490.16
10133.25 2490.1810133.82  2490.210134.86 2490.2110136.24 2490.2410136.46 2490.24
10138.28 2490.26 10138.6 2490.2810138.71 2490.28 10140.7  2490.3 10147.6 2490.88
10150.72 2490.8910158.13 2491.4110162.74 2491.8210164.74    249210175.59 2492.73
 10188.1 2493.7510189.91 2493.9110190.51 2493.9410191.22 2493.9710191.74    2494
10191.78    249410191.86 2494.0110192.48    249410192.49    249410192.93 2493.99
10193.53 2493.99 10193.9 2493.9810194.78 2493.9710196.27 2493.9610198.88 2493.93
10201.78 2493.9210202.34 2493.9210204.28 2493.9110204.51 2493.9210205.51 2493.88
10206.53 2493.8610209.95  2493.710210.54 2493.6810210.74 2493.6810210.95 2493.67
10211.57 2493.6310215.55 2493.2710215.92 2493.2410216.25  2493.210216.53 2493.18
10217.31 2493.11 10219.2 2492.9410225.92 2492.3310228.51 2492.0910229.56    2492
10230.76 2491.8910239.29 2491.1210240.38 2491.0310240.41 2491.0310240.48 2491.02
10240.61 2491.0110242.89 2490.8410252.69 2490.1210263.53 2491.1410268.94 2491.64
10269.11 2491.6510270.64  2491.810271.51 2491.89 10273.3 2491.9710274.19    2492
10274.33    249210274.39    249210274.53    249210277.11 2492.0610289.37 2492.51
10293.03 2492.6210299.73 2492.9210310.18 2493.2910318.28 2493.55

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9948.49    .055 9992.13     .0510070.52    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9981.0310012.47           360.74  356.27  355.13             .1       .3

CROSS SECTION


RIVER: RV WI
REACH: R1                 RS: 6.613

INPUT
Description:
Station Elevation Data    num=     173
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9860.72 2481.84 9862.39    2482 9862.92 2482.05  9863.7 2482.07 9864.11 2482.04
 9864.86    2482 9864.87    2482 9865.74 2481.95 9865.91 2481.94 9866.01 2481.94
 9868.21 2481.81 9871.79 2481.61 9873.06 2481.54 9877.43 2481.29 9879.62 2481.17
 9880.69 2481.11 9888.62  2480.7 9889.22 2480.67 9890.15 2480.62 9891.17 2480.56
 9891.72 2480.53 9892.05 2480.51  9896.6 2480.29 9898.43 2480.33 9899.99 2480.33
 9903.63 2480.38 9926.68 2480.82 9927.43 2480.84 9928.16 2480.85 9928.84 2480.86
 9935.49 2480.91 9936.24 2480.93 9937.12 2480.95 9938.15 2480.98 9939.03 2481.01
 9939.73 2481.03 9940.23 2481.04 9941.08 2481.06 9942.31 2481.09 9947.35 2481.14
 9948.85 2481.18 9960.83 2481.31 9961.15 2481.32 9963.34  2481.5  9963.4  2481.5
 9963.47  2481.5 9963.57 2481.51 9964.07 2481.55 9979.47 2481.67 9983.52 2481.64
 9984.76 2481.63  9985.3 2481.62 9985.31 2481.62 9989.22  2481.2 9994.43 2480.63
10000.22  2480.110000.27 2480.0910000.35 2480.0910000.44  2480.110000.51  2480.1
```

```
10000.57 2480.1110000.64 2480.11 10000.7 2480.11 10004.8 2480.4110006.44 2480.54
10017.81 2481.4110024.62 2481.7310025.36 2481.7710029.92 2481.9810030.32    2482
10035.03 2482.22 10037.6 2482.3510038.73  2482.410050.37 2482.9510050.69 2482.97
10050.95 2482.9810051.36    248310051.54 2483.01 10051.7 2483.0210052.26 2483.04
10052.58 2483.0310052.62 2483.0310052.66 2483.03 10052.7 2483.0310052.75 2483.03
10052.78 2483.0310058.96 2482.7910059.26 2482.7710059.51 2482.7610059.91 2482.74
 10060.5 2482.7210061.33 2482.6810062.07 2482.6510062.68 2482.6210065.74  2482.5
 10067.1 2482.4410068.62 2482.3710070.96 2482.2610072.83 2482.1810075.93 2482.03
10076.19 2482.0210076.33 2482.02 10076.5 2482.0110076.73    248210076.76    2482
10077.46 2481.9710077.92 2481.9610078.42 2481.96 10079.2 2481.9810081.68    2482
 10082.4 2482.0110082.51 2482.0110086.68 2482.0310086.88 2482.0210088.79 2482.07
10095.71 2482.1210099.85 2482.1510103.21 2482.1210103.87 2482.1110104.63 2482.08
10105.48 2482.0610106.45 2482.0310107.53    248210107.64    248210108.79 2481.97
10109.96 2481.9310111.05  2481.910111.84 2481.88 10112.4 2481.8710112.75 2481.86
10113.16 2481.8510113.62 2481.84 10115.6 2481.7810116.07 2481.7710116.63 2481.76
10117.24 2481.7410117.86 2481.7210118.29 2481.7110122.37 2481.59 10123.1 2481.62
10123.19 2481.6310123.39 2481.6410123.97 2481.6610129.46 2481.9210130.84    2482
10130.95    248210131.04    2482 10131.4 2482.0210136.33 2482.3310137.49  2482.4
10140.42 2482.58 10141.3 2482.6310141.73 2482.6610142.42  2482.710143.57 2482.77
10144.99 2482.8510145.79  2482.910151.34 2483.2610160.31 2483.8710160.65 2483.88
 10160.8 2483.8910161.15  2483.910161.56 2483.9210162.07 2483.9610162.64 2483.99
10164.26    2484 10164.6 2484.0110167.21 2484.0610167.41 2484.0610170.15 2484.09
10171.83 2484.1310179.25 2484.2110179.59 2484.22

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9860.72    .055 9989.22     .0510006.44    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9984.7610024.62           457.89  460.46  463.57             .1       .3
Left Levee      Station=  9863.7      Elevation= 2482.07

CROSS SECTION


RIVER: RV WI
REACH: R1                 RS: 6.526

INPUT
Description:
Station Elevation Data    num=     146
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9842.21 2469.67 9842.42 2469.69 9842.61 2469.69 9844.67 2469.56 9844.77 2469.56
 9844.85 2469.55 9844.94 2469.55 9845.03 2469.54 9845.44 2469.52 9847.02 2469.41
 9851.84 2469.07 9854.73 2468.95 9857.42 2468.78 9863.91 2468.51 9865.81 2468.42
 9873.02 2468.13 9875.17 2468.06 9875.86 2468.06  9876.3 2468.06 9878.72 2468.17
 9886.79 2468.63  9892.5 2468.94 9912.52 2469.99 9912.54    2470 9912.61    2470
 9913.99 2470.07 9919.92 2470.38 9921.69 2470.48 9923.24 2470.56 9926.31  2470.7
 9927.84 2470.64  9928.4 2470.61 9929.12 2470.58 9934.86 2470.31 9936.13 2470.25
 9937.25 2470.19 9938.24 2470.14 9938.98  2470.1 9939.43 2470.08 9940.23 2470.04
 9941.14    2470 9941.89 2469.97 9944.28 2469.85 9945.48 2469.79 9946.17 2469.76
 9946.63 2469.74 9946.96 2469.72 9947.21 2469.71  9947.4  2469.7 9948.04 2469.67
 9948.56 2469.63 9949.78 2469.57 9950.92 2469.53 9953.252469.434  9958.7 2469.21
 9964.28 2468.98 9965.39 2469.02 9970.72 2469.01 9986.51 2468.98 9993.57 2468.97
  9995.8 2468.85 9999.76 2468.6410002.02 2468.74 10008.5 2469.0410016.87 2469.43
10017.19 2469.4410019.33 2469.4510035.09 2469.5210051.94  2469.610052.73 2469.56
10053.41 2469.5310063.15 2469.0710072.35 2468.6810073.74 2468.6210075.62 2468.54
10076.15 2468.5710076.87 2468.6210084.04 2469.1310090.29 2469.6710092.22 2469.66
 10108.6 2469.5410109.17 2469.53 10109.6 2469.5310109.89 2469.5310110.05 2469.53
10112.27 2469.5110113.65 2469.5710115.24 2469.6510116.99 2469.7510117.27 2469.77
10117.57 2469.79 10117.9 2469.8110118.27 2469.84 10118.7 2469.8710119.18  2469.9
10119.72 2469.9410120.34 2469.9810120.65    247010120.66    247010120.67    2470
 10120.7    247010121.48 2470.0510122.02 2470.0910122.11 2470.0910123.15 2470.16
10124.57 2470.2410124.79 2470.2610126.55 2470.37 10126.9 2470.3910128.16 2470.47
   10129 2470.5210129.46 2470.5510129.96 2470.58 10130.7 2470.6310131.65 2470.69
10132.28 2470.7310133.39  2470.810134.18 2470.85   10135  2470.910135.96 2470.96
10136.54    247110136.91 2471.0310137.69 2471.0710138.09  2471.110138.49 2471.13
10139.02 2471.1610139.44 2471.1810139.67  2471.210140.28 2471.2410140.64 2471.26
10140.98 2471.2810142.03 2471.3510142.33 2471.3610142.63 2471.3810144.19 2471.48
10144.47  2471.510145.65 2471.5710145.89 2471.5910146.59 2471.6310146.76 2471.64
10146.91 2471.6510147.51 2471.6910150.86  2471.910151.18 2471.9210151.77 2471.96
10151.87 2471.97

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9842.21    .055 9986.51     .05 10008.5    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9953.2510017.19                0       0       0             .1       .3
Left Levee      Station= 9926.31      Elevation=  2470.7

CROSS SECTION


RIVER: RV WI
REACH: R2                 RS: 6.453

INPUT
Description: Q=1110 cfs (CP4N, 24 hr)
Station Elevation Data    num=     110
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9906.04 2461.33 9907.57 2461.42    9915 2461.18 9926.74 2460.84 9927.86 2460.81
 9928.44 2460.79  9934.7 2460.65 9935.98 2460.61 9936.93 2460.58 9943.45  2460.4
 9943.99 2460.38 9944.47 2460.36 9945.04 2460.34 9945.96 2460.32 9947.36 2460.27
 9947.58 2460.26 9949.16 2460.21 9950.99 2460.15 9953.11 2460.08  9955.1 2460.01
 9955.34    2460 9956.56 2459.95  9957.7 2459.92 9960.84 2459.85 9961.31 2459.83
```

```
 9964.17 2459.75 9970.86 2459.55 9973.68 2459.47 9975.82 2459.41 9976.99 2459.37
 9978.06 2459.34 9981.96 2459.23 9982.26 2459.18 9985.52 2458.59 9986.46 2458.44
 9986.49 2458.43 9988.76 2458.04 9988.99    2458 9989.62 2457.89 9992.21 2457.45
 9993.31 2457.26 9994.48 2457.28 10006.3 2457.4810007.07 2457.5310007.25 2457.55
10007.58 2457.5710008.03 2457.6110008.73 2457.6710009.89 2457.7610012.71    2458
10013.47 2458.0710016.62 2458.3310017.94 2458.4410018.16 2458.4610018.61  2458.5
10019.02 2458.53 10020.2 2458.64 10022.3 2458.6610028.02 2458.6310035.24 2458.61
10038.94 2458.5610040.72 2458.4210040.83 2458.4110040.94  2458.410041.04  2458.4
10041.33 2458.3810041.69 2458.3410042.44 2458.2710043.69 2458.1710044.37  2458.1
10044.99 2458.04 10045.4    245810045.42    245810046.04 2457.9510046.61  2457.9
10047.09 2457.8610047.48 2457.8210047.76 2457.7910048.85 2457.6610054.68 2457.61
10055.82 2457.6210062.81  2457.710063.61 2457.71 10065.8 2457.7210068.37 2457.77
10068.77 2457.8610069.31 2457.9710069.47    2458 10070.2 2458.1510072.97 2458.74
10075.83 2459.3810075.92  2459.410075.95  2459.410075.96 2459.4110075.98 2459.41
 10076.1 2459.4310076.27  2459.410079.91 2459.3810084.04 2459.3110087.19 2459.27
10089.69 2459.2310136.91 2459.0710139.14 2459.0210140.12 2458.9810158.37 2459.41
10192.42 2459.9610192.46 2459.9410193.11 2459.9110199.14 2459.6610205.55 2459.37

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9906.04    .055 9986.46     .0510063.61    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9982.2610075.83            49.12   49.12   49.12             .3       .5
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
 10076.110205.55    2460       F
Right Levee     Station=10192.42      Elevation= 2459.96

CROSS SECTION


RIVER: RV WI
REACH: R2                 RS: 6.446

INPUT
Description:
Station Elevation Data    num=     109
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9888.13 2459.78 9889.76 2459.93 9889.79 2459.93 9889.82 2459.93 9889.85 2459.93
 9889.94 2459.93 9890.07 2459.92  9896.3 2459.44 9901.07 2459.07 9902.57 2458.94
 9904.54 2458.79 9905.78 2458.69 9907.08 2458.59 9908.02 2458.52 9908.72 2458.47
 9910.95  2458.3 9911.69 2458.24 9912.08 2458.21 9912.75 2458.16 9913.43 2458.11
 9914.13 2458.05 9914.21 2458.05 9914.82    2458 9914.86    2458 9915.59 2457.94
 9916.16  2457.9 9916.63 2457.86 9917.01 2457.84 9917.32 2457.81 9917.59 2457.79
 9917.82 2457.78 9918.02 2457.76 9918.19 2457.75 9918.35 2457.74 9918.48 2457.73
 9918.61 2457.72 9918.72 2457.71 9918.82  2457.7 9918.91  2457.7 9918.99 2457.69
  9920.1 2457.65 9921.21 2457.61 9922.14 2457.58 9925.04 2457.62 9926.65 2457.65
 9928.51 2457.61 9929.67 2457.59 9931.47  2457.6 9931.89 2457.59 9932.45 2457.59
 9959.12 2457.31 9962.01 2457.25  9963.4 2457.23 9965.07 2457.22 9968.56 2457.17
 9970.23 2457.15 9972.18 2457.13 9976.29 2457.07 9983.87 2456.75 9984.13 2454.45
10037.13 2454.4510037.96 2457.2310041.53 2457.1710041.64 2457.1710042.53 2457.21
10055.22 2457.8410060.35 2457.9710060.37 2457.9710060.42 2457.9710060.52 2457.97
10060.69 2457.9810061.29 2457.99 10062.7    245810062.89    245810065.06    2458
10066.56    245810067.48    245810067.97    245810068.77    245810069.31    2458
10069.79    245810070.22    245810070.82    245810071.54    245810073.59    2458
10074.68    245810082.26 2458.15 10082.8 2458.15 10084.9 2458.1710086.73 2458.14
10087.55 2458.1310088.59 2458.1210091.82 2458.0810093.45 2458.0710095.31 2458.05
10097.53 2458.0310097.62 2458.0310101.41  2458.110114.73 2457.9810118.07 2457.48
10124.17 2456.6110129.91 2457.29 10134.2 2457.6710135.78 2457.6310163.81 2457.91
10172.14 2458.3510172.86 2458.3910184.33 2458.53   10197 2458.46

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9888.13    .055  9896.3     .0510042.53    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9983.8710037.96            48.09   48.09   48.09             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
 9888.13 9978.87  2461.3       F
10042.96   10197    2461       F

CULVERT


RIVER: RV WI
REACH: R2                 RS: 6.439

INPUT
Description:
Distance from Upstream XS =       1
Deck/Roadway Width        =      46
Weir Coefficient          =     2.6
Upstream  Deck/Roadway Coordinates
    num=       7
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
*******************************************************************************
    9705 2456.69          9764.64 2461.35         10008.19 2461.28
10056.49 2460.82         10120.78  2460.2         10132.16 2460.02
10148.24 2459.88

Upstream Bridge Cross Section Data
Station Elevation Data    num=     109
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9888.13 2459.78 9889.76 2459.93 9889.79 2459.93 9889.82 2459.93 9889.85 2459.93
```

```
 9889.94 2459.93 9890.07 2459.92  9896.3 2459.44 9901.07 2459.07 9902.57 2458.94
 9904.54 2458.79 9905.78 2458.69 9907.08 2458.59 9908.02 2458.52 9908.72 2458.47
 9910.95  2458.3 9911.69 2458.24 9912.08 2458.21 9912.75 2458.16 9913.43 2458.11
 9914.13 2458.05 9914.21 2458.05 9914.82    2458 9914.86    2458 9915.59 2457.94
 9916.16  2457.9 9916.63 2457.86 9917.01 2457.84 9917.32 2457.81 9917.59 2457.79
 9917.82 2457.78 9918.02 2457.76 9918.19 2457.75 9918.35 2457.74 9918.48 2457.73
 9918.61 2457.72 9918.72 2457.71 9918.82  2457.7 9918.91  2457.7 9918.99 2457.69
  9920.1 2457.65 9921.21 2457.61 9922.14 2457.58 9925.04 2457.62 9926.65 2457.65
 9928.51 2457.61 9929.67 2457.59 9931.47  2457.6 9931.89 2457.59 9932.45 2457.59
 9959.12 2457.31 9962.01 2457.25  9963.4 2457.23 9965.07 2457.22 9968.56 2457.17
 9970.23 2457.15 9972.18 2457.13 9976.29 2457.07 9983.87 2456.75 9984.13 2454.45
10037.13 2454.4510037.96 2457.2310041.53 2457.1710041.64 2457.1710042.53 2457.21
10055.22 2457.8410060.35 2457.9710060.37 2457.9710060.42 2457.9710060.52 2457.97
10060.69 2457.9810061.29 2457.99 10062.7    245810062.89    245810065.06    2458
10066.56    245810067.48    245810067.97    245810068.77    245810069.31    2458
10069.79    245810070.22    245810070.82    245810071.54    245810073.59    2458
10074.68    245810082.26 2458.15 10082.8 2458.15 10084.9 2458.1710086.73 2458.14
10087.55 2458.1310088.59 2458.1210091.82 2458.0810093.45 2458.0710095.31 2458.05
10097.53 2458.0310097.62 2458.0310101.41  2458.110114.73 2457.9810118.07 2457.48
10124.17 2456.6110129.91 2457.29 10134.2 2457.6710135.78 2457.6310163.81 2457.91
10172.14 2458.3510172.86 2458.3910184.33 2458.53   10197 2458.46

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
 9888.13    .055  9896.3     .0510042.53    .055

Bank Sta: Left   Right    Coeff Contr.   Expan.
       9983.8710037.96             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
 9888.13 9978.87  2461.3       F
10042.96   10197    2461       F

Downstream  Deck/Roadway Coordinates
    num=       7
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
*********************************************************************
    9705 2456.69         9764.64 2461.35        10008.19 2461.28
10056.49 2460.82        10120.78  2460.2        10132.16 2460.02
10148.24 2459.88

Downstream Bridge Cross Section Data
Station Elevation Data    num=      71
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*************************************************************************************
  9891.7 2457.95 9892.04 2457.97 9892.26 2457.98 9892.65    2458 9892.66    2458
 9892.68    2458  9893.8 2458.06 9894.84 2458.06 9895.95    2458 9896.02    2458
  9896.1 2457.99 9896.52 2457.97 9896.73 2457.96 9899.51 2457.82 9900.93 2457.75
 9901.35 2457.73 9903.02 2457.64 9903.31 2457.63 9905.74  2457.5 9906.29 2457.48
 9917.52  2456.9 9918.99 2456.82 9919.62 2456.79 9920.29 2456.76    9928 2456.35
 9929.46 2456.35 9930.33 2456.35 9933.29 2456.34 9936.18 2456.33  9936.4 2456.32
 9938.79 2456.29 9942.27 2456.28 9944.05 2456.26 9947.55 2456.25 9950.71 2456.23
 9952.18 2456.22    9955 2456.21 9969.03 2456.07 9970.31  2456.1 9971.76 2456.09
 9972.93 2456.09 9974.59 2456.13 9975.82 2456.13 9975.85 2456.13 9977.43 2456.12
 9979.31 2456.11 9980.42 2456.11 9981.76  2456.1 9982.48 2456.06 9983.42    2456
 9983.44    2456 9984.11 2455.96 9985.55 2455.87 9986.55 2455.81 9987.26 2455.76
  9987.7 2453.62 10040.7 2453.6210042.73 2455.5910043.77  2455.710044.34 2455.76
10045.76 2455.9110046.61    245610047.34 2456.08 10057.8 2457.2210063.47 2457.21
10071.85 2457.1710075.84 2457.1610076.36 2457.1610079.16 2457.1310089.47 2457.01
10097.51 2457.01

Manning's n Values        num=       2
     Sta   n Val     Sta   n Val
*******************************
  9891.7    .055 9903.02     .05

Bank Sta: Left   Right    Coeff Contr.   Expan.
       9987.2610042.73             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
  9891.7 9982.26  2461.3       F
10047.7310097.51    2461       F

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

Number of Culverts =  1

Culvert Name     Shape      Rise    Span
Culvert #1           Box       4       8
FHWA Chart # 8 - flared wingwalls
FHWA Scale # 1 - Wingwall flared 30 to 75 deg.
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef   Exit Loss Coef
                  1      46     .012     .012        0                  .4                 1
Number of Barrels =  6
Upstream   Elevation =  2454.45
Centerline Stations
    Sta.    Sta.    Sta.    Sta.    Sta.    Sta.
 9988.13 9997.1310006.1310015.1310024.1310033.13
Downstream Elevation =  2453.62
Centerline Stations
    Sta.    Sta.    Sta.    Sta.    Sta.    Sta.
  9991.7 10000.7 10009.7 10018.7 10027.7 10036.7
```

```
CROSS SECTION


RIVER: RV WI
REACH: R2                    RS: 6.435

INPUT
Description:
Station Elevation Data    num=      71
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
  9891.7 2457.95 9892.04 2457.97 9892.26 2457.98 9892.65    2458 9892.66    2458
 9892.68    2458  9893.8 2458.06 9894.84 2458.06 9895.95    2458 9896.02    2458
  9896.1 2457.99 9896.52 2457.97 9896.73 2457.96 9899.51 2457.82 9900.93 2457.75
 9901.35 2457.73 9903.02 2457.64 9903.31 2457.63 9905.74  2457.5 9906.29 2457.48
 9917.52  2456.9 9918.99 2456.82 9919.62 2456.79 9920.29 2456.76    9928 2456.35
 9929.46 2456.35 9930.33 2456.35 9933.29 2456.34 9936.18 2456.33  9936.4 2456.32
 9938.79 2456.29 9942.27 2456.28 9944.05 2456.26 9947.55 2456.25 9950.71 2456.23
 9952.18 2456.22    9955 2456.21 9969.03 2456.07 9970.31  2456.1 9971.76 2456.09
 9972.93 2456.09 9974.59 2456.13 9975.82 2456.13 9975.85 2456.13 9977.43 2456.12
 9979.31 2456.11 9980.42 2456.11 9981.76  2456.1 9982.48 2456.06 9983.42    2456
 9983.44    2456 9984.11 2455.96 9985.55 2455.87 9986.55 2455.81 9987.26 2455.76
  9987.7 2453.62 10040.7 2453.6210042.73 2455.5910043.77  2455.710044.34 2455.76
10045.76 2455.9110046.61    245610047.34 2456.08 10057.8 2457.2210063.47 2457.21
10071.85 2457.1710075.84 2457.1610076.36 2457.1610079.16 2457.1310089.47 2457.01
10097.51 2457.01

Manning's n Values        num=       2
     Sta   n Val     Sta   n Val
*******************************
  9891.7    .055 9903.02     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9987.2610042.73           59.03   59.03   59.03             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
  9891.7 9982.26  2461.3       F
10047.7310097.51    2461       F

CROSS SECTION


RIVER: RV WI
REACH: R2                    RS: 6.423

INPUT
Description:
Station Elevation Data    num=      89
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 9927.62  2456.5 9927.79 2456.51 9929.43 2456.43 9930.22 2456.39  9935.9 2456.11
 9937.99    2456 9946.77 2455.49 9962.64 2454.57 9967.86 2454.22 9969.94 2454.15
 9974.33 2454.02 9975.08    2454 9975.36 2453.99 9975.41 2453.99 9979.21 2453.82
 9980.54 2453.76 9981.02 2453.72 9984.78 2453.45  9986.1 2453.37 9986.54 2453.34
 9987.62 2453.24 9993.67 2453.38 9995.81 2453.4510001.44 2453.6410009.38 2453.89
 10011.2 2453.93 10012.1 2453.9510012.87 2453.9710013.53 2453.9710014.69 2453.99
10015.17    2454 10015.3    245410015.39    245410015.73 2454.0110016.01 2454.01
10016.28 2454.0110017.33 2454.0310017.69 2454.0410017.99 2454.0410021.61 2454.11
10021.77 2454.11 10021.9 2454.1110022.02 2454.1110022.11 2454.1210023.11 2454.13
10026.22 2454.2110027.38 2454.2410027.83 2454.2510031.13 2454.3310034.84 2454.42
10038.98 2454.5310040.16 2454.55 10044.6 2454.6210048.34 2454.5210050.76 2454.45
10051.99 2454.42 10053.8 2454.3810054.88 2454.3510086.32    245610086.33    2456
10088.52 2456.1210089.36 2456.1710089.84 2456.1610092.55 2456.1110096.57 2456.09
10101.42    245610101.97    245610104.28    2456 10105.1    245610106.23    2456
10106.44    245610107.03    245610107.15    2456 10107.4    245610108.83 2455.98
10110.61 2455.9610113.89  2455.910116.98 2455.9510119.92 2455.9610124.24 2455.94
10127.55    245610128.85    245610129.39    2456 10130.1    245610132.31 2456.05
10133.48 2456.0710134.66 2456.0910137.45 2456.1310139.92  2456.2

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
 9927.62    .055 9979.21     .0510050.76    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9975.3610014.69                 0       0       0             .1       .3
Right Levee     Station=10089.36      Elevation= 2456.17

CROSS SECTION


RIVER: RV WI T3
REACH: R1                    RS: 0.797

INPUT
Description: Q=430 cfs (CP2S, 24 hr)
Station Elevation Data    num=      82
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 9901.33 2559.11 9905.36 2559.12  9905.7 2559.12  9905.9 2559.12  9906.1 2559.12
 9906.25 2559.12 9907.52 2559.11 9914.85 2558.37 9917.09 2558.17 9918.83    2558
 9922.37  2557.7 9924.66 2557.51 9941.69 2556.06 9942.31 2556.01 9943.62 2556.04
  9944.5 2556.06 9945.15 2556.07 9946.26 2556.08 9946.38 2556.08 9957.36 2556.39
 9957.58 2556.41 9958.76 2556.43 9960.01 2556.46 9962.89 2556.52 9965.69 2556.53
 9966.81 2556.54 9969.31 2556.55 9971.39 2556.24 9972.77 2556.03 9972.97    2556
 9977.58 2555.41 9978.44 2555.28 9980.45 2555.01 9981.66 2554.84 9982.37 2554.74
 9983.942554.505 9985.91 2554.21 9986.69 2554.09  9987.3    2554 9987.52    2554
 9987.61    2554 9991.87 2553.46 9994.45 2553.13 9998.07 2552.6910009.72 2553.19
10010.73 2553.2410010.94 2553.2410012.99  2553.410013.18 2553.4210013.42 2553.45
```

```
10013.73 2553.4910014.09 2553.5310014.47 2553.5710015.87 2553.7110017.38 2553.87
10017.87 2553.9210018.61    255410019.34 2554.07 10024.1 2554.5110029.22 2554.66
   10037 2554.8910057.92 2555.5110064.33    255610064.35    255610069.23 2556.37
10069.75 2556.4110072.43 2556.6110074.05 2556.7410075.29 2556.8310075.58 2556.85
10083.34 2557.3910084.92 2557.5210086.24 2557.58 10087.4 2557.6810088.35 2557.77
10088.96 2557.8210089.82  2557.910090.93    255810091.07 2558.0110093.96 2558.23
10095.47 2558.3410096.21  2558.4

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9901.33    .055 9986.69     .0510017.87    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9983.94 10024.1           269.34  194.82  200.73             .1       .3

CROSS SECTION


RIVER: RV WI T3
REACH: R1                 RS: 0.760

INPUT
Description:
Station Elevation Data    num=     115
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9870.57  2554.6  9876.1 2554.08 9876.57 2554.03 9876.82    2554 9877.46 2553.93
 9879.26 2553.75 9883.22 2553.37 9886.32 2553.04 9888.22 2552.87  9891.3 2552.55
 9893.22 2552.37  9897.4 2552.08 9898.31    2552 9898.34    2552  9899.6 2551.93
 9900.59 2551.88  9902.2 2551.81 9903.35 2551.75 9907.25 2551.44 9908.23 2551.39
 9911.29 2551.24 9913.23 2551.14 9916.29 2550.99 9918.22 2550.88 9921.28 2550.73
 9923.23 2550.63 9924.82 2550.55 9926.77 2550.45 9928.23 2550.42 9932.03 2550.23
 9932.95 2550.21 9934.44 2550.17 9934.81 2550.15 9935.19 2550.14 9935.58 2550.13
 9935.98 2550.12 9936.38 2550.11 9937.19 2550.09 9938.44 2550.05 9939.31 2550.03
  9940.2    2550 9940.86 2549.98 9941.92 2549.95 9942.69 2549.93 9943.62 2549.91
 9944.12 2549.89 9944.67 2549.88 9948.22 2549.78 9951.28 2549.69 9952.53 2549.66
 9953.22 2549.64 9955.69 2549.57 9957.62 2549.52 9958.22 2549.51 9961.28 2549.44
 9963.22 2549.39 9966.27 2549.32 9967.74 2549.27 9968.22 2549.27 9971.27 2549.21
 9973.22 2549.19 9976.26 2549.12 9978.22 2549.11 9981.26 2549.04 9983.22 2549.03
 9985.98 2548.96 9987.94 2548.94 9988.22 2548.94 9991.27 2548.97 9993.22 2548.96
 9996.28 2548.99 9998.13 2548.98 9998.23 2548.98 10001.3 2549.0110003.22 2549.11
10003.29 2549.1110006.33 2549.1310008.21 2549.2310011.35 2549.2510013.21 2549.35
10016.38 2549.3710019.99 2549.5810021.05 2549.6610023.17 2549.8410024.21 2549.93
10025.04    255010026.09  2550.110026.37 2550.1210031.94 2550.5210033.17 2550.63
 10036.5 2550.9210038.16 2551.0710041.54 2551.3610045.81 2551.7310046.59  2551.8
10047.48 2551.8810048.84    255210049.56 2552.0510050.69 2552.1410051.89 2552.23
10056.69 2552.61 10058.1 2552.7310061.74    255310062.35 2553.0610063.08 2553.09
10066.79 2553.3810068.06 2553.4510070.95 2553.6410072.32 2553.7510074.36  2553.9
10075.67    255410077.67 2554.15 10078.8 2554.1110083.03  2554.310085.68 2554.19

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9870.57    .055 9952.53     .0510003.29    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9932.9510026.09           557.67  549.66  562.77             .1       .3

CROSS SECTION


RIVER: RV WI T3
REACH: R1                 RS: 0.656

INPUT
Description: Q=500 cfs (CP3S, 24 hr)
Station Elevation Data    num=     135
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9822.63 2541.35 9823.52  2541.4 9824.41 2541.46 9825.16 2541.49 9826.49 2541.44
 9839.91 2540.85 9840.39 2540.82 9841.33 2540.76 9842.02 2540.73 9842.49  2540.7
 9842.84 2540.69 9849.82 2540.18 9850.74 2540.09 9850.79 2540.08 9851.28 2540.04
  9851.3 2540.04 9851.31 2540.03 9851.32 2540.03 9851.35 2540.03 9851.37 2540.03
  9851.4 2540.03 9851.84 2540.01 9851.93    2540 9851.97    2540 9852.22    2540
 9852.28    2540 9852.66    2540 9852.73    2540 9854.15 2539.91 9854.36  2539.9
 9855.76 2539.83 9856.23 2539.79 9857.67  2539.7 9860.22  2539.5 9864.86 2539.19
 9865.14 2539.17 9865.18 2539.17 9865.33 2539.16 9873.83 2538.47 9873.86 2538.47
 9873.89 2538.47 9873.92 2538.47 9873.94 2538.46 9873.97 2538.46 9873.98 2538.46
 9874.12 2538.45 9881.58 2538.36  9881.9 2538.35 9882.38 2538.34 9882.64 2538.34
 9883.05 2538.33 9883.64 2538.33 9888.19 2538.27 9889.14 2538.25 9890.39 2538.24
 9891.59 2538.22 9892.72 2538.21 9893.75 2538.19 9896.25 2538.16 9897.42 2538.14
 9898.85 2538.12 9900.59  2538.1 9901.51 2538.09  9902.7 2538.07  9903.6 2538.06
 9903.73 2538.06 9904.24 2538.05 9904.99 2538.04 9906.35 2538.04 9910.56    2538
 9910.88    2538 9911.16    2538 9911.27    2538 9912.07 2537.99 9918.46 2537.93
 9921.44 2537.92  9922.2  2537.9 9924.41 2537.88 9925.81 2537.86 9927.31 2537.84
 9927.61 2537.83 9930.08  2537.8  9932.4 2537.79 9934.53 2537.78  9936.8 2537.76
 9941.22 2537.74 9943.81 2537.69 9944.24 2537.69 9944.78 2537.68 9946.67 2537.65
 9962.01 2537.78 9964.39 2537.69 9966.04 2537.68 9968.96 2537.56  9970.1 2537.54
  9973.8 2537.39 9978.89 2537.23 9979.33 2537.22 9984.29 2537.13 9985.11 2537.12
 9987.15 2536.93 9987.25 2536.92 9987.38 2536.91 9987.62 2536.88 9987.99 2536.85
 9990.16 2536.63 9992.27 2536.42 9996.34    2536 9997.95 2535.8410002.12 2535.41
10003.68 2535.6510006.06    253610007.18 2536.1710012.17  2536.910013.752537.128
10019.78    2538   10020 2538.0110025.45 2538.3410026.23 2538.3810026.99 2538.42
10028.11 2538.4910028.63 2538.52 10038.6 2539.0910050.63 2539.7710054.66    2540
10056.18 2540.1510061.84 2540.7110061.94 2540.7110061.95 2540.7110061.96 2540.71
10066.08 2540.7110066.48 2540.7110066.85 2540.7110067.19 2540.71 10067.2 2540.71

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
```

```
**********************************************
 9822.63    .055 9990.16     .0510012.17    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9984.2910013.75           550.92  552.74     557             .1       .3

CROSS SECTION


RIVER: RV WI T3
REACH: R1                  RS: 0.552

INPUT
Description:
Station Elevation Data    num=     115
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
**********************************************************************************
 9865.86 2530.85 9866.03 2530.85  9868.7 2530.86 9869.11 2530.86 9869.83 2530.87
 9878.92 2530.47  9886.7 2530.19 9888.19 2530.13  9891.1    2530  9891.2    2530
 9891.32    2530 9891.82    2530 9898.35 2529.75 9902.68 2529.58 9905.72 2529.46
 9905.96 2529.45 9906.22 2529.44 9906.53 2529.42 9908.19  2529.3 9908.69 2529.26
  9909.2 2529.22 9909.64 2529.19 9910.41 2529.13 9917.67 2528.57 9919.17 2528.46
  9921.8 2528.26 9924.66 2528.05 9925.25    2528 9925.26    2528 9925.81 2527.96
  9925.9 2527.95 9927.13 2527.86  9927.9  2527.8 9928.85 2527.73 9930.62 2527.59
 9932.08 2527.47 9933.49 2527.36 9933.85 2527.33 9935.17 2527.23 9951.69 2526.25
 9952.38 2526.21 9953.95 2526.14  9955.1  2526.1    9956 2526.06 9956.49 2526.04
 9957.05 2526.03 9957.44 2526.01 9957.95    2526 9957.99    2526 9959.51 2525.96
 9964.95 2525.78 9969.15 2525.24 9976.17 2524.43 9979.86    2524 9979.88    2524
 9979.95    2524 9979.97    2524 9983.95 2523.53 9984.42 2523.47 9984.57 2523.45
 9984.62 2523.45 9984.78 2523.43 9987.05 2523.5710002.73 2523.5310003.22 2523.52
10006.45 2523.2710007.69 2523.4510008.36 2523.55 10009.3 2523.6910010.59 2523.88
10011.44    252410011.46    2524 10011.8 2524.0510011.82 2524.0510011.84 2524.05
10011.86 2524.0610012.91 2524.2110012.99 2524.2210014.65 2524.4710014.72 2524.48
10018.79 2525.0210019.76 2525.1410019.78 2525.1510020.47 2525.2210021.73 2525.35
10021.91 2525.3810022.23 2525.4310026.85    252610027.34    252610027.75    2526
10027.96    252610028.18    2526 10029.2 2526.1410030.81 2526.2710032.03 2526.11
10058.55 2526.5810065.81 2526.9110068.21  2526.910083.86 2527.1610084.84 2527.17
10085.29 2527.1810086.13 2527.1910095.35  2527.210108.96 2527.2710111.38 2527.24
10114.83 2527.1910120.17 2527.1310120.19 2527.1310120.23 2527.1310123.54 2527.31
10136.01    252810136.43 2528.0210140.04 2528.2310142.82 2528.3910147.27 2528.64

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
 9865.86    .055 9976.17     .0510007.69    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9964.9510026.85           428.96  407.08  407.98             .1       .3

CROSS SECTION


RIVER: RV WI T3
REACH: R1                  RS: 0.475

INPUT
Description:
Station Elevation Data    num=     115
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
**********************************************************************************
 9685.19 2521.72 9694.63 2520.99  9707.6 2520.01 9707.64 2520.01 9707.67    2520
 9707.73    2520 9710.76 2519.81 9711.25 2519.78 9718.25 2519.33 9719.98 2519.21
 9729.68 2518.51  9730.7 2518.44 9732.93 2518.26 9735.84    2518 9736.85 2517.93
 9752.48 2516.97 9754.67 2516.84 9764.91  2516.7 9766.54 2516.67 9768.07 2516.63
 9769.53  2516.6 9776.58 2516.28 9779.63 2516.14 9781.19 2516.06 9782.25    2516
  9782.3    2516 9782.65 2515.98 9787.14 2515.78 9788.39 2515.79 9789.54 2515.79
 9791.97 2515.79 9795.16 2515.79 9799.32 2515.84 9802.2[illegible] 2515.83 9803.18 2515.83
 9804.67 2515.82 9810.01 2515.52 9814.19  2515.3    9815 2515.26 9816.22 2515.21
 9819.08 2515.17 9821.18 2515.28 9826.73 2515.69 9829.67    2516 9829.78    2516
 9830.65    2516 9837.96 2516.26 9840.09 2516.38 9841.21 2516.39 9841.42 2516.38
 9844.83 2516.47 9847.65 2516.55  9852.9 2516.57 9856.91 2516.64 9860.25 2516.69
 9873.41 2516.78  9875.7 2516.74 9915.23 2516.85 9915.51 2516.85 9915.95 2516.86
 9916.88 2516.84 9916.99 2516.84 9917.09 2516.83 9917.27 2516.83 9917.34 2516.83
 9957.35  2516.5 9957.74 2516.49 9957.96 2516.48 9958.67 2516.46 9963.87 2516.32
 9964.79 2516.32 9965.62 2516.29 9966.67 2516.29 9966.99 2516.29 9967.38 2516.29
 9968.76 2516.25 9970.96 2516.19  9971.2 2516.19  9973.4 2516.17 9975.33  2516.1
 9975.65  2516.1 9977.12 2516.05 9978.11 2516.02 9978.19 2516.02 9978.32 2516.01
 9978.72    2516 9984.12 2515.89 9985.24 2515.87 9985.61 2515.85 9988.77 2515.39
 9993.51  2514.7 9995.43 2514.43 9997.93 2514.08 9998.48    2514 9999.54 2513.85
10000.84 2513.8210001.67    251410004.92 2514.5210011.21 2515.5310012.59 2515.75
10013.04 2515.8210013.26 2515.8610014.48    2516 10019.2  2516.510020.48 2516.63
10033.64    2518 10033.7    251810033.73    2518   10034 2518.0210034.65 2518.07
10035.18 2518.1110042.14 2518.6510059.58    2520 10059.8 2520.01 10060.9 2520.02

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
 9685.19    .055 9988.77     .0510004.92    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9977.12 10019.2           501.31  501.12  508.45             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
 9685.19 9915.95    2520       F

CROSS SECTION


RIVER: RV WI T3
REACH: R1                  RS: 0.380
```

```
INPUT
Description:
Station Elevation Data    num=     150
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 9706.72 2508.99 9707.32 2508.99 9708.22 2509.02 9711.19 2509.15 9714.92    2509
 9715.03    2509 9717.43 2508.78 9720.96 2508.46 9722.06 2508.36 9728.75    2508
 9728.82    2508 9728.83    2508 9728.84    2508 9728.85    2508 9728.86    2508
 9728.87    2508 9732.11    2508 9732.45    2508 9738.99 2507.86 9739.21 2507.85
 9748.51 2507.71 9763.22 2506.94 9766.42 2506.84 9767.63  2506.8  9767.8  2506.8
 9767.97 2506.79 9768.13 2506.78 9768.28 2506.78 9771.25 2506.68 9772.05 2506.66
 9772.91 2506.66 9773.89 2506.67 9774.52 2506.68 9775.08 2506.67  9776.6 2506.65
 9778.67 2506.62 9781.79 2506.61 9787.16 2506.58 9792.51 2506.55 9795.64 2506.53
 9799.95 2506.51 9803.29 2506.51 9804.11 2506.51 9807.13 2506.51 9812.72 2506.16
 9813.64  2506.1 9814.59 2506.03 9815.08    2506  9815.1    2506 9816.55  2505.9
 9818.29 2505.78 9821.73 2505.55 9824.12 2505.39 9828.37 2505.11  9829.1 2505.06
 9829.44 2505.03 9829.98    2505 9830.22 2504.98 9831.97 2504.87 9839.92 2505.45
 9841.48 2505.56 9843.08 2505.67 9844.46 2505.77 9845.22 2505.82 9847.28 2505.97
  9847.7    2506 9849.04  2506.1 9849.87 2506.15 9851.11 2506.24 9853.31 2506.21
 9854.48  2506.2 9857.34 2506.17 9863.86  2506.1 9865.89 2506.07 9871.48 2506.09
 9875.31 2506.02 9876.31    2506 9880.51 2505.93 9882.19 2505.88  9885.6  2505.8
 9887.46 2505.72 9892.57 2505.61 9894.18 2505.56 9895.06  2505.6 9902.46 2505.56
  9907.3 2505.59  9913.8 2505.63 9925.13 2505.68 9925.77 2505.68 9927.21 2505.68
 9932.99  2505.3 9935.04 2505.17 9935.84 2505.12 9947.34 2504.09 9948.13 2504.14
 9954.11 2504.57 9957.38 2504.82 9957.83 2504.85 9961.12 2505.14 9963.38 2505.17
 9964.96 2505.21 9967.38 2505.27 9970.89 2505.36 9972.93 2505.42 9979.44 2505.59
 9985.46 2505.14 9986.53 2505.06 9987.49 2504.98 9988.09 2504.94 9988.85 2504.88
  9989.6 2504.82  9989.9  2504.8 9990.83 2504.72 9992.96 2504.54 9996.98 2504.21
 9998.42 2504.09 9999.47    250410000.03    250410000.18    250410000.25    2504
10000.41 2504.0110001.58 2504.0710002.32 2504.1110006.11 2504.3910011.02 2504.75
10011.25 2504.7710019.99 2504.6910023.43 2504.7910030.11 2504.9710037.73 2505.19
10042.72 2505.3210044.68 2505.3610050.62 2505.5110053.51 2505.5610055.76  2505.6
10072.41 2505.8610073.03 2505.8710073.53 2505.8910073.92  2505.910074.72 2505.92
10075.18 2505.9310076.24 2505.96 10077.7    250610078.51 2506.02 10080.5 2506.07
10081.43 2506.0810082.12 2506.0810082.68 2506.0910083.77 2506.0910083.79 2506.09

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*************************************************
 9706.72    .055  9989.9     .0510011.25    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9979.4410055.76           610.36  541.55  534.37             .1       .3

CROSS SECTION


RIVER: RV WI T3
REACH: R1                 RS: 0.277

INPUT
Description:
Station Elevation Data    num=     104
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 9754.02 2493.29 9754.24 2493.27 9757.24 2493.03 9764.83 2492.48 9769.62 2492.07
  9771.3 2492.08 9771.83 2492.08 9780.28 2492.29 9782.96 2492.37 9786.28 2492.44
 9788.54 2492.48 9792.13 2492.52 9794.68 2492.57 9819.23 2492.23 9827.25 2492.26
  9837.7 2492.89 9839.37 2492.93 9841.36 2492.82 9841.92 2492.81 9846.82 2492.58
 9860.54 2492.68  9862.7 2492.67 9865.01 2492.68 9878.42 2492.33 9886.92  2492.3
 9887.34 2492.32 9887.86 2492.31 9888.82 2492.35 9890.84 2492.38  9917.4 2492.77
 9919.09 2492.77 9919.33 2492.76 9919.36 2492.76 9923.52 2492.62 9943.77 2492.71
 9944.79 2492.71    9966 2492.76 9966.35 2492.72 9966.46 2492.71 9966.66 2492.68
 9967.22 2492.62 9969.81 2492.31 9972.44    2492 9972.46    2492  9977.4 2491.41
 9977.45 2491.41 9982.32 2491.82 9983.74 2491.94 9984.42    2492 9986.75 2492.19
 9987.23 2492.24 9987.39 2492.25 9987.69 2492.27 9987.93 2492.23 9988.36 2492.16
 9989.31    2492    9990 2491.8810000.15 2490.1710002.07 2490.4810003.21 2490.67
10006.03 2491.1510011.03    249210011.92 2492.15 10016.3  2492.910018.39 2492.63
10020.31 2492.3910021.45 2492.2310023.19    249210024.29 2491.8610027.52 2491.43
10028.32 2491.3210029.54 2491.1410031.59 2491.3910033.61 2491.6310036.66    2492
10036.76    249210039.55 2492.3310040.93 2492.4910043.47 2492.7210044.43 2492.81
10045.49 2492.9310047.94 2493.1910048.17 2493.2110052.12 2493.5110052.21 2493.52
10052.51 2493.5410052.57 2493.5510054.05 2493.6810055.23 2493.6910065.96 2493.86
 10071.6 2493.8810072.68  2493.910078.37 2493.9210078.75 2493.92 10084.3 2493.95
10084.56 2493.9510090.04 2493.9110090.52 2493.9210093.54 2493.9510093.79 2493.96
10096.99 2493.9910097.02 2493.9910098.76    249410100.96    2494

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*************************************************
 9754.02    .055 9977.45     .0510018.39    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          9966 10016.3           472.24  481.08  502.68             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
 10016.310100.96    2494       F

CROSS SECTION


RIVER: RV WI T3
REACH: R1                 RS: 0.186

INPUT
Description: Q=510 cfs (CP3S, 24 hr) This flowrate was modified from the
             hydrology report to include flow from Basin 4N. The additional
             flow from this basin was proportioned to RV WI and RV WI T3 based
             on their tributary areas.
```

```
Station Elevation Data    num=     116
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 9835.22 2484.24 9835.26 2484.24  9836.6 2484.24 9838.49 2484.24 9841.69 2484.11
 9844.51    2484 9844.57    2484 9845.49 2483.96 9861.23 2483.34 9862.41 2483.29
 9862.75 2483.28 9863.13 2483.28 9866.65 2483.14 9866.94 2483.12 9867.55 2483.08
 9868.98    2483 9871.12 2482.87 9875.39 2482.61 9877.97 2482.44 9882.62 2482.14
  9884.7    2482  9885.7 2481.94 9887.55 2481.82 9888.42 2481.76 9888.93 2481.73
 9891.95 2481.53 9897.52 2481.27 9900.51 2481.09 9905.84 2480.83 9912.33  2480.4
 9913.55 2480.33 9913.97  2480.3 9914.61 2480.26 9914.73 2480.27 9914.85 2480.27
 9932.04 2480.83 9934.71 2480.87 9937.56 2480.98 9941.04 2481.12 9942.87 2481.14
 9944.05 2481.16 9944.73 2481.17 9947.98 2481.18 9950.33 2481.14  9950.4 2481.14
 9956.15 2480.97 9961.73  2480.8 9963.94 2480.66 9966.71 2480.51 9967.62 2480.46
 9969.63 2480.34 9970.58 2480.28 9971.76 2480.21 9973.37 2480.12 9974.83 2480.05
 9975.48    2480 9975.54    2480 9975.64    2480 9976.12 2479.97 9976.67 2479.94
  9976.7 2479.94 9977.39 2479.89 9977.79 2479.86 9978.82 2479.91 9979.43    2480
  9980.9 2480.23 9982.62  2480.5 9985.68 2481.07 9990.11 2480.67 9992.93 2480.42
  9994.1 2480.34 9994.49 2480.31 9995.23 2480.26 9995.26 2480.26 9996.08  2480.2
 9997.57 2480.09 9998.66    2480 9999.42 2479.9410000.65 2479.8410003.73 2479.87
10003.81 2479.8910004.19    248010007.89 2481.0610009.03 2481.3910011.15    2482
10011.72 2482.1610012.09 2482.26 10012.4 2482.3510018.07 2482.2610018.43 2482.26
10030.75 2482.2210036.67 2482.1810039.28 2482.1610039.59 2482.1610040.76 2482.19
10041.72 2482.2110042.38 2482.2210045.24 2482.2410045.88 2482.2310061.78 2482.49
10072.09 2482.5710074.97 2482.5910076.82 2482.6110077.79 2482.62   10078 2482.63
10078.21 2482.6310078.43 2482.6410084.48 2482.8410084.51 2482.84 10084.7 2482.85
10084.77 2482.8510084.85 2482.8510084.97 2482.8610085.42 2482.8810095.99 2482.45
 10096.2 2482.44

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9835.22    .055 9976.67     .0510003.81    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9985.6810007.89           487.04  465.11  468.82             .1       .3

CROSS SECTION


RIVER: RV WI T3
REACH: R1                 RS: 0.098

INPUT
Description:
Station Elevation Data    num=      63
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 9918.36 2472.01 9918.65    2472 9918.67    2472 9919.02 2471.97 9919.53 2471.94
 9919.95 2471.91 9920.12 2471.89 9930.21 2471.37 9932.13 2471.25 9951.23 2470.09
 9951.29 2470.09 9951.35 2470.09 9951.55 2470.08 9951.66 2470.08 9951.81 2470.08
 9951.97 2470.08  9952.1 2470.08 9952.23 2470.08 9952.31 2470.08 9952.39 2470.08
 9952.47 2470.08 9961.89 2470.16 9962.88 2470.17 9964.21 2470.19 9969.95 2470.25
 9970.22 2470.26 9970.44 2470.26  9970.6 2470.26 9970.86 2470.26 9970.91 2470.26
 9971.24 2470.24 9971.65  2470.2    9974    2470 9981.25 2469.38 9981.31 2469.37
 9982.85 2469.2410000.05 2468.3610002.97 2468.2210003.08 2468.2110010.53 2469.19
10012.21 2469.4110013.45 2469.5710016.03  2469.910016.79    247010017.75 2470.12
10019.45 2470.3410027.61 2470.6710034.92 2471.0310047.72 2471.6710052.06 2471.87
10054.38    247210054.39    247210057.47 2472.1410087.86 2473.5110089.11 2473.48
10089.31 2473.4610097.02 2473.8310102.66 2473.9710102.74 2473.9710102.82 2473.97
10102.94 2473.9710107.13 2473.7910107.22 2473.79

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9918.36    .055 9981.25     .0510002.97    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9970.8610019.45                0       0       0             .1       .3

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

SUMMARY OF MANNING'S N VALUES

River:RV WI
*****************************************************************
*     Reach      *   River Sta.   *   n1    *   n2    *   n3    *
*****************************************************************
*R1              *    7.262       *     .055*      .05*     .055*
*R1              *    7.217       *     .055*      .05*     .055*
*R1              *    7.127       *     .055*      .05*     .055*
*R1              *    7.042       *     .055*      .05*     .055*
*R1              *    6.961       *     .055*      .05*     .055*
*R1              *    6.898       *     .055*      .05*     .055*
*R1              *    6.797       *     .055*      .05*     .055*
*R1              *    6.681       *     .055*      .05*     .055*
*R1              *    6.613       *     .055*      .05*     .055*
*R1              *    6.526       *     .055*      .05*     .055*
*R2              *    6.453       *     .055*      .05*     .055*
*R2              *    6.446       *     .055*      .05*     .055*
*R2              *    6.439       *Culvert  *        *        *
*R2              *    6.435       *     .055*      .05*        *
*R2              *    6.423       *     .055*      .05*     .055*
*****************************************************************

River:RV WI T3
*****************************************************************
*     Reach      *   River Sta.   *   n1    *   n2    *   n3    *
*****************************************************************
*R1              *    0.797       *     .055*      .05*     .055*
*R1              *    0.760       *     .055*      .05*     .055*
```

*R1	0.656	.055*	.05*	.055*
*R1	0.552	.055*	.05*	.055*
*R1	0.475	.055*	.05*	.055*
*R1	0.380	.055*	.05*	.055*
*R1	0.277	.055*	.05*	.055*
*R1	0.186	.055*	.05*	.055*
*R1	0.098	.055*	.05*	.055*

SUMMARY OF REACH LENGTHS

River: RV WI

Reach	River Sta.	Left	Channel	Right
*R1	7.262	350.67*	236.11*	240.18*
*R1	7.217	541.85*	475.74*	467.51*
*R1	7.127	460.49*	447.38*	465.5*
*R1	7.042	437.48*	432.18*	434.33*
*R1	6.961	338.67*	332.56*	262.02*
*R1	6.898	523.25*	530.5*	557.79*
*R1	6.797	613.78*	613.64*	630.41*
*R1	6.681	360.74*	356.27*	355.13*
*R1	6.613	457.89*	460.46*	463.57*
*R1	6.526	0*	0*	0*
*R2	6.453	49.12*	49.12*	49.12*
*R2	6.446	48.09*	48.09*	48.09*
*R2	6.439	*Culvert *	*	*
*R2	6.435	59.03*	59.03*	59.03*
*R2	6.423	0*	0*	0*

River: RV WI T3

Reach	River Sta.	Left	Channel	Right
*R1	0.797	269.34*	194.82*	200.73*
*R1	0.760	557.67*	549.66*	562.77*
*R1	0.656	550.92*	552.74*	557*
*R1	0.552	428.96*	407.08*	407.98*
*R1	0.475	501.31*	501.12*	508.45*
*R1	0.380	610.36*	541.55*	534.37*
*R1	0.277	472.24*	481.08*	502.68*
*R1	0.186	487.04*	465.11*	468.82*
*R1	0.098	0*	0*	0*

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: RV WI

Reach	River Sta.	Contr.	Expan.
*R1	7.262	.1*	.3*
*R1	7.217	.1*	.3*
*R1	7.127	.1*	.3*
*R1	7.042	.1*	.3*
*R1	6.961	.1*	.3*
*R1	6.898	.1*	.3*
*R1	6.797	.1*	.3*
*R1	6.681	.1*	.3*
*R1	6.613	.1*	.3*
*R1	6.526	.1*	.3*
*R2	6.453	.3*	.5*
*R2	6.446	.3*	.5*
*R2	6.439	*Culvert *	*
*R2	6.435	.3*	.5*
*R2	6.423	.1*	.3*

River: RV WI T3

Reach	River Sta.	Contr.	Expan.
*R1	0.797	.1*	.3*
*R1	0.760	.1*	.3*
*R1	0.656	.1*	.3*
*R1	0.552	.1*	.3*
*R1	0.475	.1*	.3*
*R1	0.380	.1*	.3*
*R1	0.277	.1*	.3*
*R1	0.186	.1*	.3*
*R1	0.098	.1*	.3*

ERRORS WARNINGS AND NOTES
Errors Warnings and Notes for Plan : Wash I

River: RV WI Reach: R1 RS: 7.262 Profile: 100-YR FP
Warning:The energy loss was 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: RV WI Reach: R1 RS: 7.217 Profile: 100-YR FP
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

```
    Warning:Divided flow computed for this cross-section.
    Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
            This may indicate the need for additional cross sections.
    Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
            the need for additional cross sections.
    Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
            water surface came back below critical depth.  This indicates that there is not a valid subcritical answer.  The
            program defaulted to critical depth.
    Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, water surface was
            used.
River: RV WI  Reach: R1     RS: 7.127     Profile: 100-YR FP
    Warning:The energy equation could not be balanced within the specified number of iterations.  The program used critical depth
            for the water surface and continued on with the calculations.
    Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
            the need for additional cross sections.
    Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
            water surface came back below critical depth.  This indicates that there is not a valid subcritical answer.  The
            program defaulted to critical depth.
River: RV WI  Reach: R1     RS: 7.042     Profile: 100-YR FP
    Warning:The energy equation could not be balanced within the specified number of iterations.  The program used critical depth
            for the water surface and continued on with the calculations.
    Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
            the need for additional cross sections.
    Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
            water surface came back below critical depth.  This indicates that there is not a valid subcritical answer.  The
            program defaulted to critical depth.
River: RV WI  Reach: R1     RS: 6.961     Profile: 100-YR FP
    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.
    Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, water surface was
            used.
River: RV WI  Reach: R1     RS: 6.898     Profile: 100-YR FP
    Warning:The energy equation could not be balanced within the specified number of iterations.  The program selected the water
            surface that had the least amount of error between computed and assumed values.
    Warning:Divided flow computed for this cross-section.
    Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
            the need for additional cross sections.
    Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
            water surface came back below critical depth.  This indicates that there is not a valid subcritical answer.  The
            program defaulted to critical depth.
River: RV WI  Reach: R1     RS: 6.797     Profile: 100-YR FP
    Warning:The energy equation could not be balanced within the specified number of iterations.  The program used critical depth
            for the water surface and continued on with the calculations.
    Warning:Divided flow computed for this cross-section.
    Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
            the need for additional cross sections.
    Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
            water surface came back below critical depth.  This indicates that there is not a valid subcritical answer.  The
            program defaulted to critical depth.
River: RV WI  Reach: R1     RS: 6.681     Profile: 100-YR FP
    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.
River: RV WI  Reach: R1     RS: 6.613     Profile: 100-YR FP
    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.
    Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, water surface was
            used.
River: RV WI  Reach: R1     RS: 6.526     Profile: 100-YR FP
    Warning:The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for additional cross sections.
    Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
            the need for additional cross sections.
    Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, water surface was
            used.
River: RV WI  Reach: R2     RS: 6.453     Profile: 100-YR FP
    Warning:The energy equation could not be balanced within the specified number of iterations.  The program used critical depth
            for the water surface and continued on with the calculations.
    Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
            This may indicate the need for additional cross sections.
    Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
            the need for additional cross sections.
    Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
            water surface came back below critical depth.  This indicates that there is not a valid subcritical answer.  The
            program defaulted to critical depth.
    Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, water surface was
            used.
River: RV WI  Reach: R2     RS: 6.446     Profile: 100-YR FP
    Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.
River: RV WI  Reach: R2     RS: 6.439     Profile: 100-YR FP     Culv: Culvert #1
    Note:   The flow in the culvert is entirely supercritical.
River: RV WI  Reach: R2     RS: 6.435     Profile: 100-YR FP
    Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.
River: RV WI  Reach: R2     RS: 6.423     Profile: 100-YR FP
    Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, water surface was
            used.
River: RV WI T3  Reach: R1     RS: 0.797     Profile: 100-YR FP
    Warning:The energy loss was 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: RV WI T3  Reach: R1     RS: 0.760     Profile: 100-YR FP
    Warning:The conveyance ratio (upstream 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: RV WI T3  Reach: R1     RS: 0.656     Profile: 100-YR FP
    Warning:The energy equation could not be balanced within the specified number of iterations.  The program used critical depth
            for the water surface and continued on with the calculations.
    Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
            the need for additional cross sections.
```

```
    Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
            water surface came back below critical depth.  This indicates that there is not a valid subcritical answer.  The
            program defaulted to critical depth.
River: RV WI T3  Reach: R1     RS: 0.552     Profile: 100-YR FP
    Warning:The energy loss was 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: RV WI T3  Reach: R1     RS: 0.475     Profile: 100-YR FP
    Warning:The energy equation could not be balanced within the specified number of iterations.  The program used critical depth
            for the water surface and continued on with the calculations.
    Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
            the need for additional cross sections.
    Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
            water surface came back below critical depth.  This indicates that there is not a valid subcritical answer.  The
            program defaulted to critical depth.
    Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, water surface was
            used.
River: RV WI T3  Reach: R1     RS: 0.380     Profile: 100-YR FP
    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.
River: RV WI T3  Reach: R1     RS: 0.277     Profile: 100-YR FP
    Warning:The energy equation could not be balanced within the specified number of iterations.  The program used critical depth
            for the water surface and continued on with the calculations.
    Warning:Divided flow computed for this cross-section.
    Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
            the need for additional cross sections.
    Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
            water surface came back below critical depth.  This indicates that there is not a valid subcritical answer.  The
            program defaulted to critical depth.
    Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, water surface was
            used.
River: RV WI T3  Reach: R1     RS: 0.186     Profile: 100-YR FP
    Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
            the need for additional cross sections.
    Note:   Manning's n values were composited to a single value in the main channel.
River: RV WI T3  Reach: R1     RS: 0.098     Profile: 100-YR FP
    Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
            the need for additional cross sections.
```

E.3.7 HEC-RAS Output

RV Wash K

7 Wash K Profile: 100-YR FP

River	Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
RV WK T13	R1	1.960	100-YR FP	990.00	2760.87	2764.42	2764.42	2764.97	0.010815	7.77	249.59	217.78	0.80
RV WK T13	R1	1.894	100-YR FP	990.00	2752.11	2754.51	2754.51	2755.10	0.023061	8.40	196.10	163.65	1.09
RV WK T13	R1	1.810	100-YR FP	990.00	2738.95	2741.24	2741.24	2741.63	0.017845	6.40	249.74	391.89	0.93
RV WK T13	R1	1.700	100-YR FP	990.00	2723.28	2724.73	2724.73	2725.34	0.032058	7.55	177.03	171.18	1.21
RV WK T13	R1	1.577	100-YR FP	990.00	2703.26	2705.32	2705.32	2705.59	0.019824	6.74	329.47	522.34	0.98
RV WK T13	R1	1.494	100-YR FP	990.00	2689.11	2691.50	2691.50	2691.79	0.017114	6.64	317.46	453.25	0.92
RV WK T13	R1	1.415	100-YR FP	990.00	2676.11	2675.90	2675.85	2676.40	0.037466		181.53	160.87	0.00
RV WK T13	R1	1.276	100-YR FP	990.00	2649.33	2651.28	2651.28	2651.65	0.032159	5.75	226.38	290.77	0.90
RV WK T13	R1	1.239	100-YR FP	990.00	2641.70	2645.15	2645.15	2646.01	0.020672	7.78	146.79	92.26	0.89
RV WK T13	R1	1.164	100-YR FP	990.00	2629.82	2632.59	2632.59	2633.14	0.019441	7.24	208.39	192.62	0.88
RV WK T13	R1	1.026	100-YR FP	990.00	2605.11	2608.21	2608.19	2608.74	0.027242	6.49	186.44	183.90	0.86
RV WK T13	R1	0.901	100-YR FP	1450.00	2591.70	2594.24	2594.24	2595.20	0.017633	8.01	195.14	107.48	0.98
RV WK T13	R2	0.866	100-YR FP	1771.00	2585.60	2589.15		2589.54	0.016946	5.02	352.88	200.32	0.67
RV WK T13	R2	0.865	100-YR FP	1771.00	2585.42	2589.01		2589.44	0.019652	5.27	336.30	197.63	0.71
RV WK T13	R2	0.864	100-YR FP	1771.00	2585.22	2588.67	2588.59	2589.28	0.035471	6.25	283.15	197.61	0.92
RV WK T13	R3	0.808	100-YR FP	642.00	2580.58	2582.83	2582.83	2583.28	0.020050	5.94	140.59	171.20	0.95
RV WK T13	R3	0.752	100-YR FP	642.00	2574.22	2576.23	2576.16	2576.45	0.019098	5.51	241.04	496.36	0.92
RV WK T13	R3	0.630	100-YR FP	642.00	2557.65	2559.67	2559.62	2559.94	0.037974	5.20	163.61	295.71	1.17
RV WK T13	R3	0.537	100-YR FP	642.00	2545.22	2547.74	2547.74	2548.12	0.016611	6.92	175.47	226.91	0.92
RV WK T13	R3	0.419	100-YR FP	3300.00	2530.45	2531.63	2531.31	2531.80	0.017245	3.45	1009.32	1074.92	0.79
RV WK T13	R3	0.339	100-YR FP	3300.00	2520.62	2522.34	2522.20	2522.63	0.027816	6.19	775.41	926.16	1.09
RV WK T13	R3	0.231	100-YR FP	3300.00	2507.48	2510.39	2510.23	2510.69	0.017886	6.87	825.10	784.88	0.84
RV WK T13	R3	0.111	100-YR FP	3300.00	2493.52	2495.62	2495.62	2496.12	0.030408	5.58	611.32	638.97	1.01
RV WK S4	R1	0.497	100-YR FP	752.00	2599.62	2601.50		2601.74	0.015829	5.81	223.14	242.90	0.87
RV WK S4	R1	0.496		Lat Struct									
RV WK S4	R1	0.483	100-YR FP	732.00	2598.03	2599.71	2599.71	2600.04	0.032937	5.21	174.06	239.39	1.02
RV WK S4	R1	0.482		Lat Struct									
RV WK S4	R1	0.456	100-YR FP	321.00	2594.39	2596.33		2596.47	0.009751	3.85	111.69	121.11	0.63
RV WK S4	R1	0.455		Lat Struct									
RV WK S4	R1	0.443	100-YR FP	321.00	2593.30	2594.98	2594.98	2595.37	0.028790	6.09	70.98	84.48	1.07
RV WK S4	R2	0.339	100-YR FP	1134.00	2579.18	2582.66	2582.66	2583.28	0.016996	7.77	220.13	177.57	0.83
RV WK S4	R2	0.285	100-YR FP	1134.00	2572.41	2575.62	2575.62	2576.14	0.021248	6.18	225.55	232.73	0.84
RV WK S4	R2	0.240	100-YR FP	2733.00	2566.89	2568.90	2568.90	2569.06	0.017134	4.21	873.47	1064.31	0.64
RV WK S4	R2	0.194	100-YR FP	2733.00	2559.59	2561.24	2561.24	2561.87	0.026398	3.43	435.11	338.72	0.68
RV WK S4	R2	0.108	100-YR FP	2733.00	2547.10	2548.91	2548.91	2549.90	0.015634	2.69	357.54	187.16	0.53
RV WK	R1	8.742	100-YR FP	1530.00	2752.00	2753.61	2753.48	2753.89	0.019380	6.80	408.53	405.53	0.98
RV WK	R1	8.583	100-YR FP	1530.00	2731.22	2733.34	2733.34	2734.08	0.026426	9.07	249.97	165.93	1.17
RV WK	R1	8.444	100-YR FP	1900.00	2715.58	2718.66	2718.66	2719.35	0.014292	8.00	358.64	248.36	0.90
RV WK	R1	8.311	100-YR FP	1960.00	2699.68	2701.63	2701.63	2702.17	0.033278	8.90	368.35	324.02	1.27
RV WK	R1	8.107	100-YR FP	1960.00	2671.45	2674.43	2674.43	2675.07	0.015778	8.55	415.77	414.11	0.95
RV WK	R1	7.952	100-YR FP	1960.00	2650.35	2653.72	2653.72	2654.76	0.016387	9.67	284.25	139.78	1.00
RV WK	R1	7.747	100-YR FP	1960.00	2621.21	2624.38	2624.38	2625.11	0.027109	9.39	324.06	289.43	1.19
RV WK	R1	7.671	100-YR FP	1960.00	2607.96	2610.67	2610.67	2611.53	0.019841	9.58	319.06	185.53	1.07
RV WK	R2	7.603	100-YR FP	1168.00	2597.14	2600.41	2600.41	2601.74	0.015902	9.43	133.12	53.66	0.98
RV WK	R2	7.541	100-YR FP	1599.00	2587.30	2589.83	2589.72	2590.12	0.029780	5.27	380.19	417.99	0.93
RV WK	R2	7.504	100-YR FP	1599.00	2581.04	2583.07	2583.07	2583.48	0.038951	7.54	338.08	689.22	1.29
RV WK	R2	7.463	100-YR FP	1599.00	2574.37	2576.92	2576.92	2577.28	0.017070	7.09	454.19	524.88	0.88
RV WK	R2	7.413	100-YR FP	2733.00	2566.72	2568.90	2568.90	2569.11	0.017943	7.43	873.46	1064.31	0.97
RV WK	R2	7.363	100-YR FP	2733.00	2557.30	2561.58	2561.58	2562.23	0.015019	9.38	567.06	420.06	0.96
RV WK	R2	7.246	100-YR FP	2733.00	2544.38	2549.11	2549.11	2550.23	0.011701	9.11	396.75	199.94	0.81
RV WK	R3	7.131	100-YR FP	3300.00	2530.40	2531.50	2531.31	2531.73	0.025411	3.55	869.07	1004.57	0.82
RV WK	R3	7.061	100-YR FP	3300.00	2522.07	2522.38	2522.18	2522.65	0.023769	1.66	821.39	946.95	0.74
RV WK	R3	6.957	100-YR FP	3300.00	2507.85	2510.35	2510.25	2510.70	0.020101	7.05	790.63	783.39	0.94
RV WK	R3	6.818	100-YR FP	3300.00	2493.44	2495.75	2495.75	2496.28	0.022791	8.74	698.39	672.01	1.10
RV WK	R4	6.686	100-YR FP	3300.00	2479.40	2481.63		2481.93	0.013488	6.20	863.95	667.31	0.83
RV WK	R4	6.597	100-YR FP	3300.00	2469.41	2471.46	2471.46	2471.91	0.035599	9.15	681.52	707.22	1.32
RV WK	R4	6.484	100-YR FP	3300.00	2455.96	2458.83		2459.13	0.013737	6.30	827.62	601.74	0.84
RV WK	R4	6.416	100-YR FP	3300.00	2448.80	2450.84	2450.84	2451.31	0.029861	7.90	679.33	674.24	1.19
RV WK	R4	6.384	100-YR FP	3300.00	2445.11	2448.50	2447.03	2448.62	0.002859	3.80	1284.37	581.04	0.41

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

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

*******************************************************************************
```

PROJECT DATA
Project Title: RV Wash K
Project File : RV_Wash_K.prj
Run Date and Time: 11/1/2007 10:08:40 AM

Project in English units

Project Description:
Rio Verde ADMP, Project FCDMC 2001C056, river system including RV Wash K, RV Wash K Split 16, and RV Wash K Trib 13. Phase 3 RAS model started in June 2005, preliminary model completed in August 2005.

RAS model is prepared by Dibble
Engineering. Field reconnaissance per report dated April 18, 2005.

For the
study washes, the starting water surface elevation is on RV Wash K, and is taken from the starting water surface elevation as provided by the Flood Control District of Maricopa County.

RV Wash K Floodplain Delineation
From
a point approximately 1,800 feet south of the intersection of 144th Street and Dove Valley Road (River Mile 6.149) to a point approximately 850 feet north and 3,300 feet west of the intersection of 136th Street and Black Mountain Road (River Mile 8.742), a distance of 2.593 river miles.

RV Wash K Split 16
Floodplain Delineation
From the confluence with RV Wash K (River Mile 0.000,
approximately 650 feet north and 2,400 feet east of the intersection of 136th Street and Dove Valley Road) to a point approximately 650 feet south and 200 feet east of the intersection of 136th Street and East Rock View Road (River Mile 0.566), a distance of 0.566 river miles.

RV Wash K Trib 13 Floodplain
Delineation
From the confluence with RV Wash K (River Mile 0.000,
approximately 600 feet south and 1,100 feet west of the intersection of 144th Street and Dove Valley Road) to a point approximately 700 feet south and 4,450 feet west of the intersection of 136th Street and East Rock View Road (River Mile 1.939), a distance of 1.939 river miles.

The Cross-section data were
generated by INROADS. The mapped hydraulic base line represents the 10,000-station point of the HEC-RAS model.

Topographic mapping is supplied
by the Flood Control District of Maricopa County.

Discharge data is from the
Rio Verde ADMP HEC-1 model. The original models are from the Flood Control District of Maricopa County, prepared for the Rio Verde South Floodplain Delineation, the Rio Verde South Extension Floodplain Delineation, the Rio Verde North Floodplain Delineation, and the Rio Verde North Extension Floodplain Delineation. The HEC-1 models were modified for the Rio Verde ADMP. The final HEC-1 files were received in February 2004 and FCDMC approved the hydrology model.

Hydrologic concentration points are noted in cross-section
descriptions using the corresponding HEC-1 ID's. The flow rates have been rounded to the nearest 10 cubic feet per second (cfs). Flow rates obtained from HEC-1 are applied at the downstream end of the relevant sub-basin and stepped upstream at cross-sections to meet the HEC-1 flow from the upstream sub-basin.

River Mile (RM) stationing is based upon the estimated tie in
point with downstream receiving waters or the start of two-dimensional flow models. This point represents RM 0.000. The assumed starting WS Elevation is based upon normal depth in the study wash.

Horizontal and Vertical
Coordinate Basis for this project is as follows:
Horizontal--Arizona State
Plane, Central Region, NAD 1983
Vertical--NAVD 1988

RAS model river naming
corresponds to project river naming as follows:
RV WK = RV Wash K
RV WK S16

```
= RV Wash K Split 16
         RV WK T13 = RV Wash K Trib 13

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

PLAN DATA

Plan Title: RV Wash K
Plan File : j:\2006\10-0606.1\Design Notebook\Drainage Design\HEC-RAS\RV_Wash_K.p01

           Geometry Title: RV Wash K
           Geometry File : j:\2006\10-0606.1\Design Notebook\Drainage Design\HEC-RAS\RV_Wash_K.g01

           Flow Title    : RV Wash K
           Flow File     : j:\2006\10-0606.1\Design Notebook\Drainage Design\HEC-RAS\RV_Wash_K.f01

Plan Summary Information:
Number of:  Cross Sections =   56    Multiple Openings  =    0
            Culverts       =    0    Inline Structures  =    0
            Bridges        =    0    Lateral Structures =    3

Computational Information
    Water surface calculation tolerance  =  0.01
    Critical depth calculation tolerance =  0.01
    Maximum number of iterations         =  20
    Maximum difference tolerance         =  0.3
    Flow tolerance factor                =  0.001

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

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

River = RV WK            Reach = R3
RS      Profile           Method  Value1  Value2
6.818   PF 2                   1 9973.07   10272

River = RV WK            Reach = R4
RS      Profile           Method  Value1  Value2
6.686   PF 2                   1 9914.7310162.99
6.597   PF 2                   1 9869.8210228.04
6.484   PF 2                   1 9793.3810144.79
6.416   PF 2                   1 9773.6410084.75
6.346   PF 2                   1 9873.6510017.36

River = RV WK            Reach = R5
RS      Profile           Method  Value1  Value2
6.209   PF 2                   1 9879.4710074.25
6.062   PF 2                   1 9928.1710134.56
5.976   PF 2                   1 9804.2310057.29
5.884   PF 2                   1 9955.3410071.82
5.683   PF 2                   1 9747.2510038.08
5.681   PF 2                   1 9747.35 10038.5
5.679   PF 2                   1 9748.7510033.18

River = RV WK T13        Reach = R3
RS      Profile           Method  Value1  Value2
0.111   PF 2                   1 9804.0810160.96

River = RV WK T12        Reach = R1
RS      Profile           Method  Value1  Value2
1.218   PF 2                   1 9980.4210011.65
1.120   PF 2                   1 9989.9510030.49
1.035   PF 2                   1 9979.9810012.41
0.902   PF 2                   1 9983.4710011.88
0.781   PF 2                   1 9979.2210017.12
0.688   PF 2                   1 9984.7510013.32
0.565   PF 2                   1 9972.2210025.08
0.453   PF 2                   1 9993.71 10015.3
0.324   PF 2                   1 9979.6510027.31
0.230   PF 2                   1 9989.6510022.69
0.170   PF 2                   1 9977.9310017.31
0.099   PF 2                   1 9961.0810019.35

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

FLOW DATA

Flow Title: RV Wash K
Flow File : j:\2006\10-0606.1\Design Notebook\Drainage Design\HEC-RAS\RV_Wash_K.f01

Flow Data (cfs)
*************************************************************
* River          Reach          RS      *       100-YR FP *
* RV WK          R1             8.742   *            1530 *
* RV WK          R1             8.444   *            1900 *
* RV WK          R1             8.311   *            1960 *
* RV WK          R2             7.603   *            1168 *
* RV WK          R2             7.541   *            1599 *
* RV WK          R2             7.413   *            2733 *
* RV WK          R3             7.131   *            3300 *
* RV WK          R3             6.818   *            3300 *
```

```
* RV WK          R4            6.686   *          3300 *
* RV WK S16      R1            0.497   *           752 *
* RV WK S16      R1            0.483   *           732 *
* RV WK S16      R1            0.456   *           321 *
* RV WK S16      R2            0.339   *          1134 *
* RV WK S16      R2            0.240   *          2733 *
* RV WK T13      R1            1.960   *           990 *
* RV WK T13      R1            0.901   *          1450 *
* RV WK T13      R2            0.866   *          1771 *
* RV WK T13      R3            0.808   *           642 *
* RV WK T13      R3            0.419   *          3300 *
* RV WK T13      R3            0.111   *          3300 *
* RV WK S4       R1            0.497   *           752 *
* RV WK S4       R1            0.483   *           732 *
* RV WK S4       R1            0.456   *           321 *
* RV WK S4       R2            0.339   *          1134 *
* RV WK S4       R2            0.240   *          2733 *
*************************************************************

Boundary Conditions
*****************************************************************************************************
* River          Reach          Profile          *          Upstream                Downstream    *
*****************************************************************************************************
* RV WK          R4             100-YR FP        *                                Known WS = 2448.5 *
*****************************************************************************************************

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

GEOMETRY DATA

Geometry Title: RV Wash K
Geometry File : j:\2006\10-0606.1\Design Notebook\Drainage Design\HEC-RAS\RV_Wash_K.g01

Reach Connection Table
*****************************************************************************
* River          Reach          *  Upstream Boundary  * Downstream Boundary *
*****************************************************************************
* RV WK          R1             *                     *   J1                *
* RV WK          R2             *   J1                *   J4                *
* RV WK          R3             *   J4                *   J5                *
* RV WK          R4             *   J5                *                     *
* RV WK S4       R1             *   J1                *   J2                *
* RV WK S4       R2             *   J3                *   J4                *
* RV WK T13      R1             *                     *   J2                *
* RV WK T13      R2             *   J2                *   J3                *
* RV WK T13      R3             *   J3                *   J5                *
*****************************************************************************

JUNCTION INFORMATION

Name: J1
Description:
Energy computation Method

    Length across Junction            Tributary
     River          Reach              River          Reach        Length   Angle
RV WK          R1              to RV WK          R2               358.09
RV WK          R1              to RV WK S4       R1               385.53

Name: J2
Description:
Energy computation Method

    Length across Junction            Tributary
     River          Reach              River          Reach        Length   Angle
RV WK T13      R1              to RV WK T13      R2               188.73
RV WK S4       R1              to RV WK T13      R2               309.65

Name: J3
Description:
Energy computation Method

    Length across Junction            Tributary
     River          Reach              River          Reach        Length   Angle
RV WK T13      R2              to RV WK T13      R3               299.61
RV WK T13      R2              to RV WK S4       R2               232.93

Name: J4
Description:
Energy computation Method

    Length across Junction            Tributary
     River          Reach              River          Reach        Length   Angle
RV WK          R2              to RV WK          R3               611.96
RV WK S4       R2              to RV WK          R3               644.11

Name: J5
Description:
Energy computation Method

    Length across Junction            Tributary
     River          Reach              River          Reach        Length   Angle
RV WK          R3              to RV WK          R4               697.89
RV WK T13      R3              to RV WK          R4               681.94

CROSS SECTION


RIVER: RV WK
REACH: R1              RS: 8.742
```

```
INPUT
Description: Q=1530 cfs (CB2W6, 24 hr)
Station Elevation Data    num=      70
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
  9790.3 2757.97 9807.71 2755.05 9810.07 2754.56 9815.81  2753.3 9823.61 2751.32
  9828.5 2752.03  9835.1 2753.01 9837.92 2753.26 9844.36 2751.84 9847.84 2751.28
 9855.19 2751.26 9855.78 2751.32 9856.44 2751.39 9857.97 2751.34 9867.46 2751.54
 9867.69 2751.55 9877.33 2752.91  9877.7 2752.96 9878.34 2752.96 9888.35 2753.07
 9916.38 2753.17 9919.37 2753.17 9921.91 2753.21 9937.57 2753.29 9952.28 2753.37
 9955.95 2753.34 9980.96 2752.93 9987.65 2752.46 9991.88 2752.03 9999.99    2752
   10000    275210000.08    275210006.93 2752.1210008.58 2752.1210011.72 2752.01
10016.05 2752.36 10018.2 2751.8310020.26  2751.910030.65 2752.4710046.54 2752.39
10059.19 2752.4810065.76 2752.4110083.01 2752.3710099.66 2752.5410100.39 2752.54
10100.64 2752.5510102.86 2752.6310122.45 2753.2810124.04 2753.2910127.47 2753.03
10142.12    275210145.66 2752.3210151.26 2753.1110163.32 2752.9310165.52 2753.02
10169.97 2752.8110172.82 2752.6710181.95 2752.7210185.88  2752.210188.23 2752.08
10196.19 2752.2710196.41 2752.2610204.32  2751.910210.23 2752.5210222.93 2753.94
10232.68 2754.2310240.39  2755.410246.86 2756.4110259.13 2758.9210264.95 2759.98

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
  9790.3     .06 9987.65     .0410016.05     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9987.6510016.05              875  838.28     900             .1       .3

CROSS SECTION


RIVER: RV WK
REACH: R1                 RS: 8.583

INPUT
Description:
Station Elevation Data    num=      39
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9922.45 2744.04 9926.29 2743.25 9930.37 2742.18 9933.66 2741.26 9948.42 2738.66
 9959.97 2736.28 9963.96 2735.64 9968.72 2734.85 9976.39 2733.46 9981.232732.427
 9983.84 2731.87 9987.84 2731.35   10000 2731.2510000.02 2731.2510002.43 2731.23
10003.55 2731.2210008.82 2731.2310015.88 2732.3910016.27 2732.4610025.09 2732.65
10034.76 2732.6810042.81 2731.7110044.89 2731.3710047.87 2731.7110054.07 2732.48
10064.45 2732.6810069.07 2732.7210083.97 2732.3710085.76 2732.3410085.98 2732.28
10086.92 2732.0310090.23 2731.1510123.53 2731.0310137.11 2731.0210141.21 2732.72
10145.23 2734.1910151.01  2735.810163.67 2739.6410178.07  2744.1

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9922.45     .06 9981.23     .0410015.88     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9981.2310015.88              750  735.87     750             .1       .3

CROSS SECTION


RIVER: RV WK
REACH: R1                 RS: 8.444

INPUT
Description: Q=1900 cfs (CB3W6, 24 hr)
Station Elevation Data    num=      64
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9866.96 2735.89 9884.44  2734.2 9885.65  2734.1  9897.7 2731.91 9898.75 2731.57
 9922.97 2724.22 9924.28 2723.81 9926.12 2723.36 9932.21 2721.24 9932.75 2721.03
 9933.15 2720.85 9943.21 2715.71 9956.63 2716.08 9962.58  2716.3 9968.78 2717.01
 9970.84 2717.17 9972.63 2717.25 9981.65  2717.5 9987.52 2715.67 9987.81 2715.58
 9999.96  2715.7   10000  2715.710012.17 2715.8310014.39 2715.8410020.85 2716.76
10025.78 2716.3610025.82 2716.3610030.35 2716.7210039.95 2717.4310069.22 2717.68
10080.82  2717.710088.61  2717.910114.02 2718.3210118.41 2718.3110139.17 2718.43
10146.75 2717.53 10151.8 2716.9210172.06 2717.4610180.36 2717.5610184.18 2718.35
10187.57    271910197.22 2719.1210234.46 2719.4410266.09 2719.6710282.55 2719.73
10314.73 2719.6510320.96 2719.6110336.25 2719.3910369.26 2718.8410378.73 2718.73
10388.21 2718.5410427.47 2718.0910452.71 2718.2810458.44 2718.57 10464.1 2719.05
10483.94 2720.3410493.16 2721.3610497.87 2721.7810511.52 2722.8410527.86 2723.79
   10530 2723.8910530.62 2723.9410533.22 2724.4210534.15 2724.54

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9866.96     .06 9981.65     .0410039.95     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9981.6510039.95              650  698.11     700             .1       .3
Right Levee     Station=10282.55      Elevation= 2719.73

CROSS SECTION


RIVER: RV WK
REACH: R1                 RS: 8.311

INPUT
Description: Q=1960 cfs (CB6W6, 24 hr)
Station Elevation Data    num=      59
```

```
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9682.54 2707.58 9683.01 2707.61 9685.21 2707.23 9687.19  2706.8 9689.15 2706.62
 9711.19 2701.34  9716.7 2699.31 9717.81    2699 9757.51 2700.25 9759.78  2700.3
 9760.36 2700.38 9766.12 2700.92 9781.09 2701.29 9782.49 2701.31 9786.01  2701.3
 9798.65 2701.21 9801.25  2701.1 9812.36 2700.54 9818.56 2700.97 9821.56 2701.11
 9831.38 2700.86 9849.37 2700.64 9849.64 2700.64 9850.38 2700.61 9873.58 2699.85
 9876.21 2699.51  9880.7 2699.04 9896.37 2699.24 9905.51  2699.3 9908.14 2700.11
 9912.55  2701.2 9925.47 2700.91 9939.82 2701.09 9951.02 2700.95 9963.88 2701.08
 9974.11 2701.12  9985.7    2701 9991.93 2699.86 9992.89 2699.68 9994.74 2699.69
   10000 2699.7410003.38 2699.7710008.89 2700.5210012.65 2700.9710027.94 2701.09
10028.19 2701.09 10028.3  2701.110028.57 2701.1110049.15  2703.110056.43 2703.42
10064.41 2704.1710078.28 2706.2410087.71 2707.1210109.73 2710.4510111.44 2710.69
 10128.8 2713.2110129.09 2713.2410130.59 2713.4410138.26 2714.13

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*************************************************
 9682.54     .06  9985.7     .0410012.65     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        9985.710012.65             1075  1078.4    1100             .1       .3

CROSS SECTION


RIVER: RV WK
REACH: R1                 RS: 8.107

INPUT
Description: The ineffective flow station was determined using a 2:1 expansion
             ratio from the point the ridge is overtopped.
Station Elevation Data    num=      52
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9546.03 2677.82 9557.62 2676.51 9572.11 2674.42 9577.02 2673.84  9598.4 2671.83
 9603.96 2671.83 9636.16 2672.19 9663.59 2672.72 9679.53 2673.04 9702.35 2673.32
 9716.01 2673.73 9728.23 2673.82  9730.4 2673.65 9738.46 2672.65 9740.25 2672.45
 9742.81 2672.63 9751.77 2673.26 9752.74 2673.34 9756.41 2673.32  9786.3 2673.38
 9814.51 2673.53 9827.28 2673.58 9831.03 2673.63 9847.14 2674.12  9856.4 2674.38
 9882.56 2674.57 9893.65 2674.77 9897.09 2674.49 9905.39 2673.73 9914.43 2673.79
 9923.92 2674.02 9928.37 2673.12 9932.11 2672.22 9938.63 2672.12 9956.28 2672.63
 9962.27  2672.6 9963.46 2672.71 9971.09 2673.58 9974.21 2672.92  9979.1 2672.23
 9982.01 2671.69 9987.15  2671.6 9989.63 2671.64 9998.03  2671.5   10000 2671.49
10000.02 2671.4910009.45 2671.4510015.45 2673.4110024.72 2675.5310029.06 2677.72
10030.85 2678.3310041.46 2680.21

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*************************************************
 9546.03     .06 9971.09     .0410015.45     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        9971.0910015.45             900  817.82     850             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
 9546.03    9660    2677       F

CROSS SECTION


RIVER: RV WK
REACH: R1                 RS: 7.952

INPUT
Description:
Station Elevation Data    num=      25
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9905.19 2657.87 9912.86 2656.83 9920.14 2655.75 9928.13 2654.23 9934.06 2653.09
 9950.84 2650.69 9952.48 2650.45 9953.54 2650.43 9968.53 2650.24  9969.7 2650.35
 9972.85 2650.71 9974.04 2650.35   10000 2650.9710007.07 2651.1410012.58 2651.28
10013.75 2651.3910025.35 2652.4210044.66 2652.8210048.15 2652.87 10057.5 2653.04
10068.34 2653.1610073.89 2654.5810100.79 2664.4410107.99 2667.1710109.37 2667.99

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*************************************************
 9905.19     .06 9972.85     .0410013.75     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        9972.8510013.75             925 1082.06    1100             .1       .3

CROSS SECTION


RIVER: RV WK
REACH: R1                 RS: 7.747

INPUT
Description:
Station Elevation Data    num=     173
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
  9560.5    2630  9562.5 2629.72 9566.39 2629.04 9570.54 2628.48 9571.97 2628.24
 9593.93 2626.03 9595.54 2625.73 9595.59 2625.73 9597.59 2625.61 9600.24 2625.45
 9603.92 2625.22 9606.01  2625.1 9609.45 2625.09 9610.75 2625.09  9612.2 2625.05
 9615.51 2624.93 9618.72 2624.86 9621.57 2624.76  9623.4 2624.72 9624.12 2624.69
 9627.24 2624.74 9627.64 2624.75 9629.95 2624.79 9633.58 2624.77  9634.6 2624.77
 9639.37 2624.75 9641.21 2624.75 9644.17 2624.74 9647.05 2624.91 9658.17 2624.13
```

```
 9659.69 2624.02 9663.28  2623.9 9665.67 2623.57 9667.51  2623.3 9671.54 2622.71
 9672.26 2622.62 9678.65 2621.65 9679.05 2621.59  9679.7 2621.49 9685.04 2621.31
 9686.78 2621.26    9691 2621.12 9694.54 2621.03 9696.31 2620.98 9697.69 2620.95
 9701.98 2620.79 9702.33 2620.79 9705.16 2620.68 9709.74 2621.95  9714.9 2623.42
 9716.69 2623.92 9716.94    2624 9718.82 2624.54 9725.69 2624.26 9730.76 2624.06
 9734.02 2623.97 9734.98 2623.93 9741.53 2623.76 9744.23 2623.66 9749.72 2623.56
 9753.07 2622.68 9755.39 2621.92 9761.41 2622.92  9766.2 2623.69 9768.15 2623.64
 9770.82 2623.58 9789.91  2624.2 9795.69 2624.34 9798.56 2624.14 9798.79 2624.13
 9798.94 2624.11 9798.95 2624.11 9799.08 2624.09 9803.03 2624.09 9804.36 2624.08
 9824.21 2624.07 9832.61 2624.18  9833.4 2624.19 9835.71 2623.96 9836.63 2623.87
 9838.83 2623.61  9841.1 2624.12 9842.48 2624.33 9843.65  2624.5 9848.88 2624.43
 9850.64 2624.41 9850.71 2624.41 9851.27 2624.42 9854.17 2624.34 9854.79 2624.33
 9855.78 2624.32  9857.5 2624.29  9859.7 2624.25  9861.9 2624.22 9864.78 2624.17
 9872.73    2624 9875.36 2623.94 9876.67 2623.91 9879.82 2623.78  9880.5 2623.95
 9882.21 2624.56 9883.92 2625.07 9889.67 2626.95 9892.32 2627.73 9894.94 2628.47
  9897.4  2629.2 9898.61  2629.5 9899.43 2629.62  9900.1 2629.67 9900.73 2629.68
 9901.38 2629.61 9902.19 2629.44 9903.41 2629.07 9904.67 2628.64 9906.05 2628.13
 9915.91 2624.54 9921.58 2624.49 9922.68 2624.51 9923.89 2624.51 9928.87 2624.47
 9932.32 2624.57 9933.28 2624.62 9934.57 2624.68 9936.62 2624.72 9937.59 2624.73
 9939.23 2624.58 9948.84 2623.66 9949.16 2623.63 9951.92  2623.3 9952.73  2623.2
 9956.87 2622.61  9958.6 2622.89 9959.02 2622.96 9961.12 2623.29 9976.18 2623.06
 9977.472623.033 9977.64 2623.03 9981.27 2622.73 9982.75 2622.63 9982.94 2622.62
 9983.47 2622.58  9983.9 2622.55 9984.05 2622.53 9984.19  2622.4 9986.35 2622.51
 9987.28 2622.48  9988.7 2622.45 9989.39 2622.42 9994.49 2622.26 9995.22  2622.1
 9996.96 2621.71 9999.96 2621.21 9999.98 2621.22   10000 2621.2310001.62 2621.99
10001.68 2622.0510004.48 2622.4410013.44  2623.510013.58 2623.4910013.66 2623.36
10014.74    262310026.93 2628.79 10027.9 2629.1710030.02 2630.4310030.78 2630.14
10032.43 2629.8210037.11 2628.4910038.49 2628.5210039.28 2628.5410041.23 2628.58
10041.31 2628.5910046.16  2630.6 10047.7 2630.58

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
  9560.5     .06 9977.47     .0410013.44     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9977.4710013.44              500  403.64     425             .1       .3

CROSS SECTION


RIVER: RV WK
REACH: R1                 RS: 7.671

INPUT
Description:
Station Elevation Data    num=      68
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 9771.65 2611.91 9771.91 2611.89    9773  2611.8 9777.04 2611.46 9777.78 2611.41
 9781.82 2611.07 9782.28 2610.95 9782.88 2610.81 9782.95  2610.8 9783.04 2610.79
 9796.29 2609.93 9809.39 2609.99 9821.15 2610.04 9829.18  2608.8 9831.45 2608.45
 9850.34 2608.99 9853.01 2609.08  9860.6 2608.51 9867.28 2607.99 9869.84 2607.98
 9874.01 2607.96 9880.66 2607.97 9886.33 2609.94 9894.95  2612.5 9898.13 2612.51
 9898.86 2612.54 9900.24 2612.56 9906.77 2612.74 9910.16 2612.84 9911.77 2612.88
 9912.03 2612.89 9921.95 2612.77 9923.48 2612.72 9925.77 2612.64 9926.04 2612.63
 9929.51 2612.57 9937.32 2612.43 9946.16 2612.15 9946.38 2612.17  9954.3 2610.49
 9966.51 2608.28 9969.01 2608.28 9971.872608.285 9974.77 2608.29 9981.68  2608.3
 9984.36 2608.31  9986.7 2608.25 9994.59 2608.04   10000 2607.9610000.01 2607.96
10000.27 2607.9610006.48 2608.2510010.77  2608.410016.72 2608.5410024.74 2608.67
10029.282609.54910030.58  2609.810030.92 2609.8610040.63 2611.7410044.11 2611.67
10045.41 2611.6410048.19  2611.6   10057 2611.4510065.79 2611.3610068.44 2612.33
10068.48 2612.3310073.08    261310073.74 2613.15

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
 9771.65     .06 9966.51     .0410006.48     .06

Bank Sta: Left   Right    Coeff Contr.   Expan.
       9966.5110006.48             .1       .3

CROSS SECTION


RIVER: RV WK
REACH: R2                 RS: 7.603

INPUT
Description: Q=1168 cfs (This flow is a result of the energy analysis at the
             upstream split)
Station Elevation Data    num=      39
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 9946.16 2607.14 9950.95 2606.98  9951.6 2606.93 9953.03 2606.75 9955.43 2606.63
 9958.62 2606.03 9960.47 2605.27 9960.97 2605.11  9962.5 2604.61 9969.03  2602.2
 9970.13 2601.81 9976.04 2600.01  9978.4 2599.21 9979.32 2598.91 9979.53 2598.84
  9981.92598.089 9982.37 2597.94 9991.83 2597.74 9996.74 2597.63   10000 2597.56
10005.95 2597.4310011.17  2597.310018.74 2597.1810019.73 2597.1610021.26 2597.14
10023.28 2598.0810038.54 2605.0110039.78 2605.07 10042.5 2604.6910046.65 2604.61
10048.03 2604.4710048.19 2604.4810053.05 2604.49 10053.1 2604.4910053.54 2604.49
10057.46 2604.2610057.78 2604.2610061.24  2604.310062.19 2604.29

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
 9946.16     .06  9981.9     .0410023.28     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        9981.910023.28            327.22  327.22  327.22             .1       .3
```

CROSS SECTION

RIVER: RV WK
REACH: R2 RS: 7.541

INPUT
Description: Q=1599 cfs (This flow is a result of the lateral weir analysis on the left overbank of RV WK S16 between RM 0.497 and RM 0.443)
Station Elevation Data num= 114

```
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9710.13 2596.28 9711.36 2596.14 9720.97 2594.86 9721.14 2594.87 9725.35 2593.91
 9727.85 2593.39 9736.42  2591.5 9745.85 2589.62 9746.19 2589.54  9752.2 2588.18
 9752.49 2588.17 9752.86 2588.16 9753.11 2588.17 9753.96 2588.22  9768.3 2588.39
 9770.01 2588.42 9772.02 2588.46  9773.6 2588.49  9773.7 2588.49 9780.95 2588.76
 9782.96 2588.73 9794.39 2589.03 9796.98 2589.02 9797.57 2589.02 9831.68 2589.88
 9835.46 2589.93 9838.46 2589.98 9864.69 2590.17 9876.22 2590.23 9880.16 2590.19
 9893.67 2590.03 9895.02 2590.02 9895.42 2590.01 9915.67 2590.12 9921.07 2590.14
 9929.84 2590.02 9931.66 2589.96 9943.71 2589.48 9954.39  2589.2 9956.56 2589.12
 9958.41 2589.09  9963.7 2588.96  9968.1 2588.91 9971.44 2588.86 9990.52 2588.59
 9991.42 2588.48 9993.74 2588.19 9998.96 2587.54 9999.99 2587.41   10000 2587.41
10000.88  2587.3 10007.4 2588.9610008.27 2589.1910008.65 2589.1810009.42 2589.17
10018.31 2589.0410021.51 2588.5310024.07 2588.1110025.52 2588.3310028.91 2588.82
10039.67 2588.7210040.89 2588.7110045.39 2588.3310047.09  2588.210052.67 2588.58
10057.23 2588.9510065.24 2589.0410078.61 2589.1710086.27 2589.2510090.12 2589.29
10091.21 2589.2710094.63 2589.2410097.14 2589.2210099.06 2589.2110099.84  2589.2
10100.55 2589.2110119.41 2589.2610120.99 2589.2510121.34 2589.2510123.07 2589.22
10126.03 2589.1710130.62  2589.110137.76 2588.9810146.76 2589.0110171.74 2588.99
10207.03 2588.96 10207.3 2588.9710208.63 2588.9610208.64 2588.96 10208.8 2588.95
 10209.3 2588.9310211.11 2588.8710216.04 2588.6710225.47 2588.39 10247.4 2588.78
10265.19 2589.3910266.71 2589.6810267.22 2589.7510271.67 2590.5410274.93 2591.04
10277.22 2591.3610278.35 2591.5210280.17 2591.6410282.93 2592.0310285.47 2592.22
10288.61 2592.6710290.76 2592.8410291.78 2592.93 10295.3 2593.4410297.36 2593.73
10299.07    259410303.18 2594.6410309.57 2595.4910312.26 2595.92
```

Manning's n Values num= 3

```
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9710.13     .06  9963.7     .04 10007.4     .06
```

```
Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9876.2210008.27            195.66  195.66  195.66             .1       .3
```

CROSS SECTION

RIVER: RV WK
REACH: R2 RS: 7.504

INPUT
Description:
Station Elevation Data num= 133

```
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9504.22 2588.04 9505.22 2587.92 9509.44 2587.48 9510.09  2587.4 9514.48 2586.94
 9514.94 2586.88 9519.62  2586.4 9524.17 2585.96 9530.35 2585.13 9532.88 2584.51
  9534.7 2584.21  9535.6 2583.85 9536.02 2583.79 9545.71 2582.63 9553.34 2582.61
 9555.76 2582.57 9557.51 2582.56 9560.19 2582.52 9573.93  2581.8 9574.73 2581.78
 9575.87 2581.74 9577.66 2581.71 9579.19 2581.64 9580.38 2581.62 9586.97 2581.42
 9587.84 2581.37 9598.36 2581.46 9626.86 2581.87 9629.54 2581.93 9629.87 2581.92
 9645.69 2581.47 9646.37 2581.44 9647.43 2581.36 9662.96 2581.54 9668.61 2581.55
 9696.24 2581.87 9722.23 2582.21 9734.16 2582.41 9741.48 2582.57 9744.65 2582.61
 9746.64 2582.53 9753.84 2582.66 9758.26 2582.57 9758.41 2582.62 9759.39 2582.58
 9770.59 2582.67 9775.68 2582.76 9778.02 2582.76 9783.52 2582.81 9787.02 2582.92
 9791.29 2582.97 9796.15 2583.12 9799.15 2583.16 9805.28 2583.38 9815.53 2583.46
 9832.63 2583.46 9837.86 2583.21 9839.32 2583.15 9863.06 2583.53 9869.28 2583.81
 9892.38 2584.49 9893.83 2584.49 9893.85  2584.5 9903.75 2584.58 9919.46 2584.08
  9930.2 2583.85 9936.51 2583.62 9948.57 2583.22 9950.26 2583.19 9956.86 2583.01
  9959.6 2582.97 9965.13 2582.83 9969.15 2582.78 9973.38 2582.67 9974.27 2582.66
 9975.96 2582.62 9991.48 2582.64 9998.12 2581.41 9999.97 2581.04   10000 2581.04
10008.54 2582.3510018.19 2582.5510032.21 2582.8110053.84 2582.9710072.15 2583.22
10084.84 2583.3810103.21 2583.5710123.99 2582.99 10151.5  2582.8 10189.2 2582.63
10191.33  2582.510191.72  2582.510196.09 2582.3610199.86 2582.2710213.93 2582.82
 10219.8  2582.810227.93 2582.8110232.57 2582.6810237.25 2582.6310270.97 2581.96
10287.49 2581.4310289.42 2581.3310292.99 2581.1810294.94 2581.0810295.85 2581.05
10297.67 2580.9610328.57 2579.7610330.99 2579.6410352.24 2579.0710355.11 2579.01
10361.84 2578.9410362.99 2579.0310372.42 2578.5110373.17 2578.49 10374.2  2578.5
10417.47 2578.7310418.81 2578.75 10421.7 2578.7710421.83  2578.810427.68 2579.58
10436.21 2580.71 10439.9 2581.18 10443.2 2581.6310447.71 2582.1310448.41 2582.22
10450.41 2582.4410455.57 2585.0610458.27 2585.9810461.54 2587.2910463.31 2587.92
10468.06 2589.87 10468.5 2589.9910471.15 2591.14
```

Manning's n Values num= 3

```
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9504.22     .06 9991.48     .0410018.19     .06
```

```
Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9991.4810018.19            213.9   213.9   213.9             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
10213.9310471.15 2587.82       F
```

CROSS SECTION

RIVER: RV WK
REACH: R2 RS: 7.463

```
INPUT
Description:
Station Elevation Data    num=      89
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 9288.86  2580.1 9290.62    2580 9292.61 2579.96 9296.95 2579.81 9315.87 2579.39
 9340.85 2578.68  9357.1 2578.26 9370.73 2577.92 9376.27 2577.73 9377.03 2577.69
 9381.81 2577.51 9382.62 2577.47 9386.74 2577.31 9387.65 2577.29 9390.91 2577.15
 9392.84 2577.12 9396.09 2576.99 9398.35 2576.95 9401.27 2576.83 9415.46 2576.75
 9416.23 2576.74 9416.78 2576.74 9430.48 2576.48 9432.85 2576.45 9435.27  2576.4
 9457.23  2575.5 9467.15 2575.13 9488.17 2575.66 9500.37 2575.75 9520.72 2575.94
 9525.16 2575.89 9549.38 2576.12    9558 2576.01 9564.89 2575.91 9572.07  2576.2
 9573.78 2576.27 9582.56 2576.14 9593.58 2575.95 9597.04 2575.93 9609.32 2575.92
 9613.74 2576.14 9615.43  2576.1 9638.26 2576.11 9646.95 2576.16 9669.26 2576.38
 9675.46 2576.25 9677.73 2576.18 9685.81 2576.13 9695.98 2576.07 9698.77 2576.04
  9705.7 2576.05 9721.18 2576.09 9724.84 2575.94 9732.08 2575.59 9738.19 2576.05
 9743.81  2576.5 9767.05 2576.68 9767.72 2576.69 9772.37 2576.73 9776.19 2576.82
 9778.41 2576.81 9815.18 2577.67 9819.87 2577.51 9822.54 2577.48 9912.74  2577.7
  9912.9 2577.73  9913.1 2577.73 9913.37 2577.68 9921.53 2577.47 9925.85 2577.23
 9929.77  2577.2 9933.32 2577.12 9939.94 2576.82  9963.4 2576.06 9969.11 2575.81
 9971.41 2575.78 9982.46 2574.87 9986.42 2574.42 9996.97  2574.4   10000 2574.37
10000.08 2574.3710000.12 2574.3710003.532574.87410004.59 2575.0310010.16 2575.82
10031.37 2576.0510066.78 2576.6110089.41 2577.1910112.13  2577.4

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
 9288.86     .06 9982.46     .0410003.53     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9969.1110010.16           264.57  264.57  264.57             .1       .3

CROSS SECTION


RIVER: RV WK
REACH: R2                 RS: 7.413

INPUT
Description: Q=2733 cfs (This flow is the arithmetic combination of RV WK and
             RV WK S16)  This cross section is identical to RM 0.240 on RV WK
             S16.
Station Elevation Data    num=     171
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 9533.04 2570.53 9542.42  2569.4 9542.99 2569.32 9546.46 2569.04  9548.7 2568.83
 9551.37 2568.58 9554.24 2568.31 9555.45 2568.16 9558.96 2567.84    9562 2568.18
  9564.3 2568.45  9567.9 2568.86 9571.74 2569.31  9576.9 2569.14 9582.86 2568.93
 9592.38  2568.6 9598.69 2568.37 9603.93 2568.24  9615.4 2568.02 9615.86 2568.01
 9616.08 2568.01 9617.42 2568.12 9626.36 2568.84 9629.72  2568.8 9630.27 2568.79
 9638.08  2568.7 9649.97 2568.52 9656.77 2568.44 9664.68 2568.29 9671.86 2566.82
 9674.55 2566.31 9679.44 2566.73 9683.97 2567.14 9684.99 2567.23 9687.66 2567.49
 9696.15 2568.29  9698.9 2568.58 9701.85  2568.6 9711.84 2568.69 9725.25 2568.66
 9733.64 2568.63 9734.18 2568.63 9734.24 2568.63 9740.87 2568.58 9747.02 2568.53
 9750.79 2568.47 9756.21 2568.42 9760.79 2568.35 9761.39 2568.34 9766.06  2568.3
 9770.09 2568.26 9773.63 2568.19 9778.13 2568.18 9783.75 2568.11 9786.14  2568.1
 9791.29  2568.1 9809.71 2568.07 9812.21 2568.07  9815.1 2568.06 9818.45 2568.07
 9822.41 2568.07 9823.38 2568.09 9823.56 2568.07 9824.18 2568.08 9824.45 2568.07
 9830.72 2568.12 9835.57 2568.02 9839.93    2568 9846.38 2567.81 9846.52 2567.81
 9847.01  2567.8  9848.1 2567.79 9848.32 2567.82 9851.94  2567.8 9864.25 2567.83
 9866.81 2567.84 9872.26 2567.82 9877.19 2567.82 9880.44 2567.82 9889.39 2567.76
 9895.21 2567.72 9904.76 2567.43 9907.53 2567.37 9938.31    2567 9940.43 2566.96
 9940.89 2566.96 9964.72 2567.39 9967.12 2567.58 9969.11 2567.73 9974.15 2567.79
 9980.32 2567.84 9982.44 2567.59 9984.972567.302 9987.88 2566.97 9989.44 2566.79
 9990.04 2566.72 9994.61 2566.93   10000 2567.1810000.04 2567.1810005.74 2567.44
10005.93 2567.4510020.79 2567.3810033.31 2567.2910041.86 2567.5210042.11 2567.53
10042.58 2567.6210042.91 2567.7210043.19 2567.7210105.03 2568.2810179.15 2568.31
10183.03 2568.3410196.02  2568.410199.41 2568.4210204.26 2567.7510206.99 2567.43
10211.18 2566.8410216.22 2567.2610217.24 2567.3610225.46 2568.0310227.08 2568.17
10227.48  2568.210228.08 2568.2510230.11 2568.2710231.51 2568.2810253.24 2568.49
10265.61 2568.6110273.31 2568.6910282.94 2568.6510315.51 2568.42 10315.6 2568.42
10316.74 2568.4210318.46 2568.4210319.37 2568.42 10321.3 2568.4110324.95 2568.39
10331.64 2567.9910332.97 2567.9110343.65 2568.5210346.71  2568.710370.59 2568.68
10390.35 2568.6710403.47 2568.5510426.86 2568.4210447.18 2568.3610471.97 2567.01
 10474.1 2566.8910476.86 2566.9610514.95    256810520.85 2567.42 10524.5 2567.04
 10527.72567.42110536.86 2568.5110539.92 2568.8810548.32 2568.8110580.09 2568.43
10601.98 2568.1610603.25 2568.02 10610.6 2567.1910629.72 2569.08   10630 2569.11
10630.35 2569.1210637.34 2569.2310672.25 2569.7710674.99 2569.8110675.68 2569.83
10675.72 2569.8310676.38 2569.7910685.98 2569.3310687.91 2569.7110691.44 2570.35
10700.73 2570.26

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************************************************
 9533.04     .06 9984.97     .0410005.93     .0610520.85     .04 10527.7     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9984.9710005.93           266.11  266.11  266.11             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
 9533.04 9711.84 2568.89       F
10199.4110700.73 2568.89       F

CROSS SECTION


RIVER: RV WK
REACH: R2                 RS: 7.363
```

```
INPUT
Description: This cross section is identical to RM 0.194 on RV WK S16.
Station Elevation Data    num=     116
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 9891.31 2572.12 9894.14 2571.44  9894.7 2571.36 9898.95 2569.75 9899.47 2569.67
  9899.8  2569.6 9900.54 2569.31 9906.19 2567.42  9915.5 2566.46 9921.94  2564.9
 9929.35 2563.33 9929.92 2563.37 9936.82 2561.94 9946.91 2560.22 9949.55  2559.7
 9954.56 2558.74 9958.64 2558.09 9974.55 2558.36 9976.64 2558.46 9982.88 2558.45
 9988.05 2558.43 9993.45 2558.83   10000 2559.2710000.09 2559.2810001.02 2559.34
10014.66 2558.6610016.32 2558.54 10019.1 2557.8510021.44  2557.310030.11 2559.15
10031.23 2559.3510033.85 2559.7510034.27 2559.6910038.73 2559.3410044.89 2558.84
10048.33 2559.6310050.22 2559.6210051.66 2559.5810064.43 2559.8110065.89 2559.81
 10094.8 2560.5110142.83 2560.6710145.18 2560.5410161.53 2560.2510166.21 2560.01
 10171.3 2559.1610174.78 2559.6510180.49 2560.5110182.26 2560.5310182.74 2560.55
10202.22 2560.9410210.73 2561.0910225.13 2561.2410226.69 2561.2810242.74 2561.28
10253.39 2561.2210257.33 2560.7910257.99 2560.7410264.02 2560.16 10264.7 2560.24
10269.79 2560.9310272.25 2561.3210288.14  2561.410294.12 2561.36 10314.3 2561.66
10330.52 2562.0110338.45 2561.4110342.79 2562.0810347.78 2562.7410382.04 2562.44
10391.02 2562.4310400.73 2562.4410406.96 2561.3810410.55 2560.9110417.85 2561.47
10421.49 2561.8710423.33 2562.04 10425.3 2562.2910425.71 2562.3310447.09 2562.49
10463.32  2562.710469.18 2562.7110490.22 2562.7510508.82 2562.7410522.46 2562.47
10527.14 2562.2510546.79 2562.1410551.63 2562.0110584.79 2561.6410589.62 2561.74
 10592.4 2561.7410593.95 2561.7710600.48 2561.7710604.41 2561.7510605.79 2561.77
10610.02 2561.6410612.71  2561.610617.08 2561.4310620.88 2561.0210622.98 2560.97
10625.73 2560.6810629.42 2560.3610631.07 2560.13   10636 2559.5910637.76 2559.83
 10638.9 2560.0510641.71  2560.510651.21 2562.3210655.77 2562.3710702.97 2562.57
10703.43 2562.4410704.36 2562.5310710.92 2562.4210716.82  2562.310731.05 2562.27
10766.74 2562.35

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9891.31     .0610001.02     .0410031.23     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
      10001.0210031.23           614.84  614.84  614.84             .1       .3

CROSS SECTION


RIVER: RV WK
REACH: R2                 RS: 7.246

INPUT
Description: This cross section is identical to RM 0.108 on RV WK S16.
Station Elevation Data    num=      97
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 9904.71 2552.01 9906.28 2551.82 9908.04 2551.65 9916.41 2550.51    9927 2549.04
 9929.19 2548.83 9930.58 2548.74 9933.44 2548.49 9936.41 2548.29 9952.69 2546.96
 9954.82 2546.84 9956.29 2546.85 9958.24 2546.72 9960.23 2546.79 9960.49 2546.82
 9965.25 2546.29 9977.222544.876 9979.05 2544.66 9987.92 2544.78 9994.15 2544.87
   10000 2544.7410000.01 2544.7410000.63 2544.7310013.47 2544.3810015.64 2544.88
10021.24 2546.1710025.912546.81810029.02 2547.2510029.07 2547.22 10029.8 2547.36
10031.82 2547.1310032.13 2547.1210032.39 2547.1110032.61 2547.1110032.83 2547.12
 10042.5 2547.57   10044  2547.710044.87 2547.8410047.34 2548.2310063.04 2548.53
10066.86 2548.6410070.07 2548.8510073.46 2548.9310079.04 2549.2810080.78  2549.3
10085.15 2549.4810088.69 2549.4510094.59 2549.5210096.26 2549.5110097.14 2549.51
10104.04 2549.6110105.55 2549.6210113.56 2549.7310113.96 2549.7410116.82 2549.78
10125.95 2549.7210135.48  2549.710170.59  2549.510171.25 2549.4810171.62 2549.46
10172.56 2549.4410174.05 2549.3610174.26 2549.3510174.57 2549.3510178.49 2548.59
10180.59 2548.1710181.55 2548.4310186.98  2549.7 10187.2 2549.7610188.11 2549.98
10188.29 2550.0110201.31 2549.3910212.95 2548.7610219.32 2548.4710219.88 2548.46
10228.72  2547.610234.36  2547.110242.72 2548.4110251.53 2549.6110267.01 2549.46
10298.02 2549.1510302.76 2549.3410306.24 2549.5110311.87 2549.5410325.37 2549.71
10325.41  2549.710329.92 2549.7110336.93  2549.710342.26  2549.710350.23 2549.75
10353.43 2549.8110398.82 2549.7610416.03 2549.6910419.59 2549.5710424.08 2549.43
10429.92 2549.2410433.22 2549.14

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9904.71     .06 9977.22     .0410015.64     .06

Bank Sta: Left   Right    Coeff Contr.   Expan.
       9960.4910025.91             .1       .3
Right Levee     Station=10251.53      Elevation= 2549.61

CROSS SECTION


RIVER: RV WK
REACH: R3                 RS: 7.131

INPUT
Description: Q=3300 cfs (CB9W6, 24 hr)  This cross section is identical to RM
             0.419 on RV WK T13.
Station Elevation Data    num=     203
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 9514.82 2553.59 9515.83 2553.69 9516.51 2553.61 9516.88 2553.56 9523.33 2552.72
 9524.84 2552.56 9526.13 2552.42 9529.28 2552.08 9535.29 2551.38 9539.33 2550.94
 9540.43  2550.8 9544.27 2550.55 9544.44 2550.54 9547.33 2550.36 9549.47 2550.16
  9554.2 2549.62 9554.38 2549.57  9565.3 2548.25 9568.54  2547.9 9573.93 2547.32
 9574.15 2547.31  9581.1 2546.42 9582.41 2546.29  9590.7 2544.68 9603.16 2542.26
 9613.49 2540.42 9650.85 2535.89 9652.74 2535.68 9665.69 2534.52 9680.14 2533.09
 9686.91 2533.06 9687.69 2533.03 9724.25 2533.15  9749.4 2533.21 9770.99 2532.32
 9773.25 2532.24 9782.07 2531.95 9783.67 2531.89 9785.55 2531.83 9787.71 2531.73
 9789.16 2531.69 9801.92  2531.5 9824.08 2531.74  9839.5  2531.9 9868.62 2532.25
```

```
 9890.44 2531.64  9909.8  2531.2 9913.75 2531.22 9917.03 2531.22 9939.25 2531.27
 9955.56 2531.23 9960.25 2531.12 9972.25 2530.92 9977.74 2530.87    99832530.794
 9995.02 2530.62 9999.97 2530.55   10000 2530.5510001.28 2530.5310009.47  2530.4
10026.71 2530.9410033.44 2531.0310054.372531.278 10094.2 2531.7510116.74 2529.89
10123.95 2530.5210135.89 2531.64   10138 2531.7110182.93 2531.84 10187.7 2531.73
10203.57 2531.54 10205.9 2531.5310229.03 2531.5310233.72 2531.5510238.39 2531.55
10240.92 2531.4910263.47 2530.8510264.15 2530.7910266.79 2530.7110268.39 2530.72
 10275.2  2530.610282.17 2530.7510282.52 2530.7510285.56 2530.8210298.04 2530.75
10311.18 2530.6410325.46 2530.5810344.73 2529.51 10373.9 2531.3210395.75 2531.28
10432.77 2531.2910434.76 2531.2610436.99 2531.2310438.76 2531.1910455.77 2530.94
10460.82 2530.84 10469.4 2530.7110485.03 2530.6310489.96 2530.5710490.09  2530.6
10492.82 2530.4710502.59 2529.99 10519.1 2530.5210523.21 2530.4710540.07 2530.23
10566.45 2529.8910578.03 2529.7510592.68 2529.5610601.21 2529.3910608.38 2528.71
10610.46 2528.5110615.28 2529.6510616.54 2529.8810617.69 2530.2110624.27 2530.02
10629.97 2529.8310631.29  2529.610635.06 2528.6710640.74 2529.5810645.16 2530.31
10657.07 2530.1510666.76 2530.0810667.66 2530.0110670.09 2529.8710680.98 2529.33
10684.74 2529.3510690.59 2529.3410697.42 2529.3610702.78 2529.9610706.62 2530.38
10709.22 2530.5910721.37  2530.4 10727.1 2530.2910732.34  2530.2 10739.6 2530.05
10746.45 2531.1810747.73 2531.3910756.22  2530.710760.11 2530.6510764.98  2530.9
10766.09 2530.7510771.35 2530.0410783.73 2530.29 10795.3  2530.510801.62 2530.63
10803.51  2530.710812.04 2530.81 10832.1 2531.0410839.61  2531.210841.45  2530.7
10848.29 2529.0710851.65 2529.6710857.91 2530.97 10867.3 2530.9510877.35 2530.97
10882.38    253110890.54 2530.9410892.14 2530.9610896.47 2530.9110901.17 2530.91
10905.08 2530.85 10911.1 2530.7810914.69 2530.7710921.72 2530.7110936.71  2530.7
 10942.1 2530.4210945.83 2530.2610951.72 2530.7910956.99 2531.2710963.06 2531.32
10964.72 2531.3310972.01 2531.3910985.45 2531.3810988.02 2531.4210988.79 2531.42
10994.03 2531.5310998.64 2531.1411002.14 2530.8311005.15 2530.57   11009 2530.22
11014.72 2531.0911017.78  2531.611023.66  2531.811024.23 2531.72 11024.9 2531.61
11029.01 2530.9911033.06 2530.4511042.52  2531.611043.82 2531.7511053.54 2532.45
11060.34 2533.3511073.18 2534.5911079.38 2534.95 11079.5 2534.8811080.39 2534.93
11081.35 2535.0311082.87 2535.1211086.21 2535.43 11087.6 2535.5111090.47 2535.78
11093.22  2535.911095.97 2536.1411097.28 2536.24

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
 9514.82     .06    9983     .0410009.47     .0611024.23     .0411043.82     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9939.2510054.37           369.36  369.36  369.36             .1       .3
Left Levee      Station= 9868.62      Elevation= 2532.25

CROSS SECTION


RIVER: RV WK
REACH: R3                 RS: 7.061

INPUT
Description: This cross section is identical to RM 0.339 on RV WK T13.
Station Elevation Data    num=     201
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9399.81 2539.18 9402.53 2538.87 9424.27 2536.04 9431.85    2535 9443.84 2533.31
 9445.16 2533.22 9446.86 2532.95 9449.68 2532.75 9451.87  2532.4 9453.64 2532.27
 9457.81  2531.6  9461.8 2531.21  9463.9 2530.88 9465.41 2530.73  9469.6 2530.14
 9473.52 2529.63 9480.16 2528.71 9480.35  2528.7 9481.53 2528.54 9505.69 2526.31
 9507.48 2526.18 9517.62 2525.31 9526.92 2525.12 9529.35 2525.09 9531.96 2525.02
 9534.02    2525 9535.72 2524.95 9540.62 2524.94 9545.84 2524.82 9567.87 2524.19
 9570.89 2524.18 9574.19 2524.11 9589.05 2523.88 9592.35 2523.85 9599.72 2523.83
 9607.16 2523.76  9610.5 2523.77 9614.61 2523.81 9615.93  2523.8 9622.94 2523.88
 9626.56 2523.88 9638.16 2523.84 9648.54 2523.67 9654.99 2523.67 9673.33 2523.45
  9697.7 2523.38 9708.07 2523.68 9711.47 2523.62 9730.99 2524.33 9732.37 2524.36
 9736.24 2524.32 9777.49 2523.21 9787.39 2522.81 9802.15 2522.62 9815.09 2522.55
 9830.23 2522.34 9830.49 2522.35 9837.36 2522.11 9838.14 2522.11 9839.17 2522.07
 9858.72 2522.21 9867.61 2522.12 9880.82 2522.19 9886.44 2522.24 9913.86 2522.12
 9931.93 2522.16 9953.57 2521.93 9991.51  2522.4   10000 2522.2910000.06 2522.29
 10016.4 2522.0710022.61 2522.6310024.78 2522.6210071.34 2522.9210075.71 2522.82
10083.68 2522.7310090.38 2522.5710093.39 2522.5410102.55 2522.3610107.99 2522.31
10114.89  2522.210130.71 2522.0210134.72 2521.5310135.61 2521.4510141.62 2520.53
10148.11  2521.110157.67  2522.110159.49 2522.0510182.16 2522.0110207.42 2522.51
10216.34 2522.8310228.63 2523.07 10243.3  2522.510248.56 2522.4310279.27  2521.5
10281.94 2521.4410292.98 2521.5610304.35 2521.56 10312.5 2521.5310315.15 2521.02
10320.79 2519.7210328.29 2521.4410332.66 2521.3610335.48 2521.3810355.27 2521.33
10415.85 2520.84 10420.5 2521.5910457.92 2521.8110475.01 2521.7910494.84  2521.3
10501.39 2521.3110525.22 2521.1910538.64 2521.1710545.37 2521.0810555.54 2520.89
 10556.5 2520.8510564.94 2520.8910590.32 2520.2910591.75 2520.5110599.95 2520.81
10602.67 2521.0910615.53 2521.05 10622.6 2521.21 10632.9 2520.9810639.69 2520.68
10648.83 2520.3910654.03 2520.2510658.89 2521.1610663.24 2521.0810676.22 2520.97
10679.81  2520.410681.97 2520.0210685.32 2520.31 10694.9  2521.310695.27  2521.2
10695.87 2521.2410700.29 2520.9610702.78 2520.9210716.13 2520.5710720.73 2520.37
10725.19 2520.7410730.02 2521.4410733.85 2521.37   10740 2520.9110743.67 2521.65
10744.85 2521.8710748.99 2521.9510757.59 2522.0610760.72 2521.1410771.65 2521.36
10782.64 2521.68 10783.1 2521.7110784.72 2521.7210798.15 2521.6110809.43 2521.46
 10821.4 2521.2810827.69 2520.6310829.79 2520.9610831.99 2521.1710836.21 2521.71
10837.17 2521.8110841.67 2522.1110844.48  2521.810846.09 2521.6710850.34 2521.24
10856.17 2520.78 10858.4 2520.6210869.78 2521.34 10872.7 2521.5510881.06 2522.09
10901.96 2522.1310905.83 2522.3110934.02 2524.2710943.58 2525.1510946.08 2525.02
10955.13 2525.4810973.38 2527.2710976.04 2527.5610976.54  2527.610982.48 2527.32
10988.64 2527.6611001.15 2528.7311002.12 2528.8411012.52 2529.6411015.14 2529.97
11026.01 2530.9111031.01 2531.4511031.55 2531.3211032.16 2531.4611035.49 2531.81
11037.09 2532.1711038.69 2532.4611042.08 2532.8411043.81 2533.1511045.71 2533.47
11048.98 2533.8411061.77 2535.9511073.11 2537.7311082.05 2538.9811092.27 2540.53
11103.45 2541.35

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
 9399.81     .06 9991.51     .0410022.61     .0610841.67     .0410881.06     .06
```

```
Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9991.5110022.61           547.17  547.17  547.17            .1       .3

CROSS SECTION


RIVER: RV WK
REACH: R3                  RS: 6.957

INPUT
Description: This cross section is identical to RM 0.231 on RV WK T13.
Station Elevation Data    num=     198
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
 9707.16 2525.94  9740.9 2521.11 9741.63 2521.01 9747.96 2519.95 9748.14 2519.93
  9748.3 2519.91  9750.3 2519.55 9751.93  2519.4 9754.53 2519.29 9756.74 2519.23
 9759.12 2519.18 9763.12 2518.64 9766.28 2518.52 9766.59 2518.48 9769.59 2518.35
 9770.22 2518.27 9783.32 2516.99 9783.89 2516.89 9787.69 2516.69 9796.09 2515.92
 9798.84  2515.5 9800.04  2515.3 9804.58 2514.81 9805.65 2514.66 9810.35 2514.19
 9811.27 2514.06 9816.18 2513.68 9816.96 2513.57  9817.8  2513.5 9834.39 2512.39
 9835.38 2512.38 9838.94 2512.18 9845.11 2511.84 9853.94 2511.34 9855.69 2511.29
 9855.93 2511.29 9862.94 2511.12 9864.13 2511.12 9870.24    2511 9874.89    2511
 9875.71 2510.98  9879.1 2510.98  9884.3 2510.95 9888.95 2510.92  9893.7 2510.93
 9899.72 2510.93 9903.12 2510.92 9920.34 2510.86 9921.22 2510.86 9926.15 2510.83
 9931.22 2510.61 9933.11 2510.51 9940.61 2510.16 9945.86  2509.9 9950.05  2509.7
 9954.212509.484 9958.53 2509.26  9959.5 2509.21 9960.99 2509.13 9962.44 2509.06
 9966.09 2508.67 9969.18 2508.45 9971.09 2508.28 9975.38    2508  9975.5 2507.99
 9975.99 2507.95  9978.7 2508.23 9983.54 2508.71 9984.93 2508.85 9985.67 2508.96
 9998.63 2508.15 9999.96 2507.97   10000 2507.9610000.83 2507.8510007.99 2508.48
10019.03 2509.4810019.08 2509.48 10024.6 2509.5710067.67 2510.2710069.72 2510.32
10070.33 2510.3310078.86 2508.8910079.97 2508.6910083.81 2509.0810092.99 2509.95
10093.08 2509.9710093.16 2509.9810094.12 2510.1110095.01 2510.0810190.63 2509.33
10197.41 2509.2710201.34 2509.1410209.13 2508.8910217.27 2509.4410223.02 2509.83
10265.69 2509.7710278.05 2509.7510297.24 2509.8910297.79  2509.910297.96 2509.89
10400.61 2509.3510429.54 2509.3210490.54 2509.2710511.26 2509.3110511.72 2509.31
10511.76 2509.31 10512.4 2509.3110513.22  2509.310514.25  2509.3 10515.4 2509.29
10515.54 2509.2910517.21 2509.2910519.49 2509.2810521.39 2509.2710522.83 2509.28
10526.72 2509.3210543.42  2509.510544.19 2509.5110548.46  2509.610551.38 2509.99
10552.25 2509.9510552.45 2509.9210552.77 2509.8710553.29 2509.7910553.94 2509.45
10554.14 2509.43 10557.1 2509.1510563.16 2508.5910567.96 2508.6510572.67 2508.67
10575.66 2508.6910578.67  2508.710581.02 2508.7610582.06 2508.7710584.46 2508.84
10588.27 2508.88   10594 2508.9910597.01    250910602.91 2509.0610603.48 2508.98
10608.18 2508.3110611.77 2507.9810617.12 2507.3210617.47 2507.3210619.34 2507.57
10620.58 2507.6510626.15 2508.2410630.73 2508.4710633.32 2508.6910635.06 2508.76
10640.12 2508.9710640.51 2508.9910643.06 2509.0810646.62 2508.8810647.37 2508.83
10649.51 2508.7110649.64  2508.7 10651.1  2508.610653.71 2508.4410657.18 2508.19
10660.04 2508.0110660.87 2507.9510666.09 2507.4910666.13 2507.49 10666.3 2507.48
10672.52 2508.4210677.77  2509.310678.58 2509.2510679.75 2509.1810681.62 2509.05
10696.44 2509.5910699.77 2509.8310705.25 2509.6810706.58 2509.6510709.81 2509.55
10715.67 2510.0110722.83 2510.5810723.24 2510.6110725.73 2510.8110729.85 2511.05
10731.61 2511.3410732.03 2511.3910732.04  2511.410732.47 2511.4510761.56  2514.5
10762.85  2514.610763.19 2514.6410766.75 2515.2210767.69 2515.3710772.29 2516.21
10777.37 2517.1110782.09 2517.8910786.43 2518.6210801.76 2522.1710804.51 2522.82
10805.61 2523.06 10811.7 2524.3510820.21 2526.16

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*****************************************************************************
 9707.16     .06 9969.18     .0410007.99     .0610653.71     .0410672.52     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9954.2110019.03              700  731.86     650            .1       .3

CROSS SECTION


RIVER: RV WK
REACH: R3                  RS: 6.818

INPUT
Description: This cross section is identical to RM 0.111 on RV WK T13.
Station Elevation Data    num=     176
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
 9881.06 2508.15 9881.49 2508.04 9883.67  2507.5 9896.95 2505.01 9901.57    2504
 9902.63 2503.86 9903.12  2503.8 9907.42 2502.88  9911.4 2502.39  9916.9 2501.55
 9920.73 2500.79 9924.39 2500.19  9927.5 2499.58 9927.53 2499.58 9929.63 2499.16
 9930.24 2499.02 9932.62 2498.45 9934.74 2497.94 9936.66 2497.47 9954.35 2494.93
 9956.88  2494.6  9964.1 2494.25 9969.52 2494.16 9973.07 2494.03    9980 2493.97
 9981.71    2494 9982.31 2493.99 9988.24 2494.05 9991.04 2493.97  9992.8 2493.97
 9994.01 2493.93 9998.11 2493.78 9999.97 2493.71   10000 2493.71 10006.5 2493.46
10007.95 2493.4410019.37 2493.6610020.37 2493.6910021.81 2493.7410026.27 2493.86
 10029.6 2493.9410031.56 2493.9910032.86 2494.0210043.64 2494.0810047.69 2494.16
10050.45 2494.2110052.45 2494.2610053.22 2494.2710053.96 2494.2610055.13 2494.25
10056.05 2494.2410072.47 2494.5710076.17 2494.5910082.09 2494.6310092.22  2494.7
 10100.9 2494.8310105.69 2494.8310105.99 2494.8310106.41 2494.8310107.03 2494.82
10108.02 2494.8210109.87  2494.810110.85 2494.7910122.47 2494.6210124.02 2494.65
10126.56 2494.6910128.01  2494.710137.96 2494.9410175.07 2495.7910177.86 2495.85
10178.57 2495.8710179.03 2495.8710179.52 2495.8610205.14 2495.6710229.96 2495.45
10230.94 2495.3810237.56 2494.8610241.37 2494.5610249.39 2493.93 10251.6 2493.75
10256.27    249410266.52 2494.5410277.49 2495.1210279.26 2495.0610284.01 2494.99
10296.76 2494.09 10302.5 2493.6510304.22 2493.5210319.24 2494.9210328.12 2495.77
10339.13 2495.4410344.84 2495.2910349.28 2494.7110352.62 2494.2910359.48 2494.88
10363.77 2495.2610370.04  2495.310374.38 2495.3210383.63 2495.3710392.28 2495.38
10402.51 2495.3810404.18 2495.3810406.45 2495.3810411.72 2495.3410456.93 2495.13
10460.42 2495.1710460.78 2495.1710464.52 2495.3610470.26 2495.6510473.88  2495.3
10480.59 2494.6310496.08 2494.5810497.85 2494.5710500.09 2494.5810505.15 2494.49
10505.73 2494.4510507.15 2494.3410513.27 2493.8810514.51 2493.8110517.54 2493.64
10526.13 2493.1710529.64 2492.9610534.52 2493.4310540.79 2494.1510540.96 2494.13
10541.14 2494.1110551.21  2493.110551.93 2493.2510558.78 2494.6210567.81 2494.64
```

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 10589.1 2494.7510591.66 2494.7510602.89 2494.9110611.61 2494.9710616.53 2494.97
 10621.8 2494.9710622.08 2494.97 10622.1 2494.9710627.92 2495.0810628.25  2495.1
10629.18 2495.1210633.78 2495.33 10638.8 2495.5710643.39 2495.7910647.58    2496
10679.59  2497.910683.77 2498.1310687.16 2498.3110689.32 2498.4210690.45 2498.48
10698.16 2498.8810698.98  2498.910706.08 2499.2810709.28 2499.66 10716.2 2500.48
10719.82 2500.9110725.36 2501.5610726.02 2501.5910727.14 2501.6510728.19 2501.71
10729.16 2501.7710742.43 2504.6710746.64 2505.5510747.69 2505.6410752.13 2506.59
10752.97 2506.6710753.13 2506.6810757.75  2507.710758.24 2507.7510761.63 2508.51
10762.09 2508.56 10764.1 2508.7710765.33 2508.8910769.71 2509.3110774.34 2509.76
10778.74 2510.18

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************************************************
 9881.06     .06 9973.07     .0410032.86     .0610241.37     .0410266.52     .06

Bank Sta: Left   Right    Coeff Contr.   Expan.
       9973.0710032.86             .1       .3

CROSS SECTION


RIVER: RV WK
REACH: R4                 RS: 6.686

INPUT
Description: Q=3300 cfs (CB9W6, 24 hr)
Station Elevation Data    num=     172
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 9472.62 2500.63 9475.09 2500.47 9478.46 2500.24 9479.02 2500.11 9481.37  2499.5
 9483.85 2498.91 9486.84 2498.14 9488.71 2497.69 9489.85  2497.4 9491.17 2497.08
 9493.57 2496.74 9497.17 2496.24 9498.46 2495.96  9502.2 2495.43 9503.34 2495.19
 9509.19 2494.65  9513.2  2494.1 9516.14 2493.69 9517.17 2493.61 9521.07 2493.31
 9524.99 2493.02 9528.89 2492.72 9529.97 2492.54 9533.94 2492.24 9534.94 2492.07
 9538.98 2491.77  9543.3 2491.38  9544.2 2491.25 9544.34 2491.22 9548.84 2490.83
 9553.83 2490.39 9554.21 2490.33 9559.65 2489.87 9560.76 2489.72 9565.53 2488.84
 9566.77 2488.66 9571.29 2487.86 9574.24 2487.46 9576.05 2487.16 9577.73 2486.93
 9578.42 2486.82 9579.65 2486.61 9580.39 2486.49 9580.87 2486.41 9580.89 2486.41
 9581.21 2486.39 9601.11  2485.9 9621.51 2484.61 9623.36  2484.5 9624.84 2484.42
 9625.34  2484.4 9627.39 2484.32  9627.4 2484.32 9629.38 2484.23 9645.96 2483.42
 9648.62 2483.31 9650.16 2483.16 9651.47  2483.1 9653.78 2482.88 9656.04 2482.67
 9657.41 2482.64 9659.65 2482.43 9662.33 2482.37 9664.57 2482.16 9667.24  2482.1
 9669.51 2481.89 9672.16 2481.83 9673.05 2481.74 9674.44 2481.75 9677.09 2481.69
 9679.38 2481.68 9682.01 2481.62 9684.32 2481.62 9684.51 2481.61 9726.23 2480.64
 9727.22 2480.64 9731.75 2480.53 9735.01 2480.45 9735.24 2480.46 9737.36 2480.38
 9738.64 2480.32 9742.02 2480.24 9745.52 2480.15 9748.85 2480.04 9751.26 2479.97
 9752.09 2479.94 9752.52 2479.93 9753.32  2479.9 9760.87 2479.84 9791.47 2480.67
 9813.67 2481.28 9842.04 2480.85  9894.7 2479.96 9895.81 2479.99 9896.07 2480.01
 9897.25 2480.06 9900.13 2480.17 9901.75 2480.23 9912.72 2479.92 9918.69 2479.61
 9923.07 2479.38 9928.96 2479.75 9939.66 2480.51 9953.96 2480.41 9968.57 2480.28
 9987.06 2479.69 9997.57  2479.4   10000 2479.5310000.01 2479.5310014.15 2480.23
10019.71  2480.510026.01 2480.1810039.14 2479.4910041.14 2479.5910042.56 2479.65
10056.58 2480.2810065.54 2480.1210068.98 2480.0610079.49 2479.7910079.87 2479.79
10080.81 2479.7710084.39 2479.7110086.06 2479.6810086.46 2479.6710088.18 2479.64
10091.12 2479.9510097.38 2479.4310100.45 2479.3710103.13 2479.32 10103.8  2479.3
10108.09 2479.6910112.98 2480.1810117.18 2480.2410118.52 2480.2410127.29 2480.34
 10131.9 2480.3410137.39 2480.3910139.79 2480.4110146.92 2480.39 10147.5 2480.38
10152.75 2480.3710152.98 2480.3710153.13 2480.3710153.23 2480.37 10153.3 2480.37
10153.35 2480.3710153.76 2480.3710160.68 2480.42 10203.2 2480.7110249.38    2481
10251.95 2480.9910253.64 2480.9610260.24 2480.8210264.52 2480.7710272.57 2480.71
10285.83  2480.610292.73 2480.5610295.71 2480.1510300.94 2479.4610314.96  2479.8
10315.62 2479.8210319.66 2479.9210324.09 2480.0210328.46 2479.47 10333.6 2478.85
10335.42 2478.6210337.23 2478.41 10341.2 2479.5210345.01 2480.5910347.76 2481.36
10349.35 2481.8110364.52 2484.81

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
 9472.62     .06 9968.57     .0410056.58     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9968.5710056.58           498.67  471.95   476.5             .1       .3

CROSS SECTION


RIVER: RV WK
REACH: R4                 RS: 6.597

INPUT
Description:
Station Elevation Data    num=     201
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 9479.25 2496.06 9479.58 2496.05 9479.79 2496.04 9488.79 2495.26 9492.42  2493.8
 9494.29 2493.47 9499.03  2492.3 9499.39 2492.14 9502.72 2491.19 9504.18 2490.84
  9508.7 2489.56 9510.39 2489.17 9512.72 2488.65  9514.6 2488.21 9517.73 2487.51
 9519.82 2487.02 9522.73 2486.37 9523.87  2486.1 9524.68 2485.92 9526.56 2485.64
 9527.73 2485.46 9530.24 2485.09 9535.14 2484.38 9540.05 2483.64 9542.65 2483.23
    9545 2482.88 9547.56 2482.47 9552.52 2481.72  9555.2 2481.34 9556.35 2481.16
 9557.51 2481.04 9566.91 2478.97 9566.98 2478.95 9568.57 2478.77 9572.37 2478.18
 9573.07 2478.23 9578.98 2478.22 9583.16 2478.13 9583.65 2478.13 9584.83 2478.11
 9587.16 2478.04 9588.25 2477.95  9591.4 2477.85 9594.79 2477.56 9597.45 2477.46
 9598.45 2477.47 9600.85 2477.38 9603.42 2477.42 9604.73 2477.38 9607.74 2477.17
  9608.5 2477.11 9616.11 2476.28 9617.16 2476.26 9619.57 2476.24 9620.73 2476.21
 9623.89 2476.19 9627.06 2475.98 9629.63 2475.94 9633.38 2475.86 9640.35 2475.11
  9644.4 2475.01 9646.88 2475.17 9655.62  2474.5 9657.63 2474.34 9677.77  2473.1
 9709.34 2471.07 9712.45 2471.01 9766.83 2470.35 9781.05  2470.2 9783.03 2470.15
 9810.22 2470.19 9836.32 2470.08 9841.86  2469.9 9850.26 2469.29 9855.64 2468.91
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 9857.84 2469.12 9872.78 2469.74 9876.21  2469.7 9877.05 2469.63 9881.57 2469.61
 9889.99 2469.52 9891.17 2469.55 9891.48 2469.55 9897.38 2470.15 9904.02 2470.89
 9905.23 2470.91 9906.21 2470.92 9917.83 2471.11 9929.01 2471.21 9930.44 2471.23
  9932.5 2471.24 9934.36 2471.12 9944.72 2470.57 9948.36 2470.94 9952.43  2471.4
 9981.91 2470.55 9999.95 2469.58   10000 2469.5810003.48 2469.4110011.24 2470.07
10015.88  2470.510037.79 2470.5810071.96 2470.7210083.26 2470.7910084.18 2470.81
   10085 2470.8310093.96 2470.8510094.74 2470.8510102.32 2471.2710106.55 2471.24
10137.52 2471.0610149.87 2470.9510157.23  2470.910174.79 2470.76 10176.4 2470.68
 10184.7 2470.1210185.55 2470.2410189.76 2470.8210192.39 2470.8810197.55 2471.03
10202.82 2470.9210205.39 2470.8810214.51  2470.710218.65 2470.5310233.28 2470.49
10234.59 2470.4710248.55 2470.5110254.19 2470.4410264.56  2470.410272.48 2470.39
10284.31 2470.35 10291.3 2470.3310296.32 2470.3110302.74 2469.8610307.91 2469.51
10317.84 2470.2110318.61 2470.2310327.91 2470.3410335.27 2470.4410340.42 2470.48
10347.66 2470.4210352.64 2470.5210368.04 2470.1310371.69 2470.08 10376.9 2470.03
10383.24 2470.1410383.82 2470.1510387.64 2470.2210391.75 2470.3110410.92 2471.48
10411.32 2471.4910413.77 2471.5610415.78 2471.6310418.55 2471.7410422.44 2471.89
10424.44 2471.9810429.27 2472.1810433.81 2472.3610441.85 2472.6510445.45 2472.78
10446.45 2472.8210452.03 2473.0710466.03 2473.4710474.41 2473.8210483.32 2474.23
10499.25 2474.9610501.13 2475.0710503.42 2475.1810512.39 2475.6910538.08 2476.65
10545.53 2477.4710571.42 2479.8810572.32 2479.84 10578.8  2479.810579.23 2479.86
10579.32 2479.8710582.17 2480.2510582.91  2480.310586.77 2480.8410587.06 2480.87
10587.76 2480.9610589.72 2481.25   10593 2481.5610593.49 2481.6310599.73 2482.24
10601.27 2482.4610606.42    248310608.14 2483.2710612.13 2483.7210613.08  2483.8
10616.23 2484.1510619.77 2484.4210622.11 2484.6710624.01 2484.8110627.23    2485
 10629.3 2485.16 10629.7 2485.1810634.13 2485.5410634.67 2485.5710642.01 2486.16
10644.75 2486.12

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
 9479.25     .06 9981.91     .0410015.88     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9981.9110015.88           626.33  592.78   598.5             .1       .3

CROSS SECTION


RIVER: RV WK
REACH: R4                 RS: 6.484

INPUT
Description:
Station Elevation Data    num=     200
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
**************************************************************************************
 9489.46 2471.68 9489.97  2471.7 9490.05  2471.7 9508.64 2471.83 9509.64 2471.82
 9511.09 2471.78 9512.01 2471.67 9516.89 2471.11 9521.75 2470.55 9526.58    2470
 9531.38 2469.44 9540.91 2468.35 9541.15 2468.33 9544.54 2467.93 9545.95 2467.65
 9546.15 2467.63 9551.11 2466.59 9551.19 2466.58 9554.28 2465.98  9554.8 2465.82
 9555.61 2465.64 9555.62 2465.64 9556.26 2465.58 9556.32 2465.57 9561.41 2465.06
 9561.73 2465.04 9566.55 2464.57  9566.7 2464.56 9571.03 2464.17 9573.33 2464.02
 9574.47 2463.92 9575.96 2463.82 9580.61 2463.44 9582.72 2463.29 9585.91 2462.95
 9588.94 2462.69 9593.59 2462.18 9599.13 2461.61 9609.62 2461.01 9614.49 2460.74
 9642.73 2459.09 9645.15 2459.08 9646.18 2459.06 9647.38 2459.02 9652.59 2458.94
 9655.88 2458.89 9659.11 2458.69 9663.42 2458.66 9665.65 2458.53  9670.9 2458.54
 9672.01 2458.49 9672.22  2458.5 9673.21 2458.52 9678.79 2458.54 9679.13 2458.55
 9682.44 2458.55  9684.5 2458.37 9685.38 2458.29  9689.1 2457.96 9692.01 2457.68
 9695.73 2457.34 9696.19 2457.29 9697.09 2457.19 9698.37 2457.17 9698.48 2457.17
 9701.51 2457.12 9703.44 2457.23 9707.29 2457.79 9707.39 2457.79 9713.78 2457.45
 9731.58 2456.29 9732.23 2456.28 9739.09 2456.28 9740.26 2456.29 9741.04 2456.29
 9747.02 2456.33 9752.32 2456.33 9753.76 2456.33 9755.88 2456.33 9757.51 2456.34
  9759.4 2456.41 9763.95 2456.57 9767.93  2456.7 9771.49 2456.84 9795.11 2457.17
 9800.51 2457.28 9805.27 2457.42 9812.51 2457.55 9815.39 2457.63 9824.79  2457.8
 9825.46 2457.81 9828.17 2457.86 9834.75 2457.83 9838.02 2457.82 9870.51  2458.4
  9883.2 2458.67 9891.18 2458.83 9894.96 2458.91  9901.7 2458.22  9905.4 2457.82
 9906.47 2457.71 9909.26 2457.43 9913.21 2456.99 9918.27 2457.51 9925.37 2458.14
 9932.76  2458.1 9950.93  2458.1 9958.68 2458.09 9959.95 2458.09  9961.6  2458.1
 9966.42 2457.43 9977.05 2455.96 9990.16 2456.81 9992.91 2456.93   10000 2457.15
10009.22 2457.4510011.79 2457.5710013.03 2457.4110013.37 2457.3610017.48 2456.81
10025.69  2457.3 10037.4 2458.1310040.97 2458.1110041.81  2458.110050.92 2457.97
10059.37 2457.9510061.95 2457.9210066.41 2457.9310070.09 2457.7510075.39 2457.39
10076.88 2457.4110084.78 2457.5510093.23 2457.7210106.37  2457.610117.95 2457.54
10119.49 2457.5310120.99 2457.5210125.31 2457.29   10135 2456.7710139.08 2456.84
10145.75 2456.9310154.63 2456.9910160.22 2457.0510170.62 2456.7110170.75 2456.71
10180.73 2457.1710193.12 2456.7410196.18 2456.6610200.56 2456.4110204.55 2456.15
10208.62 2456.3310212.18 2456.4710214.54 2456.5710220.56 2456.8110220.97 2456.82
10221.32 2456.8310224.63 2456.9510226.14    245710228.06 2457.0710231.83 2457.19
10233.26 2457.25 10234.8  2457.310237.08 2457.3710237.46 2457.3910241.54 2457.53
10242.99 2457.5910248.35 2457.77 10248.5 2457.7710248.77 2457.7910248.92  2457.8
10263.09 2458.9210266.36 2458.9510272.91  2459.110277.73 2458.8210279.11 2458.83
10280.83 2458.9910281.44 2459.0410284.44 2459.3110301.21 2461.1710309.77 2461.99
10310.52 2462.1410310.76 2462.1910312.51  2462.110313.94 2462.0310314.59 2462.04
 10316.6 2462.2310326.74 2463.2110329.65  2463.510331.02 2463.7210334.81 2464.38
10338.22 2464.9610355.84 2467.98 10359.5 2468.6610361.74 2469.07 10364.5 2469.64
10369.05 2470.4510370.65 2470.77   10371 2470.8310377.23 2471.6210378.59 2471.47

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
 9489.46     .06  9961.6     .04 10037.4     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        9961.6 10037.4           432.44  362.56  383.02             .1       .3

CROSS SECTION


RIVER: RV WK
REACH: R4                 RS: 6.416
```

```
INPUT
Description:
Station Elevation Data    num=     200
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 9451.21 2468.04 9451.55 2468.04 9451.64 2468.03 9451.85 2468.01 9451.87    2468
  9456.6 2467.56 9456.85 2467.52 9458.84 2467.37 9460.46 2467.23 9464.15  2466.9
 9468.65 2466.52 9472.64 2466.19 9475.46 2466.05 9478.69 2465.79 9480.65 2465.62
  9481.9 2465.41 9485.05 2464.85 9485.32 2464.81 9486.83 2464.55 9489.78 2464.25
 9490.66 2464.11 9490.75 2464.08 9491.25    2464 9494.23 2463.46 9495.78 2463.19
 9498.67 2462.67 9500.29 2462.39  9503.1 2461.88 9504.79 2461.59 9506.37 2461.37
 9509.41 2460.83 9511.17 2460.62 9511.36 2460.58 9514.08 2460.27 9529.76 2458.66
 9534.53 2458.17 9536.36 2457.96 9542.18 2457.21 9543.59 2456.97  9550.7  2456.5
 9553.05 2456.33 9554.09 2456.28 9555.54 2456.21  9561.8 2455.91 9562.25 2455.89
 9564.61  2455.8 9564.87 2455.82 9565.63 2455.79 9566.36 2455.73 9567.93 2455.71
 9568.89 2455.81 9570.38 2455.75 9579.83 2455.57  9583.6 2455.44 9587.23 2455.31
 9616.63 2453.08 9616.83 2453.05 9617.01 2453.02 9619.37 2452.76 9622.06 2452.59
 9622.37 2452.57 9627.15 2452.27 9628.01 2452.22 9629.03 2452.14 9630.31 2452.07
  9635.3 2451.74 9637.12 2451.65  9641.2 2451.39  9643.8 2451.23 9644.42 2451.19
 9649.03 2450.93 9650.74 2450.83 9652.18 2450.75 9653.06 2450.69 9687.63 2449.11
 9705.19 2448.26 9705.39 2448.26 9705.61 2448.26  9711.5 2448.52 9716.78 2448.81
 9725.52 2449.08 9729.16 2449.18 9747.98 2449.12 9800.22    2449 9812.08 2449.26
 9838.57 2449.58 9839.08 2449.85 9845.38 2450.19 9852.05 2450.59 9913.71  2450.3
 9931.85 2450.21  9938.3 2450.12 9958.86 2449.81 9964.36  2449.9 9980.97 2450.15
 9985.61 2449.44 9989.12  2448.9  9993.9 2449.09 9999.88  2449.2 9999.91  2449.2
   10000  2449.210002.78 2449.2510003.38 2449.2610006.25 2449.32 10010.2 2449.25
10014.71 2449.1410016.61  2449.110018.31 2449.0610023.41 2449.5710027.47    2450
10031.25 2450.0310035.08 2450.1710039.16 2449.1310040.46  2448.810050.31  2449.8
10057.07 2450.4810057.17 2450.4910058.22 2450.5110094.71 2450.0210097.45 2449.99
10112.52 2449.8210112.76 2449.8310113.34 2449.8410124.02 2450.1110128.38 2450.19
10128.64 2450.2210128.84 2450.2510159.57 2450.2410165.76 2450.2210169.69 2450.24
10192.39  2450.210192.44 2450.19 10196.2  2450.210204.08 2450.2110208.19 2450.28
10226.24 2449.9810227.27 2449.9410230.76  2449.8   10240 2449.4410248.44 2449.63
10250.06 2449.6610255.21 2449.7610270.78 2449.9410272.82 2449.9610275.41 2449.98
10278.31 2450.0510285.41 2450.16 10307.2 2450.4810316.28 2450.6110338.26 2451.19
10338.73 2451.1910340.74 2451.1810342.25 2451.2210344.51 2451.3310348.66 2451.53
10355.75 2451.7910355.85 2451.7910358.72 2451.8310373.73 2451.66   10422 2453.41
10422.22 2453.4210423.35 2453.4510424.35 2453.4910425.98 2453.5410427.69 2453.55
10457.18 2454.4910462.57 2454.6610465.66 2454.7610471.75 2454.9410479.29 2455.17
10479.79 2455.1310485.78 2455.8210495.49 2456.7810502.58 2457.4710505.02 2457.64
10510.67 2458.1710515.09 2458.5610542.64 2460.5210544.36 2460.6210548.26 2460.91
10550.75 2461.1410551.24 2461.1810551.26 2461.1910551.88 2461.2810552.73  2461.4
10552.96 2461.4310553.88 2461.5410555.48 2461.7310557.84 2462.0110561.71 2462.47
10566.32 2463.0610573.91 2463.9410580.33 2464.7910580.75 2464.8210580.87 2464.84
10584.65 2466.1710584.68 2466.1710584.87  2466.210585.09 2466.2310608.99  2468.9

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
 9451.21     .06 9980.97     .0410057.07     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9980.9710057.07           154.69  185.83  268.96             .1       .3

CROSS SECTION


RIVER: RV WK
REACH: R4                 RS: 6.384

INPUT
Description:
Station Elevation Data    num=     201
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 9571.89 2464.97 9574.67 2465.12 9578.02 2465.02  9582.4  2464.4 9587.96 2463.54
  9603.7 2460.92 9608.46 2460.26 9608.83 2460.19 9611.86 2459.79 9612.34 2459.82
 9612.93 2459.81 9615.86 2459.87 9617.11 2459.85  9624.8 2459.96 9629.57 2459.91
 9633.74 2459.79 9636.93 2459.72 9644.29 2459.51 9645.42 2459.39 9648.51 2459.34
 9648.98  2459.3 9651.72 2459.24 9651.74 2459.23 9651.98 2459.23 9658.01 2457.99
  9662.2 2457.14 9664.26 2456.69  9667.4 2456.04 9667.56 2456.01 9670.45  2455.4
 9673.05  2454.9 9673.75 2454.74 9675.73 2454.36 9678.52 2453.95 9681.62 2453.32
 9685.31 2452.78 9686.58 2452.55 9690.45    2452 9691.51 2451.81 9691.55 2451.81
 9692.27 2451.67 9696.29 2451.02 9696.57 2451.01 9700.05 2450.45 9700.93  2450.4
 9701.59 2450.34 9702.44  2450.3 9706.55 2449.86 9707.44 2449.82 9711.53  2449.4
 9712.38 2449.35 9716.44 2448.93 9716.51 2448.92 9720.73 2448.45 9721.48 2448.32
 9722.19 2448.23 9723.57    2448 9727.12 2447.17 9727.99 2447.01  9731.3 2446.23
 9731.66 2446.16 9732.42  2446.1 9743.17 2445.27 9743.34 2445.26  9747.9 2444.96
 9750.91 2444.61  9753.2 2444.34 9754.61 2444.26 9754.82 2444.25 9756.11 2444.13
  9761.9 2443.88 9764.52 2444.53 9767.54 2445.24  9768.7 2445.53 9769.27 2445.64
 9778.73 2445.42 9779.55 2445.42 9789.66 2445.56 9796.93 2445.55 9805.46 2444.99
 9814.36 2444.59 9817.37 2444.42  9822.1 2444.23  9825.7  2444.5 9829.35 2444.77
 9832.71 2445.01 9837.61 2444.86 9849.93 2444.47 9853.78 2444.59 9861.47 2444.81
  9870.5 2445.23 9882.35 2445.73 9890.65 2445.86 9896.62 2445.95 9904.02 2446.11
  9908.3 2445.85 9913.66 2445.52 9925.53 2445.71 9932.59  2445.8 9983.57 2447.22
 9989.18  2446.1 9993.74  2445.2 9999.97 2445.16   10000 2445.1610008.65 2445.11
10011.24 2445.43 10018.8 2446.3310020.83 2446.2610039.55 2445.6510043.81 2446.38
10048.27 2447.0510050.45  2446.510050.75 2446.4310068.66 2447.5210070.98 2447.58
10076.39 2447.5910079.26 2447.6610084.44 2447.6610085.41 2447.5910087.84 2447.43
 10090.5  2447.510113.09 2447.9810113.54 2447.9810118.89 2447.7610132.64 2447.16
10136.79 2447.0610141.59 2446.8110147.09 2446.5810147.97 2446.6710149.93 2446.84
10154.43 2447.1910156.31 2447.4310164.89  2447.5 10172.9 2447.5910176.49  2447.3
10192.14 2446.1510206.41 2446.3210208.15 2446.33 10208.3 2446.3210211.36 2446.34
10213.66 2446.3310215.82 2446.3410218.34 2446.41 10222.1 2446.4210230.66 2446.59
   10235 2446.5810235.34 2446.5910239.19 2446.5810239.27 2446.58 10240.8 2446.59
10246.69 2446.2310251.59 2445.9110252.95 2446.1110253.89 2446.1910255.27 2446.36
10260.79 2447.0210263.55 2447.3310267.05 2447.7510267.63 2447.7710280.67 2448.09
10282.64 2448.1910286.75 2448.2210287.93 2448.2710291.85  2448.310292.94 2448.35
10293.21 2448.3610296.93 2448.4110298.41 2448.4510300.35 2448.4710303.58 2448.57
```

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10306.97 2448.6610311.99  2448.810315.24 2448.8910321.66 2449.0710324.85 2449.16
10328.27 2449.2310331.85 2449.3110339.47 2449.4710343.57 2449.5610347.85 2449.65
10355.76 2449.7210379.52  2450.710380.99 2450.7410389.86 2450.9710390.12 2450.92
10390.61 2450.9210392.84 2450.9910400.25 2451.2210400.73 2451.2310406.19 2451.25
10407.91 2451.2810409.43  2451.310436.42 2454.1610455.67  2456.110458.51 2456.56
10461.67 2457.0810465.25 2457.6610469.28 2458.3310474.58 2459.1910475.06 2459.22
10475.46 2459.22

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
 9571.89     .06 9983.57     .0410048.27     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9983.5710048.27                0       0       0             .1       .3

CROSS SECTION


RIVER: RV WK S4
REACH: R1                 RS: 0.497

INPUT
Description: Q=752 cfs (This flow is a result of the energy analysis at the
             upstream split)
Station Elevation Data    num=      50
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 9943.43 2604.29 9944.73 2604.38 9949.64 2603.04  9949.7 2603.04 9950.11 2602.92
 9950.13 2602.92 9950.14 2602.91 9962.78 2601.07  9968.2 2601.09 9971.84 2601.07
 9975.03 2601.07 9983.36 2601.03 9988.11  2600.6 9997.54 2599.74 9998.36 2599.66
 9998.88 2599.62   10000 2599.6810015.462600.59410017.25  2600.710019.86 2600.87
10020.95 2600.87 10027.8 2600.8510033.25 2600.8410034.68 2600.8310112.73 2601.04
10114.53 2601.0810119.79 2601.2410123.86 2601.2210129.69 2601.1910137.05 2601.18
10137.07 2601.1810145.43 2600.2910151.57 2599.6310161.96  2599.610170.27 2599.61
10170.62 2599.6110174.04 2599.61 10175.7 2599.6110181.59 2598.79 10181.8 2598.77
10182.08  2598.810183.24  2598.910183.94  2598.910184.78  2598.910186.29 2598.97
10207.06 2602.1610211.24 2602.9110218.42 2607.1810224.59 2610.7810225.34 2610.61

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
 9943.43     .06 9988.11     .0410015.46     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9988.1110015.46            82.07   76.26   76.26             .1       .3

LATERAL STRUCTURE


RIVER: RV WK S4
REACH: R1                 RS: 0.496

INPUT
Description:
Lateral structure position     = Left overbank
Distance from Upstream XS =     .01
Deck/Roadway Width        =       2
Weir Coefficient          =     2.5
Weir Flow Reference       = Water Surface
 Weir Embankment Coordinates    num =       31
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
       0 2604.29    3.88 2603.83   10.72 2602.24   20.37 2601.43   21.27 2601.31
   25.89 2600.98   34.78 2600.52   37.37 2600.44   40.64 2600.35   43.92 2600.25
   46.48 2600.18   50.47 2600.05   52.32    2600   57.02 2599.84   58.14 2599.81
   59.62 2599.76   60.42 2599.73   63.88 2599.73   64.25 2599.72   69.44 2599.74
   69.52 2599.73   70.83 2599.74    71.4 2599.71   71.54 2599.71   75.25 2599.71
   75.35 2599.71   80.24 2599.71   80.28 2599.71   81.75 2599.71   81.98 2599.71
   82.06 2599.71

Weir crest shape                          = Broad Crested


CROSS SECTION


RIVER: RV WK S4
REACH: R1                 RS: 0.483

INPUT
Description: Q=732 cfs (This flow is a result of the lateral weir analysis on
             the left overbank of RV WK S16 between RM 0.497 and RM 0.483)
Station Elevation Data    num=      51
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 9936.85 2599.71 9936.92  2599.7 9936.98  2599.7 9937.51 2599.66 9937.73 2599.63
 9937.91 2599.61 9938.29 2599.58 9941.642599.254 9943.84 2599.04 9952.56 2598.18
 9959.07 2597.59 9961.75 2597.75 9964.13 2597.92 9976.89 2598.84 9979.26 2599.01
  9979.7 2599.05 9994.532598.314 9996.64 2598.21   10000 2598.0310000.06 2598.03
 10002.72598.31210004.09 2598.4610011.54 2599.2610015.29 2599.2910023.28 2599.37
10023.68 2599.3710028.81 2599.3810033.06 2599.3810033.67 2599.3810036.45 2599.37
10041.11 2599.3710081.16  2599.2 10120.6 2599.1710123.55 2599.1310128.77  2599.2
10139.93 2599.3610141.33 2599.3810141.84 2599.3210145.07 2598.8910152.72 2598.18
10167.06 2599.2510169.43 2599.3710176.29 2599.7110176.96 2599.8110178.87 2600.08
 10182.4 2600.5710192.75 2603.5610194.87 2604.0510197.66 2604.7810207.74 2606.58
10209.97 2607.08

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
```

```
**********************************************
 9936.85     .06 9994.53     .04 10002.7     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        9979.710033.67           154.12     138     138             .1       .3

LATERAL STRUCTURE


RIVER: RV WK S4
REACH: R1                  RS: 0.482

INPUT
Description:
Lateral structure position      = Left overbank
Distance from Upstream XS =      .01
Deck/Roadway Width        =        2
Weir Coefficient          =      2.5
Weir Flow Reference       = Water Surface
 Weir Embankment Coordinates    num =       55
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0 2599.71     .06  2599.7     .11  2599.7     .25 2599.69     .42 2599.68
   24.94 2597.56    26.9 2597.51   29.46 2597.39   31.37 2597.35   33.99 2597.23
   35.82 2597.19   38.52 2597.05   38.83 2597.05   42.16 2596.88   43.16 2596.89
   47.08 2596.66   47.74 2596.66    49.6 2596.53   51.34 2596.43   52.45 2596.45
   52.51 2596.46    57.7 2596.58   58.05 2596.58   62.52 2596.68   63.64 2596.67
   67.58 2596.75   69.04 2596.74   70.76 2596.77   70.96 2596.77   73.05 2596.76
   80.47 2597.15   82.98  2597.1   89.48 2596.77   90.44 2596.76   91.13 2596.75
   91.17 2596.75   101.5 2596.99   102.4 2596.99  106.97 2597.01  107.18 2597.01
  110.47 2597.06  110.68 2597.06  114.85 2596.92   119.2 2596.78  120.28 2596.74
  123.72  2596.8  128.32 2596.87  133.03 2596.95   133.3 2596.95  138.14 2597.03
  141.03 2596.97  145.27 2597.05  145.68 2597.06  149.48 2596.99  154.11 2596.91

Weir crest shape                          = Broad Crested


CROSS SECTION


RIVER: RV WK S4
REACH: R1                  RS: 0.456

INPUT
Description: Q=321 cfs (This flow is a result of the lateral weir analysis on
             the left overbank of RV WK S16 between RM 0.483 and RM 0.456)
Station Elevation Data    num=      89
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9983.12 2596.91 9989.272595.973 9992.31 2595.51 9995.282595.088 9999.99 2594.42
   10000 2594.42 10000.2 2594.3910001.99 2594.6210005.63 2595.0810010.38 2595.68
10012.72 2595.97 10017.4 2596.0710020.25 2596.1210024.39 2596.1710030.77 2596.27
10040.32 2596.35 10041.4 2596.3610043.67 2596.3710047.66 2595.6410051.54  2594.9
10052.29 2594.7510053.31 2594.5610054.54 2594.3610057.69 2594.7310060.09 2595.08
10061.12 2595.2410062.28 2595.3910065.06 2595.5510065.38 2595.5410068.49 2595.66
10068.67 2595.6610070.16 2595.6810071.36 2595.6710071.92 2595.6310076.24 2595.56
10076.44 2595.5410078.09 2595.3310078.22 2595.3310078.52 2595.2910081.42 2595.08
10083.65 2594.9310086.11 2595.0110086.85 2594.9710087.79    259510089.67 2595.07
10093.19 2594.9210094.46 2594.7810099.75 2594.5410099.78 2594.5410099.96 2594.57
10100.11 2594.5710103.51 2594.8710105.05 2594.8910106.69 2594.9110107.01 2594.94
10108.11 2595.0310119.56 2597.3410124.34 2597.99 10124.8 2598.0610126.04 2598.23
10130.49 2598.8410132.45 2599.0810132.54 2599.0910132.95 2599.1410137.37 2599.86
10137.84 2599.9410142.42 2600.43 10162.3 2602.1810164.55 2602.3610167.69 2602.75
10173.33 2603.2710179.61 2603.8410182.29 2604.1210184.71 2604.3410189.88  2604.9
10191.86 2604.9410192.15 2604.9410198.38 2605.0510200.66 2605.0410205.21 2605.09
10205.89 2605.0910208.91 2605.1210222.13  2604.710223.33 2604.7910225.28 2604.94
10227.98 2605.1510230.85 2605.1210232.81 2605.23 10234.8 2605.33

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
 9983.12     .06 9995.28     .0410005.63     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9989.2710012.72            89.44   69.06   69.06             .1       .3

LATERAL STRUCTURE


RIVER: RV WK S4
REACH: R1                  RS: 0.455

INPUT
Description:
Lateral structure position      = Left overbank
Distance from Upstream XS =      .01
Deck/Roadway Width        =        2
Weir Coefficient          =      2.5
Weir Flow Reference       = Water Surface
 Weir Embankment Coordinates    num =       35
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0 2596.91    4.67 2596.68    6.46 2596.58     8.6 2596.64   11.11 2596.51
   13.82 2596.58   15.77  2596.5   18.83 2596.58   18.95 2596.58   20.62 2596.58
   23.41 2596.65   24.03 2596.66   27.71 2596.72   29.23 2596.73   31.15 2596.76
   32.33 2596.76   43.63 2597.04   44.47 2597.04   49.13 2597.11   52.24 2597.16
    54.4 2597.78   56.87 2597.96    64.9 2598.77   67.64 2599.57   70.42 2600.39
   71.11 2600.59   73.29 2600.99   74.87 2601.32   77.97 2601.88   78.94 2602.09
   79.81 2602.25   83.13 2602.84   84.79 2603.14   88.28 2603.77   89.43 2603.97
```

```
Weir crest shape                        = Broad Crested

CROSS SECTION


RIVER: RV WK S4
REACH: R1                 RS: 0.443

INPUT
Description:
Station Elevation Data    num=      54
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9926.71 2603.97 9930.09 2603.14 9935.85 2601.71 9945.12 2599.42  9945.5 2599.33
 9946.12 2599.18 9947.02 2599.04 9948.39 2598.86  9971.2 2595.72 9973.75 2595.33
 9973.92 2595.33  9977.4  2595.1 9981.16  2594.8 9983.912594.598 9988.93 2594.23
 9992.192593.953 9999.88  2593.3   10000 2593.3210004.41 2593.9610009.55  2594.6
10016.23 2594.5610018.94 2594.5610021.96 2594.55 10022.2 2594.5410025.93 2594.57
10030.22  2594.3 10030.4 2594.2910030.55 2594.2910032.69 2594.1110037.09 2593.95
10043.16 2592.8310043.54 2592.8710044.27 2592.9710047.33 2593.3610051.51 2593.93
10054.06 2594.2810061.94 2594.8110089.52 2598.1110089.67 2598.1310091.66 2598.22
10093.87 2598.3210094.04 2598.3510096.68 2598.7710099.75 2599.2710106.91 2601.09
10108.68  2601.310110.84 2601.5510111.06  2601.610114.23 2602.4510118.02 2603.46
10118.07 2603.4710122.39 2604.2410127.04 2605.2510131.24 2605.93

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9926.71     .06 9992.19     .0410004.41     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9983.9110009.55                0       0       0             .1       .3

CROSS SECTION


RIVER: RV WK S4
REACH: R2                 RS: 0.339

INPUT
Description: Q=1134 cfs (This flow is a result of the energy analysis at the
             upstream split)
Station Elevation Data    num=      38
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9927.92 2591.14 9927.95 2591.14 9927.98 2591.14 9928.04 2591.12 9942.98  2581.2
 9945.85 2581.02 9956.05 2580.53 9958.53 2580.58 9958.97 2580.58 9965.82 2580.69
 9968.52 2580.67 9973.24 2580.73 9988.53 2580.54 9995.18 2579.71   10000 2579.21
10000.01 2579.2110000.33 2579.1810004.29 2579.7110008.63  2580.110010.61 2580.32
10014.42  2580.510015.04 2580.5610016.49 2580.8610019.79 2580.7510020.59  2580.8
10020.71 2580.8210024.07 2581.7910029.09 2581.9110042.53 2581.9610045.34 2581.98
10046.39 2581.9710081.81 2582.43 10089.1 2582.5510108.85 2582.2110118.63 2582.67
10132.53 2583.2910144.87 2583.8710153.74 2584.23

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9927.92     .06 9995.18     .0410004.29     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9988.5310015.04           283.76  283.76  283.76             .1       .3

CROSS SECTION


RIVER: RV WK S4
REACH: R2                 RS: 0.285

INPUT
Description:
Station Elevation Data    num=      46
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9678.59  2577.4 9692.99 2577.02 9708.89 2576.81 9712.57 2576.76 9728.51  2576.6
 9736.45 2576.58 9762.14 2576.34 9762.95 2576.38 9765.93 2576.34 9773.97 2576.33
  9776.8 2576.38 9779.98 2576.19 9783.72 2576.03 9786.64  2575.9 9795.63 2576.18
 9865.68 2575.86 9873.05 2575.88  9892.7 2575.74 9913.15  2575.6 9918.73 2575.58
 9938.172575.001 9949.29 2574.67 9965.37 2574.23 9983.18 2573.68 9991.59 2572.99
 9995.17 2572.68 9998.66 2572.41 9999.86 2572.62   10000 2572.6310000.07 2572.64
 10004.1 2572.94 10031.9 2575.0110044.25 2575.0210053.08 2575.1410070.29 2575.39
10079.58 2575.5110088.15 2575.1410102.19 2574.6910108.99 2574.6810126.55 2574.77
10132.07 2575.08 10134.5 2575.27 10141.8 2575.5510153.49 2576.06 10158.3 2576.29
10161.39 2576.37

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9678.59     .06 9991.59     .04 10004.1     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9938.17 10031.9           238.58  238.58  238.58             .1       .3

CROSS SECTION


RIVER: RV WK S4
REACH: R2                 RS: 0.240

INPUT
```

```
Description: Q=2733 cfs (This flow is the arithmetic combination of RV WK and
             RV WK S16)  This cross section is identical to RM 7.413 on RV WK.
Station Elevation Data    num=     172
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 9008.74 2570.53 9018.12  2569.4 9018.69 2569.32 9022.16 2569.04  9024.4 2568.83
 9027.07 2568.58 9029.94 2568.31 9031.15 2568.16 9034.66 2567.84  9037.7 2568.18
    9040 2568.45  9043.6 2568.86 9047.44 2569.31  9052.6 2569.14 9058.56 2568.93
 9068.08  2568.6 9074.39 2568.37 9079.63 2568.24  9091.1 2568.02 9091.56 2568.01
 9091.78 2568.01 9093.12 2568.12 9102.06 2568.84 9105.42  2568.8 9105.97 2568.79
 9113.78  2568.7 9125.67 2568.52 9132.47 2568.44 9140.38 2568.29 9147.56 2566.82
 9150.25 2566.31 9155.14 2566.73 9159.67 2567.14 9160.69 2567.23 9163.36 2567.49
 9171.85 2568.29  9174.6 2568.58 9177.55  2568.6 9187.54 2568.69 9200.95 2568.66
 9209.34 2568.63 9209.88 2568.63 9209.94 2568.63 9216.57 2568.58 9222.72 2568.53
 9226.49 2568.47 9231.91 2568.42 9236.49 2568.35 9237.09 2568.34 9241.76  2568.3
 9245.79 2568.26 9249.33 2568.19 9253.83 2568.18 9259.45 2568.11 9261.84  2568.1
 9266.99  2568.1 9285.41 2568.07 9287.91 2568.07  9290.8 2568.06 9294.15 2568.07
 9298.11 2568.07 9299.08 2568.09 9299.26 2568.07 9299.88 2568.08 9300.15 2568.07
 9306.42 2568.12 9311.27 2568.02 9315.63    2568 9322.08 2567.81 9322.22 2567.81
 9322.71  2567.8  9323.8 2567.79 9324.02 2567.82 9327.64  2567.8 9339.95 2567.83
 9342.51 2567.84 9347.96 2567.82 9352.89 2567.82 9356.14 2567.82 9365.09 2567.76
 9370.91 2567.72 9380.46 2567.43 9383.23 2567.37 9414.01    2567 9416.13 2566.96
 9416.59 2566.96 9440.42 2567.39 9442.82 2567.58 9444.81 2567.73 9449.85 2567.79
 9456.02 2567.84 9458.14 2567.59 9460.672567.302 9463.58 2566.97 9465.14 2566.79
 9465.74 2566.72 9470.31 2566.93 9481.44 2567.44 9481.63 2567.45 9496.49 2567.38
 9509.01 2567.29 9517.56 2567.52 9517.81 2567.53 9518.28 2567.62 9518.61 2567.72
 9518.89 2567.72 9580.73 2568.28 9654.85 2568.31 9658.73 2568.34 9671.72  2568.4
 9675.11 2568.42 9679.96 2567.75 9682.69 2567.43 9686.88 2566.84 9691.92 2567.26
 9692.94 2567.36 9701.16 2568.03 9702.78 2568.17 9703.18  2568.2 9703.78 2568.25
 9705.81 2568.27 9707.21 2568.28 9728.94 2568.49 9741.31 2568.61 9749.01 2568.69
 9758.64 2568.65 9791.21 2568.42  9791.3 2568.42 9792.44 2568.42 9794.16 2568.42
 9795.07 2568.42     9797 2568.41 9800.65 2568.39 9807.34 2567.99 9808.67 2567.91
 9819.35 2568.52 9822.41  2568.7 9846.29 2568.68 9866.05 2568.67 9879.17 2568.55
 9902.56 2568.42 9922.88 2568.36 9947.67 2567.01  9949.8 2566.89 9952.56 2566.96
 9990.65    2568 9996.55 2567.42   10000 2567.0610000.04 2567.06 10000.2 2567.04
 10003.42567.42110011.262568.35510012.56 2568.5110015.62 2568.8810024.02 2568.81
10055.79 2568.4310077.68 2568.1610078.95 2568.02 10086.3 2567.1910105.42 2569.08
10105.71 2569.1110106.05 2569.1210113.04 2569.2310147.95 2569.7710150.69 2569.81
10151.39 2569.8310151.42 2569.8310152.08 2569.7910161.68 2569.3310163.61 2569.71
10167.14 2570.3510176.44 2570.26

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************************************************
 9008.74     .06 9460.67     .04 9481.63     .06 9996.55     .04 10003.4     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9922.8810011.26           242.04  242.04  242.04             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
 9008.74 9675.11 2568.89       F

CROSS SECTION


RIVER: RV WK S4
REACH: R2                 RS: 0.194

INPUT
Description: This cross section is identical to RM 7.363 on RV WK.
Station Elevation Data    num=     118
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
  9261.4 2572.12 9264.23 2571.44 9264.79 2571.36 9269.04 2569.75 9269.56 2569.67
 9269.89  2569.6 9270.63 2569.31 9276.28 2567.42 9285.59 2566.46 9292.03  2564.9
 9299.44 2563.33 9300.01 2563.37 9306.91 2561.94    9317 2560.22 9319.64  2559.7
 9324.65 2558.74 9328.73 2558.09 9344.64 2558.36 9346.73 2558.46 9352.97 2558.45
 9358.14 2558.43 9363.54 2558.83 9369.69 2559.25 9371.11 2559.34 9384.75 2558.66
 9386.41 2558.54 9389.19 2557.85 9391.53  2557.3  9400.2 2559.15 9401.32 2559.35
 9403.94 2559.75 9404.36 2559.69 9408.82 2559.34 9414.98 2558.84 9418.42 2559.63
 9420.31 2559.62 9421.75 2559.58 9434.52 2559.81 9435.98 2559.81 9464.89 2560.51
 9512.92 2560.67 9515.27 2560.54 9531.62 2560.25  9536.3 2560.01 9541.39 2559.16
 9544.87 2559.65 9550.58 2560.51 9552.35 2560.53 9552.83 2560.55 9572.31 2560.94
 9580.82 2561.09 9595.22 2561.24 9596.78 2561.28 9612.83 2561.28 9623.48 2561.22
 9627.42 2560.79 9628.08 2560.74 9634.11 2560.16 9634.79 2560.24 9639.88 2560.93
 9642.34 2561.32 9658.23  2561.4 9664.21 2561.36 9684.39 2561.66 9700.61 2562.01
 9708.54 2561.41 9712.88 2562.08 9717.87 2562.74 9752.13 2562.44 9761.11 2562.43
 9770.82 2562.44 9777.05 2561.38 9780.64 2560.91 9787.94 2561.47 9791.58 2561.87
 9793.42 2562.04 9795.39 2562.29  9795.8 2562.33 9817.18 2562.49 9833.41  2562.7
 9839.27 2562.71 9860.31 2562.75 9878.91 2562.74 9892.55 2562.47 9897.23 2562.25
 9916.88 2562.14 9921.72 2562.01 9954.88 2561.64 9959.71 2561.74 9962.49 2561.74
 9964.04 2561.77 9970.57 2561.77  9974.5 2561.75 9975.88 2561.77 9980.11 2561.64
  9982.8  2561.6 9987.17 2561.43 9990.97 2561.02 9993.07 2560.97 9995.82 2560.68
 9999.51 2560.36   10000 2560.2910001.16 2560.1310006.09 2559.5910007.85 2559.83
10008.99 2560.05 10011.8  2560.510014.522561.021 10018.52561.784 10021.3 2562.32
10025.86 2562.3710073.06 2562.5710073.52 2562.4410074.45 2562.5310081.01 2562.42
10086.91  2562.310101.14 2562.2710136.83 2562.35

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
  9261.4     .06 9371.11     .04 9401.32     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9975.88 10018.5           453.28  453.28  453.28             .1       .3

CROSS SECTION


RIVER: RV WK S4
```

```
REACH: R2                  RS: 0.108

INPUT
Description: This cross section is identical to RM 7.246 on RV WK.
Station Elevation Data    num=      95
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 9671.69 2552.01 9673.26 2551.82 9675.02 2551.65 9683.39 2550.51 9693.98 2549.04
 9696.17 2548.83 9697.56 2548.74 9700.42 2548.49 9703.39 2548.29 9719.67 2546.96
  9721.8 2546.84 9723.27 2546.85 9725.22 2546.72 9727.21 2546.79 9727.47 2546.82
 9732.23 2546.29  9744.22544.876 9746.03 2544.66  9754.9 2544.78 9761.13 2544.87
 9767.61 2544.73 9780.45 2544.38 9782.62 2544.88 9788.22 2546.17    9796 2547.25
 9796.05 2547.22 9796.78 2547.36  9798.8 2547.13 9799.11 2547.12 9799.37 2547.11
 9799.59 2547.11 9799.81 2547.12 9809.48 2547.57 9810.98  2547.7 9811.85 2547.84
 9814.32 2548.23 9830.02 2548.53 9833.84 2548.64 9837.05 2548.85 9840.44 2548.93
 9846.02 2549.28 9847.76  2549.3 9852.13 2549.48 9855.67 2549.45 9861.57 2549.52
 9863.24 2549.51 9864.12 2549.51 9871.02 2549.61 9872.53 2549.62 9880.54 2549.73
 9880.94 2549.74  9883.8 2549.78 9892.93 2549.72 9902.46  2549.7 9937.57  2549.5
 9938.23 2549.48  9938.6 2549.46 9939.54 2549.44 9941.03 2549.36 9941.24 2549.35
 9941.55 2549.35 9945.47 2548.59 9947.57 2548.17 9948.53 2548.43 9953.96  2549.7
 9954.18 2549.76 9955.09 2549.98 9955.27 2550.01 9968.29 2549.39 9979.93 2548.76
  9986.3 2548.47 9986.86 2548.46  9995.7  2547.6   10000 2547.2210001.34  2547.1
 10009.7 2548.4110018.51 2549.6110033.99 2549.46   10065 2549.1510069.74 2549.34
10073.22 2549.5110078.85 2549.5410092.35 2549.7110092.39  2549.7 10096.9 2549.71
10103.91  2549.710109.24  2549.710117.21 2549.7510120.41 2549.81 10165.8 2549.76
10183.01 2549.6910186.57 2549.5710191.06 2549.43 10196.9 2549.24 10200.2 2549.14

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9671.69     .06  9744.2     .04 9782.62     .06

Bank Sta: Left   Right    Coeff Contr.   Expan.
       9955.2710018.51             .1       .3
Right Levee     Station=10018.51      Elevation= 2549.61

CROSS SECTION


RIVER: RV WK T13
REACH: R1                  RS: 1.960

INPUT
Description: Q=990 cfs (CB7W6A, 24 hr)
Station Elevation Data    num=      42
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 9872.97 2775.66 9900.39 2767.84 9910.62 2765.41 9921.07 2764.55 9933.73    2764
  9946.1 2763.53 9949.19 2763.34  9950.3 2763.22 9960.19 2761.68 9962.87 2762.05
 9967.57 2763.07 9972.07 2763.11 9977.26 2763.07 9982.22 2763.06 9987.22 2763.05
 9989.35 2762.38 9994.26 2760.95 9999.88 2760.94 9999.98 2760.94   10000 2760.94
10003.76 2760.8710010.24 2762.51   10011 2762.6910011.89 2762.7110038.79 2763.37
10060.79 2763.5910078.85 2763.8210107.06 2763.7310118.46 2763.8210156.93  2764.8
10167.82 2765.0710176.08 2765.5210195.58 2766.29 10212.4 2767.4110219.16 2768.14
10231.55 2769.2410248.35 2770.5510268.01 2773.1910289.28  2775.810297.33 2776.67
10299.81 2776.6910301.53 2776.87

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9872.97     .06 9987.22     .04   10011     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9987.22   10011              350  347.73     300             .1       .3

CROSS SECTION


RIVER: RV WK T13
REACH: R1                  RS: 1.894

INPUT
Description:
Station Elevation Data    num=      43
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 9938.33 2759.94 9948.67 2758.12 9968.06  2754.5 9978.48  2752.4 9980.32 2752.03
 9990.44 2753.74 9991.68 2753.97 9991.97  2753.9 9997.76 2752.11   10000 2752.14
10001.49 2752.1610005.58  2752.210008.52 2752.2910013.87 2753.1310017.97 2753.67
10027.97 2753.3810043.77 2753.5910049.99 2753.6210052.89 2752.8610056.77 2751.91
10068.92 2752.9110069.51 2752.9910071.98 2753.0310089.24 2753.5610094.73 2753.71
10103.33 2753.8510119.27 2754.1810134.38 2754.5810137.67 2754.7310147.21 2756.46
10150.46 2757.0510151.75 2757.2710166.07 2758.7510170.18 2759.3410177.58 2759.77
10187.58  2760.310194.68 2760.8910198.39 2761.3410216.84  2765.510220.88 2765.89
10224.14 2766.1610239.65  2767.310242.97 2767.77

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9938.33     .06 9991.97     .0410017.97     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9991.9710017.97              450  441.52     500             .1       .3

CROSS SECTION


RIVER: RV WK T13
REACH: R1                  RS: 1.810
```

```
INPUT
Description:
Station Elevation Data    num=      50
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 9803.05 2750.21 9803.21  2750.2 9818.32 2748.28 9840.74 2744.62 9845.46 2743.78
 9861.92  2741.6 9866.63 2741.01 9872.73 2740.91 9889.25 2740.63 9894.04 2740.57
 9909.43 2741.31 9924.54  2740.9 9925.31 2740.83 9927.76  2740.6  9937.7  2740.6
 9960.33 2740.57 9962.71 2740.59 9965.34 2740.64 9987.83  2741.2 9996.39 2739.66
 9999.88 2738.95   10000 2738.9610000.02 2738.9610005.74 2739.1910010.06 2739.63
10011.77 2739.9410013.67 2740.5210018.03 2739.69 10018.2 2739.6610019.12 2739.65
10036.31 2739.4510039.32  2740.210042.87  2740.610059.98 2740.9410068.14 2741.16
10110.71 2740.5910121.11 2740.4110128.48 2740.4110160.63 2740.37 10169.7 2740.45
10198.54 2739.9710204.49 2739.9110213.53    274010226.76 2740.0710240.85 2740.24
10255.86 2740.5110278.52 2743.7610284.36 2744.3110296.15 2744.8210312.22 2745.95

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9803.05     .06 9987.83     .0410042.87     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9987.8310042.87              600  580.72     550             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
 9803.05 9987.63    2744       F

CROSS SECTION


RIVER: RV WK T13
REACH: R1                 RS: 1.700

INPUT
Description:
Station Elevation Data    num=      35
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 9887.07 2732.16 9899.94 2730.96 9930.57 2728.14 9932.59 2727.88 9955.62 2724.81
 9962.08 2723.95 9962.75 2723.97 9965.32 2724.12 9969.77 2724.34 9974.37 2724.64
 9974.75 2724.56 9984.56 2723.29   10000  2723.310011.04  2723.310020.84 2723.28
10029.65 2724.7910029.71  2724.810032.47 2724.86 10070.8 2725.7210072.23 2725.73
10083.78 2725.6610129.66 2725.3210135.43 2725.3210183.58 2724.5310207.01 2723.52
10215.75 2723.5710242.94  2723.110255.87 2722.7410267.69 2724.5210277.16 2725.76
 10296.7 2728.6410298.22 2728.8410303.24 2728.78 10327.4 2728.2610328.05 2728.31

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9887.07     .06 9974.75     .0410029.65     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9974.7510029.65              625  652.36     675             .1       .3

CROSS SECTION


RIVER: RV WK T13
REACH: R1                 RS: 1.577

INPUT
Description:
Station Elevation Data    num=      55
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
  9467.4  2708.6  9477.7 2707.98 9479.27 2707.87 9480.25 2707.81 9496.96 2706.66
  9515.4 2705.14 9527.22 2704.09 9527.72 2704.09 9531.09 2704.16 9575.67 2705.04
  9582.3 2705.17 9584.26 2705.14 9625.38  2704.9 9632.25 2704.87 9683.34 2704.82
 9698.15 2704.79 9701.03 2704.65 9717.87 2703.67 9728.76 2704.62 9730.82 2704.82
 9762.07 2704.88 9782.83 2704.92 9788.39 2704.88 9805.53 2704.65 9807.91 2704.74
  9814.4 2704.77 9829.28 2705.03 9845.09 2703.89 9847.52 2703.69 9859.27 2704.64
 9861.42 2704.84 9873.69 2705.03 9879.69 2705.14 9881.49 2705.11 9887.86 2705.02
 9931.93 2704.48 9966.38 2704.58 9976.51 2704.52 9980.69 2704.52 9981.66 2704.44
 9999.97 2703.39   10000 2703.39 10002.1 2703.2610010.812704.41910017.35 2705.29
10022.36 2705.3610025.87 2704.8510038.12 2705.2410043.17 2705.7210059.08 2706.57
10067.22  2707.510088.89 2709.6910089.47 2709.7510091.66 2709.9110098.07  2710.1

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
  9467.4     .06 9981.66     .0410010.81     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9981.6610010.81              450  438.49     525             .1       .3

CROSS SECTION


RIVER: RV WK T13
REACH: R1                 RS: 1.494

INPUT
Description:
Station Elevation Data    num=      80
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 9368.21 2696.93  9383.5 2694.83 9388.58 2694.41 9399.61 2693.43 9414.92 2692.18
 9419.45 2691.75 9429.44 2691.25 9433.27 2691.41 9436.89 2691.35 9440.99 2691.05
 9445.54 2690.59 9457.81 2688.84 9468.86 2690.48 9482.82 2692.32 9501.67 2693.66
 9506.98 2694.04 9508.82 2694.09  9510.8 2694.07  9531.5 2694.36 9541.22 2694.37
```

```
 9545.16 2694.49 9557.08 2694.18 9572.47 2693.92 9574.15 2693.99 9574.86    2694
 9575.73 2693.99 9577.33 2693.88 9596.22 2693.27 9597.67 2693.13 9613.97 2692.46
 9621.84 2692.34 9627.11 2692.06 9634.45 2692.24 9647.23 2692.51 9663.52 2692.96
 9666.28 2693.05 9677.66 2692.84 9691.69 2692.31 9699.36 2691.54 9709.71 2691.09
 9710.46 2691.08 9732.01 2691.09 9749.52 2691.09 9750.83 2691.01 9753.11 2690.86
 9760.43 2690.27 9763.43 2690.54 9770.33  2691.1 9782.72 2690.94 9809.63 2691.06
 9838.52 2690.86 9856.97 2690.81 9880.66 2690.96 9925.69    2691 9936.87  2691.1
 9975.36 2690.92 9985.58  2690.8   10000 2689.23 10000.5 2689.1810001.09 2689.11
 10002.1 2689.1910015.89 2690.5710021.02 2690.9910041.42 2690.3710064.12 2690.32
10081.95    269110116.77 2691.8910117.72 2691.91 10137.4 2691.7310157.92 2691.79
10197.82 2691.49 10206.9 2691.6110223.87 2692.1210234.73 2692.2710253.43 2692.56
10260.71 2691.0910261.64 2690.9710262.86 2691.1310272.44  2692.410294.73 2692.45

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
 9368.21     .06 9985.58     .0410015.89     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        9985.5810015.89              425  417.72     450             .1       .3
Right Levee     Station=10117.72      Elevation= 2691.91

CROSS SECTION


RIVER: RV WK T13
REACH: R1                 RS: 1.415

INPUT
Description:
Station Elevation Data    num=      75
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 9424.22 2682.67 9430.34 2682.56 9434.02 2682.52 9437.42 2682.27 9452.96 2680.03
 9457.36 2679.39 9459.71 2678.92 9470.77 2676.16 9477.84 2674.71 9494.51 2674.58
 9495.52 2674.57 9496.23 2674.46 9510.56 2672.17 9518.15 2674.33 9521.43 2675.35
 9526.55 2675.95 9531.51 2676.43 9554.81 2680.35  9555.6 2680.45 9557.71 2680.68
 9583.36 2683.15 9588.45 2683.45 9597.67  2684.1 9605.37 2683.49  9611.3 2682.92
 9614.34 2682.65 9619.51 2682.08 9639.55  2679.5 9642.42 2679.19 9645.04 2678.56
 9670.08 2674.46 9692.37 2679.05  9704.3 2680.56 9728.14  2678.4 9740.47 2676.99
 9745.27 2676.94 9768.18  2676.7 9795.61 2676.79 9802.62 2676.78  9812.1 2676.76
 9848.25 2676.52 9873.71  2676.9 9877.85 2676.95 9883.53 2676.49 9889.28 2676.01
 9893.82 2676.36 9901.09 2676.86 9936.41 2676.03 9947.86    2676 9958.95 2676.04
 9980.21 2676.58 9986.86 2676.32 9993.15 2676.11 9996.48 2676.21 9999.97 2676.35
   10000 2676.35 10007.5 2676.6610056.61 2676.5510062.58 2676.4510068.86 2676.36
10073.82 2676.2710106.64 2676.2210112.75 2676.0510136.15 2674.9410146.83 2673.47
10151.82 2672.8610164.12 2674.8510167.26 2675.4610181.98 2675.5210186.34 2675.46
10205.36 2675.8110206.05 2675.8210206.92 2675.8910254.12 2679.8910276.59 2682.08

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
 9424.22     .06 9980.21     .04 10007.5     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        9980.21 10007.5              700  728.79     725             .1       .3

CROSS SECTION


RIVER: RV WK T13
REACH: R1                 RS: 1.276

INPUT
Description:
Station Elevation Data    num=      46
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 9820.34 2656.92 9827.51 2654.81 9836.74 2651.09 9839.99 2650.58    9848 2649.67
 9850.39 2649.34 9850.98 2649.29 9853.84 2649.52 9862.06 2650.17 9868.62 2650.21
  9908.3 2650.67 9926.89 2650.63 9941.02 2650.57 9963.01 2649.91 9969.48  2649.8
  9976.5 2649.43 9978.58 2649.33 9980.04 2649.47 9991.27 2650.68  9996.9 2649.84
 9999.34  2649.5   10000 2649.59 10002.7 2649.9710005.97 2650.4310006.712650.562
10009.61 2651.0810015.62 2650.93 10028.7 2650.7910045.03  2650.910052.87 2650.66
10060.21 2651.1510071.64 2651.4810075.44 2651.4610082.61 2650.9710090.22 2650.61
 10098.9  2650.5 10106.7 2650.8510112.17 2651.1310114.33 2651.1410116.76 2651.02
 10129.1 2650.7710140.54 2651.2910163.57 2652.14 10168.3 2652.3510173.16 2652.58
10185.15 2653.06

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
 9820.34     .06 9991.27     .0410005.97     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        9941.0210006.71           210.09  198.94  184.88             .1       .3

CROSS SECTION


RIVER: RV WK T13
REACH: R1                 RS: 1.239

INPUT
Description:
Station Elevation Data    num=      29
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 9917.75 2650.03 9935.55 2648.16 9937.49  2647.8 9957.69 2645.48 9958.56 2645.45
 9960.63 2645.29 9970.192644.407 9973.51  2644.1 9977.38 2643.84 9978.57 2643.67
```

```
    9985 2642.94 9992.76 2642.06 9998.75 2641.98  9999.8 2641.97   10000 2641.97
10010.26  2641.710014.012642.97210016.57 2643.84 10018.7 2644.4110028.17 2644.15
10037.72  2643.910040.97 2644.2510066.38 2645.9410073.25 2645.1210077.86 2644.54
10082.09 2644.1110091.91 2642.2510103.93 2640.2810119.34 2637.97

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
 9917.75     .06    9985     .0410014.01     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9970.19 10018.7          414.91  392.88  365.12            .1       .3
Right Levee     Station=10066.38      Elevation= 2645.94

CROSS SECTION


RIVER: RV WK T13
REACH: R1                 RS: 1.164

INPUT
Description:
Station Elevation Data    num=      39
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 9911.89 2633.94 9925.86 2632.73 9928.49 2632.57 9929.15 2632.52 9929.93 2632.49
 9958.55  2631.8 9965.06 2631.23    9973 2631.09 9976.51 2630.39 9983.38  2630.9
 9987.51 2630.65 9997.84 2629.82   10000 2630.0210004.67 2630.4610004.75 2630.47
10006.06 2630.5410022.542630.894 10033.5 2631.1310043.37 2631.31   10068 2631.88
10079.02 2632.2310093.51  2632.610113.34 2632.76 10134.6 2633.2610148.49 2633.35
10181.43    263310191.02 2633.0110201.84 2633.0610204.67 2632.6810206.88 2632.44
10209.27 2632.2110212.53 2632.1510229.91 2632.0610235.83 2633.0110236.62 2633.16
10236.77 2633.1810238.16 2633.1710243.42 2633.1110268.68 2632.78

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
 9911.89     .06 9987.51     .0410004.67     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9983.3810022.54              725  732.16     725            .1       .3

CROSS SECTION


RIVER: RV WK T13
REACH: R1                 RS: 1.026

INPUT
Description:
Station Elevation Data    num=     119
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 9870.87 2627.49 9871.74 2627.16 9874.76 2626.35 9876.48 2625.67 9877.33 2625.44
 9877.87  2625.2 9880.54 2624.05 9881.11 2623.73 9886.91 2620.25 9887.26 2620.25
 9889.41 2618.82 9893.17 2616.23 9893.75 2615.95 9894.05 2615.86  9894.2 2615.82
 9894.27  2615.8 9894.63 2615.69 9913.87 2609.86 9915.74 2609.47 9930.63 2606.25
 9931.14 2606.15 9931.95 2605.99 9932.34 2605.93 9943.48 2607.13 9944.08 2607.11
 9945.16 2606.35 9952.75 2605.11 9956.67 2605.38  9965.4 2606.16 9975.71 2606.95
 9976.81 2606.98 9979.33 2607.03 9984.32 2607.14 9984.76 2607.09 9985.54    2607
  9985.9 2607.03 9988.73 2606.15 9989.01 2606.04 9989.69 2606.26 9990.16 2606.36
 9992.11 2606.79 9992.32 2606.85 9993.06 2607.03 9994.59 2607.15   10000 2607.64
10001.47 2607.7710001.84 2607.3410002.22 2606.8710003.09 2606.0110005.932607.133
10007.16 2607.6210007.63 2607.8210009.55  2608.610009.79 2608.5410013.08 2607.67
10025.44 2607.4510026.75 2607.41 10027.9  2607.510028.48 2607.5410030.21 2607.67
10035.45 2608.0510043.59  2607.610050.45  2607.210050.81 2606.9410051.12 2606.72
10057.44 2607.4810061.21 2607.89 10062.7 2608.0510067.48 2608.2310078.04 2608.62
10078.36 2608.6410082.93 2608.8910096.16 2609.0610098.97 2608.92 10101.6 2608.79
10103.66 2608.6910103.83 2608.6810124.83  2609.410127.66 2609.5510135.17 2609.14
 10141.6 2608.7810145.45 2608.5610145.53 2608.5610155.98 2607.5310157.62 2607.88
   10176 2608.0910177.95 2608.1610185.25 2608.4510197.64 2608.9310198.69 2608.94
10199.55 2608.9310209.03 2608.8710212.93 2608.6610218.24 2608.3210218.89 2608.11
10227.66 2607.3210230.55 2608.6410244.42 2608.8310248.08 2609.37 10252.4 2609.64
10275.55 2612.08 10280.4 2612.9910285.01 2613.2810293.11  2615.610293.66 2615.76
10295.65 2615.9310298.22 2616.1410298.88 2616.2310303.19 2616.81 10309.3 2617.62
10309.95 2617.6710310.64 2617.7910314.44 2617.8910319.04    261810321.59 2618.07
10323.54 2618.07 10323.8  2618.110328.26 2618.1110330.07 2618.25

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
 9870.87     .06 9984.32     .0410005.93     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9943.4810001.47              625  656.79     600            .1       .3

CROSS SECTION


RIVER: RV WK T13
REACH: R1                 RS: 0.901

INPUT
Description: Q=1450 cfs (CB7W6, 24 hr)
Station Elevation Data    num=      96
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 9927.65 2604.54  9928.5 2604.23 9929.01 2604.18 9930.96 2604.01 9931.22 2603.99
 9931.51 2603.96 9934.13 2603.67 9935.43 2603.98 9936.81  2604.3 9939.79 2604.28
 9941.49 2604.13  9943.6 2603.96 9944.43 2603.33 9955.85 2600.72  9956.7 2599.84
```

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 9958.43 2598.89 9961.27 2597.33 9963.05 2595.85 9965.27    2594 9968.69 2592.78
 9971.17  2591.9 9974.78 2591.86 9976.86 2591.84 9977.67 2591.83 9980.85 2591.78
 9986.31  2591.7 9986.95 2591.71 9988.23 2591.74 9994.81 2591.85 9995.34 2591.86
 9998.32 2591.96   10000 2592.0710000.49  2592.110001.36 2592.0710005.14 2592.16
10011.08 2592.3210017.02 2592.4810022.33 2592.6210028.46 2592.6210032.37 2592.62
10038.88 2592.1110040.71 2591.9610041.77 2591.8910051.56  2592.610060.29 2593.12
 10063.1 2593.3110063.74 2593.3510067.45 2593.5410072.58 2594.2610075.69  2594.7
10086.52 2596.1810087.03 2596.2510087.38 2596.2910099.99 2599.0310100.13 2599.06
10101.55 2599.3410101.71 2599.3810102.22 2599.4610106.25 2600.3410106.32 2600.35
10111.84 2601.1410116.44 2601.7810117.57 2601.9510120.39 2602.2510122.74  2602.5
10123.93 2602.5210124.96 2602.5610128.54 2602.6210131.13 2602.6410132.49 2602.63
10136.17  2602.710139.72 2602.7310141.19 2602.7210148.15  2602.710149.22 2602.69
10153.05 2602.6610155.81 2602.6310156.17 2602.6310158.03 2602.6610161.47  2602.7
10163.23 2602.6110168.29 2602.3910173.08  2602.310177.74 2602.2110182.39 2602.37
10186.99 2602.7110187.24 2602.7810187.45 2602.8110192.41 2604.2810193.08 2604.35
 10197.7 2605.8410199.03 2606.2710202.42 2607.2110206.94 2608.4610211.22 2609.64
10214.25 2610.38

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
 9927.65     .06 9968.69     .0410051.56     .06

Bank Sta: Left   Right    Coeff Contr.   Expan.
       9968.6910051.56             .1       .3

CROSS SECTION


RIVER: RV WK T13
REACH: R2                 RS: 0.866

INPUT
Description: Q=1771 cfs (This flow is the arithmetic combination of RV WK S16
             and RV WK T13)  This cross section is added to the model to
             provide the minimum number of cross sections required for a
             junction reach. This cross section is not plotted on the work
             maps, nor is used in plotting the base flood elevations.
Station Elevation Data    num=      53
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9801.57 2597.48 9821.63 2589.69  9828.6 2586.65 9833.48 2586.52 9846.28 2586.23
 9856.58  2585.6  9856.7  2585.6 9856.86 2585.61  9857.4 2585.65 9866.94 2586.44
 9874.14 2586.41  9877.4 2586.32 9888.16  2586.1 9889.36 2586.08 9890.86 2586.05
 9890.88 2586.05 9896.74 2586.55 9898.05 2586.68 9898.37 2586.71 9901.25 2586.95
 9902.25 2586.92 9903.94 2586.87 9913.34 2587.09 9916.17 2587.12 9919.61  2587.3
 9924.52 2587.55 9928.46 2587.75 9973.67 2588.42 9976.26 2588.47 9985.19 2588.41
 9988.99 2588.38 9995.04 2588.39   10000 2588.3910016.24 2588.4210019.04 2588.52
 10026.52589.64610037.66 2591.3310039.48 2591.9410041.45  2592.210052.06 2594.21
10054.42 2595.0410056.85 2595.8910057.37 2596.0710059.35 2596.4410061.74 2596.89
10062.06 2596.9410062.55 2597.0310064.81 2597.3710066.78 2597.6910068.85    2598
10071.45 2598.4210073.57  2598.710075.35 2598.85

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
 9801.57     .06 9985.19     .0410016.24     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9821.63 10026.5                5    5.07       5             .1       .3

CROSS SECTION


RIVER: RV WK T13
REACH: R2                 RS: 0.865

INPUT
Description:
Station Elevation Data    num=      57
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
  9800.7 2598.32 9812.46 2593.29 9820.28 2589.79 9827.23 2586.63 9832.52 2586.46
    9846 2586.08 9856.32 2585.44 9856.65 2585.42 9858.22 2585.59  9865.7 2586.38
 9876.83 2586.36 9878.78 2586.35 9881.09 2586.34 9885.95 2586.21 9887.18 2586.25
 9889.17  2586.3 9893.02 2586.64 9894.25 2586.74 9895.84 2586.88 9898.17 2586.86
 9898.65 2586.86 9899.91 2586.83 9900.99  2586.8 9919.41 2587.23 9921.69 2587.26
 9924.47  2587.4 9928.44  2587.6 9931.61 2587.76 9968.09  2588.3 9971.45 2588.37
 9972.62 2588.38 9974.74 2588.44 9983.33 2588.31 9987.34 2588.22 9994.39 2588.24
   10000 2588.2610015.88  2588.3 10015.9 2588.2910023.28 2589.7210038.79 2592.06
 10041.3 2592.9110042.34 2593.04 10047.9  2594.110051.44 2595.3410055.11 2596.62
10055.89 2596.8910058.85 2597.4510062.44 2598.1110062.61 2598.1410063.34 2598.27
10064.53 2598.4610067.25  2598.910068.45 2599.0710071.86 2599.6210073.16  2599.8
10074.37 2599.8910074.47 2599.91

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
  9800.7     .06 9983.33     .0410015.88     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9820.2810023.28                5    5.67       5             .1       .3

CROSS SECTION


RIVER: RV WK T13
REACH: R2                 RS: 0.864

INPUT
```

```
Description: This cross section is added to the model to provide the minimum
             number of cross sections required for a junction reach. This cross
             section is not plotted on the work maps, nor is used in plotting
             the base flood elevations.
Station Elevation Data    num=      62
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9797.74 2598.46 9816.85 2589.79 9823.77 2586.61 9829.43 2586.41 9831.99 2586.31
 9843.64 2585.92 9853.07 2585.28 9853.83 2585.22 9855.99  2585.5 9861.06 2586.16
 9862.24  2586.3 9864.42  2586.3 9873.92 2586.28 9882.79  2586.5  9883.2 2586.52
 9888.38 2586.79  9889.4 2586.78 9893.33 2586.76 9894.74 2586.75 9894.95 2586.75
 9895.48 2586.74 9895.94 2586.72  9923.4 2587.37 9925.13 2587.39 9927.25 2587.49
 9930.26 2587.65 9932.68 2587.77 9960.44 2588.18 9962.98 2588.23 9963.89 2588.24
 9967.06 2588.33 9971.32 2588.44 9979.44  2588.2  9983.6 2588.06   10000 2588.12
10001.46 2588.1210001.78 2588.1210014.36 2588.15 10022.52589.80810032.48 2591.84
10035.85  2592.510037.84  2592.810041.03 2593.8710041.13 2593.8810041.66 2593.99
10046.39 2595.6410049.69  2596.810051.25 2597.2910051.27 2597.2910052.29 2597.61
10054.05 2598.0410056.25 2598.4510061.04 2599.3410061.05 2599.3410062.03 2599.52
10062.18 2599.5510065.65  2600.110065.96 2600.1510070.19 2600.8210070.68 2600.89
10071.13 2600.9210071.52 2600.98

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9797.74     .06 9979.44     .0410014.36     .06

Bank Sta: Left   Right    Coeff Contr.   Expan.
       9816.85 10022.5             .1       .3

CROSS SECTION


RIVER: RV WK T13
REACH: R3                 RS: 0.808

INPUT
Description: Q=642 cfs (This flow is a result of the energy analysis at the
             upstream split)
Station Elevation Data    num=      36
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9752.29 2584.23  9788.8 2583.44 9806.02 2583.31    9815 2583.26 9836.56 2582.96
 9855.022583.246 9861.09 2583.34 9869.77 2583.29 9910.72 2582.87 9910.79 2582.87
 9924.33 2582.73  9943.5 2582.26 9953.83 2581.93 9964.81 2581.76 9966.54 2581.62
 9969.16 2581.34 9971.89 2581.08 9973.93 2580.84 9978.36 2581.29 9985.75 2582.12
 9988.72 2582.12 9990.17  2582.1 9992.31 2581.47 9995.09 2580.5810002.91 2581.33
10012.66 2582.2910032.62 2582.1510070.29 2581.9610071.36 2581.9810077.55 2582.17
10081.61 2582.4210112.82 2585.6310116.45 2586.1410145.25 2587.3410163.47 2588.24
10168.17 2588.09

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9752.29     .06  9943.5     .0410012.66     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        9943.510012.66           251.33  293.59  293.22             .1       .3

CROSS SECTION


RIVER: RV WK T13
REACH: R3                 RS: 0.752

INPUT
Description:
Station Elevation Data    num=      75
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9491.21 2576.37 9491.57 2576.33 9494.17 2576.33 9494.75 2576.31 9497.03 2576.27
 9499.61 2576.25 9512.41 2576.11  9521.1 2576.07 9528.72    2576 9535.61 2575.98
  9538.6 2575.96 9545.03  2575.9 9547.24 2575.88  9547.4 2575.88 9553.94 2575.31
 9556.82 2575.12 9561.99 2575.44 9565.14  2575.6 9569.58 2575.86  9574.7 2576.09
 9585.77 2576.19 9595.85 2576.19 9609.85  2575.8 9611.22 2575.63 9612.12 2575.43
 9614.11  2575.1 9626.83 2575.83 9636.57 2575.44  9642.1 2575.21 9645.35  2575.3
 9652.37 2575.52 9656.87 2575.68 9659.51 2575.76 9666.21 2576.11 9666.26 2576.11
 9672.64 2576.21 9677.52 2575.89 9719.72 2576.17 9735.17 2576.47 9748.72 2575.77
 9753.35 2575.51 9789.76 2576.08 9796.81 2575.75 9807.29 2575.27 9816.89 2575.89
 9827.73 2576.49 9867.38 2575.53 9867.86  2575.5 9867.91  2575.5 9876.74 2575.02
 9895.99 2576.51  9897.7 2576.48 9901.91 2576.38 9920.62 2575.88 9920.75 2575.91
 9926.43 2575.37 9935.74 2574.82 9940.32 2574.56 9944.47 2574.95 9957.99 2576.17
 9959.93 2576.13 9973.48 2575.65 9982.66 2575.46  9984.8  2575.4 9987.92 2575.35
 9999.67 2574.2210000.64 2574.3410012.82 2575.73 10026.6 2575.9610040.79 2576.11
10041.67 2576.1210093.28 2577.5310101.64 2578.0410108.87 2578.2810176.58 2579.91

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9491.21     .06 9973.48     .0410012.82     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9973.4810012.82           574.6  643.64  670.37             .1       .3

CROSS SECTION


RIVER: RV WK T13
REACH: R3                 RS: 0.630

INPUT
```

```
Description:
Station Elevation Data    num=      87
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 9439.07 2562.35 9447.26 2562.22 9448.91 2562.16 9451.85 2561.96 9455.88 2561.89
 9477.95 2561.33 9489.97 2561.09 9504.45 2561.01  9507.6 2560.55 9512.94 2559.86
    9518 2560.67 9523.12  2561.4 9534.96 2561.73 9546.35 2561.96 9551.93  2562.1
 9564.04 2562.33 9584.28 2562.14 9610.76 2561.64 9636.98 2561.55 9677.23 2561.64
 9708.64 2561.66 9716.47 2561.77 9755.05 2561.17 9784.45 2560.65 9798.06 2560.36
 9856.36 2559.85 9856.67 2559.88 9858.43 2559.82 9871.02 2559.57 9871.87 2559.57
 9888.35  2559.7 9908.52 2559.71 9935.14 2559.66 9935.74 2559.64 9935.97 2559.68
  9972.7 2559.27 9989.45 2559.01 9999.98 2558.01   10000 2558.0110003.96 2557.65
 10018.6 2559.85 10022.2 2559.9110039.78 2560.1510042.05 2559.7910050.02 2558.48
10058.81 2559.3710062.54 2559.7810078.79 2559.6210087.52 2559.6610122.01  2559.3
10135.08 2559.2810151.74 2558.7310152.24 2558.7310153.38 2558.6910166.48 2558.73
10167.11 2558.7110171.54 2558.6210179.04 2558.43 10194.4  2558.110205.38 2559.08
10206.53  2559.110213.87 2559.3510215.57 2559.37 10220.9 2559.4910229.77 2558.48
10236.79 2559.3910276.35 2560.5110285.28 2560.5110297.93 2560.71 10299.1 2560.71
10303.91  2560.810312.72 2560.5310321.22 2560.1610322.98  2560.1   10324 2560.04
10330.99 2560.5810339.06 2561.0710339.63 2561.0510341.64 2561.3310353.72 2562.59
 10368.8  2563.710375.03 2563.9210377.98 2564.0910384.17 2564.95 10387.4 2565.41
10401.66 2568.6410402.77 2568.86

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
 9439.07     .06 9935.97     .04 10018.6     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9935.97 10018.6           477.71  491.61  502.71             .1       .3

CROSS SECTION


RIVER: RV WK T13
REACH: R3                 RS: 0.537

INPUT
Description:
Station Elevation Data    num=     123
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
  9424.6 2549.77 9432.65 2549.73 9442.27 2549.66 9448.85 2549.61 9452.64 2549.62
 9456.91 2549.64 9461.99 2549.61  9463.4 2549.61 9465.55  2549.6 9468.22  2549.6
 9469.96 2549.55 9472.13 2549.56 9503.21    2549 9504.14 2548.93 9504.68  2548.9
 9506.73 2548.76 9508.28 2548.62 9508.38 2548.61 9510.71 2548.43 9511.61 2548.37
  9513.3 2548.24 9513.69 2548.19 9519.46 2548.19 9524.15 2548.19 9530.39 2548.53
 9535.88 2548.83 9537.11 2548.82 9542.25 2548.73  9547.3 2548.64    9553 2548.54
 9559.63 2548.44  9563.2 2547.97 9565.15 2547.71 9575.22 2548.46 9576.88 2548.54
 9583.67 2548.44  9590.9 2548.31 9596.42 2548.26 9599.42 2548.23 9610.03 2548.07
 9615.53 2548.02 9622.87 2548.06 9625.14 2548.05 9632.85 2548.11 9641.52 2548.17
 9651.55 2548.26 9664.45 2548.36 9675.19 2548.46 9676.53 2548.31 9681.34 2547.73
 9683.91 2547.36 9694.12 2547.72 9697.69 2547.84 9697.89 2547.87 9698.61 2547.92
 9699.35  2547.9 9699.93 2547.86 9701.59 2547.87  9720.7 2547.75 9725.06 2547.67
 9726.52 2547.64 9762.51 2547.95 9764.37 2547.96 9765.69 2547.78 9771.57 2547.02
 9785.37 2547.83 9785.56 2547.84 9785.62 2547.84 9785.65 2547.84 9797.03 2547.91
 9798.61 2547.92 9805.54 2547.99 9811.75 2548.03 9824.81 2548.17    9825 2548.17
 9825.44 2548.17  9834.5 2546.96  9836.4 2546.68  9843.7 2547.09 9848.16 2547.46
 9849.44 2547.41 9868.85  2548.1  9874.1 2548.27  9876.2 2547.71 9878.66 2547.02
 9881.46 2546.23 9887.57 2546.41 9890.05 2546.49 9893.48 2547.17 9895.59 2547.56
 9907.45 2547.26 9919.61 2546.94 9921.77 2546.77 9932.72 2545.94 9933.67 2546.05
  9937.9 2546.55 9944.54 2547.47 9945.73 2547.44 9947.93 2547.38 9955.72 2546.77
 9976.08 2546.72 9982.27 2546.68    9993 2546.62 9996.74 2546.64 9999.22 2546.58
 9999.99 2546.49   10000 2546.4910006.52 2545.7210011.04 2545.22 10018.72546.641
10022.47 2547.34 10026.2 2548.0310029.79  2548.710032.77 2549.2610034.56 2549.64
10039.79 2550.6210042.11 2551.05 10046.2 2551.7610063.55 2554.37 10065.2 2554.66
10067.81 2555.2110069.61 2555.5110071.99 2556.02

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
  9424.6     .06 9996.74     .04 10018.7     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9996.74 10018.7           589.61  623.82  639.61             .1       .3

CROSS SECTION


RIVER: RV WK T13
REACH: R3                 RS: 0.419

INPUT
Description: Q=3300 cfs (CB9W6)  This cross section is identical to RM 7.131 on
             RV WK.
Station Elevation Data    num=     202
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 8488.28 2553.59 8489.29 2553.69 8489.97 2553.61 8490.34 2553.56 8496.79 2552.72
  8498.3 2552.56 8499.59 2552.42 8502.74 2552.08 8508.75 2551.38 8512.79 2550.94
 8513.89  2550.8 8517.73 2550.55  8517.9 2550.54 8520.79 2550.36 8522.93 2550.16
 8527.66 2549.62 8527.84 2549.57 8538.76 2548.25    8542  2547.9 8547.39 2547.32
 8547.61 2547.31 8554.56 2546.42 8555.87 2546.29 8564.16 2544.68 8576.62 2542.26
 8586.95 2540.42 8624.31 2535.89  8626.2 2535.68 8639.15 2534.52  8653.6 2533.09
 8660.37 2533.06 8661.15 2533.03 8697.71 2533.15 8722.86 2533.21 8744.45 2532.32
 8746.71 2532.24 8755.53 2531.95 8757.13 2531.89 8759.01 2531.83 8761.17 2531.73
 8762.62 2531.69 8775.38  2531.5 8797.54 2531.74 8812.96  2531.9 8842.08 2532.25
  8863.9 2531.64 8883.26  2531.2 8887.21 2531.22 8890.49 2531.22 8912.71 2531.27
 8929.02 2531.23 8933.71 2531.12 8945.71 2530.92  8951.2 2530.87 8956.46 2530.79
 8968.48 2530.62 8974.74 2530.53 8982.93  2530.4 9000.17 2530.94  9006.9 2531.03
```

```
 9067.66 2531.75  9090.2 2529.89 9097.41 2530.52 9109.35 2531.64 9111.46 2531.71
 9156.39 2531.84 9161.16 2531.73 9177.03 2531.54 9179.36 2531.53 9202.49 2531.53
 9207.18 2531.55 9211.85 2531.55 9214.38 2531.49 9236.93 2530.85 9237.61 2530.79
 9240.25 2530.71 9241.85 2530.72 9248.66  2530.6 9255.63 2530.75 9255.98 2530.75
 9259.02 2530.82  9271.5 2530.75 9284.64 2530.64 9298.92 2530.58 9318.19 2529.51
 9347.36 2531.32 9369.21 2531.28 9406.23 2531.29 9408.22 2531.26 9410.45 2531.23
 9412.22 2531.19 9429.23 2530.94 9434.28 2530.84 9442.86 2530.71 9458.49 2530.63
 9463.42 2530.57 9463.55  2530.6 9466.28 2530.47 9476.05 2529.99 9492.56 2530.52
 9496.67 2530.47 9513.53 2530.23 9539.91 2529.89 9551.49 2529.75 9566.14 2529.56
 9574.67 2529.39 9581.84 2528.71 9583.92 2528.51 9588.74 2529.65    9590 2529.88
 9591.15 2530.21 9597.73 2530.02 9603.43 2529.83 9604.75  2529.6 9608.52 2528.67
  9614.2 2529.58 9618.62 2530.31 9630.53 2530.15 9640.22 2530.08 9641.12 2530.01
 9643.55 2529.87 9654.44 2529.33  9658.2 2529.35 9664.05 2529.34 9670.88 2529.36
 9676.24 2529.96 9680.08 2530.38 9682.68 2530.59 9694.83  2530.4 9700.56 2530.29
  9705.8  2530.2 9713.06 2530.05 9719.91 2531.18 9721.19 2531.39 9729.68  2530.7
 9733.57 2530.65 9738.44  2530.9 9739.55 2530.75 9744.81 2530.04 9757.19 2530.29
 9768.76  2530.5 9775.08 2530.63 9776.97  2530.7  9785.5 2530.81 9805.56 2531.04
 9813.07  2531.2 9814.91  2530.7 9821.75 2529.07 9825.11 2529.67 9831.37 2530.97
 9840.76 2530.95 9850.81 2530.97 9855.84    2531    9864 2530.94  9865.6 2530.96
 9869.93 2530.91 9874.63 2530.91 9878.54 2530.85 9884.56 2530.78 9888.15 2530.77
 9895.18 2530.71 9910.17  2530.7 9915.56 2530.42 9919.29 2530.26 9925.18 2530.79
 9930.45 2531.27 9936.52 2531.32 9938.18 2531.33 9945.47 2531.39 9958.91 2531.38
 9961.48 2531.42 9962.25 2531.42 9967.49 2531.53  9972.1 2531.14  9975.6 2530.83
 9978.61 2530.57 9982.46 2530.22 9988.18 2531.09 9991.24  2531.6 9997.12  2531.8
 9997.69 2531.72 9998.36 2531.61 9999.97 2531.37   10000 2531.3610002.47 2530.99
10006.52 2530.4510015.98  2531.610017.28 2531.75   10027 2532.45 10033.8 2533.35
10046.64 2534.5910052.84 2534.9510052.96 2534.8810053.85 2534.9310054.81 2535.03
10056.33 2535.1210059.67 2535.4310061.06 2535.5110063.93 2535.7810066.68  2535.9
10069.43 2536.1410070.74 2536.24

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*****************************************************************************
 8488.28     .06 8956.46     .04 8982.93     .06 9997.69     .0410017.28     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9997.1210017.28           424.45  424.45  424.45             .1       .3
Left Levee      Station= 8842.08      Elevation= 2532.25

CROSS SECTION


RIVER: RV WK T13
REACH: R3                 RS: 0.339

INPUT
Description: This cross section is identical to RM 7.061 on RV WK.
Station Elevation Data    num=     201
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
 8544.41 2539.18 8547.13 2538.87 8568.87 2536.04 8576.45    2535 8588.44 2533.31
 8589.76 2533.22 8591.46 2532.95 8594.28 2532.75 8596.47  2532.4 8598.24 2532.27
 8602.41  2531.6  8606.4 2531.21  8608.5 2530.88 8610.01 2530.73  8614.2 2530.14
 8618.12 2529.63 8624.76 2528.71 8624.95  2528.7 8626.13 2528.54 8650.29 2526.31
 8652.08 2526.18 8662.22 2525.31 8671.52 2525.12 8673.95 2525.09 8676.56 2525.02
 8678.62    2525 8680.32 2524.95 8685.22 2524.94 8690.44 2524.82 8712.47 2524.19
 8715.49 2524.18 8718.79 2524.11 8733.65 2523.88 8736.95 2523.85 8744.32 2523.83
 8751.76 2523.76  8755.1 2523.77 8759.21 2523.81 8760.53  2523.8 8767.54 2523.88
 8771.16 2523.88 8782.76 2523.84 8793.14 2523.67 8799.59 2523.67 8817.93 2523.45
  8842.3 2523.38 8852.67 2523.68 8856.07 2523.62 8875.59 2524.33 8876.97 2524.36
 8880.84 2524.32 8922.09 2523.21 8931.99 2522.81 8946.75 2522.62 8959.69 2522.55
 8974.83 2522.34 8975.09 2522.35 8981.96 2522.11 8982.74 2522.11 8983.77 2522.07
 9003.32 2522.21 9012.21 2522.12 9025.42 2522.19 9031.04 2522.24 9058.46 2522.12
 9076.53 2522.16 9098.17 2521.93 9136.11  2522.4    9161 2522.07 9167.21 2522.63
 9169.38 2522.62 9215.94 2522.92 9220.31 2522.82 9228.28 2522.73 9234.98 2522.57
 9237.99 2522.54 9247.15 2522.36 9252.59 2522.31 9259.49  2522.2 9275.31 2522.02
 9279.32 2521.53 9280.21 2521.45 9286.22 2520.53 9292.71  2521.1 9302.27  2522.1
 9304.09 2522.05 9326.76 2522.01 9352.02 2522.51 9360.94 2522.83 9373.23 2523.07
  9387.9  2522.5 9393.16 2522.43 9423.87  2521.5 9426.54 2521.44 9437.58 2521.56
 9448.95 2521.56  9457.1 2521.53 9459.75 2521.02 9465.39 2519.72 9472.89 2521.44
 9477.26 2521.36 9480.08 2521.38 9499.87 2521.33 9560.45 2520.84  9565.1 2521.59
 9602.52 2521.81 9619.61 2521.79 9639.44  2521.3 9645.99 2521.31 9669.82 2521.19
 9683.24 2521.17 9689.97 2521.08 9700.14 2520.89  9701.1 2520.85 9709.54 2520.89
 9734.92 2520.29 9736.35 2520.51 9744.55 2520.81 9747.27 2521.09 9760.13 2521.05
  9767.2 2521.21  9777.5 2520.98 9784.29 2520.68 9793.43 2520.39 9798.63 2520.25
 9803.49 2521.16 9807.84 2521.08 9820.82 2520.97 9824.41  2520.4 9826.57 2520.02
 9829.92 2520.31  9839.5  2521.3 9839.87  2521.2 9840.47 2521.24 9844.89 2520.96
 9847.38 2520.92 9860.73 2520.57 9865.33 2520.37 9869.79 2520.74 9874.62 2521.44
 9878.45 2521.37  9884.6 2520.91 9888.27 2521.65 9889.45 2521.87 9893.59 2521.95
 9902.19 2522.06 9905.32 2521.14 9916.25 2521.36 9927.24 2521.68  9927.7 2521.71
 9929.32 2521.72 9942.75 2521.61 9954.03 2521.46    9966 2521.28 9972.29 2520.63
 9974.39 2520.96 9976.59 2521.17 9980.81 2521.71 9981.77 2521.81 9986.27 2522.11
 9989.08  2521.8 9990.69 2521.67 9994.94 2521.24 9999.94 2520.86   10000 2520.85
10000.77 2520.78   10003 2520.6210014.38 2521.34 10017.3 2521.5510025.66 2522.09
10046.56 2522.1310050.43 2522.3110078.62 2524.2710088.18 2525.1510090.68 2525.02
10099.73 2525.4810117.98 2527.2710120.64 2527.5610121.14  2527.610127.08 2527.32
10133.24 2527.6610145.75 2528.7310146.72 2528.8410157.12 2529.6410159.74 2529.97
10170.61 2530.9110175.61 2531.4510176.15 2531.3210176.76 2531.4610180.09 2531.81
10181.69 2532.1710183.29 2532.4610186.68 2532.8410188.41 2533.1510190.31 2533.47
10193.58 2533.8410206.37 2535.9510217.71 2537.7310226.65 2538.9810236.87 2540.53
10248.05 2541.35

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*****************************************************************************
 8544.41     .06 9136.11     .04 9167.21     .06 9986.27     .0410025.66     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9986.2710025.66           538.77  566.98  563.94             .1       .3
```

CROSS SECTION

RIVER: RV WK T13
REACH: R3 RS: 0.231

INPUT
Description: This cross section is identical to RM 6.957 on RV WK.
Station Elevation Data num= 198

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9040.44	2525.94	9074.18	2521.11	9074.91	2521.01	9081.24	2519.95	9081.42	2519.93
9081.58	2519.91	9083.58	2519.55	9085.21	2519.4	9087.81	2519.29	9090.02	2519.23
9092.4	2519.18	9096.4	2518.64	9099.56	2518.52	9099.87	2518.48	9102.87	2518.35
9103.5	2518.27	9116.6	2516.99	9117.17	2516.89	9120.97	2516.69	9129.37	2515.92
9132.12	2515.5	9133.32	2515.3	9137.86	2514.81	9138.93	2514.66	9143.63	2514.19
9144.55	2514.06	9149.46	2513.68	9150.24	2513.57	9151.08	2513.5	9167.67	2512.39
9168.66	2512.38	9172.22	2512.18	9178.39	2511.84	9187.22	2511.34	9188.97	2511.29
9189.21	2511.29	9196.22	2511.12	9197.41	2511.12	9203.52	2511	9208.17	2511
9208.99	2510.98	9212.38	2510.98	9217.58	2510.95	9222.23	2510.92	9226.98	2510.93
9233	2510.93	9236.4	2510.92	9253.62	2510.86	9254.5	2510.86	9259.43	2510.83
9264.5	2510.61	9266.39	2510.51	9273.89	2510.16	9279.14	2509.9	9283.33	2509.7
9291.81	2509.26	9292.78	2509.21	9294.27	2509.13	9295.72	2509.06	9299.37	2508.67
9302.46	2508.45	9304.37	2508.28	9308.66	2508	9308.78	2507.99	9309.27	2507.95
9311.98	2508.23	9316.82	2508.71	9318.21	2508.85	9318.95	2508.96	9331.91	2508.15
9334.11	2507.85	9341.27	2508.48	9352.31	2509.48	9352.36	2509.48	9357.88	2509.57
9400.95	2510.27	9403	2510.32	9403.61	2510.33	9412.14	2508.89	9413.25	2508.69
9417.09	2509.08	9426.27	2509.95	9426.36	2509.97	9426.44	2509.98	9427.4	2510.11
9428.29	2510.08	9523.91	2509.33	9530.69	2509.27	9534.62	2509.14	9542.41	2508.89
9550.55	2509.44	9556.3	2509.83	9598.97	2509.77	9611.33	2509.75	9630.52	2509.89
9631.07	2509.9	9631.24	2509.89	9733.89	2509.35	9762.82	2509.32	9823.82	2509.27
9844.54	2509.31	9845	2509.31	9845.04	2509.31	9845.68	2509.31	9846.5	2509.3
9847.53	2509.3	9848.68	2509.29	9848.82	2509.29	9850.49	2509.29	9852.77	2509.28
9854.67	2509.27	9856.11	2509.28	9860	2509.32	9876.7	2509.5	9877.47	2509.51
9881.74	2509.6	9884.66	2509.99	9885.53	2509.95	9885.73	2509.92	9886.05	2509.87
9886.57	2509.79	9887.22	2509.45	9887.42	2509.43	9890.38	2509.15	9896.44	2508.59
9901.24	2508.65	9905.95	2508.67	9908.94	2508.69	9911.95	2508.7	9914.3	2508.76
9915.34	2508.77	9917.74	2508.84	9921.55	2508.88	9927.28	2508.99	9930.29	2509
9936.19	2509.06	9936.76	2508.98	9941.46	2508.31	9945.05	2507.98	9950.4	2507.32
9950.75	2507.32	9952.62	2507.57	9953.86	2507.65	9959.43	2508.24	9964.01	2508.47
9966.6	2508.69	9968.34	2508.76	9973.4	2508.97	9973.79	2508.99	9976.34	2509.08
9979.9	2508.88	9980.65	2508.83	9982.79	2508.71	9982.92	2508.7	9984.38	2508.6
9986.99	2508.44	9990.46	2508.19	9993.32	2508.01	9994.15	2507.95	9999.37	2507.49
9999.41	2507.49	9999.58	2507.48	9999.98	2507.54	10000	2507.54	10005.8	2508.42
10009.77	2509.08	10011.05	2509.3	10011.86	2509.25	10013.03	2509.18	10014.9	2509.05
10029.72	2509.59	10033.05	2509.83	10038.53	2509.68	10039.86	2509.65	10043.09	2509.55
10048.95	2510.01	10056.11	2510.58	10056.52	2510.61	10059.01	2510.81	10063.13	2511.05
10064.89	2511.34	10065.31	2511.39	10065.32	2511.41	10065.75	2511.45	10094.84	2514.5
10096.13	2514.61	10096.47	2514.64	10100.03	2515.22	10100.97	2515.37	10105.57	2516.21
10110.65	2517.11	10115.37	2517.89	10119.71	2518.62	10135.04	2522.17	10137.79	2522.82
10138.89	2523.06	10144.98	2524.35	10153.49	2526.16				

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
9040.44	.06	9302.46	.04	9352.36	.06	9993.32	.04	10005.8	.06

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9976.34	10009.77	634.97	634.97	634.97	.1	.3

CROSS SECTION

RIVER: RV WK T13
REACH: R3 RS: 0.111

INPUT
Description: This cross section is identical to RM 6.818 on RV WK.
Station Elevation Data num= 176

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9628.54	2508.15	9628.97	2508.04	9631.15	2507.5	9644.43	2505.01	9649.05	2504
9650.11	2503.86	9650.6	2503.8	9654.9	2502.88	9658.88	2502.39	9664.38	2501.55
9668.21	2500.79	9671.87	2500.19	9674.98	2499.58	9675.01	2499.58	9677.11	2499.16
9677.72	2499.02	9680.1	2498.45	9682.22	2497.94	9684.14	2497.47	9701.83	2494.93
9704.36	2494.6	9711.58	2494.25	9717	2494.16	9720.55	2494.03	9727.48	2493.97
9729.19	2494	9729.79	2493.99	9735.72	2494.05	9738.52	2493.97	9740.28	2493.97
9741.49	2493.93	9745.59	2493.78	9753.98	2493.46	9755.43	2493.44	9766.85	2493.66
9767.85	2493.69	9769.29	2493.74	9773.75	2493.86	9777.08	2493.94	9779.04	2493.99
9780.34	2494.02	9791.12	2494.08	9795.17	2494.16	9797.93	2494.21	9799.93	2494.26
9800.7	2494.27	9801.44	2494.26	9802.61	2494.25	9803.53	2494.24	9819.95	2494.57
9823.65	2494.59	9829.57	2494.63	9839.7	2494.7	9848.38	2494.83	9853.17	2494.83
9853.47	2494.83	9853.89	2494.83	9854.51	2494.82	9855.5	2494.82	9857.35	2494.8
9858.33	2494.79	9869.95	2494.62	9871.5	2494.65	9874.04	2494.69	9875.49	2494.7
9885.44	2494.94	9922.55	2495.79	9925.34	2495.85	9926.05	2495.87	9926.51	2495.87
9927	2495.86	9952.62	2495.67	9977.44	2495.45	9978.42	2495.38	9985.04	2494.86
9988.85	2494.56	9996.87	2493.93	9999.08	2493.75	9999.98	2493.8	10000	2493.8
10003.75	2494	10014	2494.54	10024.97	2495.12	10026.74	2495.06	10031.49	2494.99
10044.24	2494.09	10049.98	2493.65	10051.7	2493.52	10066.72	2494.92	10075.6	2495.77
10086.61	2495.44	10092.32	2495.29	10096.76	2494.71	10100.1	2494.29	10106.96	2494.88
10111.25	2495.26	10117.52	2495.31	10121.86	2495.32	10131.11	2495.37	10139.76	2495.38
10149.99	2495.38	10151.66	2495.38	10153.93	2495.38	10159.2	2495.34	10204.41	2495.13
10207.9	2495.17	10208.26	2495.17	10212	2495.36	10217.74	2495.65	10221.36	2495.3
10228.07	2494.63	10243.56	2494.58	10245.33	2494.57	10247.57	2494.58	10252.63	2494.49
10253.21	2494.45	10254.63	2494.34	10260.75	2493.88	10261.99	2493.81	10265.02	2493.64
10273.61	2493.17	10277.12	2492.96	10282	2493.43	10288.27	2494.15	10288.44	2494.13
10288.62	2494.11	10298.69	2493.11	10299.41	2493.25	10306.26	2494.62	10315.29	2494.64
10336.58	2494.75	10339.14	2494.75	10350.37	2494.91	10359.09	2494.97	10364.01	2494.97
10369.28	2494.97	10369.56	2494.97	10369.58	2494.97	10375.4	2495.08	10375.73	2495.1
10376.66	2495.12	10381.26	2495.33	10386.28	2495.57	10390.87	2495.79	10395.06	2496

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10427.07  2497.910431.25 2498.1310434.64 2498.31 10436.8 2498.4210437.93 2498.48
10445.64 2498.8810446.47  2498.910453.56 2499.2810456.76 2499.6610463.68 2500.48
 10467.3 2500.9110472.84 2501.56 10473.5 2501.5910474.62 2501.6510475.67 2501.71
10476.64 2501.7710489.91 2504.6710494.12 2505.5510495.17 2505.6410499.61 2506.59
10500.45 2506.6710500.61 2506.6810505.23  2507.710505.72 2507.7510509.11 2508.51
10509.57 2508.5610511.58 2508.7710512.81 2508.8910517.19 2509.3110521.82 2509.76
10526.22 2510.18

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*****************************************************************************
 9628.54     .06 9720.55     .04 9780.34     .06 9988.85     .04   10014     .06

Bank Sta: Left   Right    Coeff Contr.   Expan.
       9926.51 10075.6              .1       .3

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

SUMMARY OF MANNING'S N VALUES

River:RV WK
*****************************************************************************
*     Reach       *   River Sta.   *   n1    *   n2    *   n3    *   n4    *   n5    *
*****************************************************************************
*R1                *    8.742       *      .06*      .04*      .06*         *         *
*R1                *    8.583       *      .06*      .04*      .06*         *         *
*R1                *    8.444       *      .06*      .04*      .06*         *         *
*R1                *    8.311       *      .06*      .04*      .06*         *         *
*R1                *    8.107       *      .06*      .04*      .06*         *         *
*R1                *    7.952       *      .06*      .04*      .06*         *         *
*R1                *    7.747       *      .06*      .04*      .06*         *         *
*R1                *    7.671       *      .06*      .04*      .06*         *         *
*R2                *    7.603       *      .06*      .04*      .06*         *         *
*R2                *    7.541       *      .06*      .04*      .06*         *         *
*R2                *    7.504       *      .06*      .04*      .06*         *         *
*R2                *    7.463       *      .06*      .04*      .06*         *         *
*R2                *    7.413       *      .06*      .04*      .06*      .04*      .06*
*R2                *    7.363       *      .06*      .04*      .06*         *         *
*R2                *    7.246       *      .06*      .04*      .06*         *         *
*R3                *    7.131       *      .06*      .04*      .06*      .04*      .06*
*R3                *    7.061       *      .06*      .04*      .06*      .04*      .06*
*R3                *    6.957       *      .06*      .04*      .06*      .04*      .06*
*R3                *    6.818       *      .06*      .04*      .06*      .04*      .06*
*R4                *    6.686       *      .06*      .04*      .06*         *         *
*R4                *    6.597       *      .06*      .04*      .06*         *         *
*R4                *    6.484       *      .06*      .04*      .06*         *         *
*R4                *    6.416       *      .06*      .04*      .06*         *         *
*R4                *    6.384       *      .06*      .04*      .06*         *         *
*****************************************************************************

River:RV WK S4
*****************************************************************************
*     Reach       *   River Sta.   *   n1    *   n2    *   n3    *   n4    *   n5    *
*****************************************************************************
*R1                *    0.497       *      .06*      .04*      .06*         *         *
*R1                *    0.496       *Lat Struct*        *         *         *         *
*R1                *    0.483       *      .06*      .04*      .06*         *         *
*R1                *    0.482       *Lat Struct*        *         *         *         *
*R1                *    0.456       *      .06*      .04*      .06*         *         *
*R1                *    0.455       *Lat Struct*        *         *         *         *
*R1                *    0.443       *      .06*      .04*      .06*         *         *
*R2                *    0.339       *      .06*      .04*      .06*         *         *
*R2                *    0.285       *      .06*      .04*      .06*         *         *
*R2                *    0.240       *      .06*      .04*      .06*      .04*      .06*
*R2                *    0.194       *      .06*      .04*      .06*         *         *
*R2                *    0.108       *      .06*      .04*      .06*         *         *
*****************************************************************************

River:RV WK T13
*****************************************************************************
*     Reach       *   River Sta.   *   n1    *   n2    *   n3    *   n4    *   n5    *
*****************************************************************************
*R1                *    1.960       *      .06*      .04*      .06*         *         *
*R1                *    1.894       *      .06*      .04*      .06*         *         *
*R1                *    1.810       *      .06*      .04*      .06*         *         *
*R1                *    1.700       *      .06*      .04*      .06*         *         *
*R1                *    1.577       *      .06*      .04*      .06*         *         *
*R1                *    1.494       *      .06*      .04*      .06*         *         *
*R1                *    1.415       *      .06*      .04*      .06*         *         *
*R1                *    1.276       *      .06*      .04*      .06*         *         *
*R1                *    1.239       *      .06*      .04*      .06*         *         *
*R1                *    1.164       *      .06*      .04*      .06*         *         *
*R1                *    1.026       *      .06*      .04*      .06*         *         *
*R1                *    0.901       *      .06*      .04*      .06*         *         *
*R2                *    0.866       *      .06*      .04*      .06*         *         *
*R2                *    0.865       *      .06*      .04*      .06*         *         *
*R2                *    0.864       *      .06*      .04*      .06*         *         *
*R3                *    0.808       *      .06*      .04*      .06*         *         *
*R3                *    0.752       *      .06*      .04*      .06*         *         *
*R3                *    0.630       *      .06*      .04*      .06*         *         *
*R3                *    0.537       *      .06*      .04*      .06*         *         *
*R3                *    0.419       *      .06*      .04*      .06*      .04*      .06*
*R3                *    0.339       *      .06*      .04*      .06*      .04*      .06*
*R3                *    0.231       *      .06*      .04*      .06*      .04*      .06*
*R3                *    0.111       *      .06*      .04*      .06*      .04*      .06*
*****************************************************************************

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

SUMMARY OF REACH LENGTHS
```

River: RV WK

Reach	River Sta.	Left	Channel	Right
R1	8.742	875	838.28	900
R1	8.583	750	735.87	750
R1	8.444	650	698.11	700
R1	8.311	1075	1078.4	1100
R1	8.107	900	817.82	850
R1	7.952	925	1082.06	1100
R1	7.747	500	403.64	425
R1	7.671			
R2	7.603	327.22	327.22	327.22
R2	7.541	195.66	195.66	195.66
R2	7.504	213.9	213.9	213.9
R2	7.463	264.57	264.57	264.57
R2	7.413	266.11	266.11	266.11
R2	7.363	614.84	614.84	614.84
R2	7.246			
R3	7.131	369.36	369.36	369.36
R3	7.061	547.17	547.17	547.17
R3	6.957	700	731.86	650
R3	6.818			
R4	6.686	498.67	471.95	476.5
R4	6.597	626.33	592.78	598.5
R4	6.484	432.44	362.56	383.02
R4	6.416	154.69	185.83	268.96
R4	6.384	0	0	0

River: RV WK S4

Reach	River Sta.	Left	Channel	Right
R1	0.497	82.07	76.26	76.26
R1	0.496	Lat Struct		
R1	0.483	154.12	138	138
R1	0.482	Lat Struct		
R1	0.456	89.44	69.06	69.06
R1	0.455	Lat Struct		
R1	0.443	0	0	0
R2	0.339	283.76	283.76	283.76
R2	0.285	238.58	238.58	238.58
R2	0.240	242.04	242.04	242.04
R2	0.194	453.28	453.28	453.28
R2	0.108			

River: RV WK T13

Reach	River Sta.	Left	Channel	Right
R1	1.960	350	347.73	300
R1	1.894	450	441.52	500
R1	1.810	600	580.72	550
R1	1.700	625	652.36	675
R1	1.577	450	438.49	525
R1	1.494	425	417.72	450
R1	1.415	700	728.79	725
R1	1.276	210.09	198.94	184.88
R1	1.239	414.91	392.88	365.12
R1	1.164	725	732.16	725
R1	1.026	625	656.79	600
R1	0.901			
R2	0.866	5	5.07	5
R2	0.865	5	5.67	5
R2	0.864			
R3	0.808	251.33	293.59	293.22
R3	0.752	574.6	643.64	670.37
R3	0.630	477.71	491.61	502.71
R3	0.537	589.61	623.82	639.61
R3	0.419	424.45	424.45	424.45
R3	0.339	538.77	566.98	563.94
R3	0.231	634.97	634.97	634.97
R3	0.111			

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: RV WK

Reach	River Sta.	Contr.	Expan.
R1	8.742	.1	.3
R1	8.583	.1	.3
R1	8.444	.1	.3
R1	8.311	.1	.3
R1	8.107	.1	.3
R1	7.952	.1	.3
R1	7.747	.1	.3
R1	7.671	.1	.3
R2	7.603	.1	.3
R2	7.541	.1	.3
R2	7.504	.1	.3
R2	7.463	.1	.3
R2	7.413	.1	.3
R2	7.363	.1	.3

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*R2              *    7.246   *        .1*       .3*
*R3              *    7.131   *        .1*       .3*
*R3              *    7.061   *        .1*       .3*
*R3              *    6.957   *        .1*       .3*
*R3              *    6.818   *        .1*       .3*
*R4              *    6.686   *        .1*       .3*
*R4              *    6.597   *        .1*       .3*
*R4              *    6.484   *        .1*       .3*
*R4              *    6.416   *        .1*       .3*
*R4              *    6.384   *        .1*       .3*
*****************************************************
River: RV WK S4

*****************************************************
*     Reach      *   River Sta.   * Contr.  * Expan.  *
*****************************************************
*R1               *    0.497   *        .1*       .3*
*R1               *    0.496   *Lat Struct*          *
*R1               *    0.483   *        .1*       .3*
*R1               *    0.482   *Lat Struct*          *
*R1               *    0.456   *        .1*       .3*
*R1               *    0.455   *Lat Struct*          *
*R1               *    0.443   *        .1*       .3*
*R2               *    0.339   *        .1*       .3*
*R2               *    0.285   *        .1*       .3*
*R2               *    0.240   *        .1*       .3*
*R2               *    0.194   *        .1*       .3*
*R2               *    0.108   *        .1*       .3*
*****************************************************
River: RV WK T13

*****************************************************
*     Reach      *   River Sta.   * Contr.  * Expan.  *
*****************************************************
*R1               *    1.960   *        .1*       .3*
*R1               *    1.894   *        .1*       .3*
*R1               *    1.810   *        .1*       .3*
*R1               *    1.700   *        .1*       .3*
*R1               *    1.577   *        .1*       .3*
*R1               *    1.494   *        .1*       .3*
*R1               *    1.415   *        .1*       .3*
*R1               *    1.276   *        .1*       .3*
*R1               *    1.239   *        .1*       .3*
*R1               *    1.164   *        .1*       .3*
*R1               *    1.026   *        .1*       .3*
*R1               *    0.901   *        .1*       .3*
*R2               *    0.866   *        .1*       .3*
*R2               *    0.865   *        .1*       .3*
*R2               *    0.864   *        .1*       .3*
*R3               *    0.808   *        .1*       .3*
*R3               *    0.752   *        .1*       .3*
*R3               *    0.630   *        .1*       .3*
*R3               *    0.537   *        .1*       .3*
*R3               *    0.419   *        .1*       .3*
*R3               *    0.339   *        .1*       .3*
*R3               *    0.231   *        .1*       .3*
*R3               *    0.111   *        .1*       .3*
*****************************************************

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

ERRORS WARNINGS AND NOTES
Errors Warnings and Notes for Plan : RV Wash K

River: RV WK  Reach: R1     RS: 8.742     Profile: 100-YR FP
     Warning:The energy loss was 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: RV WK  Reach: R1     RS: 8.583     Profile: 100-YR FP
     Warning:The energy equation could not be balanced within the specified number of iterations.  The program used critical depth
             for the water surface and continued on with the calculations.
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
     Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
             the need for additional cross sections.
     Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
             water surface came back below critical depth.  This indicates that there is not a valid subcritical answer.  The
             program defaulted to critical depth.
River: RV WK  Reach: R1     RS: 8.444     Profile: 100-YR FP
     Warning:The energy equation could not be balanced within the specified number of iterations.  The program used critical depth
             for the water surface and continued on with the calculations.
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
     Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
             the need for additional cross sections.
     Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
             water surface came back below critical depth.  This indicates that there is not a valid subcritical answer.  The
             program defaulted to critical depth.
     Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, water surface was
             used.
River: RV WK  Reach: R1     RS: 8.311     Profile: 100-YR FP
     Warning:The energy equation could not be balanced within the specified number of iterations.  The program used critical depth
             for the water surface and continued on with the calculations.
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
     Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
             the need for additional cross sections.
     Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
             water surface came back below critical depth.  This indicates that there is not a valid subcritical answer.  The
             program defaulted to critical depth.
River: RV WK  Reach: R1     RS: 8.107     Profile: 100-YR FP
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    Warning:The energy equation could not be balanced within the specified number of iterations.  The program used critical depth
            for the water surface and continued on with the calculations.
    Warning:Divided flow computed for this cross-section.
    Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
            the need for additional cross sections.
    Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
            water surface came back below critical depth.  This indicates that there is not a valid subcritical answer.  The
            program defaulted to critical depth.
    Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, water surface was
            used.
River: RV WK  Reach: R1     RS: 7.952     Profile: 100-YR FP
    Warning:The energy equation could not be balanced within the specified number of iterations.  The program used critical depth
            for the water surface and continued on with the calculations.
    Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
            the need for additional cross sections.
    Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
            water surface came back below critical depth.  This indicates that there is not a valid subcritical answer.  The
            program defaulted to critical depth.
River: RV WK  Reach: R1     RS: 7.747     Profile: 100-YR FP
    Warning:The energy equation could not be balanced within the specified number of iterations.  The program used critical depth
            for the water surface and continued on with the calculations.
    Warning:Divided flow computed for this cross-section.
    Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
            the need for additional cross sections.
    Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
            water surface came back below critical depth.  This indicates that there is not a valid subcritical answer.  The
            program defaulted to critical depth.
River: RV WK  Reach: R1     RS: 7.671     Profile: 100-YR FP
    Warning:The energy equation could not be balanced within the specified number of iterations.  The program used critical depth
            for the water surface and continued on with the calculations.
    Warning:Divided flow computed for this cross-section.
    Warning:A flow split was encountered.  The program first calculated the momentum of both channels below the junction.  An
            energy balance was performed across the junction from the stream with the highest momentum downstream to the section
            upstream.
    Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
            the need for additional cross sections.
    Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
            water surface came back below critical depth.  This indicates that there is not a valid subcritical answer.  The
            program defaulted to critical depth.
River: RV WK  Reach: R2     RS: 7.603     Profile: 100-YR FP
    Warning:The energy equation could not be balanced within the specified number of iterations.  The program used critical depth
            for the water surface and continued on with the calculations.
    Warning:The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for additional cross sections.
    Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
            the need for additional cross sections.
    Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
            water surface came back below critical depth.  This indicates that there is not a valid subcritical answer.  The
            program defaulted to critical depth.
River: RV WK  Reach: R2     RS: 7.541     Profile: 100-YR FP
    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.
    Note:   Manning's n values were composited to a single value in the main channel.
River: RV WK  Reach: R2     RS: 7.504     Profile: 100-YR FP
    Warning:The energy equation could not be balanced within the specified number of iterations.  The program used critical depth
            for the water surface and continued on with the calculations.
    Warning:Divided flow computed for this cross-section.
    Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
            This may indicate the need for additional cross sections.
    Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
            the need for additional cross sections.
    Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
            water surface came back below critical depth.  This indicates that there is not a valid subcritical answer.  The
            program defaulted to critical depth.
    Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, water surface was
            used.
River: RV WK  Reach: R2     RS: 7.463     Profile: 100-YR FP
    Warning:The energy equation could not be balanced within the specified number of iterations.  The program used critical depth
            for the water surface and continued on with the calculations.
    Warning:Divided flow computed for this cross-section.
    Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
            This may indicate the need for additional cross sections.
    Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
            the need for additional cross sections.
    Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
            water surface came back below critical depth.  This indicates that there is not a valid subcritical answer.  The
            program defaulted to critical depth.
River: RV WK  Reach: R2     RS: 7.413     Profile: 100-YR FP
    Warning:The energy equation could not be balanced within the specified number of iterations.  The program used critical depth
            for the water surface and continued on with the calculations.
    Warning:Divided flow computed for this cross-section.
    Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
            the need for additional cross sections.
    Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
            water surface came back below critical depth.  This indicates that there is not a valid subcritical answer.  The
            program defaulted to critical depth.
River: RV WK  Reach: R2     RS: 7.363     Profile: 100-YR FP
    Warning:The energy equation could not be balanced within the specified number of iterations.  The program used critical depth
            for the water surface and continued on with the calculations.
    Warning:Divided flow computed for this cross-section.
    Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
            the need for additional cross sections.
    Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
            water surface came back below critical depth.  This indicates that there is not a valid subcritical answer.  The
            program defaulted to critical depth.
River: RV WK  Reach: R2     RS: 7.246     Profile: 100-YR FP
    Warning:The energy equation could not be balanced within the specified number of iterations.  The program used critical depth
            for the water surface and continued on with the calculations.
    Warning:Divided flow computed for this cross-section.
    Warning:The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for additional cross sections.
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    Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
            the need for additional cross sections.
    Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
            water surface came back below critical depth.  This indicates that there is not a valid subcritical answer.  The
            program defaulted to critical depth.
    Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, water surface was
            used.
River: RV WK  Reach: R3     RS: 7.131     Profile: 100-YR FP
    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.
    Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, water surface was
            used.
River: RV WK  Reach: R3     RS: 7.061     Profile: 100-YR FP
    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.
River: RV WK  Reach: R3     RS: 6.957     Profile: 100-YR FP
    Warning:The energy loss was 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: RV WK  Reach: R3     RS: 6.818     Profile: 100-YR FP
    Warning:The energy equation could not be balanced within the specified number of iterations.  The program used critical depth
            for the water surface and continued on with the calculations.
    Warning:Divided flow computed for this cross-section.
    Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
            the need for additional cross sections.
    Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
            water surface came back below critical depth.  This indicates that there is not a valid subcritical answer.  The
            program defaulted to critical depth.
River: RV WK  Reach: R4     RS: 6.686     Profile: 100-YR FP
    Warning:The conveyance ratio (upstream 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: RV WK  Reach: R4     RS: 6.597     Profile: 100-YR FP
    Warning:The energy equation could not be balanced within the specified number of iterations.  The program selected the water
            surface that had the least amount of error between computed and assumed values.
    Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
            This may indicate the need for additional cross sections.
    Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
            the need for additional cross sections.
    Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
            water surface came back below critical depth.  This indicates that there is not a valid subcritical answer.  The
            program defaulted to critical depth.
River: RV WK  Reach: R4     RS: 6.484     Profile: 100-YR FP
    Warning:Divided flow computed for this cross-section.
    Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
            This may indicate the need for additional cross sections.
    Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
            the need for additional cross sections.
River: RV WK  Reach: R4     RS: 6.416     Profile: 100-YR FP
    Warning:The energy equation could not be balanced within the specified number of iterations.  The program used critical depth
            for the water surface and continued on with the calculations.
    Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
            This may indicate the need for additional cross sections.
    Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
            the need for additional cross sections.
    Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
            water surface came back below critical depth.  This indicates that there is not a valid subcritical answer.  The
            program defaulted to critical depth.
River: RV WK S4  Reach: R1     RS: 0.497     Profile: 100-YR FP
    Warning:The conveyance ratio (upstream 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: RV WK S4  Reach: R1     RS: 0.496     Profile: 100-YR FP
    Warning:The energy loss was 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: RV WK S4  Reach: R1     RS: 0.483     Profile: 100-YR FP
    Warning:The energy equation could not be balanced within the specified number of iterations.  The program used critical depth
            for the water surface and continued on with the calculations.
    Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
            the need for additional cross sections.
    Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
            water surface came back below critical depth.  This indicates that there is not a valid subcritical answer.  The
            program defaulted to critical depth.
River: RV WK S4  Reach: R1     RS: 0.482     Profile: 100-YR FP
    Warning:The energy loss was 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: RV WK S4  Reach: R1     RS: 0.456     Profile: 100-YR FP
    Warning:Divided flow computed for this cross-section.
    Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
            This may indicate the need for additional cross sections.
    Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
            the need for additional cross sections.
River: RV WK S4  Reach: R1     RS: 0.455     Profile: 100-YR FP
    Warning:The energy loss was 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: RV WK S4  Reach: R1     RS: 0.443     Profile: 100-YR FP
    Warning:The energy equation could not be balanced within the specified number of iterations.  The program selected the water
            surface that had the least amount of error between computed and assumed values.
    Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
            the need for additional cross sections.
    Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
            water surface came back below critical depth.  This indicates that there is not a valid subcritical answer.  The
            program defaulted to critical depth.
River: RV WK S4  Reach: R2     RS: 0.339     Profile: 100-YR FP
    Warning:The energy equation could not be balanced within the specified number of iterations.  The program selected the water
            surface that had the least amount of error between computed and assumed values.
    Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
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the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
River: RV WK S4 Reach: R2 RS: 0.285 Profile: 100-YR FP
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
River: RV WK S4 Reach: R2 RS: 0.240 Profile: 100-YR FP
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:Divided flow computed for this cross-section.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
River: RV WK S4 Reach: R2 RS: 0.194 Profile: 100-YR FP
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:Divided flow computed for this cross-section.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
River: RV WK S4 Reach: R2 RS: 0.108 Profile: 100-YR FP
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:Divided flow computed for this cross-section.
Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
River: RV WK T13 Reach: R1 RS: 1.960 Profile: 100-YR FP
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
River: RV WK T13 Reach: R1 RS: 1.894 Profile: 100-YR FP
Warning:The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
River: RV WK T13 Reach: R1 RS: 1.810 Profile: 100-YR FP
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:Divided flow computed for this cross-section.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
River: RV WK T13 Reach: R1 RS: 1.700 Profile: 100-YR FP
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:Divided flow computed for this cross-section.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
River: RV WK T13 Reach: R1 RS: 1.577 Profile: 100-YR FP
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:Divided flow computed for this cross-section.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
River: RV WK T13 Reach: R1 RS: 1.494 Profile: 100-YR FP
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:Divided flow computed for this cross-section.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated

water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
River: RV WK T13 Reach: R1 RS: 1.415 Profile: 100-YR FP
Warning:Divided flow computed for this cross-section.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:There is no flow in the channel. Check that the channel stations are correctly coded. To force flow into the channel, a levee or ineffective flow may have to be added or the Manning's n of the overbank could be increased.
River: RV WK T13 Reach: R1 RS: 1.276 Profile: 100-YR FP
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:Divided flow computed for this cross-section.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
River: RV WK T13 Reach: R1 RS: 1.239 Profile: 100-YR FP
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
River: RV WK T13 Reach: R1 RS: 1.164 Profile: 100-YR FP
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:Divided flow computed for this cross-section.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
River: RV WK T13 Reach: R1 RS: 1.026 Profile: 100-YR FP
Warning:Divided flow computed for this cross-section.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
River: RV WK T13 Reach: R1 RS: 0.901 Profile: 100-YR FP
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
River: RV WK T13 Reach: R2 RS: 0.864 Profile: 100-YR FP
Warning:A flow split was encountered. The program first calculated the momentum of both channels below the junction. An energy balance was performed across the junction from the stream with the highest momentum downstream to the section upstream.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Manning's n values were composited to a single value in the main channel.
River: RV WK T13 Reach: R3 RS: 0.808 Profile: 100-YR FP
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
River: RV WK T13 Reach: R3 RS: 0.752 Profile: 100-YR FP
Warning:Divided flow computed for this cross-section.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
River: RV WK T13 Reach: R3 RS: 0.630 Profile: 100-YR FP
Warning:Divided flow computed for this cross-section.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
River: RV WK T13 Reach: R3 RS: 0.537 Profile: 100-YR FP
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:Divided flow computed for this cross-section.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
River: RV WK T13 Reach: R3 RS: 0.419 Profile: 100-YR FP
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.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
River: RV WK T13 Reach: R3 RS: 0.339 Profile: 100-YR FP
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.
River: RV WK T13  Reach: R3     RS: 0.231     Profile: 100-YR FP
    Warning:The energy loss was 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: RV WK T13  Reach: R3     RS: 0.111     Profile: 100-YR FP
    Warning:The energy equation could not be balanced within the specified number of iterations.  The program used critical depth
            for the water surface and continued on with the calculations.
    Warning:Divided flow computed for this cross-section.
    Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
            the need for additional cross sections.
    Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
            water surface came back below critical depth.  This indicates that there is not a valid subcritical answer.  The
            program defaulted to critical depth.
```

E.3.8 HEC-RAS Output

RV Wash K Trib 11

WK T11	Profile: 100-YR FP												
River	Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
RV WK T11B	R1	0.627	100-YR FP	310.00	2581.95	2584.45	2584.45	2584.95	0.023281	5.81	56.67	61.70	0.98
RV WK T11B	R1	0.547	100-YR FP	310.00	2571.94	2573.75	2573.75	2574.20	0.021014	6.27	62.32	74.00	0.98
RV WK T11B	R1	0.452	100-YR FP	310.00	2560.10	2561.26	2561.26	2561.55	0.030203	5.04	75.07	139.27	1.16
RV WK T11B	R1	0.322	100-YR FP	310.00	2541.41	2543.42	2543.42	2543.97	0.020953	5.99	52.70	48.53	0.97
RV WK T11B	R1	0.205	100-YR FP	310.00	2527.75	2528.99	2528.99	2529.22	0.021624	4.97	89.93	179.48	0.94
RV WK T11B	R1	0.103	100-YR FP	650.00	2513.69	2514.85	2514.85	2514.87	0.000768	0.69	504.80	319.89	0.16
RV WK T11	R1	1.511	100-YR FP	330.00	2594.98	2596.82	2596.82	2597.49	0.026496	6.56	50.27	49.29	1.00
RV WK T11	R1	1.384	100-YR FP	330.00	2578.63	2580.02	2580.00	2580.19	0.021537	4.39	105.61	336.53	0.88
RV WK T11	R1	1.312	100-YR FP	330.00	2569.25	2570.15	2570.15	2570.44	0.030551	4.93	77.94	213.15	0.98
RV WK T11	R1	1.204	100-YR FP	330.00	2552.44	2554.78	2554.78	2555.28	0.021933	6.23	62.69	179.06	0.91
RV WK T11	R1	1.114	100-YR FP	330.00	2540.04	2542.62	2542.62	2543.11	0.015267	6.21	69.43	81.43	0.81
RV WK T11	R1	1.004	100-YR FP	330.00	2525.81	2527.51	2527.51	2527.96	0.025797	5.37	61.55	71.02	0.99
RV WK T11	R1	0.895	100-YR FP	650.00	2511.16	2512.97	2512.97	2513.49	0.024404	6.69	119.09	122.45	1.01
RV WK T11	R2	0.808	100-YR FP	650.00	2500.53	2503.35	2503.02	2503.60	0.008950	4.48	173.23	284.02	0.60
RV WK T11	R2	0.807	100-YR FP	650.00	2500.53	2503.35	2503.02	2503.60	0.008950	4.48	173.23	284.02	0.60

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

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

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

PROJECT DATA
Project Title: RV Wash K Trib 11
Project File : RV_Wash_K_Trib_11.prj
Run Date and Time: 11/1/2007 10:09:16 AM

Project in English units

Project Description:
Rio Verde ADMP, Project FCDMC 2001C056, river system including RV Wash K Trib
11 and RV Wash K Trib 11B. Phase 3 RAS model started in June 2005, preliminary
model completed in August 2005.

RAS model is prepared by Dibble Engineering.
Field reconnaissance per report dated April 18, 2005.

For the study washes,
the starting water surface elevation is on RV Wash K Trib 11, and is taken from
the starting water surface elevation as provided by the Flood Control District
of Maricopa County.

RV Wash K Trib 11 Floodplain Delineation
From a point
approximately 2,100 feet north and 2,700 feet east of the intersection of 136th
Street and Lone Mountain Road (River Mile 0.808) to a point approximately 3,700
feet north and 300 feet west of the intersection of 136th Street and Lone
Mountain Road (River Mile 1.511), a distance of 0.703 river miles.

RV Wash K
Trib 11B Floodplain Delineation
From the confluence with RV Wash K Trib 11 at
a point coincident with the downstream end of RV Wash K Trib 11 (approximately
2,100 feet north and 2,700 feet east of the intersection of 136th Street and
Lone Mountain Road (River Mile 0.000)) to a point approximately 3,100 feet
north and 200 feet west of the intersection of 136th Street and Lone Mountain
Road (River Mile 0.627), a distance of 0.627 river miles.

The Cross-section
data were generated by INROADS. The mapped hydraulic base line represents the
10,000-station point of the HEC-RAS model.

Topographic mapping is supplied
by the Flood Control District of Maricopa County.

Discharge data is from the
Rio Verde ADMP HEC-1 model. The original models are from the Flood Control
District of Maricopa County, prepared for the Rio Verde South Floodplain
Delineation, the Rio Verde South Extension Floodplain Delineation, the Rio
Verde North Floodplain Delineation, and the Rio Verde North Extension
Floodplain Delineation. The HEC-1 models were modified for the Rio Verde ADMP.
The final HEC-1 files were received in February 2004 and FCDMC approved the
hydrology model.

Hydrologic concentration points are noted in cross-section
descriptions using the corresponding HEC-1 ID's. The flow rates have been
rounded to the nearest 10 cubic feet per second (cfs). Flow rates obtained from
HEC-1 are applied at the downstream end of the relevant sub-basin and stepped
upstream at cross-sections to meet the HEC-1 flow from the upstream
sub-basin.

Flowrates were modified from the approved hydrology model to
accurately depict flowrates in the two separate washes which are both contained
in basin B11W6. The additional flow from this basin was proportioned to RV Wash
K Trib 11B and RV Wash K Trib 11 based on their tributary areas.

River Mile
(RM) stationing is based upon the estimated tie in point with downstream
receiving waters or the start of two-dimensional flow models. This point
represents RM 0.000. The assumed starting WS Elevation is based upon normal
depth in the study wash.

Horizontal and Vertical Coordinate Basis for this
project is as follows:
          Horizontal--Arizona State Plane, Central Region, NAD
1983
          Vertical--NAVD 1988

RAS model river naming corresponds to project
river naming as follows:
          RV WK T11 = RV Wash K Trib 11
          RV WK T11B = RV Wash
K Trib 11B
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PLAN DATA

Plan Title: RV Wash K Trib 11
Plan File : j:\2006\10-0606.1\Design Notebook\Drainage Design\HEC-RAS\RV_Wash_K_Trib_11.p01

          Geometry Title: RV Wash K Trib 11
          Geometry File : j:\2006\10-0606.1\Design Notebook\Drainage Design\HEC-RAS\RV_Wash_K_Trib_11.g01

          Flow Title    : RV Wash K Trib 11
          Flow File     : j:\2006\10-0606.1\Design Notebook\Drainage Design\HEC-RAS\RV_Wash_K_Trib_11.f01

Plan Summary Information:
Number of:  Cross Sections =   15    Multiple Openings  =    0
            Culverts       =    0    Inline Structures  =    0
            Bridges        =    0    Lateral Structures =    0

Computational Information
    Water surface calculation tolerance  =  0.01
    Critical depth calculation tolerance =  0.01
    Maximum number of iterations         =  20
    Maximum difference tolerance         =  0.3
    Flow tolerance factor                =  0.001

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

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

River = RV WK T11        Reach = R2
RS      Profile           Method  Value1  Value2
0.808   PF 2                   1 9987.9110042.55
0.806   PF 2                   1 9987.0910042.49
0.804   PF 2                   1 9986.5910041.79

River = RV WK T11        Reach = R1
RS      Profile           Method  Value1  Value2
1.511   PF 2                   1 9989.7510027.34
1.384   PF 2                   1 9918.4410018.84
1.312   PF 2                   1  9982.510018.52
1.204   PF 2                   1  9987.410015.06
1.114   PF 2                   1  9991.610013.78
1.004   PF 2                   1 9968.7710039.79
0.895   PF 2                   1 9984.6510023.62

River = RV WK T11B       Reach = R1
RS      Profile           Method  Value1  Value2
0.627   PF 2                   1 9975.0310020.95
0.547   PF 2                   1 9985.8210009.01
0.452   PF 2                   1 9970.0910020.32
0.322   PF 2                   1 9989.1510037.67
0.205   PF 2                   1 9978.0710016.59
0.103   PF 2                   1 9951.3510005.89


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FLOW DATA

Flow Title: RV Wash K Trib 11
Flow File : j:\2006\10-0606.1\Design Notebook\Drainage Design\HEC-RAS\RV_Wash_K_Trib_11.f01

Flow Data (cfs)
*************************************************************
* River           Reach           RS      *       100-YR FP *
* RV WK T11       R1              1.511   *             330 *
* RV WK T11       R1              0.895   *             650 *
* RV WK T11       R2              0.808   *             650 *
* RV WK T11B      R1              0.627   *             310 *
* RV WK T11B      R1              0.103   *             650 *
*************************************************************

Boundary Conditions
*****************************************************************************************************
* River           Reach           Profile          *            Upstream                 Downstream    *
*****************************************************************************************************
* RV WK T11       R2              100-YR FP        *                                Known WS = 2503.35 *
*****************************************************************************************************


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

GEOMETRY DATA

Geometry Title: RV Wash K Trib 11
Geometry File : j:\2006\10-0606.1\Design Notebook\Drainage Design\HEC-RAS\RV_Wash_K_Trib_11.g01

Reach Connection Table
*****************************************************************************
* River           Reach           *  Upstream Boundary  * Downstream Boundary *
*****************************************************************************
* RV WK T11       R1              *                     *   J1                *
```

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* RV WK T11        R2                *   J1                *                    *
* RV WK T11B       R1                *                     *   J1               *
*****************************************************************************

JUNCTION INFORMATION

Name: J1
Description: Convergence of K 11 Wash and K 11B Wash
Energy computation Method

    Length across Junction              Tributary
     River           Reach               River           Reach        Length   Angle
RV WK T11       R1                to RV WK T11       R2                459.05
RV WK T11B      R1                to RV WK T11       R2                485.89

CROSS SECTION


RIVER: RV WK T11
REACH: R1                  RS: 1.511

INPUT
Description: Q=330 cfs (B10W6A, 24 hr) This flowrate was modified from the
             hydrology report to include flow from Basin B11W6. The additional
             flow from this basin was proportioned to RV WK T11 and RV WK T11B
             based on their tributary areas.
Station Elevation Data    num=      54
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
 9883.21 2598.55 9898.38 2598.24 9908.87 2598.86 9911.41 2598.93 9919.46 2598.42
 9929.03 2597.89 9929.55 2597.65 9930.35 2597.35 9930.94 2597.18 9931.75 2596.13
 9947.84 2597.13 9948.48 2597.16 9948.96  2597.2 9951.35 2597.36 9957.41  2597.4
 9973.71 2597.55 9976.55 2597.51  9976.7 2597.51 9981.67 2597.48 9987.27 2597.44
 9987.71 2597.33 9993.26 2595.95   10000 2595.3710001.92 2595.2110004.67 2595.04
10005.59 2594.9910005.61 2594.9910005.62 2594.9810008.05 2595.02 10016.1 2595.11
10018.11 2595.1410020.73 2595.2210022.84 2595.7310024.89 2596.2510030.012597.447
10030.92 2597.6610033.76 2597.9610034.19 2598.0210035.91  2598.210036.28 2598.22
10037.77  2598.210039.38  2598.310041.95 2598.3110044.04 2598.4210060.48 2598.76
10060.95 2598.7810062.62 2598.8610066.02 2598.5710077.04 2599.2110080.07 2600.23
10080.54 2600.55 10083.4 2600.3710087.28 2599.4210089.53 2599.58

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*************************************************
 9883.21    .04510004.67    .04510008.05    .045

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9987.2710030.01           668.39  668.39  668.39             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
 9883.21 9973.71 2597.55       F

CROSS SECTION


RIVER: RV WK T11
REACH: R1                  RS: 1.384

INPUT
Description:
Station Elevation Data    num=     133
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
 9769.49 2582.53 9770.07 2582.55 9770.65 2582.56 9775.55 2582.06 9780.73 2581.74
 9782.82  2581.6 9789.36  2581.1 9794.93 2580.66 9809.89 2579.45  9809.9 2579.45
 9810.92 2579.35  9826.1 2577.89 9830.36 2578.25 9832.04 2578.33 9834.98 2578.51
  9837.4 2578.64 9840.02 2578.81 9840.11 2578.81 9840.44  2578.8 9840.85 2578.79
 9841.31 2578.79 9844.14 2578.74 9846.23 2578.71 9847.93 2578.71 9867.66 2578.56
 9871.03 2578.55 9874.42 2578.56 9880.02 2578.56 9885.08 2578.54 9918.92 2580.03
 9925.72 2580.32 9929.31 2580.34 9930.24 2580.34 9930.57 2580.35  9931.2 2580.37
 9946.76 2580.38 9948.09 2580.38 9958.45 2580.41 9982.18 2580.46 9985.86 2580.13
 9990.542579.679 9994.942579.255 9999.98 2578.77   10000 2578.7710000.79 2578.69
10001.41 2578.6310003.06 2578.78 10008.52579.25810011.48 2579.5210017.13 2579.67
10018.84 2579.6910024.94 2579.6610026.67 2579.6410026.73 2579.6410037.83 2579.58
10047.05 2579.5610053.32 2579.5410057.87 2579.52 10061.3 2579.5110062.23 2579.51
10064.53 2579.5210067.08 2579.5410067.93 2579.54 10087.4 2579.89 10090.3 2579.97
10099.71 2579.8410101.57 2579.8110109.75 2579.7710109.97 2579.77 10115.7 2579.88
10119.48 2579.8310147.87 2579.4610148.93 2579.4510149.87 2579.4410150.67 2579.44
10153.68 2579.4110155.14 2579.3910158.89 2579.0410159.79 2578.9610162.15 2578.75
10167.68 2578.27 10172.3 2578.7810172.61 2578.8110174.17 2578.9810177.02 2579.26
10181.09 2579.6610181.15 2579.6610181.17 2579.6610190.57 2579.8110196.44 2579.76
 10197.6 2579.7710199.25 2579.7910201.47 2579.7210201.68 2579.7210206.44 2579.96
10210.41 2580.1510212.88 2580.2610223.57 2582.11 10223.6 2582.1110224.63 2582.24
10225.25 2582.3210225.33 2582.3310230.65 2582.3710230.78 2582.38   10232 2582.38
10233.24 2582.3510236.18 2582.6810241.08 2583.2310241.49 2583.2410241.57 2583.24
10243.64 2583.47 10246.3 2583.6210250.75 2583.87 10251.3 2583.9310255.61 2584.17
10256.41 2584.27 10260.6 2584.5210262.11 2584.6110264.59 2584.7110268.41 2584.86
10272.08 2585.0110275.59 2585.1510287.34 2586.3610289.12 2586.5510291.41 2586.72
10294.76  2586.910297.53 2587.03 10300.2 2587.1710302.28 2587.2810303.88 2587.36
 10310.6 2587.69 10311.4 2587.7310311.87 2587.69

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*************************************************
 9769.49    .045 9994.94    .045 10008.5    .045

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9990.5410018.84           382.75  382.75  382.75             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
```

```
 9769.49 9982.18 2580.46       F

CROSS SECTION


RIVER: RV WK T11
REACH: R1                  RS: 1.312

INPUT
Description:
Station Elevation Data    num=      90
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9698.42 2570.64 9699.12 2570.66 9702.81 2570.77 9707.15  2570.9 9710.12 2571.01
 9712.32 2571.07 9712.83 2571.09 9714.36 2571.12 9717.06 2571.21 9718.46 2571.25
 9723.97 2571.44 9724.62 2571.45 9730.19 2571.65 9730.72 2571.64 9735.51 2571.57
 9739.34 2571.51  9743.9 2571.33 9744.42 2571.31 9748.61 2571.22 9750.97 2571.12
 9751.23 2571.11 9754.83    2571 9758.09 2570.87 9760.78 2570.77 9764.94  2570.6
 9766.75 2570.54 9771.79 2570.32 9778.06 2570.03 9778.14 2570.03 9778.69 2569.97
  9779.5 2569.89 9786.53 2569.17 9787.88 2569.03 9789.91 2568.83 9795.46 2569.55
 9800.46 2570.11 9800.75 2570.11 9801.19  2570.1  9814.9 2570.07 9818.09 2570.07
 9825.96 2570.06 9826.88 2570.05 9831.35 2570.07 9836.92 2570.06 9840.35 2570.08
 9847.92 2570.07 9849.18 2570.08 9853.81 2570.07 9854.15 2570.09 9860.38 2570.15
 9868.94 2570.27 9872.83 2570.33 9874.42 2570.35 9877.69 2570.41 9885.81 2570.53
 9887.23 2570.56 9890.96 2570.61 9907.75 2569.44 9912.93  2569.1 9915.54 2569.15
 9921.98 2569.35 9927.91 2569.58 9929.74 2569.65 9930.38 2569.67  9930.7 2569.69
 9930.73 2569.69 9932.47 2569.72 9932.63 2569.72 9932.78 2569.72 9933.21 2569.73
 9933.45 2569.73 9933.82 2569.72 9934.33  2569.7 9934.68  2569.7 9965.11 2569.68
 9969.29 2569.63 9979.37 2569.55  9980.3 2569.55 9984.81 2569.51   10000 2569.35
10003.19 2569.3210005.53 2569.2910007.09 2569.2910015.56 2569.2510018.522569.513
10027.04 2570.2710047.95 2571.9310051.11 2571.7510055.04 2571.5310057.11 2571.42

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9698.42    .045 9984.81    .04510018.52    .045

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9984.8110018.52            568.2   568.2   568.2             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
 9698.42 9890.96 2570.61       F

CROSS SECTION


RIVER: RV WK T11
REACH: R1                  RS: 1.204

INPUT
Description:
Station Elevation Data    num=     112
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9796.26  2558.9 9796.87 2558.95 9805.71 2558.39 9807.26 2558.27  9807.7 2558.25
 9818.64 2557.13 9820.56 2557.11 9822.49 2557.09 9823.26 2556.79 9823.67 2556.67
 9831.06 2556.31 9835.03 2555.95 9836.93 2555.81 9840.23 2555.54 9842.78 2555.37
 9845.39 2555.27 9848.54 2555.05 9850.51 2554.97 9854.39 2554.66  9855.6 2554.61
 9856.08 2554.57 9856.39 2554.56 9857.07 2554.53 9860.25 2554.09 9860.93 2554.06
 9861.36 2554.04 9877.48 2552.06 9877.52 2552.05 9877.67 2552.04 9885.66 2552.47
 9889.03 2552.64 9897.95  2553.1 9902.07 2553.12  9907.9 2553.15  9909.9  2553.2
 9914.78 2553.32 9918.57 2553.41 9920.86 2553.46 9921.66 2553.66 9946.05  2555.6
 9948.99  2555.9 9953.55 2555.75  9956.8 2555.67 9968.83  2555.3 9983.25 2554.95
 9983.96 2554.93 9984.87 2554.91  9987.42554.299 9992.74 2553.01 9995.52 2552.44
 9998.85 2552.74 9999.25 2552.76   10000 2552.8210001.23  2552.910004.93 2553.28
10008.88  2553.610014.78 2554.2810015.06 2554.3210015.12 2554.3210015.28  2554.3
10020.16 2553.8610023.14 2553.58 10024.2  2553.510028.81 2554.0510036.27  2554.9
10036.43 2554.8910045.75 2554.8410047.93 2554.84 10056.8 2554.7910059.82 2554.76
10065.54 2554.7810067.25 2554.5910073.87 2553.9410074.43    255410077.03 2554.26
10081.89 2554.7210084.34 2554.9510085.22 2555.04 10085.6 2555.0710097.91 2554.97
10102.64 2554.9410110.73 2554.88 10120.8 2555.0110122.82    255510123.44 2555.01
 10124.9 2555.0110125.84 2555.0210126.48 2555.0210126.94 2555.0210127.31 2555.02
 10127.6 2555.0210129.31 2555.0410136.53 2554.8510179.28 2553.7710209.98 2553.81
10213.51 2553.8210220.06 2553.3910220.89 2553.3410221.48 2553.3910229.95 2553.93
10233.26  2553.5 10238.2 2552.8810238.48 2552.9610240.46 2553.4610247.29  2555.2
10248.73 2555.5110254.21 2555.6210254.83 2555.6310256.35 2555.64   10257 2555.65
10289.69 2558.3710301.83 2559.44

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9796.26    .045 9992.74    .04510001.23    .045

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9987.410015.06            475.29  475.29  475.29             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
 10085.610301.83 2555.07       F
Left Levee      Station= 9948.99      Elevation=  2555.9

CROSS SECTION


RIVER: RV WK T11
REACH: R1                  RS: 1.114

INPUT
Description:
Station Elevation Data    num=      65
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
```

```
*******************************************************************************
 9948.46 2545.15 9967.08 2543.87 9974.75 2543.32 9975.29 2543.29 9977.94 2543.07
 9985.61 2542.61 9989.65 2541.81  9991.6 2541.43 9995.44 2540.77 9999.95 2540.04
 9999.97 2540.04   10000 2540.0410001.96 2540.3110004.61 2540.6610013.78 2541.43
10053.33 2543.3310054.53 2543.3910061.45 2543.72 10061.8 2543.7510072.82 2543.53
10073.77 2543.5110089.33 2543.2710095.39 2543.18 10100.8 2543.0910100.83  2543.1
10105.35 2542.4310108.79 2541.9710111.24 2542.2610119.69 2543.1810121.33 2543.23
10123.49 2543.3110127.81 2543.1110140.73 2542.6810174.41 2543.5610178.13 2543.71
10189.22 2541.85 10190.5 2541.6410191.61 2541.78 10201.4 2543.0310213.59 2542.76
10214.44 2542.7410232.32 2542.95 10250.2 2543.2210250.95 2543.1910251.93 2543.14
10253.25 2543.0710257.45 2542.8710262.28 2542.5810263.21 2542.59 10265.8 2542.62
10273.24 2543.5710275.77 2543.8410281.81 2544.4110286.29 2544.8910290.38 2545.28
 10296.8    254610297.89 2546.1110307.14 2547.1410307.31 2547.1610308.54  2547.3
10315.91 2547.76 10317.3 2547.8310322.24 2548.0610327.23 2548.3410335.49 2548.69

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9948.46    .045 9995.44    .04510004.61    .045

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        9991.610013.78           578.73  578.73  578.73             .1       .3

CROSS SECTION


RIVER: RV WK T11
REACH: R1                 RS: 1.004

INPUT
Description:
Station Elevation Data    num=      66
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9856.75 2532.29 9857.07 2532.26 9858.03 2532.18 9864.93 2531.75 9868.99 2531.55
 9870.11  2531.5 9875.41 2531.22  9878.4 2531.08 9878.49 2531.08 9882.92 2530.85
 9883.06 2530.85 9917.42 2528.48 9919.06 2528.45 9920.95 2528.41 9922.52 2528.38
 9923.17 2528.38 9925.81  2528.4 9928.71 2528.42 9929.42 2528.42 9931.96 2528.31
 9933.61 2528.23 9935.22 2528.28  9940.6  2528.2 9955.05 2527.99 9961.09 2527.69
 9962.04 2527.67  9970.7 2527.46 9985.49 2526.59  9991.62526.203 9997.82 2525.81
 9999.97 2525.88   10000 2525.88 10008.62526.18210015.07 2526.4110032.52 2527.14
10038.11 2527.4210045.63 2527.8110050.92 2528.0210053.46 2528.1110064.51 2528.55
10068.84  2528.7 10077.9 2529.0910080.17 2528.9210081.08 2528.8510083.12 2528.66
 10084.6 2528.5210085.33 2528.4510085.51 2528.4510131.44 2529.0610135.26 2529.13
10137.22 2529.1710139.76 2528.8910142.52  2528.610148.16    252810155.87 2527.17
10158.64  2526.910168.82 2527.8910179.55 2528.8210185.86 2529.2210231.98  2531.6
10233.53 2531.69 10234.1 2531.7410237.13 2532.0310238.96 2532.2110241.58 2532.33
 10243.5 2532.41

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9856.75    .045  9991.6    .045 10008.6    .045

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        9970.710038.11           577.95  577.95  577.95             .1       .3
Right Levee     Station= 10077.9      Elevation= 2529.09

CROSS SECTION


RIVER: RV WK T11
REACH: R1                 RS: 0.895

INPUT
Description: Q=650 cfs (CB11W6, 24 hr)  This cross section is identical to RM
             0.103 on RV WK T11B.  The left bank water surface is plotted on
             the work map from RM 0.895 on RV WK T11, and the right bank water
             surface is plotted from RM 0.103 on RV WK T11B. This was done due
             to the elevation difference between the perched thalweg of RV WK
             T11B and the thalweg of RV WK T11.
Station Elevation Data    num=     147
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9863.57 2516.98 9881.24 2516.61 9882.63 2516.46 9883.25 2516.39 9898.15  2514.8
 9907.16  2513.7 9913.51 2512.99 9915.34 2512.79 9922.16 2511.89 9927.08 2511.38
 9928.93  2511.2 9930.33 2511.48 9930.86 2511.57 9930.98 2511.59 9938.13 2512.77
 9944.33 2512.52 9946.91 2512.42 9949.01 2512.25 9956.33 2511.74 9957.15 2511.83
 9957.84 2511.89 9957.87 2511.89 9960.09 2512.11 9963.85 2512.41 9970.32 2512.93
 9970.54 2512.94 9970.78 2512.96 9971.27 2512.98 9981.09 2513.13 9984.08 2512.81
 9984.652512.733 9986.23 2512.52 9990.66 2511.99 9995.29 2511.29 9997.57 2511.28
 9999.78 2511.27   10000 2511.2610000.02 2511.2610007.03 2511.2310014.68 2511.16
10016.36 2511.4110019.592511.99310022.51 2512.5210023.34 2512.6710023.56  2512.7
10023.62 2512.7110024.84 2512.4910031.38 2511.4510031.78 2511.3910032.95 2511.05
10034.16 2511.2910035.63 2511.4610040.98 2512.2710042.49 2512.4110050.97 2513.33
10051.14 2513.3510051.36 2513.3810051.74 2513.41 10059.7 2513.4910060.79  2513.5
10061.35  2513.510068.78 2513.4410073.23 2513.4110098.15 2513.8410145.31  2514.8
10153.31 2514.8310155.58 2514.8310170.06 2514.8410171.61 2514.6810175.09 2514.34
10179.41 2513.9210180.58  2513.810189.43 2514.2710196.68 2514.5710198.19 2514.64
10199.79  2514.7 10207.1 2513.9710209.68 2513.69 10218.7 2515.0110224.35 2515.81
10259.63  2515.510273.47 2515.3810277.29 2515.3610279.75 2515.3410280.45 2515.34
10280.72 2515.3310281.24 2515.32 10281.4 2515.3210281.56 2515.3210282.85 2515.31
10283.53  2515.310283.59  2515.310283.64  2515.310283.76  2515.310283.93  2515.3
10284.16  2515.3 10284.5  2515.310315.64 2515.5910318.12 2515.5310318.85 2515.51
10321.61 2515.43 10326.9 2515.2710334.61 2515.0410335.59 2514.9410336.38 2514.86
10344.68 2514.0110354.46 2515.8410355.04 2515.9510355.42 2515.9510361.94 2516.06
10363.39 2516.0710367.08  2516.110368.77 2516.12 10370.1 2516.0310389.75 2515.39
10391.47 2515.3810394.43 2515.3610397.53 2515.3410417.95 2514.8810418.66 2514.88
10421.46 2514.87 10437.3 2514.95 10437.5 2514.9610437.54 2514.96   10438  2514.9
10438.66 2514.81 10438.9 2514.7810442.73 2514.2710447.84 2513.6310452.77 2515.15
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10453.64 2515.3910456.36 2516.1210456.96 2516.0810457.25 2516.0610457.86 2516.12
10460.55 2515.8610462.28 2516.0110477.77 2516.4210478.89 2516.5510482.97 2516.86
10484.29 2517.0310488.17 2517.3310488.92 2517.3910491.99 2517.6510495.51 2517.95
 10521.4 2519.2410531.71 2520.06

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
 9863.57    .045 9990.66    .04510019.59    .045

Bank Sta: Left   Right    Coeff Contr.   Expan.
       9984.6510023.62             .1       .3

CROSS SECTION


RIVER: RV WK T11
REACH: R2                 RS: 0.808

INPUT
Description: Q=650 cfs (CB11W6, 24 hr)
Station Elevation Data    num=      83
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
**********************************************************************************
 9837.12 2506.09 9840.21 2505.93 9845.83 2505.65 9847.27 2505.66 9848.64 2505.61
 9854.72 2505.71 9855.86 2505.73 9855.94 2505.72 9862.18 2505.79 9862.73 2505.75
 9867.83 2505.78 9868.43 2505.77 9873.37 2505.63 9877.63 2505.52 9881.17  2504.9
 9884.37 2504.57 9887.21 2504.29 9889.74 2504.04 9923.21 2502.68 9924.01 2502.63
 9927.66 2502.43  9927.7 2502.43 9928.16 2502.39 9928.46 2502.38 9928.75 2502.37
 9930.18 2502.29 9930.39 2502.26 9979.92 2502.27 9981.64 2502.26 9987.91 2502.24
   10000 2500.8610000.08 2500.8510002.93 2500.5310006.53 2501.0710014.79 2502.28
10018.72  2502.210025.15 2502.0810030.55 2501.6610030.64 2501.6510037.69 2501.23
 10039.7  2501.610042.55 2502.1110046.77 2502.8810048.87 2503.1810049.01 2503.27
10049.07 2503.2710053.84 2503.3710135.16 2503.2710140.85 2503.2710146.07 2503.27
10147.42 2503.2510148.27 2503.1510154.56 2502.4410160.91 2502.0310162.98 2502.14
10163.74 2502.1810169.55 2502.4410171.21 2502.5210179.32  2502.210181.69 2501.83
10182.83 2501.6610183.89 2501.4310187.85 2501.6910189.98 2501.8210201.45 2502.54
10220.56 2504.9210221.31 2505.0110221.32 2505.02 10221.4 2505.0310221.43 2505.03
10221.54 2505.0410221.55 2505.0410221.57 2505.0410221.59 2505.0410221.63 2505.04
10221.69 2505.0410224.96 2505.0710227.72 2505.1610241.16  2505.410255.91 2506.02
10257.41 2506.0610258.03 2506.0910258.42 2506.11

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
 9837.12    .045 9987.91    .04510042.55    .045

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9987.9110042.55              .01     .01     .01              .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
10053.8410258.42 2503.37       F

CROSS SECTION


RIVER: RV WK T11
REACH: R2                 RS: 0.807

INPUT
Description: Q=650 cfs (CB11W6, 24 hr) This cross section is added to the model
             to provide the minimum number of cross sections required for a
             junction reach. This cross section is not plotted on the work
             maps, nor is used in plotting the base flood elevations.
Station Elevation Data    num=      83
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
**********************************************************************************
 9837.12 2506.09 9840.21 2505.93 9845.83 2505.65 9847.27 2505.66 9848.64 2505.61
 9854.72 2505.71 9855.86 2505.73 9855.94 2505.72 9862.18 2505.79 9862.73 2505.75
 9867.83 2505.78 9868.43 2505.77 9873.37 2505.63 9877.63 2505.52 9881.17  2504.9
 9884.37 2504.57 9887.21 2504.29 9889.74 2504.04 9923.21 2502.68 9924.01 2502.63
 9927.66 2502.43  9927.7 2502.43 9928.16 2502.39 9928.46 2502.38 9928.75 2502.37
 9930.18 2502.29 9930.39 2502.26 9979.92 2502.27 9981.64 2502.26 9987.91 2502.24
   10000 2500.8610000.08 2500.8510002.93 2500.5310006.53 2501.0710014.79 2502.28
10018.72  2502.210025.15 2502.0810030.55 2501.6610030.64 2501.6510037.69 2501.23
 10039.7  2501.610042.55 2502.1110046.77 2502.8810048.87 2503.1810049.01 2503.27
10049.07 2503.2710053.84 2503.3710135.16 2503.2710140.85 2503.2710146.07 2503.27
10147.42 2503.2510148.27 2503.1510154.56 2502.4410160.91 2502.0310162.98 2502.14
10163.74 2502.1810169.55 2502.4410171.21 2502.5210179.32  2502.210181.69 2501.83
10182.83 2501.6610183.89 2501.4310187.85 2501.6910189.98 2501.8210201.45 2502.54
10220.56 2504.9210221.31 2505.0110221.32 2505.02 10221.4 2505.0310221.43 2505.03
10221.54 2505.0410221.55 2505.0410221.57 2505.0410221.59 2505.0410221.63 2505.04
10221.69 2505.0410224.96 2505.0710227.72 2505.1610241.16  2505.410255.91 2506.02
10257.41 2506.0610258.03 2506.0910258.42 2506.11

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
 9837.12    .045 9987.91    .04510042.55    .045

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9987.9110042.55                0       0       0              .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
10053.8410258.42 2503.37       F

CROSS SECTION


RIVER: RV WK T11B
```

```
REACH: R1                    RS: 0.627

INPUT
Description: Q=310 cfs (B10W6B, 24 hr) This flowrate was modified from the
             hydrology report to include flow from Basin B11W6. The additional
             flow from this basin was proportioned to RV WK T11 and RV WK T11B
             based on their tributary areas.
Station Elevation Data    num=      35
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9920.74 2590.02 9920.94 2589.99 9923.35 2589.71 9927.08 2589.06 9945.71 2586.07
 9947.58 2585.94 9947.97 2585.92 9948.27 2585.91 9954.62 2585.17  9967.2 2583.93
 9972.19 2583.66 9972.69 2583.74  9974.1 2583.96 9975.03 2584.11 9976.01 2583.68
 9981.78 2581.95 9985.28 2582.89 9989.82 2583.81 9990.52 2583.95  9991.5 2583.94
   10000 2583.8310001.77 2583.8110003.22 2583.6210004.64 2583.4310006.61 2582.99
10014.71  2583.210020.95 2584.0810029.17 2585.2410029.39 2585.4210031.08 2585.46
10049.42 2585.8610068.48  2590.910070.79 2591.4910078.14 2591.5710082.95 2591.65

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9920.74    .045 9976.01     .0410014.71    .045

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9975.0310020.95            421.3   421.3   421.3             .1       .3

CROSS SECTION


RIVER: RV WK T11B
REACH: R1                    RS: 0.547

INPUT
Description:
Station Elevation Data    num=      58
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9884.19 2578.96 9886.28 2578.92 9886.93 2578.87 9891.12 2578.77 9891.44 2578.75
 9892.39 2578.73 9893.07 2578.69  9894.1 2578.64 9896.82 2578.34 9898.22 2578.27
  9901.5 2577.89 9903.69 2577.66 9906.06 2577.31 9908.98 2576.99 9910.94 2576.79
 9914.93 2576.43 9917.02 2576.21  9919.6 2575.98 9931.25 2574.04 9936.93 2573.24
 9937.95 2573.12 9941.24 2572.73 9947.76 2571.98  9947.9    2572 9948.77 2572.12
 9960.49 2573.77 9962.46 2574.04 9976.06 2573.38 9986.86 2573.01 9991.64 2572.68
   10000 2571.9610000.18 2571.9410007.62 2572.8310009.012572.99610022.75 2574.64
10026.71 2574.9710028.47 2575.1210042.66 2575.6610046.74  2575.610068.62 2575.16
 10068.7 2575.1710072.87 2575.1110073.43  2575.110077.76 2575.0210085.72 2574.95
10088.13 2574.7210092.31 2574.3110102.77 2573.0410102.92 2573.0210103.08    2573
10104.67 2573.1110116.91 2574.0210120.99 2574.2810129.65 2575.2210135.81 2575.83
 10158.1 2577.5110175.84 2578.84 10177.8 2578.77

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9884.19    .045 9986.86     .0410009.01    .045

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9986.8610009.01            497.12  497.12  497.12             .1       .3
Right Levee     Station=10042.66      Elevation= 2575.66

CROSS SECTION


RIVER: RV WK T11B
REACH: R1                    RS: 0.452

INPUT
Description:
Station Elevation Data    num=      71
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9820.75 2570.03 9841.31 2569.15 9842.99 2569.03 9844.39 2568.92 9845.57 2568.84
 9852.04 2568.26 9854.12    2568 9858.57 2567.49 9858.67 2567.48 9862.25 2567.06
 9865.11 2566.93 9868.06 2566.62 9871.06  2566.5 9871.63 2566.48 9873.95 2566.24
 9878.17 2566.07 9879.83 2565.91 9884.71 2565.74 9885.71 2565.65 9891.26  2565.5
  9891.6 2565.47 9894.48 2565.41 9897.35 2565.18 9897.62 2565.16 9902.99 2564.74
 9907.57 2564.33 9908.66 2564.28 9912.91 2563.86 9915.97 2563.69 9921.87 2562.96
 9925.99 2562.65  9928.8 2562.38 9937.59 2561.35 9942.12 2560.74  9953.6 2559.88
 9958.31  2559.5 9967.47 2560.59 9969.12 2560.81 9976.91 2560.96 9989.87 2561.22
 9993.112560.857 9995.76 2560.56 9999.99 2560.12   10000 2560.12 10000.3  2560.1
10007.83 2560.88 10013.5 2561.3510013.51 2561.3510032.29 2561.0810042.11 2560.93
10061.04  2560.610061.57 2560.5410061.67 2560.5410066.75 2560.5110069.41 2560.48
10072.05 2560.5710084.45 2561.2510086.22 2561.29 10086.7 2561.3110092.28 2561.64
10094.26 2561.7510102.86 2562.2310108.42 2562.5210113.37 2562.7910122.63 2563.26
10125.53 2563.4210126.95 2563.4710136.11 2563.9410138.54 2564.0910154.08 2564.98
10155.24 2565.05

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9820.75    .045 9993.11     .0410007.83    .045

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9989.87 10013.5            688.79  688.79  688.79             .1       .3

CROSS SECTION


RIVER: RV WK T11B
REACH: R1                    RS: 0.322
```

```
INPUT
Description:
Station Elevation Data    num=      97
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9626.95 2548.69 9628.16 2548.59 9630.61 2548.37    9636 2547.83 9657.72 2545.83
  9659.7 2545.76 9660.88 2545.73 9670.67 2545.12 9678.61 2544.64 9689.99 2543.95
 9692.71 2543.79 9694.76 2543.65 9696.94 2543.45 9706.07 2542.61 9716.94 2544.06
  9721.5 2544.66 9742.54 2545.68 9765.72  2546.7 9799.78 2545.03 9816.14 2544.18
 9841.31 2544.15 9855.94 2544.13  9860.3 2543.37  9863.9 2542.79 9865.64 2543.21
 9866.47 2543.38 9873.28 2544.83 9878.68  2544.7 9885.95 2544.52    9886 2544.52
 9888.76 2544.48 9890.31 2544.42 9896.16 2543.91  9901.2  2543.5  9903.7 2543.56
 9907.27 2543.71  9908.4 2543.75  9927.5 2543.99  9940.7 2544.08 9943.21 2544.15
 9946.31 2544.25 9949.35 2544.26 9951.36 2544.27  9952.8 2544.28 9953.89 2544.29
 9957.61 2544.04  9972.7 2544.09 9982.49 2543.86 9987.61 2543.74 9991.98 2542.83
 9998.62 2541.41   10000 2541.5110000.03 2541.5110010.68  2542.310010.98 2542.32
10013.54 2542.5110016.08  2542.7   10019 2542.5910023.11 2542.3110023.83 2542.27
10024.65 2542.2210025.85 2542.1510027.35 2542.0910032.88 2542.67 10035.3 2542.92
10035.62 2542.9810036.21  2543.110040.68 2544.0810042.08 2544.29 10042.7 2544.38
10044.12 2544.4910046.27 2544.5310064.35 2546.5310065.33 2546.5710070.94 2547.18
10071.75 2547.2210076.28 2547.3810076.92 2547.4110081.63 2547.57 10082.1 2547.59
10086.97 2547.7610087.28 2547.7710092.31 2547.9510092.45 2547.95 10092.5 2547.95
10096.78 2548.1110097.72 2548.1210097.76 2548.1210097.78 2548.1210103.06 2548.29
10103.23 2548.28 10108.4 2548.4410113.35 2548.5910115.04 2548.65 10118.1 2548.65
10122.63 2548.6710123.94 2548.68

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
 9626.95    .045 9991.98     .04 10035.3    .045

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9991.98 10035.3           616.78  616.78  616.78             .1       .3
Left Levee      Station= 9873.28      Elevation= 2544.83

CROSS SECTION


RIVER: RV WK T11B
REACH: R1                 RS: 0.205

INPUT
Description:
Station Elevation Data    num=      91
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9789.47 2532.41 9798.06 2531.85 9813.99 2530.72 9815.91  2530.6 9837.97 2529.11
 9839.62 2529.02 9845.49 2528.72 9859.97 2528.04 9864.48 2528.08 9870.57 2528.21
 9909.16 2528.82 9912.21  2528.8 9916.37 2528.78 9917.34 2528.78 9920.51 2528.61
 9929.96    2528 9941.62 2529.07 9943.17  2529.2 9973.81 2528.77 9980.45 2528.68
 9989.58 2528.55 9995.97  2528.1 9999.97 2527.77   10000 2527.7710000.17 2527.75
10004.72 2527.9310016.59 2528.4410018.17 2528.4610023.17  2528.510026.72 2528.52
 10035.2 2528.8310035.48 2528.8510036.48 2528.9410037.27 2529.0110041.55 2529.44
10044.87 2529.7410047.61 2529.9510074.31 2530.6410075.17 2530.6510080.19 2530.76
10082.56 2530.82 10089.8 2530.3110094.39 2529.9310097.75 2529.6510106.58 2530.64
10107.84 2530.83 10108.8 2530.9110114.08 2531.3910117.94 2531.5610121.02 2531.55
10123.42 2531.5310153.76 2532.4810159.38 2532.7210162.89 2532.8710164.84 2532.68
10189.92 2531.21 10197.5 2530.1310199.39  2530.210199.64 2530.2110203.15  2530.1
10206.36    253010209.15 2529.7810209.43 2529.7710211.54 2529.6210214.78 2529.52
10220.71 2529.3210221.45 2529.2810223.57  2529.210230.67 2528.9510235.97 2528.76
10240.45  2528.610246.84 2528.3510248.31  2528.310248.65 2528.2910250.09 2528.25
10251.01 2528.2210254.14 2528.17 10258.8 2527.5710260.78 2527.2610262.19 2527.05
10270.71 2528.0410271.87 2528.2110271.96 2528.2210304.47 2531.6510321.03 2533.47
10324.24 2533.7110324.86 2533.7510327.01 2533.8510331.44 2534.1210332.12 2534.14
10337.15 2534.35

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
 9789.47    .045 9989.58     .0410016.59    .045

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9989.5810016.59           538.96  538.96  538.96             .1       .3
Right Levee     Station=10162.89      Elevation= 2532.87

CROSS SECTION


RIVER: RV WK T11B
REACH: R1                 RS: 0.103

INPUT
Description: Q=650 cfs (CB11W6, 24 hr)  This cross section is identical to RM
             0.895 on RV WK T11.  The left bank water surface is plotted on the
             work map from RM 0.895 on RV WK T11, and the right bank water
             surface is plotted from RM 0.103 on RV WK T11B. This was done due
             to the elevation difference between the perched thalweg of RV WK
             T11B and the thalweg of RV WK T11.
Station Elevation Data    num=     147
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
  9653.1 2516.98 9670.77 2516.61 9672.16 2516.46 9672.78 2516.39 9687.68  2514.8
 9696.69  2513.7 9703.04 2512.99 9704.87 2512.79 9711.69 2511.89 9716.61 2511.38
 9718.46  2511.2 9719.86 2511.48 9720.39 2511.57 9720.51 2511.59 9727.66 2512.77
 9733.86 2512.52 9736.44 2512.42 9738.54 2512.25 9745.86 2511.74 9746.68 2511.83
 9747.37 2511.89  9747.4 2511.89 9749.62 2512.11 9753.38 2512.41 9759.85 2512.93
 9760.07 2512.94 9760.31 2512.96  9760.8 2512.98 9770.62 2513.13 9773.61 2512.81
 9775.76 2512.52 9780.19 2511.99 9784.82 2511.29  9787.1 2511.28 9789.31 2511.27
 9796.56 2511.23 9804.21 2511.16 9805.89 2511.41 9812.04 2512.52 9812.87 2512.67
 9813.09  2512.7 9813.15 2512.71 9814.37 2512.49 9820.91 2511.45 9821.31 2511.39
```

```
 9822.48 2511.05 9823.69 2511.29 9825.16 2511.46 9830.51 2512.27 9832.02 2512.41
  9840.5 2513.33 9840.67 2513.35 9840.89 2513.38 9841.27 2513.41 9849.23 2513.49
 9850.32  2513.5 9850.88  2513.5 9858.31 2513.44 9862.76 2513.41 9887.68 2513.84
 9934.84  2514.8 9942.84 2514.83 9945.11 2514.83 9959.59 2514.84 9961.14 2514.68
 9964.62 2514.34 9968.94 2513.92 9970.11  2513.8 9978.96 2514.27 9986.21 2514.57
 9987.72 2514.64 9989.32  2514.7 9996.63 2513.97 9999.21 2513.69 9999.98  2513.8
   10000  2513.8 10001.22513.97610005.892514.66610008.23 2515.0110013.88 2515.81
10049.16  2515.5   10063 2515.3810066.82 2515.3610069.28 2515.3410069.98 2515.34
10070.25 2515.3310070.77 2515.3210070.93 2515.3210071.09 2515.3210072.38 2515.31
10073.06  2515.310073.12  2515.310073.17  2515.310073.29  2515.310073.46  2515.3
10073.69  2515.310074.03  2515.310105.17 2515.5910107.65 2515.5310108.38 2515.51
10111.14 2515.4310116.43 2515.2710124.14 2515.0410125.12 2514.9410125.91 2514.86
10134.21 2514.0110143.99 2515.8410144.57 2515.9510144.95 2515.9510151.47 2516.06
10152.92 2516.0710156.61  2516.1 10158.3 2516.1210159.63 2516.0310179.28 2515.39
   10181 2515.3810183.96 2515.3610187.06 2515.3410207.48 2514.8810208.19 2514.88
10210.99 2514.8710226.83 2514.9510227.03 2514.9610227.07 2514.9610227.53  2514.9
10228.18 2514.8110228.43 2514.7810232.26 2514.2710237.37 2513.63 10242.3 2515.15
10243.17 2515.3910245.89 2516.1210246.49 2516.0810246.78 2516.0610247.39 2516.12
10250.08 2515.8610251.81 2516.01 10267.3 2516.4210268.42 2516.55 10272.5 2516.86
10273.82 2517.03 10277.7 2517.3310278.45 2517.3910281.52 2517.6510285.04 2517.95
10310.93 2519.2410321.24 2520.06

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
  9653.1    .045 9996.63     .04 10001.2    .045

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9961.1410005.89                 0       0       0             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
  9653.1 9959.59 2514.84       F
Right Levee     Station=10013.88      Elevation= 2515.81

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

SUMMARY OF MANNING'S N VALUES

River:RV WK T11
*****************************************************************
*     Reach       *   River Sta.   *   n1     *   n2     *   n3     *
*****************************************************************
*R1              *    1.511       *     .045*     .045*     .045*
*R1              *    1.384       *     .045*     .045*     .045*
*R1              *    1.312       *     .045*     .045*     .045*
*R1              *    1.204       *     .045*     .045*     .045*
*R1              *    1.114       *     .045*     .045*     .045*
*R1              *    1.004       *     .045*     .045*     .045*
*R1              *    0.895       *     .045*     .045*     .045*
*R2              *    0.808       *     .045*     .045*     .045*
*R2              *    0.807       *     .045*     .045*     .045*
*****************************************************************

River:RV WK T11B
*****************************************************************
*     Reach       *   River Sta.   *   n1     *   n2     *   n3     *
*****************************************************************
*R1              *    0.627       *     .045*      .04*     .045*
*R1              *    0.547       *     .045*      .04*     .045*
*R1              *    0.452       *     .045*      .04*     .045*
*R1              *    0.322       *     .045*      .04*     .045*
*R1              *    0.205       *     .045*      .04*     .045*
*R1              *    0.103       *     .045*      .04*     .045*
*****************************************************************

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

SUMMARY OF REACH LENGTHS

River: RV WK T11
*****************************************************************
*     Reach       *   River Sta.   *  Left    * Channel *  Right  *
*****************************************************************
*R1              *    1.511       *  668.39*   668.39*   668.39*
*R1              *    1.384       *  382.75*   382.75*   382.75*
*R1              *    1.312       *   568.2*    568.2*    568.2*
*R1              *    1.204       *  475.29*   475.29*   475.29*
*R1              *    1.114       *  578.73*   578.73*   578.73*
*R1              *    1.004       *  577.95*   577.95*   577.95*
*R1              *    0.895       *       *         *         *
*R2              *    0.808       *     .01*      .01*      .01*
*R2              *    0.807       *       0*        0*        0*
*****************************************************************

River: RV WK T11B
*****************************************************************
*     Reach       *   River Sta.   *  Left    * Channel *  Right  *
*****************************************************************
*R1              *    0.627       *   421.3*    421.3*    421.3*
*R1              *    0.547       *  497.12*   497.12*   497.12*
*R1              *    0.452       *  688.79*   688.79*   688.79*
*R1              *    0.322       *  616.78*   616.78*   616.78*
*R1              *    0.205       *  538.96*   538.96*   538.96*
*R1              *    0.103       *       0*        0*        0*
*****************************************************************

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

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: RV WK T11
```

Reach	River Sta.	Contr.	Expan.
R1	1.511	.1	.3
R1	1.384	.1	.3
R1	1.312	.1	.3
R1	1.204	.1	.3
R1	1.114	.1	.3
R1	1.004	.1	.3
R1	0.895	.1	.3
R2	0.808	.1	.3
R2	0.807	.1	.3

River: RV WK T11B

Reach	River Sta.	Contr.	Expan.
R1	0.627	.1	.3
R1	0.547	.1	.3
R1	0.452	.1	.3
R1	0.322	.1	.3
R1	0.205	.1	.3
R1	0.103	.1	.3

****

ERRORS WARNINGS AND NOTES
Errors Warnings and Notes for Plan : RV Wash K

River: RV WK Reach: R1 RS: 8.742 Profile: 100-YR FP
Warning:The energy loss was 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: RV WK Reach: R1 RS: 8.583 Profile: 100-YR FP
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
River: RV WK Reach: R1 RS: 8.444 Profile: 100-YR FP
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
River: RV WK Reach: R1 RS: 8.311 Profile: 100-YR FP
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
River: RV WK Reach: R1 RS: 8.107 Profile: 100-YR FP
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:Divided flow computed for this cross-section.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
River: RV WK Reach: R1 RS: 7.952 Profile: 100-YR FP
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
River: RV WK Reach: R1 RS: 7.747 Profile: 100-YR FP
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:Divided flow computed for this cross-section.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
River: RV WK Reach: R1 RS: 7.671 Profile: 100-YR FP
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:Divided flow computed for this cross-section.
Warning:A flow split was encountered. The program first calculated the momentum of both channels below the junction. An

energy balance was performed across the junction from the stream with the highest momentum downstream to the section upstream.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
River: RV WK Reach: R2 RS: 7.603 Profile: 100-YR FP
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
River: RV WK Reach: R2 RS: 7.541 Profile: 100-YR FP
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.
Note: Manning's n values were composited to a single value in the main channel.
River: RV WK Reach: R2 RS: 7.504 Profile: 100-YR FP
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:Divided flow computed for this cross-section.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
River: RV WK Reach: R2 RS: 7.463 Profile: 100-YR FP
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:Divided flow computed for this cross-section.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
River: RV WK Reach: R2 RS: 7.413 Profile: 100-YR FP
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:Divided flow computed for this cross-section.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
River: RV WK Reach: R2 RS: 7.363 Profile: 100-YR FP
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:Divided flow computed for this cross-section.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
River: RV WK Reach: R2 RS: 7.246 Profile: 100-YR FP
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:Divided flow computed for this cross-section.
Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
River: RV WK Reach: R3 RS: 7.131 Profile: 100-YR FP
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.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
River: RV WK Reach: R3 RS: 7.061 Profile: 100-YR FP
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.
River: RV WK Reach: R3 RS: 6.957 Profile: 100-YR FP
Warning:The energy loss was 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: RV WK Reach: R3 RS: 6.818 Profile: 100-YR FP
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:Divided flow computed for this cross-section.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
River: RV WK Reach: R4 RS: 6.686 Profile: 100-YR FP
Warning:The conveyance ratio (upstream 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: RV WK Reach: R4 RS: 6.597 Profile: 100-YR FP
Warning:The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
River: RV WK Reach: R4 RS: 6.484 Profile: 100-YR FP
Warning:Divided flow computed for this cross-section.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
River: RV WK Reach: R4 RS: 6.416 Profile: 100-YR FP
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
River: RV WK S4 Reach: R1 RS: 0.497 Profile: 100-YR FP
Warning:The conveyance ratio (upstream 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: RV WK S4 Reach: R1 RS: 0.496 Profile: 100-YR FP
Warning:The energy loss was 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: RV WK S4 Reach: R1 RS: 0.483 Profile: 100-YR FP
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
River: RV WK S4 Reach: R1 RS: 0.482 Profile: 100-YR FP
Warning:The energy loss was 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: RV WK S4 Reach: R1 RS: 0.456 Profile: 100-YR FP
Warning:Divided flow computed for this cross-section.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
River: RV WK S4 Reach: R1 RS: 0.455 Profile: 100-YR FP
Warning:The energy loss was 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: RV WK S4 Reach: R1 RS: 0.443 Profile: 100-YR FP
Warning:The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
River: RV WK S4 Reach: R2 RS: 0.339 Profile: 100-YR FP
Warning:The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
River: RV WK S4 Reach: R2 RS: 0.285 Profile: 100-YR FP
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
River: RV WK S4 Reach: R2 RS: 0.240 Profile: 100-YR FP
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:Divided flow computed for this cross-section.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
River: RV WK S4 Reach: R2 RS: 0.194 Profile: 100-YR FP
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:Divided flow computed for this cross-section.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

River: RV WK S4 Reach: R2 RS: 0.108 Profile: 100-YR FP
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:Divided flow computed for this cross-section.
Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
River: RV WK T13 Reach: R1 RS: 1.960 Profile: 100-YR FP
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
River: RV WK T13 Reach: R1 RS: 1.894 Profile: 100-YR FP
Warning:The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
River: RV WK T13 Reach: R1 RS: 1.810 Profile: 100-YR FP
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:Divided flow computed for this cross-section.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
River: RV WK T13 Reach: R1 RS: 1.700 Profile: 100-YR FP
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:Divided flow computed for this cross-section.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
River: RV WK T13 Reach: R1 RS: 1.577 Profile: 100-YR FP
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:Divided flow computed for this cross-section.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
River: RV WK T13 Reach: R1 RS: 1.494 Profile: 100-YR FP
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:Divided flow computed for this cross-section.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
River: RV WK T13 Reach: R1 RS: 1.415 Profile: 100-YR FP
Warning:Divided flow computed for this cross-section.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:There is no flow in the channel. Check that the channel stations are correctly coded. To force flow into the channel, a levee or ineffective flow may have to be added or the Manning's n of the overbank could be increased.
River: RV WK T13 Reach: R1 RS: 1.276 Profile: 100-YR FP
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:Divided flow computed for this cross-section.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
River: RV WK T13 Reach: R1 RS: 1.239 Profile: 100-YR FP
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
River: RV WK T13 Reach: R1 RS: 1.164 Profile: 100-YR FP
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth

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        for the water surface and continued on with the calculations.
    Warning:Divided flow computed for this cross-section.
    Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
        the need for additional cross sections.
    Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
        water surface came back below critical depth.  This indicates that there is not a valid subcritical answer.  The
        program defaulted to critical depth.
River: RV WK T13  Reach: R1     RS: 1.026     Profile: 100-YR FP
    Warning:Divided flow computed for this cross-section.
    Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
        This may indicate the need for additional cross sections.
    Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
        the need for additional cross sections.
River: RV WK T13  Reach: R1     RS: 0.901     Profile: 100-YR FP
    Warning:The energy equation could not be balanced within the specified number of iterations.  The program used critical depth
        for the water surface and continued on with the calculations.
    Warning:The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for additional cross sections.
    Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
        the need for additional cross sections.
    Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
        water surface came back below critical depth.  This indicates that there is not a valid subcritical answer.  The
        program defaulted to critical depth.
River: RV WK T13  Reach: R2     RS: 0.864     Profile: 100-YR FP
    Warning:A flow split was encountered.  The program first calculated the momentum of both channels below the junction.  An
        energy balance was performed across the junction from the stream with the highest momentum downstream to the section
        upstream.
    Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
        the need for additional cross sections.
    Note:   Manning's n values were composited to a single value in the main channel.
River: RV WK T13  Reach: R3     RS: 0.808     Profile: 100-YR FP
    Warning:The energy equation could not be balanced within the specified number of iterations.  The program used critical depth
        for the water surface and continued on with the calculations.
    Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
        the need for additional cross sections.
    Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
        water surface came back below critical depth.  This indicates that there is not a valid subcritical answer.  The
        program defaulted to critical depth.
River: RV WK T13  Reach: R3     RS: 0.752     Profile: 100-YR FP
    Warning:Divided flow computed for this cross-section.
    Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
        This may indicate the need for additional cross sections.
    Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
        the need for additional cross sections.
River: RV WK T13  Reach: R3     RS: 0.630     Profile: 100-YR FP
    Warning:Divided flow computed for this cross-section.
    Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
        This may indicate the need for additional cross sections.
    Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
        the need for additional cross sections.
River: RV WK T13  Reach: R3     RS: 0.537     Profile: 100-YR FP
    Warning:The energy equation could not be balanced within the specified number of iterations.  The program used critical depth
        for the water surface and continued on with the calculations.
    Warning:Divided flow computed for this cross-section.
    Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
        This may indicate the need for additional cross sections.
    Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
        the need for additional cross sections.
    Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
        water surface came back below critical depth.  This indicates that there is not a valid subcritical answer.  The
        program defaulted to critical depth.
River: RV WK T13  Reach: R3     RS: 0.419     Profile: 100-YR FP
    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.
    Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, water surface was
        used.
River: RV WK T13  Reach: R3     RS: 0.339     Profile: 100-YR FP
    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.
River: RV WK T13  Reach: R3     RS: 0.231     Profile: 100-YR FP
    Warning:The energy loss was 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: RV WK T13  Reach: R3     RS: 0.111     Profile: 100-YR FP
    Warning:The energy equation could not be balanced within the specified number of iterations.  The program used critical depth
        for the water surface and continued on with the calculations.
    Warning:Divided flow computed for this cross-section.
    Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
        the need for additional cross sections.
    Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
        water surface came back below critical depth.  This indicates that there is not a valid subcritical answer.  The
        program defaulted to critical depth.
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E.3.9 HEC-RAS Output

RV Wash K Trib 11A

HEC-RAS Plan: HEC-RAS Plan: Wash K 11A River: RV WK T11A Reach: R1 Profile: 100-YR FP

River	Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
RV WK T11A	R1	0.542	100-YR FP	180.00	2498.56	2500.11	2500.11	2500.56	0.024327	5.45	34.99	42.70	0.94
RV WK T11A	R1	0.444	100-YR FP	180.00	2485.47	2487.63	2487.47	2488.03	0.020150	5.02	35.84	31.97	0.84
RV WK T11A	R1	0.349	100-YR FP	180.00	2473.27	2475.58	2475.55	2476.01	0.028908	5.28	34.10	37.91	0.97
RV WK T11A	R1	0.219	100-YR FP	180.00	2458.35	2459.99	2459.99	2460.29	0.018444	4.88	46.23	126.67	0.82
RV WK T11A	R1	0.182	100-YR FP	180.00	2453.72	2456.90	2455.91	2456.97	0.001894	2.28	101.55	111.51	0.29

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

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

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

PROJECT DATA
Project Title: RV Wash K Trib 11A
Project File : RV_Wash_K_Trib_11A.prj
Run Date and Time: 11/1/2007 10:09:49 PM

Project in English units

Project Description:
Rio Verde ADMP, Project FCDMC 2001C056, RV Wash K Trib 11A. Phase 3 RAS model
started in June 2005, preliminary model completed in August 2005.

RAS model
is prepared by Dibble Engineering. Field reconnaissance per report dated April
18, 2005.

For the study washes, the starting water surface elevation is on
RV Wash K Trib 11A, and is taken from the starting water surface elevation as
provided by the Flood Control District of Maricopa County.

RV Wash K Trib
11A Floodplain Delineation
From a point approximately 2,400 feet north and 750
feet west of the intersection of 144th Street and Lone Mountain Road (River
Mile 0.138) to a point approximately 3,000 feet north and 2,300 feet west of
the intersection of 144th Street and Lone Mountain Road (River Mile 0.498), a
distance of 0.360 river miles.

The Cross-section data were generated by
INROADS. The mapped hydraulic base line represents the 10,000-station point of
the HEC-RAS model.

Topographic mapping is supplied by the Flood Control
District of Maricopa County.

Discharge data is from the Rio Verde ADMP HEC-1
model. The original models are from the Flood Control District of Maricopa
County, prepared for the Rio Verde South Floodplain Delineation, the Rio Verde
South Extension Floodplain Delineation, the Rio Verde North Floodplain
Delineation, and the Rio Verde North Extension Floodplain Delineation. The
HEC-1 models were modified for the Rio Verde ADMP. The final HEC-1 files were
received in February 2004 and FCDMC approved the hydrology model.

Hydrologic
concentration points are noted in cross-section descriptions using the
corresponding HEC-1 ID's. The flow rates have been rounded to the nearest 10
cubic feet per second (cfs). Flow rates obtained from HEC-1 are applied at the
downstream end of the relevant sub-basin and stepped upstream at cross-sections
to meet the HEC-1 flow from the upstream sub-basin.

River Mile (RM)
stationing is based upon the estimated tie in point with downstream receiving
waters or the start of two-dimensional flow models. This point represents RM
0.000. The assumed starting WS Elevation is based upon normal depth in the
study wash.

Horizontal and Vertical Coordinate Basis for this project is as
follows:
          Horizontal--Arizona State Plane, Central Region, NAD
1983
          Vertical--NAVD 1988

RAS model river naming corresponds to project
river naming as follows:
          RV WK T11A = RV Wash K Trib 11A

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

PLAN DATA

Plan Title: RV Wash K Trib 11A
Plan File : j:\2006\10-0606.1\Design Notebook\Drainage Design\HEC-RAS\RV_Wash_K_Trib_11A.p01

           Geometry Title: RV Wash K Trib 11A
           Geometry File : j:\2006\10-0606.1\Design Notebook\Drainage Design\HEC-RAS\RV_Wash_K_Trib_11A.g01

           Flow Title    : RV Wash K Trib 11A
           Flow File     : j:\2006\10-0606.1\Design Notebook\Drainage Design\HEC-RAS\RV_Wash_K_Trib_11A.f01

Plan Summary Information:
Number of:  Cross Sections =    5    Multiple Openings  =    0
```

```
            Culverts        =    0    Inline Structures  =    0
            Bridges         =    0    Lateral Structures =    0

 Computational Information
     Water surface calculation tolerance  =  0.01
     Critical depth calculation tolerance =  0.01
     Maximum number of iterations         =  20
     Maximum difference tolerance         =  0.3
     Flow tolerance factor                =  0.001

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

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

 River = RV WK T11A       Reach = R1
 RS      Profile           Method  Value1  Value2
 0.542   PF 2                   1 9985.7710016.36
 0.444   PF 2                   1 9979.9510012.37
 0.349   PF 2                   1 9988.32 10025.3
 0.219   PF 2                   1 9987.4910012.04
 0.182   PF 2                   1 9985.8110016.16
 0.060   PF 2                   1 9983.3710017.96
 0.058   PF 2                   1 9990.4210031.46
 0.055   PF 2                   1 9994.2110043.38


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

 FLOW DATA

 Flow Title: RV Wash K Trib 11A
 Flow File : j:\2006\10-0606.1\Design Notebook\Drainage Design\HEC-RAS\RV_Wash_K_Trib_11A.f01

 Flow Data (cfs)
 ************************************************************
 * River           Reach           RS      *       100-YR FP *
 * RV WK T11A      R1              0.542   *             180 *
 ************************************************************

 Boundary Conditions
 ***********************************************************************************************************
 * River           Reach           Profile          *            Upstream                Downstream    *
 ***********************************************************************************************************
 * RV WK T11A      R1              100-YR FP        *                                  Known WS = 2456.9 *
 ***********************************************************************************************************

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

 GEOMETRY DATA

 Geometry Title: RV Wash K Trib 11A
 Geometry File : j:\2006\10-0606.1\Design Notebook\Drainage Design\HEC-RAS\RV_Wash_K_Trib_11A.g01

 CROSS SECTION


 RIVER: RV WK T11A
 REACH: R1                 RS: 0.542

 INPUT
 Description: Q=180 cfs (B14W6, 24 hr)
 Station Elevation Data    num=      51
      Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
 ******************************************************************************
  9892.03 2506.68 9892.88 2506.65 9920.28 2505.64 9922.51 2505.38 9925.46 2505.05
  9927.71 2504.79 9929.53 2504.61 9930.72 2504.41 9935.69 2503.98 9935.75 2503.97
  9935.99 2503.95 9937.73  2503.8 9942.13 2503.31 9944.93 2503.01 9947.53 2502.76
  9952.07 2502.31 9956.01 2501.92 9959.46 2501.59 9961.94 2501.35 9962.47 2501.31
  9983.07 2499.78 9985.77 2499.58 9991.44 2499.29 9991.77 2499.27 9994.31 2499.14
   9997.1 2498.92   10000 2498.7210002.49 2498.5610011.52 2499.1610012.59 2499.22
 10013.31 2499.2610016.02 2499.5510016.362499.58610046.03 2502.7110059.15 2504.07
 10066.06  2504.510069.99 2504.7410082.91 2505.6310083.94 2505.7310085.08 2505.84
 10086.33 2505.9710087.73  2506.110089.35 2506.1610091.28 2506.1910093.58 2506.22
 10094.41 2506.2410124.88 2508.0110127.34 2508.1110128.81 2508.1710131.82 2508.28
 10131.93 2508.28

 Manning's n Values        num=       3
      Sta   n Val     Sta   n Val     Sta   n Val
 ***********************************************
  9892.03    .045 9994.31    .04510011.52    .045

 Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        9985.7710016.36           519.49  519.49  519.49            .1       .3

 CROSS SECTION


 RIVER: RV WK T11A
 REACH: R1                 RS: 0.444

 INPUT
 Description:
 Station Elevation Data    num=      25
```

```
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9902.59 2493.05 9907.03 2493.52 9911.34 2493.18 9914.89 2492.95 9949.31 2490.69
 9953.93 2490.38 9955.47 2490.28 9974.15 2488.28  9977.12487.968 9992.93 2486.29
 9993.85 2486.19 9993.88 2486.19 9996.29 2485.99   10000 2485.6710002.39 2485.47
10004.05 2485.83 10006.52486.37110013.66 2487.9510051.53 2492.4510061.33 2493.63
10061.48 2493.6210064.42 2493.6610081.05 2493.8210084.56 2493.8410095.66 2494.11

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9902.59    .045 9992.93    .045 10006.5    .045

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        9977.110013.66           501.58  501.58  501.58             .1       .3

CROSS SECTION


RIVER: RV WK T11A
REACH: R1                 RS: 0.349

INPUT
Description:
Station Elevation Data    num=      84
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9842.85 2486.05  9844.8 2486.05 9844.92 2486.04 9851.45 2485.67 9856.21  2485.4
 9856.28  2485.4 9857.77 2485.27 9861.73 2485.06 9863.79 2484.88 9867.18 2484.69
 9869.71 2484.47 9872.64 2484.29 9899.87 2480.86 9899.94 2480.86 9900.85 2480.78
 9901.84  2480.7 9902.82 2480.61 9903.65 2480.54 9903.79 2480.54 9907.64 2480.34
 9908.73 2480.29 9912.49 2480.11 9913.69 2480.05 9917.36 2479.87 9918.65 2479.81
 9919.93 2479.78 9921.35 2479.73 9922.69 2479.67 9925.01 2479.55 9926.65 2479.48
 9930.05 2479.31 9930.63 2479.29 9931.97 2479.24 9935.08 2479.09 9937.32 2479.01
 9937.58    2479 9940.36  2478.9 9942.75 2478.84 9944.91 2478.79 9948.12 2478.67
  9948.2 2478.67 9949.29 2478.63 9950.92 2478.55 9952.24 2478.48 9954.84 2478.29
 9955.62 2478.25 9959.38 2477.98 9959.83 2477.95 9960.59 2477.89 9961.77 2477.81
  9964.8 2477.57 9965.96 2477.49 9969.76 2477.17 9970.11 2477.15 9971.25 2477.08
  9980.2 2476.54 9984.76 2475.98 9988.32 2475.54 9995.68 2474.02 9998.79 2473.37
  9999.3 2473.27   10000 2473.3810003.912474.04310009.02 2474.9110009.46 2474.98
10009.61 2474.9810012.46  2474.9 10025.32475.54510045.28 2476.5510048.46 2476.78
10052.67  2476.9   10058 2477.1210058.13 2477.0810067.81 2477.65 10071.2 2477.82
 10083.3 2478.4310097.93 2479.1710101.82 2479.3610101.89 2479.3810140.77 2481.85
10147.64 2482.2810150.52 2482.4610153.74 2482.6410182.79 2484.33

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9842.85    .045 9995.68    .04510003.91    .045

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9988.32 10025.3           687.81  687.81  687.81             .1       .3

CROSS SECTION


RIVER: RV WK T11A
REACH: R1                 RS: 0.219

INPUT
Description:
Station Elevation Data    num=     106
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9806.84 2464.37 9808.54 2464.32 9810.28 2464.27 9817.65 2464.05 9821.52 2463.94
  9827.9 2463.73 9832.66 2463.59 9842.84 2463.25 9843.71 2463.22    9846 2463.13
  9846.1 2463.14 9849.79 2462.97 9851.99 2462.87 9860.92 2462.35 9868.51 2461.93
 9878.55 2461.32 9890.69 2460.36 9905.19 2459.32 9906.93 2458.73 9907.04  2458.7
 9911.93  2457.3  9916.8 2458.44 9921.47 2459.54  9921.7 2459.54    9922 2459.54
 9924.83 2459.47 9946.17 2459.48 9953.23 2459.52    9962 2459.52 9969.32 2459.58
 9973.74 2459.59 9977.82 2459.54 9979.95 2459.55 9980.19 2459.54 9987.49 2459.44
 9995.662458.771 9999.45 2458.46 9999.99 2458.42   10000 2458.4210000.72 2458.35
10004.75 2458.7710008.37 2459.09 10009.5 2459.1910011.06 2459.3510011.45 2459.38
10012.042459.44410013.29 2459.5810014.41 2459.6210015.09 2459.6610015.46 2459.69
10017.77 2459.8110022.76    246010023.59 2460.0310027.74 2460.2310029.06  2460.3
10031.67 2460.4510038.96 2460.8510043.23 2461.1110044.33 2461.1710047.29 2461.36
10051.03  2461.610067.72 2463.44 10069.8 2463.6110071.54 2463.7410072.41 2463.81
10072.99 2463.8610074.21 2463.9610074.44 2463.9710075.44 2464.06 10079.8  2464.3
10079.95 2464.3210084.68 2464.5710085.17  2464.610089.34 2464.8310089.75 2464.85
10090.55  2464.910095.81 2465.1710095.89 2465.1810099.32 2465.36 10099.5 2465.38
10101.22 2465.45 10101.3 2465.4510106.26  2465.810111.11 2466.1510114.88 2466.38
10115.18  2466.4   10116 2466.4310120.93  2466.610125.46 2466.7510129.64 2466.89
10133.53 2467.0310137.43 2467.2310141.26 2467.4510145.29 2467.7410151.93 2468.42
10156.07 2468.6610160.19 2468.8410160.86  2468.910164.89 2469.0110168.97 2469.01
10169.37 2469.0410175.47 2469.1710175.87 2469.1510178.18 2469.1810179.08 2469.19
10180.03 2469.21

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9806.84    .045 9995.66    .04510004.75    .045

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9987.4910012.04           193.65  193.65  193.65             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
 9806.84    9950    2462       F

CROSS SECTION
```

```
RIVER: RV WK T11A
REACH: R1                    RS: 0.182

INPUT
Description:
Station Elevation Data    num=      77
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9924.67 2461.38 9926.11 2461.44 9932.88 2461.74 9933.12 2461.75 9934.38 2461.81
 9945.81 2461.46 9951.32 2461.36 9966.57 2458.88 9983.872456.205 9989.33 2455.36
 9991.25 2455.53 9995.942454.528 9999.02 2453.87   10000 2453.7310000.01 2453.73
10000.04 2453.72 10004.3  2454.3   10006 2454.5310018.34  2456.210018.44  2456.2
10023.07  2456.210036.23 2456.2210037.48 2456.22 10038.6 2456.2210041.32 2456.24
10041.68 2456.2410044.56 2456.2610047.31 2456.2710049.83 2456.2810050.54 2456.28
10052.94 2456.2910056.52 2456.34 10058.6 2456.3510060.46 2456.3610064.28 2456.42
10065.89 2456.4510067.39 2456.4910068.79 2456.5310070.16 2456.5710073.81 2456.61
10075.03 2456.6410078.83 2456.6910078.84 2456.6910079.88 2456.7410083.85 2456.78
10084.68 2456.8110088.83 2456.8510090.25 2456.8610090.29 2456.8610093.43 2457.07
10093.96 2457.09 10098.7  2457.410099.07 2457.4110100.36 2457.4910100.67  2457.5
10104.14 2457.7910104.42  2457.810104.68  2457.810109.43 2458.2110109.67 2458.21
10109.81 2458.2210122.39 2459.39 10122.4  2459.410122.44  2459.410122.48  2459.4
10122.51  2459.4 10123.5 2459.4110124.12 2459.4110127.34 2459.3910154.84 2459.26
10156.31 2459.3810158.41 2459.5210165.89 2460.0710166.64 2460.1210178.25  2460.9
 10180.7 2461.0810185.31 2461.35

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9924.67    .045 9995.94    .045   10006    .045

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9983.8710018.34                 0       0       0              .1       .3

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

SUMMARY OF MANNING'S N VALUES

River:RV WK T11A
*****************************************************************
*     Reach       *   River Sta.   *   n1    *   n2    *   n3    *
*****************************************************************
*R1              *    0.542       *    .045*    .045*    .045*
*R1              *    0.444       *    .045*    .045*    .045*
*R1              *    0.349       *    .045*    .045*    .045*
*R1              *    0.219       *    .045*    .045*    .045*
*R1              *    0.182       *    .045*    .045*    .045*
*****************************************************************

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

SUMMARY OF REACH LENGTHS

River: RV WK T11A
*****************************************************************
*     Reach       *   River Sta.   *  Left   * Channel *  Right  *
*****************************************************************
*R1              *    0.542       *  519.49*  519.49*  519.49*
*R1              *    0.444       *  501.58*  501.58*  501.58*
*R1              *    0.349       *  687.81*  687.81*  687.81*
*R1              *    0.219       *  193.65*  193.65*  193.65*
*R1              *    0.182       *       0*       0*       0*
*****************************************************************

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

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: RV WK T11A

*****************************************************
*     Reach       *   River Sta.   * Contr.  * Expan.  *
*****************************************************
*R1              *    0.542   *       .1*       .3*
*R1              *    0.444   *       .1*       .3*
*R1              *    0.349   *       .1*       .3*
*R1              *    0.219   *       .1*       .3*
*R1              *    0.182   *       .1*       .3*
*****************************************************

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

ERRORS WARNINGS AND NOTES
Errors Warnings and Notes for Plan : Wash K 11A

River: RV WK T11A  Reach: R1     RS: 0.542     Profile: 100-YR FP
     Warning:The energy equation could not be balanced within the specified number of iterations.  The program used critical depth
             for the water surface and continued on with the calculations.
     Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
             the need for additional cross sections.
     Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
             water surface came back below critical depth.  This indicates that there is not a valid subcritical answer.  The
             program defaulted to critical depth.
River: RV WK T11A  Reach: R1     RS: 0.444     Profile: 100-YR FP
     Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
             the need for additional cross sections.
     Warning:The composite Mannings n value for the channel was larger than the largest entered n value or smaller than the
             smallest entered n value.
     Note:   Manning's n values were composited to a single value in the main channel.
River: RV WK T11A  Reach: R1     RS: 0.349     Profile: 100-YR FP
     Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
```

```
        the need for additional cross sections.
    Warning:The composite Mannings n value for the channel was larger than the largest entered n value or smaller than the
        smallest entered n value.
    Note:   Manning's n values were composited to a single value in the main channel.
River: RV WK T11A  Reach: R1     RS: 0.219     Profile: 100-YR FP
    Warning:The energy equation could not be balanced within the specified number of iterations.  The program used critical depth
        for the water surface and continued on with the calculations.
    Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
        This may indicate the need for additional cross sections.
    Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
        the need for additional cross sections.
    Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
        water surface came back below critical depth.  This indicates that there is not a valid subcritical answer.  The
        program defaulted to critical depth.
    Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, water surface was
        used.
```

E.3.10 HEC-RAS Output

RV Wash K Trib 12

HEC-RAS Plan: RV Wash KT12 River: RV WK T12 Reach: R1 Profile: 100-YR FP													
River	Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
RV WK T12	R1	1.218	100-YR FP	400.00	2593.37	2595.36	2595.36	2595.77	0.027425	5.97	84.64	135.39	0.93
RV WK T12	R1	1.120	100-YR FP	400.00	2581.08	2584.11	2584.11	2584.36	0.013267	4.89	107.80	103.24	0.67
RV WK T12	R1	1.035	100-YR FP	400.00	2570.98	2573.44	2573.44	2573.93	0.020216	6.31	81.72	99.32	0.93
RV WK T12	R1	0.902	100-YR FP	400.00	2553.41	2555.97	2555.97	2556.54	0.021181	6.67	73.29	72.49	0.94
RV WK T12	R1	0.781	100-YR FP	400.00	2537.46	2540.37	2540.37	2541.13	0.024118	6.99	57.21	37.89	1.00
RV WK T12	R1	0.688	100-YR FP	400.00	2525.06	2527.33	2527.33	2527.76	0.017121	6.00	89.46	99.49	0.82
RV WK T12	R1	0.565	100-YR FP	400.00	2509.92	2511.31	2511.31	2511.59	0.025491	4.83	98.40	170.63	0.97
RV WK T12	R1	0.453	100-YR FP	400.00	2492.58	2495.11	2495.11	2495.55	0.014764	6.25	89.58	100.94	0.79
RV WK T12	R1	0.324	100-YR FP	400.00	2476.46	2478.65	2477.80	2478.69	0.001598	1.88	240.49	172.46	0.26

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

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

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PROJECT DATA
Project Title: RV Wash K Trib 12
Project File : RV_Wash_K_Trib_12.prj
Run Date and Time: 11/1/2007 10:10:20 AM

Project in English units

Project Description:
Rio Verde ADMP, Project FCDMC 2001C056, RV Wash K Trib 12. Phase 3 RAS model started in June 2005, preliminary model completed in August 2005.

RAS model
is prepared by Dibble Engineering. Field reconnaissance per report dated April 18, 2005.

For the study washes, the starting water surface elevation is on
RV Wash K Trib 12, and is taken from the starting water surface elevation as provided by the Flood Control District of Maricopa County.

RV Wash K Trib 12
Floodplain Delineation
From a point approximately 2,000 feet south and 1,250
feet west of the intersection of 144th Street and Dove Valley Road (RM 0.324) to a point approximately 1,200 feet south and 100 feet west of the intersection of 136th Street and Dove Valley Road (River Mile 1.218), a distance of 0.894 river miles.

The Cross-section data were generated by INROADS. The mapped
hydraulic base line represents the 10,000-station point of the HEC-RAS model.

Topographic mapping is supplied by the Flood Control District of Maricopa County.

Discharge data is from the Rio Verde ADMP HEC-1 model. The original models are from the Flood Control District of Maricopa County, prepared for the Rio Verde South Floodplain Delineation, the Rio Verde South Extension Floodplain Delineation, the Rio Verde North Floodplain Delineation, and the Rio Verde North Extension Floodplain Delineation. The HEC-1 models were modified for the Rio Verde ADMP. The final HEC-1 files were received in February 2004 and FCDMC approved the hydrology model.

Hydrologic concentration points are
noted in cross-section descriptions using the corresponding HEC-1 ID's. The flow rates have been rounded to the nearest 10 cubic feet per second (cfs). Flow rates obtained from HEC-1 are applied at the downstream end of the relevant sub-basin and stepped upstream at cross-sections to meet the HEC-1 flow from the upstream sub-basin.

River Mile (RM) stationing is based upon
the estimated tie in point with downstream receiving waters or the start of two-dimensional flow models. This point represents RM 0.000. The assumed starting WS Elevation is based upon normal depth in the study wash.

Horizontal and Vertical Coordinate Basis for this project is as follows:

Horizontal--Arizona State Plane, Central Region, NAD 1983
Vertical--NAVD
1988

RAS model river naming corresponds to project river naming as follows:
RV WK T12 = RV Wash K Trib 12

****

PLAN DATA

Plan Title: RV Wash K Trib 12
Plan File : j:\2006\10-0606.1\Design Notebook\Drainage Design\HEC-RAS\RV_Wash_K_Trib_12.p01

Geometry Title: RV Wash K Trib 12
Geometry File : j:\2006\10-0606.1\Design Notebook\Drainage Design\HEC-RAS\RV_Wash_K_Trib_12.g01

Flow Title : RV Wash K Trib 12
Flow File : j:\2006\10-0606.1\Design Notebook\Drainage Design\HEC-RAS\RV_Wash_K_Trib_12.f01

Plan Summary Information:
Number of: Cross Sections = 9 Multiple Openings = 0

```
            Culverts        =    0    Inline Structures  =    0
            Bridges         =    0    Lateral Structures =    0

Computational Information
    Water surface calculation tolerance  =  0.01
    Critical depth calculation tolerance =  0.01
    Maximum number of iterations         =  20
    Maximum difference tolerance         =  0.3
    Flow tolerance factor                =  0.001

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

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

River = RV WK            Reach = R3
RS      Profile           Method  Value1  Value2
6.818   PF 2                   1 9973.07   10272

River = RV WK            Reach = R4
RS      Profile           Method  Value1  Value2
6.686   PF 2                   1 9914.7310162.99
6.597   PF 2                   1 9869.8210228.04
6.484   PF 2                   1 9793.3810144.79
6.416   PF 2                   1 9773.6410084.75
6.346   PF 2                   1 9873.6510017.36

River = RV WK            Reach = R5
RS      Profile           Method  Value1  Value2
6.209   PF 2                   1 9879.4710074.25
6.062   PF 2                   1 9928.1710134.56
5.976   PF 2                   1 9804.2310057.29
5.884   PF 2                   1 9955.3410071.82
5.683   PF 2                   1 9747.2510038.08
5.681   PF 2                   1 9747.35 10038.5
5.679   PF 2                   1 9748.7510033.18

River = RV WK T13        Reach = R3
RS      Profile           Method  Value1  Value2
0.111   PF 2                   1 9804.0810160.96

River = RV WK T12        Reach = R1
RS      Profile           Method  Value1  Value2
1.218   PF 2                   1 9980.4210011.65
1.120   PF 2                   1 9989.9510030.49
1.035   PF 2                   1 9979.9810012.41
0.902   PF 2                   1 9983.4710011.88
0.781   PF 2                   1 9979.2210017.12
0.688   PF 2                   1 9984.7510013.32
0.565   PF 2                   1 9972.2210025.08
0.453   PF 2                   1 9993.71 10015.3
0.324   PF 2                   1 9979.6510027.31
0.230   PF 2                   1 9989.6510022.69
0.170   PF 2                   1 9977.9310017.31
0.099   PF 2                   1 9961.0810019.35


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

FLOW DATA

Flow Title: RV Wash K Trib 12
Flow File : j:\2006\10-0606.1\Design Notebook\Drainage Design\HEC-RAS\RV_Wash_K_Trib_12.f01

Flow Data (cfs)
*************************************************************
* River           Reach           RS      *       100-YR FP *
* RV WK T12       R1              1.218   *             400 *
*************************************************************

Boundary Conditions
*****************************************************************************************************
* River           Reach           Profile          *            Upstream                Downstream    *
*****************************************************************************************************
* RV WK T12       R1              100-YR FP        *                                 Known WS = 2478.65 *
*****************************************************************************************************


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

GEOMETRY DATA

Geometry Title: RV Wash K Trib 12
Geometry File : j:\2006\10-0606.1\Design Notebook\Drainage Design\HEC-RAS\RV_Wash_K_Trib_12.g01

CROSS SECTION


RIVER: RV WK T12
REACH: R1                RS: 1.218

INPUT
Description: Q=400 cfs (CB12W6, 24 hr)
Station Elevation Data    num=     109
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
```

```
*******************************************************************************
 9819.06 2603.35 9825.31 2603.23 9828.66 2602.85 9831.38 2602.54 9832.03 2602.41
 9833.46 2602.19 9836.77 2601.53 9838.28 2601.29  9841.5 2600.66 9843.08 2600.41
 9845.93 2599.85 9854.96 2598.49  9855.3 2598.42 9859.09 2597.82  9861.5 2597.38
 9866.79 2596.57 9867.57 2596.43 9869.98 2596.08 9873.13 2595.16 9876.34 2594.49
 9876.82  2594.5 9882.48 2594.62  9886.4 2594.67 9892.08 2594.74 9894.36  2594.8
  9897.3 2594.85 9897.81 2594.86 9901.07 2594.94 9903.24 2594.96 9904.07 2595.23
 9904.25 2595.47 9907.97 2595.53 9923.88 2595.22 9924.55 2595.23 9925.03 2595.24
 9925.09 2595.24 9925.39 2595.24 9928.98 2595.09 9940.98 2594.06 9946.86 2594.75
 9948.87  2594.8 9951.36 2594.87 9954.51 2594.96 9958.63 2595.08 9958.81 2595.08
    9966 2594.08  9966.8 2593.96 9967.91 2593.82    9972 2594.11 9972.45 2594.16
 9973.93 2594.36 9977.05 2594.63 9979.55 2595.03 9979.67 2595.05 9980.42 2595.16
 9985.01 2594.58 9989.31 2593.87 9989.69 2593.87 9990.31 2593.87 9990.39 2593.87
 9994.25 2593.79   10000 2593.52 10001.6 2593.4410002.01 2593.4210002.35 2593.37
10003.252593.53210009.78 2594.7110011.41    259510011.65 2595.0510012.29 2594.95
10014.56 2594.87   10016 2595.0210017.15 2594.9310017.54 2594.9910020.72 2595.39
10021.44 2595.4210021.73 2595.4310025.16 2595.7910026.05 2595.7910027.32 2595.78
10030.68 2596.0610030.74 2596.0610032.36 2596.0610035.15 2596.4610036.93 2596.47
10038.43 2596.6610048.18  2596.310049.47 2596.3210051.05 2596.3510065.77 2598.19
 10067.4 2598.6410067.49 2598.6610067.63 2598.6710088.05 2600.5310091.42 2601.15
10101.63  2603.510104.03 2603.9710105.21  2604.210109.24 2604.73 10112.2 2605.12
10112.49 2604.8810113.53 2603.9710119.12 2606.5510122.79 2607.3110123.01 2607.35
10124.61 2607.5910129.19 2608.0510130.06 2608.1510132.64  2608.4

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9819.06     .05   10000    .04510003.25     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9980.4210011.65           514.31  514.31  514.31             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
 9819.06 9907.97 2595.53       F

CROSS SECTION


RIVER: RV WK T12
REACH: R1                 RS: 1.120

INPUT
Description:
Station Elevation Data    num=      90
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9839.56 2588.61 9841.91 2588.58 9841.98 2588.58  9842.2 2588.58 9842.35 2588.58
 9843.56 2588.55 9844.07 2588.54 9844.67 2588.52 9845.44  2588.5 9847.86 2588.44
 9849.59 2588.38  9850.6 2588.34 9854.71 2587.92 9872.72 2587.45 9876.76 2587.68
 9881.19 2588.04  9881.8 2588.03 9889.28 2587.83 9890.13 2587.77 9893.13 2587.57
 9894.61 2587.47 9895.51 2587.42 9898.58 2587.52 9899.18 2587.49    9902 2587.57
 9902.46 2587.58 9908.71 2587.38 9912.81 2587.43 9915.04 2587.45 9916.59 2587.43
 9920.06 2587.39 9921.43 2587.19 9924.81 2587.14 9938.72 2585.74 9941.66 2585.57
 9954.02 2584.61  9955.8 2584.48 9957.96 2584.24  9959.1  2584.2 9961.74 2583.86
 9962.38 2583.85 9963.24 2583.83 9963.44 2583.83 9963.66 2583.74 9967.35 2582.64
 9969.95 2582.02 9972.51  2581.4 9980.15 2583.35 9981.86 2583.76 9984.42 2583.76
  9985.2  2583.9 9989.95 2583.88 9990.26 2583.72 9995.76  2582.3   10000 2581.22
10000.54 2581.08 10002.1 2581.5110004.762582.27710010.332583.88210011.12 2584.11
10011.45 2584.0910021.84 2583.45 10033.6 2583.1110035.84 2582.7410037.87 2582.41
10040.62 2581.8610043.67 2582.4710048.12 2583.2410051.05 2583.38 10051.6  2583.4
 10052.9 2583.5110063.03 2584.1110067.61 2584.4310074.96 2585.2310075.99  2585.3
10077.22 2585.4510077.55 2585.4710078.71 2585.5310078.97 2585.4810082.69  2585.5
10087.08 2585.4710090.33 2585.4610092.85 2585.4410114.73 2586.1910117.83 2586.27
10124.52 2586.4810125.94 2586.5310132.41 2586.7410134.07 2586.7310136.35 2586.67

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9839.56     .05 9995.76    .04510004.76     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9989.9510010.33           447.26  447.26  447.26             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
10011.1210136.35 2584.11       F

CROSS SECTION


RIVER: RV WK T12
REACH: R1                 RS: 1.035

INPUT
Description:
Station Elevation Data    num=      67
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9810.34 2577.39 9815.07 2577.07 9816.73 2576.91 9821.38 2576.57 9822.04 2576.54
 9826.23 2576.36 9829.64  2576.2 9830.89 2576.15 9832.32 2575.91 9833.89 2575.78
 9856.07 2574.19  9858.3 2574.01 9865.59 2573.41  9866.4 2573.34 9870.85 2572.97
 9874.95 2572.49 9883.25 2571.35 9883.42 2571.38 9893.33 2573.18 9893.43 2573.15
 9894.86 2573.18 9895.98 2573.11 9913.97 2573.48 9919.47 2573.53 9928.92 2573.64
 9932.26 2573.67 9934.55 2573.69 9936.22 2573.71 9945.93 2573.74 9946.63 2573.76
 9947.01 2573.77 9947.71 2573.77  9949.3 2573.79 9949.42 2573.79 9951.71 2573.71
 9962.12 2573.39 9964.97 2573.31 9966.41 2573.27 9966.62 2573.27 9967.19 2573.26
 9979.13 2573.14 9979.98 2573.13 9980.79 2573.04 9981.05 2573.01 9981.14    2573
 9981.52 2572.96 9986.71 2572.37 9989.71    2572 9992.34  2571.7 9997.99    2571
 9998.04 2570.99 9998.16 2570.98 9999.99 2571.18   10000 2571.1810005.27 2571.76
10007.79  2572.410012.41 2573.0910015.75 2574.1510019.02 2575.1910019.03  2575.2
10019.06  2575.210019.08  2575.210020.85 2575.2910022.29 2575.1810053.56 2577.25
```

```
10058.95  2577.710068.07 2578.44

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
 9810.34     .05 9986.71    .04510007.79     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9979.9810012.41           702.68  702.68  702.68             .1       .3

CROSS SECTION


RIVER: RV WK T12
REACH: R1                 RS: 0.902

INPUT
Description:
Station Elevation Data    num=      81
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 9764.48 2562.74 9767.58 2562.78 9769.42 2562.57 9774.15 2562.03 9775.33  2561.9
 9777.53 2561.69 9779.21 2561.52  9782.2 2561.23 9795.99 2560.46 9797.58  2560.3
 9799.14 2560.15 9799.53 2560.11 9803.21 2559.72 9804.18 2559.67 9808.22 2559.24
 9809.22 2559.19 9813.58  2558.7 9814.24 2558.66 9818.95 2558.11 9819.26  2558.1
 9819.36 2558.09 9823.34  2557.6 9824.48 2557.45 9824.79  2557.4 9824.89  2557.4
 9830.43 2556.97 9830.93 2556.93 9831.73 2556.87 9837.25 2556.43 9839.02  2556.3
 9843.16 2555.98 9846.34 2555.73 9846.85 2555.69 9856.85 2554.58 9860.78 2554.18
 9869.56 2555.81  9871.6 2556.17  9915.1 2556.49 9928.64 2556.55 9930.04 2556.62
 9973.21 2555.93 9976.77 2555.54 9980.99  2555.5 9983.26 2555.45 9983.47 2555.47
 9984.96  2555.3 9991.972554.383 9999.41 2553.41   10000 2553.4910006.43  2554.4
10011.882555.47310012.83 2555.66 10013.3  2555.710014.36 2555.77 10016.5  2556.1
10018.07  2556.210021.82 2556.73 10023.9 2557.0310026.12 2557.1210027.78 2557.18
10028.75 2557.2810030.42 2557.4410032.29 2557.6310036.97 2558.0810037.36 2558.12
10038.62 2558.2410043.63  2558.610044.47 2558.6510045.72 2558.7310047.76 2558.87
10051.66 2559.12 10068.9 2560.2210072.27 2560.5610077.27 2560.8510079.66    2561
10080.04 2561.0110080.63 2561.0410081.69 2561.0810084.02 2561.1610092.83 2561.45
10101.94 2561.75

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
 9764.48     .05 9991.97    .04510006.43     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9983.4710011.88           639.72  639.72  639.72             .1       .3

CROSS SECTION


RIVER: RV WK T12
REACH: R1                 RS: 0.781

INPUT
Description:
Station Elevation Data    num=      75
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 9806.47 2546.15 9808.72 2546.11 9814.75 2545.96 9819.81 2545.85 9826.58 2545.69
 9835.15 2545.07 9839.94 2544.72 9844.93 2544.32 9856.21 2543.31 9857.74 2543.18
    9860 2542.97 9862.21 2543.03 9867.09  2543.2 9869.39 2543.29 9870.08 2543.28
 9871.67 2543.28 9872.74 2543.28 9873.61 2543.27 9873.66 2543.27 9874.29 2543.26
 9874.85 2543.25 9875.32 2543.25 9921.59 2543.72 9928.45 2544.14 9928.85 2544.14
  9931.1 2544.29 9931.26 2544.29 9931.56  2544.3 9931.82  2544.3    9932 2544.31
 9932.01 2544.31 9932.19 2544.31 9934.01 2544.36 9934.21 2544.35 9934.52 2544.34
 9934.99 2544.33 9935.88  2544.3 9938.05 2544.23 9938.36 2544.22 9951.91 2543.81
 9960.65 2543.55 9964.66 2542.82 9978.582540.475 9987.04 2539.05 9990.36 2538.71
    99952538.151 9997.66 2537.83 9999.99 2537.55   10000 2537.5510000.74 2537.46
10003.89 2538.05   100052538.24410009.04 2538.9510012.86 2539.6510017.79 2540.48
 10037.9 2540.8510045.97 2540.9910047.91 2541.0510049.35 2541.08 10050.2 2541.09
10050.37  2541.110050.51  2541.110051.99 2541.1410052.15 2541.1510052.39 2541.16
10052.83 2541.1810053.72 2541.2210056.46 2541.3310061.62 2541.5510076.75 2542.14
10076.81 2542.1310084.08 2542.3710090.32 2542.5810114.24 2543.3710140.09 2544.33

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
 9806.47     .05    9995    .045   10005     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9978.5810017.79           490.49  490.49  490.49             .1       .3

CROSS SECTION


RIVER: RV WK T12
REACH: R1                 RS: 0.688

INPUT
Description:
Station Elevation Data    num=     111
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
    9705  2531.7 9706.08 2531.76 9711.07 2531.11 9719.55    2530 9723.76 2529.45
 9737.75  2528.2 9739.15  2528.1  9740.8 2527.99 9742.06  2527.9 9745.78 2527.36
 9746.52  2527.3 9749.67 2526.84 9752.21 2526.65 9754.98 2526.49 9757.43 2526.51
  9760.3 2526.27 9762.47 2526.28 9765.62 2525.99 9768.44 2525.74 9770.24 2525.73
 9770.41 2525.73 9771.87 2525.59 9772.55 2525.53 9776.23 2525.13 9777.62    2525
  9777.8 2524.98 9783.08 2524.61  9785.9 2524.29 9785.93 2524.28 9786.67 2524.25
  9789.8 2524.28 9791.37 2524.19  9794.3 2524.23 9796.17 2524.08 9797.16  2524.1
```

```
  9798.8 2523.94  9800.6  2523.7 9802.32 2523.46 9808.04 2523.07 9808.29 2523.05
 9812.73 2522.84 9815.14 2522.77 9815.62 2522.75 9816.13 2522.74 9821.64 2523.37
 9824.81  2523.6 9825.02 2523.62 9827.68 2523.91 9828.42 2523.98 9828.72 2524.02
 9829.16 2524.07 9833.06  2524.5 9843.69 2525.78 9848.82 2526.41 9861.18 2527.93
 9889.98 2531.47 9892.73  2531.3 9893.04 2531.29 9920.41  2529.5 9934.29 2528.58
 9939.67 2528.24 9942.58 2528.07 9944.46 2527.96 9945.78 2527.89 9946.75 2527.83
 9947.49 2527.79 9948.08 2527.75 9948.56 2527.72 9948.99 2527.69 9953.44 2527.23
 9979.79 2526.34 9984.75 2526.26 9991.27 2525.85   10000 2525.2810000.02 2525.28
 10003.3 2525.0610009.13 2525.7810013.32 2526.2810013.37 2526.2910019.58 2526.36
10024.94 2526.5410028.83 2526.6710031.95 2526.6810065.71 2527.7810069.31  2527.9
 10072.9 2528.0310076.27  2528.110118.21  2528.110145.69 2528.5810149.04 2528.65
10159.09 2528.8110159.62 2528.8310161.92 2528.8610165.08  2528.910168.63 2528.95
10172.64 2528.9910178.62 2529.0910181.62 2529.1310184.85  2529.210188.72 2529.26
10189.66 2529.2810193.99 2529.3110199.04 2529.3210201.81 2529.4210217.41 2529.98
10227.87 2530.5210228.18 2530.5310234.27 2530.8210242.27 2531.2510257.44 2532.09
10272.41 2532.84

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
    9705     .05 9991.27    .04510009.13     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9984.7510013.32           648.29  648.29  648.29             .1       .3
Left Levee      Station= 9889.98      Elevation= 2531.47

CROSS SECTION


RIVER: RV WK T12
REACH: R1                 RS: 0.565

INPUT
Description:
Station Elevation Data    num=     107
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
**********************************************************************************
 9698.74 2512.02 9700.23 2512.14 9715.31 2509.66 9723.45 2508.33 9733.62 2507.14
 9734.89 2506.95 9744.79 2505.69 9745.17 2505.77    9748 2505.95 9751.87 2506.13
 9752.04 2506.14 9756.28 2506.41 9759.71 2506.52 9760.11 2506.56  9786.5 2508.26
 9793.97 2508.75 9795.18 2508.82 9796.15 2508.89 9797.16 2508.95 9797.74 2508.99
 9800.44 2509.17 9800.68 2509.21 9801.05 2509.26 9802.98 2509.57 9804.79 2509.86
 9807.71 2510.09 9809.48 2510.24 9823.83 2511.42 9824.96 2511.51 9831.34 2512.04
 9839.94 2512.87 9840.21 2512.89 9846.27 2513.48 9847.43 2513.39 9854.48 2512.86
 9858.26 2512.52 9867.68 2511.78 9877.44 2510.88 9880.87 2510.59 9888.24 2509.88
 9888.29 2509.87 9900.08 2510.38 9907.91 2510.74 9915.84 2510.79 9917.68 2510.79
 9921.01  2510.8 9927.04 2510.86 9928.61 2510.85 9935.29  2510.9 9938.25 2510.88
 9967.98 2511.08 9970.06 2511.09 9971.34 2511.09 9972.22 2511.09 9976.61 2511.05
 9980.11 2510.91 9982.57  2510.8 9986.742510.625 9992.78 2510.37 9996.15 2510.18
   10000 2510.0410003.63 2509.9210016.35 2510.6310022.97    251110025.08 2511.12
10028.91 2511.1610038.34 2511.2610063.57  2511.510082.12 2512.6110083.62  2512.7
10084.06 2512.7310085.92 2512.9210088.77 2513.2310089.21 2513.2510093.91 2513.71
10095.08 2513.74 10098.1 2514.0110098.82 2514.0210099.82 2514.0310100.93 2514.04
10104.19 2514.0710106.74  2514.110109.36 2514.1210112.54 2514.1610116.68 2514.24
10117.96 2514.2610123.28 2514.36 10123.5 2514.3610124.18 2514.36 10128.2 2514.47
10130.62 2514.6510131.01 2514.6810131.15 2514.69 10132.3 2514.7810137.36 2515.19
10138.17 2515.2610154.57 2516.6310156.24 2516.62 10156.4 2516.6210172.05 2516.74
10175.49 2516.7710176.64 2516.7810180.01 2516.9510184.54 2516.75 10185.2 2516.72
10185.88 2516.6810196.35 2516.66

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
 9698.74    .045 9986.74    .04510016.35    .045

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9972.2210025.08           595.77  595.77  595.77             .1       .3
Left Levee      Station= 9846.27      Elevation= 2513.48

CROSS SECTION


RIVER: RV WK T12
REACH: R1                 RS: 0.453

INPUT
Description:
Station Elevation Data    num=     107
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
**********************************************************************************
 9943.87  2500.5 9946.02 2500.56 9946.08 2500.56 9950.26 2500.55 9951.46 2500.46
 9955.86 2500.07 9960.35 2499.42 9965.26 2499.05  9966.9 2498.88 9968.11 2498.73
 9970.34 2498.62 9970.42 2498.61 9971.84 2498.54 9976.04 2497.77 9976.92 2497.61
 9977.94 2497.35 9979.65 2496.98 9991.62  2494.2 9993.71 2493.78  9995.6  2493.4
 9996.69 2493.14 9997.28 2493.01 9999.74 2492.58   10000  2492.610006.64 2493.07
10007.52 2493.1410011.92 2493.46 10015.3 2493.7810018.15 2493.7810021.29 2493.89
10023.79 2494.0210029.76 2494.2110030.42 2494.2310035.15 2494.3710036.98 2494.44
10040.87 2494.5510044.06 2494.6310047.13 2494.7510049.74 2494.84 10049.9 2494.84
10053.66  2494.910055.72 2494.9610057.53 2495.0210059.17 2495.0410060.69 2495.07
10062.15 2495.1710063.64 2495.2610065.15 2495.3610065.56 2495.3910066.64 2495.41
10090.03  2495.710090.83 2495.7110095.21 2495.7910095.55 2495.7910097.93 2495.84
10100.81 2495.5310101.87 2495.3910103.55 2495.2110105.62 2495.0310106.32    2495
10109.88 2494.8310115.27 2494.5510117.43 2494.4510117.71 2494.4410118.45  2494.3
10121.68 2494.2610122.89 2494.4110123.46 2494.4110125.77  2494.410127.98 2494.66
10128.56 2494.7110132.63 2495.1710134.25  2495.310134.97 2495.3810137.47 2495.54
10138.68 2495.6410140.18 2495.7410141.14 2495.74 10142.4 2495.7810144.47 2495.79
10147.44 2495.8810149.13 2495.8910152.46    249610152.48    249610152.82 2496.01
10154.25 2496.0110157.43 2495.9410158.81 2495.9110160.57 2495.9110162.14 2495.99
10163.03 2496.0410176.66 2497.1210180.92 2497.5310188.65 2498.4110192.31 2498.78
10201.58  2499.910201.75 2499.8810206.03 2500.1210217.96 2500.7310224.98 2501.08
```

```
10229.61 2501.3110232.97 2501.5110237.66 2501.7210247.51 2502.6610248.55 2502.69
10255.02    2503   10256 2503.04

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
 9943.87    .045 9996.69    .04510007.52    .045

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9993.71 10015.3           679.02  679.02  679.02             .1       .3

CROSS SECTION


RIVER: RV WK T12
REACH: R1                 RS: 0.324

INPUT
Description:
Station Elevation Data    num=      49
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9858.06 2486.18 9858.07 2486.18 9858.18 2486.17  9858.3 2486.17 9859.35 2486.09
 9859.97 2486.06 9868.71 2485.37 9872.99  2485.2  9878.2 2484.85 9885.33 2484.61
 9887.76 2484.47 9888.07 2484.45  9897.2 2484.22 9897.36 2484.21 9898.39 2484.19
 9904.36 2483.55 9906.04 2483.36 9909.64 2482.94 9921.75 2481.55 9931.99 2479.78
 9935.22 2479.26 9941.77 2478.22 9943.76  2477.9 9944.53 2477.87 9947.14 2477.77
 9959.34 2477.29 9964.02  2477.1 9975.77 2477.41 9979.65 2477.53 9992.782476.848
 9994.87 2476.74   10000 2476.4810000.52 2476.46 10006.22476.84910010.46 2477.14
10015.62  2477.5 10059.3 2477.4610085.18 2477.4310092.93 2475.6210095.33    2475
10097.43 2475.6510099.68 2476.1610100.84 2476.4110119.05 2480.2310122.02  2480.8
10127.51 2481.8710130.49 2482.36 10137.6 2483.3810138.67 2483.54

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
 9858.06    .045 9992.78    .045 10006.2    .045

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9979.6510015.62                 0       0       0             .1       .3

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

SUMMARY OF MANNING'S N VALUES

River:RV WK T12
*****************************************************************
*     Reach       *   River Sta.   *   n1     *   n2     *   n3     *
*****************************************************************
*R1              *    1.218       *      .05*     .045*      .05*
*R1              *    1.120       *      .05*     .045*      .05*
*R1              *    1.035       *      .05*     .045*      .05*
*R1              *    0.902       *      .05*     .045*      .05*
*R1              *    0.781       *      .05*     .045*      .05*
*R1              *    0.688       *      .05*     .045*      .05*
*R1              *    0.565       *     .045*     .045*     .045*
*R1              *    0.453       *     .045*     .045*     .045*
*R1              *    0.324       *     .045*     .045*     .045*
*****************************************************************

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

SUMMARY OF REACH LENGTHS

River: RV WK T12
*****************************************************************
*     Reach       *   River Sta.   *  Left    * Channel *  Right   *
*****************************************************************
*R1              *    1.218       *  514.31*   514.31*   514.31*
*R1              *    1.120       *  447.26*   447.26*   447.26*
*R1              *    1.035       *  702.68*   702.68*   702.68*
*R1              *    0.902       *  639.72*   639.72*   639.72*
*R1              *    0.781       *  490.49*   490.49*   490.49*
*R1              *    0.688       *  648.29*   648.29*   648.29*
*R1              *    0.565       *  595.77*   595.77*   595.77*
*R1              *    0.453       *  679.02*   679.02*   679.02*
*R1              *    0.324       *       0*        0*        0*
*****************************************************************

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

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: RV WK T12

*****************************************************
*     Reach       *   River Sta.   * Contr.  * Expan.  *
*****************************************************
*R1              *    1.218   *       .1*       .3*
*R1              *    1.120   *       .1*       .3*
*R1              *    1.035   *       .1*       .3*
*R1              *    0.902   *       .1*       .3*
*R1              *    0.781   *       .1*       .3*
*R1              *    0.688   *       .1*       .3*
*R1              *    0.565   *       .1*       .3*
*R1              *    0.453   *       .1*       .3*
*R1              *    0.324   *       .1*       .3*
*****************************************************

*******************************************************************************
```

ERRORS WARNINGS AND NOTES
Errors Warnings and Notes for Plan : Wash K 11A

River: RV WK T11A Reach: R1 RS: 0.542 Profile: 100-YR FP
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
River: RV WK T11A Reach: R1 RS: 0.444 Profile: 100-YR FP
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:The composite Mannings n value for the channel was larger than the largest entered n value or smaller than the smallest entered n value.
Note: Manning's n values were composited to a single value in the main channel.
River: RV WK T11A Reach: R1 RS: 0.349 Profile: 100-YR FP
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:The composite Mannings n value for the channel was larger than the largest entered n value or smaller than the smallest entered n value.
Note: Manning's n values were composited to a single value in the main channel.
River: RV WK T11A Reach: R1 RS: 0.219 Profile: 100-YR FP
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

E.3.11 HEC-RAS Output

RV Wash K Trib 6

HEC-RAS Plar	HEC-RAS Plan: RV Wash K T6 River: RV WK T6 Reach: R1 Profile: 100-YR FP												
River	Reach	Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	Slope	Vel Chnl	Flow Area	Top Width	Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
RV WK T6	R1	5.986	100-YR FP	150.00	2580.70	2582.65	2582.56	2583.05	0.024641	5.11	29.42	31.06	0.90
RV WK T6	R1	5.873	100-YR FP	150.00	2566.72	2568.40	2568.24	2568.74	0.022983	4.69	32.01	31.59	0.81
RV WK T6	R1	5.744	100-YR FP	150.00	2550.68	2552.92	2552.79	2553.35	0.022619	5.28	28.40	25.42	0.88
RV WK T6	R1	5.622	100-YR FP	170.00	2537.94	2539.80	2539.71	2540.16	0.018635	4.83	35.20	52.82	0.88
RV WK T6	R1	5.562	100-YR FP	170.00	2531.80	2532.97	2532.86	2533.25	0.024977	3.85	40.11	50.15	0.89
RV WK T6	R1	5.506	100-YR FP	170.00	2524.73	2526.23	2526.23	2526.60	0.020457	4.97	36.32	56.69	0.93
RV WK T6	R1	5.448	100-YR FP	170.00	2518.01	2518.53	2518.43	2518.63	0.018860	2.66	68.55	161.32	0.79
RV WK T6	R1	5.368	100-YR FP	170.00	2507.84	2508.63	2508.63	2508.84	0.028485	3.84	48.81	122.60	1.00
RV WK T6	R1	5.366	100-YR FP	170.00	2507.54	2508.43	2508.36	2508.58	0.017657	3.19	56.12	124.73	0.79
RV WK T6	R1	5.364	100-YR FP	170.00	2507.28	2508.14	2508.13	2508.36	0.026920	3.72	45.65	95.58	0.95

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

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

****

PROJECT DATA
Project Title: RV Wash K Trib 6
Project File : RV_Wash_K_Trib_6.prj
Run Date and Time: 11/1/2007 10:10:46 AM

Project in English units

Project Description:
Rio Verde ADMP, Project FCDMC 2001C056, RV Wash K Trib 6. Phase 3 RAS model started in June 2005, preliminary model completed in August 2005.

RAS model
is prepared by Dibble Engineering. Field reconnaissance per report dated April 18, 2005.

For the study washes, the starting water surface elevation is on RV Wash K Trib 6, and is taken from normal depth for three cross sections repeated at ten-foot intervals. The slope-area method is the same as the normal depth method.

RV Wash K Trib 6 Floodplain Delineation
From a point
approximately 500 feet north and 50 feet east of the intersection of 144th Street and East Rock View Road (River Mile 5.373) to a point approximately 350 feet south and 2,300 feet west of the intersection of 144th Street and Black Mountain Road (River Mile 5.986), a distance of 0.613 river miles.

The
Cross-section data were generated by INROADS. The mapped hydraulic base line represents the 10,000-station point of the HEC-RAS model.

Topographic
mapping is supplied by the Flood Control District of Maricopa County.

Discharge data is from the Rio Verde ADMP HEC-1 model. The original models are from the Flood Control District of Maricopa County, prepared for the Rio Verde South Floodplain Delineation, the Rio Verde South Extension Floodplain Delineation, the Rio Verde North Floodplain Delineation, and the Rio Verde North Extension Floodplain Delineation. The HEC-1 models were modified for the Rio Verde ADMP. The final HEC-1 files were received in February 2004 and FCDMC approved the hydrology model.

Hydrologic concentration points are
noted in cross-section descriptions using the corresponding HEC-1 ID's. The flow rates have been rounded to the nearest 10 cubic feet per second (cfs). Flow rates obtained from HEC-1 are applied at the downstream end of the relevant sub-basin and stepped upstream at cross-sections to meet the HEC-1 flow from the upstream sub-basin.

River Mile (RM) stationing is based upon
the estimated tie in point with downstream receiving waters or the start of two-dimensional flow models. This point represents RM 0.000. The assumed starting WS Elevation is based upon normal depth in the study wash.

Horizontal and Vertical Coordinate Basis for this project is as follows:

Horizontal--Arizona State Plane, Central Region, NAD 1983
Vertical--NAVD
1988

RAS model river naming corresponds to project river naming as follows:
RV WK T6 = RV Wash K Trib 6

****

PLAN DATA

Plan Title: RV Wash K Trib 6
Plan File : j:\2006\10-0606.1\Design Notebook\Drainage Design\HEC-RAS\RV_Wash_K_Trib_6.p01

Geometry Title: RV Wash K Trib 6
Geometry File : j:\2006\10-0606.1\Design Notebook\Drainage Design\HEC-RAS\RV_Wash_K_Trib_6.g01

Flow Title : RV Wash K Trib 6
Flow File : j:\2006\10-0606.1\Design Notebook\Drainage Design\HEC-RAS\RV_Wash_K_Trib_6.f01

Plan Summary Information:

```
Number of:  Cross Sections =   10    Multiple Openings  =    0
            Culverts       =    0    Inline Structures  =    0
            Bridges        =    0    Lateral Structures =    0

Computational Information
    Water surface calculation tolerance  =  0.01
    Critical depth calculation tolerance =  0.01
    Maximum number of iterations         =  20
    Maximum difference tolerance         =  0.3
    Flow tolerance factor                =  0.001

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

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

River = RV WK T6         Reach = R1
RS      Profile           Method  Value1  Value2
5.986   PF 2                   1 9985.9710015.29
5.873   PF 2                   1 9981.9810012.87
5.744   PF 2                   1 9988.38 10013.8
5.622   PF 2                   1 9981.4310029.26
5.562   PF 2                   1  9939.810005.79
5.506   PF 2                   1 9981.97 10019.4
5.448   PF 2                   1 9988.1910030.02
5.368   PF 2                   1 9966.9210046.43
5.366   PF 2                   1    995410048.26
5.364   PF 2                   1 9946.4110041.99


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

FLOW DATA

Flow Title: RV Wash K Trib 6
Flow File : j:\2006\10-0606.1\Design Notebook\Drainage Design\HEC-RAS\RV_Wash_K_Trib_6.f01

Flow Data (cfs)
*************************************************************
* River           Reach           RS      *       100-YR FP *
* RV WK T6        R1              5.986   *             150 *
* RV WK T6        R1              5.622   *             170 *
*************************************************************

Boundary Conditions
*****************************************************************************************************
* River           Reach           Profile          *            Upstream                 Downstream    *
*****************************************************************************************************
* RV WK T6        R1              100-YR FP        *                                Normal S = 0.026921 *
*****************************************************************************************************


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

GEOMETRY DATA

Geometry Title: RV Wash K Trib 6
Geometry File : j:\2006\10-0606.1\Design Notebook\Drainage Design\HEC-RAS\RV_Wash_K_Trib_6.g01

CROSS SECTION


RIVER: RV WK T6
REACH: R1                 RS: 5.986

INPUT
Description: Q=150 cfs (B1W4C, 24 hr)
Station Elevation Data    num=      47
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9890.55 2584.32 9897.52 2584.38 9902.14 2584.33 9911.08 2584.31 9916.78  2584.3
 9921.65 2584.29 9922.91 2584.26 9925.95 2584.21 9930.14 2584.19 9933.94 2584.12
 9937.34 2584.11    9942    2584 9944.52 2583.99 9949.95 2583.88 9957.59 2583.72
 9959.89 2583.67 9970.27 2583.28 9977.74 2582.95 9981.64 2582.78 9983.92 2582.68
 9985.97 2582.59 9994.21 2581.62 9995.052581.527   10000 2580.9810002.43  2580.7
10005.12 2581.1110007.792581.50710012.66 2582.2310013.19  2582.310015.292582.591
10015.64 2582.6410016.59 2582.7710049.17 2586.0210051.04  2586.210053.39 2586.04
10054.16    258610054.97 2585.9510066.25 2585.2410076.55 2584.5810079.03 2584.43
10082.58  2584.210086.57 2584.4610087.07 2584.4910092.14 2584.83   10129 2587.33
10131.18 2587.4710135.83 2587.52

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*************************************************
 9890.55    .055 9995.05     .0510007.79    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9985.9710015.29           601.19  601.19  601.19             .1       .3

CROSS SECTION


RIVER: RV WK T6
REACH: R1                 RS: 5.873
```

```
INPUT
Description:
Station Elevation Data    num=      44
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 9881.64 2570.64 9882.42 2570.61  9884.7 2570.55 9889.09 2570.64 9891.05 2570.64
  9896.4 2570.71 9896.54 2570.71 9901.14 2570.68 9903.35 2570.68 9903.98 2570.68
 9908.31 2570.66 9910.77 2570.63 9916.04 2570.58 9920.65 2570.53 9962.77 2569.49
  9971.1 2568.96  9973.2 2568.92 9977.62 2568.79 9977.79 2568.79 9978.38 2568.76
 9978.69 2568.74 9981.982568.361  9987.2 2567.76 9988.77 2567.58 9991.53 2567.19
 9993.98 2566.98 9995.81 2566.94 9998.13 2566.85   10000 2566.8110003.73 2566.72
10004.96 2566.92 10006.9 2567.27 10010.4 2567.8810012.87 2568.3610020.12 2568.98
10028.76 2569.6810034.71 2570.0610036.11 2570.1710040.59 2570.4110044.94 2570.79
10048.08 2570.9710053.79 2571.4910054.36 2571.5310061.75 2572.21

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9881.64    .055 9995.81     .0510004.96    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9981.9810012.87             674.6   674.6   674.6             .1       .3

CROSS SECTION


RIVER: RV WK T6
REACH: R1                 RS: 5.744

INPUT
Description:
Station Elevation Data    num=     121
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 9810.32 2555.44 9810.64 2555.43 9815.62 2555.36 9817.55 2555.37 9820.67 2555.37
 9828.94 2554.61  9832.4  2554.3 9834.07 2554.08 9837.28 2553.78 9839.23 2553.52
 9842.12 2553.26 9843.57 2553.05 9846.16 2552.82 9846.97 2552.75 9849.62 2552.53
 9851.97 2552.32 9853.58 2552.17 9856.33 2551.95 9857.88 2551.19 9859.94 2550.91
 9860.38 2550.83 9864.85 2550.26 9865.43 2550.27 9865.65 2550.27 9866.73  2550.4
 9872.93 2550.84  9874.2 2550.93 9879.74  2551.4 9879.83  2551.4  9883.4  2551.5
 9887.02  2551.6 9887.37 2551.61 9887.49 2551.61 9889.93 2551.57 9891.26 2551.62
 9895.91 2551.64 9899.75 2551.74 9906.62  2551.9  9907.4 2551.91  9908.3 2551.94
 9908.64 2551.96 9911.46 2552.12  9913.4 2552.16 9915.01 2552.15 9925.62 2552.85
 9928.47 2552.96 9931.66 2553.06 9935.23  2553.2 9937.71 2553.28 9939.12 2553.32
 9943.26 2553.49 9948.21 2553.69 9948.63 2553.71 9949.76 2553.79 9955.25    2554
 9955.81 2554.03 9956.24 2554.05 9956.59 2554.07 9956.82 2554.09 9964.65 2554.11
 9967.28  2554.1 9969.97 2554.08 9978.25 2554.02    9982 2553.99 9982.86 2553.84
 9983.43 2553.75 9988.02 2552.97 9990.73 2552.56 9993.94 2552.02 9996.89 2551.56
 9998.67 2551.29 9999.08 2551.22   10000 2551.0810002.55 2550.6810005.79 2551.29
10006.67 2551.4810009.33 2552.0510012.38 2552.6710013.37 2552.87 10015.1 2553.05
10016.64 2553.14   10021 2553.6110021.24 2553.5910024.73 2553.9910025.87 2554.12
10026.05  2554.110026.11 2554.0910029.12 2554.48   10031 2554.6310031.04 2554.63
 10031.3 2554.6410036.99 2555.0910041.19 2555.4210043.82 2555.6110044.37 2555.63
10045.26 2555.6810045.84  2555.710050.89 2555.9110055.69  2556.110057.38 2556.16
   10060 2556.2610061.36  2556.310065.97 2556.48 10070.1 2556.63 10073.8 2556.77
10077.16 2556.8910083.52 2556.9110087.02 2557.0210088.28 2557.0310089.04 2557.03
   10093 2557.0310094.61 2557.0610098.19 2557.0610100.21  2557.110103.19 2557.19
10105.62 2557.2410108.12 2557.3710110.62 2557.4910112.42 2557.5810113.08 2557.57
10113.17 2557.57

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9810.32    .055 9996.89     .0510006.67    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          998210024.73            646.38  646.38  646.38             .1       .3
Left Levee      Station= 9964.65      Elevation= 2554.11

CROSS SECTION


RIVER: RV WK T6
REACH: R1                 RS: 5.622

INPUT
Description: Q=170 cfs (CB2W4C, 24 hr)
Station Elevation Data    num=      72
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 9958.26 2540.93 9959.89 2540.96 9965.27 2541.01 9966.41 2541.02 9967.01 2541.02
 9968.16    2541 9969.31 2541.05 9971.982540.791 9974.56 2540.54 9975.75 2540.39
 9981.33 2539.81    9983 2539.59 9985.01 2539.38 9986.68 2539.24 9987.93 2539.11
 9990.46 2538.89 9994.63 2538.45 9995.79 2538.34 9999.45 2537.94   10000    2538
10000.94  2538.110001.06 2538.1110001.46 2538.1310006.69 2538.6410008.25 2538.74
10010.88 2538.9910019.642539.84810029.26 2540.7910030.26  2540.810030.41 2540.77
10036.22 2540.8210044.64 2540.95   10048 2541.0210057.51 2541.1610059.57 2540.82
10061.23 2540.5710063.21 2540.3210070.19 2539.0910071.79 2538.8310072.55 2538.61
10084.35 2540.2110094.47 2541.2910098.42 2541.7810104.57 2542.3810106.03 2542.36
10107.18 2542.3610110.15 2542.3710112.07 2542.38 10124.5 2542.1710128.72 2542.12
10129.27 2542.1410130.85 2542.1310134.43 2542.2110138.66 2542.3110140.39 2542.33
10145.46 2542.4510147.93 2542.47 10149.9 2542.5210152.93 2542.5810158.13 2542.72
10160.03 2542.7410161.58 2542.7610171.57 2543.0410171.67 2543.0510172.85 2543.07
 10181.4 2543.4510183.93 2543.5610192.37 2543.9410193.93 2544.0110196.02  2544.1
10200.76 2544.2810208.96 2544.61

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9958.26     .05 9981.33     .0410019.64     .05
```

```
Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9971.9810029.26           320.94  320.94  320.94             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
10057.5110208.96 2541.16       F

CROSS SECTION


RIVER: RV WK T6
REACH: R1                 RS: 5.562

INPUT
Description:
Station Elevation Data    num=      86
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9837.26 2534.15 9865.89  2533.7 9866.32 2533.69 9866.44 2533.69 9866.49 2533.69
 9866.54 2533.69 9866.72 2533.69 9872.25 2533.58  9876.6 2533.46 9877.97 2533.43
 9879.91 2533.37 9883.84 2533.34 9884.45 2533.37 9887.46 2533.37 9889.22  2533.3
 9889.76  2533.3 9893.28 2533.17 9895.66 2533.15 9898.28 2533.07  9901.6 2533.05
 9903.21 2533.01 9906.78 2533.03  9907.6 2533.02 9909.19 2533.01 9913.79 2532.41
 9913.98 2532.39 9918.45 2531.88 9920.17 2531.68 9921.26 2531.55 9921.87 2531.54
 9927.94 2532.22 9929.89 2532.05 9936.32 2531.51 9936.82 2531.59 9936.99 2531.63
  9938.2 2531.83 9939.61 2532.12 9944.06    2533 9944.57  2533.1 9949.55 2534.13
  9952.2 2534.16 9953.14 2534.18 9957.77 2534.23 9960.58 2534.31 9961.32 2534.31
  9963.8 2534.36 9972.05 2534.32 9975.41  2534.4 9976.27 2534.43 9980.862533.924
 9984.35 2533.54 9987.88  2533.2 9989.54 2533.02 9992.51 2532.71   10000 2531.89
10000.87  2531.810004.04 2532.56   100052532.78410009.87 2533.9210011.46 2533.93
 10012.3 2533.9310014.95 2533.9410016.45 2533.9410028.47  2533.710045.49 2533.39
10048.25 2533.2710049.05 2533.2310055.88 2532.9610061.64 2532.7110061.67 2532.71
10061.72 2532.7110062.11 2532.7410064.54 2532.7510065.06 2532.7710070.13 2532.85
10070.83 2532.8610071.03 2532.8710072.63 2532.9210075.63 2533.0310077.79  2533.1
10113.76 2534.1710116.88 2534.2610118.14  2534.310121.95  2534.4 10122.5 2534.42
10124.26 2534.47

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9837.26     .05 9992.51     .04   10005     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9980.8610009.87           294.35  294.35  294.35             .1       .3
Right Levee     Station=10014.95      Elevation= 2533.94

CROSS SECTION


RIVER: RV WK T6
REACH: R1                 RS: 5.506

INPUT
Description:
Station Elevation Data    num=      70
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9815.55 2527.39 9833.68 2526.57 9850.86 2525.78 9855.98 2525.51 9857.47  2525.4
 9857.49  2525.4 9859.19 2525.27 9866.46 2525.26  9868.7 2525.31 9873.28 2525.41
 9887.57 2525.73 9892.62 2525.84  9894.8 2525.96 9900.21 2526.16 9901.96 2526.22
 9912.26 2526.64 9917.15 2526.81 9923.12 2526.76 9924.92 2526.75 9930.87  2526.7
  9933.7 2526.68 9933.89 2526.68 9935.43 2526.67 9938.92 2526.65    9946  2526.6
  9946.1  2526.6 9947.08  2526.6 9948.46 2526.59 9963.31 2526.28 9977.96 2526.01
 9981.97 2525.94 9988.53 2525.58 9997.75 2525.03   10000 2524.92 10003.6 2524.73
10017.79 2525.81 10019.4 2525.9410025.32 2526.4210030.88 2526.3510034.56 2526.34
10038.91 2526.2910054.14 2526.2610059.54 2526.2410066.93 2526.23 10080.2 2526.71
10083.71 2526.8410084.93 2526.8810084.97 2526.8810085.53 2526.9110097.07 2527.15
10101.36 2527.2510117.27 2526.7610138.79 2526.1110139.02 2526.1310146.72 2525.32
 10147.9  2525.210156.09 2524.6710156.16 2524.6710160.41 2523.9910160.67 2523.92
10160.83 2523.91 10161.7    252410166.65 2524.5810188.25 2527.0710193.29 2526.77
10205.69 2526.0310213.42 2525.6310235.68 2526.4910249.12 2527.0510249.27 2527.04

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9815.55     .05 9981.97     .0410017.79     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9981.97 10019.4           301.58  301.58  301.58             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
10025.3210249.27 2526.42       F
Left Levee      Station= 9917.15      Elevation= 2526.81
Right Levee     Station=10101.36      Elevation= 2527.25

CROSS SECTION


RIVER: RV WK T6
REACH: R1                 RS: 5.448

INPUT
Description:
Station Elevation Data    num=     124
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9720.56 2520.72  9722.1 2520.74 9738.68 2520.92 9754.94 2520.46 9766.17 2520.06
 9766.22 2520.06  9768.2 2519.88 9768.26 2519.88 9780.57 2518.81 9788.27 2517.92
  9794.2 2517.24 9794.39 2517.25 9796.95 2517.29 9797.95 2517.29 9806.24  2517.4
 9806.51 2517.41    9811 2517.38 9811.26 2517.38 9815.96  2517.4 9818.59 2517.39
```

```
 9818.83 2517.39 9825.46 2517.44 9826.39 2517.43 9830.08 2517.47 9834.31  2517.1
 9836.07 2516.92 9837.66 2516.77 9844.27 2516.14 9844.75  2516.1 9848.27 2515.79
 9850.24 2515.59 9855.18 2515.18  9857.5 2515.16 9860.59 2515.14 9869.98 2516.42
 9870.65 2516.52 9872.23 2516.75 9873.67 2516.96 9877.12 2517.45 9877.46 2517.47
  9878.1 2517.53 9878.31 2517.54 9878.44 2517.54 9879.65 2517.64 9880.32 2517.66
 9887.22 2518.15 9887.31 2518.15 9905.13 2519.04 9912.61 2519.46 9916.84 2519.67
 9919.52 2519.77 9921.48 2519.83 9923.18 2519.88 9924.51 2519.92 9930.32 2520.07
 9930.39 2520.07 9930.47 2520.07 9930.86 2520.05  9949.4 2519.59 9967.15 2519.14
 9968.68 2519.09 9969.14 2519.07  9969.6 2519.06 9982.68 2518.61 9988.192518.429
 9993.05 2518.27 9995.23  2518.2 9996.45 2518.16   10000 2518.0410000.67 2518.02
10006.85 2518.0110007.74 2518.0110013.69 2518.0710015.25 2518.1310018.65 2518.17
10021.13 2518.2710023.59 2518.3110026.92 2518.3910030.02 2518.4310030.22 2518.42
10031.21  2518.410037.75 2518.2710063.17 2517.7710096.83 2518.1810100.65 2518.22
 10105.4 2518.1710130.74 2517.8810137.03 2518.1610140.54  2518.3 10146.4 2518.53
10174.87 2519.2610179.98 2519.4310180.35 2519.4110182.65 2519.3310186.18  2519.2
10210.97 2517.4310219.71 2516.8210219.81 2516.8210220.01 2516.8310242.06  2517.9
10250.41 2518.3210254.59 2518.5210255.38 2518.56 10267.8  2519.210273.02 2518.79
10287.92 2518.3110289.67 2518.3210291.96 2518.3310292.21 2518.3310295.15 2518.32
10300.04 2518.3110302.64 2518.2710309.77 2518.3210310.09 2518.3210311.12 2518.33
10323.91 2517.5710334.33 2516.8710342.23 2517.2710355.05 2517.8910368.94 2518.58
10370.98 2518.6610373.43 2518.7810377.26 2518.9410379.95 2518.81

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
 9720.56     .05 9993.05     .0410021.13     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9988.1910030.02           426.67  426.67  426.67              .1       .3
Left Levee      Station= 9930.32      Elevation= 2520.07
Right Levee     Station=10179.98      Elevation= 2519.43

CROSS SECTION


RIVER: RV WK T6
REACH: R1                 RS: 5.368

INPUT
Description:
Station Elevation Data    num=     114
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************************
 9573.49 2512.31 9580.14 2512.14 9582.69 2512.11 9582.77 2512.11 9589.51 2511.73
 9590.08 2511.69 9590.98 2511.63 9599.61 2511.14 9603.46 2510.89 9605.52 2510.77
 9609.47 2510.54 9615.95 2510.11 9619.24 2509.91 9622.35  2509.7 9624.01  2509.6
 9629.14 2509.22 9629.23 2509.21 9629.29 2509.21  9629.8 2509.17 9642.68 2507.89
 9644.36  2507.7  9644.7  2507.7 9650.17 2507.79 9653.86 2507.91 9655.51 2507.95
  9658.3 2508.06 9666.43 2507.91 9674.45 2507.76 9679.57 2507.67 9684.36 2507.58
 9688.93 2507.31 9694.25 2507.05 9709.77 2508.48 9718.05 2509.28 9719.18 2509.28
 9743.32 2509.63 9744.29 2509.68 9746.37 2509.77  9750.6 2509.56 9751.66  2509.5
 9757.94 2509.18 9760.74    2509 9765.34 2508.76 9769.81 2508.47 9772.79  2508.3
 9778.88 2507.89 9779.79 2507.83  9787.4 2507.31 9787.84  2507.3 9787.92  2507.3
  9788.6 2507.28 9793.67  2507.2 9796.56 2507.16  9808.1 2507.13 9812.32 2507.16
 9812.34 2507.16 9812.43 2507.14 9814.27 2507.26 9814.81 2507.28 9826.18 2507.82
 9859.57 2509.22 9862.38 2509.28 9872.35 2509.95 9874.63 2509.99 9877.86 2510.03
 9878.22 2510.04 9879.97 2510.08  9881.8 2510.14 9892.56 2509.75  9901.6 2509.43
 9912.06 2508.96 9922.72 2508.73 9927.912508.594 9929.57 2508.55 9949.96 2508.12
 9950.95 2508.16 9951.94 2508.21 9952.83 2508.23 9954.81 2508.28 9955.38 2508.27
 9958.42 2508.28 9958.44 2508.28 9963.31 2508.29 9963.85 2508.29 9966.92 2508.59
 9968.77 2508.53 9974.07  2508.4 9975.08 2508.37 9981.67 2508.21 9982.02  2508.2
 9982.29  2508.2 9985.88 2508.11 9987.13 2508.07 9989.06 2508.03 9989.43 2508.04
 9996.07  2507.9 9996.43 2507.91   10000 2507.8410001.29 2507.8610002.29 2507.88
10004.32  2507.910008.05 2507.9410008.56 2507.9410011.13 2507.9610025.59 2508.19
10026.37  2508.210029.75 2508.2410034.13 2508.4110037.84 2508.4110042.75 2508.42
10044.55 2508.4910046.43 2508.5610051.92 2508.7210078.34 2510.16

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
 9573.49     .05 9954.81     .0410029.75     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9966.9210046.43              10      10      10              .1       .3
Left Levee      Station=  9881.8      Elevation= 2510.14

CROSS SECTION


RIVER: RV WK T6
REACH: R1                 RS: 5.366

INPUT
Description: This cross section is one of two cross sections added to the
             downstream end of the model to establish the starting water
             surface elevation using the normal depth calculations. This cross
             section is not plotted on the work maps, nor is used in plotting
             the base flood elevations.  Attempts to remove the negative
             surcharge of the floodway profile were unsuccessful.
Station Elevation Data    num=     116
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************************
  9573.5 2511.82 9586.51 2511.76 9587.71 2511.76 9591.22 2511.76 9591.61 2511.74
  9591.7 2511.73 9601.43 2511.14 9602.27 2511.09 9609.14 2510.66 9611.29  2510.5
 9614.11 2510.33 9616.12 2510.19 9621.28  2509.8 9624.06 2509.61  9631.4 2509.03
 9632.82  2508.9 9633.17 2508.89 9637.33 2508.49 9639.21 2508.35  9641.2 2508.19
  9643.6 2507.94 9651.08 2507.14 9651.56  2507.1 9656.24  2507.4 9661.78 2507.72
 9661.87 2507.73 9668.02 2507.64 9674.43 2507.49 9680.66 2507.37 9685.08 2507.21
 9691.08 2506.87 9695.18 2506.64 9705.12 2507.72  9714.3  2508.7 9717.99 2508.67
  9721.5 2508.64  9724.1 2508.63 9727.35 2508.62 9738.13 2508.77 9738.56  2508.8
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 9741.14 2508.91 9745.72 2509.12 9752.04 2509.41 9754.12  2509.3 9754.62 2509.27
  9761.5 2508.88 9763.69 2508.73 9767.08 2508.53 9770.77 2508.28 9771.14 2508.25
 9776.67 2507.88 9778.56 2507.76 9781.75 2507.55 9790.12 2506.99  9790.9 2506.94
 9794.02 2506.72 9800.96 2506.67  9808.3 2506.46 9808.65 2506.45 9810.71 2506.41
 9812.32 2506.34 9814.79 2506.54 9815.84 2506.59 9836.78 2507.95    9844 2508.21
 9848.78 2508.44 9862.81 2509.03 9866.69  2509.1  9869.1 2509.26 9869.65 2509.27
 9870.51 2509.29 9870.88 2509.29 9872.04 2509.32 9875.47 2509.42 9878.52  2509.5
 9886.54 2509.76 9890.88 2509.59 9894.54 2509.41 9894.61 2509.41 9904.36 2508.98
 9915.18 2508.53 9927.56 2508.24 9936.252508.038 9941.77 2507.91 9944.62 2507.85
 9948.79 2508.02    9954 2508.52 9959.16 2508.37 9959.72 2508.36 9959.73 2508.36
 9961.52 2508.32 9965.41  2508.2 9969.14 2508.11 9972.26 2508.05 9974.67 2508.03
  9979.3 2507.91  9981.1 2507.89 9996.48 2507.66 9998.15 2507.62 9999.02 2507.57
   10000 2507.5410000.89 2507.5610005.74 2507.58 10033.7 2508.03 10035.2 2508.05
10037.91 2508.09 10043.2 2508.2410044.54 2508.3110052.65 2508.5710056.98 2508.82
10062.22 2509.0210063.05 2509.0510065.49 2509.1210077.26 2509.7710078.22 2509.76
10079.63 2509.78

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
  9573.5     .05 9936.25     .04 10033.7     .05

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          995410052.65               10      10      10             .1       .3
Left Levee      Station= 9886.54      Elevation= 2509.76

CROSS SECTION


RIVER: RV WK T6
REACH: R1                 RS: 5.364

INPUT
Description: This cross section is one of two cross sections added to the
             downstream end of the model to establish the starting water
             surface elevation using the normal depth calculations. This cross
             section is not plotted on the work maps, nor is used in plotting
             the base flood elevations.
Station Elevation Data    num=     109
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
**********************************************************************************
 9568.03 2511.34 9568.04 2511.34  9570.5 2511.36 9576.96 2511.32 9577.39 2511.33
 9578.72 2511.33 9581.56 2511.32  9586.8 2511.31 9587.84 2511.31  9592.6  2511.3
 9593.55  2511.3 9595.83 2511.29 9597.46 2511.18  9597.8 2511.15 9605.58 2510.61
 9607.75 2510.44 9620.01 2509.27 9623.07 2509.01 9624.44  2508.9 9625.17 2508.86
 9625.71 2508.83 9625.92 2508.83 9626.13 2508.81  9629.3 2508.71 9632.45 2508.79
 9639.16    2508 9639.52 2507.95 9642.61 2507.59 9643.39 2507.51 9647.86 2506.82
 9649.79 2506.91 9651.61 2507.01 9656.48 2507.26 9662.47 2507.62 9664.02 2507.58
 9666.29 2507.46 9672.37 2507.21 9674.78 2507.07 9678.25 2506.89  9678.6 2506.83
  9684.5 2506.35 9687.94 2506.11  9703.2  2507.8 9706.48 2508.16 9710.66 2508.01
  9715.6 2507.94 9721.34  2507.8 9727.28 2507.77 9728.19 2507.82 9743.42 2508.61
 9750.94 2509.01 9751.84 2509.05 9752.04 2509.04 9760.92 2508.44 9763.62 2508.26
 9769.95 2507.84 9775.17 2507.48 9784.26 2506.81 9786.78 2506.64 9793.34 2506.15
 9797.47 2506.01 9803.41 2505.61 9804.59 2505.55 9807.68 2505.33 9810.17  2505.6
 9811.43 2505.69 9824.01 2506.88 9831.59 2507.31 9838.27 2507.86 9851.38 2508.48
 9853.81 2508.64  9857.7 2508.78 9861.02 2508.76 9873.69 2509.04 9881.58 2509.26
 9883.76 2509.31 9885.79 2509.38  9888.5 2509.26 9890.94 2509.17 9901.87 2508.71
 9913.65 2508.25  9915.2 2508.21 9916.16 2508.25 9921.11 2508.24 9938.07 2508.21
 9940.07  2508.2  9946.4 2508.14 9950.26 2508.04 9951.13 2508.01 9955.52 2507.93
 9955.54 2507.93    9957  2507.9 9961.57 2507.86 9964.11 2507.79 9967.93 2507.75
 9998.04  2507.3   10000 2507.2810009.15 2507.4310020.07  2507.610029.94 2507.77
10042.65 2508.1610043.57 2508.1910051.89 2508.4410056.13 2508.5510063.36 2508.93
10064.85 2508.9810069.79 2509.2610070.51 2509.2310075.44  2509.3

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
 9568.03     .05  9946.4     .0410042.65     .05

Bank Sta: Left   Right    Coeff Contr.   Expan.
         9946.410042.65             .1       .3
Left Levee      Station= 9885.79      Elevation= 2509.38

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

SUMMARY OF MANNING'S N VALUES

River:RV WK T6
*****************************************************************
*     Reach      *   River Sta.   *   n1    *   n2    *   n3    *
*****************************************************************
*R1              *    5.986       *    .055*     .05*     .055*
*R1              *    5.873       *    .055*     .05*     .055*
*R1              *    5.744       *    .055*     .05*     .055*
*R1              *    5.622       *     .05*     .04*      .05*
*R1              *    5.562       *     .05*     .04*      .05*
*R1              *    5.506       *     .05*     .04*      .05*
*R1              *    5.448       *     .05*     .04*      .05*
*R1              *    5.368       *     .05*     .04*      .05*
*R1              *    5.366       *     .05*     .04*      .05*
*R1              *    5.364       *     .05*     .04*      .05*
*****************************************************************

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

SUMMARY OF REACH LENGTHS

River: RV WK T6
*****************************************************************
*     Reach      *   River Sta.   * Left   * Channel * Right  *
```

*R1	* 5.986	* 601.19*	601.19*	601.19*
*R1	* 5.873	* 674.6*	674.6*	674.6*
*R1	* 5.744	* 646.38*	646.38*	646.38*
*R1	* 5.622	* 320.94*	320.94*	320.94*
*R1	* 5.562	* 294.35*	294.35*	294.35*
*R1	* 5.506	* 301.58*	301.58*	301.58*
*R1	* 5.448	* 426.67*	426.67*	426.67*
*R1	* 5.368	* 10*	10*	10*
*R1	* 5.366	* 10*	10*	10*
*R1	* 5.364	* *	*	*

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: RV WK T6

Reach	River Sta.	Contr.	Expan.
*R1	* 5.986	* .1*	.3*
*R1	* 5.873	* .1*	.3*
*R1	* 5.744	* .1*	.3*
*R1	* 5.622	* .1*	.3*
*R1	* 5.562	* .1*	.3*
*R1	* 5.506	* .1*	.3*
*R1	* 5.448	* .1*	.3*
*R1	* 5.368	* .1*	.3*
*R1	* 5.366	* .1*	.3*
*R1	* 5.364	* .1*	.3*

ERRORS WARNINGS AND NOTES
Errors Warnings and Notes for Plan : Wash K 11A

River: RV WK T11A Reach: R1 RS: 0.542 Profile: 100-YR FP
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
River: RV WK T11A Reach: R1 RS: 0.444 Profile: 100-YR FP
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:The composite Mannings n value for the channel was larger than the largest entered n value or smaller than the smallest entered n value.
Note: Manning's n values were composited to a single value in the main channel.
River: RV WK T11A Reach: R1 RS: 0.349 Profile: 100-YR FP
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:The composite Mannings n value for the channel was larger than the largest entered n value or smaller than the smallest entered n value.
Note: Manning's n values were composited to a single value in the main channel.
River: RV WK T11A Reach: R1 RS: 0.219 Profile: 100-YR FP
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

E.3.12 HEC-RAS Output

RV Wash K Trib 6D

HEC-RAS Plan: RV WK T6D Profile: 100-YR FP													
River	Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
RV WK T6D S1	R1	0.522	100-YR FP	14.00	2525.90	2526.07	2525.97	2526.15	0.027160	0.94	6.26	21.00	0.57
RV WK T6D S1	R1	0.387	100-YR FP	14.00	2506.75	2507.38	2507.29	2507.45	0.025134	2.20	6.37	19.93	0.69
RV WK T6D S1	R1	0.337	100-YR FP	14.00	2501.11	2501.68	2501.59	2501.73	0.018991	1.84	8.18	32.61	0.59
RV WK T6D S1	R1	0.335	100-YR FP	14.00	2500.80	2501.32	2501.31	2501.43	0.054229	2.72	5.16	21.58	0.96
RV WK T6D S1	R1	0.333	100-YR FP	14.00	2500.45	2501.01	2500.94	2501.07	0.025045	1.94	7.61	34.55	0.66
RV WK T6D	R1	2.629	100-YR FP	210.00	2655.47	2657.08	2656.89	2657.27	0.015257	4.03	65.31	82.04	0.66
RV WK T6D	R1	2.579	100-YR FP	210.00	2651.25	2652.20	2652.16	2652.34	0.023195	3.86	81.64	300.95	0.77
RV WK T6D	R1	2.470	100-YR FP	210.00	2635.70	2638.77	2638.46	2639.22	0.021957	5.35	39.26	25.59	0.76
RV WK T6D	R1	2.378	100-YR FP	350.00	2626.13	2628.48	2628.37	2629.03	0.020900	6.01	61.68	51.75	0.83
RV WK T6D	R1	2.245	100-YR FP	350.00	2610.04	2612.26	2612.26	2613.03	0.024311	7.28	53.33	37.41	0.91
RV WK T6D	R1	2.120	100-YR FP	350.00	2596.67	2597.81	2597.65	2598.02	0.020841	4.34	99.39	126.91	0.76
RV WK T6D	R1	2.001	100-YR FP	460.00	2581.01	2583.88	2583.88	2584.54	0.021356	7.08	78.83	59.28	0.86
RV WK T6D	R1	1.894	100-YR FP	460.00	2569.10	2571.10	2571.10	2571.41	0.017924	5.58	131.94	186.32	0.75
RV WK T6D	R1	1.833	100-YR FP	460.00	2562.30	2563.62	2563.45	2563.80	0.022026	4.37	147.60	237.25	0.78
RV WK T6D	R1	1.832		Lat Struct									
RV WK T6D	R1	1.771	100-YR FP	460.00	2554.20	2555.17	2555.08	2555.42	0.026937	3.58	123.92	299.31	0.80
RV WK T6D	R1	1.678	100-YR FP	460.00	2540.23	2541.90	2541.77	2542.12	0.028314	4.43	125.46	234.66	0.85
RV WK T6D	R1	1.614	100-YR FP	460.00	2532.27	2532.29	2532.22	2532.58	0.027895	0.21	110.52	151.97	0.37
RV WK T6D	R2	1.567	100-YR FP	446.00	2523.81	2525.86	2525.72	2526.16	0.024315	5.29	107.41	141.87	0.90
RV WK T6D	R2	1.453	100-YR FP	446.00	2506.36	2507.63	2507.61	2508.09	0.038140	5.66	83.23	89.66	1.00
RV WK T6D	R2	1.397	100-YR FP	446.00	2497.70	2500.44	2500.44	2500.82	0.017191	5.80	111.21	135.09	0.76
RV WK T6D	R2	1.313	100-YR FP	446.00	2487.75	2491.73		2492.02	0.010595	4.55	116.49	110.93	0.56
RV WK T6D	R2	1.311	100-YR FP	446.00	2487.46	2491.66		2491.92	0.008655	4.39	126.64	118.42	0.51
RV WK T6D	R2	1.309	100-YR FP	446.00	2487.33	2491.43	2491.28	2491.80	0.013018	5.37	109.89	112.05	0.62

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


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

****

PROJECT DATA
Project Title: RV Wash K Trib 6D
Project File : RV_Wash_K_Trib_6D.prj
Run Date and Time: 11/1/2007 10:11:08 PM

Project in English units

Project Description:
Rio Verde ADMP, Project FCDMC 2001C056, river system including RV Wash K Trib 6D and RV Wash K Trib 6D Split 1. Phase 3 RAS model started in June 2005, preliminary model completed in August 2005.

RAS model is prepared by Dibble Engineering. Field reconnaissance per report dated April 18, 2005.

For the study washes, the starting water surface elevation for both RV Wash K Trib 6D and RV Wash K Trib 6D Split 1 is taken from normal depth for three cross sections repeated at ten-foot intervals. The slope-area method is the same as the normal depth method.

RV Wash K Trib 6D Floodplain Delineation
From a point approximately 600 feet south and 20 feet west of the intersection of 144th Street and East Rock View Road (River Mile 1.313) to a point approximately 900 feet south and 200 feet west of the intersection of 136th Street and Black Mountain Road (River Mile 2.629), a distance of 1.316 river miles.

RV Wash K Trib 6D Split 1 Floodplain Delineation
From a point approximately 30 feet north of the intersection of 144th Street and East Rock View Road (River Mile 0.337) to the divergence of RV Wash K Trib 6D and RV Wash K Trib 6D Split 1 at a point approximately 400 feet north and 1,000 feet west of the intersection of 144th Street and East Rock View Road (River Mile 0.565), a distance of 0.228 river miles.

The Cross-section data were generated by INROADS. The mapped hydraulic base line represents the 10,000-station point of the HEC-RAS model.

Topographic mapping is supplied by the Flood Control District of Maricopa County.

Discharge data is from the Rio Verde ADMP HEC-1 model. The original models are from the Flood Control District of Maricopa County, prepared for the Rio Verde South Floodplain Delineation, the Rio Verde South Extension Floodplain Delineation, the Rio Verde North Floodplain Delineation, and the Rio Verde North Extension Floodplain Delineation. The HEC-1 models were modified for the Rio Verde ADMP. The final HEC-1 files were received in February 2004 and FCDMC approved the hydrology model.

Hydrologic concentration points are noted in cross-section descriptions using the corresponding HEC-1 ID's. The flow rates have been rounded to the nearest 10 cubic feet per second (cfs). Flow rates obtained from HEC-1 are applied at the downstream end of the relevant sub-basin and stepped upstream at cross-sections to meet the HEC-1 flow from the upstream sub-basin.

River Mile (RM) stationing is based upon the estimated tie in point with downstream receiving waters or the start of two-dimensional flow models. This point represents RM 0.000. The assumed starting WS Elevation is based upon normal depth in the study wash.

Horizontal and Vertical Coordinate Basis for this project is as follows:
Horizontal--Arizona State Plane, Central Region, NAD 1983
Vertical--NAVD 1988

RAS model river naming corresponds to project river naming as follows:
RV WK T6D = RV Wash K Trib 6D
RV WK T6D S1 = RV Wash K Trib 6D Split

****

PLAN DATA

```
Plan Title: RV Wash K Trib 6D
Plan File : j:\2006\10-0606.1\Design Notebook\Drainage Design\HEC-RAS\RV_Wash_K_Trib_6D.p01

          Geometry Title: RV Wash K Trib 6D
          Geometry File : j:\2006\10-0606.1\Design Notebook\Drainage Design\HEC-RAS\RV_Wash_K_Trib_6D.g01

          Flow Title    : RV Wash K Trib 6D
          Flow File     : j:\2006\10-0606.1\Design Notebook\Drainage Design\HEC-RAS\RV_Wash_K_Trib_6D.f01

Plan Summary Information:
Number of:  Cross Sections =   23    Multiple Openings  =    0
            Culverts       =    0    Inline Structures  =    0
            Bridges        =    0    Lateral Structures =    1

Computational Information
    Water surface calculation tolerance  =  0.01
    Critical depth calculation tolerance =  0.01
    Maximum number of iterations         =  20
    Maximum difference tolerance         =  0.3
    Flow tolerance factor                =  0.001

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

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

River = RV WK T6D        Reach = R1
RS      Profile           Method  Value1  Value2
2.629   PF 2                   1 9986.7210013.25
2.579   PF 2                   1   1000010037.54
2.470   PF 2                   1 9985.1910010.78
2.378   PF 2                   1 9984.9910020.17
2.245   PF 2                   1 9985.4710007.83
2.120   PF 2                   1 9975.2910011.06
2.001   PF 2                   1 9984.0110009.25
1.894   PF 2                   1 9980.2110010.44
1.833   PF 2                   1 9956.5710014.33
1.771   PF 2                   1 9962.8210037.81
1.678   PF 2                   1 9915.1910015.88
1.614   PF 2                   1 9936.5410124.46

River = RV WK T6D        Reach = R2
RS      Profile           Method  Value1  Value2
1.567   PF 2                   1  9989.1 10061.7
1.453   PF 2                   1  9972.910012.58
1.397   PF 2                   1 9982.6610011.09
1.313   PF 2                   1 9984.2810026.66
1.311   PF 2                   1 9989.7910027.72
1.309   PF 2                   1 9995.8210025.18

River = RV WK T6D S1     Reach = R1
RS      Profile           Method  Value1  Value2
0.522   PF 2                   1 9994.4310004.24
0.387   PF 2                   1 9997.2510017.18
0.337   PF 2                   1 9989.1210013.42
0.335   PF 2                   1 9993.0210013.89
0.333   PF 2                   1 9995.5410021.67


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

FLOW DATA

Flow Title: RV Wash K Trib 6D
Flow File : j:\2006\10-0606.1\Design Notebook\Drainage Design\HEC-RAS\RV_Wash_K_Trib_6D.f01

Flow Data (cfs)
*************************************************************
* River           Reach           RS      *       100-YR FP *
* RV WK T6D       R1              2.629   *             210 *
* RV WK T6D       R1              2.378   *             350 *
* RV WK T6D       R1              2.001   *             460 *
* RV WK T6D       R2              1.567   *             446 *
* RV WK T6D S1    R1              0.522   *              14 *
*************************************************************

Boundary Conditions
*****************************************************************************************************
* River           Reach           Profile          *            Upstream                Downstream    *
*****************************************************************************************************
* RV WK T6D       R2              100-YR FP        *                                 Normal S = 0.013 *
* RV WK T6D S1    R1              100-YR FP        *                                 Normal S = 0.025 *
*****************************************************************************************************

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

GEOMETRY DATA

Geometry Title: RV Wash K Trib 6D
Geometry File : j:\2006\10-0606.1\Design Notebook\Drainage Design\HEC-RAS\RV_Wash_K_Trib_6D.g01

Reach Connection Table
*****************************************************************************
```

```
* River            Reach            *  Upstream Boundary  * Downstream Boundary *
*****************************************************************************
* RV WK T6D        R1               *                     *   J1                *
* RV WK T6D        R2               *   J1                *                     *
* RV WK T6D S1     R1               *   J1                *                     *
*****************************************************************************

JUNCTION INFORMATION

Name: J1
Description:
Energy computation Method

    Length across Junction              Tributary
     River            Reach               River            Reach        Length   Angle
RV WK T6D       R1                to RV WK T6D S1    R1                225.17
RV WK T6D       R1                to RV WK T6D       R2                246.16

CROSS SECTION


RIVER: RV WK T6D
REACH: R1                  RS: 2.629

INPUT
Description: Q=210 cfs (B1W4A, 24 hr)
Station Elevation Data    num=     104
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
 9839.24  2670.2 9840.94 2670.41 9842.86 2670.35  9873.9 2666.22 9880.54 2665.38
 9882.71  2665.1 9886.61 2664.36 9888.56 2663.83 9893.34 2662.54 9894.43 2662.24
 9894.53 2662.22 9895.04 2662.12 9901.29 2661.22 9902.42 2661.08  9903.8 2660.91
 9911.85 2659.94 9920.19 2658.92 9939.49 2658.45 9965.11 2657.82 9966.03 2657.73
 9966.41 2657.71 9970.98 2657.29 9975.03 2657.06 9976.25 2656.97 9978.72 2656.77
 9984.42 2656.53 9986.19 2656.45 9986.72 2656.43 9993.05 2655.95 9997.22 2655.63
  9999.3 2655.47 9999.98 2655.51   10000 2655.5110011.11 2656.2110013.25 2656.35
10024.79  2656.610033.86 2656.7710038.24 2656.0410039.44 2655.8210041.54 2655.44
10043.87  2655.710058.22 2657.2410058.24 2657.2410079.28  2657.310092.76 2657.33
10094.31 2657.3310094.74 2657.3310094.93 2657.3310095.27 2657.3310095.49 2657.33
10095.62 2657.3310095.64 2657.3310095.75 2657.3310095.83 2657.3310095.89 2657.33
10095.93 2657.3310095.94 2657.3310095.98 2657.3310096.01 2657.3310097.48 2657.34
 10097.7 2657.3510097.99 2657.3510098.43 2657.3610099.13 2657.3610100.43 2657.38
10103.75 2657.4110129.48 2657.6910185.94  2658.310193.16 2658.14   10195  2658.1
10195.57 2658.0810195.75 2658.0810195.83 2658.0810195.88 2658.0810197.95 2658.05
10198.59 2658.0410199.41 2658.0310200.07 2658.0210206.81 2657.9410258.76 2657.35
10258.85 2657.3410282.25 2658.5810290.27    265910291.22 2659.0510292.52 2659.12
 10293.6 2659.1910294.22 2659.22 10297.2 2659.46 10297.6 2659.5610298.08 2659.67
10299.71 2660.0110302.55 2660.6210307.65 2660.9710319.34 2661.7710328.96 2662.52
10333.23 2662.8310341.28 2663.4910345.91 2663.68 10348.7 2663.7710356.94 2664.09
10366.18 2664.3410368.01  2664.410368.67 2664.4210370.85 2664.46

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*************************************************
 9839.24    .055 9986.72     .0510013.25    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9986.7210013.25            264.65  264.65  264.65             .1       .3

CROSS SECTION


RIVER: RV WK T6D
REACH: R1                  RS: 2.579

INPUT
Description:
Station Elevation Data    num=     100
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
  9841.1 2656.24 9842.58 2656.07 9877.03 2652.34 9879.86 2652.12 9885.01 2651.81
  9892.4 2651.39 9899.54 2650.96 9900.04 2650.93 9905.14  2651.2 9909.75 2651.54
 9914.85 2651.66 9916.83 2651.67 9925.26 2651.96 9930.31 2652.05 9935.37 2652.14
 9940.41 2652.22 9945.46 2652.29 9947.85 2652.32 9953.33 2652.38 9958.84 2652.41
  9963.5 2652.43    9965  2652.3 9974.63 2652.37 9976.79 2652.39 9978.94 2652.41
   10000 2651.5410006.91 2651.2510006.97 2651.2510011.87 2651.3610016.86 2651.45
10023.482651.58710026.52 2651.6510026.75 2651.6510031.67 2651.7410036.52 2651.82
10042.02 2651.8610046.83 2651.9210051.82 2651.9510056.81 2651.97 10061.8    2652
10066.78 2652.0310067.34 2652.0210071.91 2652.0110076.73 2652.0110081.69    2652
10086.66    265210091.62 2651.9910096.59 2651.9910098.48    265210102.35 2651.98
10106.49 2651.9710111.45    2652 10116.4 2652.0410121.36 2652.0810126.32 2652.14
10129.28  2652.210132.85 2652.3110136.22 2652.3910141.17 2652.4310146.14 2652.46
 10151.1 2652.4810155.91 2652.5110158.24 2652.5510162.25 2652.6210192.76 2651.54
10193.55 2651.4910193.91 2651.4910194.21 2651.4910194.35 2651.4910215.17 2651.66
10219.36 2651.3610223.38 2651.1110230.05 2650.8210232.93 2650.7110235.17 2650.75
10240.23 2650.8610246.78 2651.0710253.71 2651.2410258.45 2651.4510262.42 2651.68
10265.73 2651.9310270.83  2652.310272.63  2652.410277.37 2652.6910282.15 2652.99
10286.95 2653.2910291.73  2653.610296.23 2653.88 10301.3 2654.2210302.53 2654.28
10306.41 2654.49 10311.3 2654.7610316.12 2655.0210321.06 2655.28   10326 2655.55
10330.95 2655.8210334.12 2655.9810336.93 2656.0410341.57 2656.0910345.59 2656.09

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*************************************************
  9841.1    .055   10000     .0510023.48    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         1000010023.48            580.4   580.4   580.4             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
```

```
10162.2510345.59 2652.62        F

CROSS SECTION


RIVER: RV WK T6D
REACH: R1                  RS: 2.470

INPUT
Description:
Station Elevation Data    num=      59
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 9795.87 2642.69  9801.4  2642.7 9820.03  2641.5 9828.17 2640.97 9830.38 2640.82
 9836.32 2640.43 9855.35 2639.19 9861.39 2638.41 9863.67 2638.21 9868.06 2637.83
 9870.78 2637.59 9884.38 2638.42 9885.33 2638.48 9885.76 2638.52 9902.06 2639.69
 9904.59 2639.68 9914.31 2639.66 9915.79 2639.66 9919.48 2639.65 9922.12 2639.66
 9947.22 2639.85 9978.02 2639.71 9980.47 2639.65 9980.53 2639.65 9980.61 2639.65
 9980.81 2639.65 9982.99 2639.22    99842639.015 9996.352636.502   10000 2635.76
10000.01 2635.7610000.27  2635.710003.012636.50210010.48 2638.6910011.63 2639.01
10015.82    263910030.94 2638.9110031.29 2638.9110039.42 2639.5810043.42 2639.86
10045.17 2639.9210049.76 2640.2210049.91 2640.23 10050.4 2640.2610052.76 2640.41
10054.05 2640.5210057.82 2640.9410058.86 2641.0510061.01 2640.9810063.39 2641.06
 10090.3 2642.1310090.85  2642.210092.55 2642.4310101.26 2643.0110108.21 2643.31
10123.82 2643.92 10125.1    264410127.51 2644.1610132.27  2644.4

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9795.87    .055 9996.35     .0510003.01    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          998410011.63           477.85  477.85  477.85            .1       .3
Left Levee      Station= 9947.22      Elevation= 2639.85

CROSS SECTION


RIVER: RV WK T6D
REACH: R1                  RS: 2.378

INPUT
Description: Q=350 cfs (CB1W4, 24 hr)
Station Elevation Data    num=      47
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 9926.57 2631.17 9928.96 2631.21 9929.63 2631.17 9932.29 2630.99 9932.96 2630.95
 9954.19 2629.69 9964.73 2629.08 9969.03 2628.83 9984.99 2627.89 9985.87 2627.71
  9987.9 2627.39 9992.02 2626.69 9994.87  2626.3 9995.06 2626.27 9995.39 2626.23
   10000 2626.1610000.01 2626.1610001.61 2626.1410001.89 2626.1310008.03 2626.73
10017.06 2627.6110020.172627.889   10029 2628.6810029.04 2628.6810030.14 2628.72
 10036.4 2629.3810037.53  2629.510058.55 2629.0310070.72 2628.7610072.39  2628.6
10077.17 2628.1410078.11 2628.0510078.28 2628.0610086.12 2628.6210090.67 2628.65
10094.02 2628.7310100.91 2628.8210110.93 2629.1510112.26 2629.1610112.66  2629.2
10127.21 2630.5810139.61  2631.810143.09 2632.1410143.48 2632.1810146.47 2632.48
10149.63 2632.4510154.54 2632.53

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9926.57    .055 9992.02     .0510008.03    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9984.9910020.17           709.84  709.84  709.84            .1       .3
Right Levee     Station=10037.53      Elevation=  2629.5

CROSS SECTION


RIVER: RV WK T6D
REACH: R1                  RS: 2.245

INPUT
Description:
Station Elevation Data    num=      68
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 9916.79  2618.8 9923.22 2619.01  9923.3 2619.03 9945.86 2616.45 9966.56 2614.03
 9974.81 2613.46 9979.56 2613.12 9983.01 2611.84 9985.47 2610.99 9987.19 2610.39
 9987.72 2610.22 9993.21 2610.22 9996.61  2610.2  9997.5 2610.17 9998.01 2610.15
   10000 2610.0910004.08 2610.0410005.13 2610.3110007.83 2610.9810009.26 2611.22
10010.26 2611.3310011.84 2611.5810012.72 2611.6410015.78 2611.9610017.65 2612.08
10021.25 2612.4710022.59 2612.57 10026.7 2613.0210027.54 2613.0910032.14 2613.61
10032.49 2613.6410034.91 2613.9310035.55 2614.0210037.61 2614.1110042.49 2614.33
10046.67 2614.5110049.61 2614.6410050.13 2614.6210050.88 2614.6410053.09 2614.59
10079.58 2614.5110082.54 2614.4710085.36 2614.4810085.85 2614.4810086.26 2614.47
10092.93 2614.5110093.85  2614.510098.25 2614.5410104.38 2614.7610107.69 2614.88
10119.01 2615.2910130.51  2615.710133.45 2615.8110138.34 2615.99 10142.5 2616.76
10144.41 2617.08 10149.1    261610149.72 2615.8510150.43 2615.86 10150.6 2615.87
10165.07 2615.9910170.14 2616.6310170.85 2616.7210184.16 2617.8110184.38 2617.83
10204.65 2618.3610219.35 2618.6910224.05 2618.11

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9916.79    .055 9985.47     .0510007.83    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9985.4710007.83           652.23  652.23  652.23            .1       .3
```

CROSS SECTION

RIVER: RV WK T6D
REACH: R1 RS: 2.120

INPUT
Description:
Station Elevation Data num= 85

```
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
 9847.36    2600 9851.39 2599.77  9853.6 2599.66 9858.63 2599.42 9862.39 2599.25
 9866.31  2599.1 9871.29 2598.92 9874.24 2598.81 9878.76 2598.69 9883.79 2598.55
 9886.98 2598.48  9891.2 2598.31 9893.98 2598.16 9898.83 2597.88 9903.83  2597.6
 9908.36 2597.34 9911.19 2597.21 9915.54 2597.09 9918.83 2597.06 9923.84 2596.99
 9928.84 2596.92 9931.17 2596.89 9936.14 2596.94 9938.87 2596.91  9943.9 2596.95
 9948.92 2596.98 9951.05 2597.03 9956.07    2597 9961.07 2596.98 9965.49 2596.96
 9968.92 2596.94 9973.92 2596.94 9976.07 2596.92 9981.07 2596.84 9986.07 2596.76
 9991.07 2596.67  9993.9 2596.74 9998.91 2596.76   10000 2596.7310001.07 2596.74
10006.07 2596.8810011.06 2597.0110015.26 2597.1310017.88 2597.2710021.02  2597.5
10026.01 2597.7610030.69 2597.9910033.96 2598.0710038.97 2598.2110041.44 2598.31
   10046 2598.4810050.98 2598.6810055.95 2598.8710059.54    2599 10061.1    2599
10065.94 2598.9810070.94 2598.9610075.94 2598.9410079.02 2599.0210084.01 2599.16
10085.95 2599.1810090.95 2599.3910095.96  2599.610100.96  2599.810102.82 2599.89
10105.95 2600.0610110.96 2600.3310115.95  2600.610120.96 2600.8710125.96 2601.14
   10129 2601.2810130.96 2601.3710135.96 2601.5710140.95 2601.7710145.95 2601.97
10150.94 2602.1610154.01 2602.2110155.94 2602.2810160.94 2602.2410165.95  2602.2
10170.96 2602.1510175.96 2602.1110178.96 2601.9810180.97 2601.9510182.62 2601.83
```

Manning's n Values num= 3

```
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
 9847.36    .055 9981.07     .0510011.06    .055
```

```
Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9981.0710011.06            635.16  635.16  635.16             .1       .3
```

CROSS SECTION

RIVER: RV WK T6D
REACH: R1 RS: 2.001

INPUT
Description: Q=460 cfs (CB2W4B, 24 hr)
Station Elevation Data num= 102

```
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
  9739.7 2586.86 9742.79 2586.84 9750.04 2586.78 9753.89 2586.76 9758.29 2586.74
 9759.15 2586.66 9759.36 2586.65 9764.47 2586.21 9764.83 2586.18  9766.3 2586.04
 9770.14 2585.71 9774.94 2585.25 9780.95 2584.72  9782.4 2584.58 9785.38 2584.31
 9791.63 2583.82 9792.49 2583.74 9792.68 2583.73 9795.77  2583.5 9799.99 2583.86
 9802.03 2584.08  9806.7 2584.51 9812.44 2585.18 9813.13 2585.25 9814.11 2585.37
 9829.13 2585.22 9841.89 2585.03 9842.09 2585.01 9844.59 2584.77 9847.52 2584.54
 9856.88 2583.72 9857.13 2583.71 9860.25 2584.13 9864.34 2584.53 9872.35 2585.37
 9874.89 2585.58 9878.85 2585.71 9880.46 2585.75 9889.29 2586.02    9891 2586.06
 9895.64 2586.18 9906.29 2586.45 9906.54 2586.45 9919.46 2586.26 9927.98 2586.12
 9937.72 2585.28 9945.66 2584.59 9947.06 2584.48 9949.78 2584.23 9949.88 2584.23
 9950.82 2584.18 9953.03 2584.08 9955.76 2583.93 9956.49 2583.86 9956.59 2583.85
 9958.09 2583.63 9959.12  2583.6 9977.95 2582.71 9980.08 2582.64  9982.1 2582.59
 9984.01 2582.53 9985.98 2582.37 9986.39 2582.32 9999.26 2581.28   10000 2581.21
10000.01 2581.21 10002.2 2581.0110009.252582.53910013.45 2583.4510017.74  2584.3
10023.52  2584.3 10055.4 2584.7310058.88 2584.76 10059.5 2584.7710067.37 2584.83
10070.47 2584.8310072.03 2584.8310078.35 2584.8710081.37 2584.8810085.56 2584.97
10094.57 2585.1510094.66 2585.1510095.16 2585.16 10097.2 2585.2110097.54 2585.21
10102.81 2585.4610108.94 2585.7310109.84 2585.7610115.28    258610116.91 2586.05
10121.65 2586.25   10124 2586.3210127.74  2586.610128.17 2586.6110130.75 2586.74
10133.71 2586.9510137.62 2587.1310139.59 2587.27 10139.8 2587.2810144.55 2587.29
10146.96 2587.2910151.18 2587.13
```

Manning's n Values num= 3

```
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
  9739.7    .055 9984.01     .0510009.25    .055
```

```
Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9984.0110009.25            563.9   563.9   563.9             .1       .3
Left Levee      Station= 9906.29      Elevation= 2586.45
```

CROSS SECTION

RIVER: RV WK T6D
REACH: R1 RS: 1.894

INPUT
Description: A flow distribution was performed at this cross section in conjunction with a lateral weir between between cross sections 1.833 and 1.678 in order to determine the amount of flow leaving from the left overbank. This is an iterative solution, varying the reduction in flow at this cross section and allowing the downstream lateral weir to optimize until the flow distribution results are the same. These flows are reported on the work map, but are not subtracted from the total flow in downstream cross sections.
Station Elevation Data num= 91

```
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
 9820.24 2572.16  9823.1 2572.27 9828.52 2572.06 9842.64 2571.48 9855.41 2571.02
 9858.95 2570.92 9861.59 2570.84 9863.63 2570.79 9865.25 2570.74 9865.92 2570.72
```

```
 9866.55 2570.71 9867.61  2570.7 9892.83 2570.45 9896.48 2570.43  9901.1 2570.42
 9913.99 2570.56 9919.89 2570.62 9930.65 2570.73 9945.36 2570.88    9946 2570.89
 9946.46 2570.89 9947.81 2570.92 9955.26 2570.69 9956.68 2570.65 9970.39 2570.24
 9984.172569.716    99902569.494 9999.59 2569.13   10000 2569.1210000.53  2569.1
10000.95 2569.1210010.442569.71310019.282570.26610022.23 2570.4510033.88  2570.9
 10041.3 2571.1710054.96 2571.5310068.68 2571.9210075.69 2572.1110076.16 2572.13
10082.72 2572.3210089.54 2572.2510091.54 2572.2210097.86 2572.1610100.48 2572.13
10106.98 2572.0710120.45 2571.9710120.87 2571.9610132.69 2571.87 10136.6 2571.71
10138.22 2571.64 10143.6 2571.4310147.82 2571.2510149.67 2571.1810150.09 2571.16
10155.69 2570.9610158.12 2570.8610164.81 2570.6410169.47 2570.6210171.65 2570.61
10172.25  2570.610172.79 2570.5910174.72 2570.7910175.51 2570.8410181.36 2571.19
10183.07 2571.4510183.97 2571.5210187.11 2571.8610187.94 2571.9110190.73 2572.21
10194.25 2572.4410196.37 2572.6610197.85 2572.7510199.43  2572.910201.97 2573.08
10206.26  2573.410207.53 2573.5210208.59 2573.6210213.16 2573.94   10214 2574.01
10218.74 2574.3510219.39  2574.410219.85 2574.4510228.66 2574.8910230.93 2574.94
10236.79 2575.0710239.95 2575.1410240.24 2575.1510240.43 2575.1410242.37 2575.08
10245.73 2574.97

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9820.24    .055    9990     .0510010.44    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9984.1710010.44           321.22  321.22  321.22             .1       .3
Right Levee     Station=10082.72      Elevation= 2572.32

CROSS SECTION


RIVER: RV WK T6D
REACH: R1                 RS: 1.833

INPUT
Description: A lateral weir exists between RM 1.833 and RM 1.678 to determine
             the amount of flow leaving the left overbank. This flow is
             reported on the work maps, but is not subtracted from the total
             flow in downstream cross sections.
Station Elevation Data    num=      62
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9803.83 2564.77 9804.09 2564.77 9805.04 2564.77 9807.91 2564.78 9807.97 2564.78
 9819.46 2564.48 9820.22 2564.47  9825.9 2564.26 9829.47 2564.14 9831.04 2564.08
 9831.66 2564.07 9833.08 2564.03    9842 2563.61 9862.21 2562.65 9864.41 2562.52
 9866.35  2562.4 9868.01 2562.33  9873.5 2562.02 9878.51 2562.19  9884.8 2562.57
 9887.34 2562.64 9889.36 2562.72 9891.88 2562.85 9894.59 2562.96 9896.37 2563.05
 9897.75 2563.09 9898.69 2563.12 9898.97 2563.14 9899.76 2563.14 9902.43  2563.3
 9909.81 2563.38 9911.05 2563.39 9915.44 2563.42 9919.45 2563.45 9923.08 2563.48
 9925.96  2563.5 9926.37  2563.5 9965.91 2563.18 9968.23 2563.18 9977.64 2563.04
  9994.7 2562.42 9996.11 2562.37   10000 2562.3110000.54  2562.3 10007.6 2562.63
10009.97 2562.7710014.332563.02110015.71  2563.110017.49 2563.0210018.28 2563.02
10019.93    256310046.41 2562.7310046.88 2562.7410050.31 2562.84 10052.2  2562.9
10065.36 2563.35 10065.8 2563.3510067.14 2563.3810068.55  2563.410090.83 2563.88
10098.84 2564.0510099.29 2564.03

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9803.83    .055 9977.64     .0510014.33    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9977.6410014.33           359.53  325.68  325.68             .1       .3

LATERAL STRUCTURE


RIVER: RV WK T6D
REACH: R1                 RS: 1.832

INPUT
Description:
Lateral structure position     = Left overbank
Distance from Upstream XS =     .01
Deck/Roadway Width        =      10
Weir Coefficient          =     2.6
Weir Flow Reference       = Water Surface
 Weir Embankment Coordinates    num =       99
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
       0 2564.77   10.11 2564.49   19.63 2564.15   41.46  2563.6   47.45 2563.49
   55.61 2563.26   66.58 2563.02   70.53 2562.91      85  2562.2   86.19 2562.22
   94.33  2561.8   98.99  2561.6    99.9  2561.6  108.31 2561.28  114.91  2561.1
  128.92 2560.59  133.56 2560.29  162.71 2559.27   166.7 2559.08  175.12  2558.6
  176.16 2558.55  182.12 2558.58  183.06 2558.53  187.15 2558.56  187.95 2558.52
  194.38 2558.49  202.15 2558.49  220.12 2558.13  238.83 2557.28   243.5 2557.12
  250.78 2556.93  264.06 2556.64  273.86 2556.55  284.02 2556.55  289.99 2556.39
  293.05 2556.23  301.69 2555.99  324.23 2555.21  329.83 2555.06  359.52 2554.61
  369.58  2554.1  370.34 2553.99  374.36 2553.87  375.38 2553.87  379.56 2553.68
  383.48 2553.65  393.38 2553.43  395.73 2553.37  412.59 2553.08  413.93 2553.03
   416.5 2553.06  417.12 2553.04  421.43 2553.07  423.98 2553.06  430.98    2553
  446.82 2552.94  450.56 2552.85  457.39 2552.48  467.83 2552.15  472.68 2551.95
  480.12 2551.77  483.19 2551.63  485.99 2551.47   487.8 2551.44  508.38 2551.12
  513.24 2550.97  560.04 2549.98  567.17  2549.8  587.19 2549.46  589.18 2549.35
  594.91 2549.25  606.49 2548.74  612.87  2548.6  619.21 2548.42  631.19 2548.17
  636.16 2548.15  640.63 2548.07  649.67 2548.07  659.53 2547.92  660.62 2547.91
  675.61  2547.4  685.28 2547.15  699.36 2546.91  702.03 2546.82  708.74 2546.51
  718.95 2545.97  725.24 2545.61  744.29 2544.87  766.81 2544.04  768.43 2543.98
  771.93 2543.78  776.19 2543.62  777.74 2543.52  810.08 2542.56  814.74 2542.46
  823.84 2542.44  832.08 2542.25  833.43 2542.26     838 2542.15
```

```
Weir crest shape                          = Broad Crested

CROSS SECTION


RIVER: RV WK T6D
REACH: R1                  RS: 1.771

INPUT
Description: A lateral weir exists between RM 1.833 and RM 1.678 to determine
             the amount of flow leaving the left overbank. This flow is
             reported on the work maps, but is not subtracted from the total
             flow in downstream cross sections.
Station Elevation Data    num=     201
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 9742.86 2558.29 9746.94 2558.25  9747.9 2558.26 9751.08 2558.29 9754.49 2558.18
 9754.68 2558.17 9760.75 2557.96 9760.95 2557.95 9762.83 2557.88 9763.24 2557.86
 9767.02 2557.67 9767.98 2557.61 9773.29 2557.35 9774.69 2557.26 9779.58 2557.01
  9781.4 2556.89 9785.84 2556.66 9788.11  2556.5 9809.82 2555.51 9811.54 2555.35
 9813.94 2555.13 9815.67 2554.98 9815.71 2554.97 9818.07 2554.76 9819.85 2554.61
 9821.49 2554.47 9823.56 2554.29 9824.39 2554.21 9826.62 2554.02 9826.89 2553.98
 9829.17 2553.79 9831.98 2553.35  9832.6 2553.29 9836.28 2552.69 9837.23 2552.61
 9841.97 2552.11 9842.39 2552.07 9843.73 2551.92 9845.17 2551.99    9851 2552.14
 9859.13 2552.38 9861.08 2552.47 9868.02  2552.7 9871.21 2552.86 9876.88 2553.05
 9881.39 2553.28 9885.69 2553.43 9889.74 2553.65 9891.79 2553.75 9894.53 2553.88
 9902.14 2554.25 9903.45 2554.31 9910.79 2554.68 9912.53 2554.61 9922.86 2554.41
 9926.49 2554.33 9930.82 2554.23 9938.26 2554.08 9942.46    2554 9944.54 2553.94
 9954.66 2553.67  9955.4 2553.65  9957.9 2553.58 9966.38 2553.98 9974.07 2554.47
 9977.37 2554.65  9980.9  2554.9  9991.9 2554.53   10000  2554.210008.37  2554.5
10008.67 2554.51 10015.5 2554.77 10018.12554.90510020.89 2555.0510024.94 2555.29
10030.14 2555.5710037.81 2556.0610039.12 2555.9510039.52 2555.9110044.45 2555.38
 10052.2 2555.2710053.06 2555.22 10054.2 2555.17   10064 2555.1210072.78 2555.08
 10075.1 2555.0610076.19 2555.0510084.78 2554.9710090.13 2554.9410094.61 2554.91
10103.83 2554.8710104.59 2554.8610106.77 2554.8510109.14 2554.7610109.84 2554.74
10113.51  2554.610118.85 2554.4210122.07 2554.3110125.94 2554.1910132.52 2554.55
10134.15 2554.6410140.64    255510144.05 2555.1610144.52 2555.1810147.49 2555.31
10155.54 2555.68 10156.2 2555.6810156.39 2555.6810164.83 2555.6610168.96 2555.66
10170.07 2555.6610184.33 2555.7410186.41 2555.7510187.15 2555.7510187.64 2555.75
10189.04 2555.7610189.48 2555.7710189.85 2555.7810190.16 2555.7810199.88 2556.13
10207.12 2556.4310212.79 2556.5310218.22 2556.6510230.55 2556.8110233.99 2556.62
10238.02 2556.3910239.21 2556.3110240.48 2556.22 10244.9  2555.9 10246.3  2555.8
10257.74 2555.5410259.79 2555.47 10263.8  2555.310265.92 2555.1910275.56 2554.82
10275.86 2554.8110276.67 2554.7810279.77 2554.7610294.55 2554.6710304.13 2554.97
10315.79 2555.3310318.11 2555.3210321.66  2555.310326.14  2555.110329.75 2554.85
10332.17 2554.6710333.88 2554.5510348.61 2553.4910351.14 2553.3110353.43 2553.12
10355.45 2552.9510355.96 2552.9210357.92 2552.7910363.38 2552.2710365.29  2552.1
10365.64 2552.0910372.53 2552.0310378.83  2551.810379.14 2551.7910381.27 2551.74
10381.73 2551.7310382.76 2551.68 10383.7 2551.6710383.78 2551.6610385.29 2551.61
10385.55 2551.6110398.87  2551.1 10398.9  2551.110400.33 2551.1210401.37 2551.14
10411.51 2551.2810421.22 2551.4710422.53  2551.510423.04 2551.5110424.07 2551.53
10434.97 2552.3310435.44 2552.3610435.64 2552.3610435.81 2552.3710436.37 2552.49
10436.54 2552.4910440.45 2553.1910443.34 2553.6710446.58 2554.0810450.84 2554.66
10456.49 2555.4210457.24 2555.5410462.64 2556.2410463.55  2556.310463.62  2556.3
10468.45  2556.610468.95 2556.6410473.38 2556.9110474.48 2556.9810477.31 2557.33
 10480.9 2557.7810492.91 2558.7110493.34 2558.7410499.97 2559.2210500.58 2559.17
10502.28 2559.03

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
 9742.86    .055  9991.9     .0510008.67    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        9980.9 10018.1           478.48  489.45  489.45              .1       .3
Ineffective Flow     num=        1
   Sta L   Sta R    Elev  Permanent
 9742.86 9910.79    2557       F
Right Levee     Station=10155.54      Elevation= 2555.68

CROSS SECTION


RIVER: RV WK T6D
REACH: R1                  RS: 1.678

INPUT
Description: A lateral weir exists between RM 1.833 and RM 1.678 to determine
             the amount of flow leaving the left overbank. This flow is
             reported on the work maps, but is not subtracted from the total
             flow in downstream cross sections.
Station Elevation Data    num=     125
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 9762.152542.147 9762.83 2542.14 9762.94 2542.14 9765.29 2542.13 9767.08 2542.12
 9792.08 2541.32 9792.72  2541.3 9792.77 2541.29 9792.81 2541.29 9792.82 2541.29
 9792.89 2541.29 9792.92 2541.29 9792.96 2541.29 9793.26 2541.27    9812 2540.42
 9839.27 2541.36 9846.32 2541.61 9847.57 2541.59  9859.1 2541.35 9884.28 2540.84
 9886.98 2540.78 9893.61 2541.16 9896.69 2541.33 9897.86  2541.4 9898.44 2541.42
 9899.62 2541.48 9910.52 2541.78    9912 2541.79 9913.92  2541.8 9916.68 2541.84
  9921.1 2541.89 9929.36 2541.99  9943.2 2542.16 9945.17 2542.14 9945.94 2542.14
 9953.59 2542.08 9957.55 2542.05  9958.2 2542.05 9959.14 2542.04 9964.18 2541.99
 9970.11 2541.97 9972.46 2541.95  9973.5 2541.95 9979.86 2542.02 9987.63  2541.3
  9999.3 2540.23 9999.46 2540.25   10000 2540.3110000.03 2540.3110015.88 2542.14
10019.72 2542.0810029.87 2541.9210033.48 2541.9810050.97 2542.2510053.13 2542.28
10053.57 2542.2810074.68 2542.6610079.37 2542.7410083.91  2542.910096.07 2543.32
10100.19 2543.4710105.34 2543.6610109.62 2543.5910110.83 2543.5310115.64 2543.42
10116.99 2543.39 10121.4 2543.1810121.63 2543.1710125.74 2543.0410132.24 2542.74
10134.07 2542.6810142.44 2542.2810142.66 2542.2710142.68 2542.2710150.01 2542.14
```

```
10151.02 2542.1310157.31 2542.0310158.67 2542.0310163.51 2541.9510182.35 2541.09
10185.05 2540.9710188.95 2540.7910189.24 2540.7710194.72 2540.3110198.33 2539.88
10202.13 2540.6710202.85 2540.8110203.75 2540.9810207.93 2541.2610218.01 2541.86
10218.02 2541.8610218.11 2541.8710218.17 2541.8810219.38 2541.94 10223.3 2542.13
10224.19 2542.1810224.21 2542.1810225.49 2542.2610227.56 2542.3910229.61 2542.52
10242.01 2543.2610242.32 2543.2810243.99 2543.4310248.68 2543.8210248.81 2543.83
10248.94 2543.8410253.04 2544.19 10253.6 2544.2410253.65 2544.2510253.68 2544.26
10258.63 2544.6610258.91 2544.6810263.61 2545.0710264.12  2545.1 10268.6 2545.47
10269.31 2545.5210273.59 2545.87 10274.5 2545.9310278.58 2546.2610279.05  2546.3
10291.63 2547.4810295.38 2547.8610300.78 2548.4110316.73  2548.710321.81 2548.73

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
 9762.15    .055 9979.86     .0510079.37    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9979.8610015.88           339.26  339.26  339.26             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
10105.3410321.81 2543.66       F

CROSS SECTION


RIVER: RV WK T6D
REACH: R1                 RS: 1.614

INPUT
Description:
Station Elevation Data    num=     200
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9541.02  2533.7 9544.38 2533.31 9547.46 2533.05 9548.55 2532.93 9549.27 2532.88
 9554.46 2532.53 9555.18 2532.48 9558.85 2532.22 9559.95 2532.14 9560.29 2532.11
  9561.2 2532.01 9563.81 2531.78 9567.35 2531.43  9572.3 2530.95 9573.09 2530.87
 9574.38 2530.74 9578.91 2531.16 9589.21 2531.45 9589.52 2531.47 9590.89 2531.44
 9593.29 2531.73 9594.01 2531.77 9599.65 2532.36 9600.19 2532.39  9602.1 2532.51
 9604.35 2532.73 9608.21 2532.95 9614.62 2533.39 9618.22 2533.62 9625.36 2534.14
 9626.03 2534.15 9626.15 2534.15 9631.09 2534.22 9631.69 2534.24 9631.93 2534.25
 9636.23 2534.32 9667.99    2535 9668.07    2535 9682.51 2534.48 9701.74 2533.85
  9704.9 2533.78 9705.56 2533.78 9708.26 2533.71 9715.91 2533.83 9718.52 2533.87
 9721.62 2533.96 9741.47  2534.4 9745.12 2534.58 9745.86 2534.59 9749.53 2534.77
 9750.25 2534.78 9753.31 2534.94 9753.91 2534.94 9754.58 2534.95 9758.08 2534.92
 9758.61 2534.93 9762.28 2534.89 9765.25 2534.86  9766.7 2534.89 9767.09 2534.89
 9771.38 2534.95 9773.06 2534.93 9775.07 2534.95 9776.16 2534.91 9778.88 2534.88
 9780.98 2534.82  9784.6 2534.79 9785.88 2534.76 9787.33 2534.76 9790.34 2534.77
 9790.78 2534.76 9793.13 2534.79 9796.34 2534.62 9800.51 2534.41 9801.65 2534.35
 9802.96 2534.26 9804.28 2534.31 9806.49 2534.19 9808.64  2534.1 9810.53 2534.11
 9812.73 2534.02 9814.43 2534.02 9832.26 2533.26 9839.67 2533.13 9840.53 2533.11
 9845.17 2533.04 9854.45 2532.49 9856.25 2532.39 9860.92 2532.12 9863.94 2531.97
 9867.58 2531.79 9871.01  2531.6 9871.98 2531.54 9885.01 2530.94 9886.75 2530.97
 9887.75 2530.97 9894.58 2531.46 9897.09 2531.64 9897.59 2531.67 9900.16 2531.71
 9900.81 2531.72 9904.31  2531.8 9906.19 2531.84 9916.72 2532.04 9939.92 2532.41
 9968.86 2533.01 9976.09 2533.14 9986.43 2533.37 9986.53 2533.37 9996.68 2532.58
 9998.64 2532.43   10000 2532.3610001.75 2532.2810006.03 2532.4110007.25 2532.45
10012.14 2532.6110014.39 2532.7210015.08 2532.75 10019.7    253310026.22 2532.93
10031.42 2532.8110043.39 2532.6110054.62 2532.27 10072.4 2532.9310083.87 2533.31
10089.96    2533 10092.7 2532.8610098.98 2532.5110127.52 2530.9510127.53 2530.95
10144.19 2530.9810150.74 2530.9510156.22 2531.14   10158 2531.2310163.08 2531.43
10166.65 2531.6310170.08 2531.7810175.06 2532.0810182.38 2532.5810183.32 2532.63
10183.36 2532.6310187.03 2532.7710187.64  2532.810191.72 2532.9410191.84 2532.95
10192.59 2532.9710197.68 2533.0110197.96 2533.0110203.11 2533.04 10203.9 2533.07
10205.72 2533.1410214.91 2533.3210217.49 2533.4510219.58 2533.4810221.11  2533.5
10221.85 2533.5510224.47  2533.710227.68  2533.910231.65 2534.15 10231.7 2534.15
10235.65 2534.3210243.06 2534.7810247.38 2534.9510247.82 2534.9510250.65 2535.06
10252.02 2535.1210256.25 2535.2910256.42  2535.3 10258.6 2535.41 10258.8 2535.41
10263.46 2535.6610263.58 2535.6710266.74 2535.8410269.51 2535.8310271.07  2535.9
10273.21 2536.0110277.79 2536.2410278.59 2536.2510282.53 2536.4410282.82 2536.44
10283.78 2536.4810287.27 2536.6310288.93 2536.6910288.96 2536.6910292.01 2536.66
10293.83 2536.7310294.13 2536.7210296.75 2536.6310299.31 2536.6210302.72 2536.49
10304.49 2536.4710308.71 2536.2810309.66 2536.2710311.08  2536.210311.45 2536.19
10314.94 2536.0710315.61 2536.0510324.08 2535.5910324.89 2535.5210326.82 2535.33

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
 9541.02    .055 9856.25     .05 9939.92    .05510089.96     .0510197.68    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9986.4310083.87                0       0       0             .1       .3
Left Levee      Station= 9667.99      Elevation=    2535

CROSS SECTION


RIVER: RV WK T6D
REACH: R2                 RS: 1.567

INPUT
Description: Q=446 cfs (This flow is a result of the energy analysis at the
             upstream split)
Station Elevation Data    num=      50
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
  9862.7 2527.33 9864.93  2527.2 9868.23 2527.01 9868.82    2527 9869.96  2526.9
 9870.88 2526.89  9875.7 2526.83  9878.8 2526.79 9892.17 2526.39 9900.29  2526.4
 9927.27 2526.22 9934.58  2526.1 9940.59 2526.01 9959.02 2525.92 9960.14 2525.91
  9989.1 2525.75 9994.77 2524.98   10000 2524.2710003.36 2523.8110008.44 2524.38
10012.68 2524.8210021.852525.75210028.13 2526.3910029.22 2526.3610035.22  2526.2
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10036.36 2526.1710041.29 2526.0410043.48    252610047.02 2525.9110049.99 2525.85
10053.52 2525.7910054.12 2525.7710057.43 2525.6910077.58 2524.7210081.52 2524.69
10083.74 2524.6510085.95 2524.6110087.21 2524.5810090.92  2524.510097.73 2524.96
10100.97 2525.1810115.28 2524.8210123.97 2524.6110130.15 2525.1610138.53 2525.91
10143.81 2526.3810168.62 2528.2910169.95 2528.2910172.41 2528.2910174.36 2528.29

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
  9862.7    .055 9994.77     .0510012.68    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        9989.110021.85           600.29  600.29  600.29             .1       .3

CROSS SECTION


RIVER: RV WK T6D
REACH: R2                 RS: 1.453

INPUT
Description:
Station Elevation Data    num=      54
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 9877.38 2510.68 9883.57 2510.41 9888.29 2510.24 9891.11 2510.15  9907.9 2509.49
 9913.65 2509.38 9915.67 2509.24 9922.44 2508.76 9926.46 2508.47 9929.73 2508.15
  9932.3 2507.95 9936.67 2507.49 9937.89 2507.39 9938.04 2507.38 9938.31 2507.36
 9943.49 2506.95  9943.9 2506.92 9944.06 2506.91 9944.39 2506.89 9946.72  2506.7
 9950.54 2506.47 9953.26  2506.3 9953.29 2506.29 9953.54 2506.29 9953.72 2506.29
 9956.87 2506.22 9960.17 2506.15 9964.22 2506.07 9965.44 2506.14 9978.95 2506.93
 9992.79  2506.6 9998.97 2506.41 9999.97  2506.4   10000  2506.410003.52 2506.36
10012.58 2506.8910019.48 2507.3110033.94 2508.1310042.55 2507.9210044.69 2507.87
10062.04 2507.4510062.32 2507.4510063.17 2507.4410063.39 2507.4410075.41 2507.12
10077.31 2507.1110080.02  2507.110084.28 2507.0810091.88 2507.0410106.37 2507.02
 10106.4 2507.0210159.11 2509.9610184.39 2511.3610191.49 2511.07

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
 9877.38    .055 9992.79     .0510012.58    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        9978.9510012.58          294.61  294.61  294.61             .1       .3
Right Levee     Station=10033.94      Elevation= 2508.13

CROSS SECTION


RIVER: RV WK T6D
REACH: R2                 RS: 1.397

INPUT
Description:
Station Elevation Data    num=      82
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 9867.91 2502.93 9871.77 2503.07 9881.47  2502.4  9882.4 2502.34 9887.25    2502
 9892.68 2501.61 9897.75 2501.24 9904.26 2500.86 9906.76 2500.69 9917.02 2500.13
 9917.23 2500.11 9918.27 2500.06 9921.84 2500.02 9925.27 2499.97 9961.87 2499.91
 9966.44 2499.91 9969.51  2499.9 9982.66  2499.9 9990.92 2498.61 9996.79  2497.7
  9997.4 2497.74 9999.96 2498.03   10000 2498.0410004.69 2498.5710007.52 2498.89
10008.84 2499.0910009.31 2499.1410011.09 2499.4110011.13 2499.4110011.65 2499.42
10021.02 2499.4210024.78 2499.4910026.72  2499.510033.25 2499.6510033.33 2499.65
10033.88 2499.6610041.05 2500.0910041.98 2500.1410043.59 2500.2510043.65 2500.25
10046.11 2500.4110051.65 2500.8310056.49 2501.1410060.84 2501.4510067.01 2501.85
10068.05 2501.9210070.14 2502.0710079.23 2502.6510079.53 2502.6510079.56 2502.65
 10079.6 2502.6510087.36 2502.7210089.37 2502.79 10095.2 2502.87 10099.1 2503.04
10103.05 2503.1110103.94 2503.1310105.74 2503.22 10110.9 2503.4710114.27 2503.63
10115.28 2503.6810118.78 2503.7310118.84 2503.7310119.01 2503.7410120.17 2503.75
10128.29 2504.2110137.23 2504.7310140.56 2504.89 10148.6 2505.3910150.06 2505.43
10150.27 2505.4410150.54 2505.45 10150.9 2505.4710151.42 2505.4810152.04  2505.5
10152.25  2505.5 10153.8 2505.5510157.81 2505.6610180.25 2506.2810181.41 2506.23
10182.34 2506.1910183.66 2506.13

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
 9867.91    .055 9990.92     .0510004.69    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        9982.6610011.09              446     446     446             .1       .3

CROSS SECTION


RIVER: RV WK T6D
REACH: R2                 RS: 1.313

INPUT
Description:
Station Elevation Data    num=      78
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
  9824.4 2494.09 9826.64 2494.08 9828.56 2494.08  9828.7 2494.08 9835.52 2494.05
 9836.67 2494.05 9842.09 2494.03 9842.69 2494.03 9843.61 2494.01 9847.54 2493.96
 9848.35 2493.95 9851.13 2493.89 9852.06 2493.87 9857.72 2493.73 9859.78 2493.64
 9865.34 2493.48 9866.27 2493.45 9867.45 2493.42 9868.55 2493.38 9874.98 2493.18
 9876.98 2493.12  9882.1 2492.96  9884.9 2492.88 9888.62 2492.79 9889.19 2492.78
 9891.78 2492.71  9896.6 2492.64 9900.24 2492.58 9900.31 2492.58 9902.68  2492.5
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  9905.5 2492.39 9911.34  2492.2 9913.21 2492.13 9919.99 2491.92 9920.94 2491.88
 9928.64 2491.64 9928.67 2491.64 9928.91 2491.64 9951.75 2491.31 9962.42 2491.16
 9965.86 2491.11 9978.69  2491.1 9982.92 2491.09 9984.28  2491.1 9984.68 2491.09
 9994.022488.292 9995.26 2487.92 9995.68 2487.76 9995.75 2487.76 9995.88 2487.75
   10000 2488.3310003.43 2488.82 10011.2 2489.9310011.29 2489.9210011.42 2489.95
10011.54 2489.9610014.27 2490.2210015.11 2490.2710017.26 2490.4610017.35 2490.47
10018.83  2490.6 10020.2 2490.6810021.74 2490.7910022.26 2490.8310026.662491.104
10080.23 2494.44 10080.4 2494.4510080.54 2494.4610081.22 2494.5110081.25 2494.51
10081.47 2494.52 10081.5 2494.5210081.58 2494.5310081.65 2494.5310081.74 2494.53
10082.17 2494.5410084.56 2494.6110093.49 2494.84

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
  9824.4    .055 9994.02     .05   10000    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9984.2810026.66               10      10      10             .1       .3

CROSS SECTION


RIVER: RV WK T6D
REACH: R2                 RS: 1.311

INPUT
Description: This cross section is one of two cross sections added to the
             downstream end of the model to establish the starting water
             surface elevation using the normal depth calculations. This cross
             section is not plotted on the work maps, nor is used in plotting
             the base flood elevations.
Station Elevation Data    num=      76
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9824.17 2493.86 9827.34 2493.85 9829.91 2493.84 9833.88 2493.78  9850.9 2493.57
 9851.48 2493.56 9853.91 2493.51 9856.72 2493.45 9859.98 2493.38 9863.63 2493.29
  9864.7 2493.26 9864.74 2493.25 9869.65 2493.09 9870.13 2493.08 9870.76 2493.06
  9871.7 2493.05  9872.2 2493.04  9880.6 2492.91 9886.93 2492.81 9887.06  2492.8
 9888.25 2492.76 9893.49 2492.56 9896.92 2492.45 9901.19 2492.29 9905.59 2492.15
 9908.91 2492.03 9914.25 2491.87 9916.63  2491.8  9922.9 2491.61 9924.37 2491.57
 9931.54 2491.34 9935.13 2491.29 9936.57 2491.18 9936.85 2491.16  9937.4 2491.17
 9971.18 2491.06 9972.02 2491.06 9975.07 2491.02 9977.79 2491.02 9980.37 2491.02
 9981.97    2491 9983.28 2490.99 9985.84 2490.95 9986.53 2490.95 9989.79  2490.9
 9991.61 2490.16 9993.56 2489.06  9993.6 2489.03 9995.55 2488.08    9997 2487.46
 9997.01 2487.46   10000 2487.7610001.61 2487.9210002.782488.10310003.66 2488.24
 10008.3 2488.7910014.18  2489.910014.28 2489.9210014.76 2490.01 10017.1 2490.22
10017.52 2490.2410019.92 2490.4210020.16 2490.4310027.722490.90110048.72 2492.21
10054.87 2492.5910055.93 2492.66 10060.7 2492.9610078.06 2493.8410078.53 2493.85
 10079.5 2493.8710079.94 2493.88 10080.6  2493.910081.81 2493.94 10082.1 2493.95
10093.27 2494.28

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
 9824.17    .055 9995.55     .0510002.78    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9989.7910027.72               10      10      10             .1       .3

CROSS SECTION


RIVER: RV WK T6D
REACH: R2                 RS: 1.309

INPUT
Description: This cross section is one of two cross sections added to the
             downstream end of the model to establish the starting water
             surface elevation using the normal depth calculations. This cross
             section is not plotted on the work maps, nor is used in plotting
             the base flood elevations.
Station Elevation Data    num=      71
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9823.94 2493.54 9824.15 2493.54 9854.24 2493.18  9854.6 2493.17 9856.14 2493.14
 9857.91  2493.1 9859.96 2493.06 9862.26    2493 9865.12 2492.93 9868.63 2492.98
 9873.49 2493.04 9873.61 2493.04 9873.82 2493.03 9873.83 2493.03 9881.46 2492.74
 9882.49  2492.7 9889.17 2492.45 9891.18 2492.39 9896.87 2492.18 9899.84 2492.09
 9904.59 2491.96 9908.51 2491.84 9912.31 2491.73 9917.16 2491.58 9935.78 2491.33
  9936.7 2491.26 9937.63 2491.19 9940.02 2491.02 9943.48 2490.77 9943.81 2490.75
 9948.27 2490.84 9956.19 2491.01 9957.07 2491.03 9957.27 2491.03 9959.46 2491.02
 9959.51 2491.02 9965.67 2490.93 9966.24 2490.93 9966.77 2490.93 9972.21 2490.86
 9976.65 2490.81 9977.65 2490.79 9981.31 2490.75 9983.88 2490.71 9986.69 2490.67
 9990.17 2490.63 9995.62 2490.47 9995.82 2490.47 9996.23 2490.45   10000  2489.1
10002.09 2488.3610002.86 2488.0810004.92 2487.3310005.33 2487.4110005.67 2487.48
10008.852488.11410013.29    248910016.24 2489.5810018.82 2490.0810025.18 2490.47
 10027.3  2490.610029.46 2490.7310039.22 2491.3610074.64 2493.1510075.59 2493.17
10077.58 2493.2210078.47 2493.2310079.83 2493.2810082.29 2493.3710082.88 2493.38
10093.04 2493.68

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
 9823.94    .05510002.86     .0510008.85    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9995.8210025.18                0       0       0             .1       .3

CROSS SECTION
```

```
RIVER: RV WK T6D S1
REACH: R1                    RS: 0.522

INPUT
Description: Q=14 cfs (This flow is a result of the energy analysis at the
             upstream split)  RV Wash K Trib 6D Split 1 was originally included
             in the study; however, as a result of the low flow rate, this
             reach and its corresponding cross sections are removed from the
             work maps. They are left in the model in order to document the 14
             cfs split flow shown at RV Wash K Trib 6D River Mile 1.567.
             Neither the hydraulic base line, nor the cross sections associated
             with RV Wash K Trib 6D Split are shown on the work maps.
Station Elevation Data     num=      60
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9916.16 2528.38 9916.21 2528.38    9918 2528.42 9919.44 2528.36 9923.73  2528.2
 9930.31 2528.02 9930.34 2528.02 9930.36 2528.01 9936.78 2527.54  9938.4 2527.46
 9941.01 2527.32 9946.73 2526.96  9951.6 2526.65 9953.03 2526.56  9959.1  2526.2
  9962.2 2525.92 9963.55  2525.8 9969.76 2525.31 9971.81 2525.58 9974.53 2525.94
 9980.91 2526.78 9983.93 2526.93 9984.64 2526.97 9985.78 2527.03 9987.62 2527.14
    9992 2526.74 9994.43 2526.46 9996.08 2526.27 9996.35 2526.24 9997.55 2526.12
 9997.762526.104 9997.81  2526.1   10000  2525.910004.56 2526.0810004.72 2526.09
10005.062526.10410008.17 2526.2310009.86  2526.310014.36 2526.4510014.43 2526.45
10014.45 2526.45 10016.8 2526.4110020.94 2526.3410034.78 2526.1610037.75 2526.09
10038.19 2526.0910038.97  2526.110040.85 2526.1110041.63 2526.1110050.07 2526.27
10050.24 2526.2810050.27 2526.2810054.64 2526.5310054.67 2526.53 10063.4 2527.18
10065.36 2527.2610074.24 2527.2910074.86 2527.2710075.89  2527.310076.72 2527.33

Manning's n Values         num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9916.16    .055 9997.76     .0510005.06    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9994.4310014.43           716.14  716.14  716.14             .1       .3

CROSS SECTION


RIVER: RV WK T6D S1
REACH: R1                    RS: 0.387

INPUT
Description: RV Wash K Trib 6D Split 1 was originally included in the study;
             however, only 14 cfs follows this reach. As a result of this low
             flow rate, this reach and its corresponding cross sections are
             removed from the work maps. They are left in the model in order to
             document the 14 cfs split flow shown at RV Wash K Trib 6D River
             Mile 1.567. Neither the hydraulic base line, nor the cross
             sections associated with RV Wash K Trib 6D Split 1 are shown on
             the work maps.
Station Elevation Data     num=     129
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9758.35 2510.13 9768.64 2509.54 9777.29 2509.01 9778.52 2508.95 9781.75 2508.81
 9793.08 2508.31 9798.75  2508.1 9805.03 2507.82 9816.31 2507.42 9817.14 2507.39
 9818.38 2507.44 9819.96  2507.5 9835.47  2508.1 9849.38 2508.71 9851.08 2508.69
 9871.03  2508.9 9873.19 2509.02 9875.66 2509.03 9876.97 2508.99 9880.43 2508.98
 9885.28 2508.99 9886.54 2508.99 9888.61 2508.99 9892.61 2509.32 9895.61 2509.55
 9899.23 2509.56 9900.29 2509.58 9903.28 2509.59 9906.41 2509.63 9909.81 2509.69
 9913.39 2509.73 9913.44 2509.73 9919.71 2509.78 9920.37 2509.79 9921.78  2509.8
  9929.3 2509.38 9931.82 2509.24 9933.15 2509.17 9940.23 2508.77 9944.57 2508.52
  9956.8 2507.83 9961.62 2507.73 9969.77 2507.58 9972.14 2507.53 9996.83  2507.4
 9999.98 2507.23   10000 2507.23 10005.6 2506.9410009.07 2506.7610009.21 2506.75
10012.44 2506.9810016.19 2507.2910017.462507.40210019.03 2507.54 10026.6 2508.15
10031.59 2508.5910034.95 2508.6610037.59 2508.6710043.06 2508.7510052.72 2508.74
10053.63 2508.8310054.34 2508.89 10054.9 2508.9310059.95 2509.3610063.67 2509.58
10067.27 2509.5110070.02 2509.4610074.51 2509.3510085.52 2509.1310098.42 2508.79
10105.87 2508.9610131.37 2509.4110134.87 2509.4510136.45 2509.4610139.71 2509.42
10147.55  2509.3 10162.1 2509.1210178.94 2509.0610221.87  2508.910221.95 2508.92
10233.92 2508.8510239.57  2508.810247.22 2508.7810259.19 2508.6410260.54 2508.63
10263.37 2508.59   10265 2508.8710265.01 2508.8810265.58 2508.9910284.98  2509.2
10295.83 2509.4110297.14 2509.45 10299.9 2509.4910307.51 2509.4810308.68 2509.48
10309.17 2509.4910317.54 2509.4710323.57 2509.5310328.15 2509.58   10331 2509.52
10334.62 2509.5510339.32 2509.4110342.09 2509.4310347.64 2509.2610347.81 2509.26
10354.65 2509.0410365.22 2509.0110365.76 2508.9710366.66 2508.8410367.56 2508.87
10375.45 2508.8310376.93  2508.810378.58 2508.7910383.96 2508.6110387.99 2508.97
10393.23 2509.3310394.83 2509.3210399.55 2509.3110399.97 2509.3310400.14 2509.34
10407.57 2509.9210409.89 2510.0110431.05 2510.3510433.33 2510.4310434.37 2510.47
10434.88 2510.4810439.08 2510.5810439.63 2510.5910442.64 2510.68

Manning's n Values         num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9758.35    .055 9996.83     .0510017.46    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9996.8310017.46           262.97  262.97  262.97             .1       .3
Left Levee      Station= 9921.78      Elevation=  2509.8

CROSS SECTION


RIVER: RV WK T6D S1
REACH: R1                    RS: 0.337

INPUT
Description: RV Wash K Trib 6D Split 1 was originally included in the study;
             however, only 14 cfs follows this reach. As a result of this low
```

flow rate, this reach and its corresponding cross sections are removed from the work maps. They are left in the model in order to document the 14 cfs split flow shown at RV Wash K Trib 6D River Mile 1.567. Neither the hydraulic base line, nor the cross sections associated with RV Wash K Trib 6D Split 1 are shown on the work maps.

```
Station Elevation Data     num=      138
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
  9803.27 2502.37 9806.68 2502.49 9810.41 2502.62  9811.5 2502.57 9817.73 2502.28
  9823.83 2501.97 9831.25 2501.58 9842.15 2501.09 9852.26  2500.6 9853.81 2500.53
   9855.8 2500.43 9867.33  2499.9 9871.17 2499.98 9874.81 2500.04 9881.45 2500.16
  9888.27 2500.26 9889.94 2500.37 9890.34 2500.38 9891.51  2500.4 9893.42 2500.62
  9894.72 2500.76 9903.85 2501.48 9907.16 2501.68 9910.53 2501.87 9914.17 2501.08
  9918.98 2502.35 9921.17 2502.49 9922.81 2502.59 9928.19 2502.89  9928.8 2502.93
   9929.3 2502.93 9929.72 2502.95 9929.95 2502.96  9930.1 2502.96 9930.43 2502.97
  9930.74 2502.97 9933.65 2502.88 9934.57 2502.86 9936.79  2502.8 9940.07 2502.72
  9942.26 2502.67 9967.02 2502.13 9968.28  2502.1 9972.53    2502 9985.71 2501.71
  9989.12 2501.63 9992.31 2501.47 9999.98 2501.12   10000 2501.1210000.12 2501.11
 10006.39 2501.4210013.01 2501.7510013.07 2501.7510013.422501.75810013.95 2501.77
 10014.15 2501.7810021.98 2502.0110027.87 2502.1510030.26 2501.9310036.99 2501.34
 10041.15  2501.710049.14 2502.3510049.18 2502.3610052.83 2502.4110053.12 2501.41
 10057.42 2502.4810058.29 2502.4910059.15 2502.4910061.46 2502.4910063.23 2502.48
 10068.53 2502.4810071.15 2502.4710075.65 2502.4810099.43  2502.3 10102.3  2502.3
 10104.35 2502.3110105.44  2502.310108.91  2502.310112.78 2502.2910117.09 2502.28
 10121.95 2502.2610126.83 2502.3510130.34 2502.3110130.65 2502.3210134.98 2502.34
 10137.61 2502.3510139.77 2502.3410139.95 2502.3410144.39 2502.3110145.06 2502.29
 10149.09 2502.2610149.31 2502.2510149.93 2502.25 10152.8 2502.2410173.42 2501.96
 10176.49 2501.9310182.09  2501.810182.78 2501.7910183.28 2501.7910184.56 2501.76
 10184.83 2501.75 10187.2 2501.6210200.97 2500.89 10211.8 2501.1810225.17 2501.45
 10225.94 2501.3610227.69 2501.1210231.88 2500.5610234.57 2500.1910240.46  2500.9
  10242.7 2501.1810246.42 2501.6310249.45 2501.3310257.06 2500.4310258.67 2500.54
 10265.07 2500.9710275.73 2501.68 10283.8 2501.7410307.72 2501.88 10314.2 2501.92
  10320.6 2501.9610332.32    250210332.84 2502.0310336.38 2501.6810336.46 2501.68
 10344.41 2500.8510344.71 2500.8610344.97 2500.8710352.72 2501.2710359.19 2501.64
 10360.29 2501.6810361.98 2501.71 10370.4  2501.910376.56 2502.0810383.03 2502.25
 10391.96  2502.5 10398.7 2502.6610403.41 2502.78

Manning's n Values         num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
  9803.27    .055 9989.12     .0510013.42    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9989.1210013.42               10      10      10             .1       .3
Left Levee      Station= 9930.43      Elevation= 2502.97
Right Levee     Station=10058.29      Elevation= 2502.49

CROSS SECTION


RIVER: RV WK T6D S1
REACH: R1                  RS: 0.335

INPUT
Description: RV Wash K Trib 6D Split 1 was originally included in the study;
             however, only 14 cfs follows this reach. As a result of this low
             flow rate, this reach and its corresponding cross sections are
             removed from the work maps. They are left in the model in order to
             document the 14 cfs split flow shown at RV Wash K Trib 6D River
             Mile 1.567. Neither the hydraulic base line, nor the cross
             sections associated with RV Wash K Trib 6D Split 1 are shown on
             the work maps.
Station Elevation Data     num=      121
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
   9803.3 2502.06 9811.93 2502.34 9812.37 2502.32  9812.6 2502.31 9812.81  2502.3
  9819.04    2502 9819.37 2501.98 9822.85 2501.82 9833.61 2501.28 9860.12  2500.1
  9866.04 2499.84 9872.91 2499.53 9873.77 2499.54 9873.79 2499.54 9874.66 2499.56
  9882.47 2499.69 9883.98 2499.72 9892.55 2499.94 9892.92 2499.98 9916.25 2501.82
  9917.17 2501.88 9924.05 2502.27 9924.13 2502.27 9927.86 2502.34 9930.68 2502.39
  9962.84 2501.83 9970.58 2501.95 9972.89 2501.99 9972.92 2501.99  9979.2 2501.85
  9985.47  2501.7 9986.42 2501.67 9986.84 2501.66 9988.36 2501.62 9989.57  2501.6
  9991.71 2501.41   10000 2500.8210000.01 2500.8210000.27  2500.810005.69 2501.05
 10011.69 2501.23 10015.5 2501.3810020.26 2501.4910024.54  2501.610029.91 2501.91
 10031.68 2501.7610037.57 2501.2910041.06 2501.5410041.952501.59510050.53 2502.13
 10053.94 2502.1610054.73 2502.1610056.13 2502.1710061.72 2502.1710095.91 2501.93
 10097.97 2501.9310099.46 2501.9310100.23 2501.9310102.73 2501.9210105.52 2501.92
 10108.63 2501.9110112.13  2501.910124.12  2502.1 10126.7 2502.0810126.93 2502.08
  10130.1  2502.110133.75 2502.12   10138 2502.1410140.51 2502.0810144.48 2502.13
  10145.2 2502.1410149.26 2502.2110150.75 2502.2310157.03 2502.1610157.93 2502.14
 10164.98 2502.0610169.98 2502.0110170.52 2501.9910174.51 2501.9110177.63 2501.86
 10180.69 2501.7810181.58 2501.7710182.16 2501.7510184.84  2501.710185.37 2501.68
  10187.3 2501.6510193.16 2501.2810193.94  2501.210198.32  2500.710203.15 2500.78
 10207.52  2500.910217.66 2501.1810220.18 2500.9510224.56 2500.4410226.89 2500.19
 10228.54 2499.9710238.16 2500.9610240.71 2501.2510248.26 2500.5810252.86 2500.19
 10254.82 2500.3210262.53 2500.8510270.06 2501.36 10270.4 2501.3810271.99 2501.48
 10274.17  2501.510332.19  2501.710332.35 2501.7110332.61 2501.7310342.22 2500.86
 10345.71 2500.5710355.95 2501.1710359.53 2501.38 10360.2 2501.3910360.34  2501.4
 10360.45  2501.4   10361 2501.4110381.52 2501.94 10382.7 2501.9710390.81 2502.17
 10400.79 2502.39

Manning's n Values         num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
   9803.3    .055 9991.71     .05 10015.5    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9991.71 10015.5               10      10      10             .1       .3
Left Levee      Station= 9930.68      Elevation= 2502.39
```

```
Right Levee     Station=10056.13      Elevation= 2502.17

CROSS SECTION


RIVER: RV WK T6D S1
REACH: R1                 RS: 0.333

INPUT
Description: RV Wash K Trib 6D Split 1 was originally included in the study;
             however, only 14 cfs follows this reach. As a result of this low
             flow rate, this reach and its corresponding cross sections are
             removed from the work maps. They are left in the model in order to
             document the 14 cfs split flow shown at RV Wash K Trib 6D River
             Mile 1.567. Neither the hydraulic base line, nor the cross
             sections associated with RV Wash K Trib 6D Split 1 are shown on
             the work maps.
Station Elevation Data    num=     126
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9803.29 2501.72 9812.27 2502.02  9812.3 2502.02 9812.87 2502.03 9815.26 2501.97
 9850.37  2500.4 9854.41 2500.22  9859.6 2499.99 9864.34 2499.79 9866.48 2499.71
 9868.12 2499.58 9876.39 2499.39 9879.21 2499.32 9886.38 2499.49 9895.29 2499.67
 9908.51 2500.84 9916.92  2501.5  9919.8 2501.52 9920.85 2501.53 9924.19 2501.59
 9927.21 2501.65 9929.39 2501.69 9931.06 2501.72 9949.97 2501.39 9954.51 2501.46
 9960.92 2501.56 9970.88 2501.65 9977.04  2501.7 9987.36 2501.56    9988 2501.55
  9991.9 2501.53 9994.332501.174 9995.11 2501.06 9995.28 2501.04   10000 2500.47
10000.11 2500.4510000.26 2500.4510005.56 2500.6110011.62 2500.7810014.96 2500.88
10017.91 2500.9110020.08 2500.9710021.67 2500.9910025.64 2500.8310026.54 2500.91
10027.48 2500.9210029.31 2501.1110029.45 2501.1110030.94 2501.1110034.57 2501.05
10034.62 2501.05 10035.3 2501.0510036.99 2500.9610040.54 2501.1710051.48 2501.84
10054.79 2501.83 10055.6 2501.8210092.33 2501.55 10093.6 2501.55 10094.5 2501.55
10094.98 2501.5510096.52 2501.5510098.22 2501.5410100.13 2501.5410102.27 2501.53
10121.38 2501.8610123.02 2501.8410123.16 2501.8410125.18 2501.8610127.51 2501.87
 10130.2 2501.8810136.87 2501.7310139.32 2501.7610139.77 2501.7710142.27 2501.81
10145.86 2501.8610150.34 2501.9310156.03 2502.0210160.18 2502.07 10163.9 2502.13
10164.21 2502.13 10167.7 2502.0810170.37 2501.99 10170.9 2501.9810175.87 2501.82
10178.19 2501.7810181.85 2501.6610182.98 2501.6510185.45 2501.5810187.83 2501.43
 10188.7  2501.410193.43  2501.110193.86 2501.0810194.51 2501.05 10197.9 2500.82
 10198.9  2500.710202.12 2500.7610207.03 2500.7510209.42 2500.8110214.31 2500.47
10217.88 2500.16   10221 2499.89 10221.9 2499.8210222.46 2499.7610233.81 2500.69
10235.89 2500.8910242.56 2500.3710248.64 2499.9110250.91 2500.0610262.12 2500.82
10265.79 2501.0610266.57 2501.1110286.55 2501.1710330.12  2501.310333.58 2501.12
10339.92 2500.7310343.85  2500.510345.92 2500.3610352.31 2500.7310359.07 2501.06
10359.89  2501.1 10360.7 2501.1410374.41 2501.4610379.58 2501.5810389.53 2501.81
10398.14 2502.01

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9803.29    .055 9995.28     .0510021.67    .055

Bank Sta: Left   Right    Coeff Contr.   Expan.
       9995.2810021.67             .1       .3
Left Levee      Station= 9977.04      Elevation=  2501.7
Right Levee     Station=10051.48      Elevation= 2501.84

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

SUMMARY OF MANNING'S N VALUES

River:RV WK T6D
*******************************************************************************
*     Reach      *   River Sta.   *   n1    *   n2    *   n3    *   n4    *   n5    *
*******************************************************************************
*R1               *    2.629       *     .055*      .05*     .055*         *         *
*R1               *    2.579       *     .055*      .05*     .055*         *         *
*R1               *    2.470       *     .055*      .05*     .055*         *         *
*R1               *    2.378       *     .055*      .05*     .055*         *         *
*R1               *    2.245       *     .055*      .05*     .055*         *         *
*R1               *    2.120       *     .055*      .05*     .055*         *         *
*R1               *    2.001       *     .055*      .05*     .055*         *         *
*R1               *    1.894       *     .055*      .05*     .055*         *         *
*R1               *    1.833       *     .055*      .05*     .055*         *         *
*R1               *    1.832       *Lat Struct*        *         *         *         *
*R1               *    1.771       *     .055*      .05*     .055*         *         *
*R1               *    1.678       *     .055*      .05*     .055*         *         *
*R1               *    1.614       *     .055*      .05*     .055*      .05*      .055*
*R2               *    1.567       *     .055*      .05*     .055*         *         *
*R2               *    1.453       *     .055*      .05*     .055*         *         *
*R2               *    1.397       *     .055*      .05*     .055*         *         *
*R2               *    1.313       *     .055*      .05*     .055*         *         *
*R2               *    1.311       *     .055*      .05*     .055*         *         *
*R2               *    1.309       *     .055*      .05*     .055*         *         *
*******************************************************************************

River:RV WK T6D S1
*****************************************************************
*     Reach      *   River Sta.   *   n1    *   n2    *   n3    *
*****************************************************************
*R1               *    0.522       *     .055*      .05*     .055*
*R1               *    0.387       *     .055*      .05*     .055*
*R1               *    0.337       *     .055*      .05*     .055*
*R1               *    0.335       *     .055*      .05*     .055*
*R1               *    0.333       *     .055*      .05*     .055*
*****************************************************************

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

SUMMARY OF REACH LENGTHS
```

River: RV WK T6D

Reach	River Sta.	Left	Channel	Right
R1	2.629	264.65	264.65	264.65
R1	2.579	580.4	580.4	580.4
R1	2.470	477.85	477.85	477.85
R1	2.378	709.84	709.84	709.84
R1	2.245	652.23	652.23	652.23
R1	2.120	635.16	635.16	635.16
R1	2.001	563.9	563.9	563.9
R1	1.894	321.22	321.22	321.22
R1	1.833	359.53	325.68	325.68
R1	1.832	Lat Struct		
R1	1.771	478.48	489.45	489.45
R1	1.678	339.26	339.26	339.26
R1	1.614	0	0	0
R2	1.567	600.29	600.29	600.29
R2	1.453	294.61	294.61	294.61
R2	1.397	446	446	446
R2	1.313	10	10	10
R2	1.311	10	10	10
R2	1.309	0	0	0

River: RV WK T6D S1

Reach	River Sta.	Left	Channel	Right
R1	0.522	716.14	716.14	716.14
R1	0.387	262.97	262.97	262.97
R1	0.337	10	10	10
R1	0.335	10	10	10
R1	0.333			

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: RV WK T6D

Reach	River Sta.	Contr.	Expan.
R1	2.629	.1	.3
R1	2.579	.1	.3
R1	2.470	.1	.3
R1	2.378	.1	.3
R1	2.245	.1	.3
R1	2.120	.1	.3
R1	2.001	.1	.3
R1	1.894	.1	.3
R1	1.833	.1	.3
R1	1.832	Lat Struct	
R1	1.771	.1	.3
R1	1.678	.1	.3
R1	1.614	.1	.3
R2	1.567	.1	.3
R2	1.453	.1	.3
R2	1.397	.1	.3
R2	1.313	.1	.3
R2	1.311	.1	.3
R2	1.309	.1	.3

River: RV WK T6D S1

Reach	River Sta.	Contr.	Expan.
R1	0.522	.1	.3
R1	0.387	.1	.3
R1	0.337	.1	.3
R1	0.335	.1	.3
R1	0.333	.1	.3

ERRORS WARNINGS AND NOTES
Errors Warnings and Notes for Plan : RV WK T6D

River: RV WK T6D Reach: R1 RS: 2.629 Profile: 100-YR FP
Warning:The energy loss was 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: RV WK T6D Reach: R1 RS: 2.579 Profile: 100-YR FP
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.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
River: RV WK T6D Reach: R1 RS: 2.470 Profile: 100-YR FP
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
River: RV WK T6D Reach: R1 RS: 2.378 Profile: 100-YR FP

```
    Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
            the need for additional cross sections.
    Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, water surface was
            used.
River: RV WK T6D  Reach: R1     RS: 2.245     Profile: 100-YR FP
    Warning:The energy equation could not be balanced within the specified number of iterations.  The program selected the water
            surface that had the least amount of error between computed and assumed values.
    Warning:The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for additional cross sections.
    Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
            the need for additional cross sections.
    Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
            water surface came back below critical depth.  This indicates that there is not a valid subcritical answer.  The
            program defaulted to critical depth.
River: RV WK T6D  Reach: R1     RS: 2.120     Profile: 100-YR FP
    Warning:The energy loss was 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: RV WK T6D  Reach: R1     RS: 2.001     Profile: 100-YR FP
    Warning:The energy equation could not be balanced within the specified number of iterations.  The program used critical depth
            for the water surface and continued on with the calculations.
    Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
            the need for additional cross sections.
    Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
            water surface came back below critical depth.  This indicates that there is not a valid subcritical answer.  The
            program defaulted to critical depth.
    Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, water surface was
            used.
River: RV WK T6D  Reach: R1     RS: 1.894     Profile: 100-YR FP
    Warning:The energy equation could not be balanced within the specified number of iterations.  The program used critical depth
            for the water surface and continued on with the calculations.
    Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
            the need for additional cross sections.
    Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
            water surface came back below critical depth.  This indicates that there is not a valid subcritical answer.  The
            program defaulted to critical depth.
    Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, water surface was
            used.
River: RV WK T6D  Reach: R1     RS: 1.833     Profile: 100-YR FP
    Warning:The energy loss was 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: RV WK T6D  Reach: R1     RS: 1.832     Profile: 100-YR FP
    Warning:The energy loss was 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: RV WK T6D  Reach: R1     RS: 1.771     Profile: 100-YR FP
    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.
    Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.
River: RV WK T6D  Reach: R1     RS: 1.678     Profile: 100-YR FP
    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.
    Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, water surface was
            used.
River: RV WK T6D  Reach: R1     RS: 1.614     Profile: 100-YR FP
    Warning:Divided flow computed for this cross-section.
    Warning:A flow split was encountered.  The program first calculated the momentum of both channels below the junction.  An
            energy balance was performed across the junction from the stream with the highest momentum downstream to the section
            upstream.
    Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
            the need for additional cross sections.
    Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, water surface was
            used.
River: RV WK T6D  Reach: R2     RS: 1.567     Profile: 100-YR FP
    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.
River: RV WK T6D  Reach: R2     RS: 1.453     Profile: 100-YR FP
    Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
            This may indicate the need for additional cross sections.
    Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
            the need for additional cross sections.
    Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, water surface was
            used.
River: RV WK T6D  Reach: R2     RS: 1.397     Profile: 100-YR FP
    Warning:The energy equation could not be balanced within the specified number of iterations.  The program used critical depth
            for the water surface and continued on with the calculations.
    Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
            the need for additional cross sections.
    Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
            water surface came back below critical depth.  This indicates that there is not a valid subcritical answer.  The
            program defaulted to critical depth.
River: RV WK T6D  Reach: R2     RS: 1.313     Profile: 100-YR FP
    Note:   Manning's n values were composited to a single value in the main channel.
River: RV WK T6D  Reach: R2     RS: 1.311     Profile: 100-YR FP
    Note:   Manning's n values were composited to a single value in the main channel.
River: RV WK T6D  Reach: R2     RS: 1.309     Profile: 100-YR FP
    Note:   Manning's n values were composited to a single value in the main channel.
River: RV WK T6D S1  Reach: R1     RS: 0.522     Profile: 100-YR FP
    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.
River: RV WK T6D S1  Reach: R1     RS: 0.387     Profile: 100-YR FP
    Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
            the need for additional cross sections.
    Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, water surface was
            used.
River: RV WK T6D S1  Reach: R1     RS: 0.337     Profile: 100-YR FP
    Warning:Divided flow computed for this cross-section.
    Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
            This may indicate the need for additional cross sections.
```

```
     Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, water surface was
             used.
River: RV WK T6D S1  Reach: R1     RS: 0.335     Profile: 100-YR FP
     Warning:Divided flow computed for this cross-section.
     Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
             This may indicate the need for additional cross sections.
     Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, water surface was
             used.
River: RV WK T6D S1  Reach: R1     RS: 0.333     Profile: 100-YR FP
     Warning:Divided flow computed for this cross-section.
     Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, water surface was
             used.
```

E.3.13 HEC-RAS Output

RV Wash K Trib 6D1

HEC-RAS Plan: HEC-RAS Plan: Wash K 6D1 River: RV WK T6D1 Reach: R1 Profile: 100-YR FP

River	Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
RV WK T6D1	R1	1.085	100-YR FP	150.00	2579.90	2581.86	2581.86	2582.30	0.025723	5.49	30.87	37.43	0.87
RV WK T6D1	R1	0.998	100-YR FP	150.00	2569.22	2571.09	2570.82	2571.31	0.013497	3.76	40.51	45.24	0.65
RV WK T6D1	R1	0.940	100-YR FP	150.00	2561.94	2563.88	2563.88	2564.34	0.045272	5.45	27.53	80.45	0.99
RV WK T6D1	R1	0.890	100-YR FP	150.00	2555.48	2558.06		2558.36	0.011562	4.56	38.83	37.58	0.57
RV WK T6D1	R1	0.870	100-YR FP	150.00	2553.68	2555.78	2555.78	2556.49	0.040402	6.75	22.24	16.00	1.01
RV WK T6D1	R1	0.838	100-YR FP	150.00	2549.86	2551.82	2551.53	2552.16	0.014357	4.86	34.63	30.91	0.67
RV WK T6D1	R1	0.745	100-YR FP	150.00	2540.20	2541.87	2541.85	2542.33	0.029272	5.45	27.52	27.50	0.96
RV WK T6D1	R1	0.649	100-YR FP	150.00	2528.31	2530.00	2529.83	2530.30	0.019127	4.54	37.89	43.62	0.71
RV WK T6D1	R1	0.552	100-YR FP	150.00	2517.49	2519.53	2519.32	2519.78	0.022227	4.06	36.93	39.63	0.74
RV WK T6D1	R1	0.424	100-YR FP	150.00	2503.64	2505.37	2505.27	2505.67	0.019721	4.40	34.11	42.23	0.86
RV WK T6D1	R1	0.297	100-YR FP	150.00	2488.68	2489.70	2489.62	2489.89	0.028470	3.99	43.50	78.10	0.93
RV WK T6D1	R1	0.295	100-YR FP	150.00	2488.43	2489.28	2489.26	2489.53	0.043850	4.18	37.03	67.57	1.12
RV WK T6D1	R1	0.293	100-YR FP	150.00	2488.17	2489.03	2488.86	2489.21	0.022005	2.82	44.07	61.59	0.76

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

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

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

PROJECT DATA
Project Title: RV Wash K Trib 6D1
Project File : RV_Wash_K_Trib_6D1.prj
Run Date and Time: 11/1/2007 10:11:43 AM

Project in English units

Project Description:
Rio Verde ADMP, Project FCDMC 2001C056, RV Wash K Trib 6D1. Phase 3 RAS model
started in June 2005, preliminary model completed in August 2005.

RAS model
is prepared by Dibble Engineering. Field reconnaissance per report dated April
18, 2005.

For the study washes, the starting water surface elevation is on
RV Wash K Trib 6D1, and is taken from normal depth for three cross sections
repeated at ten-foot intervals. The slope-area method is the same as the normal
depth method.

RV Wash K Trib 6D1 Floodplain Delineation
From a point
approximately 900 feet south and 50 feet west of the intersection of 144th
Street and East Rock View Road (River Mile 0.297) to a point approximately 500
feet north and 3,100 feet west of the intersection of 144th Street and East
Rock View Road (River Mile 1.085), a distance of 0.788 river miles.

The
Cross-section data were generated by INROADS. The mapped hydraulic base line
represents the 10,000-station point of the HEC-RAS model.

Topographic
mapping is supplied by the Flood Control District of Maricopa
County.

Discharge data is from the Rio Verde ADMP HEC-1 model. The original
models are from the Flood Control District of Maricopa County, prepared for the
Rio Verde South Floodplain Delineation, the Rio Verde South Extension
Floodplain Delineation, the Rio Verde North Floodplain Delineation, and the Rio
Verde North Extension Floodplain Delineation. The HEC-1 models were modified
for the Rio Verde ADMP. The final HEC-1 files were received in February 2004
and FCDMC approved the hydrology model.

Hydrologic concentration points are
noted in cross-section descriptions using the corresponding HEC-1 ID's. The
flow rates have been rounded to the nearest 10 cubic feet per second (cfs).
Flow rates obtained from HEC-1 are applied at the downstream end of the
relevant sub-basin and stepped upstream at cross-sections to meet the HEC-1
flow from the upstream sub-basin.

River Mile (RM) stationing is based upon
the estimated tie in point with downstream receiving waters or the start of
two-dimensional flow models. This point represents RM 0.000. The assumed
starting WS Elevation is based upon normal depth in the study wash.


Horizontal and Vertical Coordinate Basis for this project is as follows:

          Horizontal--Arizona State Plane, Central Region, NAD 1983
          Vertical--NAVD
1988

RAS model river naming corresponds to project river naming as
follows:
          RV WK T6D1 = RV Wash K Trib 6D1

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

PLAN DATA

Plan Title: RV Wash K Trib 6D1
Plan File : j:\2006\10-0606.1\Design Notebook\Drainage Design\HEC-RAS\RV_Wash_K_Trib_6D1.p01

           Geometry Title: RV Wash K Trib 6D1
           Geometry File : j:\2006\10-0606.1\Design Notebook\Drainage Design\HEC-RAS\RV_Wash_K_Trib_6D1.g01

           Flow Title    : RV Wash K Trib 6D1
           Flow File     : j:\2006\10-0606.1\Design Notebook\Drainage Design\HEC-RAS\RV_Wash_K_Trib_6D1.f01

Plan Summary Information:
```

```
Number of:  Cross Sections =   13    Multiple Openings  =    0
            Culverts       =    0    Inline Structures  =    0
            Bridges        =    0    Lateral Structures =    0

Computational Information
    Water surface calculation tolerance  =  0.01
    Critical depth calculation tolerance =  0.01
    Maximum number of iterations         =  20
    Maximum difference tolerance         =  0.3
    Flow tolerance factor                =  0.001

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

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

River = RV WK T6D1       Reach = R1
RS      Profile           Method  Value1  Value2
1.085   PF 2                   1 9990.3110010.75
0.998   PF 2                   1 9983.6510022.59
0.940   PF 2                   1 9989.8310019.35
0.890   PF 2                   1 9991.5210006.77
0.870   PF 2                   1 9991.8510007.84
0.838   PF 2                   1 9989.16   10007
0.745   PF 2                   1 9986.4510013.95
0.649   PF 2                   1 9989.5310012.71
0.552   PF 2                   1 9971.8210011.46
0.424   PF 2                   1  9975.210017.43
0.297   PF 2                   1 9991.7110013.84
0.295   PF 2                   1 9994.31 10019.6
0.293   PF 2                   1 9996.54 10030.6


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

FLOW DATA

Flow Title: RV Wash K Trib 6D1
Flow File : j:\2006\10-0606.1\Design Notebook\Drainage Design\HEC-RAS\RV_Wash_K_Trib_6D1.f01

Flow Data (cfs)
*************************************************************
* River           Reach           RS      *       100-YR FP *
* RV WK T6D1      R1              1.085   *             150 *
*************************************************************

Boundary Conditions
*****************************************************************************************************
* River           Reach           Profile          *            Upstream                 Downstream    *
*****************************************************************************************************
* RV WK T6D1      R1              100-YR FP        *                                 Normal S = 0.022 *
*****************************************************************************************************

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

GEOMETRY DATA

Geometry Title: RV Wash K Trib 6D1
Geometry File : j:\2006\10-0606.1\Design Notebook\Drainage Design\HEC-RAS\RV_Wash_K_Trib_6D1.g01

CROSS SECTION


RIVER: RV WK T6D1
REACH: R1                 RS: 1.085

INPUT
Description: Q=150 cfs (B2W4A, 24 hr)
Station Elevation Data    num=     107
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
 9828.06  2588.4 9831.18  2588.6 9834.76 2588.45  9842.9 2587.89  9843.3 2587.87
 9843.86 2587.83 9845.47 2587.58 9849.46 2586.94 9850.18 2586.87 9850.47 2586.83
  9855.6 2586.28 9858.09 2585.94 9858.28 2585.91 9861.44 2585.39 9866.01  2584.8
 9867.13 2584.63 9868.69 2584.43 9870.23 2584.27 9872.31 2583.73 9872.67 2583.63
 9873.88 2583.46 9885.19  2581.9 9887.95  2581.6 9889.64 2581.49 9890.04 2581.46
 9893.89 2581.22 9899.35 2580.85  9899.9 2580.81 9901.12 2580.72 9901.36 2580.71
 9904.95  2581.2 9905.88 2581.36 9907.54 2581.72 9910.92 2582.46  9914.8 2583.08
 9915.24 2583.15 9916.36 2583.37 9921.62 2584.01 9925.73 2584.71 9929.27 2584.94
 9929.37 2584.94 9930.05 2584.92 9930.78 2584.89 9931.34 2584.86 9937.94 2584.44
 9942.31 2584.21 9945.59 2584.01 9950.33 2583.78 9958.25 2583.84 9972.76 2583.98
 9974.43 2583.76 9989.692581.457 9990.312581.364 9999.87 2579.92 9999.97  2579.9
 9999.99  2579.9   10000  2579.910000.71 2579.93 10004.8 2580.4910005.12 2580.54
10010.75 2581.36 10011.4 2581.3810012.05 2581.3910013.66 2581.4310014.88 2581.43
10015.32 2581.4410018.25 2581.45 10019.1 2581.4710022.61 2581.7710023.93 2581.81
10025.76 2581.9710027.98 2582.1410034.34 2582.7510035.65 2582.8510038.85 2583.06
10039.02 2583.0810042.43 2583.3110043.55 2583.4710043.69 2583.4910046.78 2583.68
10048.12 2583.9310048.62 2583.9710051.26  2584.210055.55 2584.4610055.84 2584.48
10060.31 2584.89 10060.6 2584.9110063.13 2585.1510065.25 2585.2310065.67 2585.27
10070.43 2585.4710070.72  2585.510075.61  2585.710075.76 2585.7110077.61 2585.78
10080.88 2585.95 10081.2 2585.9710086.21  2586.110086.61 2586.1410091.17 2586.27
10092.41 2586.4210095.73 2586.5510098.45 2587.0810099.14 2587.2110099.21 2587.21
10106.07 2587.1710110.45 2587.14
```

```
Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9828.06     .06 9990.31     .0510010.75     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9990.3110010.75           461.15  461.15  461.15            .1       .3
Left Levee      Station= 9929.27      Elevation= 2584.94

CROSS SECTION


RIVER: RV WK T6D1
REACH: R1                 RS: 0.998

INPUT
Description:
Station Elevation Data    num=      52
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9912.55 2576.49 9914.13  2576.5 9918.13 2576.52 9921.54 2576.19  9921.6 2576.18
  9930.4 2575.32 9935.89 2574.85 9939.65  2574.5  9949.7 2573.65 9949.92 2573.63
  9950.6 2573.56 9952.67  2573.4 9952.87 2573.37 9957.46 2573.17 9958.53  2573.1
 9963.57 2572.81 9965.85 2572.66 9969.66 2572.43 9971.22 2572.33 9973.94 2572.08
 9975.68 2571.72 9977.29 2571.39 9978.41 2571.26 9979.01 2571.23  9980.3 2571.17
 9980.44 2571.17 9983.652570.891 9989.52 2570.38 9994.46 2569.72 9996.65 2569.43
 9998.59 2569.22 9998.79 2569.23   10000 2569.3110007.29 2569.7910015.522570.381
 10020.1 2570.7110020.27 2570.7310022.59 2570.8910024.67 2570.9610030.77 2571.37
10053.69 2573.9410056.58  2574.310060.12 2574.6610062.08 2574.8910066.31 2575.33
10066.59 2575.38 10068.2 2575.6310073.08 2576.0810077.88 2576.5610077.91 2576.56
10080.91 2576.4610081.71 2576.43

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9912.55     .06 9989.52     .0510015.52     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9983.6510022.59           307.18  307.18  307.18            .1       .3

CROSS SECTION


RIVER: RV WK T6D1
REACH: R1                 RS: 0.940

INPUT
Description: The structure shown on the aerial photograph in the left overbank
             was constructed after the topographic mapping was prepared.
Station Elevation Data    num=      92
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9858.84 2569.15 9859.85 2569.17 9861.13 2569.13 9872.64 2568.52 9873.26 2568.49
 9876.32 2568.39 9878.28 2568.09 9880.53 2568.02 9882.32 2567.75 9883.29 2567.71
 9884.92 2567.48 9888.26 2567.36 9889.85 2567.14 9893.25 2567.01 9894.86 2566.83
 9895.44 2566.77 9898.77 2566.61 9899.82 2566.52 9903.16 2566.24 9903.38 2566.23
 9907.01 2565.89 9909.72 2565.61 9911.41  2565.4 9913.64 2565.13 9921.92 2563.87
 9923.33 2563.67 9925.51 2563.34 9931.84 2562.47 9934.98 2562.58 9935.93 2562.62
 9939.38 2562.77 9942.06 2562.89 9944.18 2562.98 9946.58 2563.09 9948.05 2563.14
 9949.13 2563.18 9953.89 2563.33 9954.12 2563.33 9954.58 2563.35 9955.63 2563.44
 9961.76 2563.64 9965.13 2563.75 9966.96 2563.78 9970.77 2563.84 9974.81 2563.91
 9985.42  2564.1 9986.62 2564.12 9987.66 2564.14 9988.57 2564.13 9994.522562.932
 9997.41 2562.35 9999.74 2561.94   10000 2561.9710005.76  2562.710007.29 2562.88
10009.51 2562.9510022.022564.12710030.55 2564.9310039.06  2565.610041.76 2565.86
10044.96 2566.1710045.97 2566.2810048.79 2566.5510053.58 2567.0210055.38 2567.19
10059.77 2567.4710061.46 2567.5710066.21 2567.62 10066.9 2567.6410072.38 2567.71
10072.46 2567.7210073.96 2567.7710078.48 2567.8410081.04 2567.9410082.02 2567.96
10082.81 2567.9910085.25  2568.110087.92 2568.21 10090.5  2568.310092.63 2568.39
 10096.5 2568.5210098.12 2568.5810098.49  2568.610100.83 2568.7410102.07 2568.79
 10103.1 2568.8410110.76  2569.2 10112.1 2569.2410117.11 2569.3610122.21 2569.48
10125.61 2569.4310126.05 2569.43

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9858.84     .06 9994.52     .0510009.51     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9988.5710022.02              259     259     259            .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
 9858.84 9987.66 2564.14       F

CROSS SECTION


RIVER: RV WK T6D1
REACH: R1                 RS: 0.890

INPUT
Description: Topographic mapping was updated for RM 0.890 through RM 0.838 to
             reflect a newly constructed structure.
Station Elevation Data    num=      27
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9947.96 2559.81 9954.55 2559.13 9956.36 2558.91 9960.32 2558.49 9965.35 2558.16
  9967.7 2558.17  9981.9 2557.72 9984.25 2557.49 9991.52 2557.23  9992.4 2556.85
 9995.11 2555.67 9999.26 2555.48   10000 2555.4910001.37 2555.5110006.77 2557.38
10012.48 2559.29 10018.5  2561.910022.05 2561.9210033.93 2561.9410044.21 2562.26
 10046.5 2562.5910059.84 2562.6410078.42 2562.6610081.85 2562.4510087.92  2561.7
```

```
10101.24 2560.48 10104.2 2560.22

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
 9947.96     .06 9991.52     .0510001.37     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9991.5210006.77               93      93      93             .1       .3

CROSS SECTION


RIVER: RV WK T6D1
REACH: R1                 RS: 0.870

INPUT
Description: Topographic mapping was updated for RM 0.890 through RM 0.838 to
             reflect a newly constructed structure.
Station Elevation Data    num=      22
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 9976.35 2557.76 9979.18 2557.49 9980.98 2557.39 9988.93 2556.94 9990.55  2556.3
 9994.29 2554.79 9997.05 2553.68   10000 2553.7410002.05 2553.7910002.63 2553.76
10005.15 2554.6910009.48 2556.4410021.82 2561.4610029.85 2562.29 10032.8 2562.53
10043.66 2562.5510055.35 2562.5810100.11 2562.4910106.73 2561.9810107.82 2561.84
10109.35 2561.5810125.83 2559.46

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
 9976.35     .06 9994.29     .0510005.15     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9990.5510009.48              159     159     159             .1       .3

CROSS SECTION


RIVER: RV WK T6D1
REACH: R1                 RS: 0.838

INPUT
Description: Topographic mapping was updated for RM 0.890 through RM 0.838 to
             reflect a newly constructed structure.
Station Elevation Data    num=      21
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 9934.14  2555.7  9939.9 2555.71 9958.88 2555.69 9959.68 2555.62 9960.55 2555.58
 9967.35 2553.04 9971.93  2552.7 9989.16 2551.04 9993.23 2550.36 9996.74 2549.86
 9999.42 2549.88   10000 2549.8910003.69 2549.97   10007 2550.7110012.97 2552.03
10022.77 2552.6210048.64 2554.2510062.59  2555.310071.15  2555.610071.21  2555.6
10080.75 2555.93

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
 9934.14     .06 9989.16     .05   10007     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9989.16   10007              494     494     494             .1       .3

CROSS SECTION


RIVER: RV WK T6D1
REACH: R1                 RS: 0.745

INPUT
Description:
Station Elevation Data    num=     103
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 9834.67  2548.3 9835.45 2548.33 9836.36 2548.35 9843.14 2548.34 9843.27 2548.31
 9843.95 2548.23  9850.9 2547.77 9858.56 2547.26 9862.09 2547.09 9864.26 2546.98
 9870.12 2546.41 9870.63 2546.38 9872.56 2546.17 9872.94 2546.17 9873.54 2546.17
  9874.3 2546.14 9875.59 2546.08 9895.39 2545.02 9895.68    2545 9896.03 2544.97
 9898.81 2544.81 9900.33 2544.74 9904.96 2544.54 9910.97 2544.28 9913.52 2543.61
 9920.53 2541.96 9920.69 2541.93 9921.06 2541.84 9921.28 2541.79 9932.74 2543.05
 9934.54 2543.25 9940.23 2543.87 9941.13 2543.96 9943.42 2544.22 9953.01 2544.07
 9956.91    2544 9957.48    2544 9958.72 2543.98 9960.19 2543.97 9960.31 2543.97
 9960.91 2543.97 9961.04 2543.97 9965.54 2543.94  9975.7 2543.89 9978.18 2543.39
 9980.63 2542.85 9981.12 2542.75 9982.36 2542.52 9988.22 2541.59 9992.34 2540.76
 9993.79 2540.47 9996.09 2540.39   10000 2540.2610000.01 2540.2610001.69  2540.2
10003.58 2540.3910011.71 2541.5910012.68 2541.7110013.32 2541.7910019.85 2542.63
10028.41  2543.310031.72 2543.5210038.222543.89410043.72 2544.2110045.26 2544.35
10047.82 2544.5810053.35 2545.1610055.77 2545.4510057.31 2545.59 10059.8  2545.9
10060.22 2545.91 10060.4 2545.9210062.35 2545.9710065.47 2546.1410067.18 2546.19
 10068.7 2546.2710069.31 2546.2810071.14 2546.3410075.06 2546.4610075.76 2546.54
10080.29 2546.6610080.85 2546.71 10084.8 2546.7910085.85 2546.7810086.85 2546.79
10087.55  2546.810091.17 2546.8310091.53 2546.8210095.72 2546.7410096.91 2546.72
 10106.2 2546.1610109.87 2545.9410115.33 2545.5910127.98 2544.8110128.32 2544.79
10128.75 2544.7710129.48  2544.810146.37 2545.5610155.48 2545.8210159.62 2545.93
10161.59 2546.0210168.52 2546.2810176.75 2546.14

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
 9834.67     .06 9988.22     .0510011.71     .06
```

```
Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        9975.710038.22           512.63  512.63  512.63            .1       .3
Left Levee      Station= 9943.42      Elevation= 2544.22

CROSS SECTION


RIVER: RV WK T6D1
REACH: R1                 RS: 0.649

INPUT
Description:
Station Elevation Data    num=      52
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 9947.55 2534.12 9949.65 2534.18 9949.79 2534.18 9950.11 2534.15 9957.46 2533.44
 9977.32 2530.98 9982.48 2530.18 9982.73 2530.14 9984.11 2529.92 9987.44 2529.54
 9987.74 2529.46 9989.53 2529.23 9990.93 2528.99 9993.48 2528.62 9997.44 2528.31
   10000 2528.4510003.08 2528.6310005.37 2528.7610012.02 2529.1410012.71 2529.18
10017.01 2529.4210021.01 2529.6410023.52 2529.7910030.13 2530.1710031.47 2530.25
 10039.2 2530.69 10039.5  2530.7 10042.1 2530.85   10045 2531.0110045.37 2531.02
10045.77 2531.0310050.25 2531.2410051.16 2531.2610052.09 2531.3110053.19 2531.34
10056.57 2531.4810058.15 2531.5310060.11 2531.5910064.14 2531.7510066.86 2531.83
10070.11 2531.9510073.59 2532.0610075.95 2532.1410080.35 2532.2710081.71 2532.32
10087.13 2532.4710087.25 2532.4710088.74 2532.5110096.19 2532.8610098.89    2533
10118.25 2534.1610124.23 2534.15

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9947.55     .06 9993.48     .0510003.08     .06

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9989.5310012.71           509.97  509.97  509.97            .1       .3

CROSS SECTION


RIVER: RV WK T6D1
REACH: R1                 RS: 0.552

INPUT
Description:
Station Elevation Data    num=      85
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 9883.52 2522.32 9897.71 2521.71 9902.79  2521.5    9910 2521.19 9915.39 2520.99
 9929.86 2520.77 9938.02 2520.68 9944.67 2520.59 9947.32 2520.57 9949.86 2520.51
 9953.14 2520.43 9955.04 2520.34 9966.25 2519.81 9968.44 2519.71    9969 2519.68
 9970.83 2519.58 9986.68 2518.73 9992.272518.276  9995.8 2517.99   10000 2517.63
10001.67 2517.4910003.42 2517.8610005.41 2518.2810006.81 2518.5710009.41 2519.12
10015.55 2520.3410029.14  2520.310052.55 2520.19 10054.2 2520.2110054.21 2520.21
10054.31 2520.2110054.33 2520.2110075.92 2521.1610089.32 2521.6310092.83 2521.81
10102.04 2522.1810106.22 2522.4210108.78 2522.5510113.85 2522.8410116.21 2522.98
10117.03 2523.0110119.65  2523.1 10123.5 2523.2210124.91 2523.2710132.09  2523.5
10134.48 2523.5810134.68 2523.5910137.43 2523.6610141.29 2523.9110141.35 2523.92
10147.53 2523.9210149.31 2523.8410151.49 2523.7510156.25 2523.5310161.67 2523.28
10162.45 2523.2310162.61 2523.2110163.76 2523.1410168.21 2522.8710170.06 2522.75
10170.66 2522.7110173.82 2522.5210177.63 2522.3110178.53 2522.2610184.53 2521.94
10184.67 2521.9310184.84 2521.9210185.46 2521.8910189.62 2521.82 10191.1  2521.8
10191.18 2521.8110197.04 2521.0610200.67 2520.8610218.04 2519.9210218.91 2519.89
10221.87  2519.510227.62 2518.7510233.72 2519.5510236.45 2519.92 10266.2 2521.58
10275.05 2522.0610278.53 2521.9710279.96 2521.9710282.82 2521.9610283.94 2521.96

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9883.52    .055 9992.27    .04510005.41    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9955.0410015.55           673.99  673.99  673.99            .1       .3
Right Levee     Station=10141.35      Elevation= 2523.92

CROSS SECTION


RIVER: RV WK T6D1
REACH: R1                 RS: 0.424

INPUT
Description:
Station Elevation Data    num=     125
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 9785.99 2506.28 9787.15 2506.23 9788.08 2506.19  9789.4 2506.13 9802.71 2505.45
 9809.19 2505.13  9818.8 2504.03 9820.55 2503.83 9821.68 2503.87 9822.59 2503.91
 9837.04 2504.47 9842.91 2504.67  9846.3 2504.77 9854.46 2505.05 9858.87 2505.18
  9858.9 2505.18 9869.68 2505.33 9897.39 2505.57 9897.97 2505.54 9898.05 2505.53
 9899.38 2505.44 9901.27 2505.31 9938.86 2505.84 9960.72 2506.16 9982.76 2504.96
 9993.02 2504.38 9996.41 2504.07   10000 2503.7610000.05 2503.7610001.47 2503.64
 10008.32504.37810011.09 2504.6810016.94 2505.3410021.57 2505.6410030.262506.151
 10043.5 2506.9310045.74 2507.0110050.03 2507.1810052.17 2507.2610065.17  2506.4
10077.83 2505.6310084.13 2505.2410090.27 2504.8810093.51 2505.0910108.01 2505.98
10109.77 2506.06 10111.5 2506.1410113.19 2506.2110116.48 2506.4110116.81 2506.43
   10120 2506.6210121.45 2506.69 10124.6 2506.8710126.42 2506.9610128.17 2507.04
10131.38 2507.2310133.24  2507.310136.05 2507.4710136.36 2507.4810138.23 2507.55
10138.31 2507.5510141.34 2507.7110143.27 2507.85 10145.9 2507.9810147.94 2508.13
10148.26 2508.1610150.56 2508.3310153.32 2508.5110155.96  2508.710158.49 2508.87
10159.35 2508.93 10160.8 2509.0310176.47 2509.85 10179.1 2510.0210179.61    2510
10182.54 2510.0410187.49 2510.1110194.78 2510.1810195.02 2510.1710196.95  2510.1
```

```
10201.52 2509.8710209.25 2509.4510211.25 2509.3310221.08 2508.7810238.57 2507.72
10249.64 2507.87 10255.4 2507.9410258.11 2507.9910271.24 2507.8210276.36 2507.83
10294.23 2507.3710294.38 2507.3710294.62 2507.3610302.88 2507.1310307.29 2507.94
10310.49  2508.610313.86 2508.4910326.04 2508.1310333.48 2507.9110406.25 2508.74
10410.38 2508.7510411.87 2508.7110414.14 2508.9510416.39 2509.1410416.53 2509.15
 10421.4 2509.56 10421.6 2509.5810421.83  2509.610426.43 2509.9910427.15 2510.07
10428.26 2510.1710431.47 2510.3910432.39 2510.4910436.52  2510.810437.63 2510.92
10441.57 2511.2210441.63 2511.2310445.33  2511.510446.07 2511.5510449.59 2511.82
10467.62 2511.37   10469 2511.31 10472.6 2511.1510476.61  2511.110480.44 2511.15

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
 9785.99    .055 9993.02    .045 10008.3    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9960.7210030.26            670.25  670.25  670.25            .1       .3
Left Levee      Station= 9960.72      Elevation= 2506.16
Right Levee     Station=10052.17      Elevation= 2507.26

CROSS SECTION


RIVER: RV WK T6D1
REACH: R1                 RS: 0.297

INPUT
Description:
Station Elevation Data    num=     133
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
**********************************************************************************
 9868.68 2491.18 9870.89 2491.09 9871.89 2491.04  9873.9 2490.95  9890.4 2490.23
 9902.11 2489.66  9920.7 2488.73 9920.72 2488.73 9930.22 2488.92 9943.54 2489.19
 9959.19  2489.5 9971.14 2489.75 9978.83 2489.75 9981.66 2489.73  9990.5 2489.68
 9991.712489.571 9993.072489.449 9995.84  2489.2   10000 2488.83 10001.7 2488.68
10004.76  2488.910012.35 2489.4610012.73 2489.4810013.82 2489.5610013.84 2489.57
10016.67 2489.46 10043.5 2488.5910043.52 2488.59 10062.5 2489.57 10065.4 2489.72
10069.61  2489.310070.16 2489.24 10071.9 2489.0510080.06 2488.4710081.95 2488.31
10084.57 2488.0710092.48 2486.0610092.58 2486.03   10093 2486.0710112.15 2488.13
10113.04 2488.2410116.58  2488.710118.19 2488.8410123.17  2489.310123.58  2489.3
10126.08 2489.3410126.39 2489.3310130.98 2489.3710131.41 2489.3610135.46 2489.38
10138.87 2489.4110140.65 2489.4210149.14  2488.9   10151 2489.3310165.67 2488.29
10167.65 2488.2510169.66 2488.2110171.73 2488.16 10173.8  2488.1 10187.6 2486.77
10187.89 2486.7610188.17 2486.7610188.46 2486.7510188.69 2486.74 10192.9 2486.83
10193.13 2486.8210194.29 2486.7710198.61 2486.6910202.65 2486.6810204.74 2486.68
10205.06  2486.7 10206.5 2486.8310208.41  2486.810211.78 2486.74 10213.2 2486.82
10213.34 2486.8310216.94 2486.7710225.57 2486.7810229.16 2486.7410229.81 2486.68
 10232.2 2486.4910234.92 2486.4510238.56 2486.0710239.44 2486.0610239.81 2486.02
   10242 2485.7210242.07 2485.7110249.67  2484.310251.66 2483.9510253.13 2484.31
10255.39  2484.910255.71 2484.9210256.08 2484.91 10256.1 2484.9210257.29 2485.12
10258.29  2485.210261.88 2485.7210271.32 2486.6210273.99 2486.8410276.61 2487.07
 10277.9 2487.0910280.47 2487.32 10281.4 2487.3910283.02 2487.5310285.45 2487.75
 10286.4 2487.8410288.79 2488.04 10291.4 2488.3110293.05 2488.4510295.68 2488.71
10296.07 2488.7510296.76 2488.8110299.08 2488.9510301.28 2489.14 10304.2 2489.32
10305.71 2489.4410308.77 2489.6310309.27 2489.6610312.46 2489.8610314.28 2489.97
10316.53  2490.110317.74 2490.1410319.32 2490.2410323.09 2490.3410323.88 2490.38
10327.83  2490.510334.73 2490.7210336.08 2490.7610339.39 2490.8610341.44 2490.91
10342.74 2490.9510344.74    249110349.62 2491.03

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
 9868.68    .055 9993.07    .04510012.35    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9991.7110013.84            10      10      10            .1       .3
Left Levee      Station= 9978.83      Elevation= 2489.75
Right Levee     Station= 10065.4      Elevation= 2489.72

CROSS SECTION


RIVER: RV WK T6D1
REACH: R1                 RS: 0.295

INPUT
Description: This cross section is one of two cross sections added to the
             downstream end of the model to establish the starting water
             surface elevation using the normal depth calculations. This cross
             section is not plotted on the work maps, nor is used in plotting
             the base flood elevations.  The levees are placed to produce the
             most conservative starting water surface.
Station Elevation Data    num=     118
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
**********************************************************************************
 9868.68 2490.98 9870.64 2491.07 9874.57 2490.88 9879.22 2490.64 9901.77 2489.51
 9920.46 2488.47 9930.08 2488.67 9942.16 2488.93 9959.44  2489.3 9973.88 2489.57
 9973.91 2489.58 9983.05 2489.48 9993.04 2489.39 9995.432489.181 9997.72 2488.98
   10000 2488.7810004.09 2488.4310007.28 2488.6710013.34 2489.1810015.69 2489.37
10017.11 2489.4910029.11 2488.9910042.22 2488.14 10042.9  2488.110042.95  2488.1
10043.04 2488.0910043.36 2488.0810043.54 2488.0610044.78 2488.0710054.46 2488.55
10060.57 2488.8610064.15 2489.0310065.67 2489.0810066.92 2489.1410067.74 2489.18
10069.47 2489.2110073.75 2488.8310076.65 2488.5610079.77 2488.2810081.39 2488.11
10089.32 2486.2210090.88 2485.8210099.67 2486.8510105.09 2487.4410113.15 2488.02
10115.41 2488.1710118.31 2488.2510119.54 2488.25 10123.6 2488.5810124.44 2488.58
10128.92 2488.9710129.02 2488.9710133.01 2489.3310134.01 2489.3410136.44 2489.36
10143.67  2489.110163.75 2487.6710164.18 2487.6410165.77 2487.5610169.44 2487.34
   10174 2487.1110176.42 2486.9510181.17 2486.68 10186.3 2486.31 10191.7 2485.98
10196.42 2485.6410197.22 2485.6310200.67 2485.9210201.13 2485.9110201.95  2485.9
10205.81 2486.1210206.21 2486.1410207.74 2486.1210230.42 2486.1510231.37 2486.13
```

```
10233.02    2486 10234.8 2485.8610245.21 2484.2610249.22 2483.6610253.49 2485.02
10255.68 2485.6610269.21 2486.8510271.78 2487.0810271.88 2487.0910272.16  2487.1
10272.23 2487.1110274.58 2487.1410276.53  2487.310276.63 2487.3110277.23 2487.35
10282.09 2487.7810284.87 2488.0210287.04 2488.2110287.07 2488.2110290.51 2488.51
10290.59 2488.51 10290.6 2488.5110292.04 2488.6410292.22 2488.6510296.81 2489.04
10297.42 2489.0810300.59 2489.3410301.47 2489.3910302.53 2489.4610303.56 2489.53
10307.48 2489.7610308.46 2489.8210308.99 2489.8310312.47 2490.0410314.41  2490.1
10316.24  2490.210318.41 2490.2610335.14  2490.8 10338.4 2490.8910339.76 2490.93
 10340.6 2490.9610344.06 2491.0610345.83  2491.1

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9868.68    .055 9995.43    .04510013.34    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9993.0410015.69               10      10      10             .1       .3
Left Levee      Station= 9973.91      Elevation= 2489.58
Right Levee     Station=10069.47      Elevation= 2489.58

CROSS SECTION


RIVER: RV WK T6D1
REACH: R1                 RS: 0.293

INPUT
Description: This cross section is one of two cross sections added to the
             downstream end of the model to establish the starting water
             surface elevation using the normal depth calculations. This cross
             section is not plotted on the work maps, nor is used in plotting
             the base flood elevations.  The levees are placed to produce the
             most conservative starting water surface.
Station Elevation Data    num=     103
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9868.68 2490.72 9872.75 2490.72 9878.55  2490.4 9882.09 2490.22  9920.1 2488.25
 9944.33 2488.68 9975.33 2489.27 9984.07 2489.22 9995.58 2489.11 9996.87    2489
 9999.54 2488.76 9999.99 2488.72   10000 2488.7210006.38 2488.1710009.33 2488.42
10014.09 2488.8610016.15 2489.0410017.052489.12210021.09 2489.4910021.96 2489.44
10039.68 2488.5310042.06 2488.3110046.05 2487.9510046.64 2487.9210047.11 2487.88
10048.03 2487.8310050.64 2487.5610054.32  2487.710054.51  2487.710056.08 2487.78
10062.36 2488.0310065.88 2488.2210066.95 2488.2310068.98 2488.2410071.63  2488.3
10072.11  2488.310072.71 2488.2910074.62 2488.2410075.22 2488.2210078.11 2488.16
10078.18 2488.16 10079.8 2487.9210086.37 2486.0110087.34 2485.6310087.42 2485.63
10087.69 2485.6210102.61  2486.710103.82 2486.7810110.27 2486.95   10113 2486.95
10115.54 2487.1610117.98 2487.1610120.82 2487.4110121.39 2487.4110124.77 2487.72
10126.16  2487.810130.09 2488.1210130.79 2488.1610135.53 2488.48 10138.4 2488.91
10138.56 2488.89 10141.7 2488.7310142.49  2488.710144.53 2488.5810151.58 2488.21
10160.03 2487.6710168.81 2487.1210170.85 2486.9910184.94 2486.1110187.15 2485.96
10190.18 2485.8910195.13 2485.7810200.91 2485.5310200.98 2485.53 10206.9 2485.56
10210.05 2485.5710229.39 2485.6310238.92 2484.3710241.38 2484.0610246.77 2483.37
10255.54 2485.96 10256.8 2486.3410256.94 2486.3410259.05 2486.4610259.44 2486.47
10259.76  2486.510262.36 2486.6210276.92 2487.5710279.83 2487.8310282.82 2488.09
10285.87 2488.3510289.31 2488.6510293.39 2488.99 10298.8 2489.3710304.53 2489.78
10305.61 2489.8510305.72 2489.8510308.58 2490.0110308.98 2490.0210335.53 2490.88
10336.74 2490.91 10340.6  2490.810342.03 2490.75

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9868.68    .055 9996.87    .04510016.15    .055

Bank Sta: Left   Right    Coeff Contr.   Expan.
       9995.5810017.05             .1       .3
Left Levee      Station= 9975.33      Elevation= 2489.49
Right Levee     Station=10072.11      Elevation= 2489.49

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

SUMMARY OF MANNING'S N VALUES

River:RV WK T6D1
*****************************************************************
*     Reach       *   River Sta.   *   n1    *   n2    *   n3    *
*****************************************************************
*R1              *    1.085       *     .06*     .05*     .06*
*R1              *    0.998       *     .06*     .05*     .06*
*R1              *    0.940       *     .06*     .05*     .06*
*R1              *    0.890       *     .06*     .05*     .06*
*R1              *    0.870       *     .06*     .05*     .06*
*R1              *    0.838       *     .06*     .05*     .06*
*R1              *    0.745       *     .06*     .05*     .06*
*R1              *    0.649       *     .06*     .05*     .06*
*R1              *    0.552       *    .055*    .045*    .055*
*R1              *    0.424       *    .055*    .045*    .055*
*R1              *    0.297       *    .055*    .045*    .055*
*R1              *    0.295       *    .055*    .045*    .055*
*R1              *    0.293       *    .055*    .045*    .055*
*****************************************************************

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

SUMMARY OF REACH LENGTHS

River: RV WK T6D1
*****************************************************************
*     Reach       *   River Sta.   *  Left   * Channel *  Right  *
*****************************************************************
*R1              *    1.085       *  461.15*  461.15*  461.15*
```

*R1	*	0.998	* 307.18*	307.18*	307.18*
*R1	*	0.940	* 259*	259*	259*
*R1	*	0.890	* 93*	93*	93*
*R1	*	0.870	* 159*	159*	159*
*R1	*	0.838	* 494*	494*	494*
*R1	*	0.745	* 512.63*	512.63*	512.63*
*R1	*	0.649	* 509.97*	509.97*	509.97*
*R1	*	0.552	* 673.99*	673.99*	673.99*
*R1	*	0.424	* 670.25*	670.25*	670.25*
*R1	*	0.297	* 10*	10*	10*
*R1	*	0.295	* 10*	10*	10*
*R1	*	0.293	* *	*	*

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SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: RV WK T6D1

* Reach	*	River Sta.	* Contr.	* Expan. *
*R1	*	1.085	* .1*	.3*
*R1	*	0.998	* .1*	.3*
*R1	*	0.940	* .1*	.3*
*R1	*	0.890	* .1*	.3*
*R1	*	0.870	* .1*	.3*
*R1	*	0.838	* .1*	.3*
*R1	*	0.745	* .1*	.3*
*R1	*	0.649	* .1*	.3*
*R1	*	0.552	* .1*	.3*
*R1	*	0.424	* .1*	.3*
*R1	*	0.297	* .1*	.3*
*R1	*	0.295	* .1*	.3*
*R1	*	0.293	* .1*	.3*

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ERRORS WARNINGS AND NOTES
Errors Warnings and Notes for Plan : RV WK T6D

River: RV WK T6D Reach: R1 RS: 2.629 Profile: 100-YR FP
Warning:The energy loss was 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: RV WK T6D Reach: R1 RS: 2.579 Profile: 100-YR FP
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.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
River: RV WK T6D Reach: R1 RS: 2.470 Profile: 100-YR FP
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
River: RV WK T6D Reach: R1 RS: 2.378 Profile: 100-YR FP
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
River: RV WK T6D Reach: R1 RS: 2.245 Profile: 100-YR FP
Warning:The energy equation could not be balanced within the specified number of iterations. The program selected the water surface that had the least amount of error between computed and assumed values.
Warning:The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
River: RV WK T6D Reach: R1 RS: 2.120 Profile: 100-YR FP
Warning:The energy loss was 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: RV WK T6D Reach: R1 RS: 2.001 Profile: 100-YR FP
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
River: RV WK T6D Reach: R1 RS: 1.894 Profile: 100-YR FP
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
River: RV WK T6D Reach: R1 RS: 1.833 Profile: 100-YR FP
Warning:The energy loss was 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: RV WK T6D Reach: R1 RS: 1.832 Profile: 100-YR FP

```
    Warning:The energy loss was 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: RV WK T6D  Reach: R1     RS: 1.771     Profile: 100-YR FP
    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.
    Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.
River: RV WK T6D  Reach: R1     RS: 1.678     Profile: 100-YR FP
    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.
    Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, water surface was
            used.
River: RV WK T6D  Reach: R1     RS: 1.614     Profile: 100-YR FP
    Warning:Divided flow computed for this cross-section.
    Warning:A flow split was encountered.  The program first calculated the momentum of both channels below the junction.  An
            energy balance was performed across the junction from the stream with the highest momentum downstream to the section
            upstream.
    Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
            the need for additional cross sections.
    Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, water surface was
            used.
River: RV WK T6D  Reach: R2     RS: 1.567     Profile: 100-YR FP
    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.
River: RV WK T6D  Reach: R2     RS: 1.453     Profile: 100-YR FP
    Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
            This may indicate the need for additional cross sections.
    Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
            the need for additional cross sections.
    Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, water surface was
            used.
River: RV WK T6D  Reach: R2     RS: 1.397     Profile: 100-YR FP
    Warning:The energy equation could not be balanced within the specified number of iterations.  The program used critical depth
            for the water surface and continued on with the calculations.
    Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
            the need for additional cross sections.
    Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
            water surface came back below critical depth.  This indicates that there is not a valid subcritical answer.  The
            program defaulted to critical depth.
River: RV WK T6D  Reach: R2     RS: 1.313     Profile: 100-YR FP
    Note:   Manning's n values were composited to a single value in the main channel.
River: RV WK T6D  Reach: R2     RS: 1.311     Profile: 100-YR FP
    Note:   Manning's n values were composited to a single value in the main channel.
River: RV WK T6D  Reach: R2     RS: 1.309     Profile: 100-YR FP
    Note:   Manning's n values were composited to a single value in the main channel.
River: RV WK T6D S1  Reach: R1     RS: 0.522     Profile: 100-YR FP
    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.
River: RV WK T6D S1  Reach: R1     RS: 0.387     Profile: 100-YR FP
    Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
            the need for additional cross sections.
    Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, water surface was
            used.
River: RV WK T6D S1  Reach: R1     RS: 0.337     Profile: 100-YR FP
    Warning:Divided flow computed for this cross-section.
    Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
            This may indicate the need for additional cross sections.
    Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, water surface was
            used.
River: RV WK T6D S1  Reach: R1     RS: 0.335     Profile: 100-YR FP
    Warning:Divided flow computed for this cross-section.
    Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
            This may indicate the need for additional cross sections.
    Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, water surface was
            used.
River: RV WK T6D S1  Reach: R1     RS: 0.333     Profile: 100-YR FP
    Warning:Divided flow computed for this cross-section.
    Note:   Multiple critical depths were found at this location.  The critical depth with the lowest, valid, water surface was
            used.
```

E.3.14 HEC-RAS Output

RV Wash P

HEC-RAS Plan: Wash P Profile: 100-YR FP

River	Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
RV WP T2	R1	0.376	100-YR FP	510.00	2025.65	2026.47	2026.28	2026.64	0.018961	3.24	154.31	205.00	0.68
RV WP T2	R1	0.276	100-YR FP	510.00	2011.01	2013.09	2013.09	2013.49	0.034300	5.32	104.09	137.84	0.94
RV WP T2	R1	0.190	100-YR FP	510.00	1999.34	2000.54	2000.37	2000.71	0.020794	3.72	152.47	224.75	0.73
RV WP T2	R1	0.148	100-YR FP	510.00	1993.08	1994.36	1994.36	1994.65	0.038878	4.78	125.91	225.43	0.98
RV WP T2	R1	0.078	100-YR FP	1040.00	1981.12	1983.17	1983.12	1983.50	0.025742	5.00	234.41	344.64	0.85
RV WP T1	R1	0.959	100-YR FP	510.00	2088.03	2089.37	2089.37	2089.62	0.033254	4.64	139.81	255.43	0.92
RV WP T1	R1	0.872	100-YR FP	510.00	2075.54	2076.71	2076.58	2076.88	0.022820	3.82	155.93	235.94	0.76
RV WP T1	R1	0.773	100-YR FP	510.00	2061.92	2063.38	2063.38	2063.67	0.028200	5.19	132.60	273.68	0.87
RV WP T1	R1	0.685	100-YR FP	510.00	2049.10	2049.49	2049.32	2049.72	0.025724	1.93	134.66	177.84	0.67
RV WP T1	R1	0.602	100-YR FP	510.00	2036.07	2037.11	2036.99	2037.31	0.031408	4.87	163.17	353.28	0.91
RV WP T1	R1	0.459	100-YR FP	510.00	2013.26	2014.95	2014.78	2015.27	0.027105	5.27	125.65	226.51	0.85
RV WP T1	R1	0.367	100-YR FP	510.00	1999.12	2000.74	2000.66	2000.98	0.032094	4.84	135.12	212.13	0.91
RV WP T1	R1	0.260	100-YR FP	1040.00	1981.94	1983.12	1983.12	1983.48	0.030170	4.24	218.67	333.38	0.86
RV WP T1	R1	0.193	100-YR FP	1040.00	1968.58	1970.91	1970.91	1971.29	0.030935	5.06	210.56	282.06	0.91
RV WP T1	R1	0.131	100-YR FP	1040.00	1958.21	1958.27	1958.12	1958.50	0.024139	0.46	274.78	431.09	0.46
RV WP T1	R1	0.047	100-YR FP	1040.00	1942.98	1944.64	1944.64	1944.97	0.040415	4.59	224.64	324.67	0.99
RV WP	R1	2.650	100-YR FP	200.00	1996.98	1997.82	1997.82	1998.07	0.038363	4.18	53.39	114.00	0.94
RV WP	R1	2.547	100-YR FP	200.00	1982.24	1983.62	1983.35	1983.75	0.009784	3.10	76.69	101.33	0.52
RV WP	R2	2.450	100-YR FP	1040.00	1968.89	1970.92	1970.92	1971.34	0.030634	6.60	211.48	285.01	0.97
RV WP	R2	2.359	100-YR FP	1040.00	1957.56	1958.35	1958.13	1958.53	0.018462	3.09	301.77	451.03	0.67
RV WP	R2	2.261	100-YR FP	1040.00	1942.98	1944.64	1944.64	1944.97	0.039680	4.56	225.90	324.73	0.98
RV WP	R3	2.064	100-YR FP	1040.00	1911.16	1912.70	1912.60	1912.97	0.022781	5.41	268.09	323.30	0.81
RV WP	R3	1.882	100-YR FP	1040.00	1882.48	1883.71	1883.71	1884.06	0.041808	5.72	228.87	330.61	1.05
RV WP	R3	1.703	100-YR FP	1040.00	1852.36	1854.18	1854.18	1854.57	0.020156	5.64	247.66	309.72	0.80
RV WP	R3	1.493	100-YR FP	1110.00	1813.96	1816.50	1816.50	1816.93	0.020338	5.94	249.14	279.90	0.81
RV WP	R3	1.368	100-YR FP	1440.00	1792.41	1793.49	1793.49	1793.94	0.042456	4.76	273.67	338.05	1.01
RV WP	R3	1.229	100-YR FP	1440.00	1768.93	1770.04	1770.04	1770.10	0.002711	1.30	762.53	529.63	0.26
RV WP	R3	1.126	100-YR FP	1440.00	1749.61	1751.51	1751.46	1751.99	0.032540	6.08	273.28	309.15	0.97
RV WP	R3	1.048	100-YR FP	1440.00	1734.91	1735.97	1735.97	1736.42	0.043665	5.13	267.00	347.62	1.04
RV WP	R3	0.853	100-YR FP	1440.00	1701.17	1702.19	1702.19	1702.67	0.014188	2.81	287.48	402.51	0.70
RV WP	R3	0.659	100-YR FP	1440.00	1662.07	1663.50	1663.50	1663.92	0.021760	5.91	297.46	347.92	0.98
RV WP	R3	0.484	100-YR FP	1440.00	1627.23	1629.09	1629.09	1629.49	0.018198	5.98	313.40	365.68	0.92
RV WP	R3	0.373	100-YR FP	1440.00	1605.23	1607.37	1607.37	1608.00	0.022816	6.71	230.89	189.49	1.03
RV WP	R3	0.267	100-YR FP	1440.00	1582.83	1585.35	1585.35	1586.05	0.017346	7.07	229.38	165.40	0.94
RV WP	R3	0.088	100-YR FP	1490.00	1549.50	1551.67	1551.67	1552.15	0.021610	5.79	276.45	290.22	0.98
RV WP	R3	0.086	100-YR FP	1490.00	1549.13	1551.36	1551.36	1551.83	0.019873	5.67	282.50	296.84	0.94
RV WP	R3	0.084	100-YR FP	1490.00	1548.90	1550.85	1550.85	1551.37	0.022124	5.88	265.11	289.31	0.99

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

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

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

PROJECT DATA
Project Title: RV Wash P
Project File : RV_Wash_P.prj
Run Date and Time: 11/1/2007 10:12:17 AM

Project in English units

Project Description:
Rio Verde ADMP, Project FCDMC 2001C056, river system including RV Wash P, RV
Wash P Trib 1, and RV Wash P Trib 2. Phase 3 RAS model started in June 2005,
preliminary model completed in August 2005.

RAS model is prepared by Dibble
Engineering. Field reconnaissance per report dated April 18, 2005.

For the
study washes, the starting water surface elevation is on RV Wash P, and is
taken from normal depth for three cross sections repeated at ten-foot
intervals. The slope-area method is the same as the normal depth method.

RV
Wash P Floodplain Delineation
From the confluence with the Verde River (River
Mile 0.000, approximately 8,300 feet north and 150 feet east of the
intersection of Needlerock Road and Rio Verde Drive) to a point approximately
3,100 feet north and 450 feet west of the intersection of 172nd Street and Lone
Mountain Road (River Mile 2.650), a distance of 2.650 river miles.

RV Wash P
Trib 1 Floodplain Delineation
From the confluence with RV Wash P (River Mile
0.000, approximately 1,200 feet south and 800 feet east of the intersection of
172nd Street and Lone Mountain Road) to a point approximately 750 feet north
and 500 feet west of the intersection of 168th Street and Four Corners
Transmission Road (River Mile 0.959), a distance of 0.959 river miles.

RV
Wash P Trib 2 Floodplain Delineation
From the confluence with RV Wash P (River
Mile 0.000, approximately 2,200 feet north and 100 feet east of the
intersection of 172nd Street and Lone Mountain Road) to a point approximately
600 feet north and 1,400 feet west of the intersection of 168th Street and Four
Corners Transmission Road (River Mile 0.376), a distance of 0.376 river
miles.

The Cross-section data were generated by INROADS. The mapped
hydraulic base line represents the 10,000-station point of the HEC-RAS model.


Topographic mapping is supplied by the Flood Control District of Maricopa
County.

Discharge data is from the Rio Verde ADMP HEC-1 model. The original
models are from the Flood Control District of Maricopa County, prepared for the
Rio Verde South Floodplain Delineation, the Rio Verde South Extension
Floodplain Delineation, the Rio Verde North Floodplain Delineation, and the Rio
Verde North Extension Floodplain Delineation. The HEC-1 models were modified
for the Rio Verde ADMP. The final HEC-1 files were received in February 2004
and FCDMC approved the hydrology model.

Hydrologic concentration points are
noted in cross-section descriptions using the corresponding HEC-1 ID's. The
flow rates have been rounded to the nearest 10 cubic feet per second (cfs).
Flow rates obtained from HEC-1 are applied at the downstream end of the
relevant sub-basin and stepped upstream at cross-sections to meet the HEC-1
flow from the upstream sub-basin.

River Mile (RM) stationing is based upon
the estimated tie in point with downstream receiving waters or the start of
two-dimensional flow models. This point represents RM 0.000. The assumed
starting WS Elevation is based upon normal depth in the study wash.

Horizontal and Vertical Coordinate Basis for this project is as follows:

          Horizontal--Arizona State Plane, Central Region, NAD 1983
          Vertical--NAVD
1988

RAS model river naming corresponds to project river naming as
follows:
          RV WP = RV Wash K
```

```
          RV WP T1 = RV Wash P Trib 1
          RV WP T2 = RV Wash
P Trib 2


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

PLAN DATA

Plan Title: RV Wash P
Plan File : j:\2006\10-0606.1\Design Notebook\Drainage Design\HEC-RAS\RV_Wash_P.p01

           Geometry Title: RV Wash P
           Geometry File : j:\2006\10-0606.1\Design Notebook\Drainage Design\HEC-RAS\RV_Wash_P.g01

           Flow Title    : RV Wash P
           Flow File     : j:\2006\10-0606.1\Design Notebook\Drainage Design\HEC-RAS\RV_Wash_P.f01

Plan Summary Information:
Number of:  Cross Sections =   37    Multiple Openings  =    0
            Culverts       =    0    Inline Structures  =    0
            Bridges        =    0    Lateral Structures =    0

Computational Information
    Water surface calculation tolerance  =  0.01
    Critical depth calculation tolerance =  0.01
    Maximum number of iterations         =  20
    Maximum difference tolerance         =  0.3
    Flow tolerance factor                =  0.001

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

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

River = RV WP            Reach = R1
RS      Profile           Method  Value1  Value2
2.650   PF 2                   1 9979.8310049.48
2.547   PF 2                   1 9988.3510035.36

River = RV WP            Reach = R2
RS      Profile           Method  Value1  Value2
2.450   PF 2                   1    9980   10043
2.359   PF 2                   1 9968.37   10072
2.261   PF 2                   1    995710243.24

River = RV WP            Reach = R3
RS      Profile           Method  Value1  Value2
2.064   PF 2                   1    9906   10185
1.882   PF 2                   1    9696   10026
1.703   PF 2                   1 9854.43   10024
1.493   PF 2                   1 9917.28   10090
1.368   PF 2                   1    9877   10224
1.229   PF 2                   1    988810073.12
1.126   PF 2                   1    9910   10059
1.048   PF 2                   1 9977.95   10123
0.853   PF 2                   1    9820   10200
0.659   PF 2                   1    9796   10143
0.484   PF 2                   1    970510033.53
0.373   PF 2                   1 9912.1410101.63
0.267   PF 2                   1 9936.4810101.88
0.088   PF 2                   1 9717.3310015.37
0.086   PF 2                   1 9719.4210019.72
0.084   PF 2                   1    972010020.72

River = RV WP T1         Reach = R1
RS      Profile           Method  Value1  Value2
0.959   PF 2                   1    994510023.01
0.872   PF 2                   1 9937.7810018.17
0.773   PF 2                   1 9978.8710029.39
0.685   PF 2                   1    987510112.91
0.602   PF 2                   1    9890   10016
0.459   PF 2                   1    9910   10019
0.367   PF 2                   1    9977   10064
0.260   PF 2                   1 9946.3710030.18
0.193   PF 2                   1    9980   10090
0.131   PF 2                   1    9900   10041
0.047   PF 2                   1 9868.5310148.88

River = RV WP T2         Reach = R1
RS      Profile           Method  Value1  Value2
0.376   PF 2                   1 9990.1910069.12
0.276   PF 2                   1    9988   10125
0.190   PF 2                   1 9983.07   10085
0.148   PF 2                   1    9979   10082
0.078   PF 2                   1    9971   10045


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

FLOW DATA

Flow Title: RV Wash P
Flow File : j:\2006\10-0606.1\Design Notebook\Drainage Design\HEC-RAS\RV_Wash_P.f01
```

Flow Data (cfs)

River	Reach	RS	100-YR FP
RV WP	R1	2.650	200
RV WP	R2	2.450	1040
RV WP	R2	2.261	1040
RV WP	R3	2.064	1040
RV WP	R3	1.493	1110
RV WP	R3	1.368	1440
RV WP	R3	0.088	1490
RV WP T1	R1	0.959	510
RV WP T1	R1	0.260	1040
RV WP T1	R1	0.047	1040
RV WP T2	R1	0.376	510
RV WP T2	R1	0.078	1040

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
RV WP	R3	100-YR FP		Normal S = 3.127799E-02

GEOMETRY DATA

Geometry Title: RV Wash P
Geometry File : j:\2006\10-0606.1\Design Notebook\Drainage Design\HEC-RAS\RV_Wash_P.g01

Reach Connection Table

River	Reach	Upstream Boundary	Downstream Boundary
RV WP	R1		J1
RV WP	R2	J1	J2
RV WP	R3	J2	
RV WP T1	R1		J2
RV WP T2	R1		J1

JUNCTION INFORMATION

Name: J1
Description: RV Wash P Trib 2 and RV Wash P Confluence
Energy computation Method

Length across Junction River	Reach	Tributary River	Reach	Length	Angle
RV WP	R1	to RV WP	R2	510.58	
RV WP T2	R1	to RV WP	R2	433.53	

Name: J2
Description: RV Wash P Trib 1 and RV Wash P Confluence
Energy computation Method

Length across Junction River	Reach	Tributary River	Reach	Length	Angle
RV WP	R2	to RV WP	R3	1042.07	
RV WP T1	R1	to RV WP	R3	1037.57	0

CROSS SECTION

RIVER: RV WP
REACH: R1 RS: 2.650

INPUT
Description: Q=200 cfs (B8W1, 24 hr)
Station Elevation Data num= 39

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9945.43	2007.97	9945.46	2007.96	9949.57	2006.33	9950.16	2006.12	9953.8	2004.68
9954.22	2004.52	9954.59	2004.38	9979.83	1997.19	9979.95	1997.16	9980.98	1996.98
9981.23	1997	9987	1997.01	9993.26	1997.04	10000	1997.11	10001.92	1997.13
10006.46	1997.16	10017.16	1997.27	10027.75	1997.5	10029.75	1997.55	10034.6	1997.57
10034.66	1997.57	10035.73	1997.49	10042.15	1997.03	10042.46	1997.03	10042.54	1997.04
10042.76	1997.04	10049.48	1997.21	10053.63	1997.33	10054.83	1997.36	10056.3	1997.42
10060.54	1997.53	10066.61	1997.56	10068.7	1997.59	10082.67	1997.69	10090.78	1997.81
10111.09	1998.12	10112.7	1998.14	10114.65	1998.18	10148.66	2005.97		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9945.43	.055	9979.83	.05	10049.48	.055

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9979.83	10049.48	547.5	547.5	547.5	.1	.3

CROSS SECTION

RIVER: RV WP
REACH: R1 RS: 2.547

INPUT
Description:
Station Elevation Data num= 31

```
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
 9915.51 1989.96 9918.32 1989.41 9923.69 1988.37 9926.88 1987.73  9934.4 1986.27
 9935.33 1986.09 9937.371985.694 9938.32 1985.51 9988.35 1982.82 9990.96 1982.68
 9998.38 1982.28 9998.96 1982.24   10000 1982.2610002.49  1982.310004.06 1982.33
10032.87 1982.7810035.361982.81810056.57 1983.1410066.66 1983.2810068.33  1983.3
 10073.8 1983.3910079.51 1984.6410084.82  1985.810088.19 1986.5410090.53 1987.05
10092.53 1987.4310094.06 1987.7310095.27 1987.9610096.26 1988.1410096.63 1988.22
10106.91 1989.97

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
 9915.51    .055 9988.35     .0510035.36    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9988.3510035.36                 0       0       0             .1       .3

CROSS SECTION


RIVER: RV WP
REACH: R2                 RS: 2.450

INPUT
Description: Q=1040 cfs (CB9W1A, 24 hr)  This cross section is identical to RM
             0.193 on RV WP T1.
Station Elevation Data    num=     113
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
  9953.4 1978.53 9957.77 1976.97  9959.4 1976.59 9965.19 1974.59 9967.77 1974.04
  9972.5 1972.47 9976.28 1971.76 9977.13  1971.5 9979.73 1970.88 9985.01    1970
 9985.61 1969.86 9986.73  1969.6 9988.24 1969.39 9991.82 1968.89 9997.03 1969.11
   10000 1969.2310000.03 1969.2310008.48 1969.5910015.371969.81310021.13    1970
10022.53 1970.0510023.16 1970.0510025.31 1970.0910036.75 1970.2710038.07  1970.3
10038.39 1970.2810047.51 1969.7810054.11 1970.2310058.04 1970.5110074.48 1970.36
10083.42  1970.310087.53 1970.0710090.75 1969.8910093.83 1970.1310100.51 1970.63
10102.65  1970.810120.29 1970.92 10124.3 1970.9510125.76 1970.9610126.53 1970.96
10127.05 1970.9710127.39 1970.9710127.65 1970.9710127.85 1970.9710127.99 1970.97
10128.06 1970.9710128.12 1970.9710130.81 1970.9710139.58 1970.9710144.51 1970.97
10213.03 1970.8610217.29  1970.910221.28 1970.9410221.31 1970.94 10224.2 1970.92
10295.35 1971.2110320.24 1971.4910322.17 1971.5310325.49 1971.4510329.98 1971.36
10333.14  1971.310337.76 1971.1310343.18 1971.0210344.37 1970.9810345.92 1970.95
10347.81 1970.9310347.99 1970.9310348.45 1970.9310359.35 1971.0910365.13 1971.19
10368.57 1971.2410388.45 1971.5710389.61 1971.5910389.76 1971.58   10390 1971.57
10391.81  1971.510397.44 1971.1910403.77 1970.9710407.06  1970.910409.32 1970.84
 10418.9 1970.5710421.24 1970.51 10426.6 1970.3810432.69 1970.2710442.73  1970.1
10445.75  1970.110446.67 1970.0910452.22 1970.0710455.38 1970.0410457.12 1970.04
10460.81    197010466.61 1969.8110471.98 1969.5910479.75 1969.3110485.38 1969.06
10485.65 1969.0510486.12 1969.0210487.48  1968.910490.24 1968.6610491.15 1968.58
 10494.1 1968.9810505.95 1970.4610510.911971.09310520.77 1972.3510521.59 1972.46
10524.63 1972.81 10534.8 1973.2510538.46 1973.4410539.42 1973.4910551.97 1974.17
10554.06 1974.2810560.92 1974.6410568.17 1975.04

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*****************************************************************************
  9953.4    .055 9985.01     .0510022.53    .05510391.81     .0510510.91    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9985.0110022.53           477.87  477.87  477.87             .1       .3

CROSS SECTION


RIVER: RV WP
REACH: R2                 RS: 2.359

INPUT
Description: This cross section is identical to RM 0.131 on RV WP T1.
Station Elevation Data    num=     122
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
 9870.59 1963.22 9883.76 1961.62 9897.56 1959.91 9903.37  1959.2 9909.79  1958.4
 9914.47 1958.47 9918.46 1958.53 9942.38 1958.79 9944.44  1958.8 9952.26 1958.67
 9971.68 1958.28 9972.78 1958.26  9974.2 1958.22  9978.5 1958.12 9983.09 1958.02
 9999.98 1957.69   10000 1957.6910001.67 1957.6510004.95 1957.6410006.89 1957.64
10016.53 1957.6110024.51 1957.5910028.26 1957.5810036.98 1957.56 10038.6  1957.6
10039.22  1957.610043.94 1957.6810046.64 1957.6610047.67 1957.6610053.88 1957.62
10056.02 1957.6110059.27 1957.5710064.85 1957.5310065.26 1957.5210066.61 1957.52
10072.64  1957.510077.59 1957.2910087.62 1956.8610106.11 1956.8410155.09 1956.99
10155.37 1957.0110155.44 1957.02   10157 1957.0610159.21 1957.1210160.29 1957.15
10163.13 1957.2910165.83 1957.4310167.44 1957.5210184.02 1957.7310192.42 1957.79
10228.25 1958.2110237.47 1958.3310243.15 1958.2710250.14 1958.21 10250.7 1958.23
10257.79 1958.4110263.17 1958.5510276.09 1958.8210280.87 1958.8910285.97    1959
10295.99 1959.14 10296.9 1959.1610302.41 1959.23 10368.9 1957.1910369.02 1957.19
10369.22 1957.1910390.37 1957.4310391.48 1957.4510391.54 1957.4510392.13 1957.46
10392.77 1957.4710392.84 1957.4710392.89 1957.4710406.93 1957.1610407.87 1957.14
10407.89 1957.1410411.18 1956.9710420.34 1957.6410422.94  1958.710422.96 1958.71
10425.87 1959.2210428.36 1959.6710430.51 1960.0510438.55 1960.9710452.89 1961.78
10459.82 1962.3710460.88 1962.4610464.22 1962.4510465.88  1962.410469.62 1962.29
   10470 1962.2610472.38 1962.0510484.57 1960.7710485.47 1960.6110486.46 1960.43
10487.55 1960.2210491.98 1959.2610493.36 1958.99 10497.5  1958.110499.17 1957.78
10499.39 1957.7410503.23 1956.91 10522.1  1954.110529.88 1952.7910530.16 1952.74
10530.29 1952.7110531.08 1952.59   10533 1952.8710534.69 1953.1210549.99 1955.39
10566.27 1957.8910568.66 1958.2510572.56 1958.6510573.75 1958.7510583.85 1959.66
10588.94  1960.110600.32 1961.1110610.88    196210616.83 1962.5210632.77 1963.83
10633.35 1963.8810634.49 1963.98

Manning's n Values        num=       5
```

```
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*******************************************************************************
 9870.59    .055   10000     .0510043.94    .05510237.47     .0510420.34    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9983.0910043.94              519     519     519              .1       .3
Ineffective Flow     num=        1
   Sta L   Sta R    Elev  Permanent
10460.8810634.49 1962.46       F

CROSS SECTION


RIVER: RV WP
REACH: R2                 RS: 2.261

INPUT
Description: This cross section is identical to RM 0.047 on RV WP T1.
Station Elevation Data    num=      70
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9903.23 1951.11 9907.94 1950.56  9914.3 1949.81 9962.861943.923 9964.29 1943.75
 9966.28 1943.64 9966.62 1943.62 9966.99  1943.6 9970.86 1943.62  9989.2 1943.68
 9991.79 1943.69 9996.17 1943.71 9996.19 1943.71 9996.39 1943.71   10000 1943.71
10004.26 1943.7110010.91  1943.710016.19 1943.6910020.48 1943.6910073.561944.105
10075.53 1944.1210078.22  1944.110081.48 1944.0910085.56 1944.0810088.71 1944.06
10090.75 1944.0810093.08  1944.110106.89 1944.1310110.33 1944.1410118.05 1944.15
10130.97 1944.1610139.76 1944.23   10143 1944.2410151.53  1944.3 10156.1 1944.33
10162.99 1944.3310163.32 1944.3210166.23 1944.3310175.11 1944.3410176.09 1944.34
10176.91 1944.3310181.69 1944.3310184.71  1944.310189.16 1944.2710191.74 1944.25
10194.44 1944.2310198.73 1944.1910198.78 1944.1910199.76 1944.1910203.13 1944.12
 10205.9 1944.0510206.92 1944.0210213.18 1943.8610217.34 1943.7810220.41 1943.71
10226.14 1943.6310227.76 1943.4410227.84 1943.4410229.48 1943.2510232.03 1942.98
10237.24 1943.4610243.24 1943.9210250.27 1943.7810271.92 1943.4210287.87 1945.41
10297.35 1946.5610302.05 1947.2810304.89 1947.7310311.86 1948.8110319.75 1950.09

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
 9903.23    .055 9962.86     .0510243.24    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9962.8610243.24          1042.07 1042.07 1042.07              .1       .3

CROSS SECTION


RIVER: RV WP
REACH: R3                 RS: 2.064

INPUT
Description: Q=1040 cfs (CB9W1A, 24 hr)
Station Elevation Data    num=      79
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9747.85 1918.73  9753.1 1918.36 9759.76 1917.91 9767.98  1917.3 9776.39 1915.66
 9779.32 1915.09 9780.29  1914.9 9784.12 1914.26 9784.43 1914.21 9784.55  1914.2
 9785.21 1914.11 9786.28 1913.98 9788.41  1913.7  9794.6 1912.91 9813.88 1910.43
 9819.34 1910.73 9821.35 1910.83  9829.3 1911.24 9841.86  1911.9 9842.51 1911.93
 9845.87 1912.12 9853.04 1912.46 9859.91 1912.35  9866.8 1912.24  9875.2  1912.1
 9884.33 1911.95  9889.9  1912.1 9894.95 1912.26 9899.82  1912.4 9903.32 1912.52
 9903.44 1912.53 9903.65 1912.54 9904.05 1912.55 9938.84 1912.27 9943.42 1912.23
 9966.18    1912    9985 1911.44 9986.691911.383 9986.77 1911.38 9993.57 1911.16
 9999.99 1911.23   10000 1911.2310003.88 1911.2710009.361911.31910023.87 1911.45
10039.27  1911.510061.51 1911.6410070.64 1911.6910077.46 1911.7410087.42 1912.87
10094.43 1913.6310099.31 1913.0510103.98  1912.510111.69 1911.9210113.55    1912
10114.54 1912.0310118.78 1912.1510118.96 1912.1610127.94 1912.6810136.04 1913.11
10137.34 1913.1510138.35  1913.210147.78 1913.5910157.56 1914.1410157.96 1914.16
10158.34 1914.1810159.71 1914.0710182.15 1912.3410192.83 1913.6710194.72 1913.91
10195.27 1913.9810197.27 1914.2810197.51 1914.3110197.79 1914.3510199.13 1914.57
10212.38 1916.7210213.62 1916.9210215.73    191710244.01 1918.04

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
 9747.85    .055 9986.69     .0510009.36    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          998510023.87           961.74  961.74  961.74              .1       .3

CROSS SECTION


RIVER: RV WP
REACH: R3                 RS: 1.882

INPUT
Description:
Station Elevation Data    num=     108
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9658.32  1887.9 9661.16 1887.59  9661.9 1887.51 9662.18 1887.49 9705.49  1882.6
 9705.92 1882.56 9706.75 1882.58 9707.05 1882.58 9713.33 1882.69 9729.52 1882.62
 9733.93 1882.63 9743.52 1882.48 9746.35 1882.65  9750.5 1882.89 9750.96  1882.9
 9751.08  1882.9 9755.59 1883.02 9756.73 1883.03 9760.26 1883.12 9762.36 1883.15
 9764.96 1883.21 9767.96 1883.24 9767.98 1883.25 9769.69 1883.25 9773.51  1883.3
 9774.44 1883.31 9776.64 1883.34 9779.05 1883.32 9779.22 1883.32 9780.42  1883.3
 9784.07 1883.22 9784.46  1883.2 9788.94 1883.08 9789.14 1883.07 9789.85 1883.07
  9793.8 1882.99 9795.23    1883 9798.67 1882.93 9800.61 1882.96 9803.55  1882.9
 9805.97 1882.94 9807.62 1882.92 9808.44 1882.94 9811.32 1882.99 9813.99 1882.94
```

```
 9816.95 1883.01 9819.14 1883.06 9820.51 1883.17 9822.01 1883.19 9823.16 1883.22
 9827.33 1883.28 9828.06  1883.3 9832.68 1883.36 9832.98 1883.37 9836.27 1883.41
 9837.65 1883.45 9837.67 1883.45 9841.72 1883.56 9841.96 1883.56 9843.48 1883.57
 9848.57 1883.67 9853.38 1883.68 9857.99 1883.68 9862.41 1883.69 9866.67 1883.69
 9866.83 1883.69 9870.81 1883.63 9874.81 1883.58 9878.69 1883.52 9888.25 1883.43
  9892.5 1883.37 9893.74 1883.37  9897.7 1883.31 9899.24 1883.32 9899.57 1883.32
 9903.14 1883.27 9904.88 1883.26 9906.05 1883.24 9908.08 1883.21 9910.73 1883.18
 9913.23 1883.15 9916.73 1883.12 9918.18  1883.1 9919.45 1883.08 9920.59 1883.07
  9921.6 1883.06 9934.53 1881.77 9935.07 1881.75 9935.15 1881.75 9935.72 1881.75
 9940.35 1882.31 9943.72 1882.72  9948.3 1883.28 9950.45 1883.29 9974.62 1882.93
 9990.54 1882.57  9990.9 1882.55 9990.91 1882.55  9994.1 1882.52 9999.67 1882.49
   10000 1882.4910015.08 1882.4910017.08 1882.4810018.17 1882.4910018.19 1882.49
10023.441883.28410027.85 1883.95 10053.1 1887.77

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9658.32    .055 9990.91     .0510018.17    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9950.4510023.44           943.71  943.71  943.71             .1       .3

CROSS SECTION


RIVER: RV WP
REACH: R3                 RS: 1.703

INPUT
Description:
Station Elevation Data    num=      62
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9822.03 1858.68 9845.33 1855.32 9850.41 1854.59 9853.77 1854.24  9860.8 1853.55
 9873.87 1853.98 9879.54 1854.01 9904.55 1853.54 9905.54 1853.52  9905.7 1853.52
 9905.81 1853.52 9910.67 1853.49 9910.81 1853.48 9917.71  1853.4 9925.75 1853.34
 9929.64  1853.3 9935.34 1853.27  9951.5 1852.55 9955.91 1852.36 9957.31 1852.37
 9965.18 1852.38 9999.98 1852.62   10000 1852.6210012.74 1852.7110015.56 1852.72
 10018.9 1852.7410020.39 1852.9110020.62 1852.9410023.551853.32610029.73 1854.14
10032.84 1854.5410033.42 1854.6210034.01  1854.6 10042.5 1854.2910047.57 1854.16
10071.59 1853.9610072.77 1853.9610074.07 1853.9310075.58 1853.8610076.81 1853.81
 10077.5 1853.8110080.03  1853.810083.61 1853.7910089.09 1853.7810098.52 1853.76
10099.32 1853.7510108.72 1853.7410111.31 1853.74 10118.7 1853.7410122.59 1853.76
10124.06 1853.7310125.62 1853.7310134.72 1853.5610144.68 1853.4610144.87  1853.4
10147.97 1853.3510153.01 1853.2510170.67 1853.1310171.29 1853.1710178.78 1853.93
10200.59  1856.210204.11 1856.14

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9822.03    .055 9935.34     .0510023.55    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9935.3410023.55          1110.04 1110.04 1110.04             .1       .3

CROSS SECTION


RIVER: RV WP
REACH: R3                 RS: 1.493

INPUT
Description: Q=1110 cfs (CB9W1, 24 hr)
Station Elevation Data    num=      42
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9899.42 1821.66 9907.73 1819.31 9920.081815.672 9920.73 1815.48 9922.95 1814.84
 9923.17 1814.78 9926.07 1813.98  9927.3 1813.97  9927.4 1813.96 9932.62 1814.07
 9954.77 1814.47 9969.92 1815.04 9973.54 1815.19 9976.62 1815.31 9978.98 1815.39
 9983.39 1815.53 9986.531815.518 9990.97  1815.5   10000 1815.5610000.02 1815.56
10001.74 1815.5710020.39 1815.8310043.33 1816.1510053.64  1816.310058.68 1816.38
10059.95 1816.4110064.06 1816.5110108.55 1816.0110126.78 1815.7910136.35 1815.92
10167.45 1815.2710182.46 1815.4810184.24 1815.4810191.15 1815.9910194.54 1816.23
10196.07 1816.3410197.08 1816.3810197.78  1816.410198.27 1816.4210213.76 1818.62
10221.35 1819.6910240.83 1822.41

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9899.42    .055 9920.08     .0510001.74    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9920.0810001.74           659.98  659.98  659.98             .1       .3

CROSS SECTION


RIVER: RV WP
REACH: R3                 RS: 1.368

INPUT
Description: Q=1440 cfs (CB13WA, 24 hr)
Station Elevation Data    num=      63
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9739.51 1798.51 9740.28 1798.34 9774.74 1790.98 9778.02 1790.43 9778.44 1790.36
    9782 1789.88 9787.44 1790.52 9795.95 1791.41 9800.74 1791.94  9802.6 1792.11
 9823.19 1792.48 9838.41 1792.74 9846.68 1792.89 9857.76 1793.07 9868.64 1792.24
 9878.81 1791.62 9893.91 1792.64 9898.21  1792.9 9902.93 1792.98 9913.65 1793.15
 9925.68 1793.34 9929.16 1793.39  9953.6 1793.27 9957.46 1793.23 9979.25 1792.89
```

```
 9990.89 1792.71 9997.38  1792.6   10000 1792.5610000.03 1792.56 10001.5 1792.54
 10015.2 1792.41 10021.7 1792.5410028.18  1792.910030.39 1793.0510034.26 1793.32
10038.94 1793.64   10043 1793.8710043.64 1793.9110044.87  1793.910065.45 1793.75
10077.71 1793.6310085.83 1793.5510091.62 1793.4910116.99 1793.4910132.98  1793.1
 10134.6 1793.0210136.67 1792.92 10137.1 1792.9110139.64 1792.8210156.13 1793.62
10166.46 1794.1410166.51 1794.1410176.95 1793.9110188.64 1793.6410222.06 1792.92
10222.15 1792.8910227.84 1794.6710232.62 1795.9910240.82 1798.4210252.56 1801.48
10253.85 1801.5610254.53 1801.6110262.37 1802.11

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**************************************************
 9739.51    .055 9957.46     .0510038.94    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9957.4610038.94           732.92  732.92  732.92             .1       .3

CROSS SECTION


RIVER: RV WP
REACH: R3                 RS: 1.229

INPUT
Description:
Station Elevation Data    num=     105
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9712.37 1773.58 9725.03 1770.19 9727.22 1769.64 9728.64 1769.33 9735.11 1767.91
 9740.86 1766.64 9746.58 1766.91 9748.04 1766.96 9755.52  1767.3  9763.1 1767.52
 9764.41 1767.57 9765.56  1767.6 9766.18 1767.62 9769.26  1767.7 9769.34 1767.71
 9769.68 1767.71 9779.66 1767.67 9783.29 1767.67 9797.32 1767.62  9799.3 1767.62
 9807.62 1767.64 9814.79 1767.62 9815.53 1767.62  9830.9 1767.67 9831.43 1767.68
 9837.37 1767.75 9841.08  1767.8 9868.91 1767.76 9871.05 1767.76 9873.56 1767.76
 9873.69 1767.76    9877 1767.83 9881.41 1767.92 9887.58 1768.05 9896.84 1768.24
 9901.92 1768.35 9905.96 1768.47 9910.45 1768.52 9912.73 1768.56 9914.93 1768.56
 9918.77 1768.63 9920.86 1768.63 9922.33 1768.66 9929.61  1768.7 9933.22 1768.78
 9938.38 1768.83 9944.04 1768.98 9947.18 1769.01 9954.83 1769.23 9955.88 1769.25
 9956.01 1769.25  9956.8 1769.26 9957.38 1769.27 9957.81 1769.28 9958.13 1769.28
 9958.16 1769.28 9958.43 1769.29 9961.66 1769.36 9984.78 1770.04 9991.621769.511
 9999.13 1768.93   10000 1768.9510000.03 1768.9510008.79 1769.0910010.76  1769.1
10013.69 1769.1110018.52 1769.1210027.92 1769.16 10031.8 1769.1710038.28 1769.22
10052.98 1769.42 10057.3 1769.4810073.12 1769.7110078.36 1769.2410078.87 1769.19
10087.51 1768.4410091.69  1768.810092.82 1768.9110098.71  1769.310100.45 1769.43
10103.02 1769.5810116.78 1769.4210120.84 1769.4210126.14 1769.3910133.02  1768.4
10138.85  1767.710146.29 1768.2710154.34 1768.7910160.41 1769.1910168.57 1768.92
10184.46 1768.4410194.08 1768.6210201.54 1768.7910223.44 1769.2410224.44 1769.31
10225.22  1769.3   10230 1768.9410242.74 1768.0910247.85 1768.8910252.75 1769.67
10257.49 1770.3710267.88 1771.9410281.26 1773.9410288.14 1774.9810294.15 1775.87

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**************************************************
 9712.37    .055 9991.62     .0510073.12    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9991.6210073.12           541.93  541.93  541.93             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
 9712.37 9984.78 1770.04       F

CROSS SECTION


RIVER: RV WP
REACH: R3                 RS: 1.126

INPUT
Description:
Station Elevation Data    num=     110
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9816.57 1770.99 9821.99 1771.36 9832.08 1769.85 9835.48  1769.3 9837.07 1768.78
 9839.17 1767.76 9839.38  1767.7 9842.14 1766.41 9857.92 1761.19 9864.66 1758.82
 9869.51 1757.21 9872.26  1756.3 9894.18 1750.76 9896.73 1750.61 9902.41 1750.14
  9904.2 1750.08 9904.23 1750.08 9908.55 1749.86 9923.31 1750.42 9923.36 1750.42
  9931.8 1750.78  9935.6 1750.87 9938.83  1750.8 9940.08 1750.76 9948.07 1750.55
 9953.08 1750.35 9957.15 1750.22  9965.8 1749.84 9965.84 1749.84 9966.92 1749.83
 9967.01 1749.83 9983.52 1749.75 9996.27 1749.61 9999.97 1749.82   10000 1749.82
10000.66 1749.8610001.26 1749.8910012.76 1750.5210016.97 1750.7610018.45 1750.84
10045.14 1750.5910051.45 1750.53 10058.71750.86610062.46 1751.0410066.94 1751.24
10067.82 1751.2510075.36 1751.2910080.31 1751.3110117.99 1751.2810120.67 1751.29
10124.78 1751.29 10124.8 1751.2910124.97 1751.3110134.22  1752.110150.88 1753.79
10164.21 1755.17 10165.7 1755.0310172.25 1754.3910173.01 1754.3110190.44 1753.69
10204.49 1752.9410207.54 1752.9510209.59 1752.9710216.13 1753.0310229.82 1753.13
10232.49 1753.1510233.47 1753.1610238.66 1753.19 10240.3 1753.1510260.59 1752.92
10295.17 1752.6310319.31  1752.410322.29 1752.3910326.41 1752.3910332.47 1752.39
10337.47 1752.3910343.89 1752.14 10357.2 1751.7310370.09 1751.5710375.03 1751.51
10375.08 1751.5110377.55 1751.4910387.75  1751.310388.59 1751.25 10389.7 1751.17
10391.54 1751.0410395.09 1750.78 10395.5 1750.7510404.89 1749.95 10407.5 1749.73
10421.93 1751.1410429.07 1751.8210429.86  1751.810430.04  1751.810437.93 1751.57
10445.77 1751.5210447.08 1751.4910449.18 1751.4910453.47 1750.5210458.27  1749.2
10458.39 1749.2310458.52 1749.2610466.95 1751.19 10472.1 1752.5710474.65 1753.37
10481.03 1755.3310504.89 1762.7610508.02 1762.5110529.36 1762.5710557.09 1763.21

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**************************************************
 9816.57    .055  9935.6     .05 10058.7    .055
```

```
Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        9935.6 10058.7            414.97  414.97  414.97             .1       .3

CROSS SECTION


RIVER: RV WP
REACH: R3                  RS: 1.048

INPUT
Description:
Station Elevation Data    num=      77
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 9880.61 1741.58 9884.89 1740.63 9884.99 1740.61 9889.81 1739.31 9891.76 1738.77
  9892.3 1738.69 9895.06 1738.23  9899.6 1737.46  9900.5 1737.32 9903.01  1736.9
 9904.33 1736.69 9905.19 1736.56 9906.62 1736.44 9910.86  1736.1 9919.57 1735.38
 9920.91 1735.25 9924.69 1734.86 9925.04 1734.86 9928.21 1734.92 9942.44 1735.42
 9942.64 1735.44 9945.78  1735.5 9946.48 1735.51 9947.75 1735.54 9951.34 1735.64
 9977.95 1736.23 9977.96 1736.23 9984.82 1735.71 9991.02 1735.03 9991.12 1735.02
 9992.11 1734.91   10000 1734.9810000.02 1734.9810012.72  1735.110030.71 1735.17
 10033.2 1735.3610041.63 1736.1110041.84  1736.110051.28 1735.5610071.12 1734.41
10086.93 1734.7510098.79 1734.9510109.34 1735.1510128.66 1735.4410128.73 1735.44
10147.18 1735.3310155.78 1735.2710159.84 1735.2510162.33 1735.2310163.96 1735.22
10173.43 1735.14 10173.9 1735.1410174.51 1735.1510175.32 1735.1510175.58 1735.15
 10176.7 1735.1610178.47 1735.1610181.77 1735.1810190.11 1735.2210196.24 1735.24
10218.68 1734.73 10224.3  1734.610224.46  1734.610230.28 1734.5410231.57 1734.51
 10232.2 1734.5210233.38 1734.5410236.09 1734.5910236.23 1734.5910253.17 1734.81
10253.46 1734.8110253.71 1734.8110263.81 1734.74   10273 1734.7110276.67 1735.46
10281.78 1736.5210309.14 1742.15

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9880.61    .055 9977.95     .0510041.63    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9977.9510041.63          1028.17 1028.17 1028.17             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
 9880.61 9977.95    1738       F

CROSS SECTION


RIVER: RV WP
REACH: R3                  RS: 0.853

INPUT
Description:
Station Elevation Data    num=     122
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 9780.43 1706.88 9783.24 1705.95 9784.21 1705.76 9787.48 1704.67 9788.54 1704.48
 9789.49 1704.16 9791.04 1703.92 9793.98 1703.45 9795.17 1703.26 9801.95 1701.96
 9803.47 1701.67 9810.33 1701.86 9821.17 1702.19 9824.18 1702.28 9825.04 1702.31
 9825.58 1702.34 9827.07  1702.5 9828.68 1702.67 9829.31 1702.71    9832  1702.8
 9832.29  1702.8 9832.68 1702.78  9836.3 1702.97  9836.9 1702.93 9837.99 1702.97
 9838.72 1702.92 9839.02  1702.9 9841.31 1702.77 9845.27 1702.56 9852.56 1702.11
  9852.7  1702.1 9853.57 1702.04  9854.6 1701.98 9868.87    1702 9876.38 1702.01
 9899.46 1702.02 9917.29 1702.71 9922.55 1702.92 9926.871702.811 9937.56 1702.54
 9938.15 1702.52 9945.55 1702.28 9951.67 1701.89 9956.92 1701.56 9957.22 1701.54
 9958.94 1701.51 9959.98 1701.49 9960.71 1701.41 9961.21 1701.35 9961.57 1701.31
 9967.94 1701.17 9968.58 1701.18 9969.16 1701.19 9969.43 1701.19 9970.61 1701.21
 9972.32 1701.24 9974.97 1701.28 9979.66 1701.35 9990.29 1701.52   10000 1701.67
10000.01 1701.67 10024.6 1702.04 10027.1 1701.99 10034.4 1701.8610046.34 1701.63
10047.64  1701.610047.81 1701.59 10050.4 1701.5210065.98 1702.0310069.38 1702.18
10074.61 1702.3710083.14 1702.6510083.53 1702.6210083.57 1702.6210083.68 1702.61
10094.55  1701.910099.22 1701.56 10105.6 1701.1310109.13 1700.8910116.63 1700.32
10117.67 1700.2410121.08 1699.9710129.82 1700.0310137.21 1700.0810144.53 1700.17
10147.24  1700.2   10153 1700.2910157.55 1700.0710159.61 1700.0110168.15 1699.65
10175.14 1699.49 10184.4 1699.1510185.47 1699.2110186.01 1699.2210195.55 1700.71
10203.07 1701.8810207.79  1702.710214.22 1701.5310227.33  1699.410231.55 1698.68
10233.94 1698.3210242.09 1697.96 10246.2 1697.7710251.63 1697.5310260.31 1697.13
10260.43 1697.1310263.17    169710263.39 1696.9910267.48 1696.4610273.12 1695.56
10275.78 1695.9310280.06 1696.5210282.39 1696.8410283.64 1697.0210288.79 1697.94
10306.29 1703.1210306.73 1703.2410308.48 1703.7110310.56 1704.2710310.82 1704.35
10313.08 1704.9510322.17 1707.51

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9780.43    .045 9926.87     .0410083.14    .045

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9926.8710083.14          1021.8  1021.8  1021.8             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
10207.7910322.17  1702.7       F

CROSS SECTION


RIVER: RV WP
REACH: R3                  RS: 0.659

INPUT
Description:
Station Elevation Data    num=      55
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
```

```
*******************************************************************************
 9745.11 1670.24 9747.51 1669.86 9754.55 1668.75 9759.25    1668 9760.67 1667.78
 9762.63 1667.47 9765.18 1667.08 9804.14 1662.49 9807.74 1662.48 9808.92 1662.47
 9813.34 1662.44 9817.48  1662.4 9820.56 1662.38 9825.42 1662.35 9829.32  1662.3
 9889.02 1662.86 9890.07 1662.86 9890.67 1662.87 9890.85 1662.87 9891.07 1662.87
 9891.34 1662.88 9891.54 1662.88  9891.7 1662.88 9891.72 1662.88 9891.82 1662.88
 9893.04  1662.9 9893.38  1662.9 9952.43 1663.23 9995.031662.693   10000 1662.63
10000.01 1662.6310010.15  1662.510010.86 1662.4710023.67 1662.32 10030.4  1662.2
10031.55 1662.1910035.76 1662.1610045.75 1662.0910047.82 1662.0710059.31 1662.13
10064.06 1662.1510066.42 1662.1610067.11 1662.1610067.83 1662.1610068.79 1662.16
10069.46 1662.1610079.79 1662.2610116.92 1662.83 10123.31662.78910127.71 1662.76
 10130.5 1662.7310134.76 1662.6910141.46 1662.6310148.86 1665.8410164.62 1672.85

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9745.11    .045 9995.03     .04 10123.3    .045

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9995.03 10123.3            924.48  924.48  924.48             .1       .3

CROSS SECTION


RIVER: RV WP
REACH: R3                 RS: 0.484

INPUT
Description:
Station Elevation Data    num=      72
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9568.55 1635.76 9569.71 1635.64 9572.21 1635.41 9574.75  1635.3 9577.46 1635.19
 9580.39 1635.05 9583.54 1634.92 9586.95 1634.77 9590.63 1634.61 9594.98 1634.37
 9600.37 1634.04 9607.45 1633.87 9610.96 1633.83 9615.43 1633.46 9617.29 1633.31
 9618.44 1633.22 9620.09 1633.06    9625 1632.68 9628.57 1632.31 9633.74 1631.89
 9636.39 1631.61 9639.66 1631.16 9641.74 1630.97 9650.62 1629.67 9652.35 1629.43
 9652.37 1629.42 9658.59 1628.76 9665.36 1628.27 9666.28  1628.2 9669.94 1627.94
 9679.62 1627.92 9701.35 1627.89 9717.43 1628.85 9720.27 1629.11 9724.58 1629.31
 9728.71 1629.19 9732.23 1629.09 9747.43 1628.67 9763.83 1628.25 9766.42 1628.23
 9783.15 1628.13 9790.64 1628.09 9793.31 1628.09 9800.11  1628.1 9804.99 1628.11
 9808.66 1628.12 9811.51 1628.12 9844.74 1628.34 9846.27 1628.42 9848.42 1628.54
 9851.67  1628.7 9856.87 1628.98 9870.98 1628.88 9919.86 1628.53 9920.98 1628.49
 9921.71 1628.53 9926.31 1628.81 9956.23 1628.07 9959.52 1627.89 9964.36 1627.64
 9972.15 1627.23 9972.53 1627.24 9973.08 1627.24   10000 1627.4510000.03 1627.45
10030.61 1627.6910031.13 1627.6810033.111628.84110039.18  1632.410046.76 1637.12
10054.52 1641.5310060.34 1644.98

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9568.55    .045 9926.31     .0410033.11    .045

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9926.3110033.11            587.04  587.04  587.04             .1       .3

CROSS SECTION


RIVER: RV WP
REACH: R3                 RS: 0.373

INPUT
Description:
Station Elevation Data    num=      74
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9853.03 1632.77 9853.06 1632.76 9853.88 1632.38 9855.39 1631.68 9858.84 1630.23
 9860.41 1629.51 9876.36 1622.74 9878.69 1621.75 9880.86 1620.84 9882.57 1620.12
 9882.86    1620  9884.7 1619.25 9886.51 1618.52 9888.28  1617.8    9890  1617.1
 9890.81 1616.77 9905.78 1610.06 9914.55 1606.35 9925.93  1606.1 9930.14 1606.03
 9935.56 1606.25 9937.02 1606.31 9937.82 1606.33 9938.91 1606.36 9941.32 1606.36
 9943.29 1606.32 9943.49 1606.31 9946.05 1606.26  9946.5 1606.25 9948.23 1606.24
 9953.63  1606.2 9962.71 1606.13 9966.88 1606.27  9971.2 1606.37 9972.84 1606.41
 9974.08 1606.45 9978.81 1606.56 9984.24 1606.08 9989.57 1605.62  9991.7 1605.93
 9995.43 1606.43   10000 1606.4110000.01 1606.4110001.29  1606.410008.78 1606.37
 10013.8 1606.3610017.27 1606.34 10037.1 1606.0810055.64 1606.0610061.87 1606.03
10071.81 1605.9710072.57 1605.9610081.02 1605.6810088.31 1605.3610088.85 1605.34
10089.84  1605.310091.46 1605.2310095.52 1606.0510095.88 1606.1510097.881606.573
 10100.7 1607.1710100.82  1607.2 10105.2 1608.1310106.03 1608.4210110.08 1609.31
10111.34 1609.7410115.13  1610.610174.83 1630.1310176.37 1630.6610177.91  1631.2
10179.46 1631.7410181.02 1632.2810182.59 1632.8210183.66 1633.02

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9853.03    .045 9978.81     .0410097.88    .045

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9978.8110097.88            559.01  559.01  559.01             .1       .3

CROSS SECTION


RIVER: RV WP
REACH: R3                 RS: 0.267

INPUT
Description:
Station Elevation Data    num=      48
```

```
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9898.44 1607.66 9910.84 1601.45 9920.16 1596.84 9920.48 1596.62 9937.371584.728
 9939.81 1583.01 9944.03 1582.95 9950.47 1582.86 9951.14 1582.85 9952.88 1582.83
 9957.18 1582.87 9957.82  1582.9 9959.41 1582.97 9964.28 1583.18 9968.04  1583.3
 9972.89 1583.56 9977.26 1583.62 9980.89 1583.67    9985 1583.63 9991.27 1583.59
    9993 1583.63 9993.96 1583.65   10000 1583.7710002.76 1583.8310004.72 1583.87
10010.65 1583.9410012.59 1583.9610020.64 1584.0610021.94  1584.110022.55 1584.12
10027.96  1584.310032.86  1584.5 10033.2 1584.5110035.36  1584.610076.72 1584.26
10085.52 1584.1910085.63 1584.1810089.57 1584.45 10102.1 1585.3710103.28 1585.61
10103.38 1585.6510103.78 1585.85 10104.2 1586.05 10129.2    159310133.04 1594.91
10134.72 1595.7410136.92 1596.8110139.38    1598

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9898.44    .045 9937.37     .0410035.36    .045

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9937.3710035.36            944.19  944.19  944.19             .1       .3

CROSS SECTION


RIVER: RV WP
REACH: R3                 RS: 0.088

INPUT
Description: Q=1490 cfs (CB13W1, 24 hr)
Station Elevation Data    num=      68
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9691.12 1565.76 9694.53 1563.92 9694.75  1563.8 9697.12 1562.53 9703.32 1559.18
 9708.41 1556.45 9711.79 1554.62 9715.04 1552.87 9719.02 1550.78 9724.54 1550.72
 9732.28 1550.64 9732.29 1550.64 9733.99 1550.69  9734.9 1550.72 9744.25 1550.98
 9750.34 1551.18 9751.31 1551.21 9754.78 1551.33 9764.54 1551.63 9765.45 1551.61
 9767.63 1551.53 9770.69 1551.44 9779.56 1551.13 9780.45  1551.1 9788.53 1550.89
 9792.21  1550.8 9795.37 1551.41  9799.2 1552.11    9805 1551.67 9815.74 1550.62
 9815.77 1550.62 9839.93 1550.79 9860.59 1550.88 9868.21 1550.88 9871.72 1550.86
 9887.35 1550.84 9888.29 1550.84 9901.87 1550.76 9919.61 1550.66 9924.98 1550.61
 9936.55 1550.54 9939.91 1550.52 9941.52 1550.51 9950.83 1550.46 9957.31 1550.42
  9962.1 1550.36 9965.49 1550.32 9981.89 1550.17    9983 1550.17  9984.1 1550.17
 9999.72 1549.77   10000 1549.7710001.53 1549.7310006.71 1549.5810007.69 1549.52
10009.48  1549.510015.32 1551.5210015.371551.53510020.42 1553.0810023.51 1553.94
10023.95 1554.1110028.06 1555.6310030.25 1556.2510031.38 1556.6810032.88 1557.11
10036.51  1559.1 10036.8 1559.1910037.05 1559.33

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9691.12    .045  9799.2     .0410015.37    .045

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        9799.210015.37               10      10      10             .1       .3

CROSS SECTION


RIVER: RV WP
REACH: R3                 RS: 0.086

INPUT
Description: This cross section is one of two cross sections added to the
             downstream end of the model to establish the starting water
             surface elevation using the normal depth calculations. This cross
             section is not plotted on the work maps, nor is used in plotting
             the base flood elevations.
Station Elevation Data    num=      52
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
  9692.9 1563.99 9697.33 1563.03 9706.01 1558.37 9709.24  1556.7  9711.7 1555.38
 9714.46 1553.79  9721.3 1550.44 9725.72 1550.45 9733.42  1550.5 9738.44 1550.63
 9739.67 1550.67 9750.67 1550.97 9754.14 1551.06 9761.44 1551.28 9765.39 1551.24
  9771.5 1551.13 9777.85 1551.03 9781.07 1550.94 9787.66 1550.72 9793.19 1550.55
 9794.89 1550.76 9799.53 1551.47 9806.25  1551.2 9818.03 1550.49  9852.4 1550.57
 9862.32 1550.48 9863.31 1550.56 9915.68 1550.27  9915.8 1550.27 9920.93 1550.27
 9922.69 1550.24 9926.59 1550.28 9927.92 1550.27 9938.94  1550.2 9947.08  1550.1
 9952.84 1550.04  9980.7 1549.78 9982.58 1549.78 9984.46 1549.7810000.05 1549.38
10009.88 1549.1310010.51 1549.1410010.77 1549.1610017.16 1550.7510020.85 1551.63
10026.06 1553.84 10031.4  1556.110031.55 1556.1110033.32 1556.73 10033.5 1556.74
10038.05 1557.7510038.83 1557.91

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
  9692.9    .045 9799.53     .0410017.16    .045

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9799.5310017.16               10      10      10             .1       .3

CROSS SECTION


RIVER: RV WP
REACH: R3                 RS: 0.084

INPUT
Description: This cross section is one of two cross sections added to the
             downstream end of the model to establish the starting water
             surface elevation using the normal depth calculations. This cross
```

```
            section is not plotted on the work maps, nor is used in plotting
            the base flood elevations.
Station Elevation Data    num=      72
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
  9692.9 1559.18 9693.54 1559.04 9694.89 1559.08 9698.67 1558.18 9699.35  1558.2
 9703.43 1557.15 9703.63 1557.16 9708.43 1555.86 9708.48 1555.85 9713.37 1553.41
 9721.79  1550.1 9722.49  1550.1 9726.17 1550.13 9736.21 1550.13 9741.73 1550.41
 9744.97 1550.53 9745.25 1550.55 9751.28 1550.72 9756.78 1550.88 9763.83 1550.85
    9771 1550.84 9772.26 1550.82 9776.78 1550.81 9780.79 1550.76 9789.24 1550.54
 9792.61 1550.44 9795.61 1550.69 9797.28 1550.82 9798.21 1550.86 9801.07 1550.82
 9803.76 1550.75 9819.01 1550.35  9832.3  1549.9  9846.7  1549.4 9859.62 1549.28
 9869.74 1550.11 9908.19  1549.9 9908.27  1549.9 9912.04  1549.9 9918.21 1549.79
 9921.49 1549.82 9924.72 1549.85 9925.33 1549.85 9925.66 1549.84 9926.48 1549.84
 9926.94 1549.84  9931.5 1549.82 9931.68 1549.82 9932.98 1549.82 9938.42 1549.76
 9977.73 1549.39 9980.39 1549.39 9983.05 1549.38 9998.31    154910002.12  1548.9
10003.94 1548.9110005.01 1548.9110009.04 1548.9310009.48 1548.9310012.57 1548.94
 10015.7 1549.7410020.72 1550.8310023.11 1551.2810024.66 1551.4810025.08 1551.53
10025.84 1551.5910027.21 1551.7210029.82 1552.75 10031.1 1552.89 10034.1 1553.94
10035.68 1554.0610038.83 1554.76

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
  9692.9    .045 9798.21     .0410020.72    .045

Bank Sta: Left   Right    Coeff Contr.   Expan.
       9798.2110020.72             .1       .3

CROSS SECTION


RIVER: RV WP T1
REACH: R1                 RS: 0.959

INPUT
Description: Q=510 cfs (CB6W1, 24 hr)
Station Elevation Data    num=     101
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 9702.62 2096.96 9703.09    2097  9704.6 2096.72 9735.99  2092.5 9736.55 2092.39
 9737.11 2092.29 9737.67 2092.19 9738.23 2092.09 9738.81 2091.99 9739.41 2091.88
 9739.58 2091.85 9746.57 2091.38 9747.79 2091.33 9749.31 2091.26 9751.25 2091.18
 9753.82 2091.04 9757.48 2090.83 9795.39 2088.52 9808.88  2089.2 9810.16 2089.26
 9811.04 2089.28 9852.25 2088.97 9854.49 2088.81 9854.57 2088.81 9855.14 2088.82
 9868.85 2089.07 9874.37 2089.02 9879.74 2088.91 9888.21  2088.8 9895.55 2088.61
    9908 2088.62 9909.98 2088.62 9910.36 2088.61  9910.9 2088.61 9913.53 2088.57
 9916.11 2088.55 9921.75 2088.62 9922.27 2088.62 9922.32 2088.62 9923.19 2088.64
 9927.64 2088.86 9928.17 2088.87 9930.54 2088.91 9933.99 2089.04 9941.07 2089.01
 9945.34 2088.91 9945.49 2088.91 9945.88 2088.91 9957.55 2088.85 9961.53 2088.83
 9962.94 2088.83 9963.57 2088.83 9971.19 2088.71 9972.32 2088.67 9972.97 2088.65
 9977.49 2088.73 9985.38 2088.56 9986.69 2088.54 9987.34 2088.53 9990.52 2088.45
 9992.97 2088.26 9995.63 2088.16  9996.6  2088.1  9998.8 2088.03 9999.99 2088.06
   10000 2088.0610002.76 2088.1110004.06 2088.1810005.03 2088.2110005.88 2088.24
10009.34 2088.3810009.362088.381 10014.42088.54310015.86 2088.5910015.94  2088.6
10016.05  2088.610023.01 2088.8410028.59 2089.03 10033.1 2089.1810033.29 2089.19
10036.81 2089.37 10039.9 2089.5410064.62 2089.8810084.24 2088.9610088.29 2088.91
10093.36 2088.8510096.96  2088.810099.12 2088.7610099.17 2088.7610103.56 2088.65
10122.66  2086.6 10125.7  2086.410135.32 2084.5310144.47 2083.3510144.65 2083.35
10145.41 2083.3710147.28 2083.4110148.52 2083.4410150.21 2083.4810151.56 2083.51
10152.25 2083.57

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9702.62    .055 9986.69     .05 10014.4    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9945.3410023.01           461.3   461.3   461.3             .1       .3
Right Levee     Station=10064.62      Elevation= 2089.88

CROSS SECTION


RIVER: RV WP T1
REACH: R1                 RS: 0.872

INPUT
Description:
Station Elevation Data    num=     122
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
    9887 2078.74 9890.54 2078.76 9894.09 2078.69 9898.79 2078.58 9905.26 2078.44
 9914.78 2078.24  9917.8 2078.17 9927.15 2077.98    9929 2077.64 9929.15 2077.62
 9937.782076.114 9940.95 2075.56  9942.1 2075.63 9949.52  2076.1 9952.44  2076.1
 9953.27  2076.1 9958.01 2075.71 9960.26 2075.54 9964.72 2075.93 9967.53 2076.15
 9990.912075.908 9995.59 2075.86   10000 2075.7910000.02 2075.7910002.47 2075.76
10005.49 2075.8210015.09 2076.0410018.172076.10610023.46 2076.2210025.87 2076.28
   10038 2076.1210038.42 2076.1210042.52 2076.1310044.65 2076.1410050.73 2076.13
10055.71 2076.1310057.81 2076.13 10068.8 2076.1510068.88 2076.1510069.03 2076.15
10069.58 2076.1510076.96  2076.110079.77 2076.0810086.63 2076.1210089.61 2076.15
10094.12 2076.1910096.75 2075.8410097.63 2075.7110099.48 2075.9410101.96 2076.23
10113.35 2076.2610127.32  2076.310127.65 2076.2710127.83 2076.25 10128.6 2076.17
10134.01 2075.6110135.47 2075.4410140.85 2075.9510147.75 2075.7110148.01 2075.64
10149.54 2075.3710149.65 2075.3710157.17 2075.9510163.72 2076.5110175.41 2076.86
10183.04 2077.0210192.07 2077.2610207.83 2077.5610208.08 2077.5710211.12 2077.68
10219.06 2077.5210227.02 2077.4910229.56 2077.4510236.36  2077.410240.06 2077.34
10245.69  2077.310250.57 2077.2210256.71 2077.1310261.03 2077.0910268.71 2076.96
10270.74 2076.9410280.22 2076.7410280.71 2076.7310291.01 2076.4610291.82 2076.34
10293.76 2076.0510297.25 2075.5410298.52 2075.3510299.75 2075.4310300.26 2075.56
```

```
10300.57 2075.6510304.99 2076.29 10306.8 2076.57 10309.3 2076.9410312.78 2077.47
10314.11 2077.6710323.97 2079.1210328.39 2079.8110328.89 2079.8710333.33 2080.55
10333.83 2080.6110338.27  2081.310338.75 2081.3510341.48 2081.7810343.21 2081.91
10347.73 2082.2610352.33 2082.62   10357 2082.9810361.76 2083.3410364.24 2083.53
10366.63 2083.71 10371.7 2084.0710376.89 2084.4510378.23 2084.4610382.75 2084.83
10382.93 2084.8310382.98 2084.8310383.08 2084.8310383.26 2084.8310383.56 2084.83
10384.22 2084.8310408.21 2084.56

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
    9887    .055 9937.78     .0510018.17    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9937.7810018.17            521.4   521.4   521.4             .1       .3
Right Levee     Station=10211.12      Elevation= 2077.68

CROSS SECTION


RIVER: RV WP T1
REACH: R1                 RS: 0.773

INPUT
Description:
Station Elevation Data    num=     122
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
**********************************************************************************
 9865.37 2067.99 9865.46 2067.99 9870.24 2067.88  9871.6 2067.84  9874.3  2067.8
 9877.37 2067.75  9902.9 2066.89 9929.46  2064.6 9932.43 2064.32 9932.54 2064.32
 9935.342064.212 9935.92 2064.19 9939.88 2064.05  9944.4 2063.88 9949.87 2063.24
  9958.1 2062.98 9960.34 2062.97 9962.35 2062.97 9963.08 2062.96 9966.53 2062.94
 9970.57  2062.9 9971.02 2062.89 9971.08 2062.88 9971.21 2062.88 9978.872062.621
 9989.642062.256 9998.66 2061.95 9999.55 2061.92   10000 2061.9410000.01 2061.94
10012.792062.24910023.552062.50910025.25 2062.5510026.57 2062.5810027.32  2062.6
10029.39 2062.6210029.53 2062.6110029.75  2062.610029.78  2062.610030.46 2062.59
10034.56 2062.4810039.19 2062.4410039.64  2062.510041.32 2062.7210047.83 2063.57
10047.94 2063.5410070.34 2063.5810088.35 2063.5310097.19 2063.5110107.05 2063.48
10112.06 2063.6510119.06 2063.8510124.21  2063.810126.04 2063.7810128.67 2063.76
10139.79 2063.64 10140.7 2063.6410146.45 2063.5810154.96 2063.5610168.78 2063.52
10171.37 2063.5110176.92    206310178.22 2062.8810181.98 2062.5510183.47 2062.43
10188.53 2061.9910189.91 2062.1310190.81 2062.2410193.34 2062.5110195.79 2062.83
10200.85 2063.4110201.57 2063.4910202.32 2063.5810203.16 2063.6510205.39  2063.4
10205.51 2063.3710207.46 2063.1310209.77 2062.8610212.24 2062.5610213.26 2062.45
10213.91 2062.25 10220.3 2063.3110221.63 2063.51 10225.6 2063.4310226.52 2063.41
10230.35 2063.3410232.05 2063.3110232.17 2063.3110232.98 2063.3410236.47 2063.29
10239.08 2063.2510266.08 2063.0410290.53 2062.8610294.45 2062.8110295.77 2062.82
 10296.9 2062.83 10300.6 2062.9910306.14 2063.2410347.29 2062.7610356.76 2063.13
10357.01 2063.1410359.25 2063.2810361.74 2063.4310364.55 2063.6110365.61 2063.67
10367.83 2063.8810371.69 2064.2310372.64 2064.2910380.35 2064.7210383.79 2064.86
10388.31 2065.3510390.84 2065.4210395.51 2065.9710396.44    206610399.07 2066.31
10401.37 2066.5610402.02 2066.5910407.24 2067.1910407.58 2067.21 10413.1 2067.86
10413.92 2067.9610415.76 2068.04

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
 9865.37    .055 9989.64     .0510012.79    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9978.8710029.39           464.29  464.29  464.29             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
10306.1410415.76    2065       F

CROSS SECTION


RIVER: RV WP T1
REACH: R1                 RS: 0.685

INPUT
Description:
Station Elevation Data    num=     104
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
**********************************************************************************
 9599.94 2054.64 9602.12 2054.66 9604.93 2054.69 9664.28 2054.48 9667.04 2054.48
 9686.86 2054.46 9702.02 2054.26 9705.74 2054.23 9711.76 2054.17 9723.15 2054.06
 9725.37 2054.01 9727.34 2054.02 9733.55 2052.91 9760.63 2048.44 9761.79 2048.25
 9762.08  2048.2 9774.67 2047.75  9775.6 2047.71 9776.67 2047.74 9779.29 2047.81
  9781.3 2047.89 9783.28 2047.99 9788.25 2048.19 9788.94 2048.24 9792.14 2048.43
 9796.87 2048.53 9805.43 2048.69 9808.89 2048.75 9808.96 2048.76 9821.66 2049.05
 9830.13 2049.24 9835.99 2049.37 9841.28 2049.49 9850.41  2049.7 9852.35 2049.74
  9858.4 2049.87  9861.9 2049.75 9867.53 2049.57 9870.02 2049.62 9872.76  2049.7
 9878.42 2049.84 9883.69 2050.02 9888.58 2050.12  9888.8 2050.13 9894.99 2050.24
 9897.97 2050.29 9909.38 2050.48 9910.91  2050.5 9911.82 2050.52 9911.97 2050.52
  9912.4 2050.54 9912.81 2050.56 9918.51 2050.57 9919.25 2050.57 9920.082050.563
  9920.4 2050.56  9922.5 2050.56 9927.43 2050.53 9931.89 2050.51 9947.66 2050.46
 9949.39 2050.41 9968.61  2049.8 9969.63 2049.84  9976.2 2050.09 9977.48 2050.14
  9977.7 2050.15 9980.72 2050.08 9986.532049.961 9987.57 2049.94 9988.37 2049.89
  9989.3 2049.83 9994.94 2049.45 9999.98 2049.11   10000 2049.1110000.13  2049.1
10001.72  2049.110006.67  2049.110009.67  2049.110028.08 2049.6410034.16  2049.9
10035.86 2049.9710038.89  2049.910049.08 2049.5910057.61 2048.8210064.96 2048.14
10074.09 2048.2810076.86 2048.3210077.48 2048.3210078.19 2048.3110079.44 2048.31
10085.12  2048.410091.11 2048.4510092.88 2048.5510095.04 2048.6810098.89 2048.89
10104.18 2049.1310115.97 2049.61 10116.1  2049.6 10116.5 2049.5910116.82 2049.59
10117.04 2049.5810119.36 2049.6210170.31 2051.4810191.75 2052.28

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
```

```
**********************************************
 9599.94    .055 9986.53     .0510035.86    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9986.5310035.86           437.38  437.38  437.38             .1       .3

CROSS SECTION


RIVER: RV WP T1
REACH: R1                  RS: 0.602

INPUT
Description:
Station Elevation Data    num=      68
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
**********************************************************************************
 9628.12 2040.38 9630.39 2040.48 9636.51 2039.84  9640.1 2039.47 9652.15 2038.21
 9652.64 2038.15  9665.1 2036.88  9667.8 2036.59  9673.1 2036.06 9676.98 2036.17
 9679.84 2036.28  9683.7 2036.37 9695.24 2036.71 9696.06  2036.7 9717.49 2036.45
 9722.05 2035.93 9723.39 2035.78  9725.2 2035.62 9725.59 2035.63 9734.25 2036.15
 9740.29 2036.48 9741.55 2036.51 9743.06 2036.54 9766.07 2037.03 9852.87 2037.11
 9855.78 2037.08 9861.94 2036.97 9869.31 2036.88 9878.27 2036.81 9886.96 2036.74
 9891.72  2036.7 9909.22 2036.57  9911.8 2036.35  9916.6 2036.03 9919.62 2036.44
 9920.62 2036.58 9922.03 2036.59 9925.89 2036.61  9931.6 2036.62 9933.09 2036.63
 9933.33 2036.62 9933.69 2036.57 9938.02 2035.98 9940.07 2036.12 9942.54 2036.29
 9945.49 2036.49 9946.91 2036.59 9954.11 2036.65 9957.462036.679 9970.48 2036.79
  9974.1 2036.62 9976.62 2036.56 9981.38 2036.38 9985.27  2036.3 9986.11 2036.27
 9988.47 2036.17  9991.2 2036.08 9991.51 2036.08 9994.36 2036.07   10000 2036.07
10000.23 2036.0710004.96 2036.1210014.05 2036.1810015.12 2036.6510016.36 2037.23
 10020.6 2039.14 10022.1 2039.85 10023.7 2039.83

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
 9628.12    .055  9974.1     .0510015.12    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        9974.110015.12              756     756     756             .1       .3

CROSS SECTION


RIVER: RV WP T1
REACH: R1                  RS: 0.459

INPUT
Description:
Station Elevation Data    num=     109
     Sta   .Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
**********************************************************************************
 9785.87 2022.86 9789.92 2022.53 9790.65  2022.5 9791.25 2022.48  9791.8 2022.45
 9792.83 2022.42 9793.29 2022.42 9797.93  2022.2 9798.37 2022.19 9798.78 2022.17
 9803.45 2021.94 9803.83 2021.92 9808.53  2021.7 9808.88 2021.69 9813.61 2021.46
  9821.4 2020.93 9821.86  2020.9 9824.68 2020.77 9825.42 2020.73 9826.44 2020.68
 9827.95 2020.54 9837.73 2019.98 9840.21 2019.77  9842.3  2019.6 9844.09 2019.45
 9845.64 2019.32 9846.34 2019.26    9847 2019.22 9849.74  2019.1 9853.24 2018.73
 9853.79 2018.65 9854.01 2018.62 9873.16 2015.87 9886.06 2014.01  9891.8 2015.11
 9891.87 2015.12 9891.98 2015.12 9892.68 2015.13 9903.55 2015.28 9905.74 2015.33
 9909.06 2015.15 9914.05 2014.89 9915.57 2015.05 9917.88 2015.28 9924.35 2015.09
 9931.55 2014.62 9932.23 2014.58 9943.01 2015.02 9946.51 2015.16 9947.38  2015.7
 9947.47 2015.75  9966.6 2014.66  9969.3 2014.61 9977.98 2014.24 9987.41 2013.76
 9990.01 2013.62 9991.62 2013.54 9997.28 2013.26   10000 2013.2810002.53 2013.29
10009.83 2013.3210012.42 2013.2910014.682013.77310018.612014.61210019.21 2014.74
10023.44 2015.5410030.13 2015.3610038.12 2015.1310042.64 2014.9710043.71 2014.94
10051.54 2014.8210052.85  2014.810054.79 2014.7810055.77 2014.7810058.65 2014.78
10073.122014.432 10077.8 2014.3210086.93 2014.0810092.13 2013.8210094.32 2013.75
10098.24 2013.6310099.93 2013.5710101.84 2013.5210106.81 2013.6510111.91 2013.75
10114.09 2013.7910115.26 2013.8410133.96  2014.810134.39  2014.810162.84 2014.98
10165.47 2013.9810169.38 2012.9710169.55 2012.9810171.56 2013.1910179.93 2014.12
10188.26 2015.03   10189 2015.1110190.07 2015.2410190.22 2015.24 10190.3 2015.24
10191.75 2015.2110213.62  2016.610219.21 2016.9210222.96 2017.11 10230.8 2017.57
10232.26 2017.6510234.69  2017.8 10237.9    201810237.99 2017.99

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
**********************************************
 9785.87    .055 9987.41     .0510014.68    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        9969.310018.61            484.6   484.6   484.6             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
 9785.87 9947.47 2015.75       F
10162.8410237.99 2014.98       F

CROSS SECTION


RIVER: RV WP T1
REACH: R1                  RS: 0.367

INPUT
Description: This cross section is identical to RM 0.148 on RV WP T2.
Station Elevation Data    num=      92
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
**********************************************************************************
    9543 2000.61 9543.43 2000.67  9561.1 1998.17 9586.32 1994.58 9591.151994.271
 9600.25 1993.69 9609.58  1993.1 9609.74 1993.11 9611.58 1993.08 9617.59 1993.15
 9624.04 1993.23 9624.91 1993.24 9635.27 1993.47  9659.9 1994.02 9661.12 1993.99
```

```
 9665.01 1993.87 9665.28 1993.87 9678.83 1993.46 9692.81 1994.27 9698.97 1994.64
 9702.92 1994.59 9740.82 1994.22  9741.4 1994.22  9745.1 1994.21 9745.75  1994.2
 9746.68 1994.21 9774.99 1993.94 9788.82 1993.86 9789.01 1993.82 9796.42 1992.39
 9797.75 1992.64 9800.19 1993.08 9805.51 1994.03 9809.66    1994 9812.04    1994
 9820.27 1993.95 9829.72 1993.93 9830.42 1993.92 9837.01 1993.92 9857.09 1994.75
  9862.6 1994.98 9862.71 1994.99 9872.55 1996.06 9877.77 1996.62    9881 1996.97
 9883.19  1997.2 9884.81 1997.38 9886.17 1997.55 9887.26 1997.69 9902.24 1998.99
 9904.45 1999.24 9907.39 1999.56 9911.48 2000.02 9915.43 2000.46  9917.6 2000.67
 9927.74 2001.66 9943.38 2003.19 9943.46 2003.19 9954.48 2002.35 9977.21 2000.62
 9988.89  1999.8 9999.01 1999.12   10000  1999.210006.06 1999.7310016.89 2000.62
 10020.2 2000.89   10023 2000.86 10036.8 2000.7110054.83 2000.55 10061.9 2000.54
10071.73 2000.4810079.93  2000.310098.18 1999.7910098.43 1999.7810098.55 1999.78
10101.45 1999.9110103.58    200010165.56 1999.98   10173    200010184.43 1999.61
10185.83 1999.5710188.31 1999.7210197.12 2000.2910198.24 2000.3610201.03 2000.56
10202.36 2000.6510210.23 2001.1610211.35 2001.2410213.48 2001.3910219.21 2001.79
10226.87 2002.3410226.93 2002.33

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*****************************************************************************
    9543    .055 9591.15     .05 9692.81    .055 9977.21     .0510016.89    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9977.2110016.89           568.37  568.37  568.37             .1       .3
Left Levee      Station= 9943.38      Elevation= 2003.19

CROSS SECTION


RIVER: RV WP T1
REACH: R1                 RS: 0.260

INPUT
Description: Q=1040 cfs (CB9W1A, 24 hr)  This cross section is identical to RM
             0.078 on RV WP T2.
Station Elevation Data    num=     111
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
 9549.85 1991.97 9550.95 1991.82 9564.72 1989.98  9565.8  1989.7 9567.05 1989.36
 9581.58 1985.47 9584.23 1984.76 9585.47 1984.43 9589.89 1983.25 9590.58 1983.07
 9597.41 1981.29 9604.51 1981.81 9607.54 1982.05 9609.91 1981.94  9623.1 1981.31
 9626.94 1981.12 9630.53 1981.51 9643.79 1982.78 9646.55 1982.62 9649.09 1982.46
 9659.77 1981.64 9661.94 1981.86 9666.01 1982.32 9667.22 1982.45 9667.61 1982.49
 9668.33 1982.59 9672.84 1982.36 9687.81 1981.63 9692.25 1981.77 9696.07 1981.94
 9699.24 1982.06 9702.95 1982.24 9706.51 1982.34 9712.35 1982.49 9712.56 1982.49
 9716.81 1982.61 9720.28 1982.69 9723.04 1982.76 9725.28 1982.82 9731.87 1983.07
 9755.19  1983.5 9757.84 1983.54 9767.81 1983.69 9772.98 1983.57 9783.56 1983.25
 9798.67  1983.3 9823.94  1983.4 9830.98 1983.42 9834.27 1983.44 9836.17 1983.44
 9838.19 1983.47 9838.99 1983.46  9839.6 1983.45 9840.08 1983.44 9840.12 1983.44
 9843.37 1983.45 9846.26 1983.43 9846.52 1983.43 9846.58 1983.42 9861.15 1983.28
    9888 1983.01    9944 1982.89 9946.37 1982.88 9946.63 1982.87 9946.95 1982.87
 9947.36 1982.87  9947.9 1982.86  9951.1 1982.81 9953.76 1982.76 9960.06 1982.65
 9977.951982.316 9984.851982.187 9989.52  1982.1 9998.13 1981.94 9999.57 1981.97
 9999.97 1981.98   10000 1981.9810003.46 1982.0410016.87 1982.3110017.03 1982.31
 10021.5 1982.3810030.18 1982.8910038.19 1983.3510040.24 1983.4710041.631983.542
10045.47 1983.7410045.91 1983.75 10046.6 1983.7710050.73 1983.9110064.48 1983.39
10088.81 1982.3710095.08  1982.710097.11  1982.810108.34 1983.37 10116.2 1983.86
10122.02 1984.1810135.32 1985.0610135.71 1985.0810136.71 1985.15   10137 1985.15
10139.16 1985.1510150.08  1985.1 10151.8  1985.110154.29  1985.110155.14  1985.1
10158.19 1985.0810165.08 1985.0410180.58 1984.9510183.69 1984.9310185.32 1984.92
10186.47 1984.86

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*****************************************************************************
 9549.85    .055 9590.58     .05 9731.87    .055 9984.85     .0510030.18    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9946.3710030.18           350.22  350.22  350.22             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
10050.7310186.47    1985       F

CROSS SECTION


RIVER: RV WP T1
REACH: R1                 RS: 0.193

INPUT
Description: This cross section is identical to RM 2.450 on RV WP.
Station Elevation Data    num=     113
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
 9546.17 1978.53 9550.54 1976.97 9552.17 1976.59 9557.96 1974.59 9560.54 1974.04
 9565.27 1972.47 9569.05 1971.76  9569.9  1971.5  9572.5 1970.88 9577.78    1970
  9579.5  1969.6 9581.01 1969.39 9584.59 1968.89  9589.8 1969.11 9601.25 1969.59
  9613.9    1970  9615.3 1970.05 9615.93 1970.05 9618.08 1970.09 9629.52 1970.27
 9630.84  1970.3 9631.16 1970.28 9640.28 1969.78 9646.88 1970.23 9650.81 1970.51
 9667.25 1970.36 9676.19  1970.3  9680.3 1970.07 9683.52 1969.89  9686.6 1970.13
 9693.28 1970.63 9695.42  1970.8 9713.06 1970.92 9717.07 1970.95 9718.53 1970.96
  9719.3 1970.96 9719.82 1970.97 9720.16 1970.97 9720.42 1970.97 9720.62 1970.97
 9720.76 1970.97 9720.83 1970.97 9720.89 1970.97 9723.58 1970.97 9732.35 1970.97
 9737.28 1970.97  9805.8 1970.86 9810.06  1970.9 9814.05 1970.94 9814.08 1970.94
 9816.97 1970.92 9888.12 1971.21 9913.01 1971.49 9914.94 1971.53 9918.26 1971.45
 9922.75 1971.36 9925.91  1971.3 9926.871971.265 9930.53 1971.13 9935.95 1971.02
 9937.14 1970.98 9938.69 1970.95 9940.58 1970.93 9940.76 1970.93 9941.22 1970.93
 9952.12 1971.09  9957.9 1971.19 9961.34 1971.24 9981.22 1971.57 9982.38 1971.59
 9982.53 1971.58 9982.77 1971.57 9984.58  1971.5 9990.21 1971.19 9996.54 1970.97
 9999.83  1970.9   10000 1970.8910002.09 1970.8410003.661970.79610011.67 1970.57
```

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10014.01 1970.5110019.37 1970.3810025.46 1970.27 10035.5  1970.110038.52  1970.1
10039.44 1970.0910044.99 1970.0710048.15 1970.0410049.89 1970.0410053.58    1970
10059.38 1969.8110064.75 1969.5910072.52 1969.3110078.15 1969.0610078.42 1969.05
10078.89 1969.0210080.25  1968.910083.01 1968.6610083.141968.64910083.92 1968.58
10086.87 1968.9810098.72 1970.4610103.66 1971.0910113.54 1972.3510114.36 1972.46
 10117.4 1972.8110127.57 1973.2510131.23 1973.4410132.19 1973.4910144.74 1974.17
10146.83 1974.2810153.69 1974.6410160.94 1975.04

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*****************************************************************************
 9546.17    .055 9577.78     .05  9615.3    .055 9984.58     .0510103.66    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9984.5810103.66           331.99  331.99  331.99             .1       .3

CROSS SECTION


RIVER: RV WP T1
REACH: R1                 RS: 0.131

INPUT
Description: This cross section is identical to RM 2.359 on RV WP.
Station Elevation Data    num=     126
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
 9608.96 1963.22 9622.13 1961.62 9635.93 1959.91 9641.74  1959.2 9648.16  1958.4
 9652.84 1958.47 9656.83 1958.53 9680.75 1958.79 9682.81  1958.8 9690.63 1958.67
 9710.05 1958.28 9711.15 1958.26 9712.57 1958.22 9716.87 1958.12 9721.46 1958.02
 9738.371957.683 9740.04 1957.65 9743.32 1957.64 9745.26 1957.64  9754.9 1957.61
 9762.88 1957.59 9766.63 1957.58 9775.35 1957.56 9776.97  1957.6 9777.59  1957.6
 9782.31 1957.68 9785.01 1957.66 9786.04 1957.66 9792.25 1957.62 9794.39 1957.61
 9797.64 1957.57 9803.22 1957.53 9803.63 1957.52 9804.98 1957.52 9811.01  1957.5
 9815.96 1957.29 9825.99 1956.86 9844.48 1956.84 9893.46 1956.99 9893.74 1957.01
 9893.81 1957.02 9895.37 1957.06 9897.58 1957.12 9898.66 1957.15  9901.5 1957.29
  9904.2 1957.43 9905.81 1957.52 9922.39 1957.73 9930.79 1957.79 9966.62 1958.21
 9975.84 1958.33 9981.52 1958.27 9988.51 1958.21 9989.07 1958.23 9993.081958.332
 9995.031958.381 9996.16 1958.41 9999.97 1958.51   10000 1958.5110001.54 1958.55
10014.46 1958.8210019.24 1958.8910024.34    195910034.36 1959.1410035.27 1959.16
10040.78 1959.2310107.27 1957.1910107.39 1957.1910107.59 1957.19 10123.31957.368
10128.74 1957.4310129.85 1957.4510129.91 1957.45 10130.5 1957.4610131.14 1957.47
10131.21 1957.4710131.26 1957.47 10145.3 1957.1610146.24 1957.1410146.26 1957.14
10149.55 1956.9710158.71 1957.6410161.31  1958.710161.33 1958.7110164.24 1959.22
10166.73 1959.6710168.88 1960.0510176.92 1960.9710191.26 1961.7810198.19 1962.37
10199.25 1962.4610202.59 1962.4510204.25  1962.410207.99 1962.2910208.37 1962.26
10210.75 1962.0510222.94 1960.7710223.84 1960.6110224.83 1960.4310225.92 1960.22
10230.35 1959.2610231.73 1958.9910235.87  1958.110237.54 1957.7810237.76 1957.74
 10241.6 1956.9110260.47  1954.110268.25 1952.7910268.53 1952.7410268.66 1952.71
10269.45 1952.5910271.37 1952.8710273.06 1953.1210288.36 1955.3910304.64 1957.89
10307.03 1958.2510310.93 1958.6510312.12 1958.7510322.22 1959.6610327.31  1960.1
10338.69 1961.1110349.25    1962 10355.2 1962.5210371.14 1963.8310371.72 1963.88
10372.86 1963.98

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*****************************************************************************
 9608.96    .055 9738.37     .05 9782.31    .055 9975.84     .0510158.71    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9975.8410040.78           439.74  439.74  439.74             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
10199.2510372.86 1962.46       F

CROSS SECTION


RIVER: RV WP T1
REACH: R1                 RS: 0.047

INPUT
Description: This cross section is identical to RM 2.261 on RV WP.
Station Elevation Data    num=      71
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
 9808.87 1951.11 9813.58 1950.56 9819.94 1949.81 9868.53 1943.92 9869.93 1943.75
 9871.92 1943.64 9872.26 1943.62 9872.63  1943.6  9876.5 1943.62 9894.84 1943.68
 9897.43 1943.69 9901.81 1943.71 9901.83 1943.71 9902.03 1943.71  9909.9 1943.71
 9916.55  1943.7 9921.83 1943.69 9926.12 1943.69 9926.311943.691 9981.17 1944.12
 9983.86  1944.1 9987.12 1944.09  9991.2 1944.08 9994.35 1944.06 9996.39 1944.08
 9998.72  1944.1   10000 1944.1110012.53 1944.1310015.97 1944.1410023.69 1944.15
10033.111944.15710036.61 1944.16 10045.4 1944.2310048.64 1944.2410057.17  1944.3
10061.74 1944.3310068.63 1944.3310068.96 1944.3210071.87 1944.3310080.75 1944.34
10081.73 1944.3410082.55 1944.3310087.33 1944.3310090.35  1944.3 10094.8 1944.27
10097.38 1944.2510100.08 1944.2310104.37 1944.1910104.42 1944.19 10105.4 1944.19
10108.77 1944.1210111.54 1944.0510112.56 1944.0210118.82 1943.8610122.98 1943.78
10126.05 1943.7110131.78 1943.63 10133.4 1943.4410133.48 1943.4410135.12 1943.25
10137.67 1942.9810142.88 1943.4610148.88 1943.9210155.91 1943.7810177.56 1943.42
10193.51 1945.4110202.99 1946.5610207.69 1947.2810210.53 1947.73 10217.5 1948.81
10225.39 1950.09

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*****************************************
 9808.87    .055 9868.53     .0510148.88    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9868.5310148.88                 0       0       0             .1       .3
```

```
CROSS SECTION


RIVER: RV WP T2
REACH: R1                    RS: 0.376

INPUT
Description: Q=510 cfs (CB7W1, 24 hr)
Station Elevation Data    num=      87
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 9869.56 2037.95  9881.5 2035.49 9887.22 2034.23 9899.38 2031.55  9904.5 2030.42
 9907.34  2029.8 9909.12  2029.4 9914.88 2028.35 9915.14  2028.3 9915.83 2028.17
 9917.28 2027.88 9918.44 2027.66 9922.48 2027.09 9922.72 2027.05 9922.94 2027.02
 9927.13 2027.18 9930.37 2027.29 9932.84 2027.38 9937.59 2027.27 9948.42 2026.74
  9964.7 2026.68 9967.35  2026.6  9969.6 2026.53 9974.75 2026.46 9976.12 2026.41
 9982.23 2026.35 9982.38 2026.34 9982.58 2026.34 9982.89 2026.34 9984.66 2026.32
 9988.19 2026.14 9990.19 2026.08 9993.56 2025.93 9998.32  2025.8 9999.14 2025.77
 9999.99 2025.74   10000 2025.7410002.86 2025.67 10005.6 2025.6610005.99 2025.66
10011.82 2025.6510016.54 2025.6510018.04 2025.6510022.17 2025.6610024.27 2025.66
10027.76 2025.6610030.49 2025.6710033.32 2025.6710036.21 2025.6710038.08 2025.68
10038.57 2025.6810042.71 2025.7210042.97 2025.7310044.45 2025.7410049.23 2025.79
10050.07  2025.810055.48 2025.8610055.67 2025.8610057.33 2025.8810061.96 2025.95
 10062.2 2025.9510063.16 2025.9610069.12 2026.0610071.47 2026.0910074.14 2026.13
10076.08 2026.1710080.78 2026.2210082.99 2026.26 10087.3 2026.3110087.69 2026.31
10088.85 2026.3710090.47 2026.3810095.42  2026.4 10097.6 2026.3410103.23 2026.15
10119.11 2025.6410127.58 2025.4110150.64 2024.8110155.01  2024.710155.05 2024.69
10157.66 2024.7210169.91 2024.8410183.56 2027.29 10190.9 2028.5310198.59 2029.88
 10222.8 2033.9610246.35 2037.97

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
***********************************************
 9869.56    .055 9990.19     .0510069.12    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9990.1910069.12           526.43  526.43  526.43             .1       .3

CROSS SECTION


RIVER: RV WP T2
REACH: R1                    RS: 0.276

INPUT
Description:
Station Elevation Data    num=     104
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 9879.18 2030.01 9881.44 2029.68 9883.23 2029.47 9887.34 2028.86 9888.48 2028.69
 9889.48 2028.57 9893.05 2027.93 9893.66 2027.86 9898.65 2026.95 9898.94 2026.91
 9904.23 2025.95 9904.26 2025.94 9905.02 2025.81 9909.25 2024.95 9911.05 2024.58
 9911.27 2024.53 9914.17 2023.81 9914.38 2023.76 9918.93 2022.64 9919.11 2022.59
 9923.43 2021.52 9924.04 2021.37 9928.24 2020.33 9928.95 2020.16 9933.06 2019.13
 9933.89 2018.94 9935.92 2018.43 9936.76 2018.23 9938.81 2017.81 9939.12 2017.74
 9943.12 2016.93 9955.13 2014.81 9958.04 2014.24 9961.55 2013.59 9961.73 2013.56
 9962.52 2013.41 9966.11 2012.82 9968.67 2012.08 9973.82 2010.73 9975.01  2010.9
 9988.11 2012.91 9994.39 2012.02   10000  2011.2 10001.3 2011.0110003.122011.195
10008.09  2011.7 10009.1 2011.8110012.78 2012.1910012.94 2012.2110017.67 2012.42
10020.16 2012.5310028.372012.90710035.41 2013.2310052.34 2013.9510053.36 2013.78
10060.71 2012.5510072.47  2013.610072.55 2013.6110072.67 2013.6110078.092013.432
10101.63 2012.6610114.19 2012.9610115.92    201310129.84 2013.3210134.56 2013.43
10146.81 2013.4910146.91 2013.4810147.08 2013.4410156.22 2011.8610160.28    2011
10167.25 2012.1110171.43  2012.810176.52 2012.9410178.29 2012.9910183.67 2013.92
10184.78 2014.1410185.47 2014.2810189.86 2015.0610193.16 2015.7610193.43 2015.81
10196.36 2016.2810200.72 2017.23 10202.9  2017.610208.06 2018.7310209.47 2018.99
10215.28 2020.2910216.05 2020.4310218.09 2020.8910218.99 2021.0410222.93 2021.68
10225.67 2022.1110228.92 2022.4510229.14 2022.4810234.64 2023.0910235.26 2023.19
10240.33 2023.7610244.16 2024.1910244.74 2024.2610248.46 2024.7110251.68  2025.1
10254.48 2025.4310256.94 2025.7310257.42 2025.7810280.18 2027.09

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************************************************
 9879.18    .055   10000     .0510003.12    .05510078.09     .0510134.56    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9988.1110028.37           457.76  457.76  457.76             .1       .3

CROSS SECTION


RIVER: RV WP T2
REACH: R1                    RS: 0.190

INPUT
Description:
Station Elevation Data    num=      50
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 9954.07 2003.97 9969.73 2002.03 9971.73  2001.8 9973.42  2001.6 9977.87 2001.02
 9985.612000.302  9987.82000.099 9991.34 1999.77 9995.94 1999.34 9997.62 1999.39
 9999.51 1999.46  9999.8 1999.46 9999.99 1999.47   10000 1999.4710000.02 1999.47
10000.76 1999.5110007.34 1999.5810022.531999.90110031.94  2000.110071.34 2000.13
10073.08 2000.1110078.23 2000.1110087.84  2000.110097.22 2000.0810101.31 2000.16
10102.67 2000.1910112.09 2000.3710121.91 2000.5610127.54 2000.67 10131.3 1999.87
10134.88 1999.1310138.47 1999.4610148.19 2000.3910157.77 2000.2710169.93 2000.17
10171.47 1999.9110173.39 1999.6110179.78 1998.5910185.35 1997.7610187.12 1998.01
10188.54  1998.210191.48 1998.6110197.86 1999.4610197.97 1999.4710204.93 1999.68
10210.68 1999.8610210.72 1999.8610210.73 1999.8710210.78 1999.8710238.14 2003.96
```

```
Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
 9954.07    .055  9987.8     .0510031.94    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        9987.810031.94           218.25  218.25  218.25            .1       .3

CROSS SECTION


RIVER: RV WP T2
REACH: R1                 RS: 0.148

INPUT
Description: This cross section is identical to RM 0.367 on RV WP T1.
Station Elevation Data    num=      93
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 9932.15 2000.61 9932.58 2000.67 9950.25 1998.17 9975.47 1994.58  9980.31994.271
  9989.4 1993.69 9998.73  1993.1 9998.89 1993.11   10000 1993.0910000.02 1993.09
10000.73 1993.0810006.74 1993.1510013.19 1993.2310014.06 1993.2410024.42 1993.47
10049.05 1994.0210050.27 1993.9910054.16 1993.8710054.43 1993.8710067.98 1993.46
10081.96 1994.2710088.12 1994.6410092.07 1994.5910129.97 1994.2210130.55 1994.22
10134.25 1994.21 10134.9  1994.210135.83 1994.2110164.14 1993.9410177.97 1993.86
10178.16 1993.8210185.57 1992.39 10186.9 1992.6410189.34 1993.0810194.66 1994.03
10198.81    199410201.19    199410209.42 1993.9510218.87 1993.9310219.57 1993.92
10226.16 1993.9210246.24 1994.7510251.75 1994.9810251.86 1994.99 10261.7 1996.06
10266.92 1996.6210270.15 1996.9710272.34  1997.210273.96 1997.3810275.32 1997.55
10276.41 1997.6910291.39 1998.99 10293.6 1999.2410296.54 1999.5610300.63 2000.02
10304.58 2000.4610306.75 2000.6710316.89 2001.6610332.53 2003.1910332.61 2003.19
10343.63 2002.3510366.36 2000.6210378.04  1999.810388.16 1999.1210395.21 1999.73
10406.04 2000.6210409.35 2000.8910412.15 2000.8610425.95 2000.7110443.98 2000.55
10451.05 2000.5410460.88 2000.4810469.08  2000.310487.33 1999.7910487.58 1999.78
 10487.7 1999.78 10490.6 1999.9110492.73    200010554.71 1999.9810562.15    2000
10573.58 1999.6110574.98 1999.5710577.46 1999.7210586.27 2000.2910587.39 2000.36
10590.18 2000.5610591.51 2000.6510599.38 2001.16 10600.5 2001.2410602.63 2001.39
10608.36 2001.7910616.02 2002.3410616.08 2002.33

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
 9932.15    .055  9980.3     .0510081.96    .05510366.36     .0510406.04    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        9980.310081.96           370.25  370.25  370.25            .1       .3
Right Levee     Station=10332.53      Elevation= 2003.19

CROSS SECTION


RIVER: RV WP T2
REACH: R1                 RS: 0.078

INPUT
Description: Q=1040 cfs (CB9W1A, 24 hr)  This cross section is identical to RM
             0.260 on RV WP T1.
Station Elevation Data    num=     110
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 9930.29 1991.97 9931.39 1991.82 9945.16 1989.98 9946.24  1989.7 9947.49 1989.36
 9962.571985.322 9964.67 1984.76 9965.91 1984.43 9970.33 1983.25 9971.02 1983.07
 9977.85 1981.29 9984.95 1981.81 9987.98 1982.05 9990.35 1981.94 9999.99 1981.48
   10000 1981.4810003.54 1981.3110007.38 1981.1210010.97 1981.5110024.23 1982.78
10026.99 1982.6210029.53 1982.4610040.21 1981.6410042.38 1981.8610046.45 1982.32
10047.66 1982.4510048.05 1982.4910048.77 1982.5910053.28 1982.3610068.25 1981.63
10072.69 1981.7710073.561981.80910076.51 1981.9410079.68 1982.0610083.39 1982.24
10086.95 1982.3410092.79 1982.49   10093 1982.4910097.25 1982.6110100.72 1982.69
10103.48 1982.7610105.72 1982.8210112.31 1983.0710135.63  1983.510138.28 1983.54
10148.25 1983.6910153.42 1983.57   10164 1983.2510179.11  1983.310204.38  1983.4
10211.42 1983.4210214.71 1983.4410216.61 1983.4410218.63 1983.4710219.43 1983.46
10220.04 1983.4510220.52 1983.4410220.56 1983.4410223.81 1983.45 10226.7 1983.43
10226.96 1983.4310227.02 1983.4210241.59 1983.2810268.44 1983.0110324.44 1982.89
10326.81 1982.8810327.07 1982.8710327.39 1982.87 10327.8 1982.8710328.34 1982.86
10331.54 1982.81 10334.2 1982.76 10340.5 1982.6510365.291982.18710369.96  1982.1
10378.57 1981.9410380.01 1981.97 10383.9 1982.0410397.31 1982.3110397.47 1982.31
10401.94 1982.3810410.62 1982.8910418.63 1983.3510420.68 1983.4710425.91 1983.74
10426.35 1983.7510427.04 1983.7710431.17 1983.9110444.92 1983.3910469.25 1982.37
10475.52  1982.710477.55  1982.810488.78 1983.3710496.64 1983.8610502.46 1984.18
10515.76 1985.0610516.15 1985.0810517.15 1985.1510517.44 1985.15 10519.6 1985.15
10530.52  1985.110532.24  1985.110534.73  1985.110535.58  1985.110538.63 1985.08
10545.52 1985.0410561.02 1984.9510564.13 1984.9310565.76 1984.9210566.91 1984.86

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
 9930.29    .055 9971.02     .0510112.31    .05510365.29     .0510410.62    .055

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9971.0210112.31                0       0       0            .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
10431.1710566.91    1985       F

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

SUMMARY OF MANNING'S N VALUES

River:RV WP
```

Reach	River Sta.	n1	n2	n3	n4	n5
R1	2.650	.055	.05	.055		
R1	2.547	.055	.05	.055		
R2	2.450	.055	.05	.055	.05	.055
R2	2.359	.055	.05	.055	.05	.055
R2	2.261	.055	.05	.055		
R3	2.064	.055	.05	.055		
R3	1.882	.055	.05	.055		
R3	1.703	.055	.05	.055		
R3	1.493	.055	.05	.055		
R3	1.368	.055	.05	.055		
R3	1.229	.055	.05	.055		
R3	1.126	.055	.05	.055		
R3	1.048	.055	.05	.055		
R3	0.853	.045	.04	.045		
R3	0.659	.045	.04	.045		
R3	0.484	.045	.04	.045		
R3	0.373	.045	.04	.045		
R3	0.267	.045	.04	.045		
R3	0.088	.045	.04	.045		
R3	0.086	.045	.04	.045		
R3	0.084	.045	.04	.045		

River:RV WP T1

Reach	River Sta.	n1	n2	n3	n4	n5
R1	0.959	.055	.05	.055		
R1	0.872	.055	.05	.055		
R1	0.773	.055	.05	.055		
R1	0.685	.055	.05	.055		
R1	0.602	.055	.05	.055		
R1	0.459	.055	.05	.055		
R1	0.367	.055	.05	.055	.05	.055
R1	0.260	.055	.05	.055	.05	.055
R1	0.193	.055	.05	.055	.05	.055
R1	0.131	.055	.05	.055	.05	.055
R1	0.047	.055	.05	.055		

River:RV WP T2

Reach	River Sta.	n1	n2	n3	n4	n5
R1	0.376	.055	.05	.055		
R1	0.276	.055	.05	.055	.05	.055
R1	0.190	.055	.05	.055		
R1	0.148	.055	.05	.055	.05	.055
R1	0.078	.055	.05	.055	.05	.055

SUMMARY OF REACH LENGTHS

River: RV WP

Reach	River Sta.	Left	Channel	Right
R1	2.650	547.5	547.5	547.5
R1	2.547	0	0	0
R2	2.450	477.87	477.87	477.87
R2	2.359	519	519	519
R2	2.261	1042.07	1042.07	1042.07
R3	2.064	961.74	961.74	961.74
R3	1.882	943.71	943.71	943.71
R3	1.703	1110.04	1110.04	1110.04
R3	1.493	659.98	659.98	659.98
R3	1.368	732.92	732.92	732.92
R3	1.229	541.93	541.93	541.93
R3	1.126	414.97	414.97	414.97
R3	1.048	1028.17	1028.17	1028.17
R3	0.853	1021.8	1021.8	1021.8
R3	0.659	924.48	924.48	924.48
R3	0.484	587.04	587.04	587.04
R3	0.373	559.01	559.01	559.01
R3	0.267	944.19	944.19	944.19
R3	0.088	10	10	10
R3	0.086	10	10	10
R3	0.084			

River: RV WP T1

Reach	River Sta.	Left	Channel	Right
R1	0.959	461.3	461.3	461.3
R1	0.872	521.4	521.4	521.4
R1	0.773	464.29	464.29	464.29
R1	0.685	437.38	437.38	437.38
R1	0.602	756	756	756
R1	0.459	484.6	484.6	484.6
R1	0.367	568.37	568.37	568.37
R1	0.260	350.22	350.22	350.22
R1	0.193	331.99	331.99	331.99
R1	0.131	439.74	439.74	439.74
R1	0.047	0	0	0

```
*************************************************************

River: RV WP T2
*************************************************************
*     Reach      *   River Sta.   *  Left   * Channel *  Right  *
*************************************************************
*R1             *    0.376       *   526.43*   526.43*   526.43*
*R1             *    0.276       *   457.76*   457.76*   457.76*
*R1             *    0.190       *   218.25*   218.25*   218.25*
*R1             *    0.148       *   370.25*   370.25*   370.25*
*R1             *    0.078       *        0*        0*        0*
*************************************************************

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

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: RV WP

*******************************************************
*     Reach      *   River Sta.   * Contr.  * Expan.  *
*******************************************************
*R1             *    2.650   *       .1*       .3*
*R1             *    2.547   *       .1*       .3*
*R2             *    2.450   *       .1*       .3*
*R2             *    2.359   *       .1*       .3*
*R2             *    2.261   *       .1*       .3*
*R3             *    2.064   *       .1*       .3*
*R3             *    1.882   *       .1*       .3*
*R3             *    1.703   *       .1*       .3*
*R3             *    1.493   *       .1*       .3*
*R3             *    1.368   *       .1*       .3*
*R3             *    1.229   *       .1*       .3*
*R3             *    1.126   *       .1*       .3*
*R3             *    1.048   *       .1*       .3*
*R3             *    0.853   *       .1*       .3*
*R3             *    0.659   *       .1*       .3*
*R3             *    0.484   *       .1*       .3*
*R3             *    0.373   *       .1*       .3*
*R3             *    0.267   *       .1*       .3*
*R3             *    0.088   *       .1*       .3*
*R3             *    0.086   *       .1*       .3*
*R3             *    0.084   *       .1*       .3*
*******************************************************
River: RV WP T1

*******************************************************
*     Reach      *   River Sta.   * Contr.  * Expan.  *
*******************************************************
*R1             *    0.959   *       .1*       .3*
*R1             *    0.872   *       .1*       .3*
*R1             *    0.773   *       .1*       .3*
*R1             *    0.685   *       .1*       .3*
*R1             *    0.602   *       .1*       .3*
*R1             *    0.459   *       .1*       .3*
*R1             *    0.367   *       .1*       .3*
*R1             *    0.260   *       .1*       .3*
*R1             *    0.193   *       .1*       .3*
*R1             *    0.131   *       .1*       .3*
*R1             *    0.047   *       .1*       .3*
*******************************************************
River: RV WP T2

*******************************************************
*     Reach      *   River Sta.   * Contr.  * Expan.  *
*******************************************************
*R1             *    0.376   *       .1*       .3*
*R1             *    0.276   *       .1*       .3*
*R1             *    0.190   *       .1*       .3*
*R1             *    0.148   *       .1*       .3*
*R1             *    0.078   *       .1*       .3*
*******************************************************

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

ERRORS WARNINGS AND NOTES
Errors Warnings and Notes for Plan : Wash K 11A

River: RV WK T11A  Reach: R1     RS: 0.542     Profile: 100-YR FP
     Warning:The energy equation could not be balanced within the specified number of iterations.  The program used critical depth
             for the water surface and continued on with the calculations.
     Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
             the need for additional cross sections.
     Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
             water surface came back below critical depth.  This indicates that there is not a valid subcritical answer.  The
             program defaulted to critical depth.
River: RV WK T11A  Reach: R1     RS: 0.444     Profile: 100-YR FP
     Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
             the need for additional cross sections.
     Warning:The composite Mannings n value for the channel was larger than the largest entered n value or smaller than the
             smallest entered n value.
     Note:   Manning's n values were composited to a single value in the main channel.
River: RV WK T11A  Reach: R1     RS: 0.349     Profile: 100-YR FP
     Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
             the need for additional cross sections.
     Warning:The composite Mannings n value for the channel was larger than the largest entered n value or smaller than the
             smallest entered n value.
     Note:   Manning's n values were composited to a single value in the main channel.
River: RV WK T11A  Reach: R1     RS: 0.219     Profile: 100-YR FP
     Warning:The energy equation could not be balanced within the specified number of iterations.  The program used critical depth
             for the water surface and continued on with the calculations.
```

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

E.4 Miscellaneous Hydraulic Analysis Supporting Documentation

E.4.1 Rio Verde ADMP ReadMe File

E.4.2 HEC-1 Final 100-Year Flow Values and Selected Subbasin Maps

E.4.1 Rio Verde ADMP Readme File

RIO VERDE ADMP
FLOODPLAIN DELINEATION STUDY
FCD Contract No. FCD2001C056

Flood Control District of Maricopa County
****

State: Arizona
Community: Rio Verde, Arizona
County: Maricopa

Consultant:
Dibble & Associates Consulting Engineers

Attn: Brian J. Fry, P.E.
7500 North Dreamy Draw Drive, Suite 200
Phoenix, AZ 85020-4660
(602) 957-1155

****

RAS model is prepared by Dibble & Associates. Field reconnaissance per report dated April 18, 2005. Phase 3 RAS model started in May 2005, preliminary model completed in June 2005.

Topographic mapping is supplied by the Flood Control District of Maricopa County.

The Cross-section data were generated by INROADS, based on the DTM data. The mapped hydraulic base line represents the 10,000-station point of the HEC-RAS model.

Discharge data is from the Rio Verde ADMP HEC-1 model. The original models are from the Flood Control District of Maricopa County, prepared for the Rio Verde South Floodplain Delineation, the Rio Verde South Extension Floodplain Delineation, the Rio Verde North Floodplain Delineation, and the Rio Verde North Extension Floodplain Delineation. The HEC-1 models were modified for the Rio Verde ADMP. The final HEC-1 files were reviewed in February 2004 and FCDMC approved the hydrology model.

Hydrologic concentration points are noted in cross-section descriptions using the corresponding HEC-1 ID's. The flow rates have been rounded to the nearest 10 cubic feet per second (cfs). Flow rates obtained from HEC-1 are applied at the downstream end of the relevant sub-basin and stepped upstream at cross-sections to meet the HEC-1 flow from the upstream sub-basin.

River Mile (RM) stationing is based upon the estimated tie in point with downstream receiving waters or the start of two-dimensional flow models. The starting WS Elevation is based upon normal depth or the resulting WS Elevation from the corresponding two-dimensional flow model.

Horizontal and Vertical Coordinate Basis for this project is as follows:
Horizontal--Arizona State Plane, Central Region, NAD 1983
Vertical--NAVD 1988

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Input File	Date
RV_Wash_10.prj	11/01/2007

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Rio Verde ADMP, Project FCDMC 2001C056, river system including RV Wash 10, RV Wash 10 Trib 2, RV Wash 10 Trib 2 Split 1, RV Wash 10 Trib 3, and RV Wash 10 Trib 4. Phase 3 RAS model started in May 2005, preliminary model completed in June 2005.

RAS model is prepared by Dibble Engineering. Field reconnaissance per report dated April 18, 2005.

For the study washes, the starting water surface elevation is on RV Wash 10, and is taken from the starting water surface elevation as provided by the Flood Control District of Maricopa County.

RV Wash 10 Floodplain Delineation
From a point approximately 2,350 feet south and 350 feet east of the intersection of 144th Street and Rio Verde Drive (River Mile 6.697) to a point approximately 1,800 feet north and 2,300 feet east of the intersection of 128th Street and Rio Verde Drive (River Mile 9.689), a distance of 2.992 river miles.

RV Wash 10 Trib 2 Floodplain Delineation
From the confluence with RV Wash 10 (River Mile 0.000, approximately 3,000 feet south and 900 feet east of the intersection of 136th Street and Rio Verde Drive) to a point approximately 2,800 feet south and 50 feet west of the intersection of 132nd Street and Rio Verde Drive (River Mile 0.844), a distance of 0.844 river miles.

RV Wash 10 Trib 2 Split 1 Floodplain Delineation

From the confluence with RV Wash 10 Trib 3 (River Mile 0.000, approximately 2,300 feet south and 1,100 feet east of the intersection of 132nd Street and Rio Verde Drive) to the divergence with RV Wash 10 Trib 2 (River Mile 0.187, approximately 2,700 feet south and 200 feet east of the intersection of 132nd Street and Rio Verde Drive, a distance of 0.187 river miles.

RV Wash 10 Trib 3 Floodplain Delineation
From the confluence with RV Wash 10 (River Mile 0.000, approximately 1,900 feet south and 100 feet west of the intersection of 136th Street and Rio Verde Drive) to a point approximately 1,900 feet south and 400 feet west of the intersection of 132nd Street and Rio Verde Drive (River Mile 0.615), a distance of 0.615 river miles.

RV Wash 10 Trib 4 Floodplain Delineation
From the confluence with RV Wash 10 (River Mile 0.000, approximately 50 feet south and 800 feet west of the intersection of 132nd Street and Rio Verde Drive) to a point approximately 50 feet south and 200 feet west of the intersection of 128th Street and Rio Verde Drive (River Mile 0.373), a distance of 0.373 river miles.

A lateral weir is modeled at RM's 2.702, 2.627, & 2.516 to allow water to flow over Rio Verde Drive to RV Wash 10 Trib 4. The methodology is as follows:

1) Model RV Wash 10 Trib 4 with the combined flow of the two watersheds and with cross sections that extend north over Rio Verde Drive. The area north of Rio Verde Drive will be modeled as ineffective.
2) Model RV Wash 10 with only the flow of its contributing watershed (before combining with RV Wash 10 Trib 4 watershed) and with a lateral weir at Rio Verde Drive.
3) The wider of the floodplains from the two models will be used for the floodplain boundary north of Rio Verde Drive; and RV Wash 10 Trib 4 model will be used for the floodplain boundary south of Rio Verde Drive.

RAS model river naming corresponds to project river naming as follows:
RV W10 = RV Wash 10
RV W10 T2 = RV Wash 10 Trib 2
RV W10 T2 S1 = RV Wash 10 Trib 2 Split 1
RV W10 T3 = RV Wash 10 Trib 3
RV W10 T4 = RV Wash 10 Trib 4

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RV_Wash_10.prj 11/01/2007

Rio Verde ADMP, Project FCDMC 2001C056, RV Wash 10 Trib 1. Phase 3 RAS model started in May 2005, preliminary model completed in June 2005.

RAS model is prepared by Dibble Engineering. Field reconnaissance per report dated April 18, 2005.

For the study washes, the starting water surface elevation is on RV Wash 10 Trib 1, and is taken from the starting water surface elevation as provided by the Flood Control District of Maricopa County.

RV Wash 10 Trib 1 Floodplain Delineation
From a point approximately 1,000 feet south and 50 feet west of the intersection of 144th Street and Rio Verde Drive (RM 0.288) to a point approximately 1,100 feet south and 350 feet west of the intersection of 138th Street and Rio Verde Drive (River Mile 1.221), a distance of 0.933 river miles.

RAS model river naming corresponds to project river naming as follows:
RV W10 T1 = RV Wash 10 Trib 1

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RV_Wash_7.prj 11/01/2007

RAS model is prepared by Dibble Engineering. Field reconnaissance per report dated April 18, 2005.

For the study wash, the starting water surface elevation is taken from normal depth for three cross sections repeated at ten-foot intervals. The slope-area method is the same as the normal depth method.

RV Wash 7 Floodplain Delineation
From a point approximately 5,000 feet south and 700 feet east of the intersection of 140th Street and Rio Verde Drive (River Mile 7.255) to a point approximately 4,000 feet south and 1,900 feet east of the intersection of 132nd Street and Rio Verde Drive (River Mile 8.325), a distance of 1.070 river miles.

RAS model river naming corresponds to project river naming as follows:
RV W7 = RV Wash 7

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RV_Wash_A.prj 11/01/2007

Rio Verde ADMP, Project FCDMC 2001C056, river system including RV Wash A, RV Wash A Trib 1, and RV Wash A Trib 2. Phase 3 RAS model started in May 2005, preliminary model completed in June 2005.

RAS model is prepared by Dibble Engineering. Field reconnaissance per report dated April 18, 2005.

This wash models the condition in which Black Hills Tank is removed, allowing all flow to continue without diversion. RV Wash A Tank Spillway in RV_Wash_A_Tank_Spillway.prj models the condition in which Black Hills Tank (a stock tank) remains in place, and the existing spillway diverts flow to RV Wash A Tank Spillway. A Hydraulic connection is not modeled between RV Wash A and RV Wash A Tank Spillway. See Report for more information.

For the study washes, the starting water surface elevation is on RV Wash A, and is taken from the starting water surface elevation as provided by the Flood Control District of Maricopa County.

RV Wash A Floodplain Delineation
From the confluence with RV Wash A Trib 1 (River Mile 7.050, approximately 2,200 feet north and 1,300 feet west of the intersection of 144th Street and Rio Verde Drive) to a point approximately 1,800 feet north and 1,100 feet east of the intersection of 122nd Street and Dixileta Drive (River Mile 9.834), a distance of 2.784 river miles.

RV Wash A Trib 1 Floodplain Delineation
From the confluence with RV Wash A (River Mile 0.000, approximately 2,200 feet north and 1,500 feet west of the intersection of 144th Street and Rio Verde Drive) to a point approximately 650 feet north and 250 feet east of the intersection of 122nd Street and Lone Mountain Road (River Mile 3.405), a distance of 3.405 river miles.

RV Wash A Trib 2 Floodplain Delineation
From the confluence with RV Wash A (River Mile 0.000, approximately 2,100 feet north and 1,800 feet west of the intersection of 144th Street and Rio Verde Drive) to a point approximately 700 feet north and 4,100 feet east of the intersection of 128th Street and Dixileta Drive (River Mile 1.920), a distance of 1.920 river miles.

RAS model river naming corresponds to project river naming as follows:
RV WA = RV Wash A
RV WA T1 = RV Wash A Trib 1
RV WA T2 = RV Wash A Trib 2

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RV_Wash_A_Tank_Spillway.prj 11/01/2007

Rio Verde ADMP, Project FCDMC 2001C056, RV Wash A Tank Spillway. Phase 3 RAS model started in May 2005, preliminary model completed in June 2005.

RAS model is prepared by Dibble Engineering. Field reconnaissance per report dated April 18, 2005.

This wash models the condition in which Black Hills Tank (a stock tank) remains in place, and the existing spillway diverts flow to RV Wash A Tank Spillway. RV Wash A in RV_Wash_A.prj models the condition in which Black Hills Tank is removed, allowing all flow to continue without diversion. A Hydraulic connection is not modeled between RV Wash A and RV Wash A Tank Spillway. See the report for more information.

For the study washes, the starting water surface elevation is taken from normal depth for three cross sections repeated at ten-foot intervals. The slope-area method is the same as the normal depth method.

RV Wash A Tank Spillway Floodplain Delineation
From the confluence with RV Wash A in RV_Wash_A.prj (River Mile 0.000, approximately 1,800 feet north and 3,800 feet west of the intersection of 144th Street and Rio Verde Drive) to a point approximately 380 feet upstream of the Black Hills Tank dam (River Mile 1.463), a distance of 1.463 river miles.

RAS model river naming corresponds to project river naming as follows:
RV WA TS = RV Wash A Tank Spillway

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RV_Wash_I.prj 11/01/2007

Rio Verde ADMP, Project FCDMC 2001C056, river system including RV Wash I and RV Wash I Trib 3. Phase 3 RAS model started in June 2005, preliminary model completed in August 2005.

RAS model is prepared by Dibble Engineering. Field reconnaissance per report dated April 18, 2005.

For the study washes, the starting water surface elevation is on RV Wash I, and is taken from the starting water surface elevation as provided by the Flood Control District of Maricopa County.

RV Wash I Floodplain Delineation
From a point approximately 1,100 feet south and 1,500 feet west of the intersection of 144th Street and Lone Mountain Road (River Mile 6.418) to a point approximately 3,100 feet north and 450 feet west of the intersection of 136th Street and Lone Mountain Road (River Mile 7.262), a distance of 0.844 river miles.

RV Wash I Trib 3 Floodplain Delineation
From the confluence with RV Wash I at the culvert crossing 142nd Street (River Mile 0.000, approximately 1,200 feet south and 1,600 feet west of the intersection of 144th Street and Lone Mountain Road) to a point approximately 400 feet south and 200 feet west of the intersection of 136th Street and Westland Drive (River Mile 0.797), a distance of 0.797 river miles.

RAS model river naming corresponds to project river naming as follows:
RV WI = RV Wash I
RV WI T3 = RV Wash I Trib 3

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RV_Wash_K.prj 11/01/2007

Rio Verde ADMP, Project FCDMC 2001C056, river system including RV Wash K, RV Wash K Split 16, and RV Wash K Trib 13. Phase 3 RAS model started in June 2005, preliminary model completed in August 2005.

RAS model is prepared by Dibble Engineering. Field reconnaissance per report dated April 18, 2005.

For the study washes, the starting water surface elevation is on RV Wash K, and is taken from the starting water surface elevation as provided by the Flood Control District of Maricopa County.

RV Wash K Floodplain Delineation
From a point approximately 1,800 feet south of the intersection of 144th Street and Dove Valley Road (River Mile 6.149) to a point approximately 850 feet north and 3,300 feet west of the intersection of 136th Street and Black Mountain Road (River Mile 8.742), a distance of 2.593 river miles.

RV Wash K Split 16 Floodplain Delineation
From the confluence with RV Wash K (River Mile 0.000, approximately 650 feet north and 2,400 feet east of the intersection of 136th Street and Dove Valley Road) to a point approximately 650 feet south and 200 feet east of the intersection of 136th Street and East Rock View Road (River Mile 0.566), a distance of 0.566 river miles.

RV Wash K Trib 13 Floodplain Delineation
From the confluence with RV Wash K (River Mile 0.000, approximately 600 feet south and 1,100 feet west of the intersection of 144th Street and Dove Valley Road) to a point approximately 700 feet south and 4,450 feet west of the intersection of 136th Street and East Rock View Road (River Mile 1.939), a distance of 1.939 river miles.

RAS model river naming corresponds to project river naming as follows:
RV WK = RV Wash K
RV WK S16 = RV Wash K Split 16
RV WK T13 = RV Wash K Trib 13

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RV_Wash_K_Trib_11.prj 11/01/2007

Rio Verde ADMP, Project FCDMC 2001C056, river system including RV Wash K Trib 11 and RV Wash K Trib 11B. Phase 3 RAS model started in June 2005, preliminary model completed in August 2005.

RAS model is prepared by Dibble Engineering. Field reconnaissance per report dated April 18, 2005.

For the study washes, the starting water surface elevation is on RV Wash K Trib 11, and is taken from the starting water surface elevation as provided by the Flood Control District of Maricopa County.

RV Wash K Trib 11 Floodplain Delineation
From a point approximately 2,100 feet north and 2,700 feet east of the intersection of 136th Street and Lone Mountain Road (River Mile 0.808) to a point approximately 3,700 feet north and 300 feet west of the intersection of 136th Street and Lone Mountain Road (River Mile 1.511), a distance of 0.703 river miles.

RV Wash K Trib 11B Floodplain Delineation
From the confluence with RV Wash K Trib 11 at a point coincident with the downstream end of RV Wash K Trib 11 (approximately 2,100 feet north and 2,700 feet east of the intersection of 136th Street and Lone Mountain Road (River Mile 0.000)) to a point approximately 3,100 feet north and 200 feet west of the intersection of 136th Street and Lone Mountain Road (River Mile 0.627), a distance of 0.627 river miles.

RAS model river naming corresponds to project river naming as follows:
RV WK T11 = RV Wash K Trib 11
RV WK T11B = RV Wash K Trib 11B

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RV_Wash_K_Trib_11A.prj 11/01/2007

Rio Verde ADMP, Project FCDMC 2001C056, RV Wash K Trib 11A. Phase 3 RAS model started in June 2005, preliminary model completed in August 2005.

RAS model is prepared by Dibble Engineering. Field reconnaissance per report dated April 18, 2005.

For the study washes, the starting water surface elevation is on RV Wash K Trib 11A, and is taken from the starting water surface elevation as provided by the Flood Control District of Maricopa County.

RV Wash K Trib 11A Floodplain Delineation
From a point approximately 2,400 feet north and 750 feet west of the intersection of 144th Street and Lone Mountain Road (River Mile 0.138) to a point approximately 3,000 feet north and 2,300 feet west of the intersection of 144th Street and Lone Mountain Road (River Mile 0.498), a distance of 0.360 river miles.

RAS model river naming corresponds to project river naming as follows:
RV WK T11A = RV Wash K Trib 11A

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RV_Wash_K_Trib_12.prj 11/01/2007

Rio Verde ADMP, Project FCDMC 2001C056, RV Wash K Trib 12. Phase 3 RAS model started in June 2005, preliminary model completed in August 2005.

RAS model is prepared by Dibble Engineering. Field reconnaissance per report dated April 18, 2005.

For the study washes, the starting water surface elevation is on RV Wash K Trib 12, and is taken from the starting water surface elevation as provided by the Flood Control District of Maricopa County.

RV Wash K Trib 12 Floodplain Delineation
From a point approximately 2,000 feet south and 1,250 feet west of the intersection of 144th Street and Dove Valley Road (RM 0.324) to a point approximately 1,200 feet south and 100 feet west of the intersection of 136th Street and Dove Valley Road (River Mile 1.218), a distance of 0.894 river miles.

RAS model river naming corresponds to project river naming as follows:
RV WK T12 = RV Wash K Trib 12

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RV_Wash_K_Trib_6.prj 11/01/2007

Rio Verde ADMP, Project FCDMC 2001C056, RV Wash K Trib 6. Phase 3 RAS model started in June 2005, preliminary model completed in August 2005.

RAS model is prepared by Dibble Engineering. Field reconnaissance per report dated April 18, 2005.

For the study washes, the starting water surface elevation is on RV Wash K Trib 6, and is taken from normal depth for three cross sections repeated at ten-foot intervals. The slope-area method is the same as the normal depth method.

RV Wash K Trib 6 Floodplain Delineation
From a point approximately 500 feet north and 50 feet east of the intersection of 144th Street and East Rock View Road (River Mile 5.373) to a point approximately 350 feet south and 2,300 feet west of the intersection of 144th Street and Black Mountain Road (River Mile 5.986), a distance of 0.613 river miles.

RAS model river naming corresponds to project river naming as follows:
RV WK T6 = RV Wash K Trib 6

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RV_Wash_K_Trib_6D.prj 11/01/2007

Rio Verde ADMP, Project FCDMC 2001C056, river system including RV Wash K Trib 6D and RV Wash K Trib 6D Split 1. Phase 3 RAS model started in June 2005, preliminary model completed in August 2005.

RAS model is prepared by Dibble Engineering. Field reconnaissance per report dated April 18, 2005.

For the study washes, the starting water surface elevation for both RV Wash K Trib 6D and RV Wash K Trib 6D Split 1 is taken from normal depth for three cross sections repeated at ten-foot intervals. The slope-area method is the same as the normal depth method.

RV Wash K Trib 6D Floodplain Delineation
From a point approximately 600 feet south and 20 feet west of the intersection of 144th Street and East Rock View Road (River Mile 1.313) to a point approximately 900 feet south and 200 feet west of the intersection of 136th Street and Black Mountain Road (River Mile 2.629), a distance of 1.316 river miles.

RV Wash K Trib 6D Split 1 Floodplain Delineation
From a point approximately 30 feet north of the intersection of 144th Street and East Rock View Road (River Mile 0.337) to the divergence of RV Wash K Trib 6D and RV Wash K Trib 6D Split 1 at a point approximately 400 feet north and 1,000 feet west of the intersection of 144th Street and East Rock View Road (River Mile 0.565), a distance of 0.228 river miles.

RAS model river naming corresponds to project river naming as follows:
RV WK T6D = RV Wash K Trib 6D
RV WK T6D S1 = RV Wash K Trib 6D Split

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RV_Wash_K_Trib_6D1.prj 11/01/2007

Rio Verde ADMP, Project FCDMC 2001C056, RV Wash K Trib 6D1. Phase 3 RAS model started in June 2005, preliminary model completed in August 2005.

RAS model is prepared by Dibble Engineering. Field reconnaissance per report dated April 18, 2005.

For the study washes, the starting water surface elevation is on RV Wash K Trib 6D1, and is taken from normal depth for three cross sections repeated at ten-foot intervals. The slope-area method is the same as the normal depth method.

RV Wash K Trib 6D1 Floodplain Delineation
From a point approximately 900 feet south and 50 feet west of the intersection of 144th Street and East Rock View Road (River Mile 0.297) to a point approximately 500 feet north and 3,100 feet west of the intersection of 144th Street and East Rock View Road (River Mile 1.085), a distance of 0.788 river miles.

RAS model river naming corresponds to project river naming as follows:
RV WK T6D1 = RV Wash K Trib 6D1

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RV_Wash_P.prj 11/01/2007

Rio Verde ADMP, Project FCDMC 2001C056, river system including RV Wash P, RV Wash P Trib 1, and RV Wash P Trib 2. Phase 3 RAS model started in June 2005, preliminary model completed in August 2005.

RAS model is prepared by Dibble Engineering. Field reconnaissance per report dated April 18, 2005.

For the study washes, the starting water surface elevation is on RV Wash P, and is taken from normal depth for three cross sections repeated at ten-foot intervals. The slope-area method is the same as the normal depth method.

RV Wash P Floodplain Delineation
From the confluence with the Verde River (River Mile 0.000, approximately 8,300 feet north and 150 feet east of the intersection of Needlerock Road and Rio Verde Drive) to a point approximately 3,100 feet north and 450 feet west of the intersection of 172nd Street and Lone Mountain Road (River Mile 2.650), a distance of 2.650 river miles.

RV Wash P Trib 1 Floodplain Delineation
From the confluence with RV Wash P (River Mile 0.000, approximately 1,200 feet south and 800 feet east of the intersection of 172nd Street and Lone Mountain Road) to a point approximately 750 feet north and 500 feet west of the intersection of 168th Street and Four Corners Transmission Road (River Mile 0.959), a distance of 0.959 river miles.

RV Wash P Trib 2 Floodplain Delineation
From the confluence with RV Wash P (River Mile 0.000, approximately 2,200 feet north and 100 feet east of the intersection of 172nd Street and Lone Mountain Road) to a point approximately 600 feet north and 1,400 feet west of the intersection of 168th Street and Four Corners Transmission Road (River Mile 0.376), a distance of 0.376 river miles.

RAS model river naming corresponds to project river naming as follows:
RV WP = RV Wash K
RV WP T1 = RV Wash P Trib 1
RV WP T2 = RV Wash P Trib 2

E.4.2 HEC-1 Final 100 Year Flow Values and Selected Subbasin Maps

TABLE 4.5-1
Peak Discharge Summary Table for the North-North Basin
(Existing Condition Model)

Line No.	Type	ID	Drainage Area	100-Year Flood Event			
				24-Hour Duration		6-Hour Duration	
				Peak Flow	Time-to-Peak	Peak Flow	Time-to-Peak
			(sq.mi)	(cfs)	(hr)	(cfs)	(hr)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	Hydrograph	B1W1	0.33	358	12.35	261	4.40
2	Hydrograph	B2W1	0.12	159	12.25	110	4.30
3	Combined	CB2W1	0.45	504	12.30	366	4.35
4	Routed	RB6W1	0.45	458	12.65	349	4.70
5	Hydrograph	B6W1	0.11	151	12.15	93	4.20
6	Combined	CB6W1	0.56	504	12.60	391	4.65
7	Hydrograph	B8W1	0.15	200	12.25	138	4.30
8	Hydrograph	B3W1	0.14	203	12.15	134	4.20
9	Hydrograph	B4W1	0.14	223	12.15	147	4.20
10	Combined	CB3W1	0.28	426	12.15	280	4.20
11	Routed	RB7W1	0.28	381	12.40	263	4.50
12	Hydrograph	B7W1	0.14	226	12.15	143	4.20
13	Combined	CB7W1	0.42	510	12.35	374	4.40
14	Combined	CB9W1A	1.14	1037	12.40	850	4.50
15	Routed	RB9W1A	1.14	1016	12.65	825	4.75
16	Hydrograph	B10W1	0.12	199	12.15	127	4.15
17	Routed	RB9W1B	0.12	198	12.20	127	4.20
18	Hydrograph	B9W1	0.11	137	12.15	76	4.20
19	Combined	CB9W1	1.36	1109	12.65	904	4.70
20	Hydrograph	B5W1	0.38	356	12.45	271	4.50
21	Combined	CB13WA	1.75	1434	12.60	1148	4.70
22	Routed	RB13WA	1.75	1373	12.85	1128	4.95
23	Hydrograph	B13W1	0.21	255	12.25	171	4.30
24	Hydrograph	B14W1	0.14	218	12.15	145	4.20
25	Routed	RB13WB	0.14	218	12.20	145	4.25
26	Combined	CB13W1	2.10	1481	12.80	1239	4.90
27	Hydrograph	B15W1	0.02	58	12.05	32	4.05
28	Hydrograph	B16W1	0.01	37	12.00	20	4.00
29	Hydrograph	B17W1	0.01	25	12.00	13	4.00
30	Hydrograph	B18W1	0.05	98	12.10	59	4.10
31	Hydrograph	B1W2	0.08	118	12.15	78	4.20
32	Hydrograph	B2W2	0.10	143	12.20	95	4.25
33	Combined	CB2W2	0.18	261	12.20	173	4.25
34	Hydrograph	B4W2	0.10	172	12.10	105	4.10

TABLE 4.5-1
Peak Discharge Summary Table for the North-North Basin
(Existing Condition Model)

Line No.	Type	ID	Drainage Area	100-Year Flood Event			
				24-Hour Duration		6-Hour Duration	
				Peak Flow	Time-to-Peak	Peak Flow	Time-to-Peak
			(sq.mi)	(cfs)	(hr)	(cfs)	(hr)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
35	Hydrograph	B3W5	0.08	138	12.10	82	4.10
36	Routed	RB6W5	0.08	110	12.45	73	4.50
37	Hydrograph	B6W5	0.10	156	12.15	96	4.20
38	Combined	CB6W5	0.18	191	12.30	147	4.40
39	Hydrograph	B4W5	0.07	118	12.10	71	4.15
40	Routed	RB7W5	0.07	112	12.25	69	4.30
41	Hydrograph	B7W5	0.14	189	12.20	125	4.25
42	Combined	CB7W5	0.21	297	12.25	193	4.30
43	Combined	CB67W5	0.40	487	12.25	334	4.35
44	Hydrograph	B5W5	0.09	118	12.20	78	4.25
45	Hydrograph	B5W5A	0.10	142	12.20	91	4.25
46	Hydrograph	B1W5	0.21	303	12.20	205	4.25
47	Hydrograph	B1W6	0.52	758	12.20	505	4.25
48	Routed	RB2W6	0.52	620	12.50	460	4.55
49	Hydrograph	B2W6	0.96	917	12.40	670	4.45
50	Combined	CB2W6	1.48	1525	12.45	1128	4.50
51	Hydrograph	B3W6	0.36	420	12.30	303	4.40
52	Combined	CB3W6	1.84	1901	12.40	1413	4.45
53	Routed	RB6W6	1.84	1855	12.60	1390	4.65
54	Hydrograph	B6W6	0.22	335	12.15	219	4.20
55	Combined	CB6W6	2.05	1958	12.60	1502	4.65
56	Routed	RB9W6A	2.05	1884	12.75	1474	4.80
57	Hydrograph	B5W6	0.38	462	12.30	351	4.40
58	Hydrograph	B4W6A	0.24	346	12.20	233	4.25
59	Hydrograph	B4W6B	0.19	315	12.15	211	4.20
60	Combined	CB4W6	0.43	654	12.15	443	4.20
61	Routed	RB7W6	0.43	636	12.35	436	4.40
62	Hydrograph	B7W6	0.26	437	12.15	302	4.20
63	Combined	CB7W6A	0.69	987	12.30	712	4.30
64	Combined	CB7W6	1.08	1449	12.30	1057	4.35
65	Routed	RB9W6	1.08	1308	12.50	1011	4.55
66	Hydrograph	B9W6	0.55	589	12.30	411	4.40
67	Combined	CB9W6	3.68	3301	12.65	2696	4.70
68	Hydrograph	B8W6	0.11	211	12.10	134	4.10
69	Routed	RB12W6	0.11	171	12.45	122	4.45

TABLE 4.5-1
Peak Discharge Summary Table for the North-North Basin
(Existing Condition Model)

Line No.	Type	ID	Drainage Area	100-Year Flood Event			
				24-Hour Duration		6-Hour Duration	
				Peak Flow	Time-to-Peak	Peak Flow	Time-to-Peak
			(sq.mi)	(cfs)	(hr)	(cfs)	(hr)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
70	Hydrograph	B12W6	0.23	316	12.20	207	4.25
71	Combined	CB12W6	0.34	397	12.35	304	4.35
72	Combined	CB9W6A	4.02	3522	12.65	2907	4.65
73	Routed	RB13WC	4.02	3515	12.65	2906	4.70
74	Hydrograph	B13W6A	0.11	232	12.05	128	4.05
75	Combined	C13W6A	4.13	3524	12.65	2922	4.70
76	Routed	RB13W3	4.13	3522	12.70	2918	4.75
77	Hydrograph	B10W6A	0.16	311	12.10	199	4.10
78	Routed	RB11WA	0.16	256	12.40	177	4.55
79	Hydrograph	B11W6	0.16	262	12.15	170	4.20
80	Hydrograph	B10W6B	0.16	282	12.15	183	4.15
81	Routed	RB11WB	0.16	251	12.40	169	4.55
82	Combined	CB11W6	0.49	652	12.40	467	4.45
83	Routed	RB13W1	0.49	596	12.55	460	4.60
84	Hydrograph	B14W6	0.11	177	12.10	107	4.15
85	Routed	RB13W2	0.11	156	12.30	101	4.35
86	Hydrograph	B13W6B	0.19	265	12.20	175	4.25
87	Combined	C13W6B	4.91	4192	12.65	3509	4.70
88	Hydrograph	B1W3	0.45	472	12.35	332	4.40
89	Hydrograph	B1W4A	0.13	210	12.15	132	4.15
90	Routed	RB1W4B	0.13	190	12.25	125	4.30
91	Hydrograph	B1W4B	0.12	178	12.15	110	4.20
92	Combined	CB1W4	0.25	349	12.25	231	4.25
93	Routed	RB2W4B	0.25	339	12.30	227	4.35
94	Hydrograph	B2W4B	0.10	161	12.15	99	4.15
95	Combined	CB2W4B	0.35	459	12.25	312	4.30
96	Hydrograph	B2W4A	0.12	148	12.25	100	4.30
97	Combined	CB2W4	0.48	607	12.25	412	4.30
98	Routed	RB4W4A	0.48	469	12.70	358	4.75
99	Hydrograph	B4W4	0.19	205	12.30	137	4.35
100	Hydrograph	B1W4C	0.10	149	12.15	95	4.20
101	Routed	RB2W4C	0.10	85	12.75	66	4.85
102	Hydrograph	B2W4C	0.13	143	12.30	99	4.35
103	Combined	CB2W4C	0.24	165	12.45	133	4.65
104	Routed	RB4W4B	0.24	164	12.50	132	4.75

TABLE 4.5-1
Peak Discharge Summary Table for the North-North Basin
(Existing Condition Model)

Line No.	Type	ID	Drainage Area	100-Year Flood Event			
				24-Hour Duration		6-Hour Duration	
				Peak Flow	Time-to-Peak	Peak Flow	Time-to-Peak
			(sq.mi)	(cfs)	(hr)	(cfs)	(hr)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
105	Combined	CB4W4	0.90	728	12.65	579	4.70
106	Hydrograph	B3W4	0.09	151	12.15	93	4.15
107	Routed	RB5W4A	0.09	120	12.45	82	4.55
108	Hydrograph	B5W4A	0.08	134	12.15	84	4.15
109	Combined	CB5W4A	0.18	182	12.40	139	4.45
110	Routed	RB5W4B	0.18	149	12.80	118	4.90
111	Hydrograph	B5W4B	0.15	188	12.20	121	4.25
112	Combined	CB5W4B	0.33	206	12.35	170	4.60
113	Combined	DUMMY	9.87	7176	12.65	6159	4.70

TABLE 4.5-2
Peak Discharge Summary Table for the North-South Basin With Black Hills Tank
(Existing Condition Model)

Line No.	Type	ID	Drainage Area	100-Year Flood Event			
				24-Hour Duration		6-Hour Duration	
				Peak Flow	Time-to-Peak	Peak Flow	Time-to-Peak
			(sq.mi.)	(cfs)	(hr)	(cfs)	(hr)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	Hydrograph	1B1	0.49	794	12.15	553	4.20
2	Routed	RT1112	0.49	497	12.90	428	4.95
3	Hydrograph	1B2	0.16	167	12.40	129	4.45
4	Combined	CP1B2	0.65	569	12.90	500	4.95
5	Hydrograph	1B3	0.13	235	12.10	159	4.15
6	Diversion	1B3R	0.13	230	12.10	158	4.15
7	Hydrograph	1B3L	0.13	6	12.10	2	4.15
8	Routed	RT1314	0.13	1	13.55	0	5.60
9	Hydrograph	1B4	0.14	183	12.25	136	4.30
10	Combined	CP1B4	0.27	183	12.25	136	4.30
11	Combined	CP1214	0.92	617	12.85	553	4.90
12	Routed	RT1452	0.92	591	13.05	534	5.05
13	Hydrograph	5B2	0.12	193	12.20	142	4.25
14	Combined	CP5B2	1.05	617	13.00	567	5.05
15	Routed	RT529B	1.05	563	13.40	521	5.45
16	Hydrograph	5B1	0.10	170	12.15	123	4.20
17	Routed	RT519B	0.10	100	12.70	91	4.75
18	Hydrograph	9B	0.20	239	12.30	177	4.35
19	Hydrograph	8B1	0.08	132	12.10	86	4.15
20	Routed	RT819B	0.08	132	12.15	86	4.20
21	Hydrograph	4B1	0.37	401	12.35	306	4.40
22	Routed	RT4142	0.37	355	12.60	285	4.70
23	Hydrograph	4B2	0.24	310	12.25	220	4.30
24	Combined	CP4B2	0.61	505	12.55	439	4.55
25	Routed	RT4282	0.61	490	12.70	427	4.70
26	Hydrograph	8B2	0.06	104	12.15	69	4.15
27	Hydrograph	2B1	0.47	776	12.15	531	4.20
28	Routed	RT2122	0.47	620	12.40	479	4.45
29	Hydrograph	2B2	0.53	645	12.30	486	4.35
30	Hydrograph	2B3	0.26	361	12.20	263	4.25
31	Combined	CP2223	1.26	1552	12.35	1200	4.35
32	Routed	RT2226	1.26	1498	12.50	1176	4.55
33	Hydrograph	2B4	0.21	253	12.30	192	4.35
34	Hydrograph	2B5	0.13	257	12.10	170	4.10
35	Combined	CP2425	0.34	436	12.15	331	4.20

TABLE 4.5-2
Peak Discharge Summary Table for the North-South Basin With Black Hills Tank
(Existing Condition Model)

Line No.	Type	ID	Drainage Area	100-Year Flood Event			
				24-Hour Duration		6-Hour Duration	
				Peak Flow	Time-to-Peak	Peak Flow	Time-to-Peak
			(sq.mi.)	(cfs)	(hr)	(cfs)	(hr)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
36	Routed	RT4526	0.34	349	12.55	296	4.60
37	Hydrograph	2B6	0.31	483	12.20	353	4.20
38	Combined	CP2B6	1.91	2090	12.50	1721	4.55
39	Routed	RS2B6	1.91	761	13.10	700	5.20
40	Routed	RT2631	1.91	743	13.30	688	5.40
41	Hydrograph	3B1	0.10	126	12.25	90	4.25
42	Combined	CP3B1	2.01	751	13.25	693	5.40
43	Routed	RT3132	2.01	717	13.50	664	5.65
44	Hydrograph	3B2	0.34	416	12.30	315	4.35
45	Combined	CP3B2	2.35	722	13.50	676	5.60
46	Routed	RT3282	2.35	721	13.50	677	5.65
47	Combined	CP8B2	3.02	869	12.45	805	5.60
48	Routed	RT829B	3.02	871	13.50	804	5.60
49	Combined	CP9B	4.44	1478	13.45	1356	5.60
50	Hydrograph	1B36B	0.00	230	12.10	158	4.15
51	Routed	RT136B	0.00	166	12.75	135	4.80
52	Hydrograph	6B	0.20	263	12.30	206	4.35
53	Combined	CP6B	0.20	301	12.65	283	4.65
54	Hydrograph	1N	0.13	331	12.05	201	4.05
55	Hydrograph	4A	0.08	125	12.20	89	4.20
56	Hydrograph	2A	0.03	58	12.10	38	4.10
57	Hydrograph	1S	0.19	364	12.10	248	4.10
58	Routed	RT1S2S	0.19	309	12.30	229	4.35
59	Hydrograph	2S	0.09	152	12.15	102	4.15
60	Combined	CP2S	0.28	432	12.25	321	4.25
61	Routed	RT2S3S	0.28	414	12.35	316	4.40
62	Hydrograph	3S	0.09	143	12.15	96	4.15
63	Combined	CP3S	0.37	500	12.35	393	4.40
64	Routed	RT3S4N	0.37	495	12.40	392	4.45
65	Hydrograph	3N	0.11	189	12.15	134	4.15
66	Routed	RT34N1	0.11	189	12.20	134	4.20
67	Hydrograph	4N1	0.05	85	12.15	57	4.15
68	Combined	CP4N1	0.16	269	12.20	190	4.20
69	Routed	RT4N14	0.16	234	12.35	182	4.40
70	Hydrograph	2N	0.20	364	12.15	252	4.15
71	Routed	RT2N4N	0.20	312	12.35	238	4.40

TABLE 4.5-2
Peak Discharge Summary Table for the North-South Basin With Black Hills Tank
(Existing Condition Model)

Line No.	Type	ID	Drainage Area	100-Year Flood Event			
				24-Hour Duration		6-Hour Duration	
				Peak Flow	Time-to-Peak	Peak Flow	Time-to-Peak
			(sq.mi.)	(cfs)	(hr)	(cfs)	(hr)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
72	Hydrograph	4N	0.07	140	12.10	97	4.15
73	Combined	CP4N	0.81	1112	12.35	885	4.40

TABLE 4.5-3
Peak Discharge Summary Table for the North-South Basin Without Black Hills Tank
(Existing Condition Model)

Line No.	Type	ID	Drainage Area	100-Year Flood Event			
				24-Hour Duration		6-Hour Duration	
				Peak Flow	Time-to-Peak	Peak Flow	Time-to-Peak
			(sq.mi.)	(cfs)	(hr)	(cfs)	(hr)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	Hydrograph	1B1	0.49	794	12.15	553	4.20
2	Routed	RT1112	0.49	497	12.90	428	4.95
3	Hydrograph	1B2	0.16	167	12.40	129	4.45
4	Combined	CP1B2	0.65	569	12.90	500	4.95
5	Hydrograph	1B3	0.13	235	12.10	159	4.15
6	Diversion	1B3R	0.13	230	12.10	158	4.15
7	Hydrograph	1B3L	0.13	6	12.10	2	4.15
8	Routed	RT1314	0.13	1	13.55	0	5.60
9	Hydrograph	1B4	0.14	183	12.25	136	4.30
10	Combined	CP1B4	0.27	183	12.25	136	4.30
11	Combined	CP1214	0.92	617	12.85	553	4.90
12	Routed	RT1452	0.92	591	13.05	534	5.05
13	Hydrograph	5B2	0.12	193	12.20	142	4.25
14	Combined	CP5B2	1.05	617	13.00	567	5.05
15	Routed	RT529B	1.05	563	13.40	521	5.45
16	Hydrograph	5B1	0.10	170	12.15	123	4.20
17	Routed	RT519B	0.10	100	12.70	91	4.75
18	Hydrograph	9B	0.20	239	12.30	177	4.35
19	Combined	CP9BA	1.35	630	13.35	587	5.40
20	Hydrograph	8B1	0.08	132	12.10	86	4.15
21	Routed	RT819B	0.08	132	12.15	86	4.20
22	Hydrograph	4B1	0.37	401	12.35	306	4.40
23	Routed	RT4142	0.37	355	12.60	285	4.70
24	Hydrograph	4B2	0.24	310	12.25	220	4.30
25	Combined	CP4B2	0.61	505	12.55	439	4.55
26	Routed	RT4282	0.61	490	12.70	427	4.70
27	Hydrograph	8B2	0.06	104	12.15	69	4.15
28	Combined	CP8B2A	0.67	510	12.65	452	4.70
29	Hydrograph	2B1	0.47	776	12.15	531	4.20
30	Routed	RT2122	0.47	620	12.40	479	4.45
31	Hydrograph	2B2	0.53	645	12.30	486	4.35
32	Hydrograph	2B3	0.26	361	12.20	263	4.25
33	Combined	CP2223	1.26	1552	12.35	1200	4.35
34	Routed	RT2226	1.26	1498	12.50	1176	4.55
35	Hydrograph	2B4	0.21	253	12.30	192	4.35

TABLE 4.5-3
Peak Discharge Summary Table for the North-South Basin Without Black Hills Tank
(Existing Condition Model)

Line No.	Type	ID	Drainage Area	100-Year Flood Event			
				24-Hour Duration		6-Hour Duration	
				Peak Flow	Time-to-Peak	Peak Flow	Time-to-Peak
			(sq.mi.)	(cfs)	(hr)	(cfs)	(hr)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
36	Hydrograph	2B5	0.13	257	12.10	170	4.10
37	Combined	CP2425	0.34	436	12.15	331	4.20
38	Routed	RT4526	0.34	349	12.55	296	4.60
39	Hydrograph	2B6	0.31	483	12.20	353	4.20
40	Combined	CP2B6	1.91	2090	12.50	1721	4.55
41	Routed	RT2632	1.91	1646	12.95	1472	5.00
42	Hydrograph	3B1	0.10	126	12.25	90	4.25
43	Routed	RT3132	0.10	88	12.65	70	4.80
44	Hydrograph	3B2	0.34	416	12.30	315	4.35
45	Combined	CP3B2	2.35	1838	12.90	1664	4.95
46	Routed	RT3282	2.35	1835	12.90	1661	4.95
47	Combined	CP8B2	3.02	2254	12.90	2039	4.95
48	Routed	RT829B	3.02	2257	12.90	2045	4.95
49	Combined	CP9B	4.44	2819	12.90	2572	4.95
50	Hydrograph	1B36B	0.00	230	12.10	158	4.15
51	Routed	RT136B	0.00	166	12.75	135	4.80
52	Hydrograph	6B	0.20	263	12.30	206	4.35
53	Combined	CP6B	0.20	301	12.65	283	4.65
54	Hydrograph	1N	0.13	331	12.05	201	4.05
55	Hydrograph	4A	0.08	125	12.20	89	4.20
56	Hydrograph	2A	0.03	58	12.10	38	4.10
57	Hydrograph	1S	0.19	364	12.10	248	4.10
58	Routed	RT1S2S	0.19	309	12.30	229	4.35
59	Hydrograph	2S	0.09	152	12.15	102	4.15
60	Combined	CP2S	0.28	432	12.25	321	4.25
61	Routed	RT2S3S	0.28	414	12.35	316	4.40
62	Hydrograph	3S	0.09	143	12.15	96	4.15
63	Combined	CP3S	0.37	500	12.35	393	4.40
64	Routed	RT3S4N	0.37	495	12.40	392	4.45
65	Hydrograph	3N	0.11	189	12.15	134	4.15
66	Routed	RT34N1	0.11	189	12.20	134	4.20
67	Hydrograph	4N1	0.05	85	12.15	57	4.15
68	Combined	CP4N1	0.16	269	12.20	190	4.20
69	Routed	RT4N14	0.16	234	12.35	178	4.40
70	Hydrograph	2N	0.20	364	12.15	252	4.15
71	Routed	RT2N4N	0.20	312	12.35	234	4.40

TABLE 4.5-3
Peak Discharge Summary Table for the North-South Basin Without Black Hills Tank
(Existing Condition Model)

Line No.	Type	ID	Drainage Area	100-Year Flood Event			
				24-Hour Duration		6-Hour Duration	
				Peak Flow	Time-to-Peak	Peak Flow	Time-to-Peak
			(sq.mi.)	(cfs)	(hr)	(cfs)	(hr)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
72	Hydrograph	4N	0.07	140	12.10	97	4.15
73	Combined	CP4N	0.81	1112	12.35	876	4.40

TABLE 4.5-4
Peak Discharge Summary Table for the South Basin
(Existing Condition Model)

Line No.	Type	ID	Drainage Area	100-Year Flood Event			
				24-Hour Duration		6-Hour Duration	
				Peak Flow	Time-to-Peak	Peak Flow	Time-to-Peak
			(sq.mi.)	(cfs)	(hr)	(cfs)	(hr)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
35	HYDROGRAPH	DIC4E2	0.02	62	12.33	46	4.37
36	ROUTED TO	RTC4E2	0.02	42	12.83	33	5.03
37	3 COMBINED	CP11E2	0.92	661	12.47	568	4.63
38	HYDROGRAPH	511C5	0.11	195	12.13	131	4.13
39	HYDROGRAPH	DRC4C5	0.00	140	12.33	109	4.37
40	ROUTED TO	RTC4C5	0.00	133	12.47	106	4.53
41	HYDROGRAPH	511C3	0.14	217	12.17	144	4.20
42	ROUTED TO	RTC3C5	0.14	198	12.3	138	4.33
43	HYDROGRAPH	511C2	0.39	434	12.33	322	4.40
44	DIVERSION	DIC2A2	0.39	167	12.33	120	4.40
45	HYDROGRAPH	DIC2C5	0.39	267	12.33	202	4.40
46	ROUTED TO	RTC2C5	0.39	244	12.5	191	4.57
47	4 COMBINED	CP11C5	0.64	626	12.4	510	4.43
48	DIVERSION	DIC5C6	0.64	448	12.4	384	4.43
49	HYDROGRAPH	DIC5E2	0.64	215	12.4	126	4.43
50	ROUTED TO	RTC5E2	0.64	171	12.5	123	4.63
51	2 COMBINED	CP11EF	1.56	830	12.53	691	4.63
52	2 COMBINED	CPEF	3.57	2712	12.57	2221	4.67
53	ROUTED TO	RTEFC8	3.57	2678	12.63	2209	4.70
54	HYDROGRAPH	511C8	0.04	88	12.07	50	4.07
55	2 COMBINED	CP11C8	3.61	2681	12.63	2215	4.70
56	ROUTED TO	RTC8C7	3.61	2680	12.63	2213	4.73
57	HYDROGRAPH	511C7	0.12	182	12.17	127	4.23
58	HYDROGRAPH	511C6	0.04	68	12.1	44	4.10
59	HYDROGRAPH	DRC5C6	0.00	448	12.27	384	4.43
60	ROUTED TO	RTC5C6	0.00	406	12.63	351	4.67
61	2 COMBINED	CP11C6	0.04	417	12.63	368	4.63
62	ROUTED TO	RTC6C7	0.04	409	12.67	362	4.73
63	3 COMBINED	CP11C7	3.76	3149	12.63	2639	4.70
64	ROUTED TO	RTC7H	3.76	3029	12.8	2577	4.87
65	HYDROGRAPH	511H	0.30	333	12.27	223	4.33
66	2 COMBINED	CP11H	4.07	3135	12.8	2673	4.87
67	ROUTED TO	RTHG4	4.07	3129	12.8	2670	4.87
68	HYDROGRAPH	511G1	0.31	505	12.13	329	4.17
69	ROUTED TO	RTG1G2	0.31	417	12.37	298	4.43

TABLE 4.5-4
Peak Discharge Summary Table for the South Basin
(Existing Condition Model)

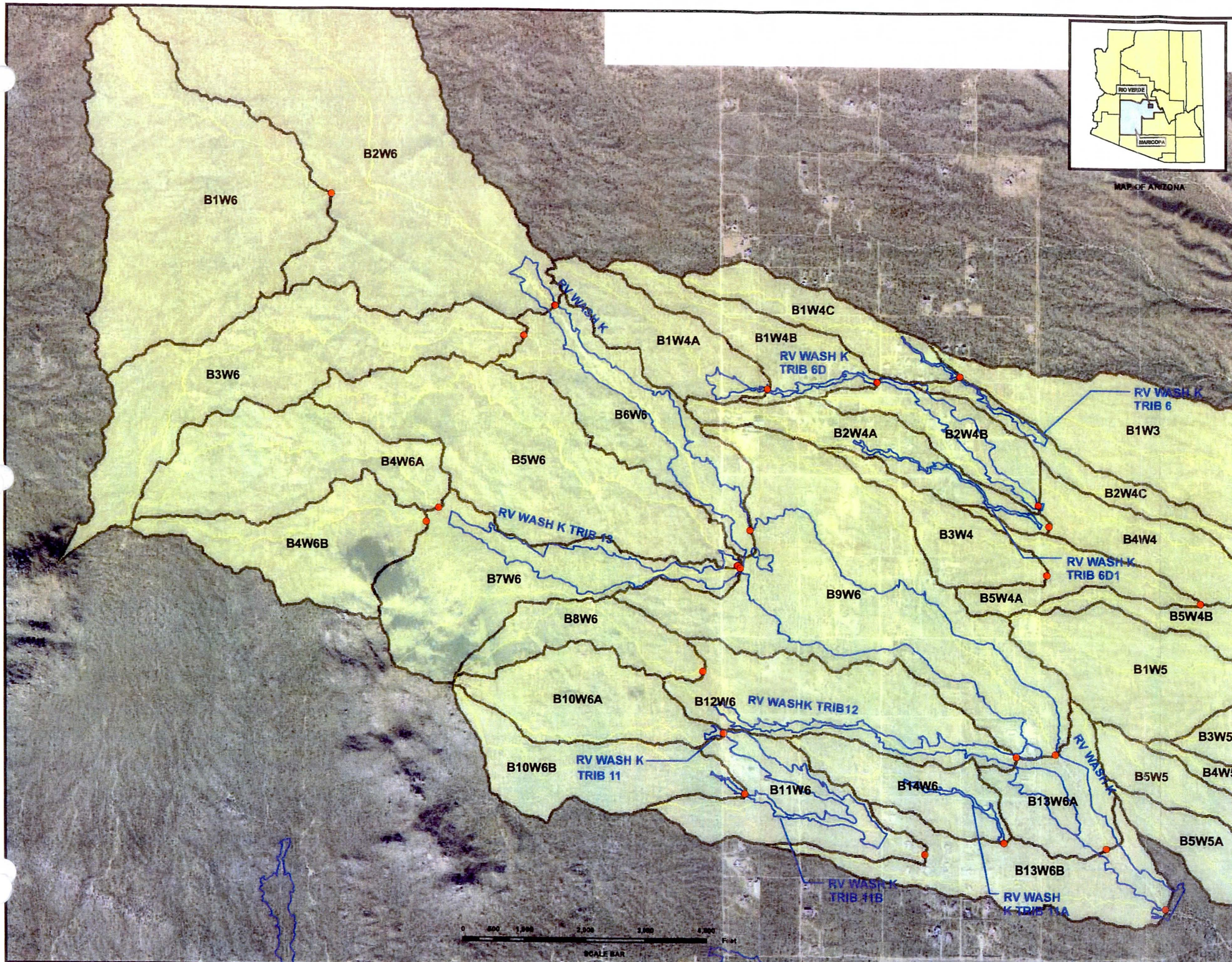
Line No.	Type	ID	Drainage Area	100-Year Flood Event			
				24-Hour Duration		6-Hour Duration	
				Peak Flow	Time-to-Peak	Peak Flow	Time-to-Peak
			(sq.mi.)	(cfs)	(hr)	(cfs)	(hr)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	HYDROGRAPH	511A1	0.29	382	12.23	272	4.30
2	HYDROGRAPH	511A2	0.06	109	12.1	68	4.10
3	ROUTED TO	RTA2A3	0.06	80	12.3	57	4.37
4	HYDROGRAPH	511A3	0.29	391	12.23	276	4.27
5	3 COMBINED	CP11A	0.65	849	12.23	605	4.30
6	ROUTED TO	RTA1D	0.65	732	12.53	564	4.57
7	HYDROGRAPH	511D	0.12	190	12.17	132	4.20
8	2 COMBINED	CP11D	0.77	824	12.5	656	4.53
9	HYDROGRAPH	511B4	0.19	337	12.13	230	4.17
10	HYDROGRAPH	511B1	0.58	616	12.4	476	4.43
11	HYDROGRAPH	511B2	0.22	272	12.3	199	4.33
12	2 COMBINED	CPB1B2	0.81	874	12.37	671	4.40
13	ROUTED TO	RT12B4	0.81	811	12.53	642	4.60
14	HYDROGRAPH	511B3	0.08	143	12.13	94	4.13
15	ROUTED TO	RTB3B4	0.08	122	12.27	86	4.30
16	3 COMBINED	CP11B	1.08	1021	12.5	855	4.50
17	ROUTED TO	RTB4D	1.08	1019	12.5	854	4.53
18	2 COMBINED	CP11DF	1.85	1844	12.5	1510	4.53
19	ROUTED TO	RTDF	1.85	1815	12.6	1462	4.73
20	HYDROGRAPH	511F	0.16	265	12.13	177	4.17
21	2 COMBINED	CP11F	2.00	1888	12.6	1536	4.70
22	HYDROGRAPH	511C1	0.33	387	12.3	282	4.37
23	DIVERSION	DIC1C4	0.33	201	12.3	146	4.37
24	HYDROGRAPH	DIC1E2	0.33	186	12.3	136	4.37
25	ROUTED TO	RTC1E2	0.33	142	12.8	117	4.83
26	HYDROGRAPH	511E1	0.30	364	12.27	262	4.33
27	ROUTED TO	RTE1E2	0.30	307	12.53	236	4.60
28	HYDROGRAPH	511E2	0.28	342	12.3	259	4.37
29	2 COMBINED	CPE1E2	0.57	586	12.43	460	4.53
30	HYDROGRAPH	511C4	0.02	46	12.03	26	4.03
31	HYDROGRAPH	DRC1C4	0.00	201	12.3	146	4.37
32	ROUTED TO	RTC1C4	0.00	194	12.37	143	4.43
33	2 COMBINED	CP11C4	0.02	202	12.33	155	4.37
34	DIVERSION	DIC4C5	0.02	140	12.33	109	4.37

TABLE 4.5-4
Peak Discharge Summary Table for the South Basin
(Existing Condition Model)

Line No.	Type	ID	Drainage Area	100-Year Flood Event			
				24-Hour Duration		6-Hour Duration	
				Peak Flow	Time-to-Peak	Peak Flow	Time-to-Peak
			(sq.mi.)	(cfs)	(hr)	(cfs)	(hr)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
70	HYDROGRAPH	511G2	0.16	228	12.17	151	4.20
71	2 COMBINED	CP11G2	0.47	594	12.3	429	4.37
72	ROUTED TO	RTG2G4	0.47	565	12.43	422	4.50
73	HYDROGRAPH	511G3	0.10	138	12.17	90	4.20
74	ROUTED TO	RTG3G4	0.10	122	12.4	85	4.43
75	HYDROGRAPH	511G4	0.30	348	12.27	238	4.33
76	3 COMBINED	CPG_G4	0.86	975	12.37	720	4.43
77	2 COMBINED	CP11G4	4.93	3612	12.77	3129	4.80
78	ROUTED TO	RTG4I	4.93	3586	12.83	3115	4.90
79	HYDROGRAPH	511I	0.20	254	12.17	158	4.23
80	2 COMBINED	CP11I	5.13	3627	12.83	3155	4.87
81	HYDROGRAPH	510A	0.92	866	12.53	707	4.57
82	HYDROGRAPH	509A5	0.02	46	12.03	26	4.03
83	DIVERSION	DIA5S	0.02	1	12.03	1	4.03
84	HYDROGRAPH	DIA59B	0.02	45	12.03	25	4.03
85	ROUTED TO	RTA59B	0.02	13	13.7	11	5.87
86	HYDROGRAPH	509B	0.65	497	12.63	384	4.63
87	2 COMBINED	CP09B	0.67	497	12.63	385	4.63
88	HYDROGRAPH	509A1	0.19	265	12.23	192	4.27
89	ROUTED TO	RTA1A2	0.19	250	12.33	187	4.37
90	HYDROGRAPH	509A2	0.13	195	12.2	140	4.23
91	HYDROGRAPH	DRC2A2	0.00	167	12.33	120	4.40
92	ROUTED TO	RTC2A2	0.00	145	12.6	111	4.67
93	3 COMBINED	CP09A2	0.32	475	12.33	386	4.47
94	ROUTED TO	RTA2A4	0.32	453	12.5	377	4.60
95	HYDROGRAPH	509A3	0.16	258	12.17	176	4.20
96	ROUTED TO	RTA3A4	0.16	249	12.23	174	4.27
97	HYDROGRAPH	509A4	0.06	133	12.07	81	4.07
98	3 COMBINED	CP09A4	0.55	668	12.33	554	4.40
99	ROUTED TO	RTA4A6	0.55	652	12.43	547	4.53
100	HYDROGRAPH	DRA5A6	0.00	1	12.03	1	4.03
101	ROUTED TO	RTA5A6	0.00	1	12.3	1	4.37
102	HYDROGRAPH	509A6	0.03	75	12.03	45	4.03
103	3 COMBINED	CP09A6	0.58	666	12.43	565	4.50
104	HYDROGRAPH	509D	0.38	394	12.4	304	4.47

TABLE 4.5-4
Peak Discharge Summary Table for the South Basin
(Existing Condition Model)

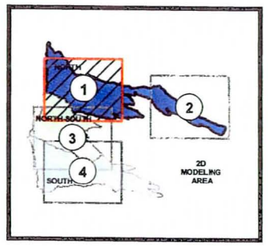
Line No.	Type	ID	Drainage Area	100-Year Flood Event			
				24-Hour Duration		6-Hour Duration	
				Peak Flow	Time-to-Peak	Peak Flow	Time-to-Peak
			(sq.mi.)	(cfs)	(hr)	(cfs)	(hr)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
105	HYDROGRAPH	500A	0.20	288	12.17	191	4.23
106	ROUTED TO	RTAB	0.20	266	12.37	185	4.40
107	HYDROGRAPH	500B	0.19	233	12.27	171	4.33
108	2 COMBINED	CP500B	0.40	493	12.33	355	4.37



Flood Control District of Maricopa County

RIO VERDE ADMP

F.C.D. CONTRACT NO. 2001C056



RIO VERDE WATERSHED MAP

LEGEND:

- Subbasins
- Concentration Points
- Subbasin Flow Paths
- 1-D Floodplain Boundary

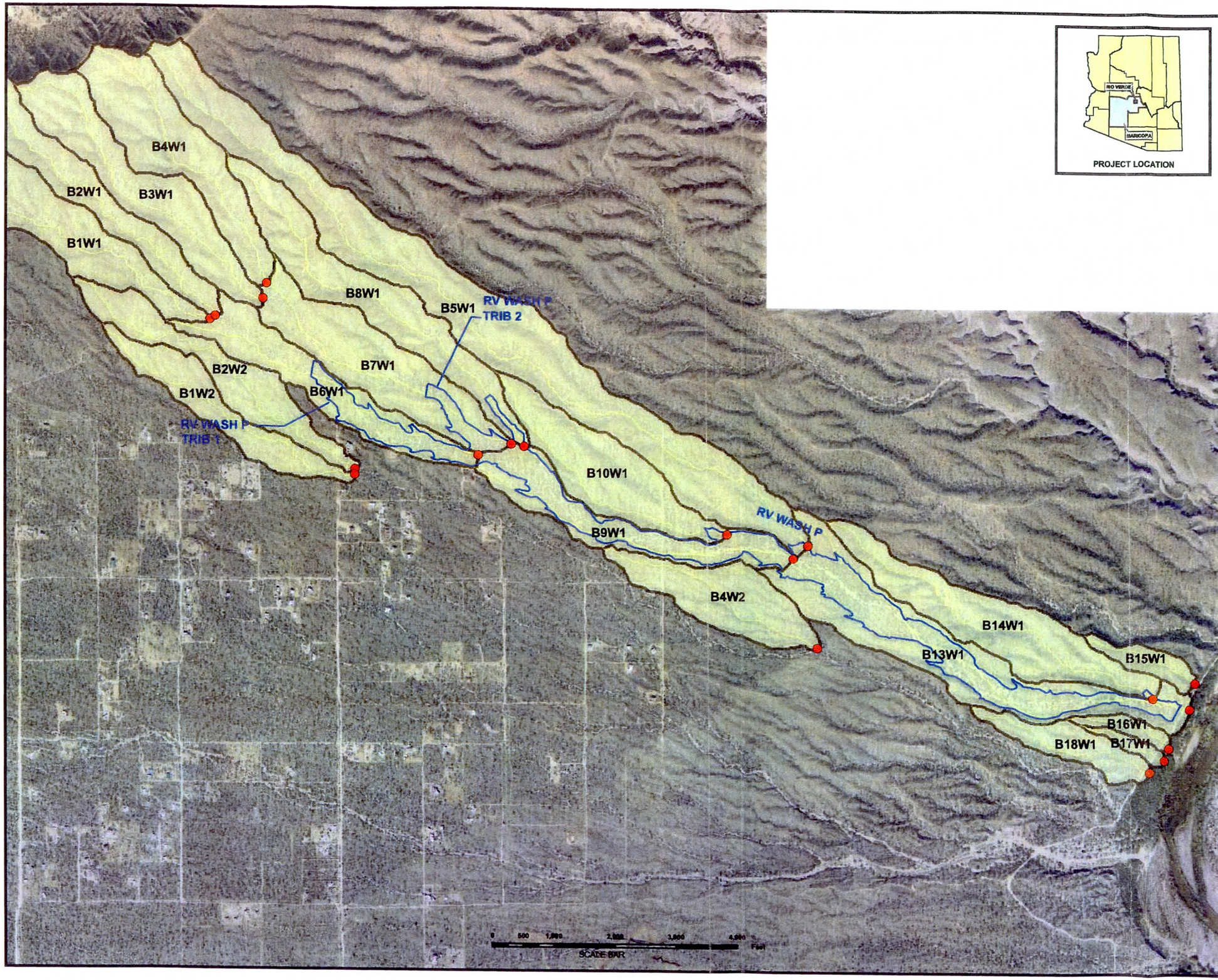
N

1 inch equals 1,500 feet

NORTH-NORTH SUBBASIN MAP

FIGURE E.4.2.1 (1 OF 4)

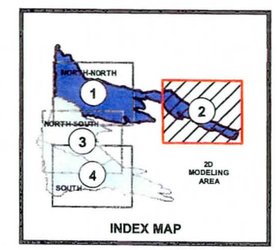
DIBBLE & ASSOCIATES
CONSULTING ENGINEERS
Since 1962



Flood Control District of Maricopa County

RIO VERDE ADMP

F.C.D. CONTRACT NO. 2001C056



LEGEND:

- Concentration Points
- Flow Paths
- Subbasins
- FPZN
- Wash_Leaders

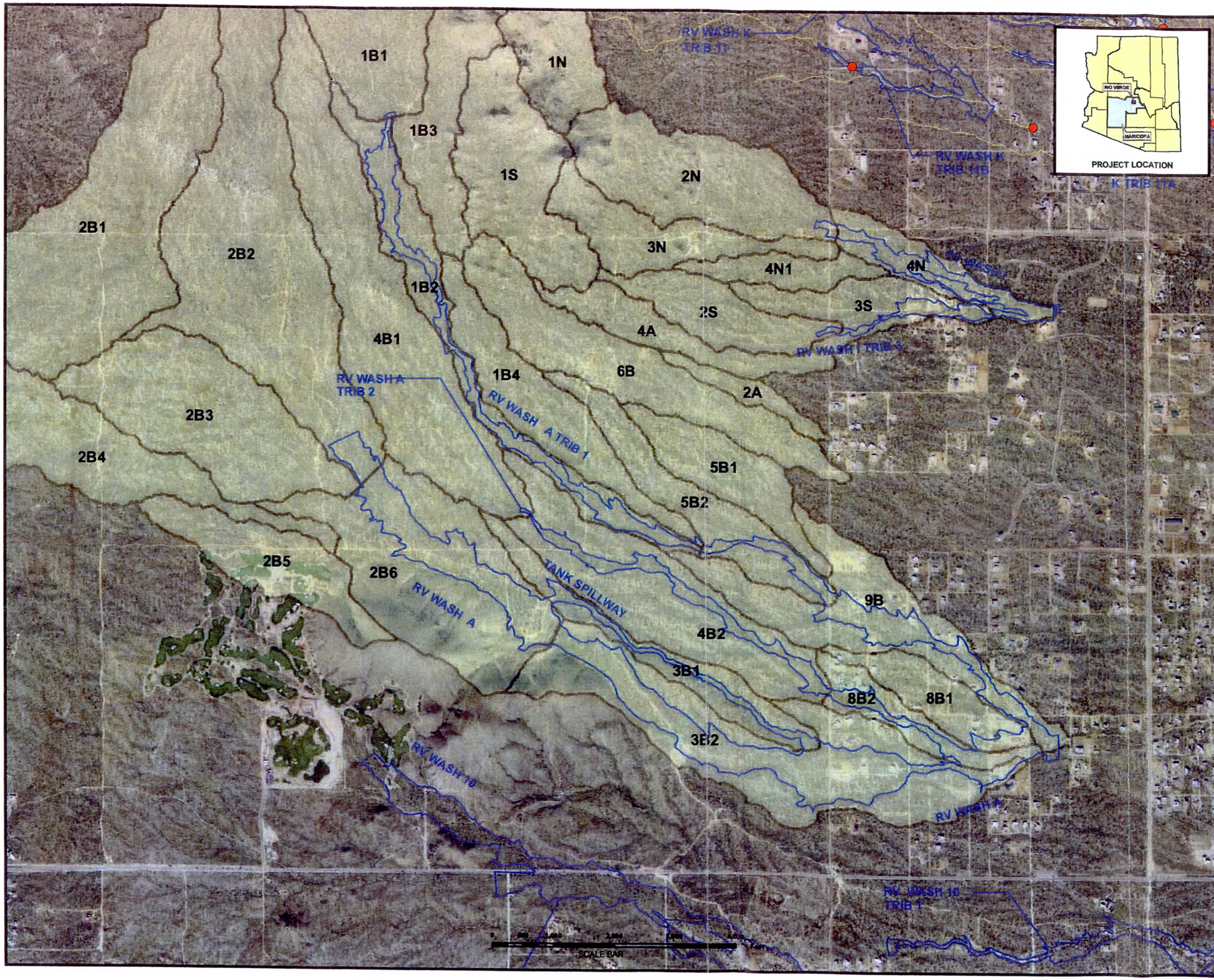
N

1 inch equals 1,500 feet

NORTH-NORTH SUBBASIN MAP

FIGURE E.4.2.1 (2 OF 4)

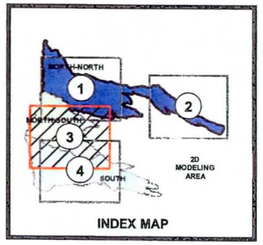
DIBBLE & ASSOCIATES
CONSULTING ENGINEERS
Since 1962



Flood Control District of Maricopa County

RIO VERDE ADMP

F.C.D. CONTRACT NO. 2001C056



INDEX MAP

LEGEND:

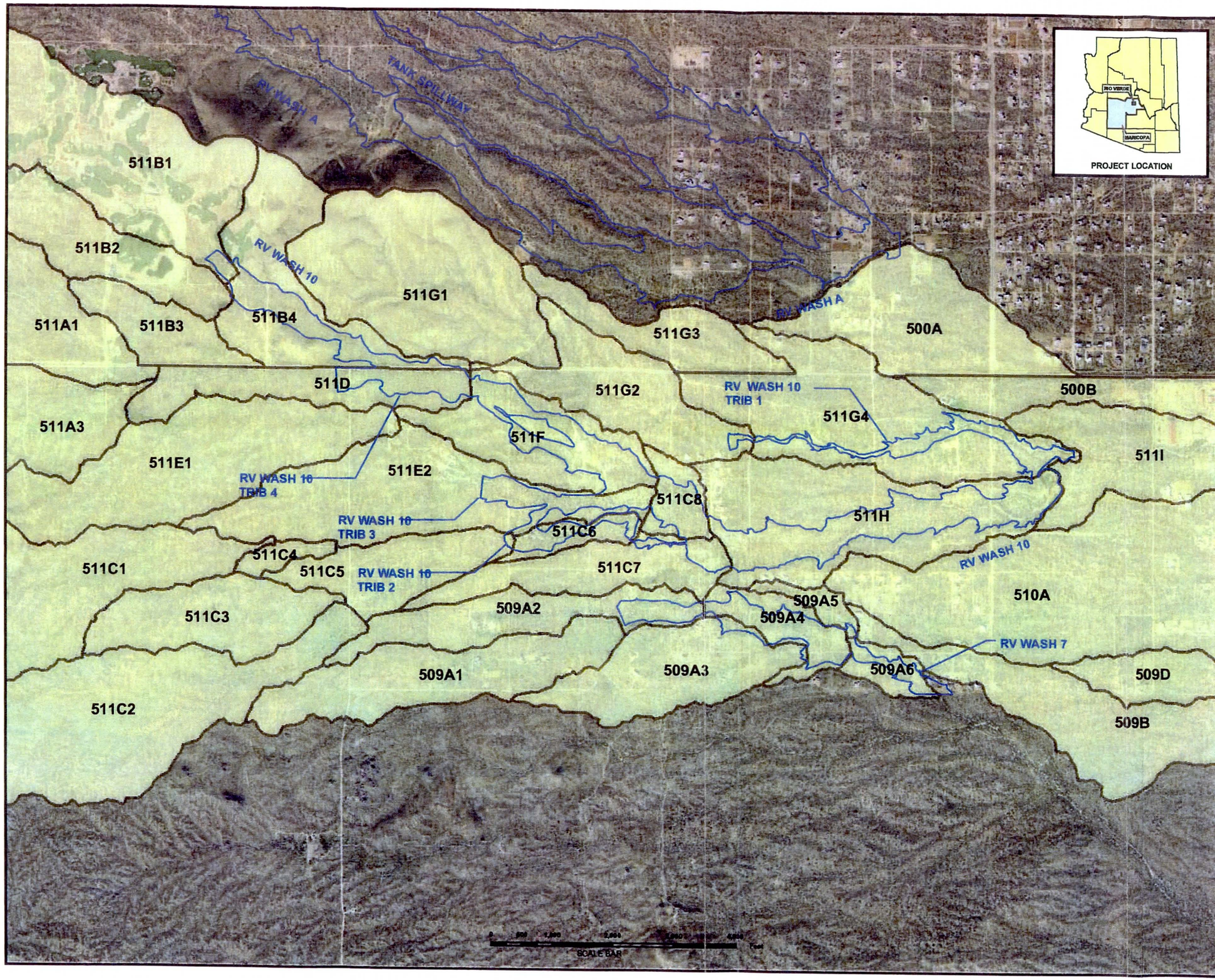
- Concentration Points
- Flow Paths
- FPZN
- Wash_Leaders
- Subbasins

1 inch equals 1,500 feet

NORTH-NORTH SUBBASIN MAP

FIGURE E.4.2.1 (3 OF 4)

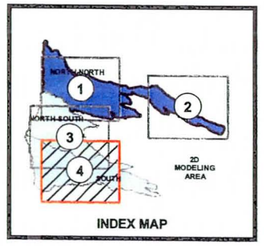
DIBBLE & ASSOCIATES
CONSULTING ENGINEERS
Since 1962



Flood Control District of Maricopa County

RIO VERDE ADMP

F.C.D. CONTRACT NO. 2001C056



LEGEND:

- Concentration Points
- Flow Paths
- FPZN
- Wash_Leaders
- Subbasins

1 inch equals 1,500 feet

NORTH-NORTH SUBBASIN MAP

FIGURE E.4.2.1 (4 OF 4)

DIBBLE & ASSOCIATES
CONSULTING ENGINEERS
Since 1962

Appendix H: FEMA Supporting Documentation

H.1 FEMA MT-2 Forms
H.2 FEMA Flood Profiles
H.3 Half Size Work Study Maps

H.1 FEMA MT-2 Forms

FEDERAL EMERGENCY MANAGEMENT AGENCY

OVERVIEW & CONCURRENCE FORM

O.M.B No. 3067-0148
Expires September 30, 2005

PAPERWORK BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 1 hour per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing, reviewing, and submitting the form. You are not required to respond to this collection of information unless a valid OMB control number appears in the upper right corner of this form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden to: Information Collections Management, Federal Emergency Management Agency, 500 C Street, SW, Washington DC 20472, Paperwork Reduction Project (3067-0148). Submission of the form is required to obtain or retain benefits under the National Flood Insurance Program. **Please do not send your completed survey to the above address.**

A. REQUESTED RESPONSE FROM FEMA

This request is for a (check one):

☐ CLOMR: A letter from FEMA commenting on whether a proposed project, if built as proposed, would justify a map revision, or proposed hydrology changes (See 44 CFR Ch. 1, Parts 60, 65 & 72).

☒ LOMR: A letter from FEMA officially revising the current NFIP map to show the changes to floodplains, regulatory floodway or flood elevations. (See Parts 60 & 65 of the NFIP Regulations.)

B. OVERVIEW

1. The NFIP map panel(s) affected for all impacted communities is (are):

Community No.	Community Name	State	Map No.	Panel No.	Effective Date
Ex: 480301	City of Katy	TX	480301	0005D	02/08/83
480287	Harris County	TX	48201C	0220G	09/28/90
040037	Maricopa County	AZ	04013C	1260F	09/30/05
[illegible]037	Maricopa County	AZ	04013C	0870F	09/30/05

2. Flooding Source: See attached list

3. Project Name/Identifier: Rio Verde ADMP

4. FEMA zone designations affected: D, AE (choices: A, AH, AO, A1-A30, A99, AE, AR, V, V1-V30, VE, B, C, D, X)

5. Basis for Request and Type of Revision:

a. The basis for this revision request is (check all that apply)

☐ Physical Change ☒ Improved Methodology/Data

☐ Regulatory Floodway Revision ☐ Other (Attach Description)

Note: A photograph and narrative description of the area of concern is not required, but is very helpful during review.

b. The area of revision encompasses the following types of flooding and structures (check all that apply)

Types of Flooding: ☒ Riverine ☐ Coastal ☐ Shallow Flooding (e.g., Zones AO and AH)

☐ Alluvial fan ☐ Lakes ☐ Other (Attach Description)

Structures: ☐ Channelization ☐ Levee/Floodwall ☐ Bridge/Culvert

☐ Dam ☐ Fill ☐ Other, Attach Description

C. REVIEW FEE

Has the review fee for the appropriate request category been included? ☒ Yes Fee amount: $0

☐ No, Attach Explanation

Please see the FEMA Web site at http://www.fema.gov/mit/tsd/frm_fees.htm **for Fee Amounts and Exemptions.**

D. SIGNATURE

All documents submitted in support of this request are correct to the best of my knowledge. I understand that any false statement may be punishable by fine or imprisonment under Title 18 of the United States Code, Section 1001.

Name: Kathryn Gross, CFM	Company: Flood Control District Maricopa County	
Mailing Address: 2801 West Durango Street Phoenix, AZ 85009	Daytime Telephone No.: (602) 506-1501	Fax No.: (602) 506-4601
	E-Mail Address: KAG@mail.maricopa.gov	
Signature of Requester (required):		Date: 11/29/08

As the community official responsible for floodplain management, I hereby acknowledge that we have received and reviewed this Letter of Map Revision (LOMR) or conditional LOMR request. Based upon the community's review, we find the completed or proposed project meets or is designed to meet all of the community floodplain management requirements, including the requirement that no fill be placed in the regulatory floodway, and that all necessary Federal, State, and local permits have been, or in the case of a conditional LOMR, will be obtained. In addition, we have determined that the land and any existing or proposed structures to be removed from the SFHA are or will be reasonably safe from flooding as defined in 44CFR 65.2(c), and that we have available upon request by FEMA, all analyses and documentation used to make this determination.

Community Official's Name and Title: Tim Phillips, Chief Engineer, Flood Control District of Maricopa County		Telephone No.: (602) 506-1501
Community Name: Maricopa County	Community Official's Signature (required):	Date: 2/11/08 KAG

CERTIFICATION BY REGISTERED PROFESSIONAL ENGINEER AND/OR LAND SURVEYOR

This certification is to be signed and sealed by a licensed land surveyor, registered professional engineer, or architect authorized by law to certify elevation information. All documents submitted in support of this request are correct to the best of my knowledge. I understand that any false statement may be punishable by fine or imprisonment under Title 18 of the United States Code, Section 1001.

Certifier's Name: Brian Fry, P.E.	License No.: 21684	Expiration Date: 12/31/2008
Company Name: Dibble Engineering	Telephone No.: (602) 957-1155	Fax No.: (602) 957-2838
Signature:		Date: 12/6/07

Ensure the forms that are appropriate to your revision request are included in your submittal.

Form Name and (Number)	Required if ...
☒ Riverine Hydrology and Hydraulics Form (Form 2)	New or revised discharges or water-surface elevations
☒ Riverine Structures Form (Form 3)	Channel is modified, addition/revision of bridge/culverts, addition/revision of levee/floodwall, addition/revision of dam
☐ Coastal Analysis Form (Form 4)	New or revised coastal elevations
☐ Coastal Structures Form (Form 5)	Addition/revision of coastal structure
☐ Alluvial Fan Flooding Form (Form 6)	Flood control measures on alluvial fans

Seal (Optional)

To Be Attached to MT-2 FORM 1 for Rio Verde ADMP

In response to Item B, Question 2. Flooding Source:

Community No.	Community Name
040037	Maricopa County

Rio Verde Wash 10 Trib 1
Rio Verde Wash 10 Trib 2
Rio Verde Wash 10
Rio Verde Wash 7
Rio Verde Wash A Tank Spillway
Rio Verde Wash A Trib 1
Rio Verde Wash A Trib 2
Rio Verde Wash A
Rio Verde Wash I Trib 3
Rio Verde Wash I
Rio Verde Wash K Split 4
Rio Verde Wash K Trib 11
Rio Verde Wash K Trib 11A
Rio Verde Wash K Trib 11B
Rio Verde Wash K Trib 12
Rio Verde Wash K Trib 13
Rio Verde Wash K Trib 6
Rio Verde Wash K Trib 6D
Rio Verde Wash K Trib 6D1
Rio Verde Wash K
Rio Verde Wash P Trib 1
Rio Verde Wash P Trib 2
Rio Verde Wash P

FEDERAL EMERGENCY MANAGEMENT AGENCY

OVERVIEW & CONCURRENCE FORM

O.M.B No. 3067-0148
Expires September 30, 2005

PAPERWORK BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 1 hour per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing, reviewing, and submitting the form. You are not required to respond to this collection of information unless a valid OMB control number appears in the upper right corner of this form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden to: Information Collections Management, Federal Emergency Management Agency, 500 C Street, SW, Washington DC 20472, Paperwork Reduction Project (3067-0148). Submission of the form is required to obtain or retain benefits under the National Flood Insurance Program. **Please do not send your completed survey to the above address.**

A. REQUESTED RESPONSE FROM FEMA

This request is for a (check one):

☐ CLOMR: A letter from FEMA commenting on whether a proposed project, if built as proposed, would justify a map revision, or proposed hydrology changes (See 44 CFR Ch. 1, Parts 60, 65 & 72).

☒ LOMR: A letter from FEMA officially revising the current NFIP map to show the changes to floodplains, regulatory floodway or flood elevations. (See Parts 60 & 65 of the NFIP Regulations.)

B. OVERVIEW

1. The NFIP map panel(s) affected for all impacted communities is (are):

Community No.	Community Name	State	Map No.	Panel No.	Effective Date
Ex: 480301	City of Katy	TX	480301	0005D	02/08/83
480287	Harris County	TX	48201C	0220G	09/28/90
012 045012	City of Scottsdale	AZ	04013C	1260F	09/30/05

2. Flooding Source: See attached list

3. Project Name/Identifier: Rio Verde ADMP

4. FEMA zone designations affected: D, AE (choices: A, AH, AO, A1-A30, A99, AE, AR, V, V1-V30, VE, B, C, D, X)

5. Basis for Request and Type of Revision:

a. The basis for this revision request is (check all that apply)

☐ Physical Change ☒ Improved Methodology/Data

☐ Regulatory Floodway Revision ☐ Other (Attach Description)

Note: A photograph and narrative description of the area of concern is not required, but is very helpful during review.

b. The area of revision encompasses the following types of flooding and structures (check all that apply)

Types of Flooding: ☒ Riverine ☐ Coastal ☐ Shallow Flooding (e.g., Zones AO and AH)

☐ Alluvial fan ☐ Lakes ☐ Other (Attach Description)

Structures: ☐ Channelization ☐ Levee/Floodwall ☐ Bridge/Culvert

☐ Dam ☐ Fill ☐ Other, Attach Description

C. REVIEW FEE

Has the review fee for the appropriate request category been included? ☒ Yes Fee amount: $0

☐ No, Attach Explanation

Please see the FEMA Web site at http://www.fema.gov/mit/tsd/frm_fees.htm **for Fee Amounts and Exemptions.**

D. SIGNATURE

All documents submitted in support of this request are correct to the best of my knowledge. I understand that any false statement may be punishable by fine or imprisonment under Title 18 of the United States Code, Section 1001.

Name: Kathyrn Gross, CFM	Company: Flood Control District Maricopa County	
Mailing Address: 2801 west Durango Street Phoenix, AZ 85009	Daytime Telephone No.: (602) 506-1501	Fax No.: (602) 506-4601
	E-Mail Address: KAG@mail.maricopa.gov	
Signature of Requester (required):		Date: 1/29/08

As the community official responsible for floodplain management, I hereby acknowledge that we have received and reviewed this Letter of Map Revision (LOMR) or conditional LOMR request. Based upon the community's review, we find the completed or proposed project meets or is designed to meet all of the community floodplain management requirements, including the requirement that no fill be placed in the regulatory floodway, and that all necessary Federal, State, and local permits have been, or in the case of a conditional LOMR, will be obtained. In addition, we have determined that the land and any existing or proposed structures to be removed from the SFHA are or will be reasonably safe from flooding as defined in 44CFR 65.2(c), and that we have available upon request by FEMA, all analyses and documentation used to make this determination.

Community Official's Name and Title: Bill Erickson, Sr. ~~Stormwater Manager~~ Floodplain Administrator		Telephone No.: (480) 312-7652
Community Name: City of Scottsdale	Community Official's Signature (required):	Date: 02/14/2008

CERTIFICATION BY REGISTERED PROFESSIONAL ENGINEER AND/OR LAND SURVEYOR

This certification is to be signed and sealed by a licensed land surveyor, registered professional engineer, or architect authorized by law to certify elevation information. All documents submitted in support of this request are correct to the best of my knowledge. I understand that any false statement may be punishable by fine or imprisonment under Title 18 of the United States Code, Section 1001.

Certifier's Name: Brian Fry, P.E.	License No.: 21684	Expiration Date: 12/31/2008
Company Name: Dibble Engineering	Telephone No.: (602) 957-1155	Fax No.: (602) 957-2838
Signature: Brian J. Fry		Date: 12.06.07

Ensure the forms that are appropriate to your revision request are included in your submittal.

Form Name and (Number)	Required if ...
☒ Riverine Hydrology and Hydraulics Form (Form 2)	New or revised discharges or water-surface elevations
☐ Riverine Structures Form (Form 3)	Channel is modified, addition/revision of bridge/culverts, addition/revision of levee/floodwall, addition/revision of dam
☐ Coastal Analysis Form (Form 4)	New or revised coastal elevations
☐ Coastal Structures Form (Form 5)	Addition/revision of coastal structure
☐ Alluvial Fan Flooding Form (Form 6)	Flood control measures on alluvial fans

Seal (Optional)

To Be Attached to MT-2 FORM 1 for Rio Verde ADMP

In response to Item B, Question 2. Flooding Source:

Community No.	Community Name
045012	City of Scottsdale

Rio Verde Wash 10 Trib 1
Rio Verde Wash 10 Trib 2 Split 1
Rio Verde Wash 10 Trib 2
Rio Verde Wash 10 Trib 3
Rio Verde Wash 10 Trib 4
Rio Verde Wash 10
Rio Verde Wash 7
Rio Verde Wash A Tank Spillway
Rio Verde Wash A Trib 1
Rio Verde Wash A Trib 2
Rio Verde Wash A
Rio Verde Wash I Trib 3
Rio Verde Wash I
Rio Verde Wash K Trib 11
Rio Verde Wash K Trib 11B
Rio Verde Wash K Trib 12
Rio Verde Wash K Trib 13
Rio Verde Wash K Trib 6D
Rio Verde Wash K

FEDERAL EMERGENCY MANAGEMENT AGENCY

RIVERINE HYDROLOGY & HYDRAULICS FORM

O.M.B No. 3067-0148
Expires September 30, 2005

PAPERWORK REDUCTION ACT

Public reporting burden for this form is estimated to average 3 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing, reviewing, and submitting the form. You are not required to respond to this collection of information unless a valid OMB control number appears in the upper right corner of this form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden to: Information Collections Management, Federal Emergency Management Agency, 500 C Street, SW, Washington DC 20472, Paperwork Reduction Project (3067-0148). Submission of the form is required to obtain or retain benefits under the National Flood Insurance Program. **Please do not send your completed survey to the above address.**

Flooding Source: Rio Verde Wash 7
Note: Fill out one form for each flooding source studied

A. HYDROLOGY

1. Reason for New Hydrologic Analysis (check all that apply)

☐ Not revised (skip to section 2) ☒ No existing analysis ☐ Improved data
☐ Alternative methodology ☐ Proposed Conditions (CLOMR) ☐ Changed physical condition of watershed

2. Comparison of Representative 1%-Annual-Chance Discharges

Location	Drainage Area (Sq. Mi.)	FIS (cfs)	Revised (cfs)

Methodology for New Hydrologic Analysis (check all that apply)

☐ Statistical Analysis of Gage Records ☒ Precipitation/Runoff Model HEC-1 [TR-20, HEC-1, HEC-HMS etc.]
☐ Regional Regression Equations ☐ Other (please attach description)

Please enclose all relevant models in digital format, maps, computations (including computation of parameters) and documentation to support the new analysis. The document, "Numerical Models Accepted by FEMA for NFIP Usage" lists the models accepted by FEMA. This document can be found at: http://www.fema.gov/mit/tsd/en_modl.htm.

4. Review/Approval of Analysis

If your community requires a regional, state, or federal agency to review the hydrologic analysis, please attach evidence of approval/review.

5. Impacts of Sediment Transport on Hydrology

Was sediment transport considered? ☐ Yes ☒ No If yes, then fill out Section F (Sediment Transport) of Form 3. If No, then attach your explanation for why sediment transport was not considered.

B. HYDRAULICS

1. Reach to be Revised

	Description	Cross Section	Water-Surface Elevations (ft.) Effective	Proposed/Revised
Downstream Limit	5000'S & 700'E of 140th St & Rio Verde D	7.273		2369.77
Upstream Limit	4000'S & 1900'E of 140th S & Rio Verde D	8.325		2482.27

Hydraulic Method Used

Hydraulic Analysis HEC-RAS [HEC-2 , HEC-RAS, Other (Attach description)]

B. HYDRAULICS (CONTINUED)

3. Pre-Submittal Review of Hydraulic Models

FEMA has developed two review programs, CHECK-2 and CHECK-RAS, to aid in the review of HEC-2 and HEC-RAS hydraulic models, respectively. These review programs verify that the hydraulic estimates and assumptions in the model data are in accordance with NFIP requirements, and that the data are comparable with the assumptions and limitations of HEC-2/HEC-RAS. CHECK-2 and CHECK-RAS identify areas of potential error or concern. These tools do not replace engineering judgment. CHECK-2 and CHECK-RAS can be downloaded from http://www.fema.gov/mit/tsd/frm_soft.htm. We recommend that you review your HEC-2 and HEC-RAS models with CHECK-2 and CHECK-RAS. If you disagree with a message, please attach an explanation of why the message is not valid in this case. Review of your submittal and resolution of valid modeling discrepancies will result in reduced review time.

HEC-2/HEC-RAS models reviewed with CHECK-2/CHECK-RAS? ☒ Yes ☐ No

4. Models Submitted

Duplicate Effective Model*	Natural File Name:	Floodway File Name:
Corrected Effective Model*	Natural File Name:	Floodway File Name:
Existing or Pre-Project Conditions Model	Natural File Name: RV_Wash_7.prj	Floodway File Name: No Floodway
Revised or Post-Project Conditions Model	Natural File Name:	Floodway File Name:
Other - (attach description)	Natural File Name:	Floodway File Name:

*Not required for revisions to approximate 1%-annual-chance floodplains (Zone A) – for details, refer to the corresponding section of the instructions.

The document "Numerical Models Accepted by FEMA for NFIP Usage" lists the models accepted by FEMA. This document can be found at: http://www.fema.gov/mit/tsd/en_modl.htm.

C. MAPPING REQUIREMENTS

A **certified topographic map** must be submitted showing the following information (where applicable): the boundaries of the effective, existing, and proposed conditions 1%-annual-chance floodplain (for approximate Zone A revisions) or the boundaries of the 1%- and 0.2%-annual-chance floodplains and regulatory floodway (for detailed Zone AE, AO, and AH revisions); location and alignment of all cross sections with stationing control indicated; stream, road, and other alignments (e.g., dams, levees, etc.); current community easements and boundaries; boundaries of the requester's property; certification of a registered professional engineer registered in the subject State; location and description of reference marks; and the referenced vertical datum (NGVD, NAVD, etc.).

Note that the boundaries of the existing or proposed conditions floodplains and regulatory floodway to be shown on the revised FIRM and/or FBFM must tie-in with the effective floodplain and regulatory floodway boundaries. Please attach **a copy of the effective FIRM and/or FBFM,** annotated to show the boundaries of the revised 1%- and 0.2%-annual-chance floodplains and regulatory floodway that tie-in with the boundaries of the effective 1%- and 0.2%-annual-chance floodplain and regulatory floodway at the upstream and downstream limits of the area of revision.

D. COMMON REGULATORY REQUIREMENTS

1. For CLOMR requests, do Base Flood Elevations (BFEs) increase? ☐ Yes ☐ No

For CLOMR requests, if either of the following is true, please submit evidence of compliance with Section 65.12 of the NFIP regulations:
- The proposed project encroaches upon a regulatory floodway and would result in increases above 0.00 foot.
- The proposed project encroaches upon a SFHA with BFEs established and would result in increases above 1.00 foot.

2. Does the request involve the placement or proposed placement of fill? ☐ Yes ☒ No

If Yes, the community must be able to certify that the area to be removed from the special flood hazard area, to include any structures or proposed structures, meets all of the standards of the local floodplain ordinances, and is reasonably safe from flooding in accordance with the NFIP regulations set forth at 44 CFR 60.3(a)(3), 65.5(a)(4), and 65.6(a)(14). Please see the MT-2 instructions for more information.

3. For LOMR requests, is the regulatory floodway being revised? ☐ Yes ☒ No

If Yes, attach evidence of regulatory floodway revision notification. As per Paragraph 65.7(b)(1) of the NFIP Regulations, notification is required for requests involving revisions to the regulatory floodway. (Not required for revisions to approximate 1%-annual-chance floodplains [studied Zone A designation] unless a regulatory floodway is being added. Elements and examples of regulatory floodway revision notification can be found in the MT-2 Form 2 Instructions.)

4. For LOMR requests, does this request require property owner notification and acceptance of BFE increases? ☐ Yes ☒ No

If Yes, please attach proof of property owner notification and acceptance (if available). Elements of and examples of property owner notification can be found in the MT-2 Form 2 Instructions.

FEDERAL EMERGENCY MANAGEMENT AGENCY

RIVERINE HYDROLOGY & HYDRAULICS FORM

O.M.B No. 3067-0148
Expires September 30, 2005

PAPERWORK REDUCTION ACT

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Flooding Source: Rio Verde Wash 10 Trib 1
Note: Fill out one form for each flooding source studied

A. HYDROLOGY

1. Reason for New Hydrologic Analysis (check all that apply)

☐ Not revised (skip to section 2) ☐ No existing analysis ☒ Improved data
☐ Alternative methodology ☐ Proposed Conditions (CLOMR) ☐ Changed physical condition of watershed

2. Comparison of Representative 1%-Annual-Chance Discharges

Location	Drainage Area (Sq. Mi.)	FIS (cfs)	Revised (cfs)

3. Methodology for New Hydrologic Analysis (check all that apply)

☐ Statistical Analysis of Gage Records ☒ Precipitation/Runoff Model HEC-1 [TR-20, HEC-1, HEC-HMS etc.]
☐ Regional Regression Equations ☐ Other (please attach description)

Please enclose all relevant models in digital format, maps, computations (including computation of parameters) and documentation to support the new analysis. The document, "Numerical Models Accepted by FEMA for NFIP Usage" lists the models accepted by FEMA. This document can be found at: http://www.fema.gov/mit/tsd/en_modl.htm.

4. Review/Approval of Analysis

If your community requires a regional, state, or federal agency to review the hydrologic analysis, please attach evidence of approval/review.

5. Impacts of Sediment Transport on Hydrology

Was sediment transport considered? ☐ Yes ☒ No If yes, then fill out Section F (Sediment Transport) of Form 3. If No, then attach your explanation for why sediment transport was not considered.

B. HYDRAULICS

1. Reach to be Revised

	Description	Cross Section	Water-Surface Elevations (ft.) Effective	Proposed/Revised
Downstream Limit	1000'S & 50'W of 144th St & Rio Verde Dr	0.288		2355.44
Upstream Limit	1100'S & 350'W of 138th St & Rio Verde D	1.204		2442.34

Hydraulic Method Used

Hydraulic Analysis HEC-RAS [HEC-2 , HEC-RAS, Other (Attach description)]

B. HYDRAULICS (CONTINUED)

3. Pre-Submittal Review of Hydraulic Models

FEMA has developed two review programs, CHECK-2 and CHECK-RAS, to aid in the review of HEC-2 and HEC-RAS hydraulic models, respectively. These review programs verify that the hydraulic estimates and assumptions in the model data are in accordance with NFIP requirements, and that the data are comparable with the assumptions and limitations of HEC-2/HEC-RAS. CHECK-2 and CHECK-RAS identify areas of potential error or concern. These tools do not replace engineering judgment. CHECK-2 and CHECK-RAS can be downloaded from http://www.fema.gov/mit/tsd/frm_soft.htm. We recommend that you review your HEC-2 and HEC-RAS models with CHECK-2 and CHECK-RAS. If you disagree with a message, please attach an explanation of why the message is not valid in this case. Review of your submittal and resolution of valid modeling discrepancies will result in reduced review time.

HEC-2/HEC-RAS models reviewed with CHECK-2/CHECK-RAS? ☒ Yes ☐ No

4. Models Submitted

Duplicate Effective Model*	Natural File Name:	Floodway File Name:
Corrected Effective Model*	Natural File Name:	Floodway File Name:
Existing or Pre-Project Conditions Model	Natural File Name: RV_Wash_10_Trib_.prj	Floodway File Name: No Floodway
Revised or Post-Project Conditions Model	Natural File Name:	Floodway File Name:
Other - (attach description)	Natural File Name:	Floodway File Name:

*Not required for revisions to approximate 1%-annual-chance floodplains (Zone A) – for details, refer to the corresponding section of the instructions.

The document "Numerical Models Accepted by FEMA for NFIP Usage" lists the models accepted by FEMA. This document can be found at: http://www.fema.gov/mit/tsd/en_modl.htm.

C. MAPPING REQUIREMENTS

A **certified topographic map** must be submitted showing the following information (where applicable): the boundaries of the effective, existing, and proposed conditions 1%-annual-chance floodplain (for approximate Zone A revisions) or the boundaries of the 1%- and 0.2%-annual-chance floodplains and regulatory floodway (for detailed Zone AE, AO, and AH revisions); location and alignment of all cross sections with stationing control indicated; stream, road, and other alignments (e.g., dams, levees, etc.); current community easements and boundaries; boundaries of the requester's property; certification of a registered professional engineer registered in the subject State; location and description of reference marks; and the referenced vertical datum (NGVD, NAVD, etc.).

Note that the boundaries of the existing or proposed conditions floodplains and regulatory floodway to be shown on the revised FIRM and/or FBFM must tie-in with the effective floodplain and regulatory floodway boundaries. Please attach **a copy of the effective FIRM and/or FBFM,** annotated to show the boundaries of the revised 1%- and 0.2%-annual-chance floodplains and regulatory floodway that tie-in with the boundaries of the effective 1%- and 0.2%-annual-chance floodplain and regulatory floodway at the upstream and downstream limits of the area of revision.

D. COMMON REGULATORY REQUIREMENTS

1. For CLOMR requests, do Base Flood Elevations (BFEs) increase? ☐ Yes ☐ No

For CLOMR requests, if either of the following is true, please submit evidence of compliance with Section 65.12 of the NFIP regulations:
- The proposed project encroaches upon a regulatory floodway and would result in increases above 0.00 foot.
- The proposed project encroaches upon a SFHA with BFEs established and would result in increases above 1.00 foot.

2. Does the request involve the placement or proposed placement of fill? ☐ Yes ☒ No

If Yes, the community must be able to certify that the area to be removed from the special flood hazard area, to include any structures or proposed structures, meets all of the standards of the local floodplain ordinances, and is reasonably safe from flooding in accordance with the NFIP regulations set forth at 44 CFR 60.3(a)(3), 65.5(a)(4), and 65.6(a)(14). Please see the MT-2 instructions for more information.

3. For LOMR requests, is the regulatory floodway being revised? ☐ Yes ☒ No

If Yes, attach evidence of regulatory floodway revision notification. As per Paragraph 65.7(b)(1) of the NFIP Regulations, notification is required for requests involving revisions to the regulatory floodway. (Not required for revisions to approximate 1%-annual-chance floodplains [studied Zone A designation] unless a regulatory floodway is being added. Elements and examples of regulatory floodway revision notification can be found in the MT-2 Form 2 Instructions.)

4. For LOMR requests, does this request require property owner notification and acceptance of BFE increases? ☐ Yes ☒ No

If Yes, please attach proof of property owner notification and acceptance (if available). Elements of and examples of property owner notification can be found in the MT-2 Form 2 Instructions.

FEDERAL EMERGENCY MANAGEMENT AGENCY

RIVERINE HYDROLOGY & HYDRAULICS FORM

O.M.B No. 3067-0148
Expires September 30, 2005

PAPERWORK REDUCTION ACT

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Flooding Source: Rio Verde Wash 10 Trib 2 Split 1
Note: Fill out one form for each flooding source studied

A. HYDROLOGY

1. Reason for New Hydrologic Analysis (check all that apply)

☐ Not revised (skip to section 2) ☐ No existing analysis ☒ Improved data
☐ Alternative methodology ☐ Proposed Conditions (CLOMR) ☐ Changed physical condition of watershed

2. Comparison of Representative 1%-Annual-Chance Discharges

Location	Drainage Area (Sq. Mi.)	FIS (cfs)	Revised (cfs)

Methodology for New Hydrologic Analysis (check all that apply)

☐ Statistical Analysis of Gage Records ☒ Precipitation/Runoff Model HEC-1 [TR-20, HEC-1, HEC-HMS etc.]
☐ Regional Regression Equations ☐ Other (please attach description)

Please enclose all relevant models in digital format, maps, computations (including computation of parameters) and documentation to support the new analysis. The document, "Numerical Models Accepted by FEMA for NFIP Usage" lists the models accepted by FEMA. This document can be found at: http://www.fema.gov/mit/tsd/en_modl.htm.

4. Review/Approval of Analysis

If your community requires a regional, state, or federal agency to review the hydrologic analysis, please attach evidence of approval/review.

5. Impacts of Sediment Transport on Hydrology

Was sediment transport considered? ☐ Yes ☒ No If yes, then fill out Section F (Sediment Transport) of Form 3. If No, then attach your explanation for why sediment transport was not considered.

B. HYDRAULICS

1. Reach to be Revised

	Description	Cross Section	Water-Surface Elevations (ft.) Effective	Proposed/Revised
Downstream Limit	2300'S & 1100'E of 132nd S & Rio Verde D	0.026		2496.32
Upstream Limit	2700'S & 200'E of 132nd St & Rio Verde D	0.138		2510.69

Iydraulic Method Used

Hydraulic Analysis HEC-RAS [HEC-2 , HEC-RAS, Other (Attach description)]

B. HYDRAULICS (CONTINUED)

3. Pre-Submittal Review of Hydraulic Models

FEMA has developed two review programs, CHECK-2 and CHECK-RAS, to aid in the review of HEC-2 and HEC-RAS hydraulic models, respectively. These review programs verify that the hydraulic estimates and assumptions in the model data are in accordance with NFIP requirements, and that the data are comparable with the assumptions and limitations of HEC-2/HEC-RAS. CHECK-2 and CHECK-RAS identify areas of potential error or concern. These tools do not replace engineering judgment. CHECK-2 and CHECK-RAS can be downloaded from http://www.fema.gov/mit/tsd/frm_soft.htm. We recommend that you review your HEC-2 and HEC-RAS models with CHECK-2 and CHECK-RAS. If you disagree with a message, please attach an explanation of why the message is not valid in this case. Review of your submittal and resolution of valid modeling discrepancies will result in reduced review time.

HEC-2/HEC-RAS models reviewed with CHECK-2/CHECK-RAS? ☒ Yes ☐ No

4. Models Submitted

Duplicate Effective Model*	Natural File Name:	Floodway File Name:
Corrected Effective Model*	Natural File Name:	Floodway File Name:
Existing or Pre-Project Conditions Model	Natural File Name: RV_Wash_10.prj	Floodway File Name: No Floodway
Revised or Post-Project Conditions Model	Natural File Name:	Floodway File Name:
Other - (attach description)	Natural File Name:	Floodway File Name:

*Not required for revisions to approximate 1%-annual-chance floodplains (Zone A) -- for details, refer to the corresponding section of the instructions.

The document "Numerical Models Accepted by FEMA for NFIP Usage" lists the models accepted by FEMA. This document can be found at: http://www.fema.gov/mit/tsd/en_modl.htm.

C. MAPPING REQUIREMENTS

A **certified topographic map** must be submitted showing the following information (where applicable): the boundaries of the effective, existing, and proposed conditions 1%-annual-chance floodplain (for approximate Zone A revisions) or the boundaries of the 1%- and 0.2%-annual-chance floodplains and regulatory floodway (for detailed Zone AE, AO, and AH revisions); location and alignment of all cross sections with stationing control indicated; stream, road, and other alignments (e.g., dams, levees, etc.); current community easements and boundaries; boundaries of the requester's property; certification of a registered professional engineer registered in the subject State; location and description of reference marks; and the referenced vertical datum (NGVD, NAVD, etc.).

Note that the boundaries of the existing or proposed conditions floodplains and regulatory floodway to be shown on the revised FIRM and/or FBFM must tie-in with the effective floodplain and regulatory floodway boundaries. Please attach **a copy of the effective FIRM and/or FBFM,** annotated to show the boundaries of the revised 1%- and 0.2%-annual-chance floodplains and regulatory floodway that tie-in with the boundaries of the effective 1%- and 0.2%-annual-chance floodplain and regulatory floodway at the upstream and downstream limits of the area of revision.

D. COMMON REGULATORY REQUIREMENTS

1. For CLOMR requests, do Base Flood Elevations (BFEs) increase? ☐ Yes ☐ No

For CLOMR requests, if either of the following is true, please submit evidence of compliance with Section 65.12 of the NFIP regulations:
- The proposed project encroaches upon a regulatory floodway and would result in increases above 0.00 foot.
- The proposed project encroaches upon a SFHA with BFEs established and would result in increases above 1.00 foot.

2. Does the request involve the placement or proposed placement of fill? ☐ Yes ☒ No

If Yes, the community must be able to certify that the area to be removed from the special flood hazard area, to include any structures or proposed structures, meets all of the standards of the local floodplain ordinances, and is reasonably safe from flooding in accordance with the NFIP regulations set forth at 44 CFR 60.3(a)(3), 65.5(a)(4), and 65.6(a)(14). Please see the MT-2 instructions for more information.

3. For LOMR requests, is the regulatory floodway being revised? ☐ Yes ☒ No

If Yes, attach evidence of regulatory floodway revision notification. As per Paragraph 65.7(b)(1) of the NFIP Regulations, notification is required for requests involving revisions to the regulatory floodway. (Not required for revisions to approximate 1%-annual-chance floodplains [studied Zone A designation] unless a regulatory floodway is being added. Elements and examples of regulatory floodway revision notification can be found in the MT-2 Form 2 Instructions.)

4. For LOMR requests, does this request require property owner notification and acceptance of BFE increases? ☐ Yes ☒ No

If Yes, please attach proof of property owner notification and acceptance (if available). Elements of and examples of property owner notification can be found in the MT-2 Form 2 Instructions.

FEDERAL EMERGENCY MANAGEMENT AGENCY

RIVERINE HYDROLOGY & HYDRAULICS FORM

O.M.B No. 3067-0148
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Flooding Source: Rio Verde Wash 10 Trib 2
Note: Fill out one form for each flooding source studied

A. HYDROLOGY

1. Reason for New Hydrologic Analysis (check all that apply)

☐ Not revised (skip to section 2) ☐ No existing analysis ☒ Improved data
☐ Alternative methodology ☐ Proposed Conditions (CLOMR) ☐ Changed physical condition of watershed

2. Comparison of Representative 1%-Annual-Chance Discharges

Location	Drainage Area (Sq. Mi.)	FIS (cfs)	Revised (cfs)

Methodology for New Hydrologic Analysis (check all that apply)

☐ Statistical Analysis of Gage Records ☒ Precipitation/Runoff Model HEC-1 [TR-20, HEC-1, HEC-HMS etc.]
☐ Regional Regression Equations ☐ Other (please attach description)

Please enclose all relevant models in digital format, maps, computations (including computation of parameters) and documentation to support the new analysis. The document, "Numerical Models Accepted by FEMA for NFIP Usage" lists the models accepted by FEMA. This document can be found at: http://www.fema.gov/mit/tsd/en_modl.htm.

4. Review/Approval of Analysis

If your community requires a regional, state, or federal agency to review the hydrologic analysis, please attach evidence of approval/review.

5. Impacts of Sediment Transport on Hydrology

Was sediment transport considered? ☐ Yes ☒ No If yes, then fill out Section F (Sediment Transport) of Form 3. If No, then attach your explanation for why sediment transport was not considered.

B. HYDRAULICS

1. Reach to be Revised

	Description	Cross Section	Water-Surface Elevations (ft.) Effective	Proposed/Revised
Downstream Limit	3000'S & 900'E of 136th St & Rio Verde D	0.072		2440.76
Upstream Limit	2800'S & 50'W of 132nd St & Rio Verde Dr	0.845		2521.40

Hydraulic Method Used

Hydraulic Analysis HEC-RAS [HEC-2 , HEC-RAS, Other (Attach description)]

B. HYDRAULICS (CONTINUED)

3. Pre-Submittal Review of Hydraulic Models

FEMA has developed two review programs, CHECK-2 and CHECK-RAS, to aid in the review of HEC-2 and HEC-RAS hydraulic models, respectively. These review programs verify that the hydraulic estimates and assumptions in the model data are in accordance with NFIP requirements, and that the data are comparable with the assumptions and limitations of HEC-2/HEC-RAS. CHECK-2 and CHECK-RAS identify areas of potential error or concern. These tools do not replace engineering judgment. CHECK-2 and CHECK-RAS can be downloaded from http://www.fema.gov/mit/tsd/frm_soft.htm. We recommend that you review your HEC-2 and HEC-RAS models with CHECK-2 and CHECK-RAS. If you disagree with a message, please attach an explanation of why the message is not valid in this case. Review of your submittal and resolution of valid modeling discrepancies will result in reduced review time.

HEC-2/HEC-RAS models reviewed with CHECK-2/CHECK-RAS? ☒ Yes ☐ No

4. Models Submitted

Duplicate Effective Model*	Natural File Name:	Floodway File Name:
Corrected Effective Model*	Natural File Name:	Floodway File Name:
Existing or Pre-Project Conditions Model	Natural File Name: RV_Wash_10.prj	Floodway File Name: No Floodway
Revised or Post-Project Conditions Model	Natural File Name:	Floodway File Name:
Other - (attach description)	Natural File Name:	Floodway File Name:

*Not required for revisions to approximate 1%-annual-chance floodplains (Zone A) – for details, refer to the corresponding section of the instructions.

The document "Numerical Models Accepted by FEMA for NFIP Usage" lists the models accepted by FEMA. This document can be found at: http://www.fema.gov/mit/tsd/en_modl.htm.

C. MAPPING REQUIREMENTS

A **certified topographic map** must be submitted showing the following information (where applicable): the boundaries of the effective, existing, and proposed conditions 1%-annual-chance floodplain (for approximate Zone A revisions) or the boundaries of the 1%- and 0.2%-annual-chance floodplains and regulatory floodway (for detailed Zone AE, AO, and AH revisions); location and alignment of all cross sections with stationing control indicated; stream, road, and other alignments (e.g., dams, levees, etc.); current community easements and boundaries; boundaries of the requester's property; certification of a registered professional engineer registered in the subject State; location and description of reference marks; and the referenced vertical datum (NGVD, NAVD, etc.).

Note that the boundaries of the existing or proposed conditions floodplains and regulatory floodway to be shown on the revised FIRM and/or FBFM must tie-in with the effective floodplain and regulatory floodway boundaries. Please attach **a copy of the effective FIRM and/or FBFM,** annotated to show the boundaries of the revised 1%- and 0.2%-annual-chance floodplains and regulatory floodway that tie-in with the boundaries of the effective 1%- and 0.2%-annual-chance floodplain and regulatory floodway at the upstream and downstream limits of the area of revision.

D. COMMON REGULATORY REQUIREMENTS

1. For CLOMR requests, do Base Flood Elevations (BFEs) increase? ☐ Yes ☐ No

For CLOMR requests, if either of the following is true, please submit evidence of compliance with Section 65.12 of the NFIP regulations:
- The proposed project encroaches upon a regulatory floodway and would result in increases above 0.00 foot.
- The proposed project encroaches upon a SFHA with BFEs established and would result in increases above 1.00 foot.

2. Does the request involve the placement or proposed placement of fill? ☐ Yes ☒ No

If Yes, the community must be able to certify that the area to be removed from the special flood hazard area, to include any structures or proposed structures, meets all of the standards of the local floodplain ordinances, and is reasonably safe from flooding in accordance with the NFIP regulations set forth at 44 CFR 60.3(a)(3), 65.5(a)(4), and 65.6(a)(14). Please see the MT-2 instructions for more information.

3. For LOMR requests, is the regulatory floodway being revised? ☐ Yes ☒ No

If Yes, attach evidence of regulatory floodway revision notification. As per Paragraph 65.7(b)(1) of the NFIP Regulations, notification is required for requests involving revisions to the regulatory floodway. (Not required for revisions to approximate 1%-annual-chance floodplains [studied Zone A designation] unless a regulatory floodway is being added. Elements and examples of regulatory floodway revision notification can be found in the MT-2 Form 2 Instructions.)

4. For LOMR requests, does this request require property owner notification and acceptance of BFE increases? ☐ Yes ☒ No

If Yes, please attach proof of property owner notification and acceptance (if available). Elements of and examples of property owner notification can be found in the MT-2 Form 2 Instructions.

FEDERAL EMERGENCY MANAGEMENT AGENCY

RIVERINE HYDROLOGY & HYDRAULICS FORM

O.M.B No. 3067-0148
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Flooding Source: Rio Verde Wash 10 Trib 3
Note: Fill out one form for each flooding source studied

A. HYDROLOGY

1. Reason for New Hydrologic Analysis (check all that apply)

☐ Not revised (skip to section 2) ☐ No existing analysis ☒ Improved data
☐ Alternative methodology ☐ Proposed Conditions (CLOMR) ☐ Changed physical condition of watershed

2. Comparison of Representative 1%-Annual-Chance Discharges

Location	Drainage Area (Sq. Mi.)	FIS (cfs)	Revised (cfs)

Methodology for New Hydrologic Analysis (check all that apply)

☐ Statistical Analysis of Gage Records ☒ Precipitation/Runoff Model HEC-1 [TR-20, HEC-1, HEC-HMS etc.]
☐ Regional Regression Equations ☐ Other (please attach description)

Please enclose all relevant models in digital format, maps, computations (including computation of parameters) and documentation to support the new analysis. The document, "Numerical Models Accepted by FEMA for NFIP Usage" lists the models accepted by FEMA. This document can be found at: http://www.fema.gov/mit/tsd/en_modl.htm.

4. Review/Approval of Analysis

If your community requires a regional, state, or federal agency to review the hydrologic analysis, please attach evidence of approval/review.

5. Impacts of Sediment Transport on Hydrology

Was sediment transport considered? ☐ Yes ☒ No If yes, then fill out Section F (Sediment Transport) of Form 3. If No, then attach your explanation for why sediment transport was not considered.

B. HYDRAULICS

1. Reach to be Revised

	Description	Cross Section	Water-Surface Elevations (ft.) Effective	Proposed/Revised
Downstream Limit	1900'S & 100'W of 136th St & Rio Verde D	0.123		2471.87
Upstream Limit	1900'S & 400'W of 132nd St & Rio Verde D	0.615		2524.93

Hydraulic Method Used

Hydraulic Analysis HEC-RAS [HEC-2 , HEC-RAS, Other (Attach description)]

B. HYDRAULICS (CONTINUED)

3. Pre-Submittal Review of Hydraulic Models

FEMA has developed two review programs, CHECK-2 and CHECK-RAS, to aid in the review of HEC-2 and HEC-RAS hydraulic models, respectively. These review programs verify that the hydraulic estimates and assumptions in the model data are in accordance with NFIP requirements, and that the data are comparable with the assumptions and limitations of HEC-2/HEC-RAS. CHECK-2 and CHECK-RAS identify areas of potential error or concern. These tools do not replace engineering judgment. CHECK-2 and CHECK-RAS can be downloaded from http://www.fema.gov/mit/tsd/frm_soft.htm. We recommend that you review your HEC-2 and HEC-RAS models with CHECK-2 and CHECK-RAS. If you disagree with a message, please attach an explanation of why the message is not valid in this case. Review of your submittal and resolution of valid modeling discrepancies will result in reduced review time.

HEC-2/HEC-RAS models reviewed with CHECK-2/CHECK-RAS? ☒ Yes ☐ No

4. Models Submitted

Duplicate Effective Model*	Natural File Name:	Floodway File Name:
Corrected Effective Model*	Natural File Name:	Floodway File Name:
Existing or Pre-Project Conditions Model	Natural File Name: RV_Wash_10.prj	Floodway File Name: No Floodway
Revised or Post-Project Conditions Model	Natural File Name:	Floodway File Name:
Other - (attach description)	Natural File Name:	Floodway File Name:

*Not required for revisions to approximate 1%-annual-chance floodplains (Zone A) – for details, refer to the corresponding section of the instructions.

The document "Numerical Models Accepted by FEMA for NFIP Usage" lists the models accepted by FEMA. This document can be found at: http://www.fema.gov/mit/tsd/en_modl.htm.

C. MAPPING REQUIREMENTS

A **certified topographic map** must be submitted showing the following information (where applicable): the boundaries of the effective, existing, and proposed conditions 1%-annual-chance floodplain (for approximate Zone A revisions) or the boundaries of the 1%- and 0.2%-annual-chance floodplains and regulatory floodway (for detailed Zone AE, AO, and AH revisions); location and alignment of all cross sections with stationing control indicated; stream, road, and other alignments (e.g., dams, levees, etc.); current community easements and boundaries; boundaries of the requester's property; certification of a registered professional engineer registered in the subject State; location and description of reference marks; and the referenced vertical datum (NGVD, NAVD, etc.).

Note that the boundaries of the existing or proposed conditions floodplains and regulatory floodway to be shown on the revised FIRM and/or FBFM must tie-in with the effective floodplain and regulatory floodway boundaries. Please attach **a copy of the effective FIRM and/or FBFM,** annotated to show the boundaries of the revised 1%- and 0.2%-annual-chance floodplains and regulatory floodway that tie-in with the boundaries of the effective 1%- and 0.2%-annual-chance floodplain and regulatory floodway at the upstream and downstream limits of the area of revision.

D. COMMON REGULATORY REQUIREMENTS

1. For CLOMR requests, do Base Flood Elevations (BFEs) increase? ☐ Yes ☐ No

For CLOMR requests, if either of the following is true, please submit evidence of compliance with Section 65.12 of the NFIP regulations:
- The proposed project encroaches upon a regulatory floodway and would result in increases above 0.00 foot.
- The proposed project encroaches upon a SFHA with BFEs established and would result in increases above 1.00 foot.

2. Does the request involve the placement or proposed placement of fill? ☐ Yes ☒ No

If Yes, the community must be able to certify that the area to be removed from the special flood hazard area, to include any structures or proposed structures, meets all of the standards of the local floodplain ordinances, and is reasonably safe from flooding in accordance with the NFIP regulations set forth at 44 CFR 60.3(a)(3), 65.5(a)(4), and 65.6(a)(14). Please see the MT-2 instructions for more information.

3. For LOMR requests, is the regulatory floodway being revised? ☐ Yes ☒ No

If Yes, attach evidence of regulatory floodway revision notification. As per Paragraph 65.7(b)(1) of the NFIP Regulations, notification is required for requests involving revisions to the regulatory floodway. (Not required for revisions to approximate 1%-annual-chance floodplains [studied Zone A designation] unless a regulatory floodway is being added. Elements and examples of regulatory floodway revision notification can be found in the MT-2 Form 2 Instructions.)

4. For LOMR requests, does this request require property owner notification and acceptance of BFE increases? ☐ Yes ☒ No

If Yes, please attach proof of property owner notification and acceptance (if available). Elements of and examples of property owner notification can be found in the MT-2 Form 2 Instructions.

FEDERAL EMERGENCY MANAGEMENT AGENCY

RIVERINE HYDROLOGY & HYDRAULICS FORM

O.M.B No. 3067-0148
Expires September 30, 2005

PAPERWORK REDUCTION ACT

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Flooding Source: Rio Verde Wash 10 Trib 4
Note: Fill out one form for each flooding source studied

A. HYDROLOGY

1. Reason for New Hydrologic Analysis (check all that apply)

☐ Not revised (skip to section 2) ☐ No existing analysis ☒ Improved data
☐ Alternative methodology ☐ Proposed Conditions (CLOMR) ☐ Changed physical condition of watershed

2. Comparison of Representative 1%-Annual-Chance Discharges

Location	Drainage Area (Sq. Mi.)	FIS (cfs)	Revised (cfs)

Methodology for New Hydrologic Analysis (check all that apply)

☐ Statistical Analysis of Gage Records ☒ Precipitation/Runoff Model HEC-1 [TR-20, HEC-1, HEC-HMS etc.]
☐ Regional Regression Equations ☐ Other (please attach description)

Please enclose all relevant models in digital format, maps, computations (including computation of parameters) and documentation to support the new analysis. The document, "Numerical Models Accepted by FEMA for NFIP Usage" lists the models accepted by FEMA. This document can be found at: http://www.fema.gov/mit/tsd/en_modl.htm.

4. Review/Approval of Analysis

If your community requires a regional, state, or federal agency to review the hydrologic analysis, please attach evidence of approval/review.

5. Impacts of Sediment Transport on Hydrology

Was sediment transport considered? ☐ Yes ☒ No If yes, then fill out Section F (Sediment Transport) of Form 3. If No, then attach your explanation for why sediment transport was not considered.

B. HYDRAULICS

1. Reach to be Revised

	Description	Cross Section	Water-Surface Elevations (ft.) Effective	Proposed/Revised
Downstream Limit	50'S & 800'W of 132nd St & Rio Verde Dr	0.034		2538.80
Upstream Limit	50'S & 200'W of 128th St & Rio Verde Dr	0.373		2575.58

Hydraulic Method Used

Hydraulic Analysis HEC-RAS [HEC-2 , HEC-RAS, Other (Attach description)]

B. HYDRAULICS (CONTINUED)

3. Pre-Submittal Review of Hydraulic Models

FEMA has developed two review programs, CHECK-2 and CHECK-RAS, to aid in the review of HEC-2 and HEC-RAS hydraulic models, respectively. These review programs verify that the hydraulic estimates and assumptions in the model data are in accordance with NFIP requirements, and that the data are comparable with the assumptions and limitations of HEC-2/HEC-RAS. CHECK-2 and CHECK-RAS identify areas of potential error or concern. These tools do not replace engineering judgment. CHECK-2 and CHECK-RAS can be downloaded from http://www.fema.gov/mit/tsd/frm_soft.htm. We recommend that you review your HEC-2 and HEC-RAS models with CHECK-2 and CHECK-RAS. If you disagree with a message, please attach an explanation of why the message is not valid in this case. Review of your submittal and resolution of valid modeling discrepancies will result in reduced review time.

HEC-2/HEC-RAS models reviewed with CHECK-2/CHECK-RAS? ☒ Yes ☐ No

4. Models Submitted

Duplicate Effective Model*	Natural File Name:	Floodway File Name:
Corrected Effective Model*	Natural File Name:	Floodway File Name:
Existing or Pre-Project Conditions Model	Natural File Name: RV_Wash_10.prj	Floodway File Name: No Floodway
Revised or Post-Project Conditions Model	Natural File Name:	Floodway File Name:
Other - (attach description)	Natural File Name:	Floodway File Name:

*Not required for revisions to approximate 1%-annual-chance floodplains (Zone A) – for details, refer to the corresponding section of the instructions.

The document "Numerical Models Accepted by FEMA for NFIP Usage" lists the models accepted by FEMA. This document can be found at: http://www.fema.gov/mit/tsd/en_modl.htm.

C. MAPPING REQUIREMENTS

A **certified topographic map** must be submitted showing the following information (where applicable): the boundaries of the effective, existing, and proposed conditions 1%-annual-chance floodplain (for approximate Zone A revisions) or the boundaries of the 1%- and 0.2%-annual-chance floodplains and regulatory floodway (for detailed Zone AE, AO, and AH revisions); location and alignment of all cross sections with stationing control indicated; stream, road, and other alignments (e.g., dams, levees, etc.); current community easements and boundaries; boundaries of the requester's property; certification of a registered professional engineer registered in the subject State; location and description of reference marks; and the referenced vertical datum (NGVD, NAVD, etc.).

Note that the boundaries of the existing or proposed conditions floodplains and regulatory floodway to be shown on the revised FIRM and/or FBFM must tie-in with the effective floodplain and regulatory floodway boundaries. Please attach **a copy of the effective FIRM and/or FBFM,** annotated to show the boundaries of the revised 1%- and 0.2%-annual-chance floodplains and regulatory floodway that tie-in with the boundaries of the effective 1%- and 0.2%-annual-chance floodplain and regulatory floodway at the upstream and downstream limits of the area of revision.

D. COMMON REGULATORY REQUIREMENTS

1. For CLOMR requests, do Base Flood Elevations (BFEs) increase? ☐ Yes ☐ No

For CLOMR requests, if either of the following is true, please submit evidence of compliance with Section 65.12 of the NFIP regulations:
- The proposed project encroaches upon a regulatory floodway and would result in increases above 0.00 foot.
- The proposed project encroaches upon a SFHA with BFEs established and would result in increases above 1.00 foot.

2. Does the request involve the placement or proposed placement of fill? ☐ Yes ☒ No

If Yes, the community must be able to certify that the area to be removed from the special flood hazard area, to include any structures or proposed structures, meets all of the standards of the local floodplain ordinances, and is reasonably safe from flooding in accordance with the NFIP regulations set forth at 44 CFR 60.3(a)(3), 65.5(a)(4), and 65.6(a)(14). Please see the MT-2 instructions for more information.

3. For LOMR requests, is the regulatory floodway being revised? ☐ Yes ☒ No

If Yes, attach evidence of regulatory floodway revision notification. As per Paragraph 65.7(b)(1) of the NFIP Regulations, notification is required for requests involving revisions to the regulatory floodway. (Not required for revisions to approximate 1%-annual-chance floodplains [studied Zone A designation] unless a regulatory floodway is being added. Elements and examples of regulatory floodway revision notification can be found in the MT-2 Form 2 Instructions.)

4. For LOMR requests, does this request require property owner notification and acceptance of BFE increases? ☐ Yes ☒ No

If Yes, please attach proof of property owner notification and acceptance (if available). Elements of and examples of property owner notification can be found in the MT-2 Form 2 Instructions.

FEDERAL EMERGENCY MANAGEMENT AGENCY

RIVERINE HYDROLOGY & HYDRAULICS FORM

O.M.B No. 3067-0148
Expires September 30, 2005

PAPERWORK REDUCTION ACT

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Flooding Source: Rio Verde Wash 10
Note: Fill out one form for each flooding source studied

A. HYDROLOGY

1. Reason for New Hydrologic Analysis (check all that apply)

☐ Not revised (skip to section 2) ☐ No existing analysis ☒ Improved data
☐ Alternative methodology ☐ Proposed Conditions (CLOMR) ☐ Changed physical condition of watershed

2. Comparison of Representative 1%-Annual-Chance Discharges

Location	Drainage Area (Sq. Mi.)	FIS (cfs)	Revised (cfs)

Methodology for New Hydrologic Analysis (check all that apply)

☐ Statistical Analysis of Gage Records ☒ Precipitation/Runoff Model HEC-1 [TR-20, HEC-1, HEC-HMS etc.]
☐ Regional Regression Equations ☐ Other (please attach description)

Please enclose all relevant models in digital format, maps, computations (including computation of parameters) and documentation to support the new analysis. The document, "Numerical Models Accepted by FEMA for NFIP Usage" lists the models accepted by FEMA. This document can be found at: http://www.fema.gov/mit/tsd/en_modl.htm.

4. Review/Approval of Analysis

If your community requires a regional, state, or federal agency to review the hydrologic analysis, please attach evidence of approval/review.

5. Impacts of Sediment Transport on Hydrology

Was sediment transport considered? ☐ Yes ☒ No If yes, then fill out Section F (Sediment Transport) of Form 3. If No, then attach your explanation for why sediment transport was not considered.

B. HYDRAULICS

1. Reach to be Revised

	Description	Cross Section	Water-Surface Elevations (ft.) Effective	Proposed/Revised
Downstream Limit	2350'S & 350'E of 144th St & Rio Verde D	6.697		2344.66
Upstream Limit	1800'N & 2300'E of 144th S & Rio Verde D	9.689		2625.39

Hydraulic Method Used

Hydraulic Analysis HEC-RAS [HEC-2 , HEC-RAS, Other (Attach description)]

B. HYDRAULICS (CONTINUED)

3. Pre-Submittal Review of Hydraulic Models

FEMA has developed two review programs, CHECK-2 and CHECK-RAS, to aid in the review of HEC-2 and HEC-RAS hydraulic models, respectively. These review programs verify that the hydraulic estimates and assumptions in the model data are in accordance with NFIP requirements, and that the data are comparable with the assumptions and limitations of HEC-2/HEC-RAS. CHECK-2 and CHECK-RAS identify areas of potential error or concern. These tools do not replace engineering judgment. CHECK-2 and CHECK-RAS can be downloaded from http://www.fema.gov/mit/tsd/frm_soft.htm. We recommend that you review your HEC-2 and HEC-RAS models with CHECK-2 and CHECK-RAS. If you disagree with a message, please attach an explanation of why the message is not valid in this case. Review of your submittal and resolution of valid modeling discrepancies will result in reduced review time.

HEC-2/HEC-RAS models reviewed with CHECK-2/CHECK-RAS? ☒ Yes ☐ No

4. Models Submitted

Duplicate Effective Model*	Natural File Name:	Floodway File Name:
Corrected Effective Model*	Natural File Name:	Floodway File Name:
Existing or Pre-Project Conditions Model	Natural File Name: RV_Wash_10.prj	Floodway File Name: No Floodway
Revised or Post-Project Conditions Model	Natural File Name:	Floodway File Name:
Other - (attach description)	Natural File Name:	Floodway File Name:

*Not required for revisions to approximate 1%-annual-chance floodplains (Zone A) – for details, refer to the corresponding section of the instructions.

The document "Numerical Models Accepted by FEMA for NFIP Usage" lists the models accepted by FEMA. This document can be found at: http://www.fema.gov/mit/tsd/en_modl.htm.

C. MAPPING REQUIREMENTS

A **certified topographic map** must be submitted showing the following information (where applicable): the boundaries of the effective, existing, and proposed conditions 1%-annual-chance floodplain (for approximate Zone A revisions) or the boundaries of the 1%- and 0.2%-annual-chance floodplains and regulatory floodway (for detailed Zone AE, AO, and AH revisions); location and alignment of all cross sections with stationing control indicated; stream, road, and other alignments (e.g., dams, levees, etc.); current community easements and boundaries; boundaries of the requester's property; certification of a registered professional engineer registered in the subject State; location and description of reference marks; and the referenced vertical datum (NGVD, NAVD, etc.).

Note that the boundaries of the existing or proposed conditions floodplains and regulatory floodway to be shown on the revised FIRM and/or FBFM must tie-in with the effective floodplain and regulatory floodway boundaries. Please attach **a copy of the effective FIRM and/or FBFM,** annotated to show the boundaries of the revised 1%- and 0.2%-annual-chance floodplains and regulatory floodway that tie-in with the boundaries of the effective 1%- and 0.2%-annual-chance floodplain and regulatory floodway at the upstream and downstream limits of the area of revision.

D. COMMON REGULATORY REQUIREMENTS

1. For CLOMR requests, do Base Flood Elevations (BFEs) increase? ☐ Yes ☐ No

For CLOMR requests, if either of the following is true, please submit evidence of compliance with Section 65.12 of the NFIP regulations:
- The proposed project encroaches upon a regulatory floodway and would result in increases above 0.00 foot.
- The proposed project encroaches upon a SFHA with BFEs established and would result in increases above 1.00 foot.

2. Does the request involve the placement or proposed placement of fill? ☐ Yes ☒ No

If Yes, the community must be able to certify that the area to be removed from the special flood hazard area, to include any structures or proposed structures, meets all of the standards of the local floodplain ordinances, and is reasonably safe from flooding in accordance with the NFIP regulations set forth at 44 CFR 60.3(a)(3), 65.5(a)(4), and 65.6(a)(14). Please see the MT-2 instructions for more information.

3. For LOMR requests, is the regulatory floodway being revised? ☐ Yes ☒ No

If Yes, attach evidence of regulatory floodway revision notification. As per Paragraph 65.7(b)(1) of the NFIP Regulations, notification is required for requests involving revisions to the regulatory floodway. (Not required for revisions to approximate 1%-annual-chance floodplains [studied Zone A designation] unless a regulatory floodway is being added. Elements and examples of regulatory floodway revision notification can be found in the MT-2 Form 2 Instructions.)

4. For LOMR requests, does this request require property owner notification and acceptance of BFE increases? ☐ Yes ☒ No

If Yes, please attach proof of property owner notification and acceptance (if available). Elements of and examples of property owner notification can be found in the MT-2 Form 2 Instructions.

FEDERAL EMERGENCY MANAGEMENT AGENCY

RIVERINE HYDROLOGY & HYDRAULICS FORM

O.M.B No. 3067-0148
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Flooding Source: Rio Verde Wash A Tank Spillway
Note: Fill out one form for each flooding source studied

A. HYDROLOGY

1. Reason for New Hydrologic Analysis (check all that apply)

☐ Not revised (skip to section 2) ☐ No existing analysis ☒ Improved data
☐ Alternative methodology ☐ Proposed Conditions (CLOMR) ☐ Changed physical condition of watershed

2. Comparison of Representative 1%-Annual-Chance Discharges

Location	Drainage Area (Sq. Mi.)	FIS (cfs)	Revised (cfs)

Methodology for New Hydrologic Analysis (check all that apply)

☐ Statistical Analysis of Gage Records ☒ Precipitation/Runoff Model HEC-1 [TR-20, HEC-1, HEC-HMS etc.]
☐ Regional Regression Equations ☐ Other (please attach description)

Please enclose all relevant models in digital format, maps, computations (including computation of parameters) and documentation to support the new analysis. The document, "Numerical Models Accepted by FEMA for NFIP Usage" lists the models accepted by FEMA. This document can be found at: http://www.fema.gov/mit/tsd/en_modl.htm.

4. Review/Approval of Analysis

If your community requires a regional, state, or federal agency to review the hydrologic analysis, please attach evidence of approval/review.

5. Impacts of Sediment Transport on Hydrology

Was sediment transport considered? ☐ Yes ☒ No If yes, then fill out Section F (Sediment Transport) of Form 3. If No, then attach your explanation for why sediment transport was not considered.

B. HYDRAULICS

1. Reach to be Revised

	Description	Cross Section	Water-Surface Elevations (ft.) Effective	Proposed/Revised
Downstream Limit	1800'N & 3800'W of 144th S & Rio Verde D	0.017		2457.42
Upstream Limit	380' upstream of the Black Hill Tank dam	1.378		2610.82

Hydraulic Method Used

Hydraulic Analysis HEC-RAS [HEC-2 , HEC-RAS, Other (Attach description)]

B. HYDRAULICS (CONTINUED)

3. Pre-Submittal Review of Hydraulic Models

FEMA has developed two review programs, CHECK-2 and CHECK-RAS, to aid in the review of HEC-2 and HEC-RAS hydraulic models, respectively. These review programs verify that the hydraulic estimates and assumptions in the model data are in accordance with NFIP requirements, and that the data are comparable with the assumptions and limitations of HEC-2/HEC-RAS. CHECK-2 and CHECK-RAS identify areas of potential error or concern. These tools do not replace engineering judgment. CHECK-2 and CHECK-RAS can be downloaded from http://www.fema.gov/mit/tsd/frm_soft.htm. We recommend that you review your HEC-2 and HEC-RAS models with CHECK-2 and CHECK-RAS. If you disagree with a message, please attach an explanation of why the message is not valid in this case. Review of your submittal and resolution of valid modeling discrepancies will result in reduced review time.

HEC-2/HEC-RAS models reviewed with CHECK-2/CHECK-RAS? ☒ Yes ☐ No

4. Models Submitted

Duplicate Effective Model*	Natural File Name:	Floodway File Name:
Corrected Effective Model*	Natural File Name:	Floodway File Name:
Existing or Pre-Project Conditions Model	Natural File Name: RV_Wash_A_Tank_S.prj	Floodway File Name: No Floodway
Revised or Post-Project Conditions Model	Natural File Name:	Floodway File Name:
Other - (attach description)	Natural File Name:	Floodway File Name:

*Not required for revisions to approximate 1%-annual-chance floodplains (Zone A) – for details, refer to the corresponding section of the instructions.

The document "Numerical Models Accepted by FEMA for NFIP Usage" lists the models accepted by FEMA. This document can be found at: http://www.fema.gov/mit/tsd/en_modl.htm.

C. MAPPING REQUIREMENTS

A **certified topographic map** must be submitted showing the following information (where applicable): the boundaries of the effective, existing, and proposed conditions 1%-annual-chance floodplain (for approximate Zone A revisions) or the boundaries of the 1%- and 0.2%-annual-chance floodplains and regulatory floodway (for detailed Zone AE, AO, and AH revisions); location and alignment of all cross sections with stationing control indicated; stream, road, and other alignments (e.g., dams, levees, etc.); current community easements and boundaries; boundaries of the requester's property; certification of a registered professional engineer registered in the subject State; location and description of reference marks; and the referenced vertical datum (NGVD, NAVD, etc.).

Note that the boundaries of the existing or proposed conditions floodplains and regulatory floodway to be shown on the revised FIRM and/or FBFM must tie-in with the effective floodplain and regulatory floodway boundaries. Please attach **a copy of the effective FIRM and/or FBFM,** annotated to show the boundaries of the revised 1%- and 0.2%-annual-chance floodplains and regulatory floodway that tie-in with the boundaries of the effective 1%- and 0.2%-annual-chance floodplain and regulatory floodway at the upstream and downstream limits of the area of revision.

D. COMMON REGULATORY REQUIREMENTS

1. For CLOMR requests, do Base Flood Elevations (BFEs) increase? ☐ Yes ☐ No

For CLOMR requests, if either of the following is true, please submit evidence of compliance with Section 65.12 of the NFIP regulations:
- The proposed project encroaches upon a regulatory floodway and would result in increases above 0.00 foot.
- The proposed project encroaches upon a SFHA with BFEs established and would result in increases above 1.00 foot.

2. Does the request involve the placement or proposed placement of fill? ☐ Yes ☒ No

If Yes, the community must be able to certify that the area to be removed from the special flood hazard area, to include any structures or proposed structures, meets all of the standards of the local floodplain ordinances, and is reasonably safe from flooding in accordance with the NFIP regulations set forth at 44 CFR 60.3(a)(3), 65.5(a)(4), and 65.6(a)(14). Please see the MT-2 instructions for more information.

3. For LOMR requests, is the regulatory floodway being revised? ☐ Yes ☒ No

If Yes, attach evidence of regulatory floodway revision notification. As per Paragraph 65.7(b)(1) of the NFIP Regulations, notification is required for requests involving revisions to the regulatory floodway. (Not required for revisions to approximate 1%-annual-chance floodplains [studied Zone A designation] unless a regulatory floodway is being added. Elements and examples of regulatory floodway revision notification can be found in the MT-2 Form 2 Instructions.)

4. For LOMR requests, does this request require property owner notification and acceptance of BFE increases? ☐ Yes ☒ No

If Yes, please attach proof of property owner notification and acceptance (if available). Elements of and examples of property owner notification can be found in the MT-2 Form 2 Instructions.

FEDERAL EMERGENCY MANAGEMENT AGENCY

RIVERINE HYDROLOGY & HYDRAULICS FORM

O.M.B No. 3067-0148
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Flooding Source: Rio Verde Wash A Trib 1
Note: Fill out one form for each flooding source studied

A. HYDROLOGY

1. Reason for New Hydrologic Analysis (check all that apply)

☐ Not revised (skip to section 2) ☐ No existing analysis ☒ Improved data
☐ Alternative methodology ☐ Proposed Conditions (CLOMR) ☐ Changed physical condition of watershed

2. Comparison of Representative 1%-Annual-Chance Discharges

Location	Drainage Area (Sq. Mi.)	FIS (cfs)	Revised (cfs)

Methodology for New Hydrologic Analysis (check all that apply)

☐ Statistical Analysis of Gage Records ☒ Precipitation/Runoff Model HEC-1 [TR-20, HEC-1, HEC-HMS etc.]
☐ Regional Regression Equations ☐ Other (please attach description)

Please enclose all relevant models in digital format, maps, computations (including computation of parameters) and documentation to support the new analysis. The document, "Numerical Models Accepted by FEMA for NFIP Usage" lists the models accepted by FEMA. This document can be found at: http://www.fema.gov/mit/tsd/en_modl.htm.

4. Review/Approval of Analysis

If your community requires a regional, state, or federal agency to review the hydrologic analysis, please attach evidence of approval/review.

5. Impacts of Sediment Transport on Hydrology

Was sediment transport considered? ☐ Yes ☒ No If yes, then fill out Section F (Sediment Transport) of Form 3. If No, then attach your explanation for why sediment transport was not considered.

B. HYDRAULICS

1. Reach to be Revised

	Description	Cross Section	Water-Surface Elevations (ft.) Effective	Proposed/Revised
Downstream Limit	2200'N & 1500'W of 144th S & Rio Verde D	0.122		2422.88
Upstream Limit	650'N & 250'E of 144th St & Rio Verde Dr	3.405		2797.10

Hydraulic Method Used

Hydraulic Analysis HEC-RAS [HEC-2 , HEC-RAS, Other (Attach description)]

B. HYDRAULICS (CONTINUED)

3. Pre-Submittal Review of Hydraulic Models

FEMA has developed two review programs, CHECK-2 and CHECK-RAS, to aid in the review of HEC-2 and HEC-RAS hydraulic models, respectively. These review programs verify that the hydraulic estimates and assumptions in the model data are in accordance with NFIP requirements, and that the data are comparable with the assumptions and limitations of HEC-2/HEC-RAS. CHECK-2 and CHECK-RAS identify areas of potential error or concern. These tools do not replace engineering judgment. CHECK-2 and CHECK-RAS can be downloaded from http://www.fema.gov/mit/tsd/frm_soft.htm. We recommend that you review your HEC-2 and HEC-RAS models with CHECK-2 and CHECK-RAS. If you disagree with a message, please attach an explanation of why the message is not valid in this case. Review of your submittal and resolution of valid modeling discrepancies will result in reduced review time.

HEC-2/HEC-RAS models reviewed with CHECK-2/CHECK-RAS? ☒ Yes ☐ No

4. Models Submitted

Duplicate Effective Model*	Natural File Name:	Floodway File Name:
Corrected Effective Model*	Natural File Name:	Floodway File Name:
Existing or Pre-Project Conditions Model	Natural File Name: RV_Wash_A.prj	Floodway File Name: No Floodway
Revised or Post-Project Conditions Model	Natural File Name:	Floodway File Name:
Other - (attach description)	Natural File Name:	Floodway File Name:

*Not required for revisions to approximate 1%-annual-chance floodplains (Zone A) – for details, refer to the corresponding section of the instructions.

The document "Numerical Models Accepted by FEMA for NFIP Usage" lists the models accepted by FEMA. This document can be found at: http://www.fema.gov/mit/tsd/en_modl.htm.

C. MAPPING REQUIREMENTS

A **certified topographic map** must be submitted showing the following information (where applicable): the boundaries of the effective, existing, and proposed conditions 1%-annual-chance floodplain (for approximate Zone A revisions) or the boundaries of the 1%- and 0.2%-annual-chance floodplains and regulatory floodway (for detailed Zone AE, AO, and AH revisions); location and alignment of all cross sections with stationing control indicated; stream, road, and other alignments (e.g., dams, levees, etc.); current community easements and boundaries; boundaries of the requester's property; certification of a registered professional engineer registered in the subject State; location and description of reference marks; and the referenced vertical datum (NGVD, NAVD, etc.).

Note that the boundaries of the existing or proposed conditions floodplains and regulatory floodway to be shown on the revised FIRM and/or FBFM must tie-in with the effective floodplain and regulatory floodway boundaries. Please attach **a copy of the effective FIRM and/or FBFM,** annotated to show the boundaries of the revised 1%- and 0.2%-annual-chance floodplains and regulatory floodway that tie-in with the boundaries of the effective 1%- and 0.2%-annual-chance floodplain and regulatory floodway at the upstream and downstream limits of the area of revision.

D. COMMON REGULATORY REQUIREMENTS

1. For CLOMR requests, do Base Flood Elevations (BFEs) increase? ☐ Yes ☐ No

For CLOMR requests, if either of the following is true, please submit evidence of compliance with Section 65.12 of the NFIP regulations:
- The proposed project encroaches upon a regulatory floodway and would result in increases above 0.00 foot.
- The proposed project encroaches upon a SFHA with BFEs established and would result in increases above 1.00 foot.

2. Does the request involve the placement or proposed placement of fill? ☐ Yes ☒ No

If Yes, the community must be able to certify that the area to be removed from the special flood hazard area, to include any structures or proposed structures, meets all of the standards of the local floodplain ordinances, and is reasonably safe from flooding in accordance with the NFIP regulations set forth at 44 CFR 60.3(a)(3), 65.5(a)(4), and 65.6(a)(14). Please see the MT-2 instructions for more information.

3. For LOMR requests, is the regulatory floodway being revised? ☐ Yes ☒ No

If Yes, attach evidence of regulatory floodway revision notification. As per Paragraph 65.7(b)(1) of the NFIP Regulations, notification is required for requests involving revisions to the regulatory floodway. (Not required for revisions to approximate 1%-annual-chance floodplains [studied Zone A designation] unless a regulatory floodway is being added. Elements and examples of regulatory floodway revision notification can be found in the MT-2 Form 2 Instructions.)

4. For LOMR requests, does this request require property owner notification and acceptance of BFE increases? ☐ Yes ☒ No

If Yes, please attach proof of property owner notification and acceptance (if available). Elements of and examples of property owner notification can be found in the MT-2 Form 2 Instructions.

FEDERAL EMERGENCY MANAGEMENT AGENCY

RIVERINE HYDROLOGY & HYDRAULICS FORM

O.M.B No. 3067-0148
Expires September 30, 2005

PAPERWORK REDUCTION ACT

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Flooding Source: Rio Verde Wash A Trib 2
Note: Fill out one form for each flooding source studied

A. HYDROLOGY

1. Reason for New Hydrologic Analysis (check all that apply)

☐ Not revised (skip to section 2) ☐ No existing analysis ☒ Improved data
☐ Alternative methodology ☐ Proposed Conditions (CLOMR) ☐ Changed physical condition of watershed

2. Comparison of Representative 1%-Annual-Chance Discharges

Location	Drainage Area (Sq. Mi.)	FIS (cfs)	Revised (cfs)

Methodology for New Hydrologic Analysis (check all that apply)

☐ Statistical Analysis of Gage Records ☒ Precipitation/Runoff Model HEC-1 [TR-20, HEC-1, HEC-HMS etc.]
☐ Regional Regression Equations ☐ Other (please attach description)

Please enclose all relevant models in digital format, maps, computations (including computation of parameters) and documentation to support the new analysis. The document, "Numerical Models Accepted by FEMA for NFIP Usage" lists the models accepted by FEMA. This document can be found at: http://www.fema.gov/mit/tsd/en_modl.htm.

4. Review/Approval of Analysis

If your community requires a regional, state, or federal agency to review the hydrologic analysis, please attach evidence of approval/review.

5. Impacts of Sediment Transport on Hydrology

Was sediment transport considered? ☐ Yes ☒ No If yes, then fill out Section F (Sediment Transport) of Form 3. If No, then attach your explanation for why sediment transport was not considered.

B. HYDRAULICS

1. Reach to be Revised

	Description	Cross Section	Water-Surface Elevations (ft.)	
			Effective	Proposed/Revised
Downstream Limit	2100'N & 1800'W of 144th S & Rio Verde D	0.065		2421.59
Upstream Limit	700'N & 4100'E of 128th St & Dixileta D	1.920		2622.53

Hydraulic Method Used

Hydraulic Analysis HEC-RAS [HEC-2 , HEC-RAS, Other (Attach description)]

B. HYDRAULICS (CONTINUED)

3. Pre-Submittal Review of Hydraulic Models

FEMA has developed two review programs, CHECK-2 and CHECK-RAS, to aid in the review of HEC-2 and HEC-RAS hydraulic models, respectively. These review programs verify that the hydraulic estimates and assumptions in the model data are in accordance with NFIP requirements, and that the data are comparable with the assumptions and limitations of HEC-2/HEC-RAS. CHECK-2 and CHECK-RAS identify areas of potential error or concern. These tools do not replace engineering judgment. CHECK-2 and CHECK-RAS can be downloaded from http://www.fema.gov/mit/tsd/frm_soft.htm. We recommend that you review your HEC-2 and HEC-RAS models with CHECK-2 and CHECK-RAS. If you disagree with a message, please attach an explanation of why the message is not valid in this case. Review of your submittal and resolution of valid modeling discrepancies will result in reduced review time.

HEC-2/HEC-RAS models reviewed with CHECK-2/CHECK-RAS? ☒ Yes ☐ No

4. Models Submitted

Duplicate Effective Model*	Natural File Name:	Floodway File Name:
Corrected Effective Model*	Natural File Name:	Floodway File Name:
Existing or Pre-Project Conditions Model	Natural File Name: RV_Wash_A.prj	Floodway File Name: No Floodway
Revised or Post-Project Conditions Model	Natural File Name:	Floodway File Name:
Other - (attach description)	Natural File Name:	Floodway File Name:

*Not required for revisions to approximate 1%-annual-chance floodplains (Zone A) – for details, refer to the corresponding section of the instructions.

The document "Numerical Models Accepted by FEMA for NFIP Usage" lists the models accepted by FEMA. This document can be found at: http://www.fema.gov/mit/tsd/en_modl.htm.

C. MAPPING REQUIREMENTS

A **certified topographic map** must be submitted showing the following information (where applicable): the boundaries of the effective, existing, and proposed conditions 1%-annual-chance floodplain (for approximate Zone A revisions) or the boundaries of the 1%- and 0.2%-annual-chance floodplains and regulatory floodway (for detailed Zone AE, AO, and AH revisions); location and alignment of all cross sections with stationing control indicated; stream, road, and other alignments (e.g., dams, levees, etc.); current community easements and boundaries; boundaries of the requester's property; certification of a registered professional engineer registered in the subject State; location and description of reference marks; and the referenced vertical datum (NGVD, NAVD, etc.).

Note that the boundaries of the existing or proposed conditions floodplains and regulatory floodway to be shown on the revised FIRM and/or FBFM must tie-in with the effective floodplain and regulatory floodway boundaries. Please attach **a copy of the effective FIRM and/or FBFM,** annotated to show the boundaries of the revised 1%- and 0.2%-annual-chance floodplains and regulatory floodway that tie-in with the boundaries of the effective 1%- and 0.2%-annual-chance floodplain and regulatory floodway at the upstream and downstream limits of the area of revision.

D. COMMON REGULATORY REQUIREMENTS

1. For CLOMR requests, do Base Flood Elevations (BFEs) increase? ☐ Yes ☐ No

For CLOMR requests, if either of the following is true, please submit evidence of compliance with Section 65.12 of the NFIP regulations:
- The proposed project encroaches upon a regulatory floodway and would result in increases above 0.00 foot.
- The proposed project encroaches upon a SFHA with BFEs established and would result in increases above 1.00 foot.

2. Does the request involve the placement or proposed placement of fill? ☐ Yes ☒ No

If Yes, the community must be able to certify that the area to be removed from the special flood hazard area, to include any structures or proposed structures, meets all of the standards of the local floodplain ordinances, and is reasonably safe from flooding in accordance with the NFIP regulations set forth at 44 CFR 60.3(a)(3), 65.5(a)(4), and 65.6(a)(14). Please see the MT-2 instructions for more information.

3. For LOMR requests, is the regulatory floodway being revised? ☐ Yes ☒ No

If Yes, attach evidence of regulatory floodway revision notification. As per Paragraph 65.7(b)(1) of the NFIP Regulations, notification is required for requests involving revisions to the regulatory floodway. (Not required for revisions to approximate 1%-annual-chance floodplains [studied Zone A designation] unless a regulatory floodway is being added. Elements and examples of regulatory floodway revision notification can be found in the MT-2 Form 2 Instructions.)

4. For LOMR requests, does this request require property owner notification and acceptance of BFE increases? ☐ Yes ☒ No

If Yes, please attach proof of property owner notification and acceptance (if available). Elements of and examples of property owner notification can be found in the MT-2 Form 2 Instructions.

FEDERAL EMERGENCY MANAGEMENT AGENCY

RIVERINE HYDROLOGY & HYDRAULICS FORM

O.M.B No. 3067-0148
Expires September 30, 2005

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Flooding Source: Rio Verde Wash A
Note: Fill out one form for each flooding source studied

A. HYDROLOGY

1. Reason for New Hydrologic Analysis (check all that apply)

☐ Not revised (skip to section 2) ☐ No existing analysis ☒ Improved data
☐ Alternative methodology ☐ Proposed Conditions (CLOMR) ☐ Changed physical condition of watershed

2. Comparison of Representative 1%-Annual-Chance Discharges

Location	Drainage Area (Sq. Mi.)	FIS (cfs)	Revised (cfs)

Methodology for New Hydrologic Analysis (check all that apply)

☐ Statistical Analysis of Gage Records ☒ Precipitation/Runoff Model HEC-1 [TR-20, HEC-1, HEC-HMS etc.]
☐ Regional Regression Equations ☐ Other (please attach description)

Please enclose all relevant models in digital format, maps, computations (including computation of parameters) and documentation to support the new analysis. The document, "Numerical Models Accepted by FEMA for NFIP Usage" lists the models accepted by FEMA. This document can be found at: http://www.fema.gov/mit/tsd/en_modl.htm.

4. Review/Approval of Analysis

If your community requires a regional, state, or federal agency to review the hydrologic analysis, please attach evidence of approval/review.

5. Impacts of Sediment Transport on Hydrology

Was sediment transport considered? ☐ Yes ☒ No If yes, then fill out Section F (Sediment Transport) of Form 3. If No, then attach your explanation for why sediment transport was not considered.

B. HYDRAULICS

1. Reach to be Revised

	Description	Cross Section	Water-Surface Elevations (ft.) Effective	Proposed/Revised
Downstream Limit	2200'N & 1300'W of 144th S & Rio Verde D	7.050		2410.20
Upstream Limit	1800'N & 1100'E of 122th St & Dixileta D	9.834		2678.57

. Hydraulic Method Used

Hydraulic Analysis HEC-RAS [HEC-2 , HEC-RAS, Other (Attach description)]

B. HYDRAULICS (CONTINUED)

3. Pre-Submittal Review of Hydraulic Models

FEMA has developed two review programs, CHECK-2 and CHECK-RAS, to aid in the review of HEC-2 and HEC-RAS hydraulic models, respectively. These review programs verify that the hydraulic estimates and assumptions in the model data are in accordance with NFIP requirements, and that the data are comparable with the assumptions and limitations of HEC-2/HEC-RAS. CHECK-2 and CHECK-RAS identify areas of potential error or concern. These tools do not replace engineering judgment. CHECK-2 and CHECK-RAS can be downloaded from http://www.fema.gov/mit/tsd/frm_soft.htm. We recommend that you review your HEC-2 and HEC-RAS models with CHECK-2 and CHECK-RAS. If you disagree with a message, please attach an explanation of why the message is not valid in this case. Review of your submittal and resolution of valid modeling discrepancies will result in reduced review time.

HEC-2/HEC-RAS models reviewed with CHECK-2/CHECK-RAS? ☒ Yes ☐ No

4. Models Submitted

Duplicate Effective Model*	Natural File Name:	Floodway File Name:
Corrected Effective Model*	Natural File Name:	Floodway File Name:
Existing or Pre-Project Conditions Model	Natural File Name: RV_Wash_A.prj	Floodway File Name: No Floodway
Revised or Post-Project Conditions Model	Natural File Name:	Floodway File Name:
Other - (attach description)	Natural File Name:	Floodway File Name:

*Not required for revisions to approximate 1%-annual-chance floodplains (Zone A) – for details, refer to the corresponding section of the instructions.

The document "Numerical Models Accepted by FEMA for NFIP Usage" lists the models accepted by FEMA. This document can be found at: http://www.fema.gov/mit/tsd/en_modl.htm.

C. MAPPING REQUIREMENTS

A **certified topographic map** must be submitted showing the following information (where applicable): the boundaries of the effective, existing, and proposed conditions 1%-annual-chance floodplain (for approximate Zone A revisions) or the boundaries of the 1%- and 0.2%-annual-chance floodplains and regulatory floodway (for detailed Zone AE, AO, and AH revisions); location and alignment of all cross sections with stationing control indicated; stream, road, and other alignments (e.g., dams, levees, etc.); current community easements and boundaries; boundaries of the requester's property; certification of a registered professional engineer registered in the subject State; location and description of reference marks; and the referenced vertical datum (NGVD, NAVD, etc.).

Note that the boundaries of the existing or proposed conditions floodplains and regulatory floodway to be shown on the revised FIRM and/or FBFM must tie-in with the effective floodplain and regulatory floodway boundaries. Please attach **a copy of the effective FIRM and/or FBFM,** annotated to show the boundaries of the revised 1%- and 0.2%-annual-chance floodplains and regulatory floodway that tie-in with the boundaries of the effective 1%- and 0.2%-annual-chance floodplain and regulatory floodway at the upstream and downstream limits of the area of revision.

D. COMMON REGULATORY REQUIREMENTS

1. For CLOMR requests, do Base Flood Elevations (BFEs) increase? ☐ Yes ☐ No

For CLOMR requests, if either of the following is true, please submit evidence of compliance with Section 65.12 of the NFIP regulations:
- The proposed project encroaches upon a regulatory floodway and would result in increases above 0.00 foot.
- The proposed project encroaches upon a SFHA with BFEs established and would result in increases above 1.00 foot.

2. Does the request involve the placement or proposed placement of fill? ☐ Yes ☒ No

If Yes, the community must be able to certify that the area to be removed from the special flood hazard area, to include any structures or proposed structures, meets all of the standards of the local floodplain ordinances, and is reasonably safe from flooding in accordance with the NFIP regulations set forth at 44 CFR 60.3(a)(3), 65.5(a)(4), and 65.6(a)(14). Please see the MT-2 instructions for more information.

3. For LOMR requests, is the regulatory floodway being revised? ☐ Yes ☒ No

If Yes, attach evidence of regulatory floodway revision notification. As per Paragraph 65.7(b)(1) of the NFIP Regulations, notification is required for requests involving revisions to the regulatory floodway. (Not required for revisions to approximate 1%-annual-chance floodplains [studied Zone A designation] unless a regulatory floodway is being added. Elements and examples of regulatory floodway revision notification can be found in the MT-2 Form 2 Instructions.)

4. For LOMR requests, does this request require property owner notification and acceptance of BFE increases? ☐ Yes ☒ No

If Yes, please attach proof of property owner notification and acceptance (if available). Elements of and examples of property owner notification can be found in the MT-2 Form 2 Instructions.

FEDERAL EMERGENCY MANAGEMENT AGENCY

RIVERINE HYDROLOGY & HYDRAULICS FORM

O.M.B No. 3067-0148
Expires September 30, 2005

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Flooding Source: Rio Verde Wash I Trib 3
Note: Fill out one form for each flooding source studied

A. HYDROLOGY

1. Reason for New Hydrologic Analysis (check all that apply)

☐ Not revised (skip to section 2) ☐ No existing analysis ☒ Improved data
☐ Alternative methodology ☐ Proposed Conditions (CLOMR) ☐ Changed physical condition of watershed

2. Comparison of Representative 1%-Annual-Chance Discharges

Location	Drainage Area (Sq. Mi.)	FIS (cfs)	Revised (cfs)

Methodology for New Hydrologic Analysis (check all that apply)

☐ Statistical Analysis of Gage Records ☒ Precipitation/Runoff Model HEC-1 [TR-20, HEC-1, HEC-HMS etc.]
☐ Regional Regression Equations ☐ Other (please attach description)

Please enclose all relevant models in digital format, maps, computations (including computation of parameters) and documentation to support the new analysis. The document, "Numerical Models Accepted by FEMA for NFIP Usage" lists the models accepted by FEMA. This document can be found at: http://www.fema.gov/mit/tsd/en_modl.htm.

4. Review/Approval of Analysis

If your community requires a regional, state, or federal agency to review the hydrologic analysis, please attach evidence of approval/review.

5. Impacts of Sediment Transport on Hydrology

Was sediment transport considered? ☐ Yes ☒ No If yes, then fill out Section F (Sediment Transport) of Form 3. If No, then attach your explanation for why sediment transport was not considered.

B. HYDRAULICS

1. Reach to be Revised

	Description	Cross Section	Water-Surface Elevations (ft.) Effective	Proposed/Revised
Downstream Limit	1200'S & 1600'W of 144th St & Lone Mnt R	0.098		2470.79
Upstream Limit	400'S & 200'W of 136th St & Westland Dr	0.797		2555.16

Hydraulic Method Used

Hydraulic Analysis HEC-RAS [HEC-2 , HEC-RAS, Other (Attach description)]

B. HYDRAULICS (CONTINUED)

3. Pre-Submittal Review of Hydraulic Models

FEMA has developed two review programs, CHECK-2 and CHECK-RAS, to aid in the review of HEC-2 and HEC-RAS hydraulic models, respectively. These review programs verify that the hydraulic estimates and assumptions in the model data are in accordance with NFIP requirements, and that the data are comparable with the assumptions and limitations of HEC-2/HEC-RAS. CHECK-2 and CHECK-RAS identify areas of potential error or concern. These tools do not replace engineering judgment. CHECK-2 and CHECK-RAS can be downloaded from http://www.fema.gov/mit/tsd/frm_soft.htm. We recommend that you review your HEC-2 and HEC-RAS models with CHECK-2 and CHECK-RAS. If you disagree with a message, please attach an explanation of why the message is not valid in this case. Review of your submittal and resolution of valid modeling discrepancies will result in reduced review time.

HEC-2/HEC-RAS models reviewed with CHECK-2/CHECK-RAS? ☒ Yes ☐ No

4. Models Submitted

Duplicate Effective Model*	Natural File Name:	Floodway File Name:
Corrected Effective Model*	Natural File Name:	Floodway File Name:
Existing or Pre-Project Conditions Model	Natural File Name: RV_Wash_I.prj	Floodway File Name: No Floodway
Revised or Post-Project Conditions Model	Natural File Name:	Floodway File Name:
Other - (attach description)	Natural File Name:	Floodway File Name:

*Not required for revisions to approximate 1%-annual-chance floodplains (Zone A) – for details, refer to the corresponding section of the instructions.

The document "Numerical Models Accepted by FEMA for NFIP Usage" lists the models accepted by FEMA. This document can be found at: http://www.fema.gov/mit/tsd/en_modl.htm.

C. MAPPING REQUIREMENTS

A **certified topographic map** must be submitted showing the following information (where applicable): the boundaries of the effective, existing, and proposed conditions 1%-annual-chance floodplain (for approximate Zone A revisions) or the boundaries of the 1%- and 0.2%-annual-chance floodplains and regulatory floodway (for detailed Zone AE, AO, and AH revisions); location and alignment of all cross sections with stationing control indicated; stream, road, and other alignments (e.g., dams, levees, etc.); current community easements and boundaries; boundaries of the requester's property; certification of a registered professional engineer registered in the subject State; location and description of reference marks; and the referenced vertical datum (NGVD, NAVD, etc.).

Note that the boundaries of the existing or proposed conditions floodplains and regulatory floodway to be shown on the revised FIRM and/or FBFM must tie-in with the effective floodplain and regulatory floodway boundaries. Please attach **a copy of the effective FIRM and/or FBFM,** annotated to show the boundaries of the revised 1%- and 0.2%-annual-chance floodplains and regulatory floodway that tie-in with the boundaries of the effective 1%- and 0.2%-annual-chance floodplain and regulatory floodway at the upstream and downstream limits of the area of revision.

D. COMMON REGULATORY REQUIREMENTS

1. For CLOMR requests, do Base Flood Elevations (BFEs) increase? ☐ Yes ☐ No

For CLOMR requests, if either of the following is true, please submit evidence of compliance with Section 65.12 of the NFIP regulations:
- The proposed project encroaches upon a regulatory floodway and would result in increases above 0.00 foot.
- The proposed project encroaches upon a SFHA with BFEs established and would result in increases above 1.00 foot.

2. Does the request involve the placement or proposed placement of fill? ☐ Yes ☒ No

If Yes, the community must be able to certify that the area to be removed from the special flood hazard area, to include any structures or proposed structures, meets all of the standards of the local floodplain ordinances, and is reasonably safe from flooding in accordance with the NFIP regulations set forth at 44 CFR 60.3(a)(3), 65.5(a)(4), and 65.6(a)(14). Please see the MT-2 instructions for more information.

3. For LOMR requests, is the regulatory floodway being revised? ☐ Yes ☒ No

If Yes, attach evidence of regulatory floodway revision notification. As per Paragraph 65.7(b)(1) of the NFIP Regulations, notification is required for requests involving revisions to the regulatory floodway. (Not required for revisions to approximate 1%-annual-chance floodplains [studied Zone A designation] unless a regulatory floodway is being added. Elements and examples of regulatory floodway revision notification can be found in the MT-2 Form 2 Instructions.)

4. For LOMR requests, does this request require property owner notification and acceptance of BFE increases? ☐ Yes ☒ No

If Yes, please attach proof of property owner notification and acceptance (if available). Elements of and examples of property owner notification can be found in the MT-2 Form 2 Instructions.

FEDERAL EMERGENCY MANAGEMENT AGENCY

RIVERINE HYDROLOGY & HYDRAULICS FORM

O.M.B No. 3067-0148
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Flooding Source: Rio Verde Wash I
Note: Fill out one form for each flooding source studied

A. HYDROLOGY

1. Reason for New Hydrologic Analysis (check all that apply)

☐ Not revised (skip to section 2) ☐ No existing analysis ☒ Improved data
☐ Alternative methodology ☐ Proposed Conditions (CLOMR) ☐ Changed physical condition of watershed

2. Comparison of Representative 1%-Annual-Chance Discharges

Location	Drainage Area (Sq. Mi.)	FIS (cfs)	Revised (cfs)

Methodology for New Hydrologic Analysis (check all that apply)

☐ Statistical Analysis of Gage Records ☒ Precipitation/Runoff Model HEC-1 [TR-20, HEC-1, HEC-HMS etc.]
☐ Regional Regression Equations ☐ Other (please attach description)

Please enclose all relevant models in digital format, maps, computations (including computation of parameters) and documentation to support the new analysis. The document, "Numerical Models Accepted by FEMA for NFIP Usage" lists the models accepted by FEMA. This document can be found at: http://www.fema.gov/mit/tsd/en_modl.htm.

4. Review/Approval of Analysis

If your community requires a regional, state, or federal agency to review the hydrologic analysis, please attach evidence of approval/review.

5. Impacts of Sediment Transport on Hydrology

Was sediment transport considered? ☐ Yes ☒ No If yes, then fill out Section F (Sediment Transport) of Form 3. If No, then attach your explanation for why sediment transport was not considered.

B. HYDRAULICS

1. Reach to be Revised

	Description	Cross Section	Water-Surface Elevations (ft.) Effective	Proposed/Revised
Downstream Limit	1100'S & 1500'W of 144th St & Lone Mnt R	6.423		2465.11
Upstream Limit	3100'N & 450'W of 136th St & Lone Mnt Rd	7.262		2567.42

Hydraulic Method Used

Hydraulic Analysis HEC-RAS [HEC-2 , HEC-RAS, Other (Attach description)]

B. HYDRAULICS (CONTINUED)

3. Pre-Submittal Review of Hydraulic Models

FEMA has developed two review programs, CHECK-2 and CHECK-RAS, to aid in the review of HEC-2 and HEC-RAS hydraulic models, respectively. These review programs verify that the hydraulic estimates and assumptions in the model data are in accordance with NFIP requirements, and that the data are comparable with the assumptions and limitations of HEC-2/HEC-RAS. CHECK-2 and CHECK-RAS identify areas of potential error or concern. These tools do not replace engineering judgment. CHECK-2 and CHECK-RAS can be downloaded from http://www.fema.gov/mit/tsd/frm_soft.htm. We recommend that you review your HEC-2 and HEC-RAS models with CHECK-2 and CHECK-RAS. If you disagree with a message, please attach an explanation of why the message is not valid in this case. Review of your submittal and resolution of valid modeling discrepancies will result in reduced review time.

HEC-2/HEC-RAS models reviewed with CHECK-2/CHECK-RAS? ☒ Yes ☐ No

4. Models Submitted

Duplicate Effective Model*	Natural File Name:	Floodway File Name:
Corrected Effective Model*	Natural File Name:	Floodway File Name:
Existing or Pre-Project Conditions Model	Natural File Name: RV_Wash_I.prj	Floodway File Name: No Floodway
Revised or Post-Project Conditions Model	Natural File Name:	Floodway File Name:
Other - (attach description)	Natural File Name:	Floodway File Name:

*Not required for revisions to approximate 1%-annual-chance floodplains (Zone A) – for details, refer to the corresponding section of the instructions.

The document "Numerical Models Accepted by FEMA for NFIP Usage" lists the models accepted by FEMA. This document can be found at: http://www.fema.gov/mit/tsd/en_modl.htm.

C. MAPPING REQUIREMENTS

A **certified topographic map** must be submitted showing the following information (where applicable): the boundaries of the effective, existing, and proposed conditions 1%-annual-chance floodplain (for approximate Zone A revisions) or the boundaries of the 1%- and 0.2%-annual-chance floodplains and regulatory floodway (for detailed Zone AE, AO, and AH revisions); location and alignment of all cross sections with stationing control indicated; stream, road, and other alignments (e.g., dams, levees, etc.); current community easements and boundaries; boundaries of the requester's property; certification of a registered professional engineer registered in the subject State; location and description of reference marks; and the referenced vertical datum (NGVD, NAVD, etc.).

Note that the boundaries of the existing or proposed conditions floodplains and regulatory floodway to be shown on the revised FIRM and/or FBFM must tie-in with the effective floodplain and regulatory floodway boundaries. Please attach **a copy of the effective FIRM and/or FBFM,** annotated to show the boundaries of the revised 1%- and 0.2%-annual-chance floodplains and regulatory floodway that tie-in with the boundaries of the effective 1%- and 0.2%-annual-chance floodplain and regulatory floodway at the upstream and downstream limits of the area of revision.

D. COMMON REGULATORY REQUIREMENTS

1. For CLOMR requests, do Base Flood Elevations (BFEs) increase? ☐ Yes ☐ No

For CLOMR requests, if either of the following is true, please submit evidence of compliance with Section 65.12 of the NFIP regulations:
- The proposed project encroaches upon a regulatory floodway and would result in increases above 0.00 foot.
- The proposed project encroaches upon a SFHA with BFEs established and would result in increases above 1.00 foot.

2. Does the request involve the placement or proposed placement of fill? ☐ Yes ☒ No

If Yes, the community must be able to certify that the area to be removed from the special flood hazard area, to include any structures or proposed structures, meets all of the standards of the local floodplain ordinances, and is reasonably safe from flooding in accordance with the NFIP regulations set forth at 44 CFR 60.3(a)(3), 65.5(a)(4), and 65.6(a)(14). Please see the MT-2 instructions for more information.

3. For LOMR requests, is the regulatory floodway being revised? ☐ Yes ☒ No

If Yes, attach evidence of regulatory floodway revision notification. As per Paragraph 65.7(b)(1) of the NFIP Regulations, notification is required for requests involving revisions to the regulatory floodway. (Not required for revisions to approximate 1%-annual-chance floodplains [studied Zone A designation] unless a regulatory floodway is being added. Elements and examples of regulatory floodway revision notification can be found in the MT-2 Form 2 Instructions.)

4. For LOMR requests, does this request require property owner notification and acceptance of BFE increases? ☐ Yes ☒ No

If Yes, please attach proof of property owner notification and acceptance (if available). Elements of and examples of property owner notification can be found in the MT-2 Form 2 Instructions.

FEDERAL EMERGENCY MANAGEMENT AGENCY

RIVERINE HYDROLOGY & HYDRAULICS FORM

O.M.B No. 3067-0148
Expires September 30, 2005

PAPERWORK REDUCTION ACT

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Flooding Source: Rio Verde Wash K Split 4
Note: Fill out one form for each flooding source studied

A. HYDROLOGY

1. Reason for New Hydrologic Analysis (check all that apply)

☐ Not revised (skip to section 2) ☒ No existing analysis ☐ Improved data
☐ Alternative methodology ☐ Proposed Conditions (CLOMR) ☐ Changed physical condition of watershed

2. Comparison of Representative 1%-Annual-Chance Discharges

Location	Drainage Area (Sq. Mi.)	FIS (cfs)	Revised (cfs)

Methodology for New Hydrologic Analysis (check all that apply)

☐ Statistical Analysis of Gage Records ☒ Precipitation/Runoff Model HEC-1 [TR-20, HEC-1, HEC-HMS etc.]
☐ Regional Regression Equations ☐ Other (please attach description)

Please enclose all relevant models in digital format, maps, computations (including computation of parameters) and documentation to support the new analysis. The document, "Numerical Models Accepted by FEMA for NFIP Usage" lists the models accepted by FEMA. This document can be found at: http://www.fema.gov/mit/tsd/en_modl.htm.

4. Review/Approval of Analysis

If your community requires a regional, state, or federal agency to review the hydrologic analysis, please attach evidence of approval/review.

5. Impacts of Sediment Transport on Hydrology

Was sediment transport considered? ☐ Yes ☒ No If yes, then fill out Section F (Sediment Transport) of Form 3. If No, then attach your explanation for why sediment transport was not considered.

B. HYDRAULICS

1. Reach to be Revised

	Description	Cross Section	Water-Surface Elevations (ft.) Effective	Proposed/Revised
Downstream Limit	650'N & 2400'E of 136th St & Dove Valley	0.108		2548.91
Upstream Limit	650'S & 200'E of 136th St & Rock View Rd	0.497		2601.50

Hydraulic Method Used

Hydraulic Analysis HEC-RAS [HEC-2 , HEC-RAS, Other (Attach description)]

B. HYDRAULICS (CONTINUED)

3. Pre-Submittal Review of Hydraulic Models

FEMA has developed two review programs, CHECK-2 and CHECK-RAS, to aid in the review of HEC-2 and HEC-RAS hydraulic models, respectively. These review programs verify that the hydraulic estimates and assumptions in the model data are in accordance with NFIP requirements, and that the data are comparable with the assumptions and limitations of HEC-2/HEC-RAS. CHECK-2 and CHECK-RAS identify areas of potential error or concern. These tools do not replace engineering judgment. CHECK-2 and CHECK-RAS can be downloaded from http://www.fema.gov/mit/tsd/frm_soft.htm. We recommend that you review your HEC-2 and HEC-RAS models with CHECK-2 and CHECK-RAS. If you disagree with a message, please attach an explanation of why the message is not valid in this case. Review of your submittal and resolution of valid modeling discrepancies will result in reduced review time.

HEC-2/HEC-RAS models reviewed with CHECK-2/CHECK-RAS? ☒ Yes ☐ No

4. Models Submitted

Duplicate Effective Model*	Natural File Name:	Floodway File Name:
Corrected Effective Model*	Natural File Name:	Floodway File Name:
Existing or Pre-Project Conditions Model	Natural File Name: RV_Wash_K.prj	Floodway File Name: No Floodway
Revised or Post-Project Conditions Model	Natural File Name:	Floodway File Name:
Other - (attach description)	Natural File Name:	Floodway File Name:

*Not required for revisions to approximate 1%-annual-chance floodplains (Zone A) – for details, refer to the corresponding section of the instructions.

The document "Numerical Models Accepted by FEMA for NFIP Usage" lists the models accepted by FEMA. This document can be found at: http://www.fema.gov/mit/tsd/en_modl.htm.

C. MAPPING REQUIREMENTS

A **certified topographic map** must be submitted showing the following information (where applicable): the boundaries of the effective, existing, and proposed conditions 1%-annual-chance floodplain (for approximate Zone A revisions) or the boundaries of the 1%- and 0.2%-annual-chance floodplains and regulatory floodway (for detailed Zone AE, AO, and AH revisions); location and alignment of all cross sections with stationing control indicated; stream, road, and other alignments (e.g., dams, levees, etc.); current community easements and boundaries; boundaries of the requester's property; certification of a registered professional engineer registered in the subject State; location and description of reference marks; and the referenced vertical datum (NGVD, NAVD, etc.).

Note that the boundaries of the existing or proposed conditions floodplains and regulatory floodway to be shown on the revised FIRM and/or FBFM must tie-in with the effective floodplain and regulatory floodway boundaries. Please attach **a copy of the effective FIRM and/or FBFM,** annotated to show the boundaries of the revised 1%- and 0.2%-annual-chance floodplains and regulatory floodway that tie-in with the boundaries of the effective 1%- and 0.2%-annual-chance floodplain and regulatory floodway at the upstream and downstream limits of the area of revision.

D. COMMON REGULATORY REQUIREMENTS

1. For CLOMR requests, do Base Flood Elevations (BFEs) increase? ☐ Yes ☐ No

For CLOMR requests, if either of the following is true, please submit evidence of compliance with Section 65.12 of the NFIP regulations:
- The proposed project encroaches upon a regulatory floodway and would result in increases above 0.00 foot.
- The proposed project encroaches upon a SFHA with BFEs established and would result in increases above 1.00 foot.

2. Does the request involve the placement or proposed placement of fill? ☐ Yes ☒ No

If Yes, the community must be able to certify that the area to be removed from the special flood hazard area, to include any structures or proposed structures, meets all of the standards of the local floodplain ordinances, and is reasonably safe from flooding in accordance with the NFIP regulations set forth at 44 CFR 60.3(a)(3), 65.5(a)(4), and 65.6(a)(14). Please see the MT-2 instructions for more information.

3. For LOMR requests, is the regulatory floodway being revised? ☐ Yes ☒ No

If Yes, attach evidence of regulatory floodway revision notification. As per Paragraph 65.7(b)(1) of the NFIP Regulations, notification is required for requests involving revisions to the regulatory floodway. (Not required for revisions to approximate 1%-annual-chance floodplains [studied Zone A designation] unless a regulatory floodway is being added. Elements and examples of regulatory floodway revision notification can be found in the MT-2 Form 2 Instructions.)

4. For LOMR requests, does this request require property owner notification and acceptance of BFE increases? ☐ Yes ☒ No

If Yes, please attach proof of property owner notification and acceptance (if available). Elements of and examples of property owner notification can be found in the MT-2 Form 2 Instructions.

FEDERAL EMERGENCY MANAGEMENT AGENCY

RIVERINE HYDROLOGY & HYDRAULICS FORM

O.M.B No. 3067-0148
Expires September 30, 2005

PAPERWORK REDUCTION ACT

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Flooding Source: Rio Verde Wash K Trib 6
Note: Fill out one form for each flooding source studied

A. HYDROLOGY

1. Reason for New Hydrologic Analysis (check all that apply)

☐ Not revised (skip to section 2) ☒ No existing analysis ☐ Improved data
☐ Alternative methodology ☐ Proposed Conditions (CLOMR) ☐ Changed physical condition of watershed

2. Comparison of Representative 1%-Annual-Chance Discharges

Location	Drainage Area (Sq. Mi.)	FIS (cfs)	Revised (cfs)

Methodology for New Hydrologic Analysis (check all that apply)

☐ Statistical Analysis of Gage Records ☒ Precipitation/Runoff Model HEC-1 [TR-20, HEC-1, HEC-HMS etc.]
☐ Regional Regression Equations ☐ Other (please attach description)

Please enclose all relevant models in digital format, maps, computations (including computation of parameters) and documentation to support the new analysis. The document, "Numerical Models Accepted by FEMA for NFIP Usage" lists the models accepted by FEMA. This document can be found at: http://www.fema.gov/mit/tsd/en_modl.htm.

4. Review/Approval of Analysis

If your community requires a regional, state, or federal agency to review the hydrologic analysis, please attach evidence of approval/review.

5. Impacts of Sediment Transport on Hydrology

Was sediment transport considered? ☐ Yes ☒ No If yes, then fill out Section F (Sediment Transport) of Form 3. If No, then attach your explanation for why sediment transport was not considered.

B. HYDRAULICS

1. Reach to be Revised

	Description	Cross Section	Water-Surface Elevations (ft.) Effective	Proposed/Revised
Downstream Limit	500'N & 50'W of 144th St & Rock View Rd	5.368		2508.63
Upstream Limit	350'S & 2300'W of 144th St & Black Mnt R	5.986		2582.65

Hydraulic Method Used

Hydraulic Analysis HEC-RAS [HEC-2 , HEC-RAS, Other (Attach description)]

B. HYDRAULICS (CONTINUED)

3. Pre-Submittal Review of Hydraulic Models

FEMA has developed two review programs, CHECK-2 and CHECK-RAS, to aid in the review of HEC-2 and HEC-RAS hydraulic models, respectively. These review programs verify that the hydraulic estimates and assumptions in the model data are in accordance with NFIP requirements, and that the data are comparable with the assumptions and limitations of HEC-2/HEC-RAS. CHECK-2 and CHECK-RAS identify areas of potential error or concern. These tools do not replace engineering judgment. CHECK-2 and CHECK-RAS can be downloaded from http://www.fema.gov/mit/tsd/frm_soft.htm. We recommend that you review your HEC-2 and HEC-RAS models with CHECK-2 and CHECK-RAS. If you disagree with a message, please attach an explanation of why the message is not valid in this case. Review of your submittal and resolution of valid modeling discrepancies will result in reduced review time.

HEC-2/HEC-RAS models reviewed with CHECK-2/CHECK-RAS? ☒ Yes ☐ No

4. Models Submitted

Duplicate Effective Model*	Natural File Name:	Floodway File Name:
Corrected Effective Model*	Natural File Name:	Floodway File Name:
Existing or Pre-Project Conditions Model	Natural File Name: RV_Wash_K_Trib_6.prj	Floodway File Name: No Floodway
Revised or Post-Project Conditions Model	Natural File Name:	Floodway File Name:
Other - (attach description)	Natural File Name:	Floodway File Name:

*Not required for revisions to approximate 1%-annual-chance floodplains (Zone A) – for details, refer to the corresponding section of the instructions.

The document "Numerical Models Accepted by FEMA for NFIP Usage" lists the models accepted by FEMA. This document can be found at: http://www.fema.gov/mit/tsd/en_modl.htm.

C. MAPPING REQUIREMENTS

A **certified topographic map** must be submitted showing the following information (where applicable): the boundaries of the effective, existing, and proposed conditions 1%-annual-chance floodplain (for approximate Zone A revisions) or the boundaries of the 1%- and 0.2%-annual-chance floodplains and regulatory floodway (for detailed Zone AE, AO, and AH revisions); location and alignment of all cross sections with stationing control indicated; stream, road, and other alignments (e.g., dams, levees, etc.); current community easements and boundaries; boundaries of the requester's property; certification of a registered professional engineer registered in the subject State; location and description of reference marks; and the referenced vertical datum (NGVD, NAVD, etc.).

Note that the boundaries of the existing or proposed conditions floodplains and regulatory floodway to be shown on the revised FIRM and/or FBFM must tie-in with the effective floodplain and regulatory floodway boundaries. Please attach **a copy of the effective FIRM and/or FBFM,** annotated to show the boundaries of the revised 1%- and 0.2%-annual-chance floodplains and regulatory floodway that tie-in with the boundaries of the effective 1%- and 0.2%-annual-chance floodplain and regulatory floodway at the upstream and downstream limits of the area of revision.

D. COMMON REGULATORY REQUIREMENTS

1. For CLOMR requests, do Base Flood Elevations (BFEs) increase? ☐ Yes ☐ No

For CLOMR requests, if either of the following is true, please submit evidence of compliance with Section 65.12 of the NFIP regulations:
- The proposed project encroaches upon a regulatory floodway and would result in increases above 0.00 foot.
- The proposed project encroaches upon a SFHA with BFEs established and would result in increases above 1.00 foot.

2. Does the request involve the placement or proposed placement of fill? ☐ Yes ☒ No

If Yes, the community must be able to certify that the area to be removed from the special flood hazard area, to include any structures or proposed structures, meets all of the standards of the local floodplain ordinances, and is reasonably safe from flooding in accordance with the NFIP regulations set forth at 44 CFR 60.3(a)(3), 65.5(a)(4), and 65.6(a)(14). Please see the MT-2 instructions for more information.

3. For LOMR requests, is the regulatory floodway being revised? ☐ Yes ☒ No

If Yes, attach evidence of regulatory floodway revision notification. As per Paragraph 65.7(b)(1) of the NFIP Regulations, notification is required for requests involving revisions to the regulatory floodway. (Not required for revisions to approximate 1%-annual-chance floodplains [studied Zone A designation] unless a regulatory floodway is being added. Elements and examples of regulatory floodway revision notification can be found in the MT-2 Form 2 Instructions.)

4. For LOMR requests, does this request require property owner notification and acceptance of BFE increases? ☐ Yes ☒ No

If Yes, please attach proof of property owner notification and acceptance (if available). Elements of and examples of property owner notification can be found in the MT-2 Form 2 Instructions.

FEDERAL EMERGENCY MANAGEMENT AGENCY

RIVERINE HYDROLOGY & HYDRAULICS FORM

O.M.B No. 3067-0148
Expires September 30, 2005

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Flooding Source: Rio Verde Wash K Trib 6D1
Note: Fill out one form for each flooding source studied

A. HYDROLOGY

1. Reason for New Hydrologic Analysis (check all that apply)

☐ Not revised (skip to section 2) ☒ No existing analysis ☐ Improved data
☐ Alternative methodology ☐ Proposed Conditions (CLOMR) ☐ Changed physical condition of watershed

2. Comparison of Representative 1%-Annual-Chance Discharges

Location	Drainage Area (Sq. Mi.)	FIS (cfs)	Revised (cfs)

Methodology for New Hydrologic Analysis (check all that apply)

☐ Statistical Analysis of Gage Records ☒ Precipitation/Runoff Model HEC-1 [TR-20, HEC-1, HEC-HMS etc.]
☐ Regional Regression Equations ☐ Other (please attach description)

Please enclose all relevant models in digital format, maps, computations (including computation of parameters) and documentation to support the new analysis. The document, "Numerical Models Accepted by FEMA for NFIP Usage" lists the models accepted by FEMA. This document can be found at: http://www.fema.gov/mit/tsd/en_modl.htm.

4. Review/Approval of Analysis

If your community requires a regional, state, or federal agency to review the hydrologic analysis, please attach evidence of approval/review.

5. Impacts of Sediment Transport on Hydrology

Was sediment transport considered? ☐ Yes ☒ No If yes, then fill out Section F (Sediment Transport) of Form 3. If No, then attach your explanation for why sediment transport was not considered.

B. HYDRAULICS

1. Reach to be Revised

	Description	Cross Section	Water-Surface Elevations (ft.) Effective	Proposed/Revised
Downstream Limit	900'S & 50'W of 144th St & Rock View Rd	0.297		2489.70
Upstream Limit	500'N & 3100'W of 144th St & Rock View R	1.085		2581.86

Hydraulic Method Used

Hydraulic Analysis HEC-RAS [HEC-2 , HEC-RAS, Other (Attach description)]

B. HYDRAULICS (CONTINUED)

3. Pre-Submittal Review of Hydraulic Models

FEMA has developed two review programs, CHECK-2 and CHECK-RAS, to aid in the review of HEC-2 and HEC-RAS hydraulic models, respectively. These review programs verify that the hydraulic estimates and assumptions in the model data are in accordance with NFIP requirements, and that the data are comparable with the assumptions and limitations of HEC-2/HEC-RAS. CHECK-2 and CHECK-RAS identify areas of potential error or concern. These tools do not replace engineering judgment. CHECK-2 and CHECK-RAS can be downloaded from http://www.fema.gov/mit/tsd/frm_soft.htm. We recommend that you review your HEC-2 and HEC-RAS models with CHECK-2 and CHECK-RAS. If you disagree with a message, please attach an explanation of why the message is not valid in this case. Review of your submittal and resolution of valid modeling discrepancies will result in reduced review time.

HEC-2/HEC-RAS models reviewed with CHECK-2/CHECK-RAS? ☒ Yes ☐ No

4. Models Submitted

Duplicate Effective Model*	Natural File Name:	Floodway File Name:
Corrected Effective Model*	Natural File Name:	Floodway File Name:
Existing or Pre-Project Conditions Model	Natural File Name: RV_Wash_K_Trib_6.prj	Floodway File Name: No Floodway
Revised or Post-Project Conditions Model	Natural File Name:	Floodway File Name:
Other - (attach description)	Natural File Name:	Floodway File Name:

*Not required for revisions to approximate 1%-annual-chance floodplains (Zone A) – for details, refer to the corresponding section of the instructions.

The document "Numerical Models Accepted by FEMA for NFIP Usage" lists the models accepted by FEMA. This document can be found at: http://www.fema.gov/mit/tsd/en_modl.htm.

C. MAPPING REQUIREMENTS

A **certified topographic map** must be submitted showing the following information (where applicable): the boundaries of the effective, existing, and proposed conditions 1%-annual-chance floodplain (for approximate Zone A revisions) or the boundaries of the 1%- and 0.2%-annual-chance floodplains and regulatory floodway (for detailed Zone AE, AO, and AH revisions); location and alignment of all cross sections with stationing control indicated; stream, road, and other alignments (e.g., dams, levees, etc.); current community easements and boundaries; boundaries of the requester's property; certification of a registered professional engineer registered in the subject State; location and description of reference marks; and the referenced vertical datum (NGVD, NAVD, etc.).

Note that the boundaries of the existing or proposed conditions floodplains and regulatory floodway to be shown on the revised FIRM and/or FBFM must tie-in with the effective floodplain and regulatory floodway boundaries. Please attach **a copy of the effective FIRM and/or FBFM,** annotated to show the boundaries of the revised 1%- and 0.2%-annual-chance floodplains and regulatory floodway that tie-in with the boundaries of the effective 1%- and 0.2%-annual-chance floodplain and regulatory floodway at the upstream and downstream limits of the area of revision.

D. COMMON REGULATORY REQUIREMENTS

1. For CLOMR requests, do Base Flood Elevations (BFEs) increase? ☐ Yes ☐ No

For CLOMR requests, if either of the following is true, please submit evidence of compliance with Section 65.12 of the NFIP regulations:
- The proposed project encroaches upon a regulatory floodway and would result in increases above 0.00 foot.
- The proposed project encroaches upon a SFHA with BFEs established and would result in increases above 1.00 foot.

2. Does the request involve the placement or proposed placement of fill? ☐ Yes ☒ No

If Yes, the community must be able to certify that the area to be removed from the special flood hazard area, to include any structures or proposed structures, meets all of the standards of the local floodplain ordinances, and is reasonably safe from flooding in accordance with the NFIP regulations set forth at 44 CFR 60.3(a)(3), 65.5(a)(4), and 65.6(a)(14). Please see the MT-2 instructions for more information.

3. For LOMR requests, is the regulatory floodway being revised? ☐ Yes ☒ No

If Yes, attach evidence of regulatory floodway revision notification. As per Paragraph 65.7(b)(1) of the NFIP Regulations, notification is required for requests involving revisions to the regulatory floodway. (Not required for revisions to approximate 1%-annual-chance floodplains [studied Zone A designation] unless a regulatory floodway is being added. Elements and examples of regulatory floodway revision notification can be found in the MT-2 Form 2 Instructions.)

4. For LOMR requests, does this request require property owner notification and acceptance of BFE increases? ☐ Yes ☒ No

If Yes, please attach proof of property owner notification and acceptance (if available). Elements of and examples of property owner notification can be found in the MT-2 Form 2 Instructions.

FEDERAL EMERGENCY MANAGEMENT AGENCY

RIVERINE HYDROLOGY & HYDRAULICS FORM

O.M.B No. 3067-0148
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Flooding Source: Rio Verde Wash K Trib 6D
Note: Fill out one form for each flooding source studied

A. HYDROLOGY

1. Reason for New Hydrologic Analysis (check all that apply)

☐ Not revised (skip to section 2) ☒ No existing analysis ☐ Improved data
☐ Alternative methodology ☐ Proposed Conditions (CLOMR) ☐ Changed physical condition of watershed

2. Comparison of Representative 1%-Annual-Chance Discharges

Location	Drainage Area (Sq. Mi.)	FIS (cfs)	Revised (cfs)

Methodology for New Hydrologic Analysis (check all that apply)

☐ Statistical Analysis of Gage Records ☒ Precipitation/Runoff Model HEC-1 [TR-20, HEC-1, HEC-HMS etc.]
☐ Regional Regression Equations ☐ Other (please attach description)

Please enclose all relevant models in digital format, maps, computations (including computation of parameters) and documentation to support the new analysis. The document, "Numerical Models Accepted by FEMA for NFIP Usage" lists the models accepted by FEMA. This document can be found at: http://www.fema.gov/mit/tsd/en_modl.htm.

4. Review/Approval of Analysis

If your community requires a regional, state, or federal agency to review the hydrologic analysis, please attach evidence of approval/review.

5. Impacts of Sediment Transport on Hydrology

Was sediment transport considered? ☐ Yes ☒ No If yes, then fill out Section F (Sediment Transport) of Form 3. If No, then attach your explanation for why sediment transport was not considered.

B. HYDRAULICS

1. Reach to be Revised

	Description	Cross Section	Water-Surface Elevations (ft.) Effective	Proposed/Revised
Downstream Limit	600'S & 20'W of 144th St & Rock View Rd	1.313		2491.73
Upstream Limit	900'S & 200'W of 144th St & Black Mnt Rd	2.629		2657.08

Hydraulic Method Used

Hydraulic Analysis HEC-RAS [HEC-2 , HEC-RAS, Other (Attach description)]

B. HYDRAULICS (CONTINUED)

3. Pre-Submittal Review of Hydraulic Models

FEMA has developed two review programs, CHECK-2 and CHECK-RAS, to aid in the review of HEC-2 and HEC-RAS hydraulic models, respectively. These review programs verify that the hydraulic estimates and assumptions in the model data are in accordance with NFIP requirements, and that the data are comparable with the assumptions and limitations of HEC-2/HEC-RAS. CHECK-2 and CHECK-RAS identify areas of potential error or concern. These tools do not replace engineering judgment. CHECK-2 and CHECK-RAS can be downloaded from http://www.fema.gov/mit/tsd/frm_soft.htm. We recommend that you review your HEC-2 and HEC-RAS models with CHECK-2 and CHECK-RAS. If you disagree with a message, please attach an explanation of why the message is not valid in this case. Review of your submittal and resolution of valid modeling discrepancies will result in reduced review time.

HEC-2/HEC-RAS models reviewed with CHECK-2/CHECK-RAS? ☒ Yes ☐ No

4. Models Submitted

Duplicate Effective Model*	Natural File Name:	Floodway File Name:
Corrected Effective Model*	Natural File Name:	Floodway File Name:
Existing or Pre-Project Conditions Model	Natural File Name: RV_Wash_K_Trib_6.prj	Floodway File Name: No Floodway
Revised or Post-Project Conditions Model	Natural File Name:	Floodway File Name:
Other - (attach description)	Natural File Name:	Floodway File Name:

*Not required for revisions to approximate 1%-annual-chance floodplains (Zone A) – for details, refer to the corresponding section of the instructions.

The document "Numerical Models Accepted by FEMA for NFIP Usage" lists the models accepted by FEMA. This document can be found at: http://www.fema.gov/mit/tsd/en_modl.htm.

C. MAPPING REQUIREMENTS

A **certified topographic map** must be submitted showing the following information (where applicable): the boundaries of the effective, existing, and proposed conditions 1%-annual-chance floodplain (for approximate Zone A revisions) or the boundaries of the 1%- and 0.2%-annual-chance floodplains and regulatory floodway (for detailed Zone AE, AO, and AH revisions); location and alignment of all cross sections with stationing control indicated; stream, road, and other alignments (e.g., dams, levees, etc.); current community easements and boundaries; boundaries of the requester's property; certification of a registered professional engineer registered in the subject State; location and description of reference marks; and the referenced vertical datum (NGVD, NAVD, etc.).

Note that the boundaries of the existing or proposed conditions floodplains and regulatory floodway to be shown on the revised FIRM and/or FBFM must tie-in with the effective floodplain and regulatory floodway boundaries. Please attach **a copy of the effective FIRM and/or FBFM,** annotated to show the boundaries of the revised 1%- and 0.2%-annual-chance floodplains and regulatory floodway that tie-in with the boundaries of the effective 1%- and 0.2%-annual-chance floodplain and regulatory floodway at the upstream and downstream limits of the area of revision.

D. COMMON REGULATORY REQUIREMENTS

1. For CLOMR requests, do Base Flood Elevations (BFEs) increase? ☐ Yes ☐ No

For CLOMR requests, if either of the following is true, please submit evidence of compliance with Section 65.12 of the NFIP regulations:
- The proposed project encroaches upon a regulatory floodway and would result in increases above 0.00 foot.
- The proposed project encroaches upon a SFHA with BFEs established and would result in increases above 1.00 foot.

2. Does the request involve the placement or proposed placement of fill? ☐ Yes ☒ No

If Yes, the community must be able to certify that the area to be removed from the special flood hazard area, to include any structures or proposed structures, meets all of the standards of the local floodplain ordinances, and is reasonably safe from flooding in accordance with the NFIP regulations set forth at 44 CFR 60.3(a)(3), 65.5(a)(4), and 65.6(a)(14). Please see the MT-2 instructions for more information.

3. For LOMR requests, is the regulatory floodway being revised? ☐ Yes ☒ No

If Yes, attach evidence of regulatory floodway revision notification. As per Paragraph 65.7(b)(1) of the NFIP Regulations, notification is required for requests involving revisions to the regulatory floodway. (Not required for revisions to approximate 1%-annual-chance floodplains [studied Zone A designation] unless a regulatory floodway is being added. Elements and examples of regulatory floodway revision notification can be found in the MT-2 Form 2 Instructions.)

4. For LOMR requests, does this request require property owner notification and acceptance of BFE increases? ☐ Yes ☒ No

If Yes, please attach proof of property owner notification and acceptance (if available). Elements of and examples of property owner notification can be found in the MT-2 Form 2 Instructions.

FEDERAL EMERGENCY MANAGEMENT AGENCY

RIVERINE HYDROLOGY & HYDRAULICS FORM

O.M.B No. 3067-0148
Expires September 30, 2005

PAPERWORK REDUCTION ACT

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Flooding Source: Rio Verde Wash K Trib 11
Note: Fill out one form for each flooding source studied

A. HYDROLOGY

1. Reason for New Hydrologic Analysis (check all that apply)

☐ Not revised (skip to section 2) ☒ No existing analysis ☐ Improved data
☐ Alternative methodology ☐ Proposed Conditions (CLOMR) ☐ Changed physical condition of watershed

2. Comparison of Representative 1%-Annual-Chance Discharges

Location	Drainage Area (Sq. Mi.)	FIS (cfs)	Revised (cfs)

Methodology for New Hydrologic Analysis (check all that apply)

☐ Statistical Analysis of Gage Records ☒ Precipitation/Runoff Model HEC-1 [TR-20, HEC-1, HEC-HMS etc.]
☐ Regional Regression Equations ☐ Other (please attach description)

Please enclose all relevant models in digital format, maps, computations (including computation of parameters) and documentation to support the new analysis. The document, "Numerical Models Accepted by FEMA for NFIP Usage" lists the models accepted by FEMA. This document can be found at: http://www.fema.gov/mit/tsd/en_modl.htm.

4. Review/Approval of Analysis

If your community requires a regional, state, or federal agency to review the hydrologic analysis, please attach evidence of approval/review.

5. Impacts of Sediment Transport on Hydrology

Was sediment transport considered? ☐ Yes ☒ No If yes, then fill out Section F (Sediment Transport) of Form 3. If No, then attach your explanation for why sediment transport was not considered.

B. HYDRAULICS

1. Reach to be Revised

	Description	Cross Section	Water-Surface Elevations (ft.) Effective	Proposed/Revised
Downstream Limit	2100'N & 2700'E of 136th St & Lone Mnt R	0.831		2503.35
Upstream Limit	3700'N & 300'W of 136th St & Lone Mnt Rd	1.534		2596.82

Hydraulic Method Used

Hydraulic Analysis HEC-RAS [HEC-2 , HEC-RAS, Other (Attach description)]

B. HYDRAULICS (CONTINUED)

3. Pre-Submittal Review of Hydraulic Models

FEMA has developed two review programs, CHECK-2 and CHECK-RAS, to aid in the review of HEC-2 and HEC-RAS hydraulic models, respectively. These review programs verify that the hydraulic estimates and assumptions in the model data are in accordance with NFIP requirements, and that the data are comparable with the assumptions and limitations of HEC-2/HEC-RAS. CHECK-2 and CHECK-RAS identify areas of potential error or concern. These tools do not replace engineering judgment. CHECK-2 and CHECK-RAS can be downloaded from http://www.fema.gov/mit/tsd/frm_soft.htm. We recommend that you review your HEC-2 and HEC-RAS models with CHECK-2 and CHECK-RAS. If you disagree with a message, please attach an explanation of why the message is not valid in this case. Review of your submittal and resolution of valid modeling discrepancies will result in reduced review time.

HEC-2/HEC-RAS models reviewed with CHECK-2/CHECK-RAS? ☒ Yes ☐ No

4. Models Submitted

Duplicate Effective Model*	Natural File Name:	Floodway File Name:
Corrected Effective Model*	Natural File Name:	Floodway File Name:
Existing or Pre-Project Conditions Model	Natural File Name: RV_Wash_K_Trib_1.prj	Floodway File Name: No Floodway
Revised or Post-Project Conditions Model	Natural File Name:	Floodway File Name:
Other - (attach description)	Natural File Name:	Floodway File Name:

*Not required for revisions to approximate 1%-annual-chance floodplains (Zone A) – for details, refer to the corresponding section of the instructions.

The document "Numerical Models Accepted by FEMA for NFIP Usage" lists the models accepted by FEMA. This document can be found at: http://www.fema.gov/mit/tsd/en_modl.htm.

C. MAPPING REQUIREMENTS

A **certified topographic map** must be submitted showing the following information (where applicable): the boundaries of the effective, existing, and proposed conditions 1%-annual-chance floodplain (for approximate Zone A revisions) or the boundaries of the 1%- and 0.2%-annual-chance floodplains and regulatory floodway (for detailed Zone AE, AO, and AH revisions); location and alignment of all cross sections with stationing control indicated; stream, road, and other alignments (e.g., dams, levees, etc.); current community easements and boundaries; boundaries of the requester's property; certification of a registered professional engineer registered in the subject State; location and description of reference marks; and the referenced vertical datum (NGVD, NAVD, etc.).

Note that the boundaries of the existing or proposed conditions floodplains and regulatory floodway to be shown on the revised FIRM and/or FBFM must tie-in with the effective floodplain and regulatory floodway boundaries. Please attach **a copy of the effective FIRM and/or FBFM,** annotated to show the boundaries of the revised 1%- and 0.2%-annual-chance floodplains and regulatory floodway that tie-in with the boundaries of the effective 1%- and 0.2%-annual-chance floodplain and regulatory floodway at the upstream and downstream limits of the area of revision.

D. COMMON REGULATORY REQUIREMENTS

1. For CLOMR requests, do Base Flood Elevations (BFEs) increase? ☐ Yes ☐ No

For CLOMR requests, if either of the following is true, please submit evidence of compliance with Section 65.12 of the NFIP regulations:
- The proposed project encroaches upon a regulatory floodway and would result in increases above 0.00 foot.
- The proposed project encroaches upon a SFHA with BFEs established and would result in increases above 1.00 foot.

2. Does the request involve the placement or proposed placement of fill? ☐ Yes ☒ No

If Yes, the community must be able to certify that the area to be removed from the special flood hazard area, to include any structures or proposed structures, meets all of the standards of the local floodplain ordinances, and is reasonably safe from flooding in accordance with the NFIP regulations set forth at 44 CFR 60.3(a)(3), 65.5(a)(4), and 65.6(a)(14). Please see the MT-2 instructions for more information.

3. For LOMR requests, is the regulatory floodway being revised? ☐ Yes ☒ No

If Yes, attach evidence of regulatory floodway revision notification. As per Paragraph 65.7(b)(1) of the NFIP Regulations, notification is required for requests involving revisions to the regulatory floodway. (Not required for revisions to approximate 1%-annual-chance floodplains [studied Zone A designation] unless a regulatory floodway is being added. Elements and examples of regulatory floodway revision notification can be found in the MT-2 Form 2 Instructions.)

4. For LOMR requests, does this request require property owner notification and acceptance of BFE increases? ☐ Yes ☒ No

If Yes, please attach proof of property owner notification and acceptance (if available). Elements of and examples of property owner notification can be found in the MT-2 Form 2 Instructions.

FEDERAL EMERGENCY MANAGEMENT AGENCY

RIVERINE HYDROLOGY & HYDRAULICS FORM

O.M.B No. 3067-0148
Expires September 30, 2005

PAPERWORK REDUCTION ACT

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Flooding Source: Rio Verde Wash K Trib 11A
Note: Fill out one form for each flooding source studied

A. HYDROLOGY

1. Reason for New Hydrologic Analysis (check all that apply)

☐ Not revised (skip to section 2) ☒ No existing analysis ☐ Improved data
☐ Alternative methodology ☐ Proposed Conditions (CLOMR) ☐ Changed physical condition of watershed

2. Comparison of Representative 1%-Annual-Chance Discharges

Location	Drainage Area (Sq. Mi.)	FIS (cfs)	Revised (cfs)

Methodology for New Hydrologic Analysis (check all that apply)

☐ Statistical Analysis of Gage Records ☒ Precipitation/Runoff Model HEC-1 [TR-20, HEC-1, HEC-HMS etc.]
☐ Regional Regression Equations ☐ Other (please attach description)

Please enclose all relevant models in digital format, maps, computations (including computation of parameters) and documentation to support the new analysis. The document, "Numerical Models Accepted by FEMA for NFIP Usage" lists the models accepted by FEMA. This document can be found at: http://www.fema.gov/mit/tsd/en_modl.htm.

4. Review/Approval of Analysis

If your community requires a regional, state, or federal agency to review the hydrologic analysis, please attach evidence of approval/review.

5. Impacts of Sediment Transport on Hydrology

Was sediment transport considered? ☐ Yes ☒ No If yes, then fill out Section F (Sediment Transport) of Form 3. If No, then attach your explanation for why sediment transport was not considered.

B. HYDRAULICS

1. Reach to be Revised

	Description	Cross Section	Water-Surface Elevations (ft.) Effective	Proposed/Revised
Downstream Limit	2400'N & 750'W of 144th St & Lone Mnt Rd	0.182		2456.90
Upstream Limit	3000'N & 2300'W of 144th St & Lone Mnt R	0.542		2500.11

2. Hydraulic Method Used

Hydraulic Analysis HEC-RAS [HEC-2 , HEC-RAS, Other (Attach description)]

B. HYDRAULICS (CONTINUED)

3. Pre-Submittal Review of Hydraulic Models

FEMA has developed two review programs, CHECK-2 and CHECK-RAS, to aid in the review of HEC-2 and HEC-RAS hydraulic models, respectively. These review programs verify that the hydraulic estimates and assumptions in the model data are in accordance with NFIP requirements, and that the data are comparable with the assumptions and limitations of HEC-2/HEC-RAS. CHECK-2 and CHECK-RAS identify areas of potential error or concern. These tools do not replace engineering judgment. CHECK-2 and CHECK-RAS can be downloaded from http://www.fema.gov/mit/tsd/frm_soft.htm. We recommend that you review your HEC-2 and HEC-RAS models with CHECK-2 and CHECK-RAS. If you disagree with a message, please attach an explanation of why the message is not valid in this case. Review of your submittal and resolution of valid modeling discrepancies will result in reduced review time.

HEC-2/HEC-RAS models reviewed with CHECK-2/CHECK-RAS? ☒ Yes ☐ No

4. Models Submitted

Duplicate Effective Model*	Natural File Name:	Floodway File Name:
Corrected Effective Model*	Natural File Name:	Floodway File Name:
Existing or Pre-Project Conditions Model	Natural File Name: RV_Wash_K_Trib_1.prj	Floodway File Name: No Floodway
Revised or Post-Project Conditions Model	Natural File Name:	Floodway File Name:
Other - (attach description)	Natural File Name:	Floodway File Name:

*Not required for revisions to approximate 1%-annual-chance floodplains (Zone A) – for details, refer to the corresponding section of the instructions.

The document "Numerical Models Accepted by FEMA for NFIP Usage" lists the models accepted by FEMA. This document can be found at: http://www.fema.gov/mit/tsd/en_modl.htm.

C. MAPPING REQUIREMENTS

A **certified topographic map** must be submitted showing the following information (where applicable): the boundaries of the effective, existing, and proposed conditions 1%-annual-chance floodplain (for approximate Zone A revisions) or the boundaries of the 1%- and 0.2%-annual-chance floodplains and regulatory floodway (for detailed Zone AE, AO, and AH revisions); location and alignment of all cross sections with stationing control indicated; stream, road, and other alignments (e.g., dams, levees, etc.); current community easements and boundaries; boundaries of the requester's property; certification of a registered professional engineer registered in the subject State; location and description of reference marks; and the referenced vertical datum (NGVD, NAVD, etc.).

Note that the boundaries of the existing or proposed conditions floodplains and regulatory floodway to be shown on the revised FIRM and/or FBFM must tie-in with the effective floodplain and regulatory floodway boundaries. Please attach a **copy of the effective FIRM and/or FBFM,** annotated to show the boundaries of the revised 1%- and 0.2%-annual-chance floodplains and regulatory floodway that tie-in with the boundaries of the effective 1%- and 0.2%-annual-chance floodplain and regulatory floodway at the upstream and downstream limits of the area of revision.

D. COMMON REGULATORY REQUIREMENTS

1. For CLOMR requests, do Base Flood Elevations (BFEs) increase? ☐ Yes ☐ No

For CLOMR requests, if either of the following is true, please submit evidence of compliance with Section 65.12 of the NFIP regulations:
- The proposed project encroaches upon a regulatory floodway and would result in increases above 0.00 foot.
- The proposed project encroaches upon a SFHA with BFEs established and would result in increases above 1.00 foot.

2. Does the request involve the placement or proposed placement of fill? ☐ Yes ☒ No

If Yes, the community must be able to certify that the area to be removed from the special flood hazard area, to include any structures or proposed structures, meets all of the standards of the local floodplain ordinances, and is reasonably safe from flooding in accordance with the NFIP regulations set forth at 44 CFR 60.3(a)(3), 65.5(a)(4), and 65.6(a)(14). Please see the MT-2 instructions for more information.

3. For LOMR requests, is the regulatory floodway being revised? ☐ Yes ☒ No

If Yes, attach evidence of regulatory floodway revision notification. As per Paragraph 65.7(b)(1) of the NFIP Regulations, notification is required for requests involving revisions to the regulatory floodway. (Not required for revisions to approximate 1%-annual-chance floodplains [studied Zone A designation] unless a regulatory floodway is being added. Elements and examples of regulatory floodway revision notification can be found in the MT-2 Form 2 Instructions.)

4. For LOMR requests, does this request require property owner notification and acceptance of BFE increases? ☐ Yes ☒ No

If Yes, please attach proof of property owner notification and acceptance (if available). Elements of and examples of property owner notification can be found in the MT-2 Form 2 Instructions.

FEDERAL EMERGENCY MANAGEMENT AGENCY

RIVERINE HYDROLOGY & HYDRAULICS FORM

O.M.B No. 3067-0148
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Flooding Source: Rio Verde Wash K Trib 11B
Note: Fill out one form for each flooding source studied

A. HYDROLOGY

1. Reason for New Hydrologic Analysis (check all that apply)

☐ Not revised (skip to section 2) ☒ No existing analysis ☐ Improved data
☐ Alternative methodology ☐ Proposed Conditions (CLOMR) ☐ Changed physical condition of watershed

2. Comparison of Representative 1%-Annual-Chance Discharges

Location	Drainage Area (Sq. Mi.)	FIS (cfs)	Revised (cfs)

Methodology for New Hydrologic Analysis (check all that apply)

☐ Statistical Analysis of Gage Records ☒ Precipitation/Runoff Model HEC-1 [TR-20, HEC-1, HEC-HMS etc.]
☐ Regional Regression Equations ☐ Other (please attach description)

Please enclose all relevant models in digital format, maps, computations (including computation of parameters) and documentation to support the new analysis. The document, "Numerical Models Accepted by FEMA for NFIP Usage" lists the models accepted by FEMA. This document can be found at: http://www.fema.gov/mit/tsd/en_modl.htm.

4. Review/Approval of Analysis

If your community requires a regional, state, or federal agency to review the hydrologic analysis, please attach evidence of approval/review.

5. Impacts of Sediment Transport on Hydrology

Was sediment transport considered? ☐ Yes ☒ No If yes, then fill out Section F (Sediment Transport) of Form 3. If No, then attach your explanation for why sediment transport was not considered.

B. HYDRAULICS

1. Reach to be Revised

	Description	Cross Section	Water-Surface Elevations (ft.) Effective	Proposed/Revised
Downstream Limit	2100'N & 2700'E of 136th St & Lone Mnt R	0.103		2514.85
Upstream Limit	3100'N & 200'W of 136th St & Lone Mnt Rd	0.627		2584.45

2. Hydraulic Method Used

Hydraulic Analysis HEC-RAS [HEC-2 , HEC-RAS, Other (Attach description)]

B. HYDRAULICS (CONTINUED)

3. Pre-Submittal Review of Hydraulic Models

FEMA has developed two review programs, CHECK-2 and CHECK-RAS, to aid in the review of HEC-2 and HEC-RAS hydraulic models, respectively. These review programs verify that the hydraulic estimates and assumptions in the model data are in accordance with NFIP requirements, and that the data are comparable with the assumptions and limitations of HEC-2/HEC-RAS. CHECK-2 and CHECK-RAS identify areas of potential error or concern. These tools do not replace engineering judgment. CHECK-2 and CHECK-RAS can be downloaded from http://www.fema.gov/mit/tsd/frm_soft.htm. We recommend that you review your HEC-2 and HEC-RAS models with CHECK-2 and CHECK-RAS. If you disagree with a message, please attach an explanation of why the message is not valid in this case. Review of your submittal and resolution of valid modeling discrepancies will result in reduced review time.

HEC-2/HEC-RAS models reviewed with CHECK-2/CHECK-RAS? ☒ Yes ☐ No

4. Models Submitted

Duplicate Effective Model*	Natural File Name:	Floodway File Name:
Corrected Effective Model*	Natural File Name:	Floodway File Name:
Existing or Pre-Project Conditions Model	Natural File Name: RV_Wash_K_Trib_1.prj	Floodway File Name: No Floodway
Revised or Post-Project Conditions Model	Natural File Name:	Floodway File Name:
Other - (attach description)	Natural File Name:	Floodway File Name:

*Not required for revisions to approximate 1%-annual-chance floodplains (Zone A) – for details, refer to the corresponding section of the instructions.

The document "Numerical Models Accepted by FEMA for NFIP Usage" lists the models accepted by FEMA. This document can be found at: http://www.fema.gov/mit/tsd/en_modl.htm.

C. MAPPING REQUIREMENTS

A **certified topographic map** must be submitted showing the following information (where applicable): the boundaries of the effective, existing, and proposed conditions 1%-annual-chance floodplain (for approximate Zone A revisions) or the boundaries of the 1%- and 0.2%-annual-chance floodplains and regulatory floodway (for detailed Zone AE, AO, and AH revisions); location and alignment of all cross sections with stationing control indicated; stream, road, and other alignments (e.g., dams, levees, etc.); current community easements and boundaries; boundaries of the requester's property; certification of a registered professional engineer registered in the subject State; location and description of reference marks; and the referenced vertical datum (NGVD, NAVD, etc.).

Note that the boundaries of the existing or proposed conditions floodplains and regulatory floodway to be shown on the revised FIRM and/or FBFM must tie-in with the effective floodplain and regulatory floodway boundaries. Please attach **a copy of the effective FIRM and/or FBFM,** annotated to show the boundaries of the revised 1%- and 0.2%-annual-chance floodplains and regulatory floodway that tie-in with the boundaries of the effective 1%- and 0.2%-annual-chance floodplain and regulatory floodway at the upstream and downstream limits of the area of revision.

D. COMMON REGULATORY REQUIREMENTS

1. For CLOMR requests, do Base Flood Elevations (BFEs) increase? ☐ Yes ☐ No

For CLOMR requests, if either of the following is true, please submit evidence of compliance with Section 65.12 of the NFIP regulations:
- The proposed project encroaches upon a regulatory floodway and would result in increases above 0.00 foot.
- The proposed project encroaches upon a SFHA with BFEs established and would result in increases above 1.00 foot.

2. Does the request involve the placement or proposed placement of fill? ☐ Yes ☒ No

If Yes, the community must be able to certify that the area to be removed from the special flood hazard area, to include any structures or proposed structures, meets all of the standards of the local floodplain ordinances, and is reasonably safe from flooding in accordance with the NFIP regulations set forth at 44 CFR 60.3(a)(3), 65.5(a)(4), and 65.6(a)(14). Please see the MT-2 instructions for more information.

3. For LOMR requests, is the regulatory floodway being revised? ☐ Yes ☒ No

If Yes, attach evidence of regulatory floodway revision notification. As per Paragraph 65.7(b)(1) of the NFIP Regulations, notification is required for requests involving revisions to the regulatory floodway. (Not required for revisions to approximate 1%-annual-chance floodplains [studied Zone A designation] unless a regulatory floodway is being added. Elements and examples of regulatory floodway revision notification can be found in the MT-2 Form 2 Instructions.)

4. For LOMR requests, does this request require property owner notification and acceptance of BFE increases? ☐ Yes ☒ No

If Yes, please attach proof of property owner notification and acceptance (if available). Elements of and examples of property owner notification can be found in the MT-2 Form 2 Instructions.

FEDERAL EMERGENCY MANAGEMENT AGENCY

RIVERINE HYDROLOGY & HYDRAULICS FORM

O.M.B No. 3067-0148
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Flooding Source: Rio Verde Wash K Trib 12
Note: Fill out one form for each flooding source studied

A. HYDROLOGY

1. Reason for New Hydrologic Analysis (check all that apply)

☐ Not revised (skip to section 2) ☒ No existing analysis ☐ Improved data
☐ Alternative methodology ☐ Proposed Conditions (CLOMR) ☐ Changed physical condition of watershed

2. Comparison of Representative 1%-Annual-Chance Discharges

Location	Drainage Area (Sq. Mi.)	FIS (cfs)	Revised (cfs)

Methodology for New Hydrologic Analysis (check all that apply)

☐ Statistical Analysis of Gage Records ☒ Precipitation/Runoff Model HEC-1 [TR-20, HEC-1, HEC-HMS etc.]
☐ Regional Regression Equations ☐ Other (please attach description)

Please enclose all relevant models in digital format, maps, computations (including computation of parameters) and documentation to support the new analysis. The document, "Numerical Models Accepted by FEMA for NFIP Usage" lists the models accepted by FEMA. This document can be found at: http://www.fema.gov/mit/tsd/en_modl.htm.

4. Review/Approval of Analysis

If your community requires a regional, state, or federal agency to review the hydrologic analysis, please attach evidence of approval/review.

5. Impacts of Sediment Transport on Hydrology

Was sediment transport considered? ☐ Yes ☒ No If yes, then fill out Section F (Sediment Transport) of Form 3. If No, then attach your explanation for why sediment transport was not considered.

B. HYDRAULICS

1. Reach to be Revised

	Description	Cross Section	Water-Surface Elevations (ft.) Effective	Proposed/Revised
Downstream Limit	2000'S & 1250'W of 144th St & Dove Valle	0.324		2478.65
Upstream Limit	1200'S & 100'W of 136th St & Dove Valley	1.218		2595.36

Hydraulic Method Used

Hydraulic Analysis HEC-RAS [HEC-2 , HEC-RAS, Other (Attach description)]

B. HYDRAULICS (CONTINUED)

3. Pre-Submittal Review of Hydraulic Models

FEMA has developed two review programs, CHECK-2 and CHECK-RAS, to aid in the review of HEC-2 and HEC-RAS hydraulic models, respectively. These review programs verify that the hydraulic estimates and assumptions in the model data are in accordance with NFIP requirements, and that the data are comparable with the assumptions and limitations of HEC-2/HEC-RAS. CHECK-2 and CHECK-RAS identify areas of potential error or concern. These tools do not replace engineering judgment. CHECK-2 and CHECK-RAS can be downloaded from http://www.fema.gov/mit/tsd/frm_soft.htm. We recommend that you review your HEC-2 and HEC-RAS models with CHECK-2 and CHECK-RAS. If you disagree with a message, please attach an explanation of why the message is not valid in this case. Review of your submittal and resolution of valid modeling discrepancies will result in reduced review time.

HEC-2/HEC-RAS models reviewed with CHECK-2/CHECK-RAS? ☒ Yes ☐ No

4. Models Submitted

Duplicate Effective Model*	Natural File Name:	Floodway File Name:
Corrected Effective Model*	Natural File Name:	Floodway File Name:
Existing or Pre-Project Conditions Model	Natural File Name: RV_Wash_K_Trib_1.prj	Floodway File Name: No Floodway
Revised or Post-Project Conditions Model	Natural File Name:	Floodway File Name:
Other - (attach description)	Natural File Name:	Floodway File Name:

*Not required for revisions to approximate 1%-annual-chance floodplains (Zone A) – for details, refer to the corresponding section of the instructions.

The document "Numerical Models Accepted by FEMA for NFIP Usage" lists the models accepted by FEMA. This document can be found at: http://www.fema.gov/mit/tsd/en_modl.htm.

C. MAPPING REQUIREMENTS

A **certified topographic map** must be submitted showing the following information (where applicable): the boundaries of the effective, existing, and proposed conditions 1%-annual-chance floodplain (for approximate Zone A revisions) or the boundaries of the 1%- and 0.2%-annual-chance floodplains and regulatory floodway (for detailed Zone AE, AO, and AH revisions); location and alignment of all cross sections with stationing control indicated; stream, road, and other alignments (e.g., dams, levees, etc.); current community easements and boundaries; boundaries of the requester's property; certification of a registered professional engineer registered in the subject State; location and description of reference marks; and the referenced vertical datum (NGVD, NAVD, etc.).

Note that the boundaries of the existing or proposed conditions floodplains and regulatory floodway to be shown on the revised FIRM and/or FBFM must tie-in with the effective floodplain and regulatory floodway boundaries. Please attach **a copy of the effective FIRM and/or FBFM,** annotated to show the boundaries of the revised 1%- and 0.2%-annual-chance floodplains and regulatory floodway that tie-in with the boundaries of the effective 1%- and 0.2%-annual-chance floodplain and regulatory floodway at the upstream and downstream limits of the area of revision.

D. COMMON REGULATORY REQUIREMENTS

1. For CLOMR requests, do Base Flood Elevations (BFEs) increase? ☐ Yes ☐ No

For CLOMR requests, if either of the following is true, please submit evidence of compliance with Section 65.12 of the NFIP regulations:
- The proposed project encroaches upon a regulatory floodway and would result in increases above 0.00 foot.
- The proposed project encroaches upon a SFHA with BFEs established and would result in increases above 1.00 foot.

2. Does the request involve the placement or proposed placement of fill? ☐ Yes ☒ No

If Yes, the community must be able to certify that the area to be removed from the special flood hazard area, to include any structures or proposed structures, meets all of the standards of the local floodplain ordinances, and is reasonably safe from flooding in accordance with the NFIP regulations set forth at 44 CFR 60.3(a)(3), 65.5(a)(4), and 65.6(a)(14). Please see the MT-2 instructions for more information.

3. For LOMR requests, is the regulatory floodway being revised? ☐ Yes ☒ No

If Yes, attach evidence of regulatory floodway revision notification. As per Paragraph 65.7(b)(1) of the NFIP Regulations, notification is required for requests involving revisions to the regulatory floodway. (Not required for revisions to approximate 1%-annual-chance floodplains [studied Zone A designation] unless a regulatory floodway is being added. Elements and examples of regulatory floodway revision notification can be found in the MT-2 Form 2 Instructions.)

4. For LOMR requests, does this request require property owner notification and acceptance of BFE increases? ☐ Yes ☒ No

If Yes, please attach proof of property owner notification and acceptance (if available). Elements of and examples of property owner notification can be found in the MT-2 Form 2 Instructions.

FEDERAL EMERGENCY MANAGEMENT AGENCY

RIVERINE HYDROLOGY & HYDRAULICS FORM

O.M.B No. 3067-0148
Expires September 30, 2005

PAPERWORK REDUCTION ACT

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Flooding Source: Rio Verde Wash K Trib 13
Note: Fill out one form for each flooding source studied

A. HYDROLOGY

1. Reason for New Hydrologic Analysis (check all that apply)

☐ Not revised (skip to section 2) ☒ No existing analysis ☐ Improved data
☐ Alternative methodology ☐ Proposed Conditions (CLOMR) ☐ Changed physical condition of watershed

2. Comparison of Representative 1%-Annual-Chance Discharges

Location	Drainage Area (Sq. Mi.)	FIS (cfs)	Revised (cfs)

Methodology for New Hydrologic Analysis (check all that apply)

☐ Statistical Analysis of Gage Records ☒ Precipitation/Runoff Model HEC-1 [TR-20, HEC-1, HEC-HMS etc.]
☐ Regional Regression Equations ☐ Other (please attach description)

Please enclose all relevant models in digital format, maps, computations (including computation of parameters) and documentation to support the new analysis. The document, "Numerical Models Accepted by FEMA for NFIP Usage" lists the models accepted by FEMA. This document can be found at: http://www.fema.gov/mit/tsd/en_modl.htm.

4. Review/Approval of Analysis

If your community requires a regional, state, or federal agency to review the hydrologic analysis, please attach evidence of approval/review.

5. Impacts of Sediment Transport on Hydrology

Was sediment transport considered? ☐ Yes ☒ No If yes, then fill out Section F (Sediment Transport) of Form 3. If No, then attach your explanation for why sediment transport was not considered.

B. HYDRAULICS

1. Reach to be Revised

	Description	Cross Section	Water-Surface Elevations (ft.) Effective	Proposed/Revised
Downstream Limit	600'S & 1100'W of 144th St & Dove Valley	0.111		2495.62
Upstream Limit	700'S & 4450'W of 136th St & Rock View R	1.960		2764.42

2. Hydraulic Method Used

Hydraulic Analysis HEC-RAS [HEC-2 , HEC-RAS, Other (Attach description)]

B. HYDRAULICS (CONTINUED)

3. Pre-Submittal Review of Hydraulic Models

FEMA has developed two review programs, CHECK-2 and CHECK-RAS, to aid in the review of HEC-2 and HEC-RAS hydraulic models, respectively. These review programs verify that the hydraulic estimates and assumptions in the model data are in accordance with NFIP requirements, and that the data are comparable with the assumptions and limitations of HEC-2/HEC-RAS. CHECK-2 and CHECK-RAS identify areas of potential error or concern. These tools do not replace engineering judgment. CHECK-2 and CHECK-RAS can be downloaded from http://www.fema.gov/mit/tsd/frm_soft.htm. We recommend that you review your HEC-2 and HEC-RAS models with CHECK-2 and CHECK-RAS. If you disagree with a message, please attach an explanation of why the message is not valid in this case. Review of your submittal and resolution of valid modeling discrepancies will result in reduced review time.

HEC-2/HEC-RAS models reviewed with CHECK-2/CHECK-RAS? ☒ Yes ☐ No

4. Models Submitted

Duplicate Effective Model*	Natural File Name:	Floodway File Name:
Corrected Effective Model*	Natural File Name:	Floodway File Name:
Existing or Pre-Project Conditions Model	Natural File Name: RV_Wash_K.prj	Floodway File Name: No Floodway
Revised or Post-Project Conditions Model	Natural File Name:	Floodway File Name:
Other - (attach description)	Natural File Name:	Floodway File Name:

*Not required for revisions to approximate 1%-annual-chance floodplains (Zone A) – for details, refer to the corresponding section of the instructions.

The document "Numerical Models Accepted by FEMA for NFIP Usage" lists the models accepted by FEMA. This document can be found at: http://www.fema.gov/mit/tsd/en_modl.htm.

C. MAPPING REQUIREMENTS

A **certified topographic map** must be submitted showing the following information (where applicable): the boundaries of the effective, existing, and proposed conditions 1%-annual-chance floodplain (for approximate Zone A revisions) or the boundaries of the 1%- and 0.2%-annual-chance floodplains and regulatory floodway (for detailed Zone AE, AO, and AH revisions); location and alignment of all cross sections with stationing control indicated; stream, road, and other alignments (e.g., dams, levees, etc.); current community easements and boundaries; boundaries of the requester's property; certification of a registered professional engineer registered in the subject State; location and description of reference marks; and the referenced vertical datum (NGVD, NAVD, etc.).

Note that the boundaries of the existing or proposed conditions floodplains and regulatory floodway to be shown on the revised FIRM and/or FBFM must tie-in with the effective floodplain and regulatory floodway boundaries. Please attach **a copy of the effective FIRM and/or FBFM,** annotated to show the boundaries of the revised 1%- and 0.2%-annual-chance floodplains and regulatory floodway that tie-in with the boundaries of the effective 1%- and 0.2%-annual-chance floodplain and regulatory floodway at the upstream and downstream limits of the area of revision.

D. COMMON REGULATORY REQUIREMENTS

1. For CLOMR requests, do Base Flood Elevations (BFEs) increase? ☐ Yes ☐ No

For CLOMR requests, if either of the following is true, please submit evidence of compliance with Section 65.12 of the NFIP regulations:
- The proposed project encroaches upon a regulatory floodway and would result in increases above 0.00 foot.
- The proposed project encroaches upon a SFHA with BFEs established and would result in increases above 1.00 foot.

2. Does the request involve the placement or proposed placement of fill? ☐ Yes ☒ No

If Yes, the community must be able to certify that the area to be removed from the special flood hazard area, to include any structures or proposed structures, meets all of the standards of the local floodplain ordinances, and is reasonably safe from flooding in accordance with the NFIP regulations set forth at 44 CFR 60.3(a)(3), 65.5(a)(4), and 65.6(a)(14). Please see the MT-2 instructions for more information.

3. For LOMR requests, is the regulatory floodway being revised? ☐ Yes ☒ No

If Yes, attach evidence of regulatory floodway revision notification. As per Paragraph 65.7(b)(1) of the NFIP Regulations, notification is required for requests involving revisions to the regulatory floodway. (Not required for revisions to approximate 1%-annual-chance floodplains [studied Zone A designation] unless a regulatory floodway is being added. Elements and examples of regulatory floodway revision notification can be found in the MT-2 Form 2 Instructions.)

4. For LOMR requests, does this request require property owner notification and acceptance of BFE increases? ☐ Yes ☒ No

If Yes, please attach proof of property owner notification and acceptance (if available). Elements of and examples of property owner notification can be found in the MT-2 Form 2 Instructions.

FEDERAL EMERGENCY MANAGEMENT AGENCY

RIVERINE HYDROLOGY & HYDRAULICS FORM

O.M.B No. 3067-0148
Expires September 30, 2005

PAPERWORK REDUCTION ACT

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Flooding Source: Rio Verde Wash K
Note: Fill out one form for each flooding source studied

A. HYDROLOGY

1. Reason for New Hydrologic Analysis (check all that apply)

☐ Not revised (skip to section 2) ☒ No existing analysis ☐ Improved data
☐ Alternative methodology ☐ Proposed Conditions (CLOMR) ☐ Changed physical condition of watershed

2. Comparison of Representative 1%-Annual-Chance Discharges

Location	Drainage Area (Sq. Mi.)	FIS (cfs)	Revised (cfs)

Methodology for New Hydrologic Analysis (check all that apply)

☐ Statistical Analysis of Gage Records ☒ Precipitation/Runoff Model HEC-1 [TR-20, HEC-1, HEC-HMS etc.]
☐ Regional Regression Equations ☐ Other (please attach description)

Please enclose all relevant models in digital format, maps, computations (including computation of parameters) and documentation to support the new analysis. The document, "Numerical Models Accepted by FEMA for NFIP Usage" lists the models accepted by FEMA. This document can be found at: http://www.fema.gov/mit/tsd/en_modl.htm.

4. Review/Approval of Analysis

If your community requires a regional, state, or federal agency to review the hydrologic analysis, please attach evidence of approval/review.

5. Impacts of Sediment Transport on Hydrology

Was sediment transport considered? ☐ Yes ☒ No If yes, then fill out Section F (Sediment Transport) of Form 3. If No, then attach your explanation for why sediment transport was not considered.

B. HYDRAULICS

1. Reach to be Revised

	Description	Cross Section	Water-Surface Elevations (ft.) Effective	Proposed/Revised
Downstream Limit	1800'S of 144th St & Dove Valley Rd	6.149		2448.50
Upstream Limit	850'S & 3300'W of 136th St & Black Mnt R	8.742		2756.61

2. Hydraulic Method Used

Hydraulic Analysis HEC-RAS [HEC-2 , HEC-RAS, Other (Attach description)]

B. HYDRAULICS (CONTINUED)

3. Pre-Submittal Review of Hydraulic Models

FEMA has developed two review programs, CHECK-2 and CHECK-RAS, to aid in the review of HEC-2 and HEC-RAS hydraulic models, respectively. These review programs verify that the hydraulic estimates and assumptions in the model data are in accordance with NFIP requirements, and that the data are comparable with the assumptions and limitations of HEC-2/HEC-RAS. CHECK-2 and CHECK-RAS identify areas of potential error or concern. These tools do not replace engineering judgment. CHECK-2 and CHECK-RAS can be downloaded from http://www.fema.gov/mit/tsd/frm_soft.htm. We recommend that you review your HEC-2 and HEC-RAS models with CHECK-2 and CHECK-RAS. If you disagree with a message, please attach an explanation of why the message is not valid in this case. Review of your submittal and resolution of valid modeling discrepancies will result in reduced review time.

HEC-2/HEC-RAS models reviewed with CHECK-2/CHECK-RAS? ☒ Yes ☐ No

4. Models Submitted

Duplicate Effective Model*	Natural File Name:	Floodway File Name:
Corrected Effective Model*	Natural File Name:	Floodway File Name:
Existing or Pre-Project Conditions Model	Natural File Name: RV_Wash_K.prj	Floodway File Name: No Floodway
Revised or Post-Project Conditions Model	Natural File Name:	Floodway File Name:
Other - (attach description)	Natural File Name:	Floodway File Name:

*Not required for revisions to approximate 1%-annual-chance floodplains (Zone A) – for details, refer to the corresponding section of the instructions.

The document "Numerical Models Accepted by FEMA for NFIP Usage" lists the models accepted by FEMA. This document can be found at: http://www.fema.gov/mit/tsd/en_modl.htm.

C. MAPPING REQUIREMENTS

A **certified topographic map** must be submitted showing the following information (where applicable): the boundaries of the effective, existing, and proposed conditions 1%-annual-chance floodplain (for approximate Zone A revisions) or the boundaries of the 1%- and 0.2%-annual-chance floodplains and regulatory floodway (for detailed Zone AE, AO, and AH revisions); location and alignment of all cross sections with stationing control indicated; stream, road, and other alignments (e.g., dams, levees, etc.); current community easements and boundaries; boundaries of the requester's property; certification of a registered professional engineer registered in the subject State; location and description of reference marks; and the referenced vertical datum (NGVD, NAVD, etc.).

Note that the boundaries of the existing or proposed conditions floodplains and regulatory floodway to be shown on the revised FIRM and/or FBFM must tie-in with the effective floodplain and regulatory floodway boundaries. Please attach **a copy of the effective FIRM and/or FBFM,** annotated to show the boundaries of the revised 1%- and 0.2%-annual-chance floodplains and regulatory floodway that tie-in with the boundaries of the effective 1%- and 0.2%-annual-chance floodplain and regulatory floodway at the upstream and downstream limits of the area of revision.

D. COMMON REGULATORY REQUIREMENTS

1. For CLOMR requests, do Base Flood Elevations (BFEs) increase? ☐ Yes ☐ No

For CLOMR requests, if either of the following is true, please submit evidence of compliance with Section 65.12 of the NFIP regulations:
- The proposed project encroaches upon a regulatory floodway and would result in increases above 0.00 foot.
- The proposed project encroaches upon a SFHA with BFEs established and would result in increases above 1.00 foot.

2. Does the request involve the placement or proposed placement of fill? ☐ Yes ☒ No

If Yes, the community must be able to certify that the area to be removed from the special flood hazard area, to include any structures or proposed structures, meets all of the standards of the local floodplain ordinances, and is reasonably safe from flooding in accordance with the NFIP regulations set forth at 44 CFR 60.3(a)(3), 65.5(a)(4), and 65.6(a)(14). Please see the MT-2 instructions for more information.

3. For LOMR requests, is the regulatory floodway being revised? ☐ Yes ☒ No

If Yes, attach evidence of regulatory floodway revision notification. As per Paragraph 65.7(b)(1) of the NFIP Regulations, notification is required for requests involving revisions to the regulatory floodway. (Not required for revisions to approximate 1%-annual-chance floodplains [studied Zone A designation] unless a regulatory floodway is being added. Elements and examples of regulatory floodway revision notification can be found in the MT-2 Form 2 Instructions.)

4. For LOMR requests, does this request require property owner notification and acceptance of BFE increases? ☐ Yes ☒ No

If Yes, please attach proof of property owner notification and acceptance (if available). Elements of and examples of property owner notification can be found in the MT-2 Form 2 Instructions.

FEDERAL EMERGENCY MANAGEMENT AGENCY

RIVERINE HYDROLOGY & HYDRAULICS FORM

O.M.B No. 3067-0148
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Flooding Source: Rio Verde Wash P
Note: Fill out one form for each flooding source studied

A. HYDROLOGY

1. Reason for New Hydrologic Analysis (check all that apply)

☐ Not revised (skip to section 2) ☒ No existing analysis ☐ Improved data
☐ Alternative methodology ☐ Proposed Conditions (CLOMR) ☐ Changed physical condition of watershed

2. Comparison of Representative 1%-Annual-Chance Discharges

Location	Drainage Area (Sq. Mi.)	FIS (cfs)	Revised (cfs)

Methodology for New Hydrologic Analysis (check all that apply)

☐ Statistical Analysis of Gage Records ☒ Precipitation/Runoff Model HEC-1 [TR-20, HEC-1, HEC-HMS etc.]
☐ Regional Regression Equations ☐ Other (please attach description)

Please enclose all relevant models in digital format, maps, computations (including computation of parameters) and documentation to support the new analysis. The document, "Numerical Models Accepted by FEMA for NFIP Usage" lists the models accepted by FEMA. This document can be found at: http://www.fema.gov/mit/tsd/en_modl.htm.

4. Review/Approval of Analysis

If your community requires a regional, state, or federal agency to review the hydrologic analysis, please attach evidence of approval/review.

5. Impacts of Sediment Transport on Hydrology

Was sediment transport considered? ☐ Yes ☒ No If yes, then fill out Section F (Sediment Transport) of Form 3. If No, then attach your explanation for why sediment transport was not considered.

B. HYDRAULICS

1. Reach to be Revised

	Description	Cross Section	Water-Surface Elevations (ft.) Effective	Proposed/Revised
Downstream Limit	Confluence with the Verde River	0.088		1551.67
Upstream Limit	3100'N & 450'W of 172nd St & Lone Mnt Rd	2.650		1997.82

Hydraulic Method Used

Hydraulic Analysis HEC-RAS [HEC-2 , HEC-RAS, Other (Attach description)]

B. HYDRAULICS (CONTINUED)

3. Pre-Submittal Review of Hydraulic Models

FEMA has developed two review programs, CHECK-2 and CHECK-RAS, to aid in the review of HEC-2 and HEC-RAS hydraulic models, respectively. These review programs verify that the hydraulic estimates and assumptions in the model data are in accordance with NFIP requirements, and that the data are comparable with the assumptions and limitations of HEC-2/HEC-RAS. CHECK-2 and CHECK-RAS identify areas of potential error or concern. These tools do not replace engineering judgment. CHECK-2 and CHECK-RAS can be downloaded from http://www.fema.gov/mit/tsd/frm_soft.htm. We recommend that you review your HEC-2 and HEC-RAS models with CHECK-2 and CHECK-RAS. If you disagree with a message, please attach an explanation of why the message is not valid in this case. Review of your submittal and resolution of valid modeling discrepancies will result in reduced review time.

HEC-2/HEC-RAS models reviewed with CHECK-2/CHECK-RAS? ☒ Yes ☐ No

4. Models Submitted

Duplicate Effective Model*	Natural File Name:	Floodway File Name:
Corrected Effective Model*	Natural File Name:	Floodway File Name:
Existing or Pre-Project Conditions Model	Natural File Name: RV_Wash_P.prj	Floodway File Name: No Floodway
Revised or Post-Project Conditions Model	Natural File Name:	Floodway File Name:
Other - (attach description)	Natural File Name:	Floodway File Name:

*Not required for revisions to approximate 1%-annual-chance floodplains (Zone A) – for details, refer to the corresponding section of the instructions.

The document "Numerical Models Accepted by FEMA for NFIP Usage" lists the models accepted by FEMA. This document can be found at: http://www.fema.gov/mit/tsd/en_modl.htm.

C. MAPPING REQUIREMENTS

A **certified topographic map** must be submitted showing the following information (where applicable): the boundaries of the effective, existing, and proposed conditions 1%-annual-chance floodplain (for approximate Zone A revisions) or the boundaries of the 1%- and 0.2%-annual-chance floodplains and regulatory floodway (for detailed Zone AE, AO, and AH revisions); location and alignment of all cross sections with stationing control indicated; stream, road, and other alignments (e.g., dams, levees, etc.); current community easements and boundaries; boundaries of the requester's property; certification of a registered professional engineer registered in the subject State; location and description of reference marks; and the referenced vertical datum (NGVD, NAVD, etc.).

Note that the boundaries of the existing or proposed conditions floodplains and regulatory floodway to be shown on the revised FIRM and/or FBFM must tie-in with the effective floodplain and regulatory floodway boundaries. Please attach **a copy of the effective FIRM and/or FBFM,** annotated to show the boundaries of the revised 1%- and 0.2%-annual-chance floodplains and regulatory floodway that tie-in with the boundaries of the effective 1%- and 0.2%-annual-chance floodplain and regulatory floodway at the upstream and downstream limits of the area of revision.

D. COMMON REGULATORY REQUIREMENTS

1. For CLOMR requests, do Base Flood Elevations (BFEs) increase? ☐ Yes ☐ No

For CLOMR requests, if either of the following is true, please submit evidence of compliance with Section 65.12 of the NFIP regulations:
- The proposed project encroaches upon a regulatory floodway and would result in increases above 0.00 foot.
- The proposed project encroaches upon a SFHA with BFEs established and would result in increases above 1.00 foot.

2. Does the request involve the placement or proposed placement of fill? ☐ Yes ☒ No

If Yes, the community must be able to certify that the area to be removed from the special flood hazard area, to include any structures or proposed structures, meets all of the standards of the local floodplain ordinances, and is reasonably safe from flooding in accordance with the NFIP regulations set forth at 44 CFR 60.3(a)(3), 65.5(a)(4), and 65.6(a)(14). Please see the MT-2 instructions for more information.

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If Yes, attach evidence of regulatory floodway revision notification. As per Paragraph 65.7(b)(1) of the NFIP Regulations, notification is required for requests involving revisions to the regulatory floodway. (Not required for revisions to approximate 1%-annual-chance floodplains [studied Zone A designation] unless a regulatory floodway is being added. Elements and examples of regulatory floodway revision notification can be found in the MT-2 Form 2 Instructions.)

4. For LOMR requests, does this request require property owner notification and acceptance of BFE increases? ☐ Yes ☒ No

If Yes, please attach proof of property owner notification and acceptance (if available). Elements of and examples of property owner notification can be found in the MT-2 Form 2 Instructions.

FEDERAL EMERGENCY MANAGEMENT AGENCY

RIVERINE HYDROLOGY & HYDRAULICS FORM

O.M.B No. 3067-0148
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Flooding Source: Rio Verde Wash P Trib 1
Note: Fill out one form for each flooding source studied

A. HYDROLOGY

1. Reason for New Hydrologic Analysis (check all that apply)

☐ Not revised (skip to section 2) ☒ No existing analysis ☐ Improved data
☐ Alternative methodology ☐ Proposed Conditions (CLOMR) ☐ Changed physical condition of watershed

2. Comparison of Representative 1%-Annual-Chance Discharges

Location	Drainage Area (Sq. Mi.)	FIS (cfs)	Revised (cfs)

Methodology for New Hydrologic Analysis (check all that apply)

☐ Statistical Analysis of Gage Records ☒ Precipitation/Runoff Model HEC-1 [TR-20, HEC-1, HEC-HMS etc.]
☐ Regional Regression Equations ☐ Other (please attach description)

Please enclose all relevant models in digital format, maps, computations (including computation of parameters) and documentation to support the new analysis. The document, "Numerical Models Accepted by FEMA for NFIP Usage" lists the models accepted by FEMA. This document can be found at: http://www.fema.gov/mit/tsd/en_modl.htm.

4. Review/Approval of Analysis

If your community requires a regional, state, or federal agency to review the hydrologic analysis, please attach evidence of approval/review.

5. Impacts of Sediment Transport on Hydrology

Was sediment transport considered? ☐ Yes ☒ No If yes, then fill out Section F (Sediment Transport) of Form 3. If No, then attach your explanation for why sediment transport was not considered.

B. HYDRAULICS

1. Reach to be Revised

	Description	Cross Section	Water-Surface Elevations (ft.) Effective	Proposed/Revised
Downstream Limit	2200'N & 100'E of 172nd St & Lone Mnt Rd	0.047		1944.64
Upstream Limit	750'N & 1400'W of 172nd St & 4 Cor Trn R	0.959		2089.37

Hydraulic Method Used

Hydraulic Analysis HEC-RAS [HEC-2 , HEC-RAS, Other (Attach description)]

B. HYDRAULICS (CONTINUED)

3. Pre-Submittal Review of Hydraulic Models

FEMA has developed two review programs, CHECK-2 and CHECK-RAS, to aid in the review of HEC-2 and HEC-RAS hydraulic models, respectively. These review programs verify that the hydraulic estimates and assumptions in the model data are in accordance with NFIP requirements, and that the data are comparable with the assumptions and limitations of HEC-2/HEC-RAS. CHECK-2 and CHECK-RAS identify areas of potential error or concern. These tools do not replace engineering judgment. CHECK-2 and CHECK-RAS can be downloaded from http://www.fema.gov/mit/tsd/frm_soft.htm. We recommend that you review your HEC-2 and HEC-RAS models with CHECK-2 and CHECK-RAS. If you disagree with a message, please attach an explanation of why the message is not valid in this case. Review of your submittal and resolution of valid modeling discrepancies will result in reduced review time.

HEC-2/HEC-RAS models reviewed with CHECK-2/CHECK-RAS? ☒ Yes ☐ No

4. Models Submitted

Duplicate Effective Model*	Natural File Name:	Floodway File Name:
Corrected Effective Model*	Natural File Name:	Floodway File Name:
Existing or Pre-Project Conditions Model	Natural File Name: RV_Wash_P.prj	Floodway File Name: No Floodway
Revised or Post-Project Conditions Model	Natural File Name:	Floodway File Name:
Other - (attach description)	Natural File Name:	Floodway File Name:

*Not required for revisions to approximate 1%-annual-chance floodplains (Zone A) – for details, refer to the corresponding section of the instructions.

The document "Numerical Models Accepted by FEMA for NFIP Usage" lists the models accepted by FEMA. This document can be found at: http://www.fema.gov/mit/tsd/en_modl.htm.

C. MAPPING REQUIREMENTS

A **certified topographic map** must be submitted showing the following information (where applicable): the boundaries of the effective, existing, and proposed conditions 1%-annual-chance floodplain (for approximate Zone A revisions) or the boundaries of the 1%- and 0.2%-annual-chance floodplains and regulatory floodway (for detailed Zone AE, AO, and AH revisions); location and alignment of all cross sections with stationing control indicated; stream, road, and other alignments (e.g., dams, levees, etc.); current community easements and boundaries; boundaries of the requester's property; certification of a registered professional engineer registered in the subject State; location and description of reference marks; and the referenced vertical datum (NGVD, NAVD, etc.).

Note that the boundaries of the existing or proposed conditions floodplains and regulatory floodway to be shown on the revised FIRM and/or FBFM must tie-in with the effective floodplain and regulatory floodway boundaries. Please attach **a copy of the effective FIRM and/or FBFM,** annotated to show the boundaries of the revised 1%- and 0.2%-annual-chance floodplains and regulatory floodway that tie-in with the boundaries of the effective 1%- and 0.2%-annual-chance floodplain and regulatory floodway at the upstream and downstream limits of the area of revision.

D. COMMON REGULATORY REQUIREMENTS

1. For CLOMR requests, do Base Flood Elevations (BFEs) increase? ☐ Yes ☐ No

For CLOMR requests, if either of the following is true, please submit evidence of compliance with Section 65.12 of the NFIP regulations:
- The proposed project encroaches upon a regulatory floodway and would result in increases above 0.00 foot.
- The proposed project encroaches upon a SFHA with BFEs established and would result in increases above 1.00 foot.

2. Does the request involve the placement or proposed placement of fill? ☐ Yes ☒ No

If Yes, the community must be able to certify that the area to be removed from the special flood hazard area, to include any structures or proposed structures, meets all of the standards of the local floodplain ordinances, and is reasonably safe from flooding in accordance with the NFIP regulations set forth at 44 CFR 60.3(a)(3), 65.5(a)(4), and 65.6(a)(14). Please see the MT-2 instructions for more information.

3. For LOMR requests, is the regulatory floodway being revised? ☐ Yes ☒ No

If Yes, attach evidence of regulatory floodway revision notification. As per Paragraph 65.7(b)(1) of the NFIP Regulations, notification is required for requests involving revisions to the regulatory floodway. (Not required for revisions to approximate 1%-annual-chance floodplains [studied Zone A designation] unless a regulatory floodway is being added. Elements and examples of regulatory floodway revision notification can be found in the MT-2 Form 2 Instructions.)

4. For LOMR requests, does this request require property owner notification and acceptance of BFE increases? ☐ Yes ☒ No

If Yes, please attach proof of property owner notification and acceptance (if available). Elements of and examples of property owner notification can be found in the MT-2 Form 2 Instructions.

FEDERAL EMERGENCY MANAGEMENT AGENCY

RIVERINE HYDROLOGY & HYDRAULICS FORM

O.M.B No. 3067-0148
Expires September 30, 2005

PAPERWORK REDUCTION ACT

Public reporting burden for this form is estimated to average 3 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing, reviewing, and submitting the form. You are not required to respond to this collection of information unless a valid OMB control number appears in the upper right corner of this form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden to: Information Collections Management, Federal Emergency Management Agency, 500 C Street, SW, Washington DC 20472, Paperwork Reduction Project (3067-0148). Submission of the form is required to obtain or retain benefits under the National Flood Insurance Program. **Please do not send your completed survey to the above address.**

Flooding Source: Rio Verde Wash P Trib 2
Note: Fill out one form for each flooding source studied

A. HYDROLOGY

1. Reason for New Hydrologic Analysis (check all that apply)

☐ Not revised (skip to section 2) ☒ No existing analysis ☐ Improved data
☐ Alternative methodology ☐ Proposed Conditions (CLOMR) ☐ Changed physical condition of watershed

2. Comparison of Representative 1%-Annual-Chance Discharges

Location	Drainage Area (Sq. Mi.)	FIS (cfs)	Revised (cfs)

Methodology for New Hydrologic Analysis (check all that apply)

☐ Statistical Analysis of Gage Records ☒ Precipitation/Runoff Model HEC-1 [TR-20, HEC-1, HEC-HMS etc.]
☐ Regional Regression Equations ☐ Other (please attach description)

Please enclose all relevant models in digital format, maps, computations (including computation of parameters) and documentation to support the new analysis. The document, "Numerical Models Accepted by FEMA for NFIP Usage" lists the models accepted by FEMA. This document can be found at: http://www.fema.gov/mit/tsd/en_modl.htm.

4. Review/Approval of Analysis

If your community requires a regional, state, or federal agency to review the hydrologic analysis, please attach evidence of approval/review.

5. Impacts of Sediment Transport on Hydrology

Was sediment transport considered? ☐ Yes ☒ No If yes, then fill out Section F (Sediment Transport) of Form 3. If No, then attach your explanation for why sediment transport was not considered.

B. HYDRAULICS

1. Reach to be Revised

	Description	Cross Section	Water-Surface Elevations (ft.) Effective	Proposed/Revised
Downstream Limit	1200'S & 800'E of 172nd St & Lone Mnt Rd	0.078		1983.17
Upstream Limit	750'N & 500'W of 172nd St & 4 Cor Tran R	0.376		2026.47

Hydraulic Method Used

Hydraulic Analysis HEC-RAS [HEC-2 , HEC-RAS, Other (Attach description)]

B. HYDRAULICS (CONTINUED)

3. Pre-Submittal Review of Hydraulic Models

FEMA has developed two review programs, CHECK-2 and CHECK-RAS, to aid in the review of HEC-2 and HEC-RAS hydraulic models, respectively. These review programs verify that the hydraulic estimates and assumptions in the model data are in accordance with NFIP requirements, and that the data are comparable with the assumptions and limitations of HEC-2/HEC-RAS. CHECK-2 and CHECK-RAS identify areas of potential error or concern. These tools do not replace engineering judgment. CHECK-2 and CHECK-RAS can be downloaded from http://www.fema.gov/mit/tsd/frm_soft.htm. We recommend that you review your HEC-2 and HEC-RAS models with CHECK-2 and CHECK-RAS. If you disagree with a message, please attach an explanation of why the message is not valid in this case. Review of your submittal and resolution of valid modeling discrepancies will result in reduced review time.

HEC-2/HEC-RAS models reviewed with CHECK-2/CHECK-RAS? ☒ Yes ☐ No

4. Models Submitted

Duplicate Effective Model*	Natural File Name:	Floodway File Name:
Corrected Effective Model*	Natural File Name:	Floodway File Name:
Existing or Pre-Project Conditions Model	Natural File Name: RV_Wash_P.prj	Floodway File Name: No Floodway
Revised or Post-Project Conditions Model	Natural File Name:	Floodway File Name:
Other - (attach description)	Natural File Name:	Floodway File Name:

*Not required for revisions to approximate 1%-annual-chance floodplains (Zone A) – for details, refer to the corresponding section of the instructions.

The document "Numerical Models Accepted by FEMA for NFIP Usage" lists the models accepted by FEMA. This document can be found at: http://www.fema.gov/mit/tsd/en_modl.htm.

C. MAPPING REQUIREMENTS

A **certified topographic map** must be submitted showing the following information (where applicable): the boundaries of the effective, existing, and proposed conditions 1%-annual-chance floodplain (for approximate Zone A revisions) or the boundaries of the 1%- and 0.2%-annual-chance floodplains and regulatory floodway (for detailed Zone AE, AO, and AH revisions); location and alignment of all cross sections with stationing control indicated; stream, road, and other alignments (e.g., dams, levees, etc.); current community easements and boundaries; boundaries of the requester's property; certification of a registered professional engineer registered in the subject State; location and description of reference marks; and the referenced vertical datum (NGVD, NAVD, etc.).

Note that the boundaries of the existing or proposed conditions floodplains and regulatory floodway to be shown on the revised FIRM and/or FBFM must tie-in with the effective floodplain and regulatory floodway boundaries. Please attach **a copy of the effective FIRM and/or FBFM,** annotated to show the boundaries of the revised 1%- and 0.2%-annual-chance floodplains and regulatory floodway that tie-in with the boundaries of the effective 1%- and 0.2%-annual-chance floodplain and regulatory floodway at the upstream and downstream limits of the area of revision.

D. COMMON REGULATORY REQUIREMENTS

1. For CLOMR requests, do Base Flood Elevations (BFEs) increase? ☐ Yes ☐ No

For CLOMR requests, if either of the following is true, please submit evidence of compliance with Section 65.12 of the NFIP regulations:
- The proposed project encroaches upon a regulatory floodway and would result in increases above 0.00 foot.
- The proposed project encroaches upon a SFHA with BFEs established and would result in increases above 1.00 foot.

2. Does the request involve the placement or proposed placement of fill? ☐ Yes ☒ No

If Yes, the community must be able to certify that the area to be removed from the special flood hazard area, to include any structures or proposed structures, meets all of the standards of the local floodplain ordinances, and is reasonably safe from flooding in accordance with the NFIP regulations set forth at 44 CFR 60.3(a)(3), 65.5(a)(4), and 65.6(a)(14). Please see the MT-2 instructions for more information.

3. For LOMR requests, is the regulatory floodway being revised? ☐ Yes ☒ No

If Yes, attach evidence of regulatory floodway revision notification. As per Paragraph 65.7(b)(1) of the NFIP Regulations, notification is required for requests involving revisions to the regulatory floodway. (Not required for revisions to approximate 1%-annual-chance floodplains [studied Zone A designation] unless a regulatory floodway is being added. Elements and examples of regulatory floodway revision notification can be found in the MT-2 Form 2 Instructions.)

4. For LOMR requests, does this request require property owner notification and acceptance of BFE increases? ☐ Yes ☒ No

If Yes, please attach proof of property owner notification and acceptance (if available). Elements of and examples of property owner notification can be found in the MT-2 Form 2 Instructions.

To Be Attached to MT-2 FORM 2 for Rio Verde Wash – All Flooding Sources

In response to Item A, Question 5. Explanation of Impacts of Sediment Transport on Hydrology:

Not a Flood Control District of Maricopa County requirement for FIS studies.

FEDERAL EMERGENCY MANAGEMENT AGENCY

RIVERINE STRUCTURES FORM

O.M.B. No. 3067-0148
Expires September 30, 2005

PAPERWORK REDUCTION ACT

Public reporting burden for this form is estimated to average 7 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing, reviewing, and submitting the form. You are not required to respond to this collection of information unless a valid OMB control number appears in the upper right corner of this form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden to: Information Collections Management, Federal Emergency Management Agency, 500 C Street, SW, Washington DC 20472, Paperwork Reduction Project (3067-0148). Submission of the form is required to obtain or retain benefits under the National Flood Insurance Program. **Please do not send your completed survey to the above address.**

Flooding Source: Rio Verde Wash I
Note: Fill out one form for each flooding source studied

A. GENERAL

Complete the appropriate section(s) for each Structure listed below:

Channelization..... complete Section B
Bridge/Culvert..... complete Section C
Dam..... complete Section D
Levee/Floodwall..... complete Section E
Sediment Transport..... complete Section F (if required)

Description Of Structure

1. **Name of Structure: 142nd Street Culvert**

   Type (check one): ☐ Channelization ☒ Bridge/Culvert ☐ Levee/Floodwall ☐ Dam

   Location of Structure: 142nd Street

   Downstream Limit/Cross Section: 6.435

   Upstream Limit/Cross Section: 6.446

2. **Name of Structure:**

   Type (check one): ☐ Channelization ☐ Bridge/Culvert ☐ Levee/Floodwall ☐ Dam

   Location of Structure:

   Downstream Limit/Cross Section:

   Upstream Limit/Cross Section:

3. **Name of Structure:**

   Type (check one) ☐ Channelization ☐ Bridge/Culvert ☐ Levee/Floodwall ☐ Dam

   Location of Structure:

   Downstream Limit/Cross Section:

   Upstream Limit/Cross Section:

NOTE: For more structures, attach additional pages as needed.

B. CHANNELIZATION

Flooding Source: Rio Verde Wash I, Reaches 1-2

Name of Structure:

1. Accessory Structures

The channelization includes (check one):

- ☐ Levees [Attach Section E (Levee/Floodwall)]
- ☐ Superelevated sections
- ☐ Debris basin/detention basin
- ☐ Other (Describe):
- ☐ Drop structures
- ☐ Transitions in cross sectional geometry
- ☐ Energy dissipator

2. Drawing Checklist

Attach the plans of the channelization certified by a registered professional engineer, as described in the instructions.

3. Hydraulic Considerations

The channel was designed to carry (cfs) and/or the -year flood.

The design elevation in the channel is based on (check one):

☐ Subcritical flow ☐ Critical flow ☐ Supercritical flow ☐ Energy grade line

If there is the potential for a hydraulic jump at the following locations, check all that apply and attach an explanation of how the hydraulic jump is controlled without affecting the stability of the channel.

☐ Inlet to channel ☐ Outlet of channel ☐ At Drop Structures ☐ At Transitions
☐ Other locations (specify):

4. Sediment Transport Considerations

Was sediment transport considered? ☐ Yes ☒ No If Yes, then fill out Section F (Sediment Transport).
If No, then attach your explanation for why sediment transport was not considered.

C. BRIDGE/CULVERT

Flooding Source: Rio Verde Wash I

Name of Structure: 142nd Street Culvert

1. This revision reflects (check one):

- ☒ New bridge/culvert not modeled in the FIS
- ☐ Modified bridge/culvert previously modeled in the FIS
- ☐ New analysis of bridge/culvert previously modeled in the FIS

2. Hydraulic model used to analyze the structure (e.g., HEC-2 with special bridge routine, WSPRO, HY8): HEC-RAS
If different than hydraulic analysis for the flooding source, justify why the hydraulic analysis used for the flooding source could not analyze the structures. Attach justification.

3. Attach plans of the structures certified by a registered professional engineer. The plan detail and information should include the following (check the information that has been provided):

- ☒ Dimensions (height, width, span, radius, length)
- ☒ Shape (culverts only)
- ☒ Material
- ☐ Beveling or Rounding
- ☒ Wing Wall Angle
- ☒ Skew Angle
- ☒ Distances Between Cross Sections
- ☒ Erosion Protection
- ☒ Low Chord Elevations – Upstream and Downstream
- ☒ Top of Road Elevations – Upstream and Downstream
- ☒ Structure Invert Elevations – Upstream and Downstream
- ☒ Stream Invert Elevations – Upstream and Downstream
- ☒ Cross-Section Locations

4. Sediment Transport Considerations

Was sediment transport considered? ☐ Yes ☒ No If yes, then fill out Section F (Sediment Transport).
If No, then attach your explanation for why sediment transport was not considered.

D. DAM

Flooding Source:

Name of Structure:

This request is for (check one): ☐ Existing dam ☐ New dam ☐ Modification of existing dam

2. The dam was designed by (check one): ☐ Federal agency ☐ State agency ☐ Local government agency

   ☐ Private organization Name of the agency or organization:

3. Does the project involve revised hydrology? ☐ Yes ☐ No

   If Yes, complete the Riverine Hydrology & Hydraulics Form (Form 2).

4. Does the submittal include debris/sediment yield analysis? ☐ Yes ☐ No

   If yes, then fill out Section F (Sediment Transport).
   If No, then attach your explanation for why debris/sediment analysis was not considered.

5. Does the Base Flood Elevation behind the dam or downstream of the dam change?

   ☐ Yes ☐ No If Yes, complete the Riverine Hydrology & Hydraulics Form (Form 2) and complete the table below.

Stillwater Elevation Behind the Dam

FREQUENCY (% annual chance)	FIS	REVISED
10-year (10%)		
50-year (2%)		
100-year (1%)		
500-year (0.2%)		
Normal Pool Elevation		

6. Please attach a copy of the formal Operation and Maintenance Plan

E. LEVEE/FLOODWALL

1. System Elements

a. This Levee/Floodwall analysis is based on (check one):

☐ upgrading of an existing levee/floodwall system
☐ a newly constructed levee/floodwall system
☐ reanalysis of an existing levee/floodwall system

b. Levee elements and locations are (check one):

☐ earthen embankment, dike, berm, etc.	Station	to
☐ structural floodwall	Station	to
☐ Other (describe):	Station	to

c. Structural Type (check one):

☐ monolithic cast-in place reinforced concrete
☐ reinforced concrete masonry block
☐ sheet piling
☐ Other (describe):

d. Has this levee/floodwall system been certified by a Federal agency to provide protection from the base flood?

☐ Yes ☐ No

If Yes, by which agency?

e. Attach certified drawings containing the following information (indicate drawing sheet numbers):

1. Plan of the levee embankment and floodwall structures. Sheet Numbers:
2. A profile of the levee/floodwall system showing the Base Flood Elevation (BFE), levee and/or wall crest and foundation, and closure locations for the total levee system. Sheet Numbers:
3. A profile of the BFE, closure opening outlet and inlet invert elevations, type and size of opening, and kind of closure. Sheet Numbers:
4. A layout detail for the embankment protection measures. Sheet Numbers:
5. Location, layout, and size and shape of the levee embankment features, foundation treatment, floodwall structure, closure structures, and pump stations. Sheet Numbers:

2. Freeboard

a. The minimum freeboard provided above the BFE is:

Riverine

3.0 feet or more at the downstream end and throughout	☐ Yes	☐ No
3.5 feet or more at the upstream end	☐ Yes	☐ No
4.0 feet within 100 feet upstream of all structures and/or constrictions	☐ Yes	☐ No

Coastal

1.0 foot above the height of the one percent wave associated with the 1%-annual-chance stillwater surge elevation or maximum wave runup (whichever is greater).	☐ Yes	☐ No
2.0 feet above the 1%-annual-chance stillwater surge elevation	☐ Yes	☐ No

2. Freeboard (continued)

Please note, occasionally exceptions are made to the minimum freeboard requirement. If an exception is requested, attach documentation addressing Paragraph 65.10(b)(1)(ii) of the NFIP Regulations.

If No is answered to any of the above, please attach an explanation.

b. Is there an indication from historical records that ice-jamming can affect the BFE? ☐ Yes ☐ No

If Yes, provide ice-jam analysis profile and evidence that the minimum freeboard discussed above still exists.

3. Closures

a. Openings through the levee system (check one): ☐ exists ☐ does not exist

If opening exists, list all closures:

Channel Station	Left or Right Bank	Opening Type	Highest Elevation for Opening Invert	Type of Closure Device

(Extend table on an added sheet as needed and reference)

Note: Geotechnical and geologic data

In addition to the required detailed analysis reports, data obtained during field and laboratory investigations and used in the design analysis for the following system features should be submitted in a tabulated summary form. (Reference U.S. Army Corps of Engineers [USACE] EM-1110-2-1906 Form 2086.)

4. Embankment Protection

a. The maximum levee slope landside is:

b. The maximum levee slope floodside is:

c. The range of velocities along the levee during the base flood is: (min.) to (max.)

d. Embankment material is protected by (describe what kind):

e. Riprap Design Parameters (check one): ☐ Velocity ☐ Tractive stress
Attach references

Reach		Sideslope	Flow Depth	Velocity	Curve or Straight	Stone Riprap			Depth of Toedown
						D_{100}	D_{50}	Thickness	
Sta	to								
Sta	to								
Sta	to								
Sta	to								
Sta	to								
Sta	to								

(Extend table on an added sheet as needed and reference each entry)

4. Embankment Protection (continued)

f. Is a bedding/filter analysis and design attached? ☐ Yes ☐ No

g. Describe the analysis used for other kinds of protection used (include copies of the design analysis):

Attach engineering analysis to support construction plans.

5. Embankment And Foundation Stability

a. Identify locations and describe the basis for selection of critical location for analysis:

☐ Overall height: Sta. ; height ft.

☐ Limiting foundation soil strength:

Sta. , depth to

strength ϕ = degrees, c = psf

slope: SS = (h) to (v)

(Repeat as needed on an added sheet for additional locations)

b. Specify the embankment stability analysis methodology used (e.g., circular arc, sliding block, infinite slope, etc.):

c. Summary of stability analysis results:

Case	Loading Conditions	Critical Safety Factor	Criteria (Min.)
I	End of construction		1.3
II	Sudden drawdown		1.0
III	Critical flood stage		1.4
IV	Steady seepage at flood stage		1.4
VI	Earthquake (Case I)		1.0

(Reference: USACE EM-1110-2-1913 Table 6-1)

d. Was a seepage analysis for the embankment performed? ☐ Yes ☐ No

If Yes, describe methodology used:

e. Was a seepage analysis for the foundation performed? ☐ Yes ☐ No

f. Were uplift pressures at the embankment landside toe checked? ☐ Yes ☐ No

g. Were seepage exit gradients checked for piping potential? ☐ Yes ☐ No

h. The duration of the base flood hydrograph against the embankment is hours.

Attach engineering analysis to support construction plans.

3. Floodwall And Foundation Stability

a. Describe analysis submittal based on Code (check one):

☐ UBC (1988) or ☐ Other (specify):

b. Stability analysis submitted provides for:

☐ Overturning ☐ Sliding If not, explain:

c. Loading included in the analyses were:

☐ Lateral earth @ P_A = psf; P_p = psf

☐ Surcharge-Slope @ , ☐ surface psf

☐ Wind @ P_w = psf

☐ Seepage (Uplift); ☐ Earthquake @ P_{eq} = %g

☐ 1%-annual-chance significant wave height: ft.

☐ 1%-annual-chance significant wave period: sec.

d. Summary of Stability Analysis Results: Factors of Safety.

Itemize for each range in site layout dimension and loading condition limitation for each respective reach.

Loading Condition	Criteria (Min)		Sta	To	Sta	To
	Overturn	Sliding	Overturn	Sliding	Overturn	Sliding
Dead & Wind	1.5	1.5				
ad & Soil	1.5	1.5				
Dead, Soil, Flood, & Impact	1.5	1.5				
Dead, Soil, & Seismic	1.3	1.3				

(Ref: FEMA 114 Sept 1986; USACE EM 1110-2-2502)

(Note: Extend table on an added sheet as needed and reference)

e. Foundation bearing strength for each soil type:

Bearing Pressure	Sustained Load (psf)	Short Term Load (psf)
Computed design maximum		
Maximum allowable		

f. Foundation scour protection ☐ is, ☐ is not provided. If provided, attach explanation and supporting documentation:

Attach engineering analysis to support construction plans.

7. Settlement

a. Has anticipated potential settlement been determined and incorporated into the specified construction elevations to maintain the established freeboard margin? ☐ Yes ☐ No

b. The computed range of settlement is ft. to ft.

c. Settlement of the levee crest is determined to be primarily from :

☐ Foundation consolidation
☐ Embankment compression
☐ Other (Describe):

d. Differential settlement of floodwalls ☐ has ☐ has not been accommodated in the structural design and construction.

Attach engineering analysis to support construction plans.

8. Interior Drainage

a. Specify size of each interior watershed:

Draining to pressure conduit: acres
Draining to ponding area: acres

b. Relationships Established

Ponding elevation vs. storage	☐ Yes	☐ No
Ponding elevation vs. gravity flow	☐ Yes	☐ No
Differential head vs. gravity flow	☐ Yes	☐ No

c. The river flow duration curve is enclosed: ☐ Yes ☐ No

d. Specify the discharge capacity of the head pressure conduit: cfs

e. Which flooding conditions were analyzed?

• Gravity flow (Interior Watershed)	☐ Yes	☐ No
• Common storm (River Watershed)	☐ Yes	☐ No
• Historical ponding probability	☐ Yes	☐ No
• Coastal wave overtopping	☐ Yes	☐ No

If No for any of the above, attach explanation.

f. Interior drainage has been analyzed based on joint probability of interior and exterior flooding and the capacities of pumping and outlet facilities to provide the established level of flood protection. ☐ Yes ☐ No

If No, attach explanation.

g. The rate of seepage through the levee system for the base flood is cfs

h. The length of levee system used to drive this seepage rate in item g: ft.

8. Interior Drainage (continued)

i. Will pumping plants be used for interior drainage? ☐ Yes ☐ No

If Yes, include the number of pumping plants:
For each pumping plant, list:

	Plant #1	Plant #2
The number of pumps		
The ponding storage capacity		
The maximum pumping rate		
The maximum pumping head		
The pumping starting elevation		
The pumping stopping elevation		
Is the discharge facility protected?		
Is there a flood warning plan?		
How much time is available between warning and flooding?		

Will the operation be automatic? ☐ Yes ☐ No

If the pumps are electric, are there backup power sources? ☐ Yes ☐ No

(Reference: USACE EM-1110-2-3101, 3102, 3103, 3104, and 3105)

Include a copy of supporting documentation of data and analysis. Provide a map showing the flooded area and maximum ponding elevations for all erior watersheds that result in flooding.

9. Other Design Criteria

a. The following items have been addressed as stated:

Liquefaction ☐ is ☐ is not a problem
Hydrocompaction ☐ is ☐ is not a problem
Heave differential movement due to soils of high shrink/swell ☐ is ☐ is not a problem

b. For each of these problems, state the basic facts and corrective action taken:

Attach supporting documentation

c. If the levee/floodwall is new or enlarged, will the structure adversely impact flood levels and/or flow velocities floodside of the structure?
☐ Yes ☐ No

Attach supporting documentation

d. Sediment Transport Considerations:

Was sediment transport considered? ☐ Yes ☐ No If Yes, then fill out Section F (Sediment Transport).
If No, then attach your explanation for why sediment transport was not considered.

E. LEVEE/FLOODWALL (CONTINUED)

10. Operational Plan And Criteria

    a. Are the planned/installed works in full compliance with Part 65.10 of the NFIP Regulations? ☐ Yes ☐ No

    b. Does the operation plan incorporate all the provisions for closure devices as required in Paragraph 65.10(c)(1) of the NFIP regulations?
    ☐ Yes ☐ No

    c. Does the operation plan incorporate all the provisions for interior drainage as required in Paragraph 65.10(c)(2) of the NFIP regulations?
    ☐ Yes ☐ No

    If the answer is No to any of the above, please attach supporting documentation.

11. Maintenance Plan

    a. Are the planned/installed works in full compliance with Part 65.10 of the NFIP Regulations? ☐ Yes ☐ No
    If No, please attach supporting documentation.

12. Operations and Maintenance Plan

    Please attach a copy of the formal Operations and Maintenance Plan for the levee/floodwall.

F. SEDIMENT TRANSPORT

Flooding Source:

Name of Structure:

If there is any indication from historical records that sediment transport (including scour and deposition) can affect the Base Flood Elevation (BFE); and/or based on the stream morphology, vegetative cover, development of the watershed and bank conditions, there is a potential for debris and sediment transport (including scour and deposition) to affect the BFEs, then provide the following information along with the supporting documentation:

Sediment load associated with the base flood discharge: Volume acre-feet

Debris load associated with the base flood discharge: Volume acre-feet

Sediment transport rate (percent concentration by volume)

Method used to estimate sediment transport:

Most sediment transport formulas are intended for a range of hydraulic conditions and sediment sizes; attach a detailed explanation for using the selected method.

Method used to estimate scour and/or deposition:

Method used to revise hydraulic or hydrologic analysis (model) to account for sediment transport:
Please note that bulked flows are used to evaluate the performance of a structure during the base flood; however, FEMA does not map BFEs based on bulked flows.

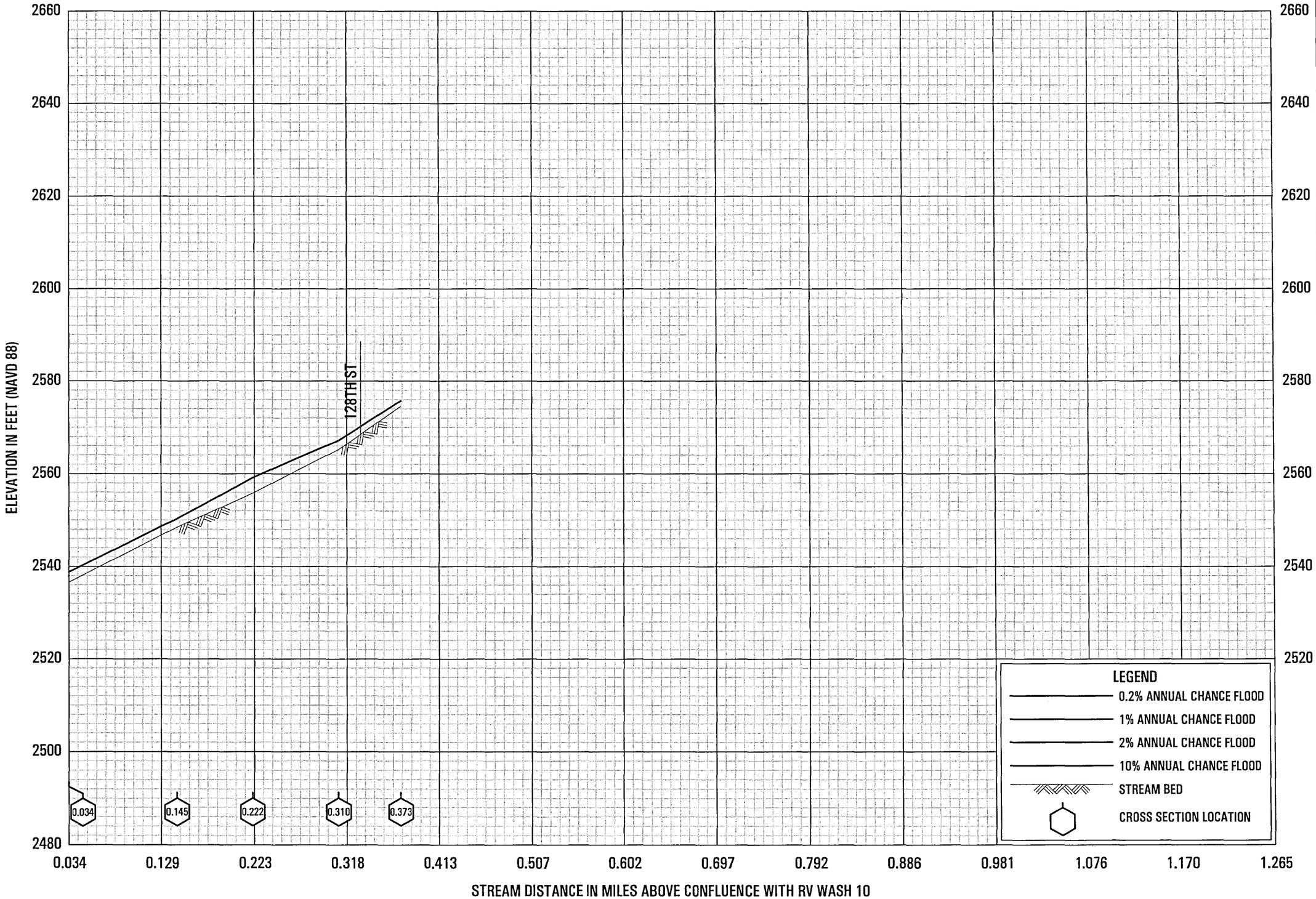
If a sediment analysis has not been performed, an explanation as to why sediment transport (including scour and deposition) will not affect the BFEs or structures must be provided.

To Be Attached to MT-2 FORM 3 for RV Wash I

In response to Item C, Question 4. Explanation of Impacts of Sediment Transport on Hydrology:

Not a Flood Control District of Maricopa County requirement for FIS studies.

H.2 FEMA Flood Profiles



FLOOD PROFILES

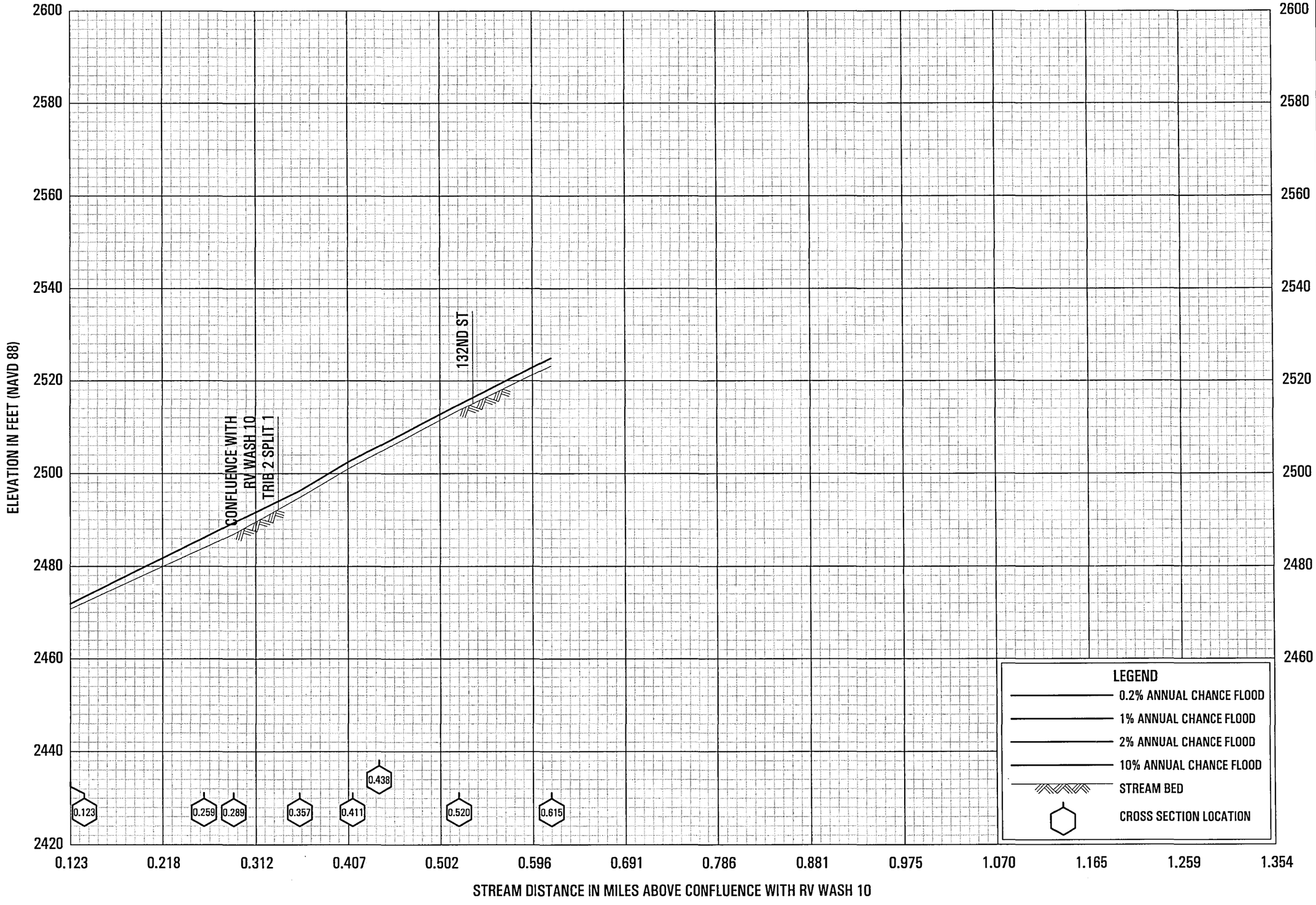
RV WASH 10 TRIB 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

MARICOPA COUNTY, AZ

AND INCORPORATED AREAS

W1-1



FLOOD PROFILES

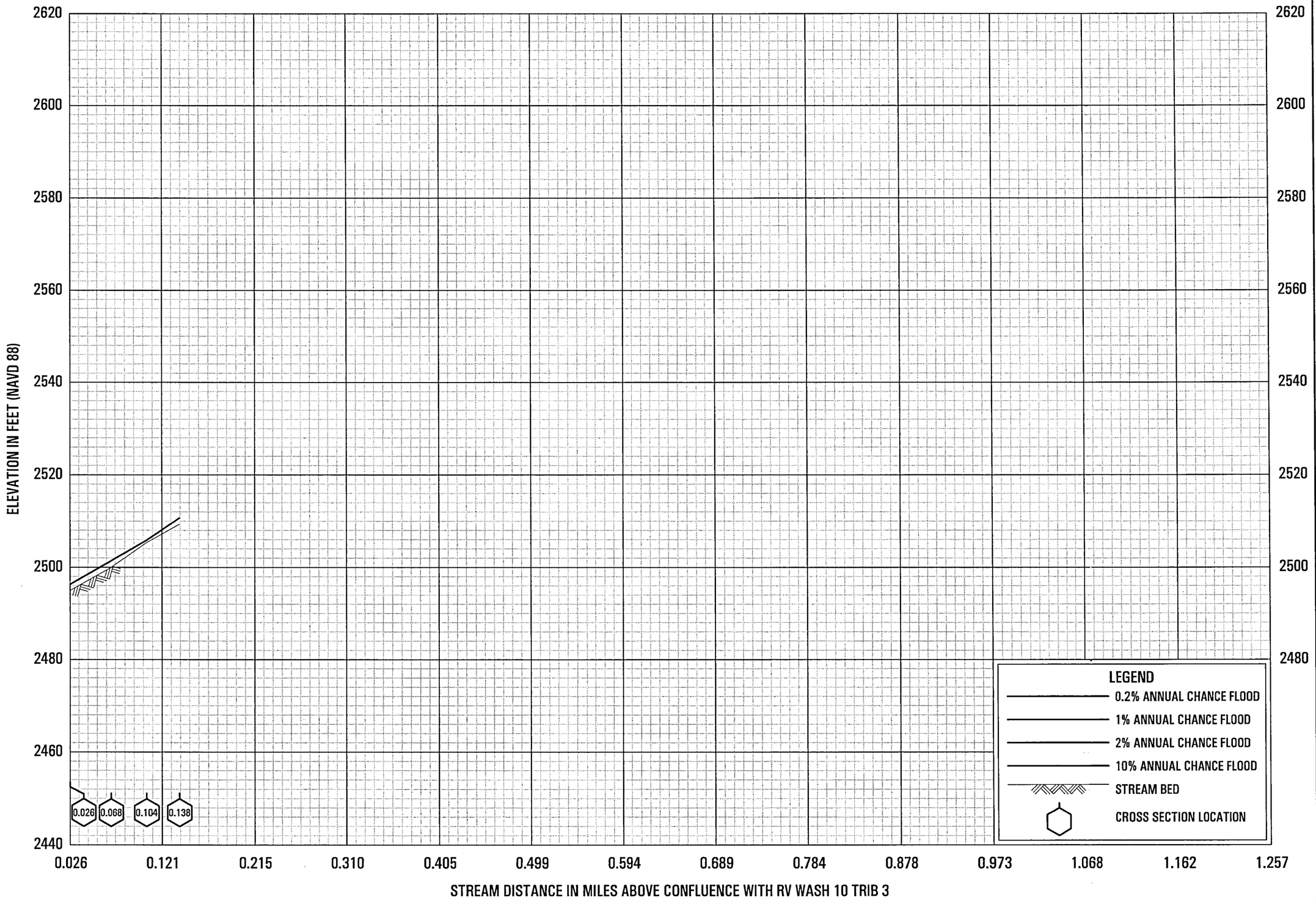
RV WASH 10 TRIB 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

MARICOPA COUNTY, AZ

AND INCORPORATED AREAS

W2-1



FLOOD PROFILES

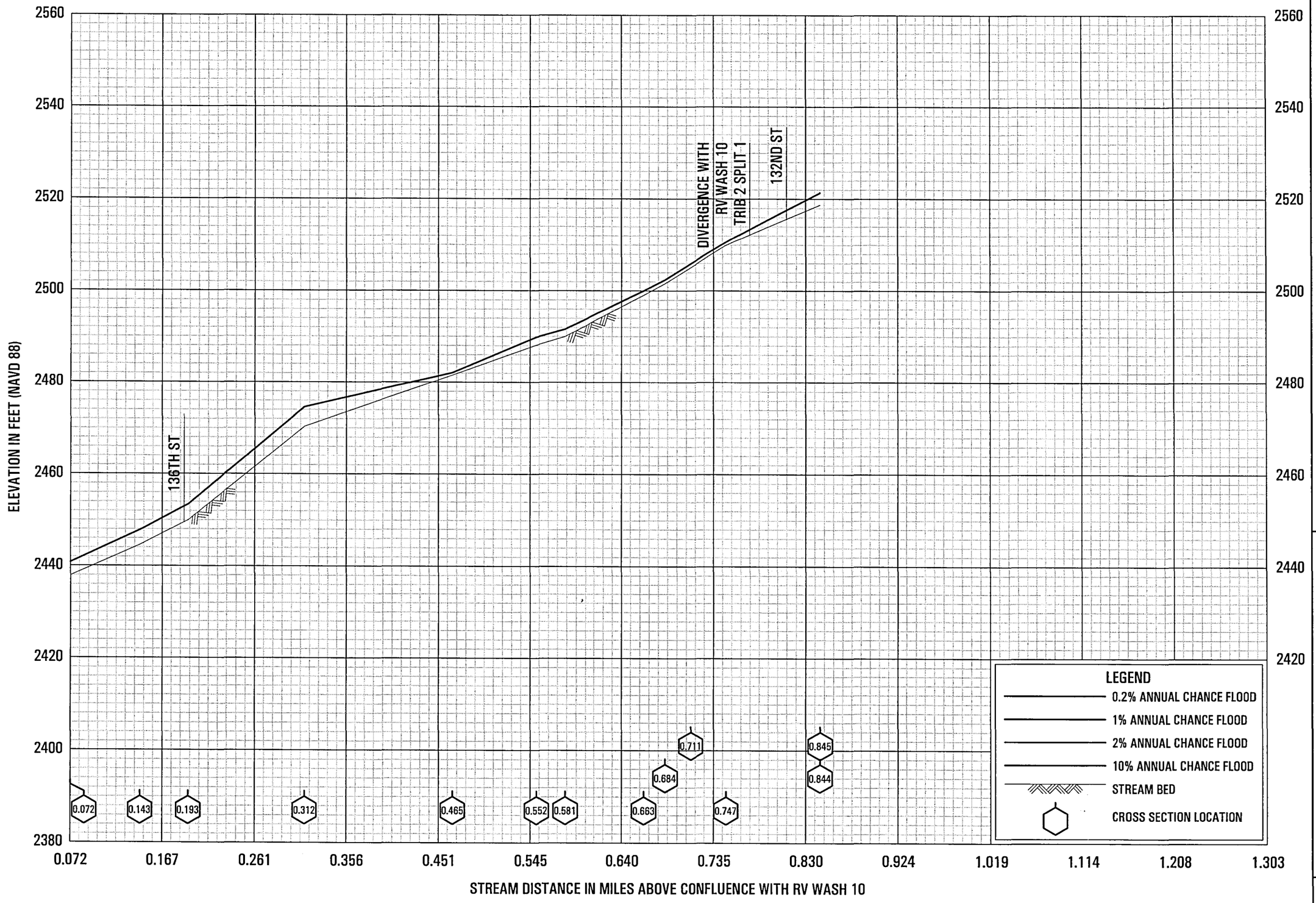
RV WASH 10 TRIB 2 SPLIT 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

MARICOPA COUNTY, AZ

AND INCORPORATED AREAS

W3-1



FLOOD PROFILES

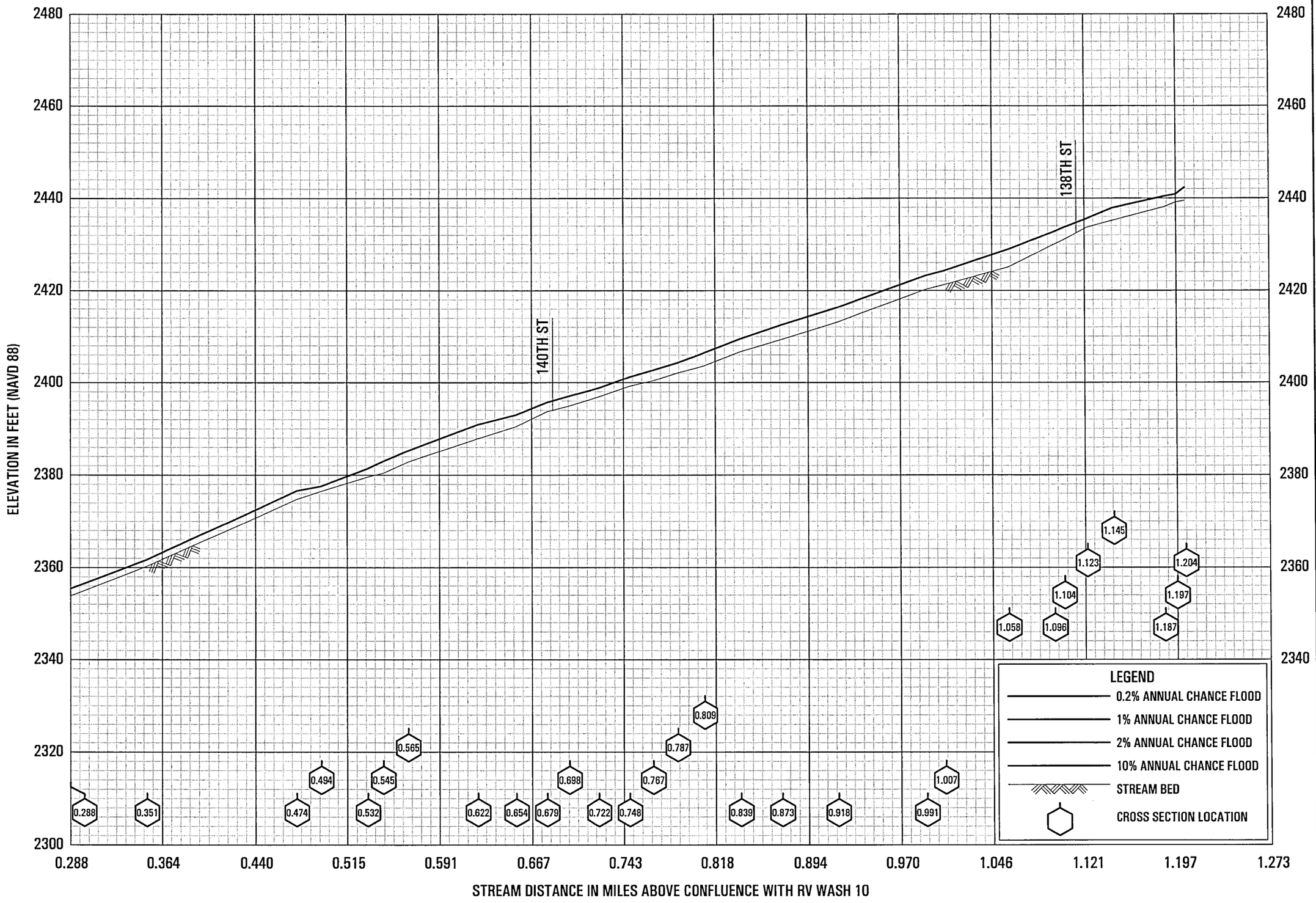
RV WASH 10 TRIB 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

MARICOPA COUNTY, AZ

AND INCORPORATED AREAS

W4-1



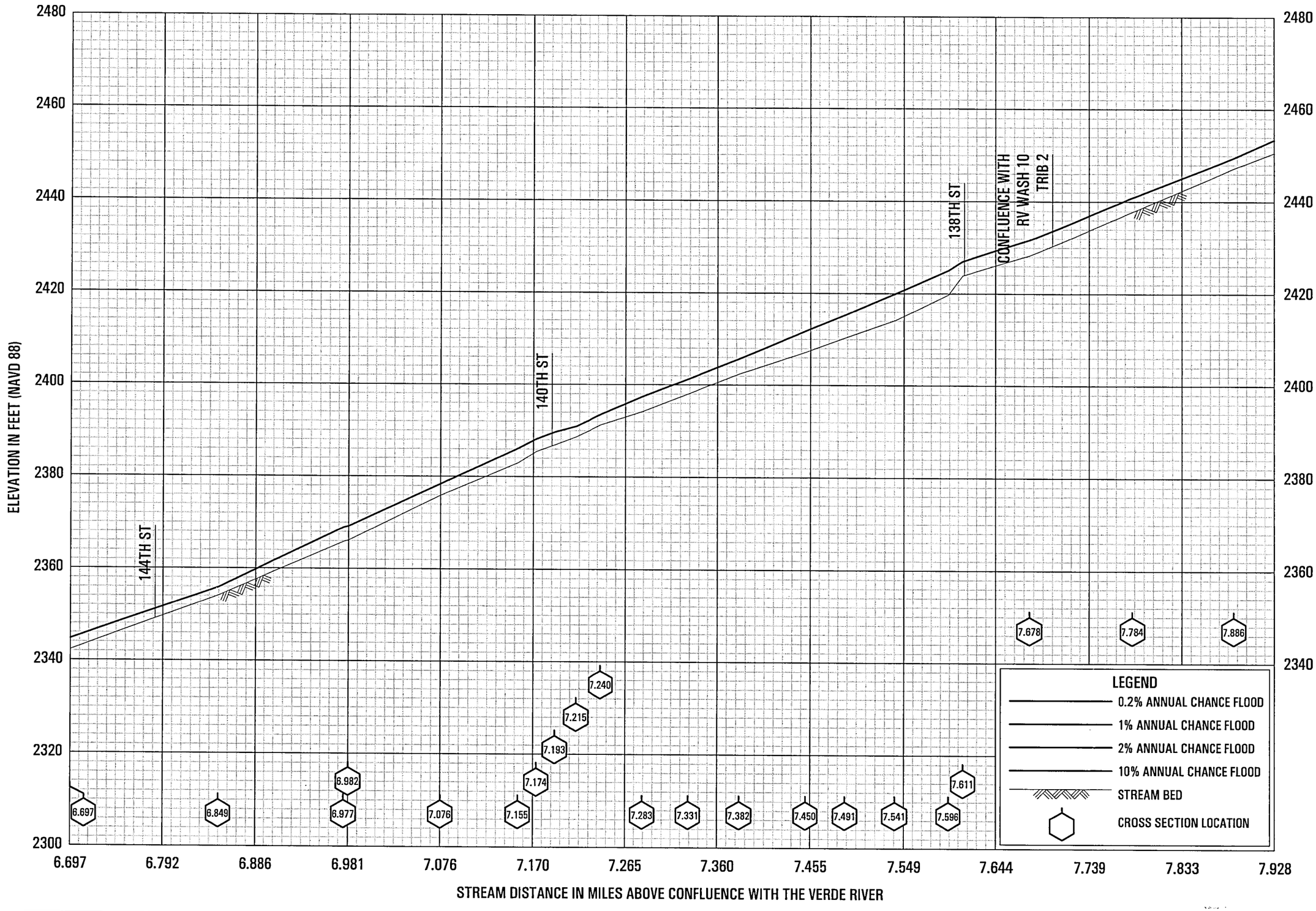
FLOOD PROFILES

RV WASH 10 TRIB 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

MARICOPA COUNTY, AZ

AND INCORPORATED AREAS



FLOOD PROFILES

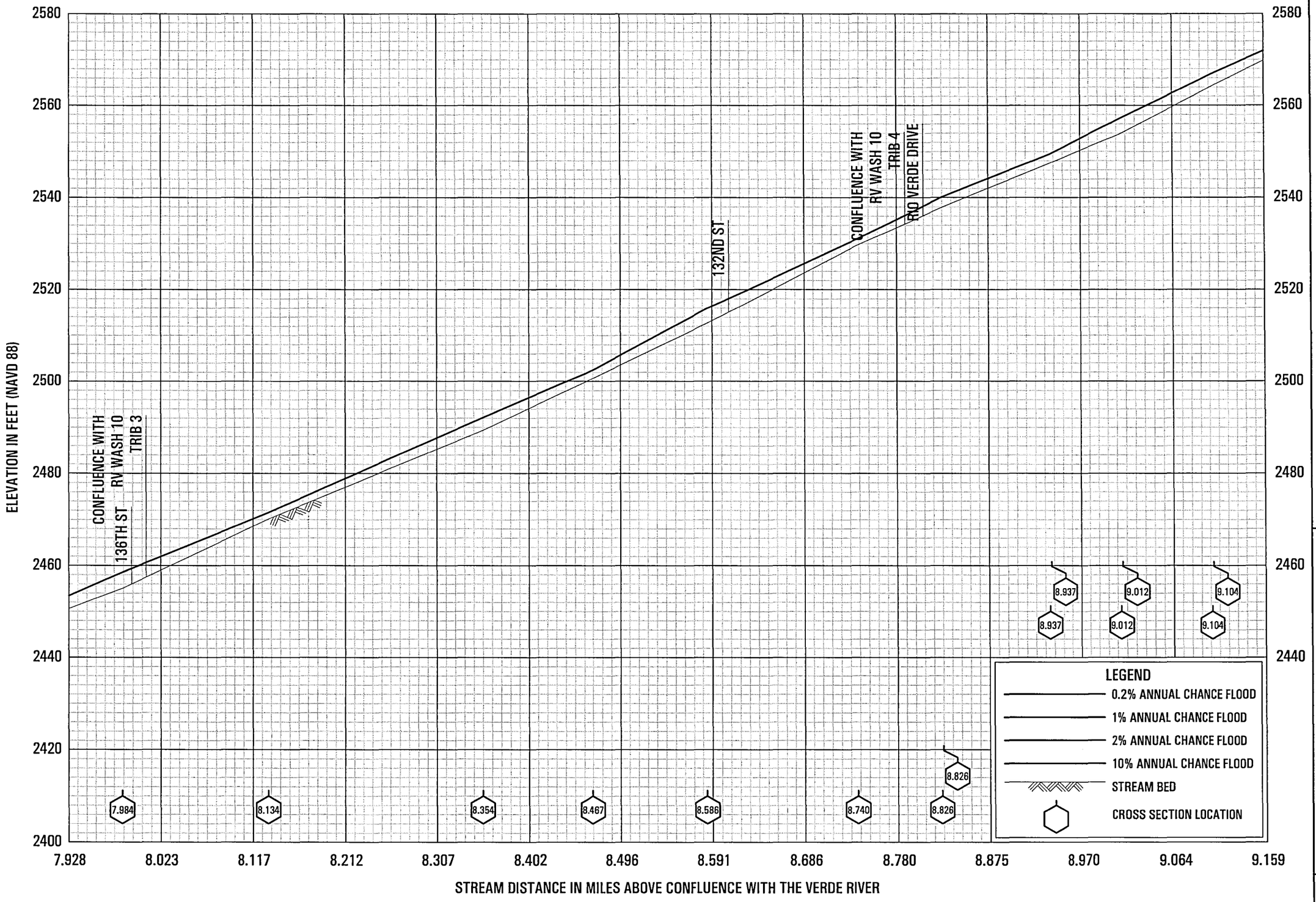
RV WASH 10

FEDERAL EMERGENCY MANAGEMENT AGENCY

MARICOPA COUNTY, AZ

AND INCORPORATED AREAS

W6-12



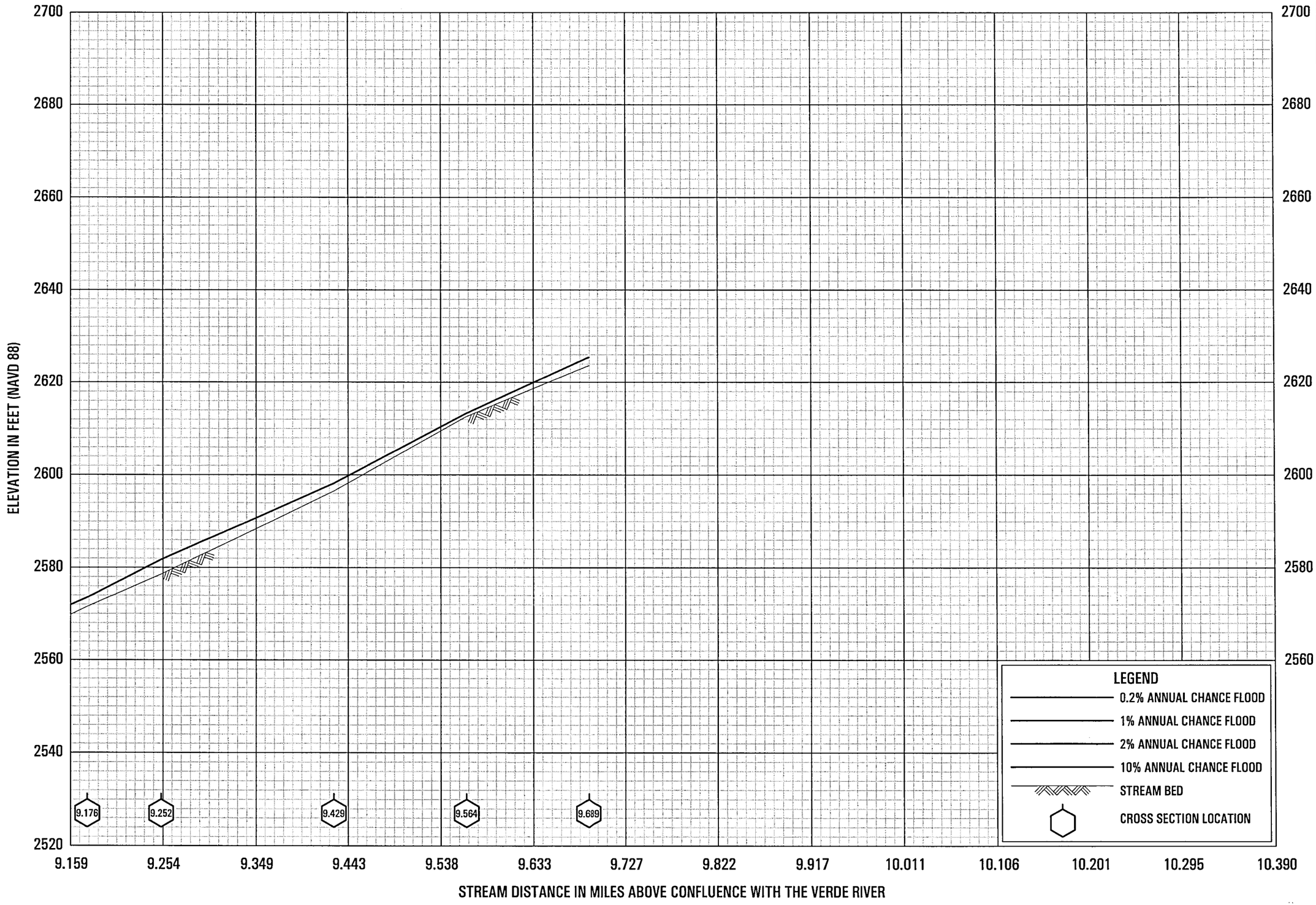
FLOOD PROFILES

RV WASH 10

FEDERAL EMERGENCY MANAGEMENT AGENCY

MARICOPA COUNTY, AZ

AND INCORPORATED AREAS



FLOOD PROFILES

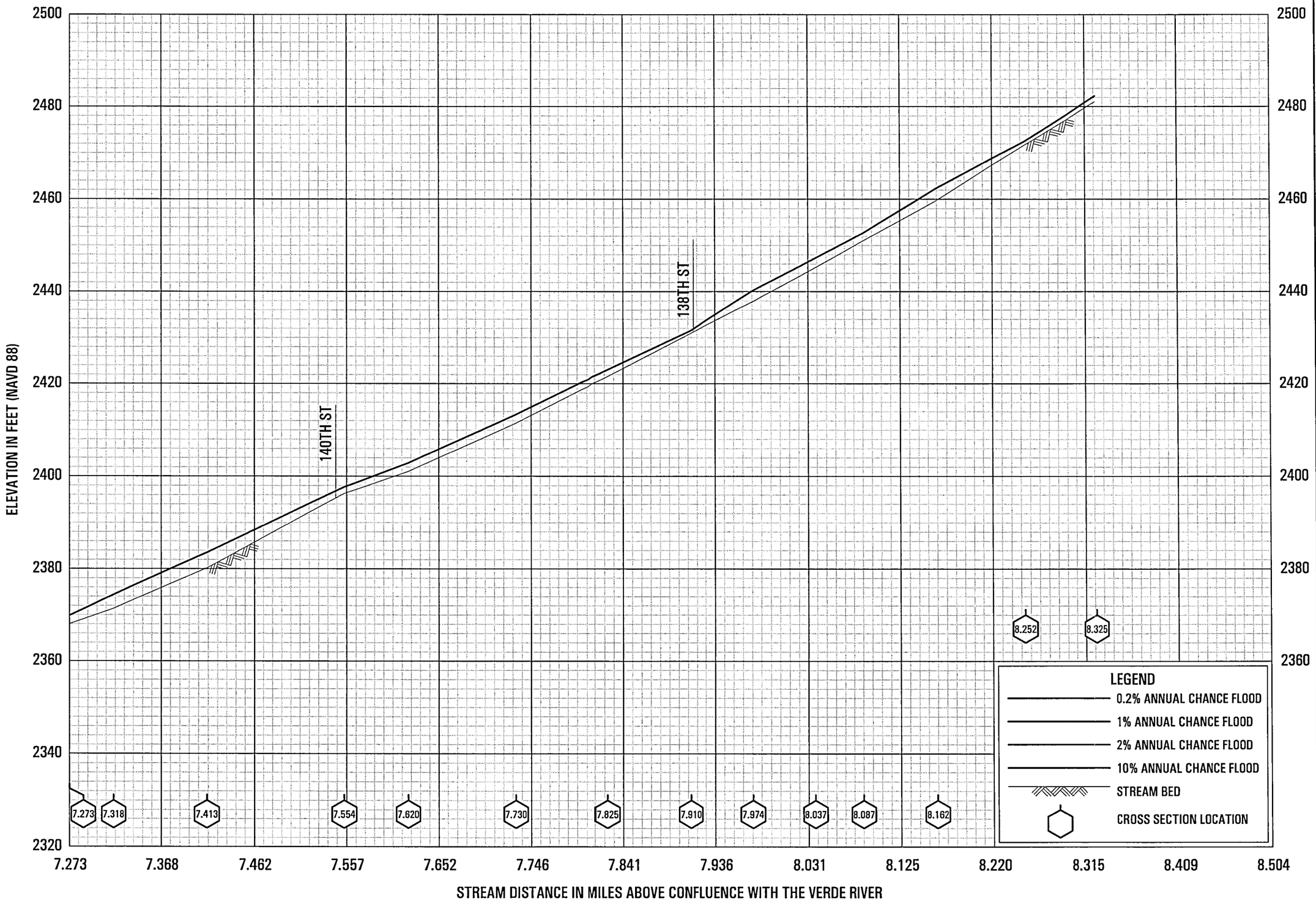
RV WASH 10

FEDERAL EMERGENCY MANAGEMENT AGENCY

MARICOPA COUNTY, AZ

AND INCORPORATED AREAS

W6-14



FLOOD PROFILES

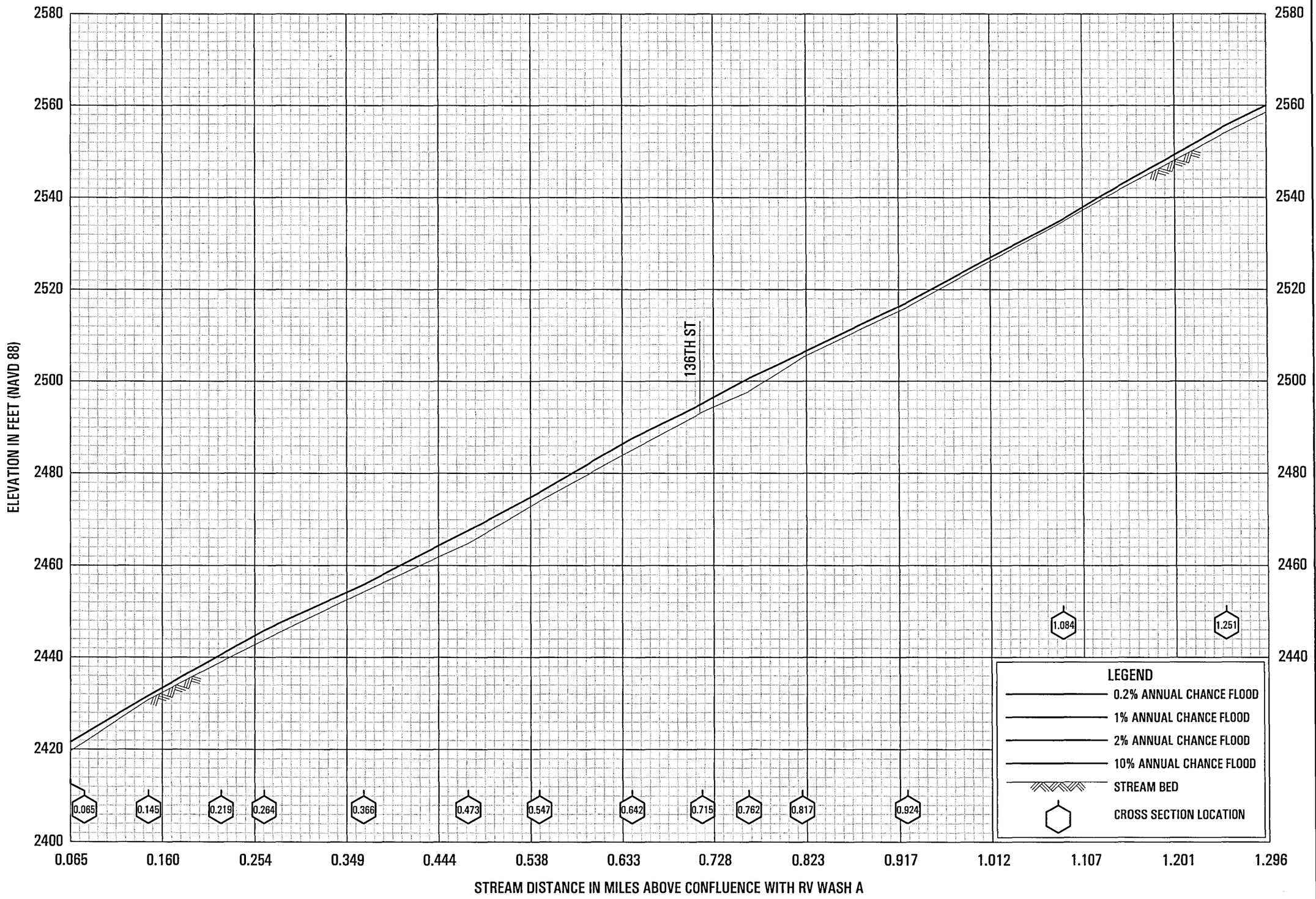
RV WASH 7

FEDERAL EMERGENCY MANAGEMENT AGENCY

MARICOPA COUNTY, AZ

AND INCORPORATED AREAS

W7-1



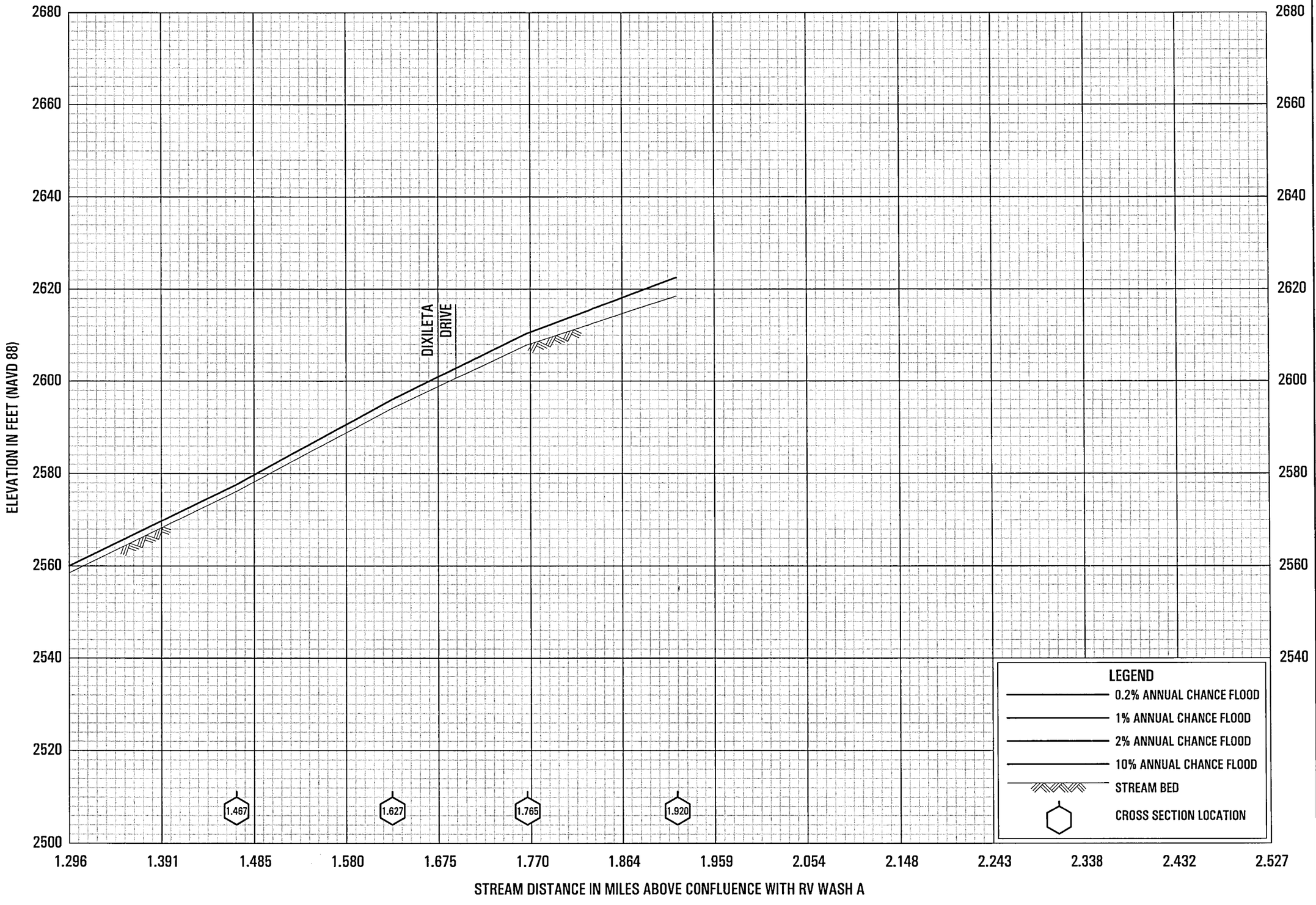
FLOOD PROFILES

RV WASH A TRIB 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

MARICOPA COUNTY, AZ

AND INCORPORATED AREAS



FLOOD PROFILES

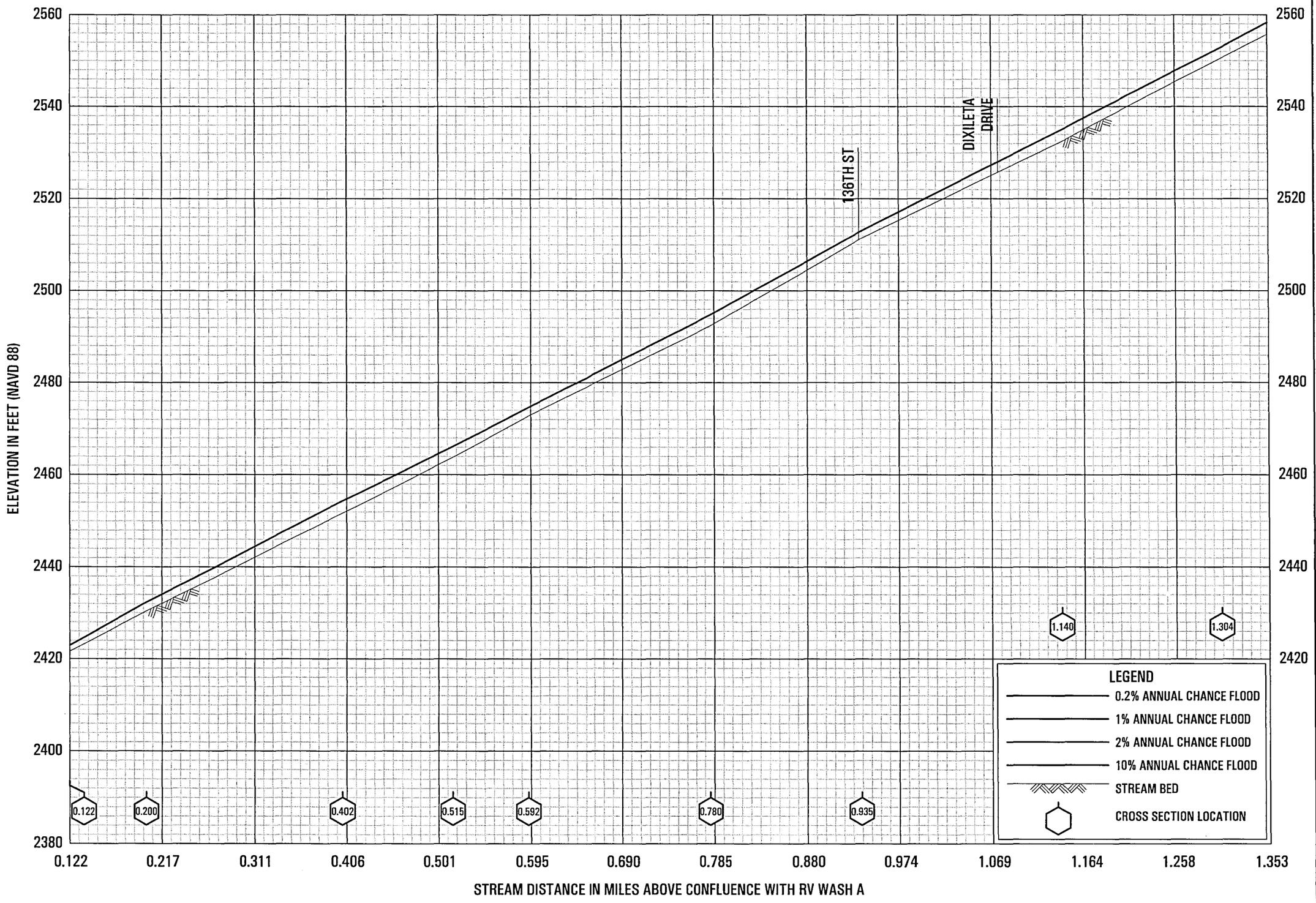
RV WASH A TRIB 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

MARICOPA COUNTY, AZ

AND INCORPORATED AREAS

W8-2



FLOOD PROFILES

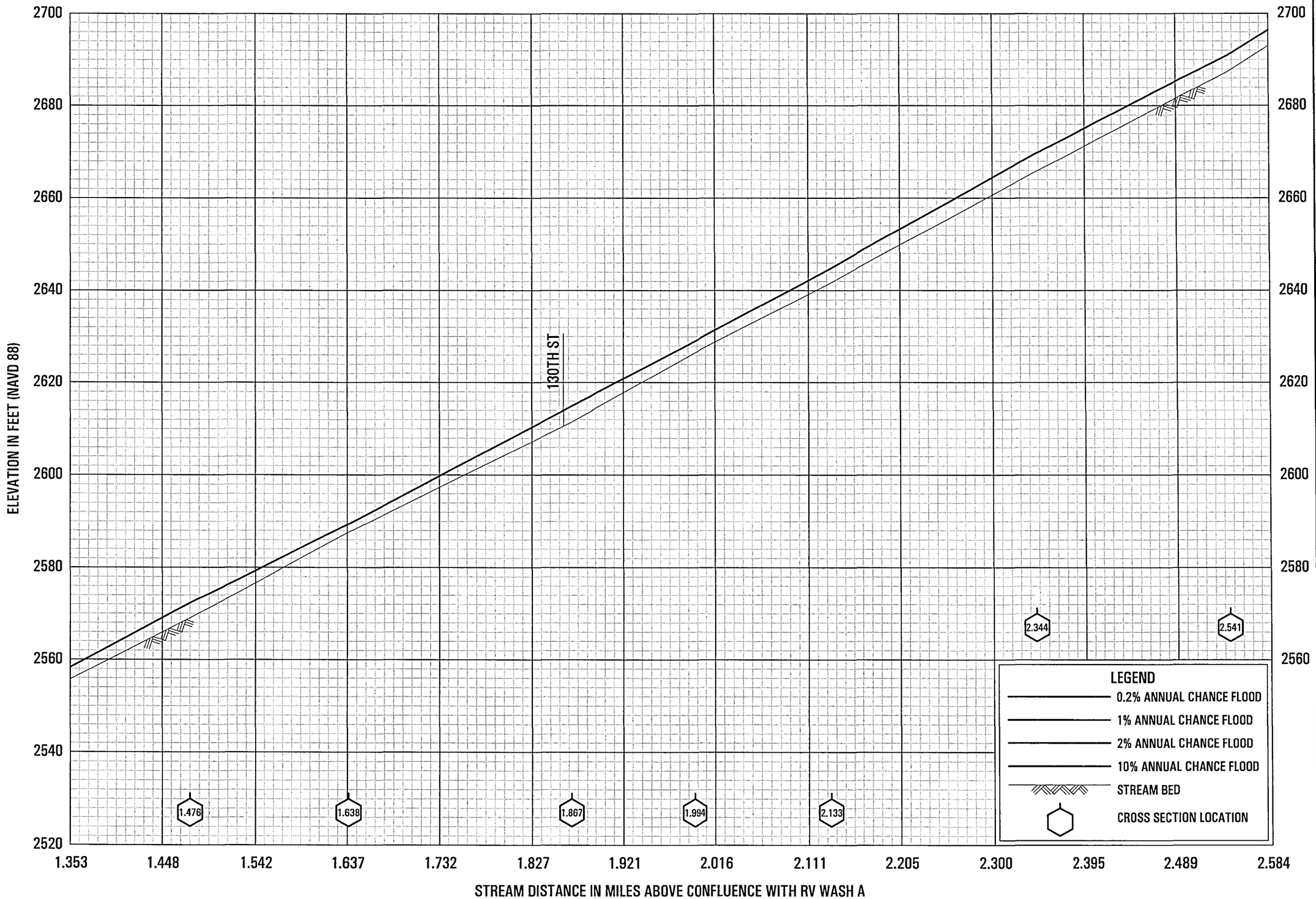
RV WASH A TRIB 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

MARICOPA COUNTY, AZ

AND INCORPORATED AREAS

W9-1



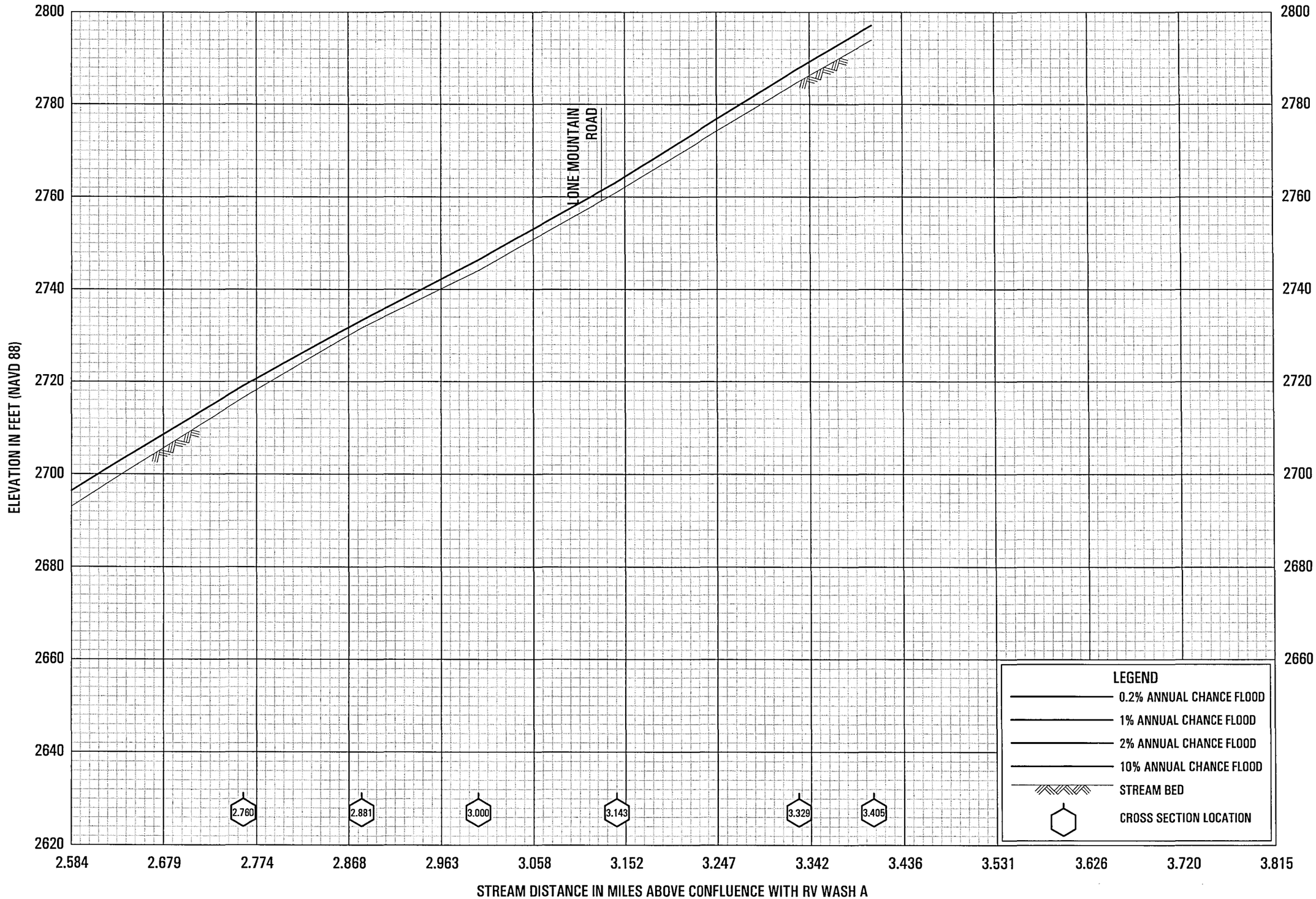
FLOOD PROFILES

RV WASH A TRIB 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

MARICOPA COUNTY, AZ

AND INCORPORATED AREAS



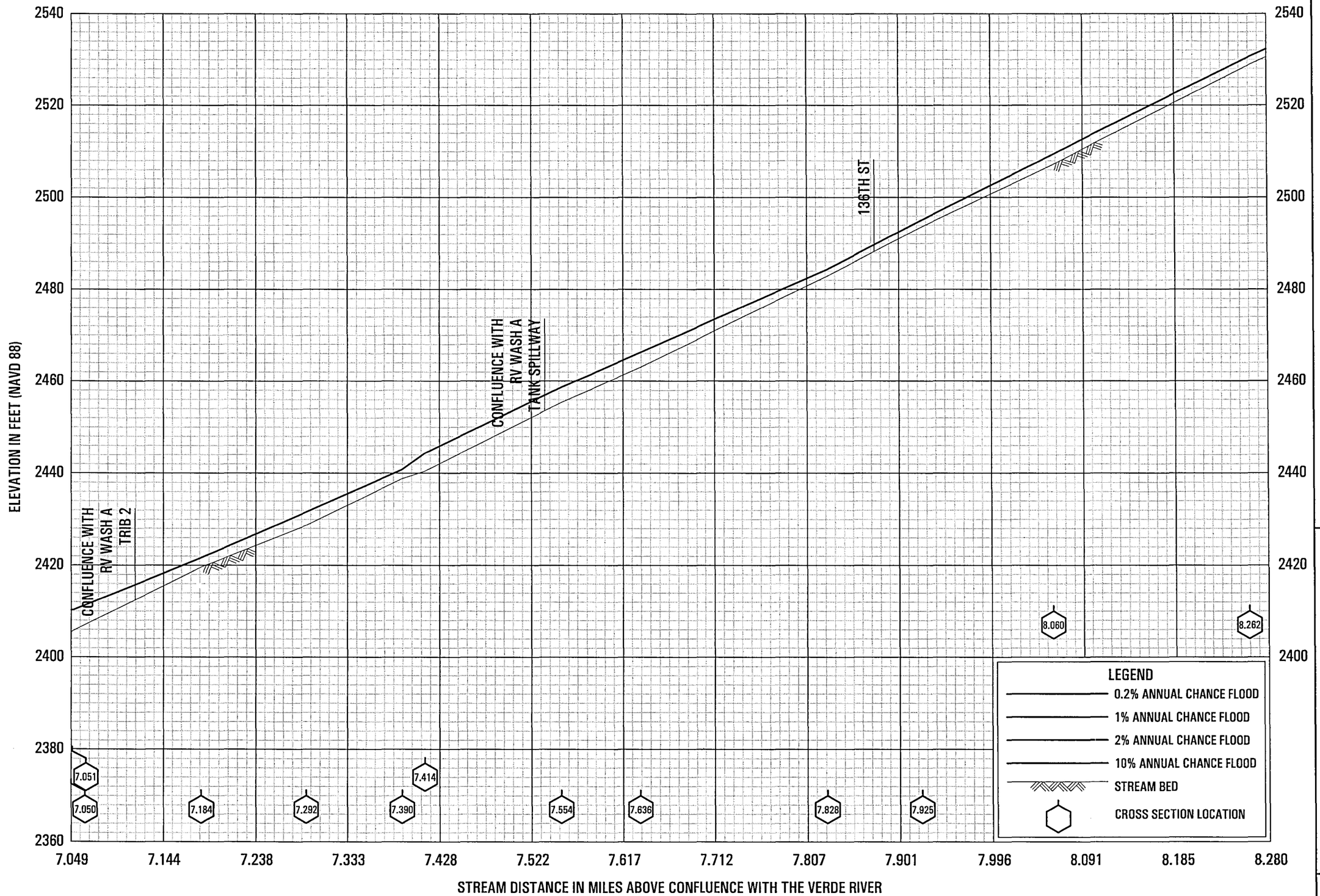
FLOOD PROFILES

RV WASH A TRIB 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

MARICOPA COUNTY, AZ

AND INCORPORATED AREAS



FLOOD PROFILES

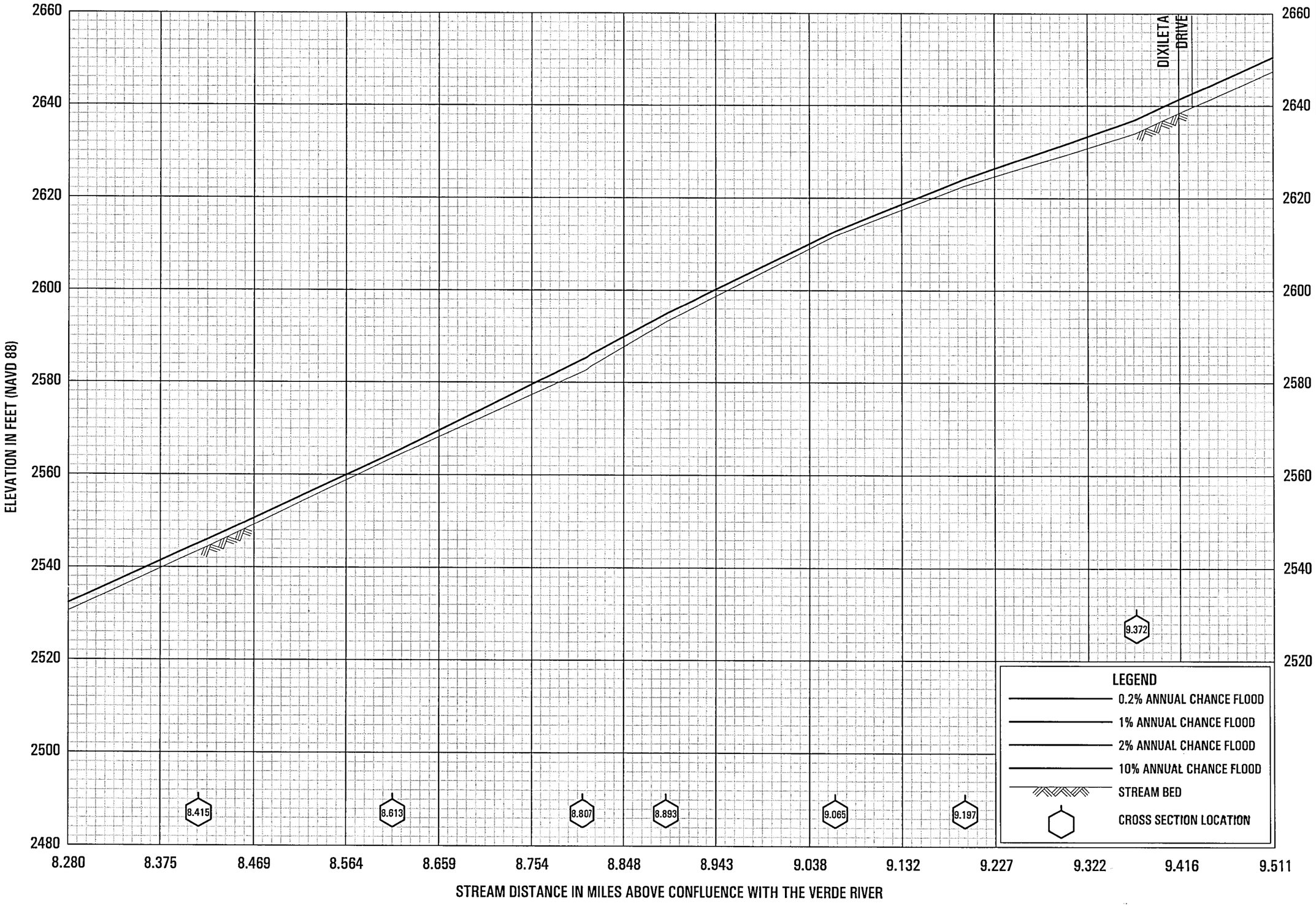
RV WASH A

FEDERAL EMERGENCY MANAGEMENT AGENCY

MARICOPA COUNTY, AZ

AND INCORPORATED AREAS

W10-14



FLOOD PROFILES

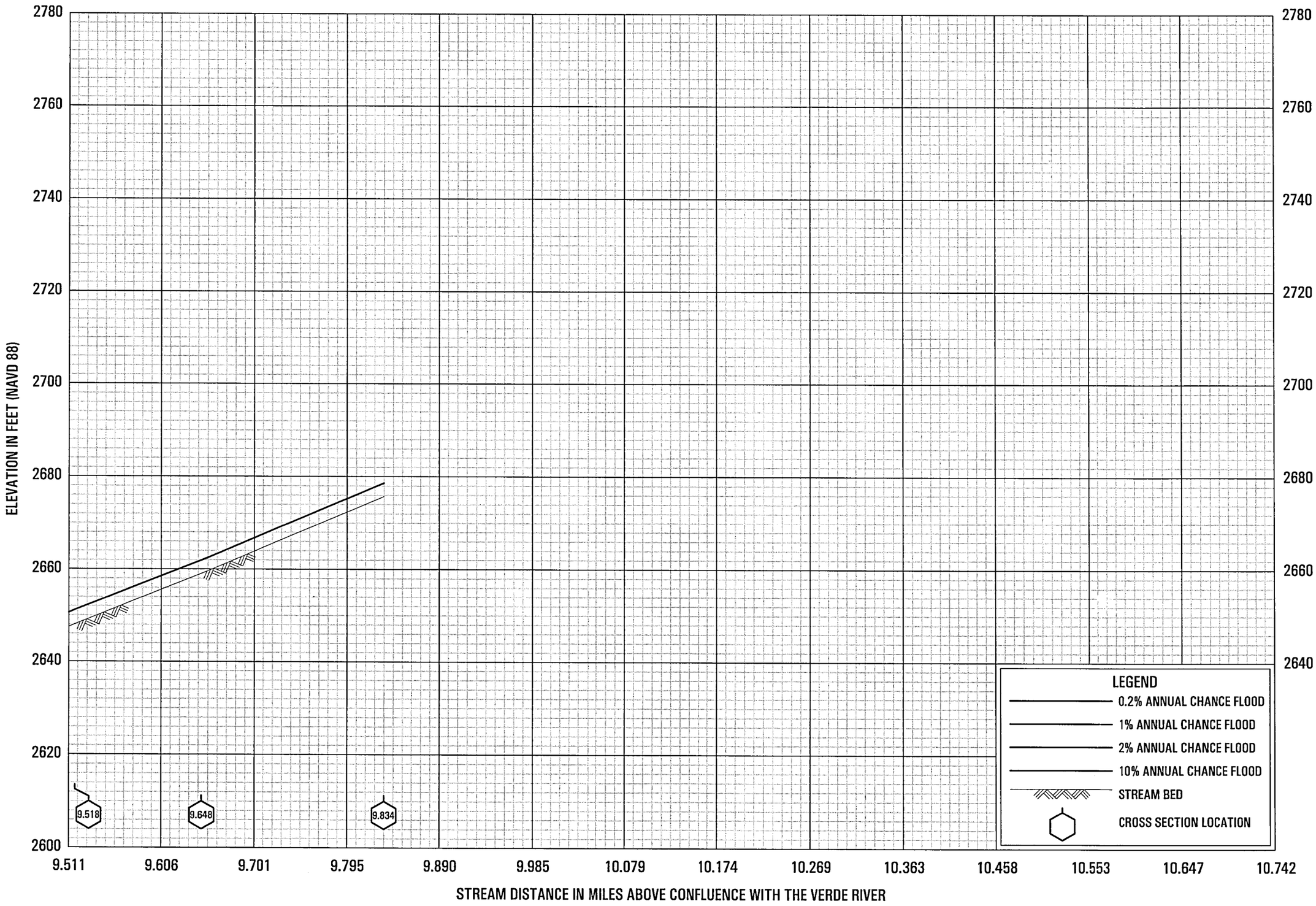
RV WASH A

FEDERAL EMERGENCY MANAGEMENT AGENCY

MARICOPA COUNTY, AZ

AND INCORPORATED AREAS

W10-15



FLOOD PROFILES

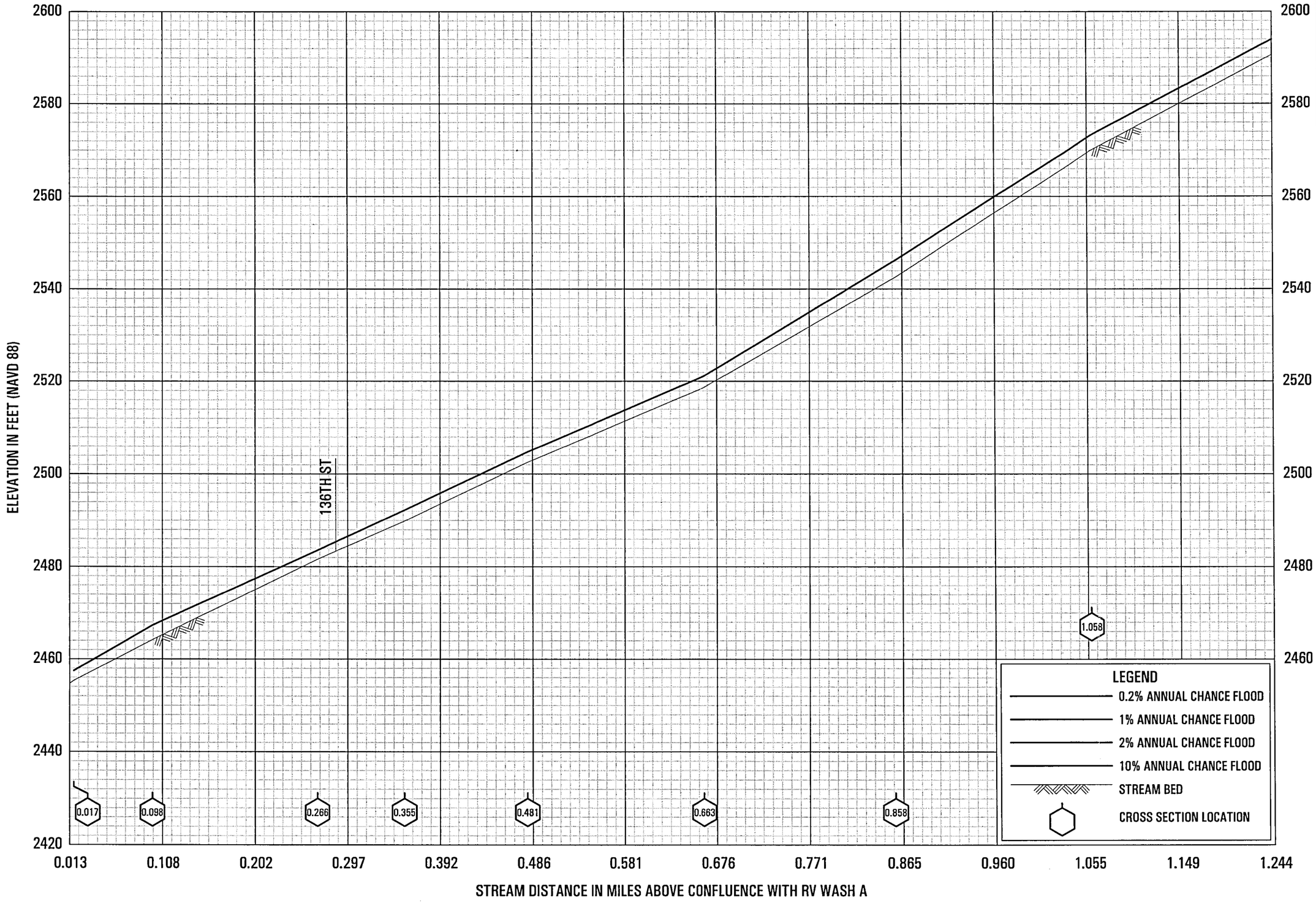
RV WASH A

FEDERAL EMERGENCY MANAGEMENT AGENCY

MARICOPA COUNTY, AZ

AND INCORPORATED AREAS

W10-16



FLOOD PROFILES

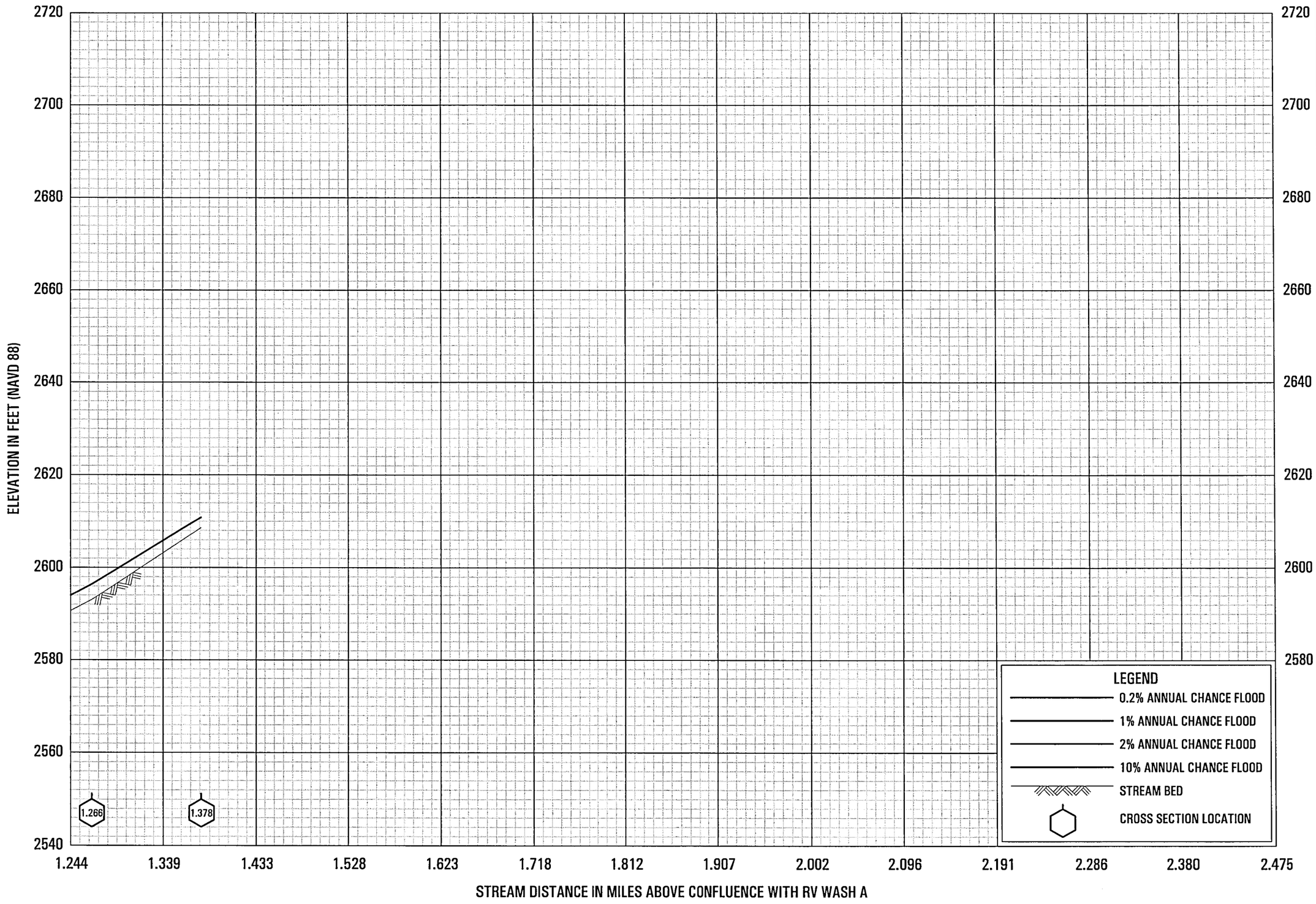
RV WASH A TANK SPILLWAY

FEDERAL EMERGENCY MANAGEMENT AGENCY

MARICOPA COUNTY, AZ

AND INCORPORATED AREAS

W11-1



FLOOD PROFILES

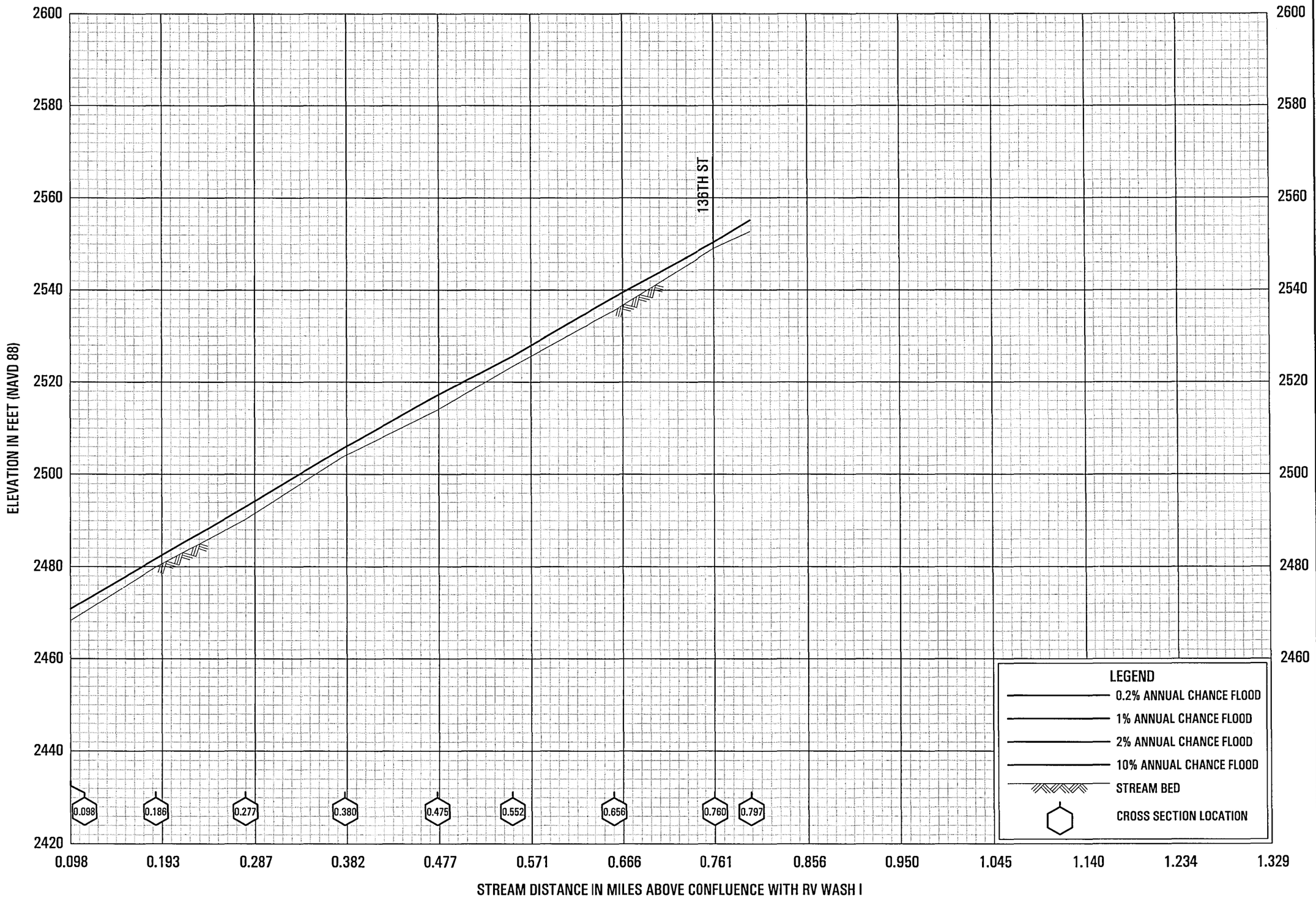
RV WASH A TANK SPILLWAY

FEDERAL EMERGENCY MANAGEMENT AGENCY

MARICOPA COUNTY, AZ

AND INCORPORATED AREAS

W11-2



FLOOD PROFILES

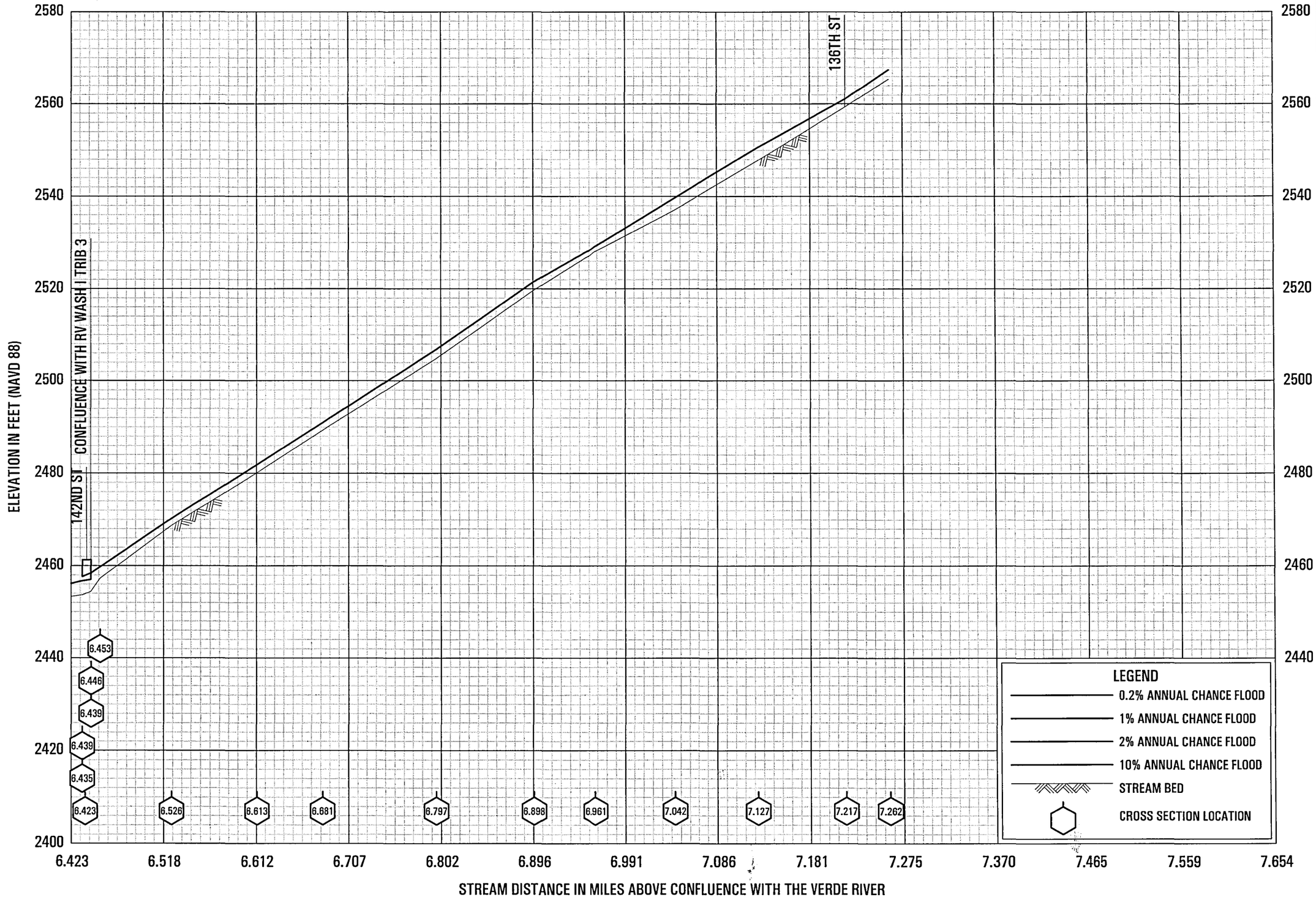
RV WASH I TRIB 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

MARICOPA COUNTY, AZ

AND INCORPORATED AREAS

W12-1



FLOOD PROFILES

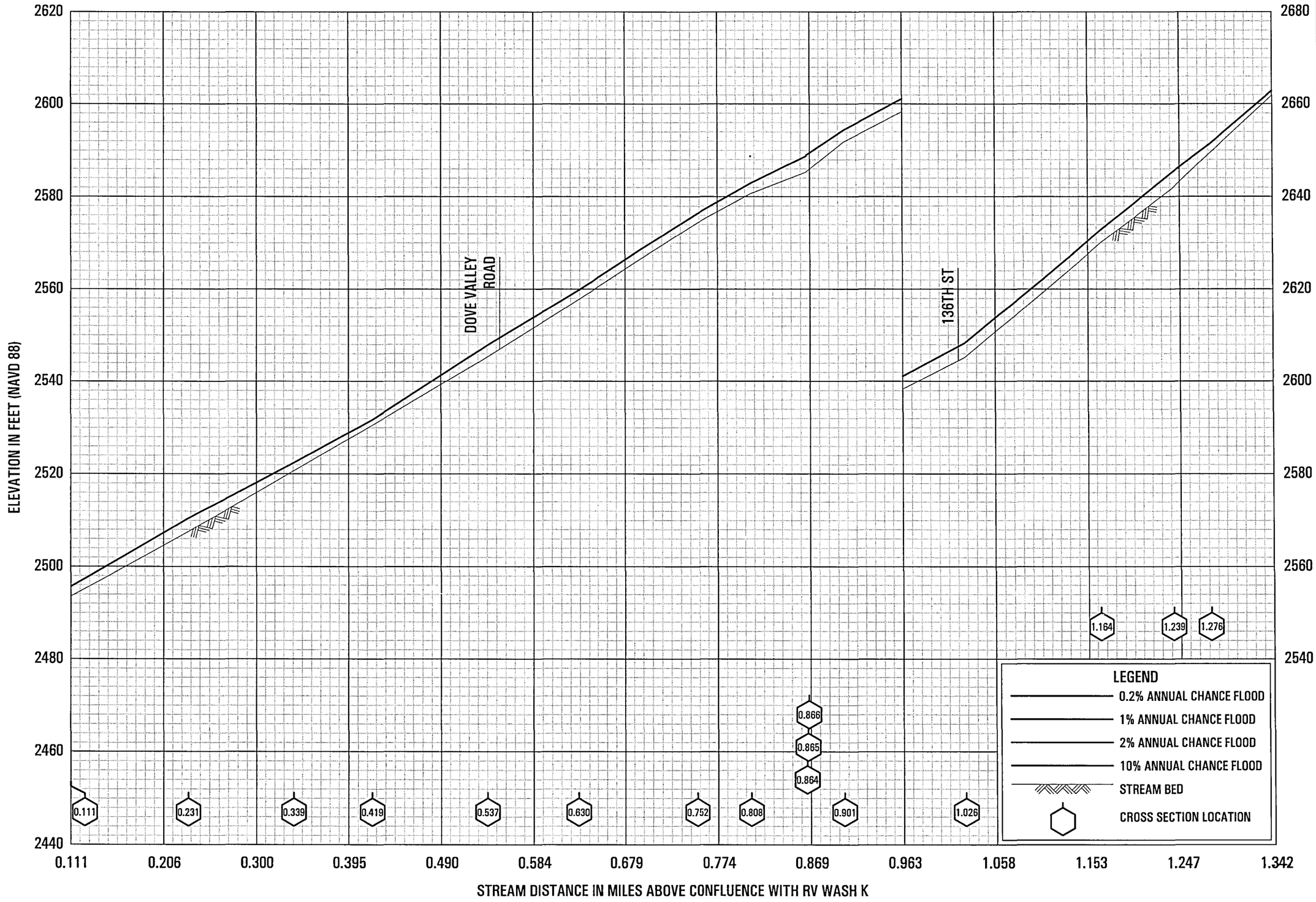
RV WASH I

FEDERAL EMERGENCY MANAGEMENT AGENCY

MARICOPA COUNTY, AZ

AND INCORPORATED AREAS

W13-15



FLOOD PROFILES

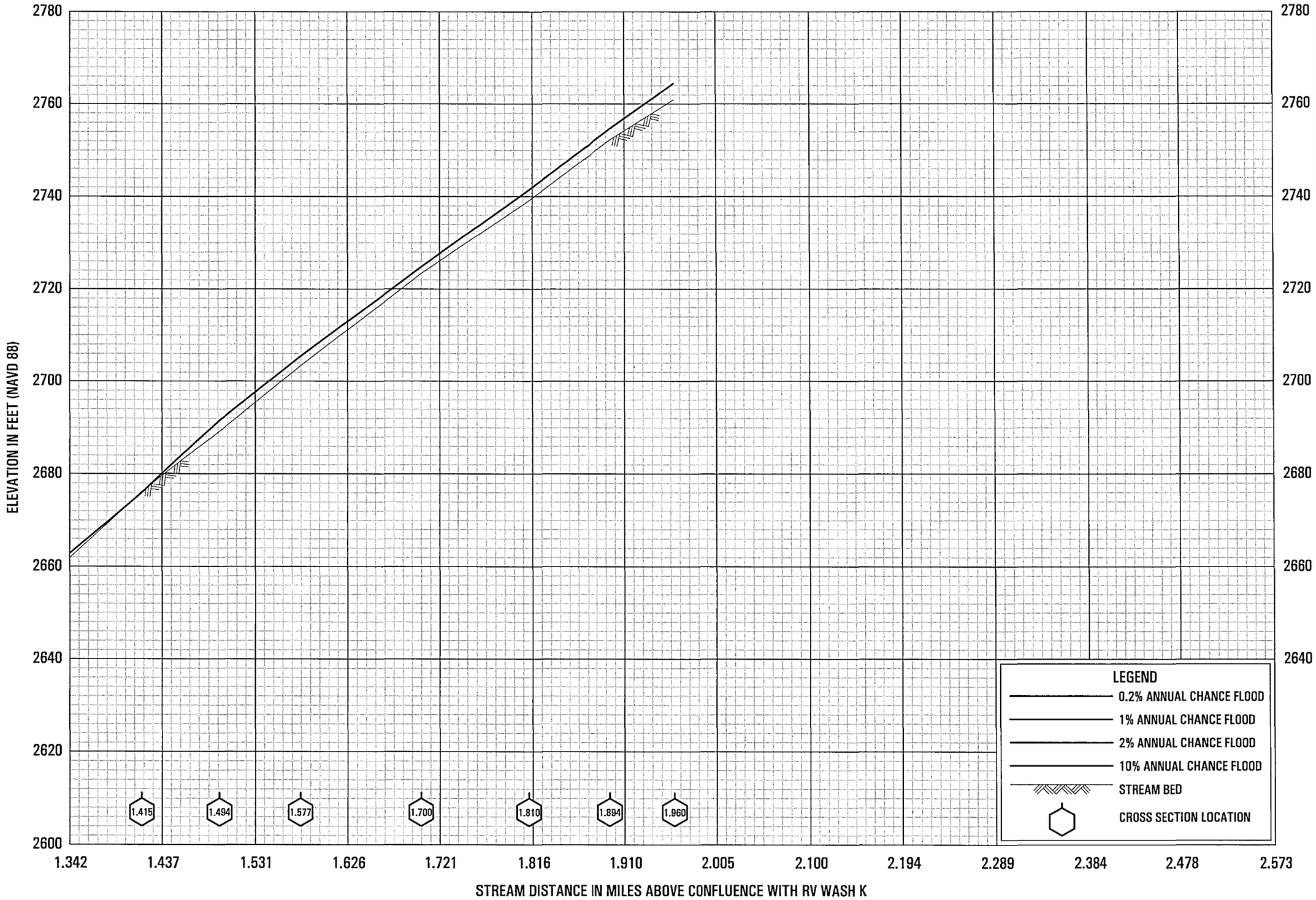
RV WASH K TRIB 13

FEDERAL EMERGENCY MANAGEMENT AGENCY

MARICOPA COUNTY, AZ

AND INCORPORATED AREAS

W14-1



FLOOD PROFILES

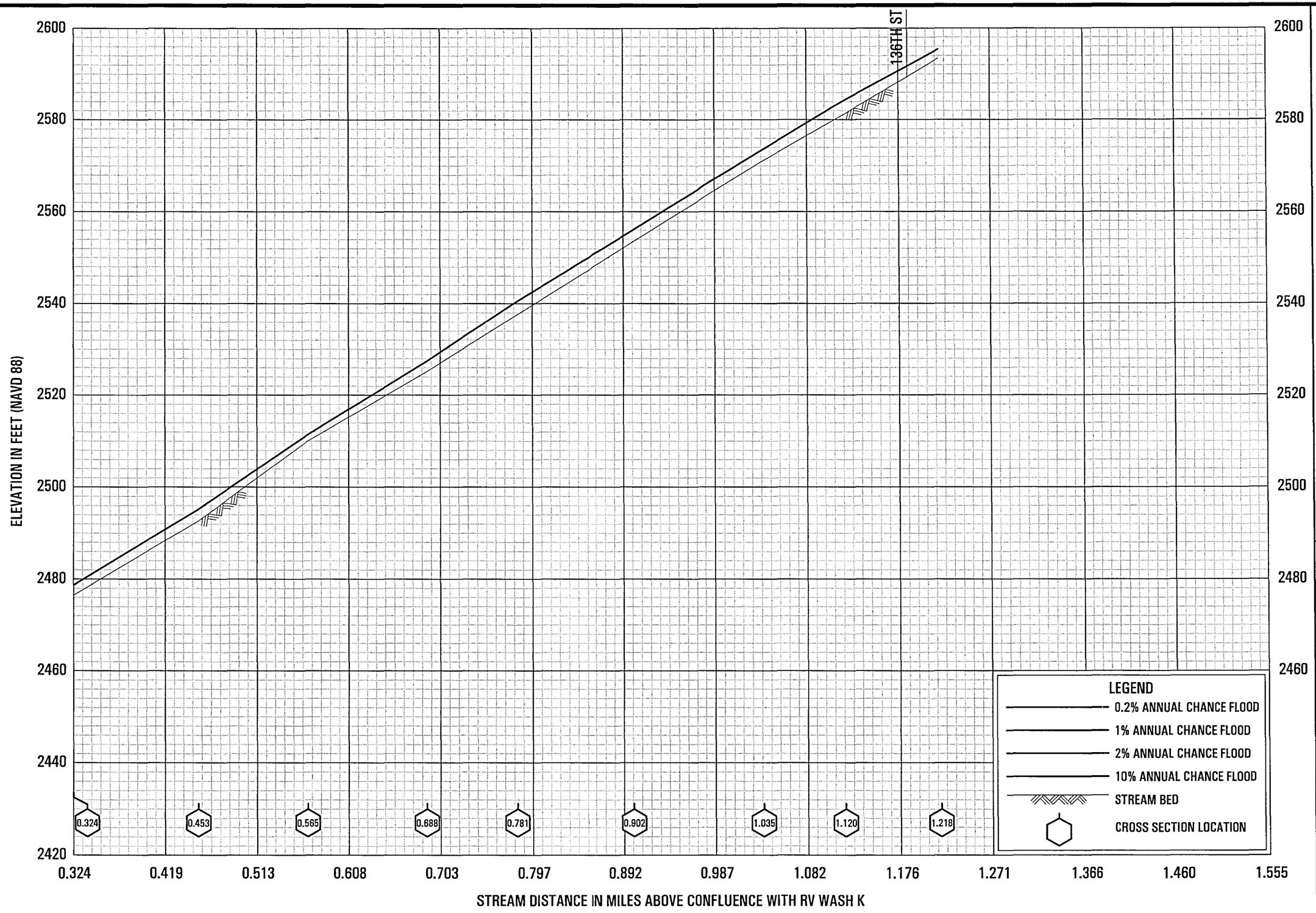
RV WASH K TRIB 13

FEDERAL EMERGENCY MANAGEMENT AGENCY

MARICOPA COUNTY, AZ

AND INCORPORATED AREAS

W14-2



FLOOD PROFILES

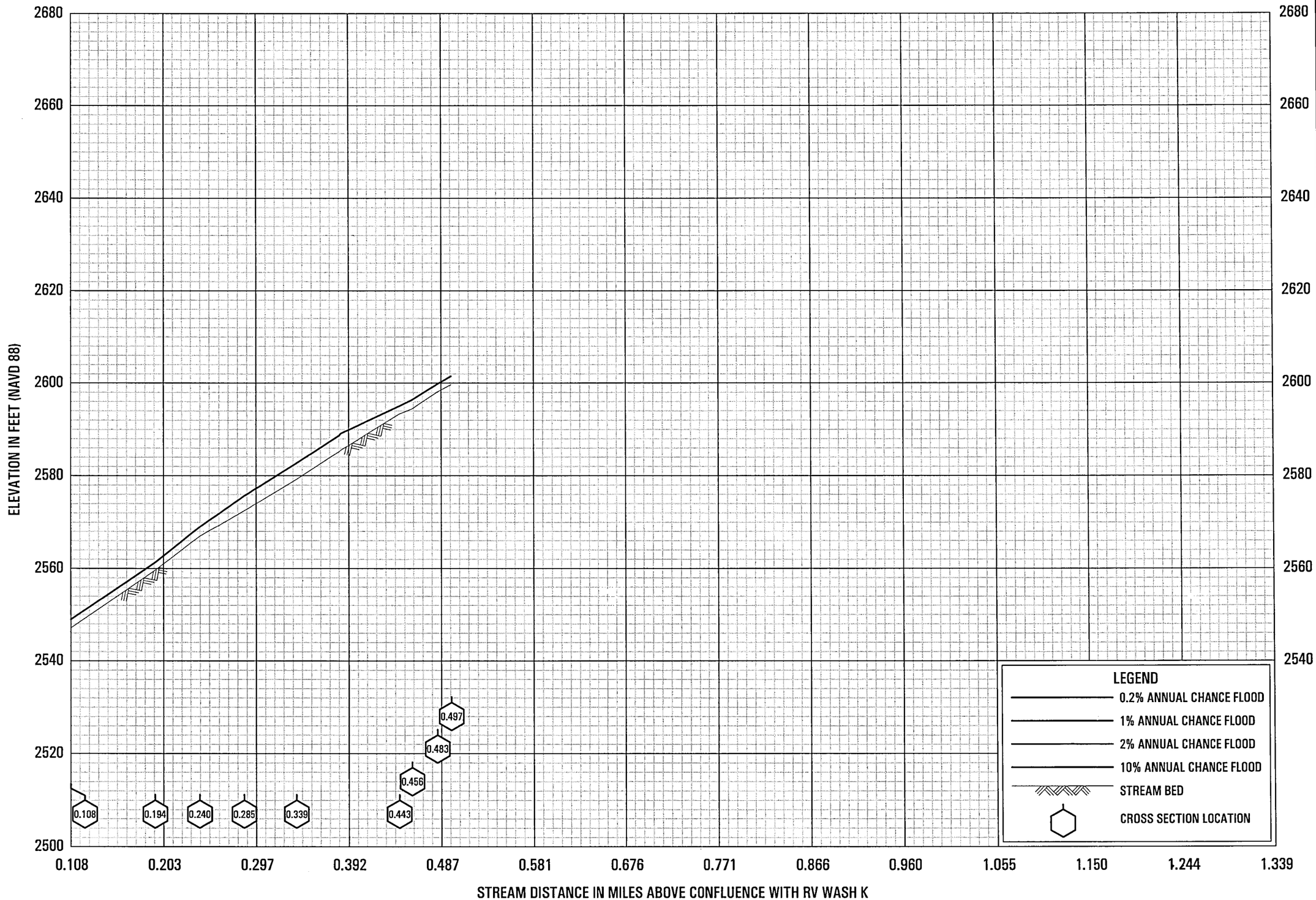
RV WASH K TRIB 12

FEDERAL EMERGENCY MANAGEMENT AGENCY

MARICOPA COUNTY, AZ

AND INCORPORATED AREAS

W15-2



FLOOD PROFILES

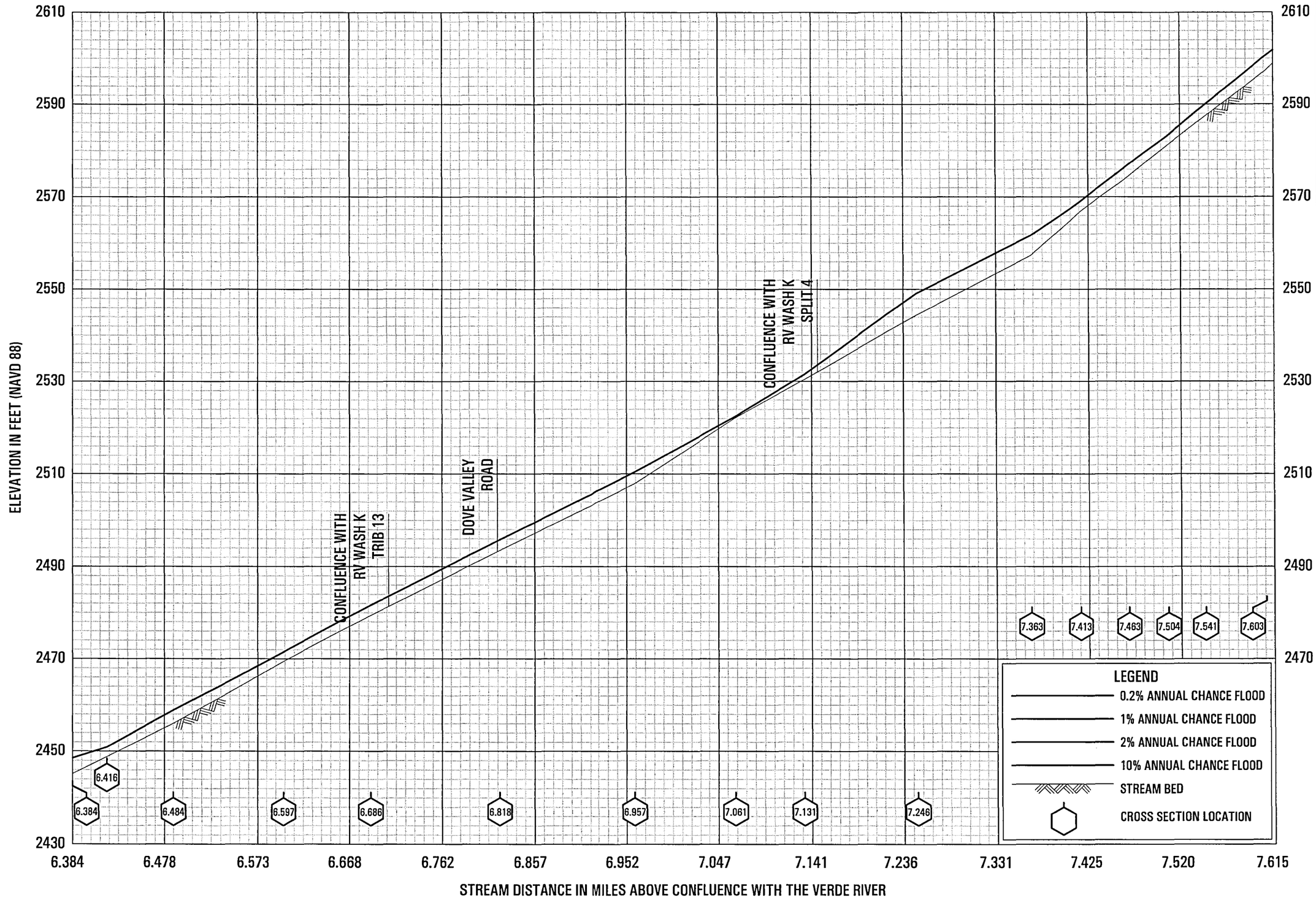
RV WASH K SPLIT 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

MARICOPA COUNTY, AZ

AND INCORPORATED AREAS

W16-1



FLOOD PROFILES

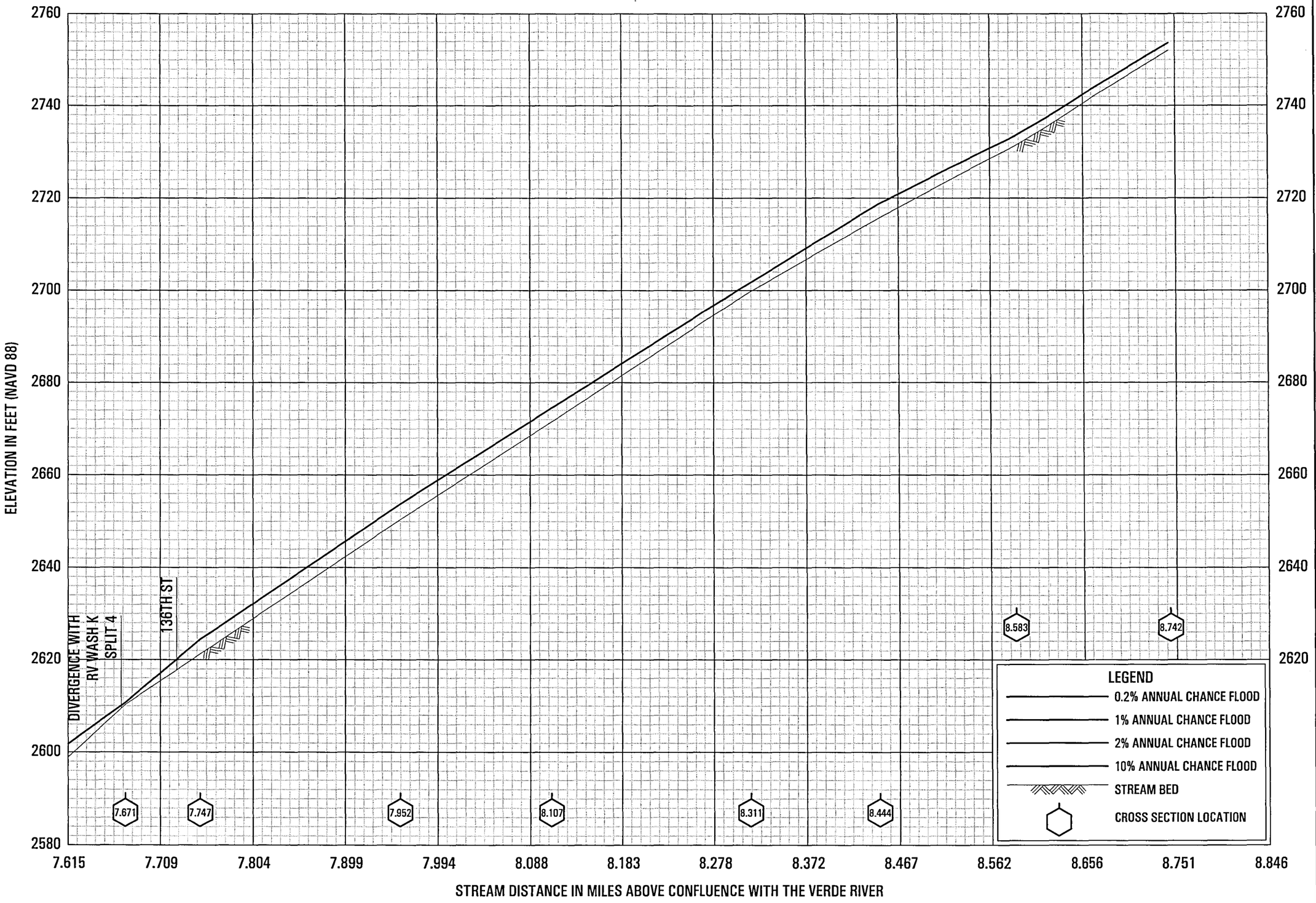
RV WASH K

FEDERAL EMERGENCY MANAGEMENT AGENCY

MARICOPA COUNTY, AZ

AND INCORPORATED AREAS

W17-14



FLOOD PROFILES

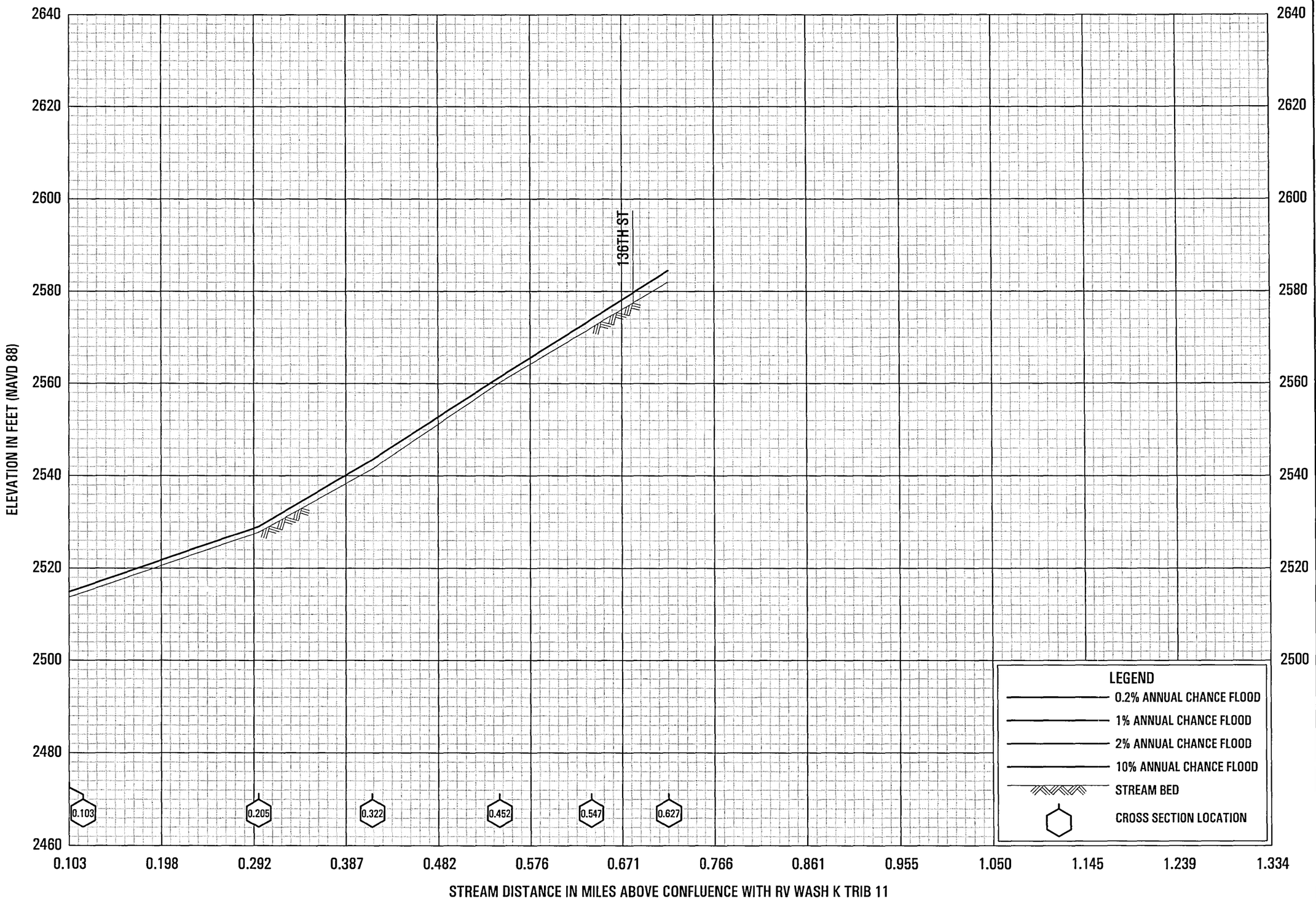
RV WASH K

FEDERAL EMERGENCY MANAGEMENT AGENCY

MARICOPA COUNTY, AZ

AND INCORPORATED AREAS

W17-15



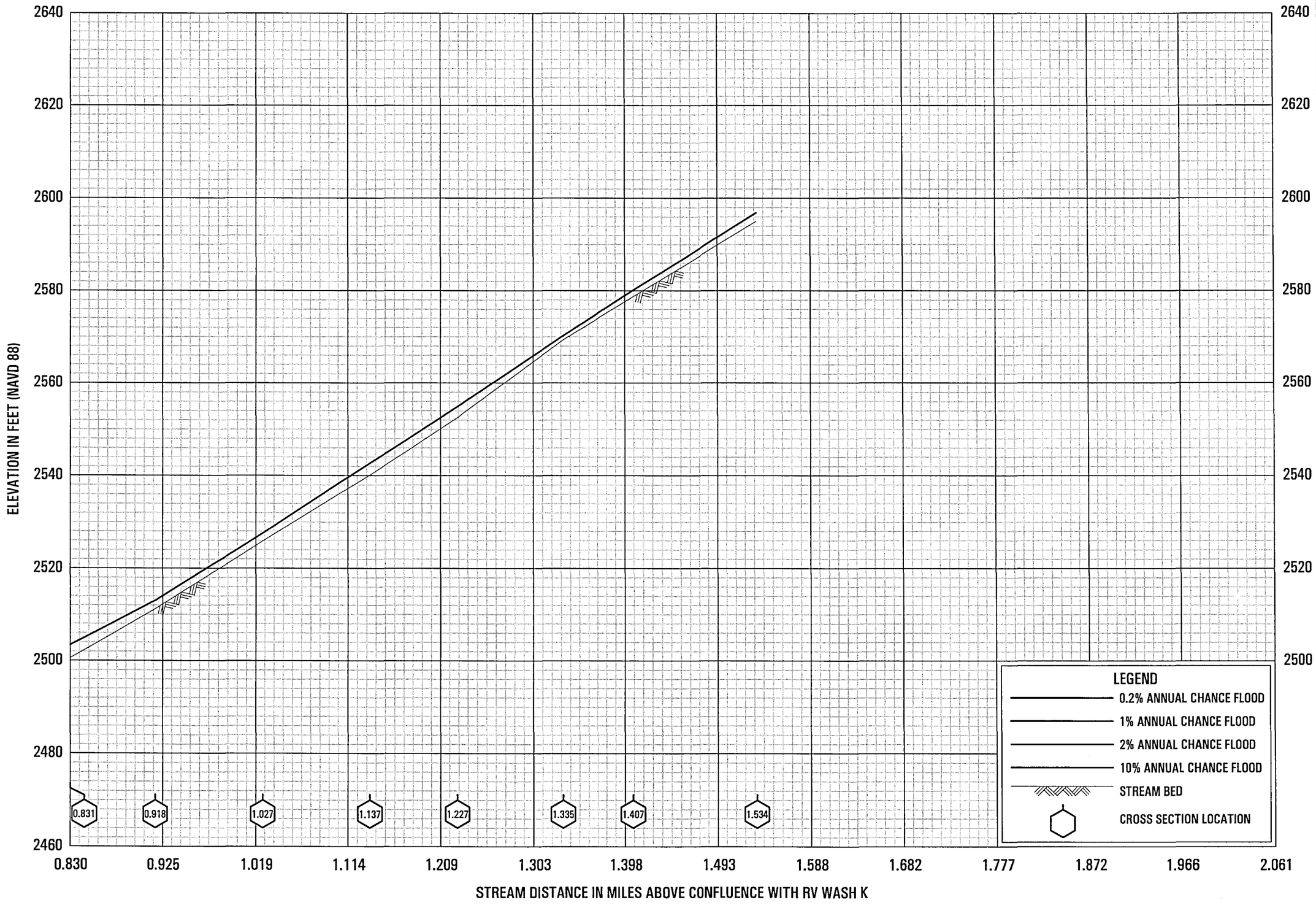
FLOOD PROFILES

RV WASH K TRIB 11B

FEDERAL EMERGENCY MANAGEMENT AGENCY

MARICOPA COUNTY, AZ

AND INCORPORATED AREAS



FLOOD PROFILES

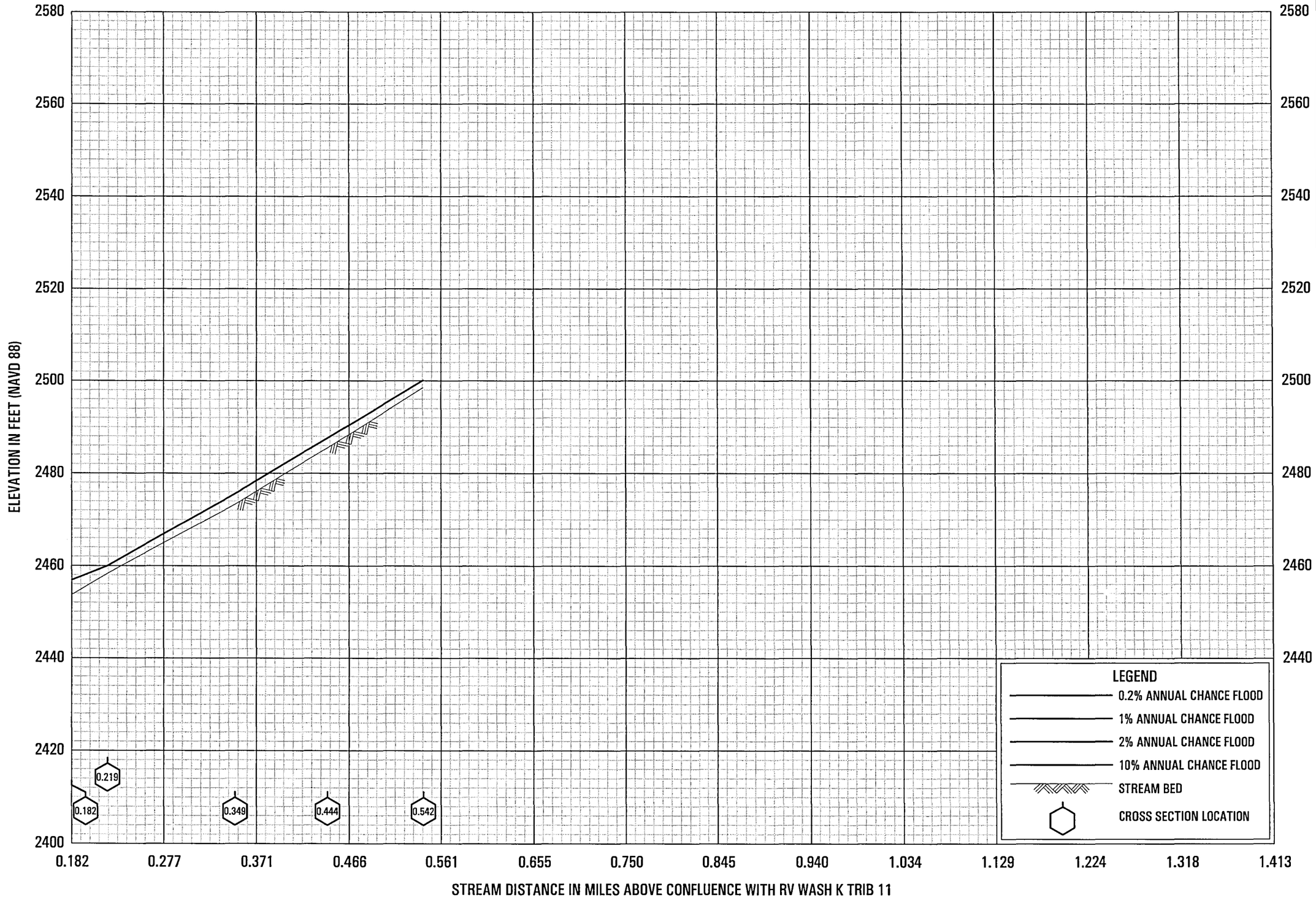
RV WASH K TRIB 11

FEDERAL EMERGENCY MANAGEMENT AGENCY

MARICOPA COUNTY, AZ

AND INCORPORATED AREAS

W19-3



FLOOD PROFILES

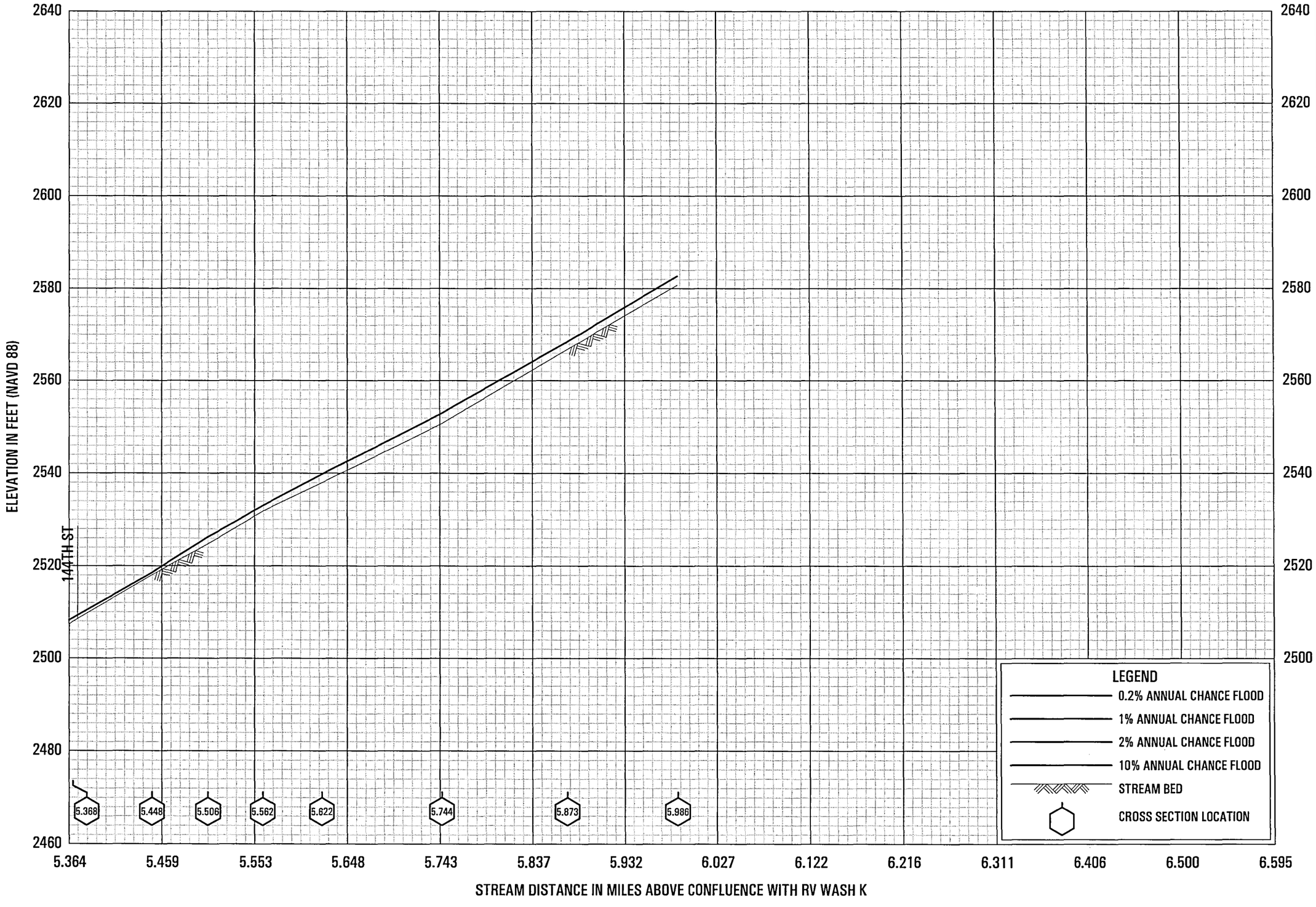
RV WASH K TRIB 11A

FEDERAL EMERGENCY MANAGEMENT AGENCY

MARICOPA COUNTY, AZ

AND INCORPORATED AREAS

W20-2



FLOOD PROFILES

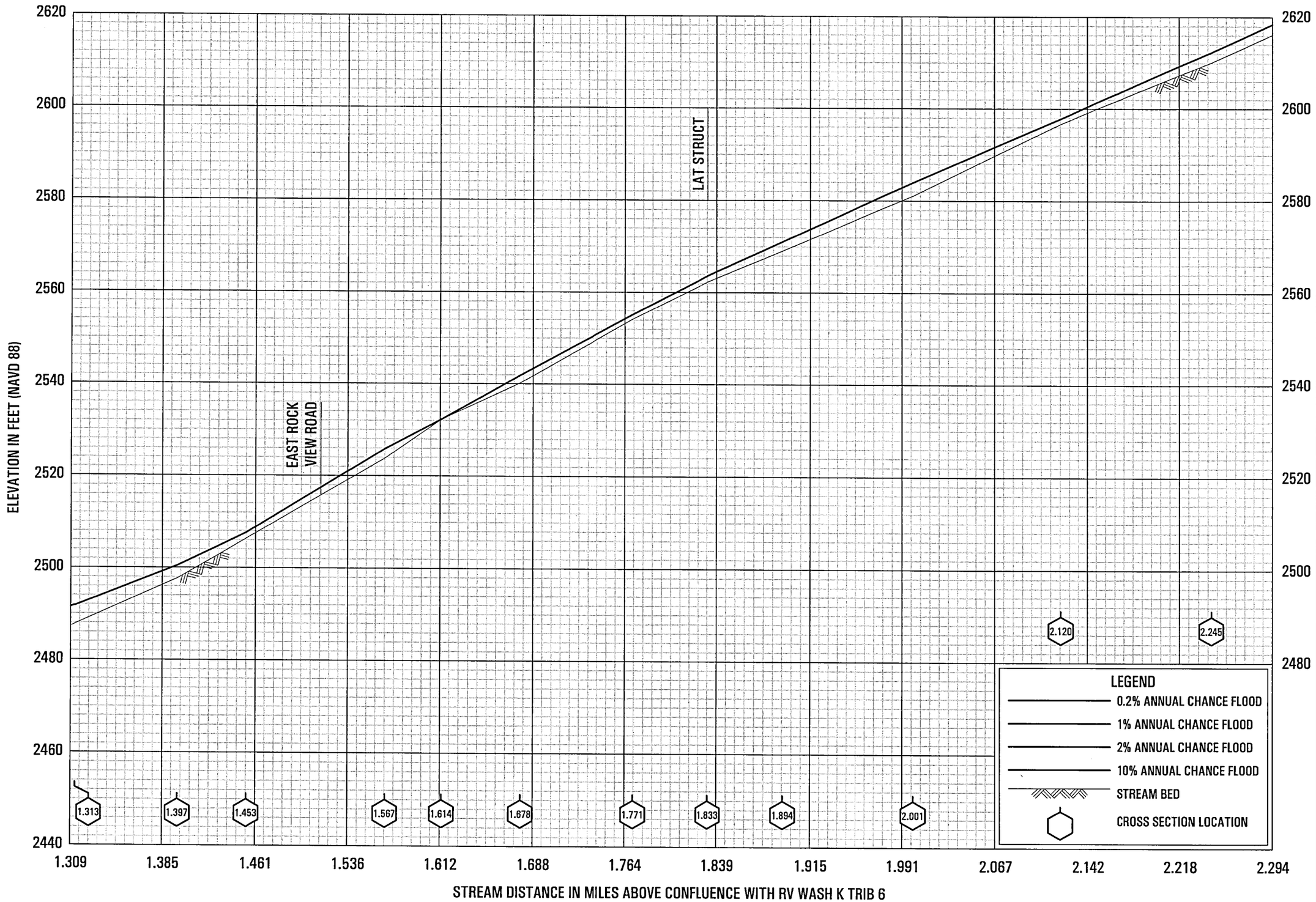
RV WASH K TRIB 6

FEDERAL EMERGENCY MANAGEMENT AGENCY

MARICOPA COUNTY, AZ

AND INCORPORATED AREAS

W21-9



FLOOD PROFILES

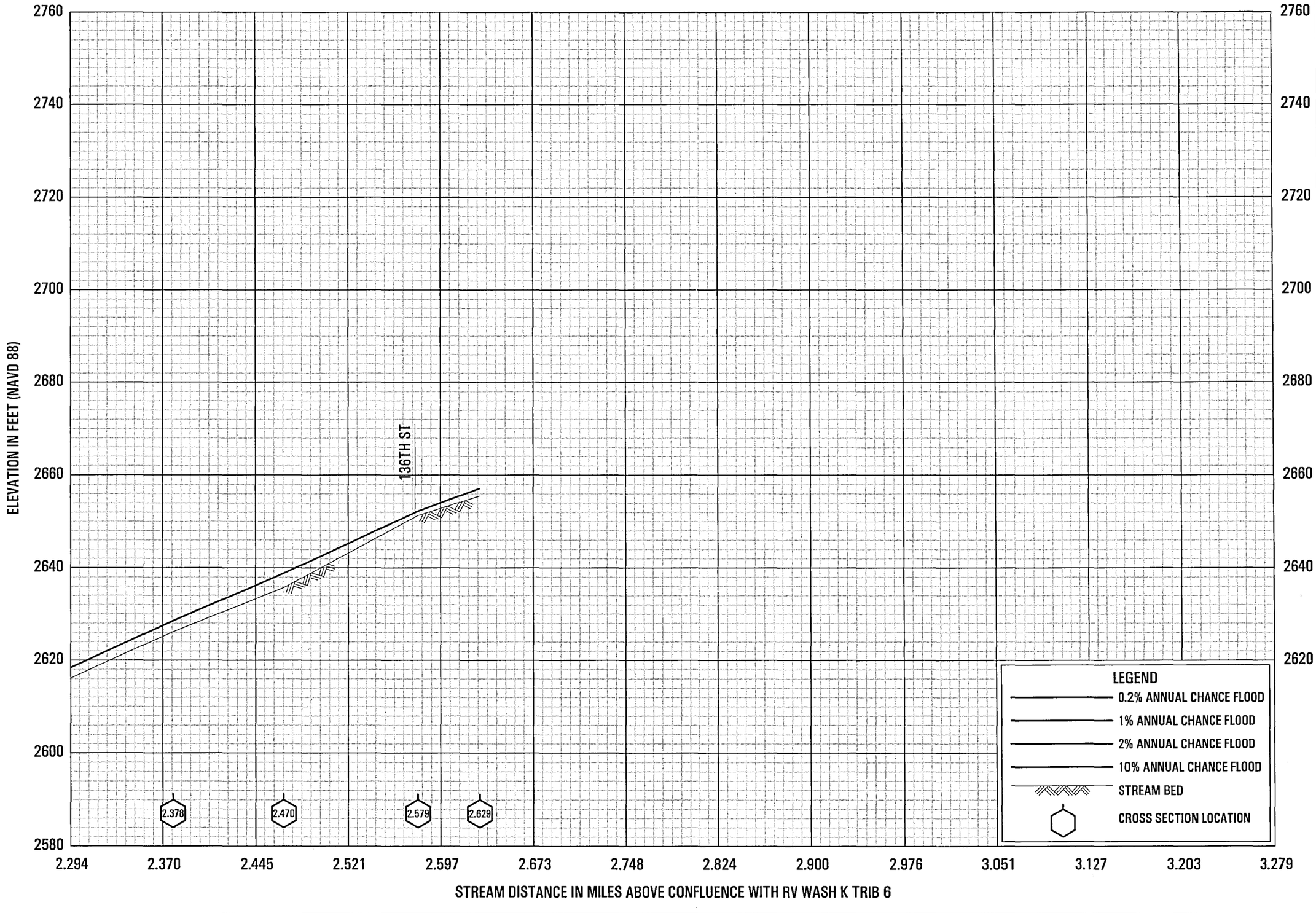
RV WASH K TRIB 6D

FEDERAL EMERGENCY MANAGEMENT AGENCY

MARICOPA COUNTY, AZ

AND INCORPORATED AREAS

W22-4



FLOOD PROFILES

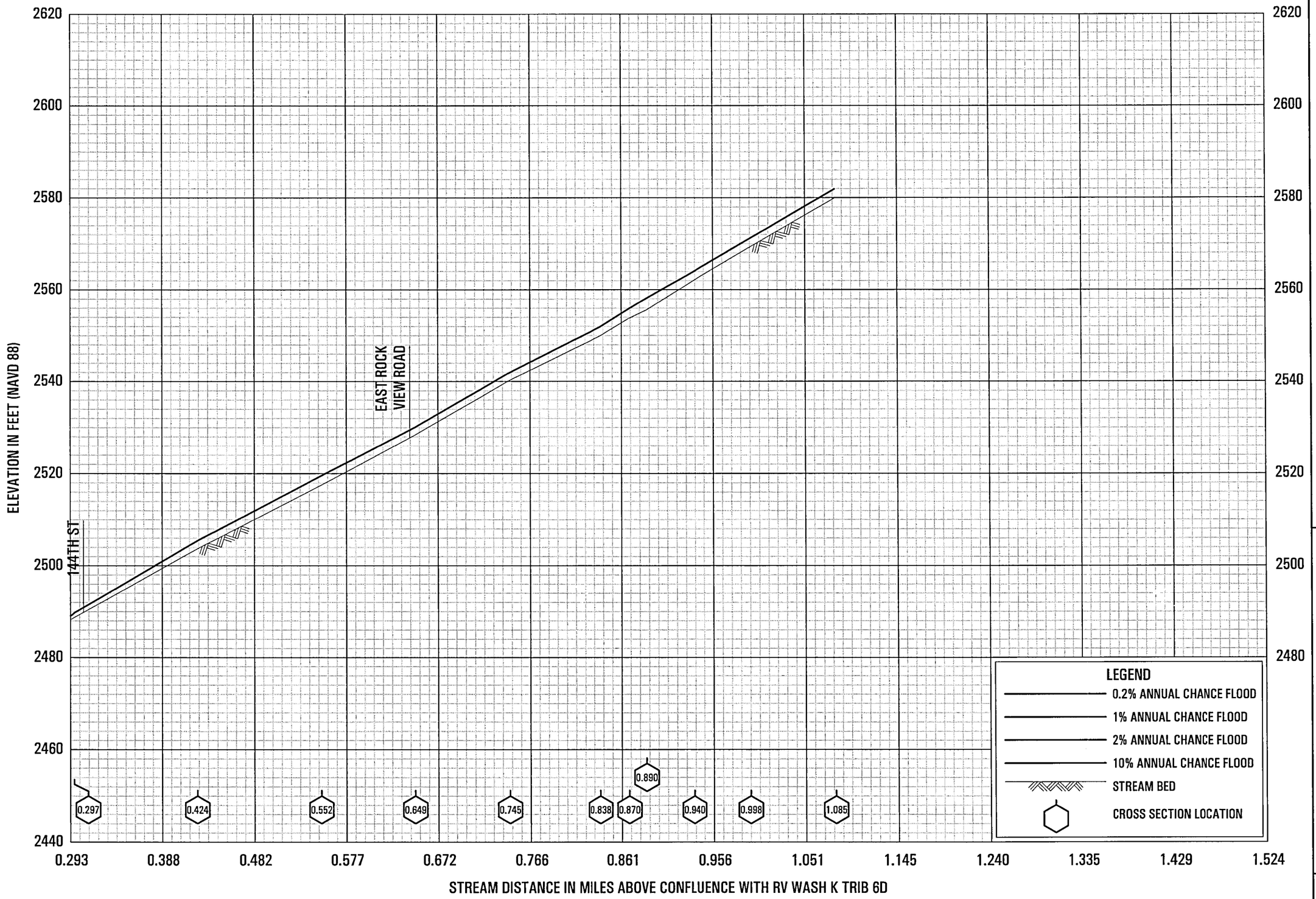
RV WASH K TRIB 6D

FEDERAL EMERGENCY MANAGEMENT AGENCY

MARICOPA COUNTY, AZ

AND INCORPORATED AREAS

W22-5



FLOOD PROFILES

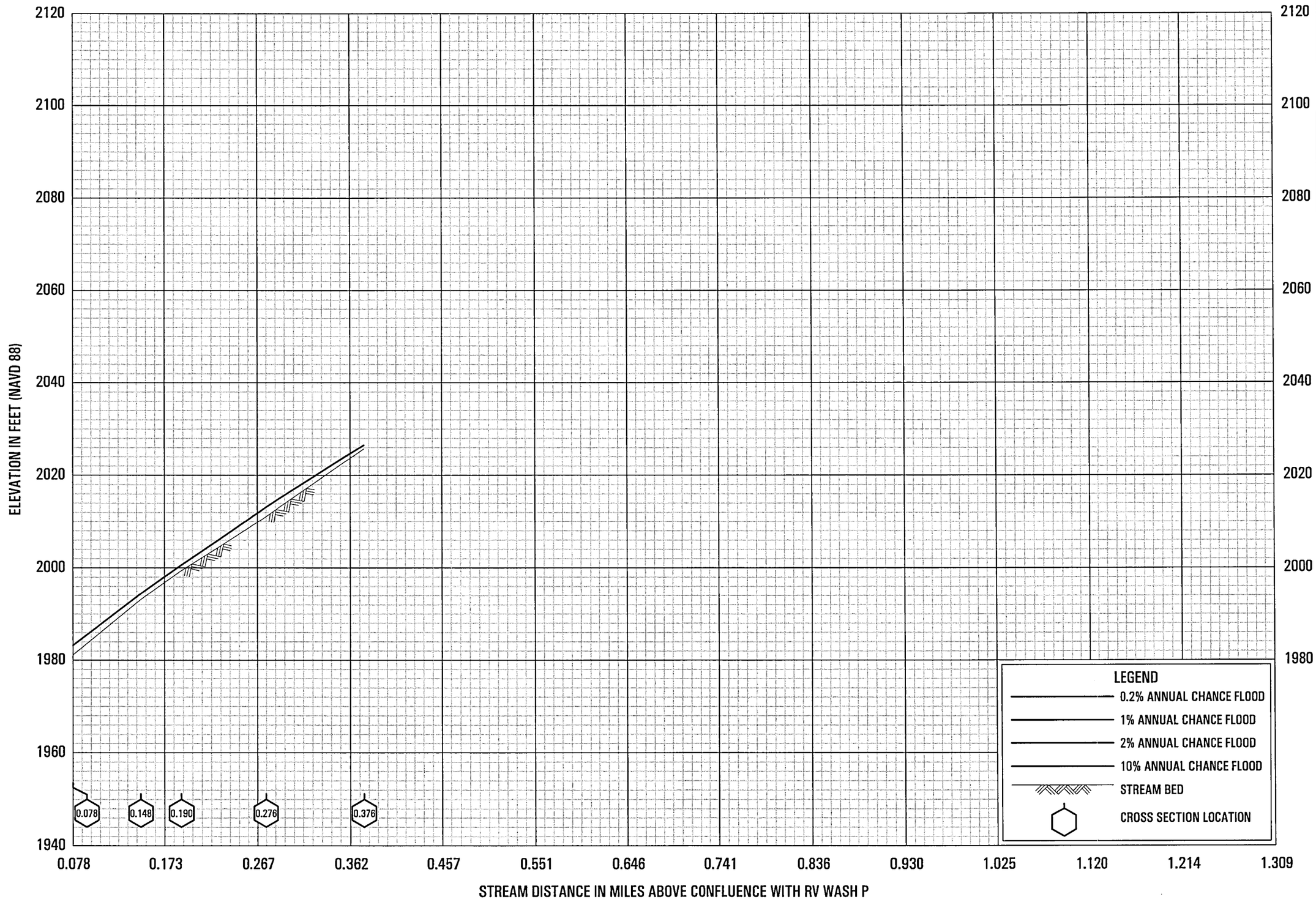
RV WASH K TRIB 6D1

FEDERAL EMERGENCY MANAGEMENT AGENCY

MARICOPA COUNTY, AZ

AND INCORPORATED AREAS

W23-2



FLOOD PROFILES

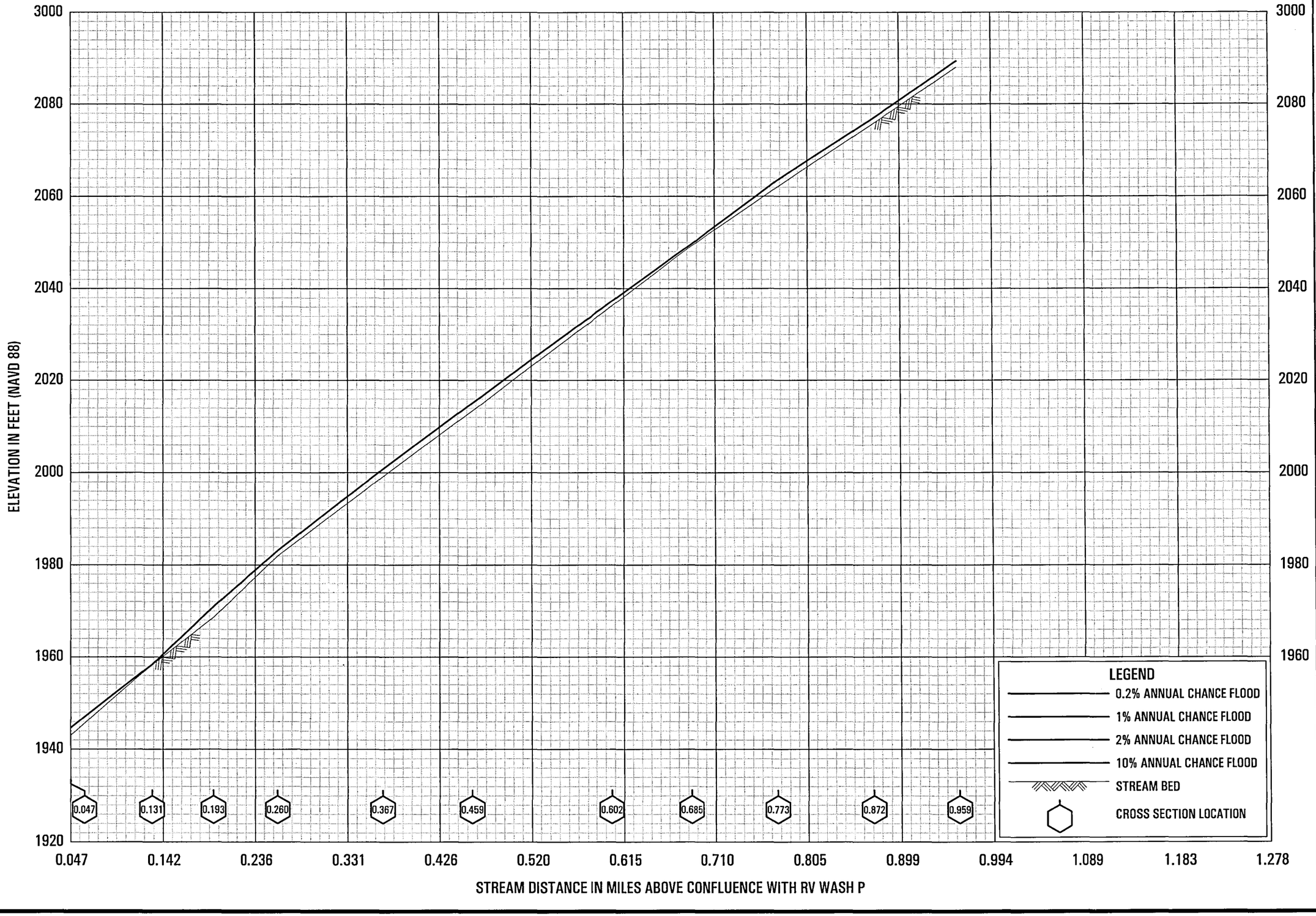
RV WASH P TRIB 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

MARICOPA COUNTY, AZ

AND INCORPORATED AREAS

W24-1



FLOOD PROFILES

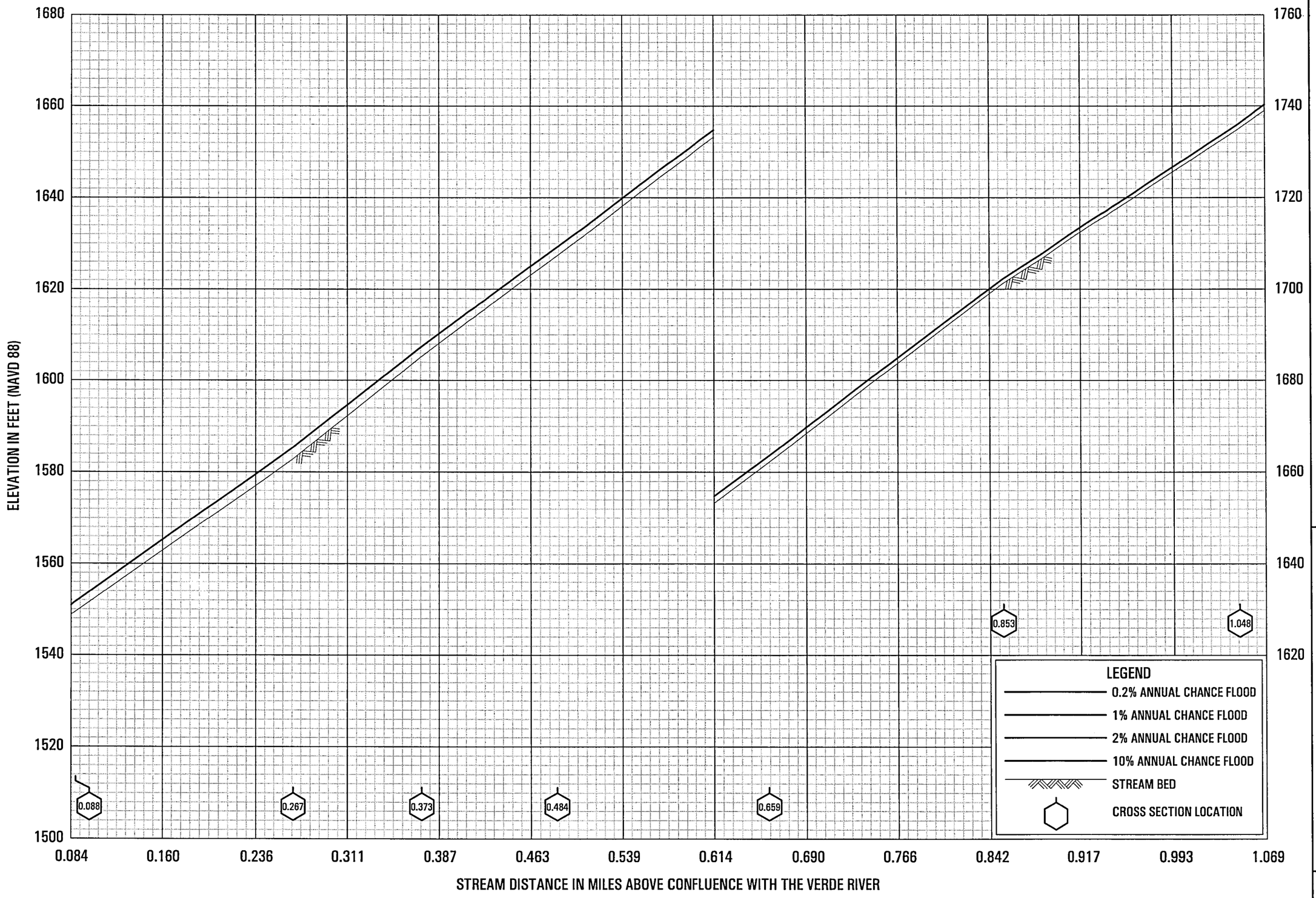
RV WASH P TRIB 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

MARICOPA COUNTY, AZ

AND INCORPORATED AREAS

W25-1



FLOOD PROFILES

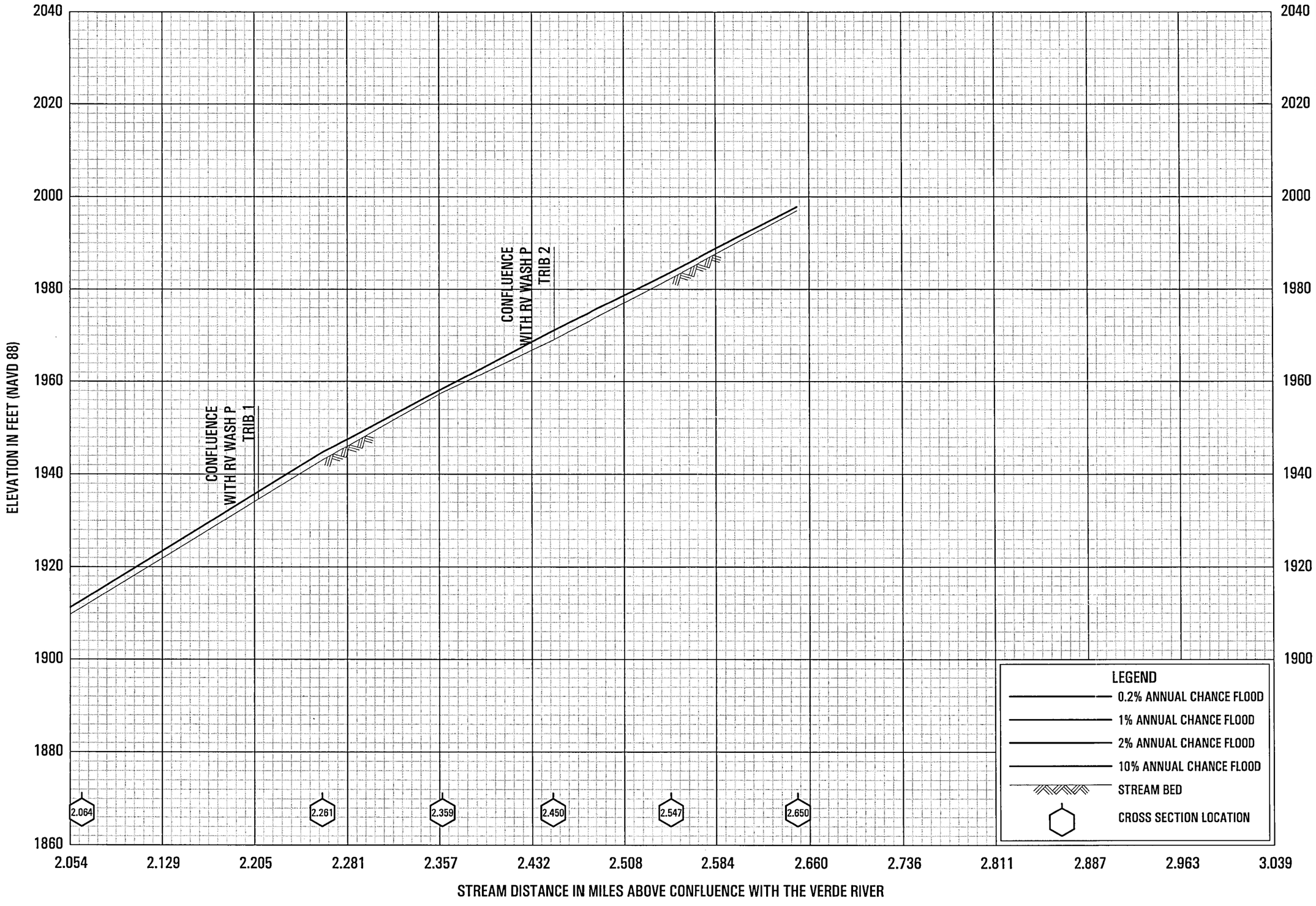
RV WASH P

FEDERAL EMERGENCY MANAGEMENT AGENCY

MARICOPA COUNTY, AZ

AND INCORPORATED AREAS

W26-1



FLOOD PROFILES

RV WASH P

FEDERAL EMERGENCY MANAGEMENT AGENCY

MARICOPA COUNTY, AZ

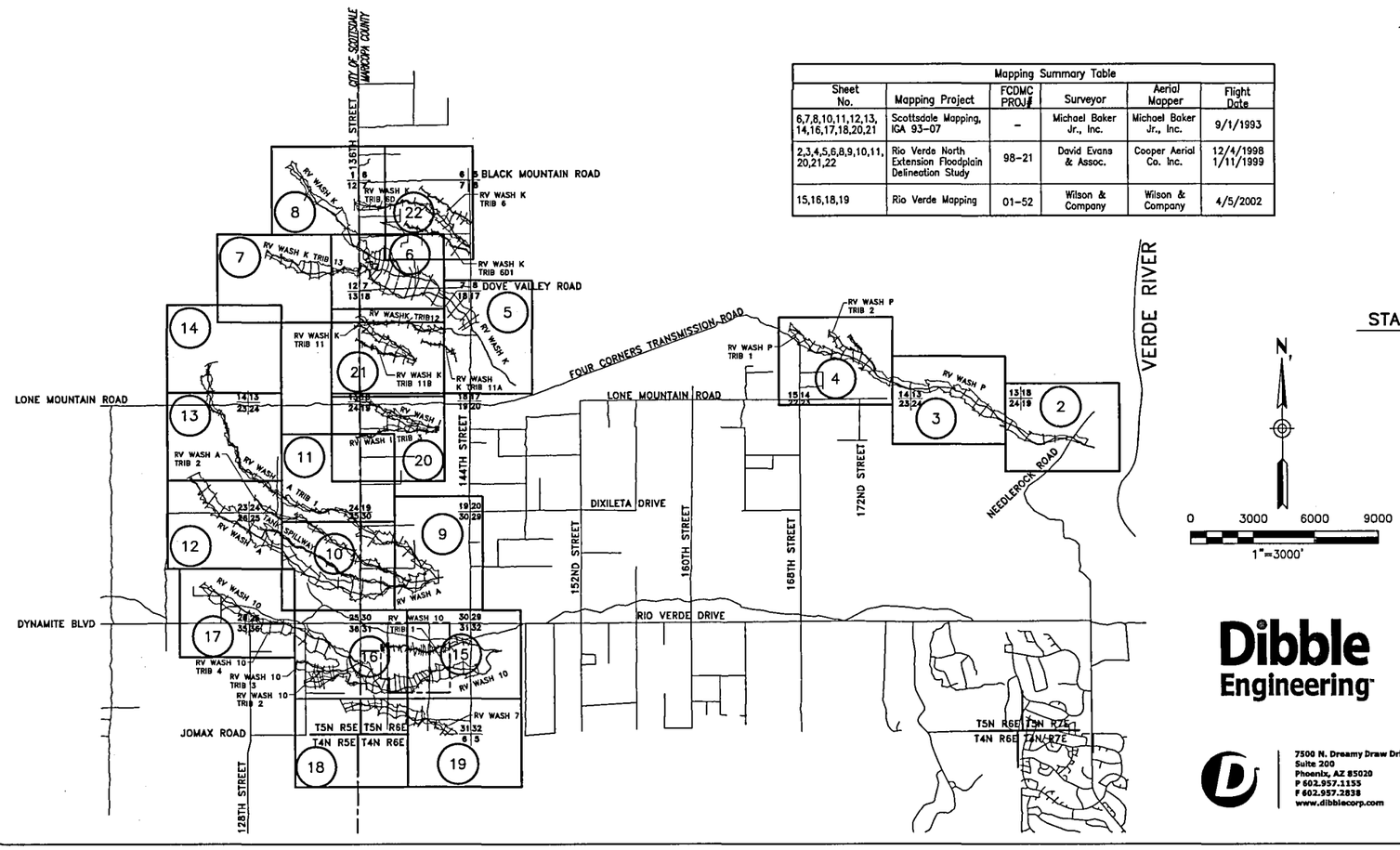
AND INCORPORATED AREAS

W26-3

H.3 Half Size Work Study Maps

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

RIO VERDE ADMP FLOODPLAIN DELINEATION STUDY – F.C.D. CONTRACT NO. 2001C056



Mapping Summary Table					
Sheet No.	Mapping Project	FCDMC PROJ#	Surveyor	Aerial Mapper	Flight Date
6,7,8,10,11,12,13, 14,16,17,18,20,21	Scottsdale Mapping, IGA 93-07	–	Michael Baker Jr., Inc.	Michael Baker Jr., Inc.	9/1/1993
2,3,4,5,6,8,9,10,11, 20,21,22	Rio Verde North Extension Floodplain Delineation Study	98-21	David Evans & Assoc.	Cooper Aerial Co. Inc.	12/4/1998 1/11/1999
15,16,18,19	Rio Verde Mapping	01-52	Wilson & Company	Wilson & Company	4/5/2002

NOTES

1. ALL ELEVATIONS ARE BASED ON NORTH AMERICAN VERTICAL DATUM OF 1988.
2. ALL HORIZONTAL COORDINATES USE ARIZONA STATE PLANE COORDINATES BASED ON THE 1983 NORTH AMERICAN DATUM.
3. MAPPING FOR THIS PROJECT IS PROVIDED BY FCDMC AND OBTAINED DURING VARIOUS SEPARATE CONTRACTS. SEE MAPPING SUMMARY TABLE ON THIS SHEET FOR MORE INFORMATION.
4. FLOODPLAIN LIMITS IN THIS STUDY ARE PLOTTED AT EACH HEC-RAS CROSS SECTION ON THE BASIS OF STARTING (Sta WS Lft) AND ENDING (Sta WS Rt) STATIONS UNLESS THERE IS INEFFECTIVE FLOW AREA OR A CONFLICT WITH TOPOGRAPHIC CONTOURS, IN WHICH CASE, THE CONTOURS TAKE PRECEDENCE.
5. THE HYDRAULIC BASE LINE IS CROSS SECTION STATION 10,000 UNLESS NOTED OTHERWISE.

STATEMENTS OF PROFESSIONAL REGISTRANTS

THE HYDROLOGIC VALUES USED FOR THE FLOODPLAIN DELINEATION WERE PREPARED UNDER MY DIRECT SUPERVISION:

Registered Professional Engineer (Civil) CERTIFICATE NO. 30003 CARLOS C. CARRIAGA Date Signed ARIZONA, U.S.A.

THE FLOODPLAIN DELINEATION WAS PREPARED UNDER MY DIRECT SUPERVISION:

Registered Professional Engineer (Civil) CERTIFICATE NO. 21684 BRIAN J. FRY Date Signed ARIZONA, U.S.A.

Dibble Engineering

7500 N. Dreamy Draw Drive
Suite 200
Phoenix, AZ 85020
P 602.957.1155
F 602.957.2838
www.dibblecorp.com

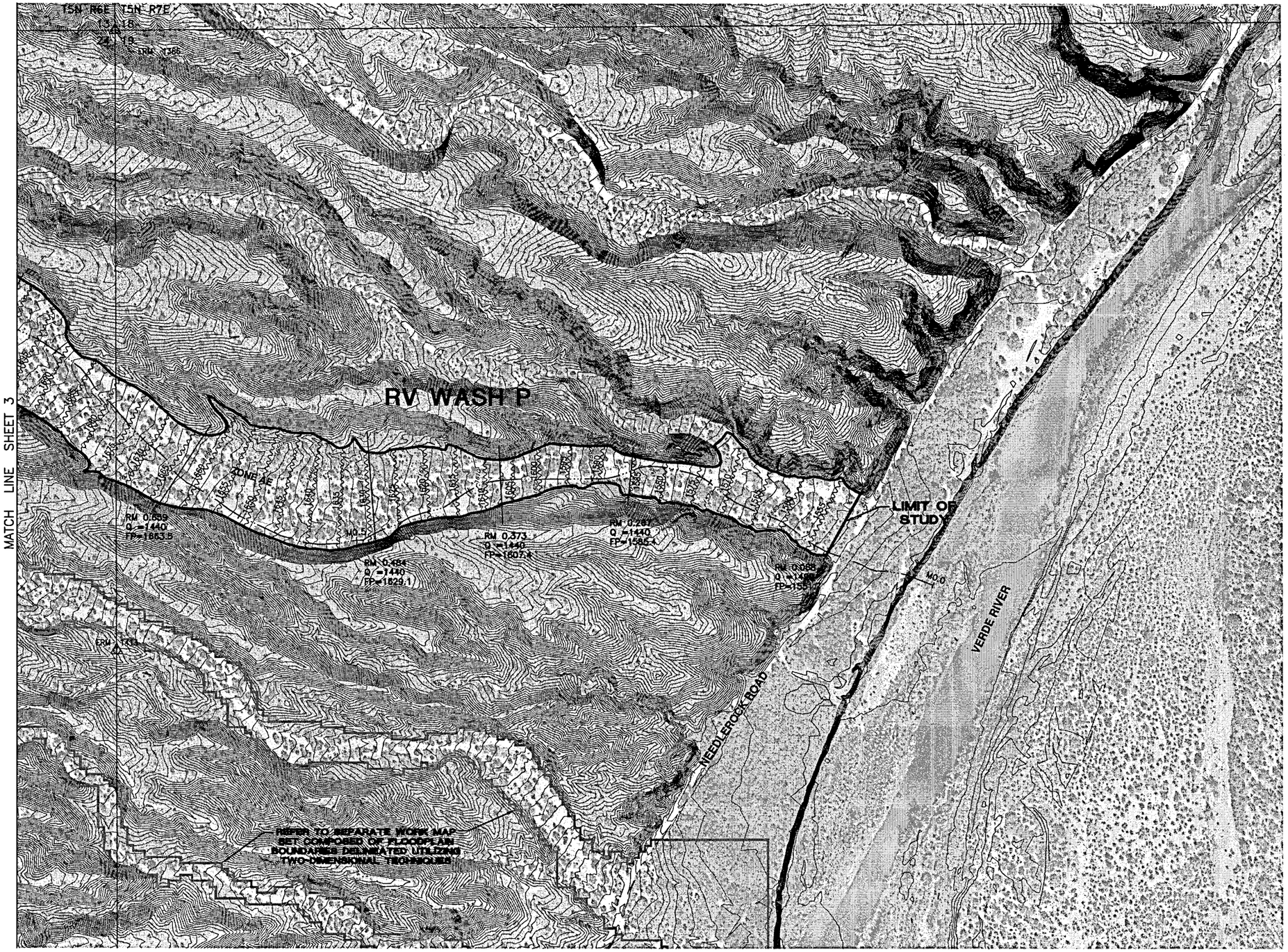
PRIME CONSULTANT: Dibble Engineering			SUB CONSULTANT:
DESIGN	BY JWL	DATE 11/01/07	FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
DESIGN CHK.	JEP	11/01/07	
PLANS	JWL/RAK	11/01/07	RECOMMENDED BY: DATE
PLANS CHK.	JEP	11/01/07	APPROVED BY: DATE
SUBMITTED BY: DATE:			CHIEF ENGINEER AND GENERAL MANAGER
			SHEET 1 OF 22

AERIAL PHOTOGRAPHY PROVIDED BY FCDMC.
2006 FLIGHT DATE.

THIS MAP WAS PREPARED BY PHOTOGRAMMETRIC METHODS TO NATIONAL MAP ACCURACY STANDARDS FOR 1"= 200' HORIZONTAL SCALE AND 2'CONTOUR INTERVALS.

AERIAL MAPPING PROVIDED BY FCDMC AND PERFORMED FOR FCDMC UNDER SEPARATE CONTRACTS. SEE TABLE ON THE COVER SHEET FOR MORE INFORMATION.

GROUND CONTROL SURVEY DATA PROVIDED BY FCDMC AND PERFORMED FOR FCDMC UNDER SEPARATE CONTRACTS. SEE TABLE ON THE COVER SHEET FOR MORE INFORMATION.



LEGEND

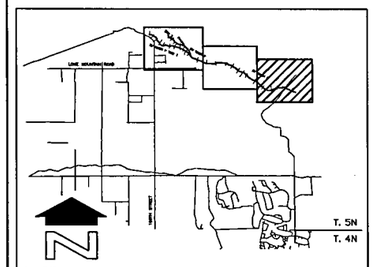
100-YR FLOODPLAIN BOUNDARY	
FLOODWAY BOUNDARY	
HYDRAULIC BASE LINE WITH RIVER MILE	M12.0 M13.0
CROSS SECTION	RM 0.100 (CROSS SECTION SCRIPT AND DESIGNATION); Q = CFS (100 YEAR DISCHARGE); FP= 1888.7 (FLOODPLAIN WATER SURFACE ELEVATION)
ELEVATION REFERENCE MARK	ERM XXX
BASE FLOOD ELEVATIONS	1221
ZONE DESIGNATIONS	ZONE AE
CORPORATE LIMITS	Corporate Limits
COUNTY, PARISH, STATE OR INTERNATIONAL BOUNDARY	County Boundary

ELEVATION REFERENCE MARKS

NOTE: ALL ELEVATIONS ARE BASED ON NORTH AMERICAN VERTICAL DATUM OF 1988.
CONVERSION FACTOR 1988 NAVD = 1929 NGVD + 1.92'

I.D. NUMBER	ELEVATION (FT)	DESCRIPTION/LOCATION
1366	1705.9	BLM CADASTRAL BC UP 0.5FT, SE COR. OF SEC 13, T5N, R6E
1413	1670.69	BLM CADASTRAL BC UP 1.5FT, E 1/4 COR. OF SEC 24, T5N, R6E

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



SHEET INDEX MAP

NO.	REVISION	BY	DATE
2			
1			

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

RIO VERDE ADMP
FLOODPLAIN DELINEATION

RV WASH P

F.C.D. CONTRACT NO. 2001C056

Dibble Engineering

	BY	DATE
DESIGN	JWL	11/01/07
DESIGN CHK.	JEP	11/01/07
PLANS	JWL/RAK	11/01/07
PLANS CHK.	JEP	11/01/07

Registered Professional Engineer (Civil) CERTIFICATE NO. 21684 BRIAN J. FRY ARIZONA, U.S.A.

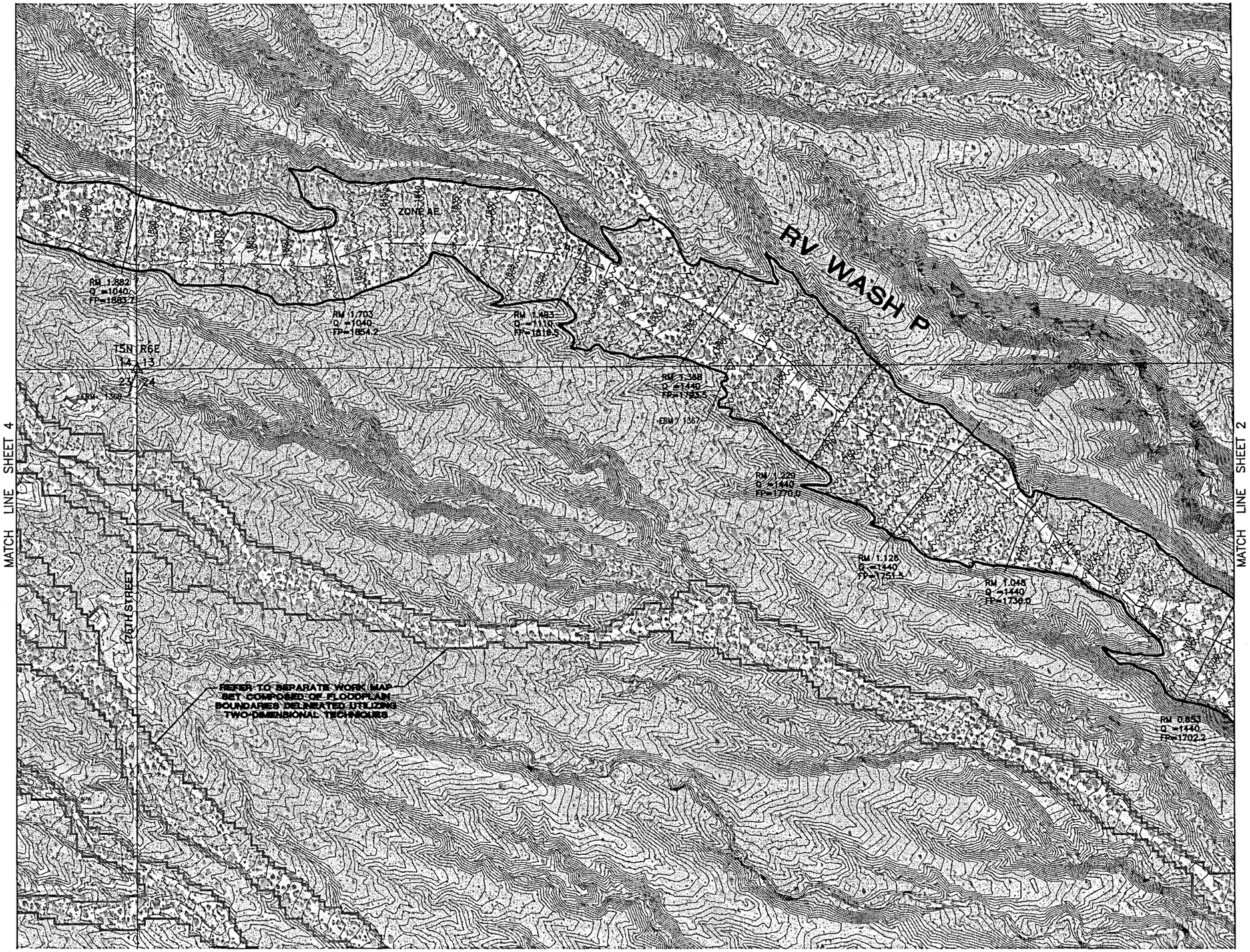
FILE:J:\2006\10-0606.1\CAD\plan02.dwg DATE:Nov. 01 2007 TIME: 10:12 am

AERIAL PHOTOGRAPHY PROVIDED BY FCDMC.
2006 FLIGHT DATE.

THIS MAP WAS PREPARED BY PHOTOGRAMMETRIC METHODS TO NATIONAL MAP ACCURACY STANDARDS FOR 1"= 200' HORIZONTAL SCALE AND 2'CONTOUR INTERVALS.

AERIAL MAPPING PROVIDED BY FCDMC AND PERFORMED FOR FCDMC UNDER SEPARATE CONTRACTS. SEE TABLE ON THE COVER SHEET FOR MORE INFORMATION.

GROUND CONTROL SURVEY DATA PROVIDED BY FCDMC AND PERFORMED FOR FCDMC UNDER SEPARATE CONTRACTS. SEE TABLE ON THE COVER SHEET FOR MORE INFORMATION.



LEGEND

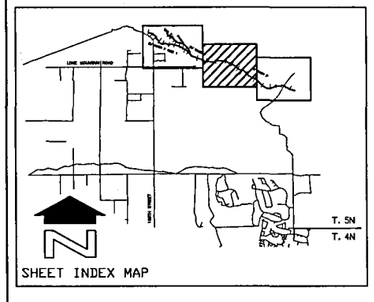
100-YR FLOODPLAIN BOUNDARY	
FLOODWAY BOUNDARY	
HYDRAULIC BASE LINE WITH RIVER MILE	M12.0 — M13.0
CROSS SECTION	RM 0.100 (CROSS SECTION DESIGNATION); Q = CFS (100 YEAR DISCHARGE); FP= 1888.7 (FLOOD-WATER SURFACE ELEVATION)
ELEVATION REFERENCE MARK	ERM XXX
BASE FLOOD ELEVATIONS	1221
ZONE DESIGNATIONS	ZONE AE
CORPORATE LIMITS	Corporate Limits
COUNTY, PARISH, STATE OR INTERNATIONAL BOUNDARY	County Boundary

ELEVATION REFERENCE MARKS

NOTE: ALL ELEVATIONS ARE BASED ON NORTH AMERICAN VERTICAL DATUM OF 1988.
CONVERSION FACTOR 1988 NAVD = 1929 NGVD + 1.94'

I.D. NUMBER	ELEVATION (FT)	DESCRIPTION/LOCATION
1367	1787.77	BLM CADASTRAL BC UP 0.5FT, S 1/4 COR. OF SEC 13, T5N, R6E
1368	1879.84	BLM CADASTRAL BC UP 0.4FT, SE COR. OF SEC 14, T5N, R6E

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



SHEET INDEX MAP

NO.	REVISION	BY	DATE
2			
1			

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

RIO VERDE ADMP
FLOODPLAIN DELINEATION

RV WASH P

F.C.D. CONTRACT NO. 2001C056

Registered Professional Engineer (Civil) CERTIFICATE NO. 21684 BRIAN J. FRY Date Signed Arizona, U.S.A.

Dibble Engineering

	BY	DATE
DESIGN	JWL	11/01/07
DESIGN CHK.	JEP	11/01/07
PLANS	JWL/RAK	11/01/07
PLANS CHK.	JEP	11/01/07

SHEET 3 OF 22

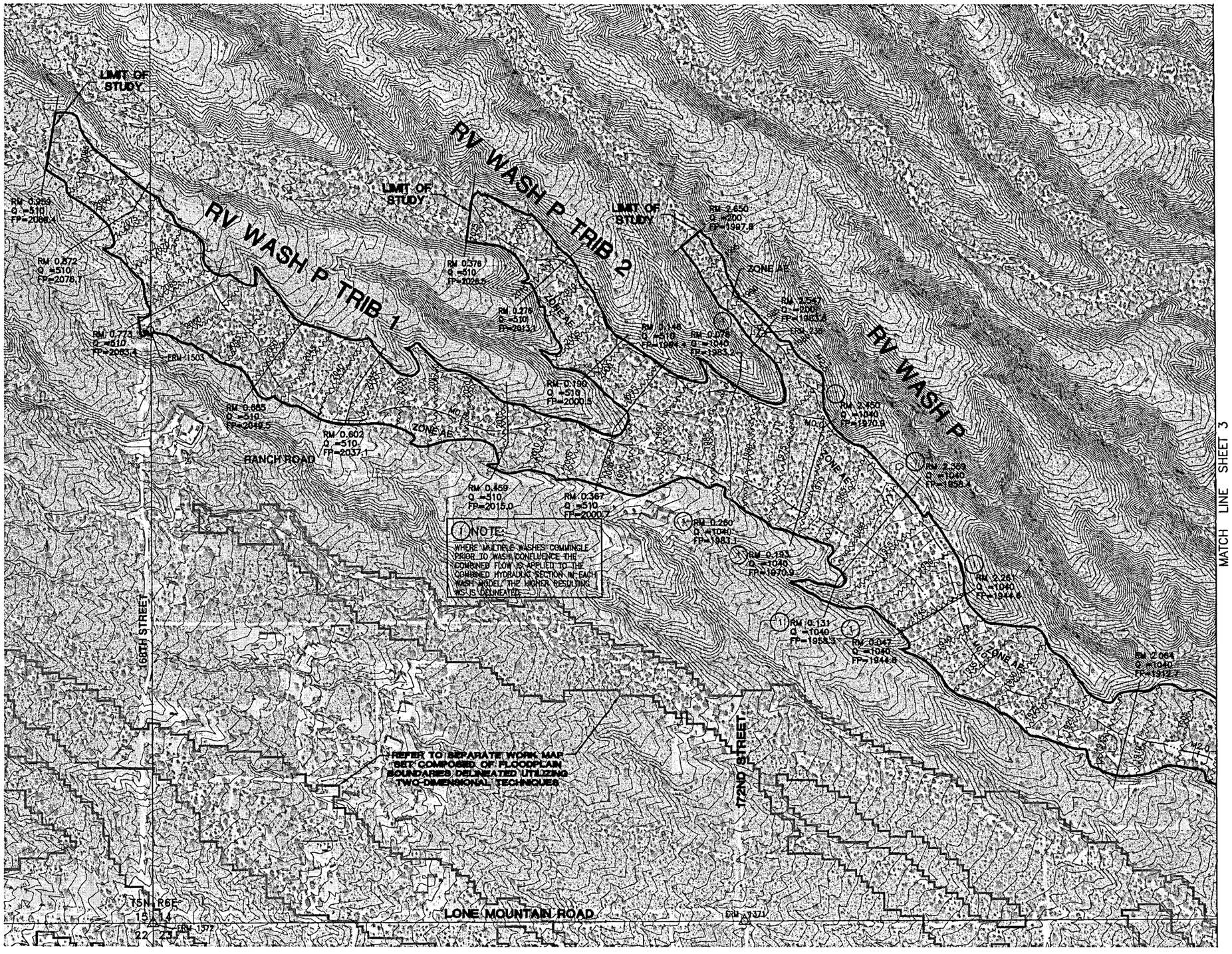
FILE:J:\2006\10-0606.1\CAD\plsh03.dwg DATE:Nov, 01 2007 TIME: 10:13 am

AERIAL PHOTOGRAPHY PROVIDED BY FCDMC.
2006 FLIGHT DATE.

THIS MAP WAS PREPARED BY PHOTOGRAMMETRIC METHODS TO NATIONAL MAP ACCURACY STANDARDS FOR 1"= 200' HORIZONTAL SCALE AND 2'CONTOUR INTERVALS.

AERIAL MAPPING PROVIDED BY FCDMC AND PERFORMED FOR FCDMC UNDER SEPARATE CONTRACTS. SEE TABLE ON THE COVER SHEET FOR MORE INFORMATION.

GROUND CONTROL SURVEY DATA PROVIDED BY FCDMC AND PERFORMED FOR FCDMC UNDER SEPARATE CONTRACTS. SEE TABLE ON THE COVER SHEET FOR MORE INFORMATION.



LEGEND

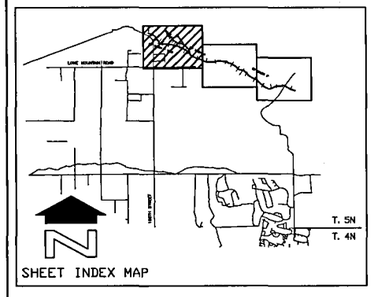
100-YR FLOODPLAIN BOUNDARY	
FLOODWAY BOUNDARY	
HYDRAULIC BASE LINE WITH RIVER MILE	M12.0 — M13.0
CROSS SECTION	RM 0.100 (CROSS SECTION ROUTE AND DESIGNATION); Q = CFS (100 YEAR DISCHARGE); FP= 1888.7 (FLOODPLAIN WATER SURFACE ELEVATION); FW= 1889.7 (FLOODWAY WATER SURFACE ELEVATION)
ELEVATION REFERENCE MARK	ERM XXX
BASE FLOOD ELEVATIONS	1221
ZONE DESIGNATIONS	ZONE AE
CORPORATE LIMITS	Corporate Limits
COUNTY, PARISH, STATE OR INTERNATIONAL BOUNDARY	County Boundary

ELEVATION REFERENCE MARKS

NOTE: ALL ELEVATIONS ARE BASED ON NORTH AMERICAN VERTICAL DATUM OF 1988.
CONVERSION FACTOR 1988 NAVD = 1929 NGVD + 1.97'

I.D. NUMBER	ELEVATION (FT)	DESCRIPTION/LOCATION
1371	1952.99	BLM CADASTRAL BC UP 0.5FT, S 1/4 COR. OF SEC 14, T5N, R6E
1372	2025.00	BLM CADASTRAL BC UP 0.8FT, SE COR. OF SEC 15, T5N, R6E
1503	2062.38	STONE, APPROX. E 1/4 COR. OF SEC 15, T5N, R6E
236	1982.12	FCDMC BC SE FLUSH NEAR CNTR SEC 14, 75N, R6E

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



SHEET INDEX MAP

NO.	REVISION	BY	DATE
2			
1			

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

RIO VERDE ADMP
FLOODPLAIN DELINEATION
RV WASH P, RV WASH P TRIB 1
& RV WASH P TRIB 2
F.C.D. CONTRACT NO. 2001C056

Certificate of Registered Engineer (Level) 21684 BRIAN J. FRY ARIZONA, U.S.A.

Dibble Engineering

	BY	DATE
DESIGN	JWL	11/01/07
DESIGN CHK.	JEP	11/01/07
PLANS	JWL/RAK	11/01/07
PLANS CHK.	JEP	11/01/07

SHEET 4 OF 22

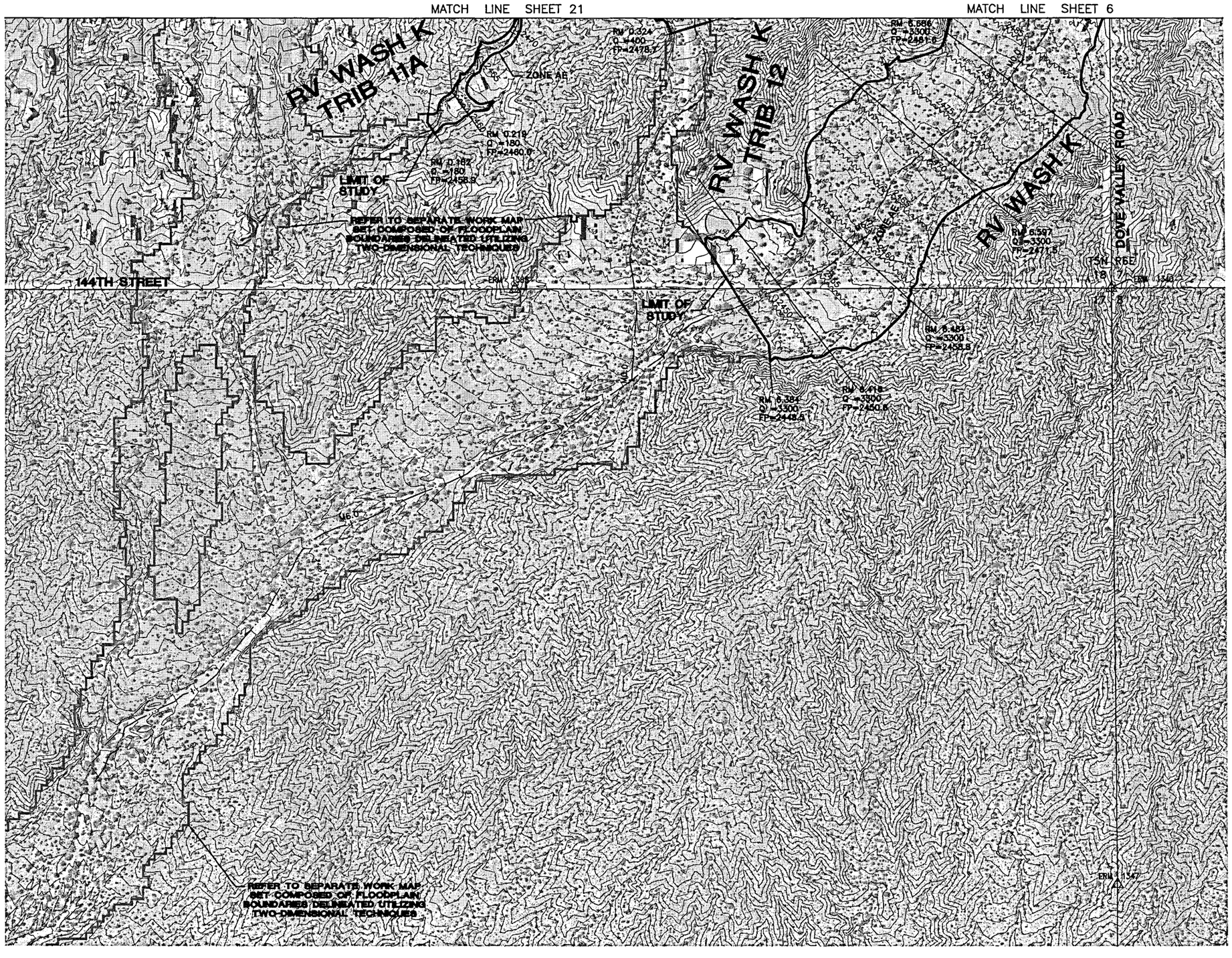
FILE:J:\2006\10-0606.1\CAD\plsh04.dwg DATE:Nov. 01 2007 TIME: 10:15 am

AERIAL PHOTOGRAPHY PROVIDED BY FCDMC.
2006 FLIGHT DATE.

THIS MAP WAS PREPARED BY PHOTOGRAMMETRIC METHODS TO NATIONAL MAP ACCURACY STANDARDS FOR 1"= 200' HORIZONTAL SCALE AND 2'CONTOUR INTERVALS.

AERIAL MAPPING PROVIDED BY FCDMC AND PERFORMED FOR FCDMC UNDER SEPARATE CONTRACTS. SEE TABLE ON THE COVER SHEET FOR MORE INFORMATION.

GROUND CONTROL SURVEY DATA PROVIDED BY FCDMC AND PERFORMED FOR FCDMC UNDER SEPARATE CONTRACTS. SEE TABLE ON THE COVER SHEET FOR MORE INFORMATION.



LEGEND

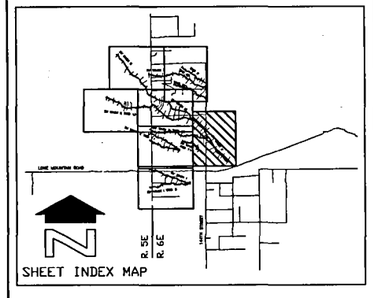
100-YR FLOODPLAIN BOUNDARY	
FLOODWAY BOUNDARY	
HYDRAULIC BASE LINE WITH RIVER MILE	M12.0 — M13.0
CROSS SECTION	RM 0.100, Q = CFS, FP= 1888.7 (CROSS SECTION NOTE AND DESIGNATION; 100 YEAR DISCHARGE; FLOODPLAIN NOTE SURFACE ELEVATION)
ELEVATION REFERENCE MARK	ERM XXX
BASE FLOOD ELEVATIONS	1221
ZONE DESIGNATIONS	ZONE AE
CORPORATE LIMITS	Corporate Limits
COUNTY, PARISH, STATE OR INTERNATIONAL BOUNDARY	County Boundary

ELEVATION REFERENCE MARKS

NOTE: ALL ELEVATIONS ARE BASED ON NORTH AMERICAN VERTICAL DATUM OF 1988.
CONVERSION FACTOR 1988 NAVD = 1929 NGVD + 2.03'

I.D. NUMBER	ELEVATION (FT)	DESCRIPTION/LOCATION
1340	2488.01	BLM CADASTRAL BC UP 0.3 FT, SE COR. OF SEC 7, T5N, R6E
1347	2414.24	BLM CADASTRAL BC UP 1.4FT, S 1/4 COR. OF SEC 8, T5N, R6E
1365	2444.97	BLM CADASTRAL BC UP 0.2FT, E 1/4 COR. OF SEC 18, T5N, R6E

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



NO.	REVISION	BY	DATE
2			
1			

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

RIO VERDE ADMP
FLOODPLAIN DELINEATION
RV WASH K, RV WASH K TRIB 11A, & RV WASH K TRIB 12
F.C.D. CONTRACT NO. 2001C056

REGISTERED PROFESSIONAL ENGINEER (CIVIL) CERTIFICATE NO. 21684 BRIAN J. FRY ARIZONA, U.S.A.

Dibble Engineering

	BY	DATE
DESIGN	JWL	11/01/07
DESIGN CHK.	JEP	11/01/07
PLANS	JWL/RAK	11/01/07
PLANS CHK.	JEP	11/01/07

SHEET 5 OF 22

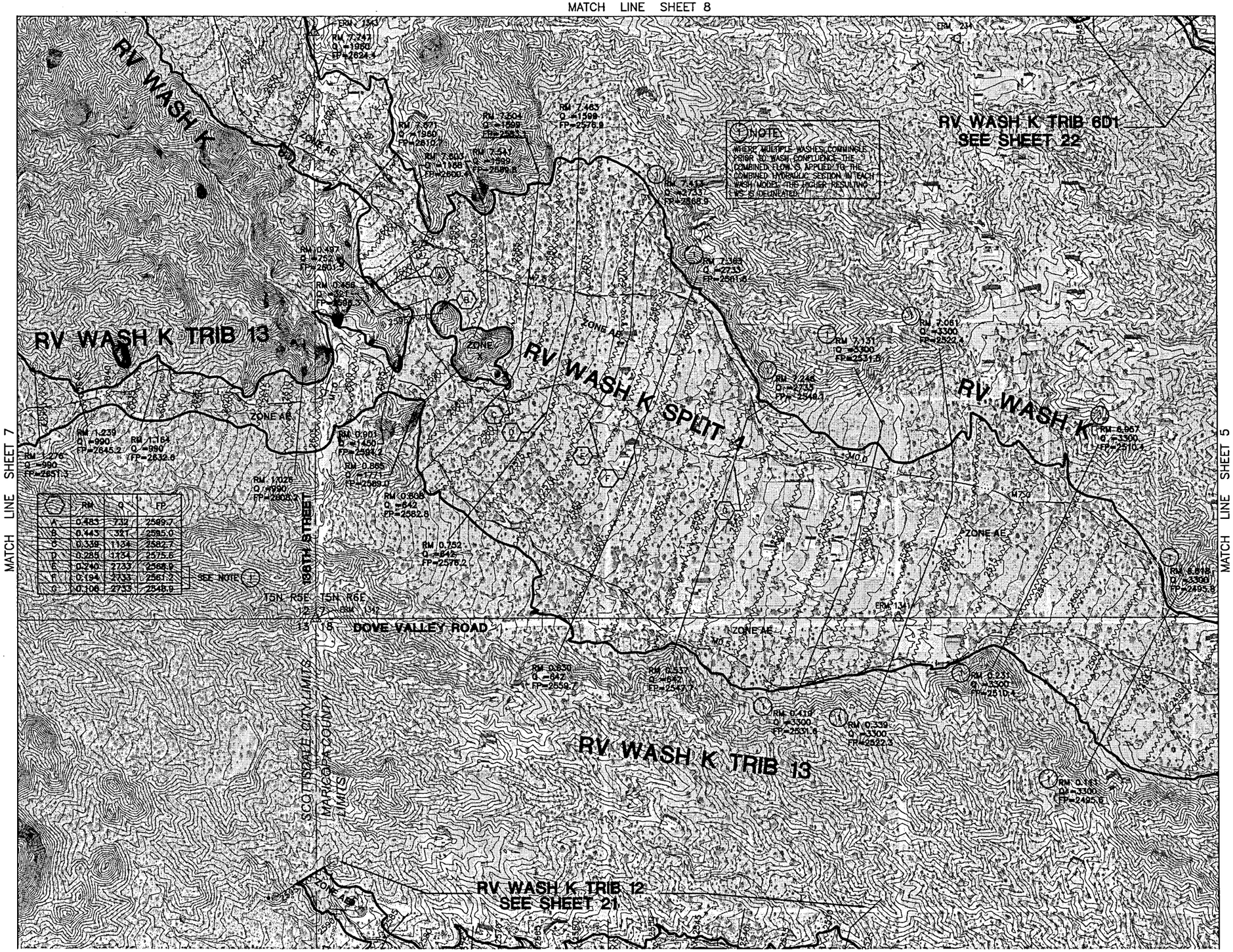
FILE:J:\2006\10-0606.1\CAD\plsh05.dwg DATE:Nov. 01 2007 TIME: 10:16 am

AERIAL PHOTOGRAPHY PROVIDED BY FCDMC. 2006 FLIGHT DATE.

THIS MAP WAS PREPARED BY PHOTOGRAMMETRIC METHODS TO NATIONAL MAP ACCURACY STANDARDS FOR 1"= 200' HORIZONTAL SCALE AND 2'CONTOUR INTERVALS.

AERIAL MAPPING PROVIDED BY FCDMC AND PERFORMED FOR FCDMC UNDER SEPARATE CONTRACTS. SEE TABLE ON THE COVER SHEET FOR MORE INFORMATION.

GROUND CONTROL SURVEY DATA PROVIDED BY FCDMC AND PERFORMED FOR FCDMC UNDER SEPARATE CONTRACTS. SEE TABLE ON THE COVER SHEET FOR MORE INFORMATION.



	RM	Q	FP
A	0.483	732	2589.7
B	0.443	321	2585.0
C	0.338	1134	2582.7
D	0.285	1134	2575.6
E	0.240	2733	2568.9
F	0.194	2733	2561.2
G	0.108	2733	2548.9

LEGEND

100-YR FLOODPLAIN BOUNDARY	
FLOODWAY BOUNDARY	
HYDRAULIC BASE LINE WITH RIVER MILE	M12.0 — M13.0
CROSS SECTION	RM 0.100 (CROSS SECTION RIVER MILE DESIGNATION); Q = CFS (100 YEAR DISCHARGE); FP= 1888.7 (FLOODPLAIN WATER SURFACE ELEVATION)
ELEVATION REFERENCE MARK	△ ERM XXX
BASE FLOOD ELEVATIONS	1221
ZONE DESIGNATIONS	ZONE AE
CORPORATE LIMITS	Corporate Limits
COUNTY, PARISH, STATE OR INTERNATIONAL BOUNDARY	County Boundary

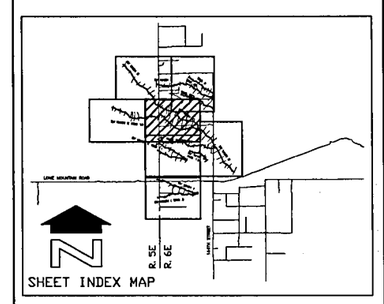
ELEVATION REFERENCE MARKS

NOTE: ALL ELEVATIONS ARE BASED ON NORTH AMERICAN VERTICAL DATUM OF 1988. CONVERSION FACTOR 1988 NAVD = 1929 NGVD + 2.05'

I.D. NUMBER	ELEVATION (FT)	DESCRIPTION/LOCATION
1341	2521.57	BLM CADASTRAL BC FLUSH, S 1/4 COR. OF SEC7, T5N, R6E
1342	2615.38	USGLO BC UP 1FT, SW COR. OF SEC7, T5N, R6E
1343	2636.58	USGLO BC UP 1FT, W 1/4 COR. OF SEC7, T5N, R6E
234	2561.80	FCDMC BC SET FLUSH NEAR CNTR SEC 7, T5N, R6E

-200' 0' 200' 400'

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



NO	REVISION	BY	DATE
2			
1			

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

RIO VERDE ADMP
FLOODPLAIN DELINEATION
RV WASH K, TRIB 13, &
RV WASH K SPLIT 4
F.C.D. CONTRACT NO. 2001C056

Registered Professional Engineer (Civil) CERTIFICATE NO. 21684 BRIAN J. FRY Date Signed 11/01/07 ARIZONA, U.S.A.

Dibble Engineering

	BY	DATE
DESIGN	JWL	11/01/07
DESIGN CHK.	JEP	11/01/07
PLANS	JWL/RAK	11/01/07
PLANS CHK.	JEP	11/01/07

SHEET 6 OF 22

FILE:J:\2006\10-0606.1\CAD\plsh06.dwg DATE:Nov. 01 2007 TIME: 10:17 am

AERIAL PHOTOGRAPHY PROVIDED BY FCDMC.
2006 FLIGHT DATE.

THIS MAP WAS PREPARED BY PHOTOGRAMMETRIC METHODS TO NATIONAL MAP ACCURACY STANDARDS FOR 1"= 200' HORIZONTAL SCALE AND 2'CONTOUR INTERVALS.

AERIAL MAPPING PROVIDED BY FCDMC AND PERFORMED FOR FCDMC UNDER SEPARATE CONTRACTS. SEE TABLE ON THE COVER SHEET FOR MORE INFORMATION.

GROUND CONTROL SURVEY DATA PROVIDED BY FCDMC AND PERFORMED FOR FCDMC UNDER SEPARATE CONTRACTS. SEE TABLE ON THE COVER SHEET FOR MORE INFORMATION.

MATCH LINE SHEET 8

MATCH LINE SHEET 6

LEGEND

100-YR FLOODPLAIN BOUNDARY	
FLOODWAY BOUNDARY	
HYDRAULIC BASE LINE WITH RIVER MILE	M12.0 M13.0
CROSS SECTION	CROSS SECTION RIVER MILE DESIGNATION — RM 0.100; Q = CFS — 100 YEAR DISCHARGE; FP= 1888.7 — FLOODPLAIN WATER SURFACE ELEVATION
ELEVATION REFERENCE MARK	ERM XXX
BASE FLOOD ELEVATIONS	1221
ZONE DESIGNATIONS	ZONE AE
CORPORATE LIMITS	Corporate Limits
COUNTY, PARISH, STATE OR INTERNATIONAL BOUNDARY	County Boundary

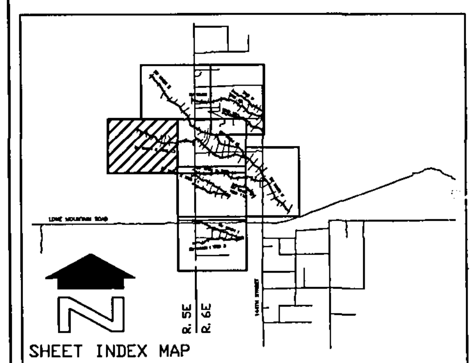
ELEVATION REFERENCE MARKS

NOTE: ALL ELEVATIONS ARE BASED ON NORTH AMERICAN VERTICAL DATUM OF 1988. CONVERSION FACTOR 1988 NAVD = 1929 NGVD + 2.06'

I.D. NUMBER	ELEVATION (FT)	DESCRIPTION/LOCATION
228	2688.80	FCDMC BC SET FLUSH NEAR N 1/4 COR. OF SEC 13, T5N, R5E

N

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



NO.	REVISION	BY	DATE
2			
1			

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

RIO VERDE ADMP
FLOODPLAIN DELINEATION

RV WASH K TRIB 13

F.C.D. CONTRACT NO. 2001C056

Registered Professional Engineer (Civil) CERTIFICATE NO. 21684 BRIAN J. FRY Date Signed ARIZONA, U.S.A.

Dibble Engineering

	BY	DATE
DESIGN	JWL	11/01/07
DESIGN CHK.	JEP	11/01/07
PLANS	JWL/RAK	11/01/07
PLANS CHK.	JEP	11/01/07

SHEET 7 OF 22

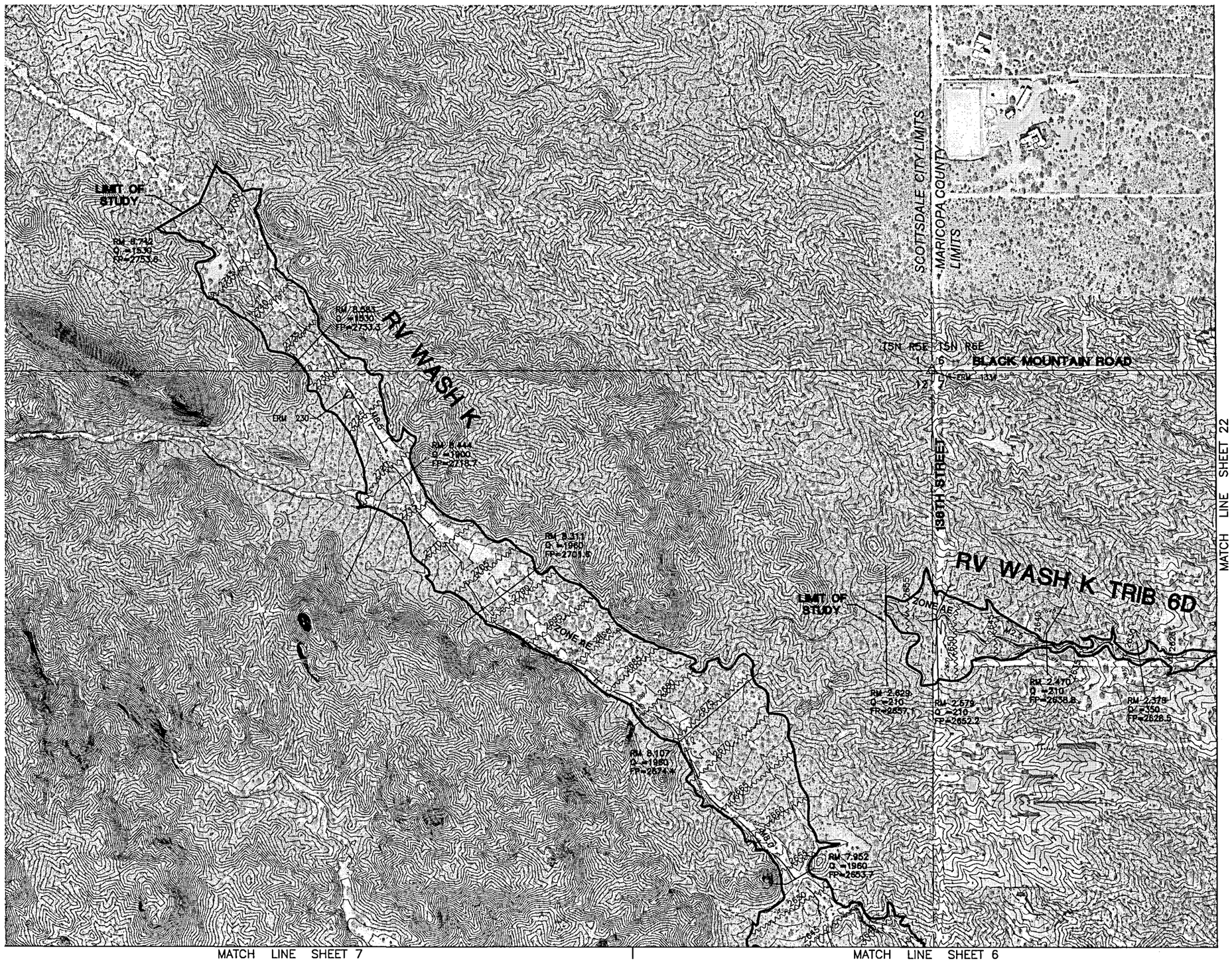
FILE:J:\2006\10-0606.1\CAD\plsh07.dwg DATE:Nov, 01 2007 TIME: 10:19 am

AERIAL PHOTOGRAPHY PROVIDED BY FCDMC.
2006 FLIGHT DATE.

THIS MAP WAS PREPARED BY PHOTOGRAMMETRIC METHODS TO NATIONAL MAP ACCURACY STANDARDS FOR 1"= 200' HORIZONTAL SCALE AND 2'CONTOUR INTERVALS.

AERIAL MAPPING PROVIDED BY FCDMC AND PERFORMED FOR FCDMC UNDER SEPARATE CONTRACTS. SEE TABLE ON THE COVER SHEET FOR MORE INFORMATION.

GROUND CONTROL SURVEY DATA PROVIDED BY FCDMC AND PERFORMED FOR FCDMC UNDER SEPARATE CONTRACTS. SEE TABLE ON THE COVER SHEET FOR MORE INFORMATION.



LEGEND

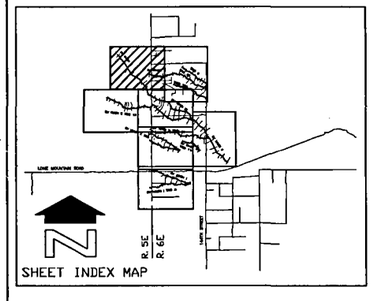
100-YR FLOODPLAIN BOUNDARY	
FLOODWAY BOUNDARY	
HYDRAULIC BASE LINE WITH RIVER MILE	M12.0 — M13.0
CROSS SECTION	CROSS SECTION DESIGNATION: RM 0.100; Q = CFS (100 YEAR DISCHARGE); FP= 1888.7 (FLOOD PLAIN WATER SURFACE ELEVATION)
ELEVATION REFERENCE MARK	ERM XXX
BASE FLOOD ELEVATIONS	1221
ZONE DESIGNATIONS	ZONE AE
CORPORATE LIMITS	Corporate Limits
COUNTY, PARISH, STATE OR INTERNATIONAL BOUNDARY	County Boundary

ELEVATION REFERENCE MARKS

NOTE: ALL ELEVATIONS ARE BASED ON NORTH AMERICAN VERTICAL DATUM OF 1988.
CONVERSION FACTOR 1988 NAVD = 1929 NGVD + 2.08'

I.D. NUMBER	ELEVATION (FT)	DESCRIPTION/LOCATION
1334	2667.78	USGLO BC UP 1FT, NW COR. OF SEC7, T5N, R6E
230	2726.29	FCDMC BC SET FLUSH NEAR N 1/4 COR. OF SEC 12, T5N, R5E

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



NO.	REVISION	BY	DATE
2			
1			

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

RIO VERDE ADMP
FLOODPLAIN DELINEATION
RV WASH K &
RV WASH K TRIB 6D
F.C.D. CONTRACT NO. 2001C056

REGISTERED PROFESSIONAL ENGINEER (CIVIL) CERTIFICATE NO. 21684 BRIAN J. FRY PHOENIX, ARIZONA, U.S.A.

Dibble Engineering

	BY	DATE
DESIGN	JWL	11/01/07
DESIGN CHK.	JEP	11/01/07
PLANS	JWL/RAK	11/01/07
PLANS CHK.	JEP	11/01/07

SHEET 8 OF 22

FILE:J:\2006\10-0606.1\CAD\plsh08.dwg DATE:Nov. 01 2007 TIME: 10:20 am

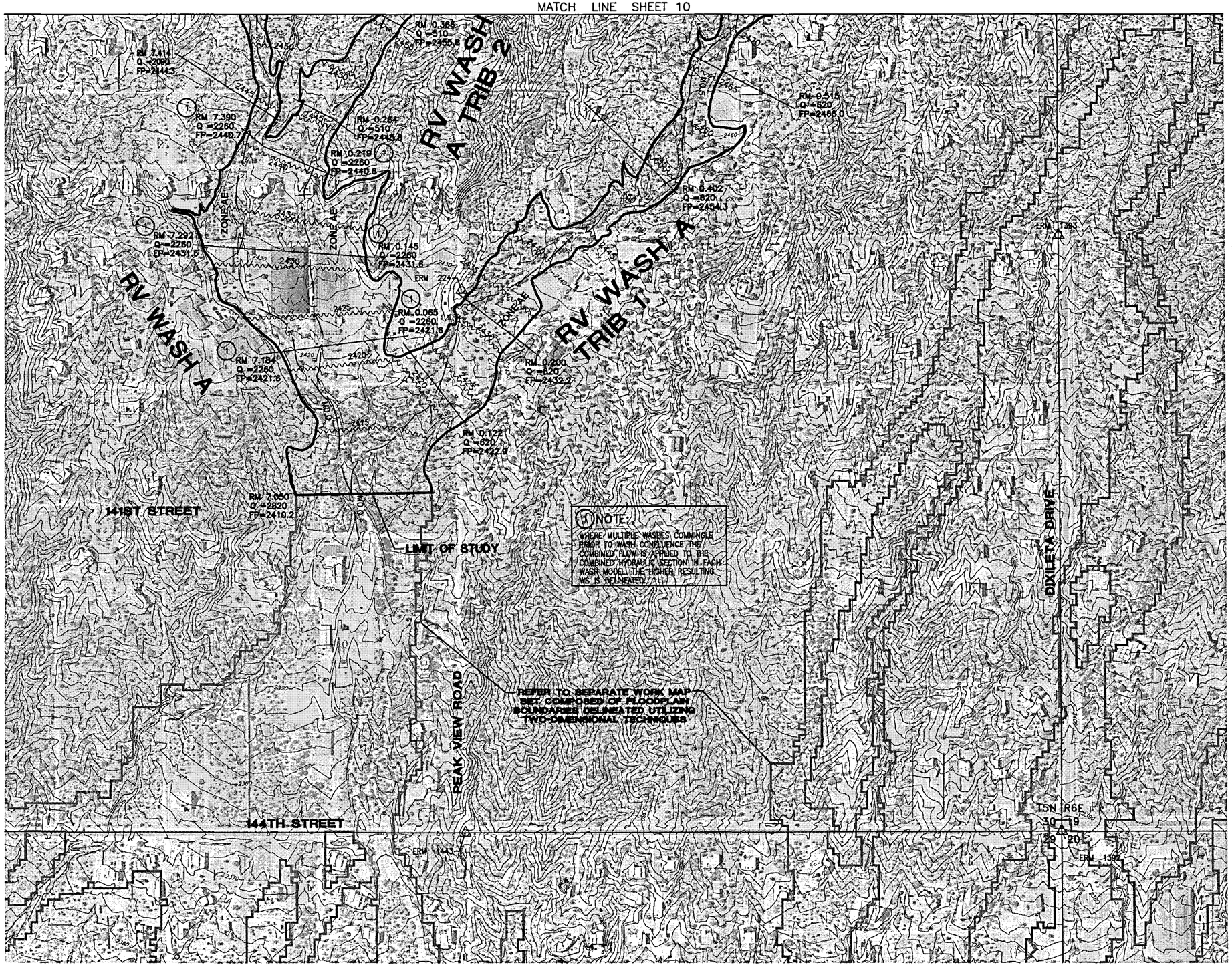
AERIAL PHOTOGRAPHY PROVIDED BY FCDMC.
2006 FLIGHT DATE.

THIS MAP WAS PREPARED BY PHOTOGRAMMETRIC METHODS TO NATIONAL MAP ACCURACY STANDARDS FOR 1"= 200' HORIZONTAL SCALE AND 2'CONTOUR INTERVALS.

AERIAL MAPPING PROVIDED BY FCDMC AND PERFORMED FOR FCDMC UNDER SEPARATE CONTRACTS. SEE TABLE ON THE COVER SHEET FOR MORE INFORMATION.

GROUND CONTROL SURVEY DATA PROVIDED BY FCDMC AND PERFORMED FOR FCDMC UNDER SEPARATE CONTRACTS. SEE TABLE ON THE COVER SHEET FOR MORE INFORMATION.

MATCH LINE SHEET 10



LEGEND

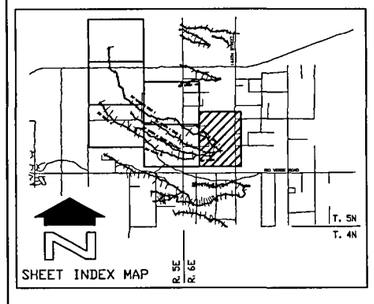
100-YR FLOODPLAIN BOUNDARY	
FLOODWAY BOUNDARY	
HYDRAULIC BASE LINE WITH RIVER MILE	M12.0 — M13.0
CROSS SECTION	RM 0.100 (CROSS SECTION DESIGNATION), Q = CFS (100 YEAR DISCHARGE), FP= 1888.7 (FLOODPLAIN WATER SURFACE ELEVATION)
ELEVATION REFERENCE MARK	ERM XXX
BASE FLOOD ELEVATIONS	1221
ZONE DESIGNATIONS	ZONE AE
CORPORATE LIMITS	Corporate Limits
COUNTY, PARISH, STATE OR INTERNATIONAL BOUNDARY	County Boundary

ELEVATION REFERENCE MARKS

NOTE: ALL ELEVATIONS ARE BASED ON NORTH AMERICAN VERTICAL DATUM OF 1988.
CONVERSION FACTOR 1988 NAVD = 1929 NGVD + 1.99'

I.D. NUMBER	ELEVATION (FT)	DESCRIPTION/LOCATION
1392	2386.69	1/2" REBAR POSS. SE COR. OF SEC19, T5N, R6E
1393	2457.42	BLM CADASTRAL BC UP 0.6FT, S 1/4 COR. OF SEC19, T5N, R6E
1443	2369.68	BLM CADASTRAL BC FLUSH, E 1/4 COR. OF SEC. 30, T5N, R6E
224	2436.20	FCDMC BC SET FLUSH NEAR CENTER OF SEC. 30, T5N, R5E

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



SHEET INDEX MAP

NO	REVISION	BY	DATE
2			
1			

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

RIO VERDE ADMP
FLOODPLAIN DELINEATION
RV WASH A, RV WASH A
TRIB 1, & RV WASH A TRIB 2
F.C.D. CONTRACT NO. 2001C056

Dibble Engineering

21684 BRIAN J. FRY — ARIZONA, U.S.A.

	BY	DATE
DESIGN	JWL	11/01/07
DESIGN CHK.	JEP	11/01/07
PLANS	JWL/RAK	11/01/07
PLANS CHK.	JEP	11/01/07

SHEET 9 OF 22

FILE:J:\2006\10-0606.1\CAD\plsh09.dwg DATE:Nov. 01 2007 TIME: 10:21 am

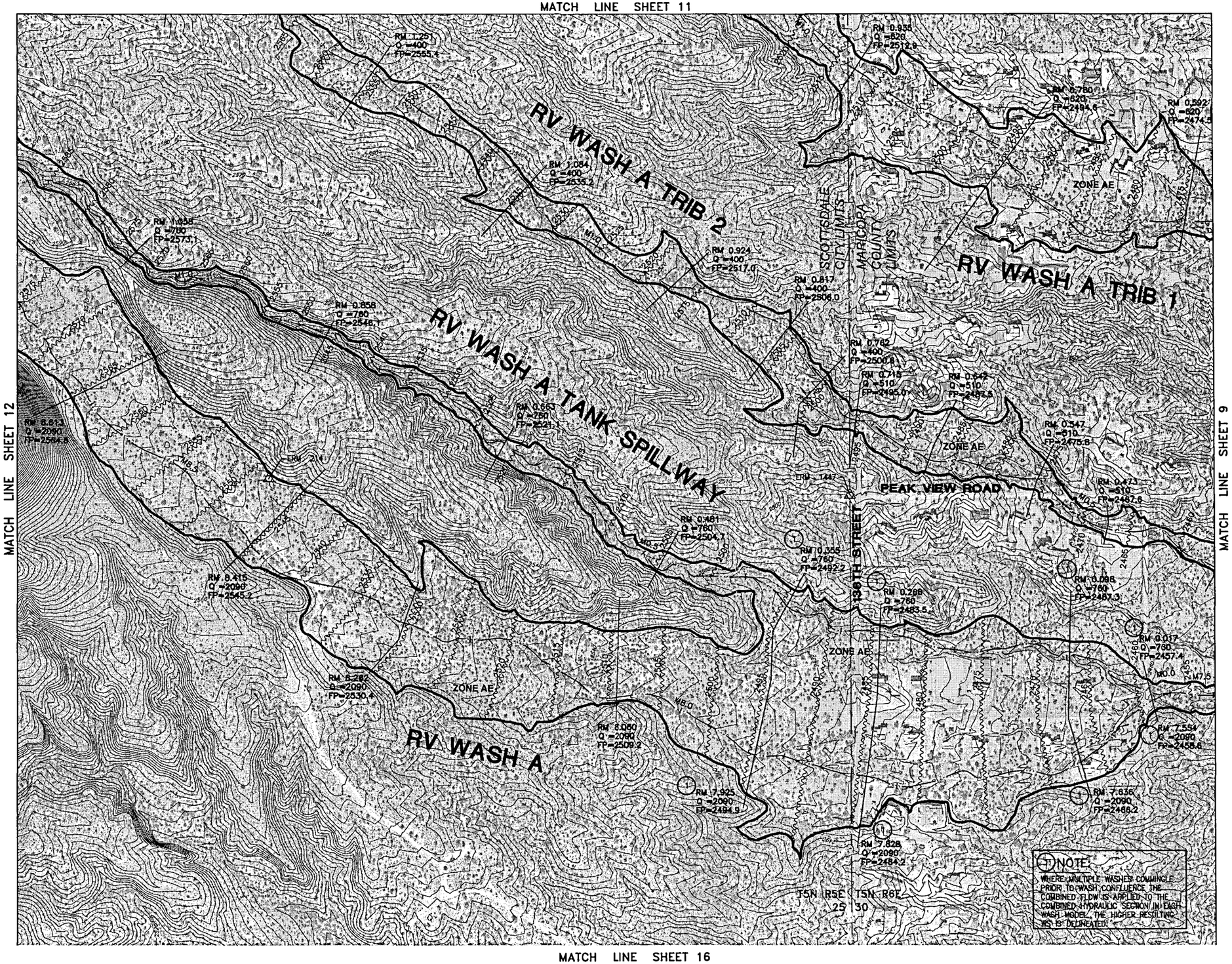
AERIAL PHOTOGRAPHY PROVIDED BY FCDMC.
2006 FLIGHT DATE.

THIS MAP WAS PREPARED BY PHOTOGRAMMETRIC METHODS TO NATIONAL MAP ACCURACY STANDARDS FOR 1"= 200' HORIZONTAL SCALE AND 2'CONTOUR INTERVALS.

AERIAL MAPPING PROVIDED BY FCDMC AND PERFORMED FOR FCDMC UNDER SEPARATE CONTRACTS. SEE TABLE ON THE COVER SHEET FOR MORE INFORMATION.

GROUND CONTROL SURVEY DATA PROVIDED BY FCDMC AND PERFORMED FOR FCDMC UNDER SEPARATE CONTRACTS. SEE TABLE ON THE COVER SHEET FOR MORE INFORMATION.

MATCH LINE SHEET 11



NOTE:
WHERE MULTIPLE WASHES COMMINGLE PRIOR TO WASH CONFLUENCE THE COMBINED FLOW IS APPLIED TO THE COMBINED HYDRAULIC SECTION IN EACH WASH MODEL. THE HIGHER RESULTING WS IS DELINEATED.

MATCH LINE SHEET 12

MATCH LINE SHEET 9

MATCH LINE SHEET 16

LEGEND

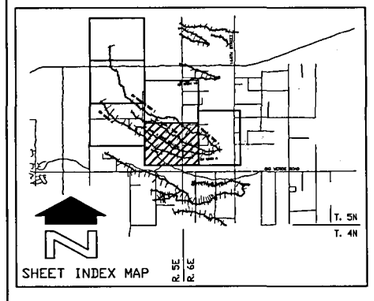
100-YR FLOODPLAIN BOUNDARY	
FLOODWAY BOUNDARY	
HYDRAULIC BASE LINE WITH RIVER MILE	M12.0 — M13.0
CROSS SECTION	RM 0.100 Q = CFS FP= 1888.7 (100 YEAR DISCHARGE; FLOODPLAIN WATER SURFACE ELEVATION)
ELEVATION REFERENCE MARK	ERM XXX
BASE FLOOD ELEVATIONS	1221
ZONE DESIGNATIONS	ZONE AE
CORPORATE LIMITS	Corporate Limits
COUNTY, PARISH, STATE OR INTERNATIONAL BOUNDARY	County Boundary

ELEVATION REFERENCE MARKS

NOTE: ALL ELEVATIONS ARE BASED ON NORTH AMERICAN VERTICAL DATUM OF 1988. CONVERSION FACTOR 1988 NAVD = 1929 NGVD + 2.00'

I.D. NUMBER	ELEVATION (FT)	DESCRIPTION/LOCATION
1447	2499.16	USGLO BC UP 1.2 FT, E ¼ COR. OF SEC 23, T5N, R5E
214	2546.42	FCDMC BC SET FLUSH NEAR CENTER OF SEC. 25, T5N, R5E

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



SHEET INDEX MAP

NO.	REVISION	BY	DATE
2			
1			

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

RIO VERDE ADMP
FLOODPLAIN DELINEATION
RV WASH A, RV WASH A
TRIB 1, TRIB 2, TANK SPILLWAY
F.C.D. CONTRACT NO. 2001C056

Registered Professional Engineer (Civil) CERTIFICATE NO. 21684 BRIAN J. FRY Date Signed ARIZONA, U.S.A.

Dibble Engineering

	BY	DATE
DESIGN	JWL	11/01/07
DESIGN CHK.	JEP	11/01/07
PLANS	JWL/RAK	11/01/07
PLANS CHK.	JEP	11/01/07

SHEET 10 OF 22

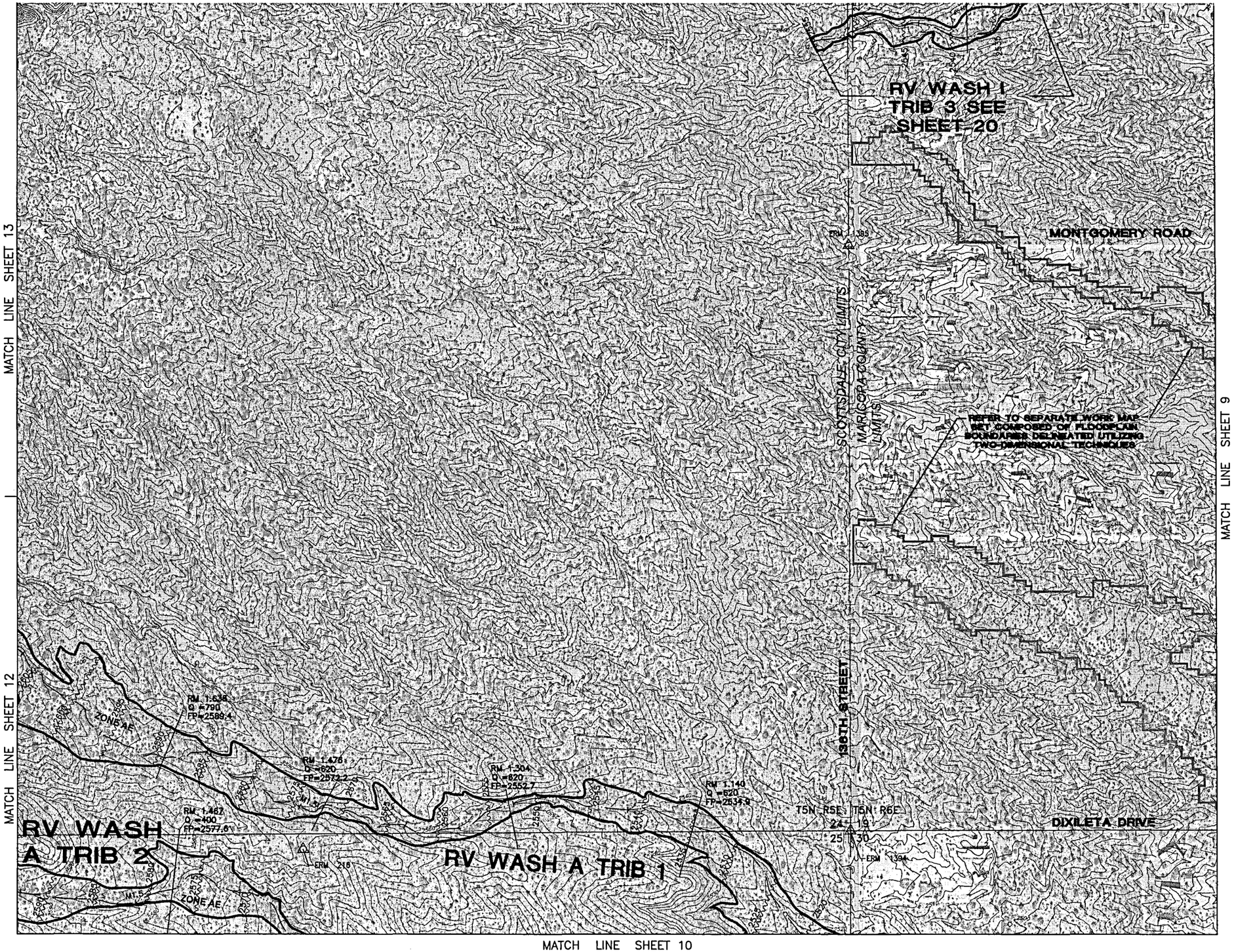
FILE:J:\2006\10-0606.1\CAD\plsh10.dwg DATE:Nov. 01 2007 TIME: 10:23 am

AERIAL PHOTOGRAPHY PROVIDED BY FCDMC.
2006 FLIGHT DATE.

THIS MAP WAS PREPARED BY PHOTOGRAMMETRIC METHODS TO NATIONAL MAP ACCURACY STANDARDS FOR 1"= 200' HORIZONTAL SCALE AND 2' CONTOUR INTERVALS.

AERIAL MAPPING PROVIDED BY FCDMC AND PERFORMED FOR FCDMC UNDER SEPARATE CONTRACTS. SEE TABLE ON THE COVER SHEET FOR MORE INFORMATION.

GROUND CONTROL SURVEY DATA PROVIDED BY FCDMC AND PERFORMED FOR FCDMC UNDER SEPARATE CONTRACTS. SEE TABLE ON THE COVER SHEET FOR MORE INFORMATION.



LEGEND

100-YR FLOODPLAIN BOUNDARY	
FLOODWAY BOUNDARY	
HYDRAULIC BASE LINE WITH RIVER MILE	M12.0 — M13.0
CROSS SECTION	RM 0.100 (CROSS SECTION DESIGNATION); Q = CFS (100 YEAR DISCHARGE); FP= 1888.7 (FLOODPLAIN WATER SURFACE ELEVATION)
ELEVATION REFERENCE MARK	ERM XXX
BASE FLOOD ELEVATIONS	1221
ZONE DESIGNATIONS	ZONE AE
CORPORATE LIMITS	Corporate Limits
COUNTY, PARISH, STATE OR INTERNATIONAL BOUNDARY	County Boundary

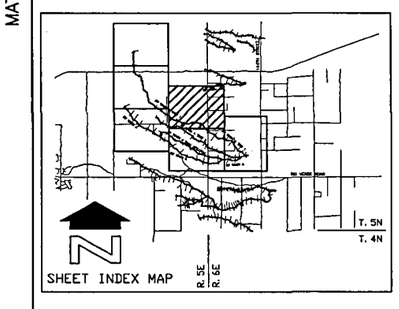
ELEVATION REFERENCE MARKS

NOTE: ALL ELEVATIONS ARE BASED ON NORTH AMERICAN VERTICAL DATUM OF 1988.
CONVERSION FACTOR 1988 NAVD = 1929 NGVD + 2.01'

I.D. NUMBER	ELEVATION (FT)	DESCRIPTION/LOCATION
1394	2522.32	USGLO BC UP 2FT, SW COR. OF SEC19, T5N, R6E
1395	2551.50	USGLO BC UP 1.7FT, W 1/4 COR. OF SEC19, T5N, R6E
216	2578.09	SET NEAR N 1/4 COR S 25 T5N R5E

N

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



NO.	REVISION	BY	DATE
2			
1			

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

RIO VERDE ADMP
FLOODPLAIN DELINEATION
RV WASH A,
TRIB 1, TRIB 2
F.C.D. CONTRACT NO. 2001C056

Registered Professional Engineer (Civil) Certificate No. 21684 BRIAN J. FRY Date Signed ARIZONA, U.S.A.

Dibble Engineering

	BY	DATE
DESIGN	JWL	11/01/07
DESIGN CHK.	JEP	11/01/07
PLANS	JWL/RAK	11/01/07
PLANS CHK.	JEP	11/01/07

SHEET 11 OF 22

FILE:J:\2006\10-0606.1\CAD\plsh11.dwg DATE:Nov. 01 2007 TIME: 10:24 am

AERIAL PHOTOGRAPHY PROVIDED BY FCDMC.
2006 FLIGHT DATE.

THIS MAP WAS PREPARED BY PHOTOGRAMMETRIC METHODS TO NATIONAL MAP ACCURACY STANDARDS FOR 1"= 200' HORIZONTAL SCALE AND 2'CONTOUR INTERVALS.

AERIAL MAPPING PROVIDED BY FCDMC AND PERFORMED FOR FCDMC UNDER SEPARATE CONTRACTS. SEE TABLE ON THE COVER SHEET FOR MORE INFORMATION.

GROUND CONTROL SURVEY DATA PROVIDED BY FCDMC AND PERFORMED FOR FCDMC UNDER SEPARATE CONTRACTS. SEE TABLE ON THE COVER SHEET FOR MORE INFORMATION.

MATCH LINE SHEET 13

MATCH LINE SHEET 17

LEGEND

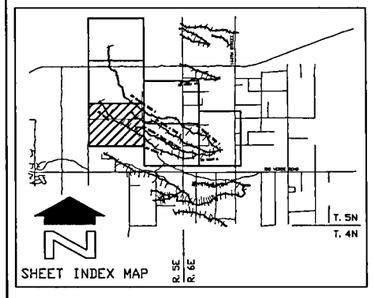
100-YR FLOODPLAIN BOUNDARY	
FLOODWAY BOUNDARY	
HYDRAULIC BASE LINE WITH RIVER MILE	M12.0 — M13.0
CROSS SECTION	RM 0.100 (CROSS SECTION DESIGNATION); Q = CFS (100 YEAR DISCHARGE); FP= 1888.7 (FLOODPLAIN WATER SURFACE ELEVATION)
ELEVATION REFERENCE MARK	ERM XXX
BASE FLOOD ELEVATIONS	1221
ZONE DESIGNATIONS	ZONE AE
CORPORATE LIMITS	Corporate Limits
COUNTY, PARISH, STATE OR INTERNATIONAL BOUNDARY	County Boundary

ELEVATION REFERENCE MARKS

NOTE: ALL ELEVATIONS ARE BASED ON NORTH AMERICAN VERTICAL DATUM OF 1988.
CONVERSION FACTOR 1988 NAVD = 1929 NGVD + 2.01'

I.D. NUMBER	ELEVATION (FT)	DESCRIPTION/LOCATION
208	2859.98	FCDMC BC SET FLUSH NEAR S 1/4 COR. OF SEC 23, T5N, R5E
210	2827.88	FCDMC BC SET FLUSH NEAR COR. OF SEC 23, 24, 25, 26 T5N, R5E
212	2812.24	FCDMC BC SET FLUSH APPROX. 1500' SE OF COR. OF SEC 23, 24, 25, 26, T5N, R5E

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



SHEET INDEX MAP

NO.	REVISION	BY	DATE
2			
1			

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

RIO VERDE ADMP
FLOODPLAIN DELINEATION
RV WASH A, RV WASH A
TRIB 1, TRIB 2, TANK SPILLWAY
F.C.D. CONTRACT NO. 2001C056

Registered Professional Engineer (Civil) CERTIFICATE NO. 21684 BRIAN J. FRY Date Signed 11/01/07 ARIZONA, U.S.A.

Dibble Engineering

	BY	DATE
DESIGN	JWL	11/01/07
DESIGN CHK.	JEP	11/01/07
PLANS	JWL/RAK	11/01/07
PLANS CHK.	JEP	11/01/07

FILE:J:\2006\10-0606.1\CAD\plsh12.dwg DATE:Nov, 01 2007 TIME: 10:26 am

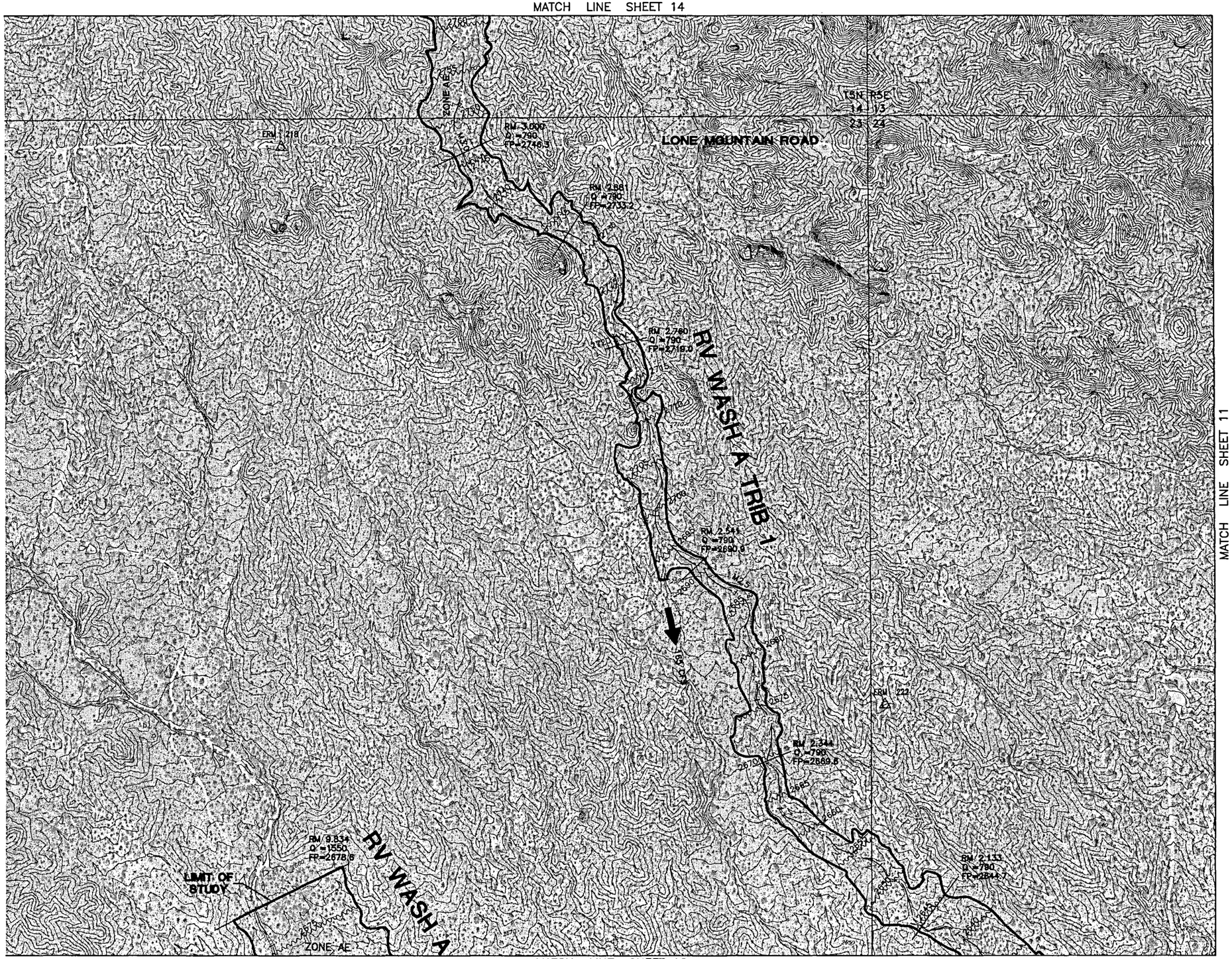
AERIAL PHOTOGRAPHY PROVIDED BY FCDMC.
2006 FLIGHT DATE.

THIS MAP WAS PREPARED BY PHOTOGRAMMETRIC METHODS TO NATIONAL MAP ACCURACY STANDARDS FOR 1"= 200' HORIZONTAL SCALE AND 2'CONTOUR INTERVALS.

AERIAL MAPPING PROVIDED BY FCDMC AND PERFORMED FOR FCDMC UNDER SEPARATE CONTRACTS. SEE TABLE ON THE COVER SHEET FOR MORE INFORMATION.

GROUND CONTROL SURVEY DATA PROVIDED BY FCDMC AND PERFORMED FOR FCDMC UNDER SEPARATE CONTRACTS. SEE TABLE ON THE COVER SHEET FOR MORE INFORMATION.

MATCH LINE SHEET 14



MATCH LINE SHEET 11

MATCH LINE SHEET 12

LEGEND

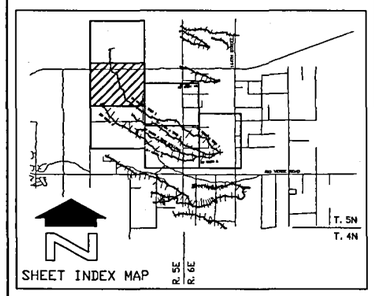
100-YR FLOODPLAIN BOUNDARY	
FLOODWAY BOUNDARY	
HYDRAULIC BASE LINE WITH RIVER MILE	M12.0 M13.0
CROSS SECTION	ZONE SECTION NUMBER DESIGNATION; RM 0.100; Q = CFS (100 YEAR DISCHARGE); FP= 1888.7 (FLOODWAY WATER SURFACE ELEVATION)
ELEVATION REFERENCE MARK	ERM XXX
BASE FLOOD ELEVATIONS	1221
ZONE DESIGNATIONS	ZONE AE
CORPORATE LIMITS	Corporate Limits
COUNTY, PARISH, STATE OR INTERNATIONAL BOUNDARY	County Boundary

ELEVATION REFERENCE MARKS

NOTE: ALL ELEVATIONS ARE BASED ON NORTH AMERICAN VERTICAL DATUM OF 1988.
CONVERSION FACTOR 1988 NAVD = 1929 NGVD + 2.03'

I.D. NUMBER	ELEVATION (FT)	DESCRIPTION/LOCATION
218	2756.98	FCDMC BC SET FLUSH NEAR N 1/4 COR. OF SEC 23, T5N, R5E
222	2669.96	FCDMC BC SET FLUSH NEAR W 1/4 COR. OF SEC 24, T5N, R5E

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



SHEET INDEX MAP

NO.	REVISION	BY	DATE
2			
1			

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

RIO VERDE ADMP
FLOODPLAIN DELINEATION
RV WASH A & RV WASH A
TRIB 1
F.C.D. CONTRACT NO. 2001C056

REGISTERED PROFESSIONAL ENGINEER CERTIFICATE NO. 21684 BRIAN J. FRY ARIZONA, U.S.A.

Dibble Engineering

	BY	DATE
DESIGN	JWL	11/01/07
DESIGN CHK.	JEP	11/01/07
PLANS	JWL/RAK	11/01/07
PLANS CHK.	JEP	11/01/07

SHEET 13 OF 22

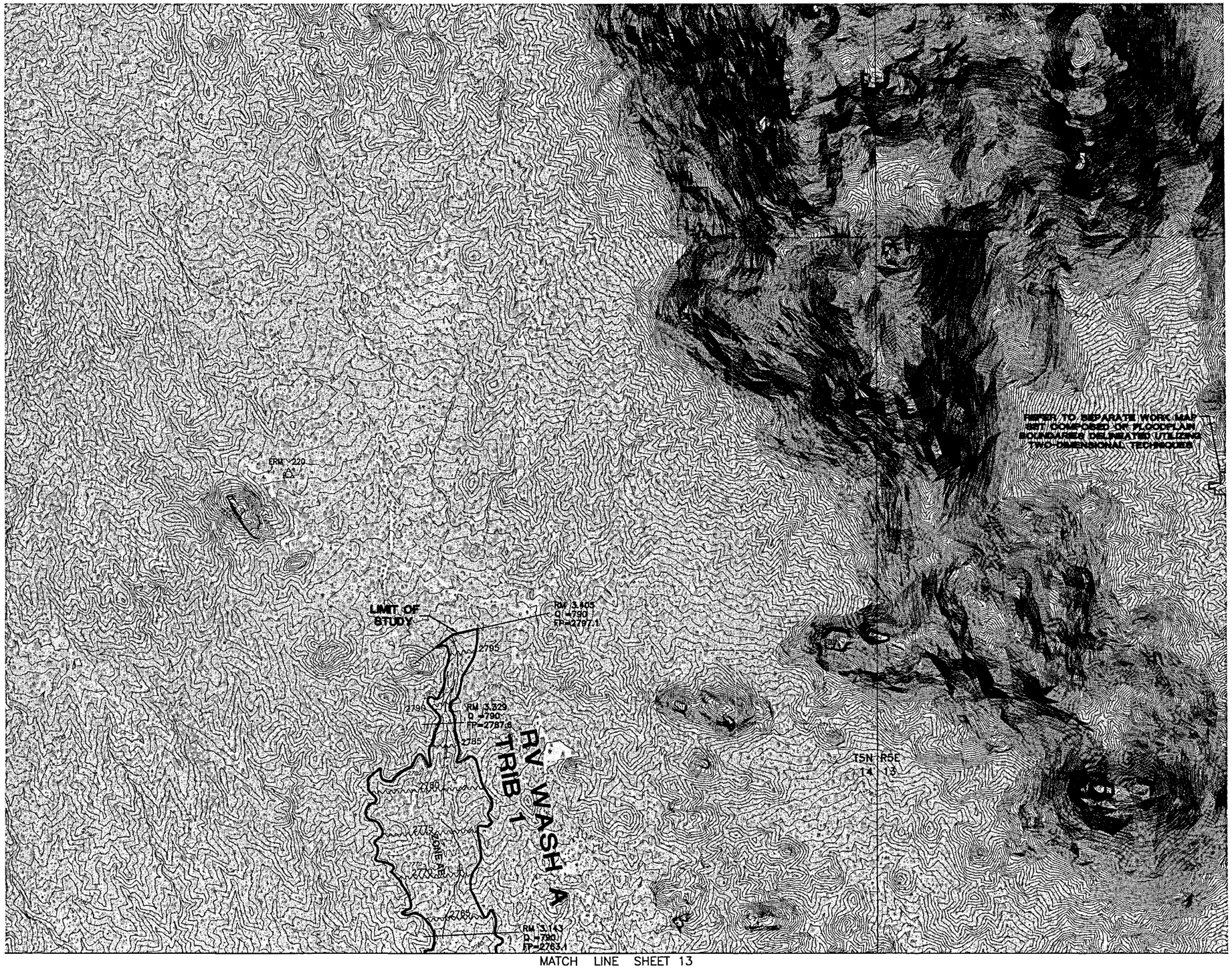
FILE:J:\2006\10-0606.1\CAD\plsh13.dwg DATE:Nov, 01 2007 TIME: 10:27 am

AERIAL PHOTOGRAPHY PROVIDED BY FCDMC.
2006 FLIGHT DATE.

THIS MAP WAS PREPARED BY PHOTOGRAMMETRIC METHODS TO NATIONAL MAP ACCURACY STANDARDS FOR 1"= 200' HORIZONTAL SCALE AND 2'CONTOUR INTERVALS.

AERIAL MAPPING PROVIDED BY FCDMC AND PERFORMED FOR FCDMC UNDER SEPARATE CONTRACTS. SEE TABLE ON THE COVER SHEET FOR MORE INFORMATION.

GROUND CONTROL SURVEY DATA PROVIDED BY FCDMC AND PERFORMED FOR FCDMC UNDER SEPARATE CONTRACTS. SEE TABLE ON THE COVER SHEET FOR MORE INFORMATION.



LEGEND

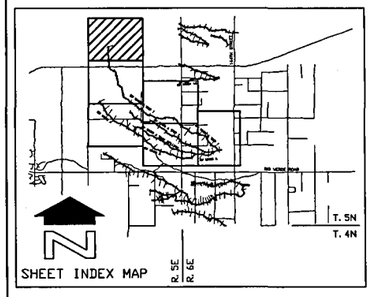
100-YR FLOODPLAIN BOUNDARY	
FLOODWAY BOUNDARY	
HYDRAULIC BASE LINE WITH RIVER MILE	M12.0 M13.0
CROSS SECTION	CROSS SECTION RIVER MILE DESIGNATION: RM 0.100; Q = CFS (100 YEAR DISCHARGE); FP= 1888.7 (FLOODWAY WATER SURFACE ELEVATION)
ELEVATION REFERENCE MARK	ERM XXX
BASE FLOOD ELEVATIONS	1221
ZONE DESIGNATIONS	ZONE AE
CORPORATE LIMITS	Corporate Limits
COUNTY, PARISH, STATE OR INTERNATIONAL BOUNDARY	County Boundary

ELEVATION REFERENCE MARKS

NOTE: ALL ELEVATIONS ARE BASED ON NORTH AMERICAN VERTICAL DATUM OF 1988.
CONVERSION FACTOR 1988 NAVD = 1929 NGVD + 2.05'

I.D. NUMBER	ELEVATION (FT)	DESCRIPTION/LOCATION
220	2823.50	FCDMC BC SET FLUSH NEAR CENTER OF SEC 14, T5N, R5E

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



NO.	REVISION	BY	DATE
2			
1			

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

RIO VERDE ADMP
FLOODPLAIN DELINEATION

RV WASH A TRIB 1

F.C.D. CONTRACT NO. 2001C056

Registered Land Surveyor CERTIFICATE NO. 21684 BRIAN J. FRY Expires 12/31/08 ARIZONA, U.S.A.

Dibble Engineering

	BY	DATE
DESIGN	JWL	11/01/07
DESIGN CHK.	JEP	11/01/07
PLANS	JWL/RAK	11/01/07
PLANS CHK.	JEP	11/01/07

SHEET 14 OF 22

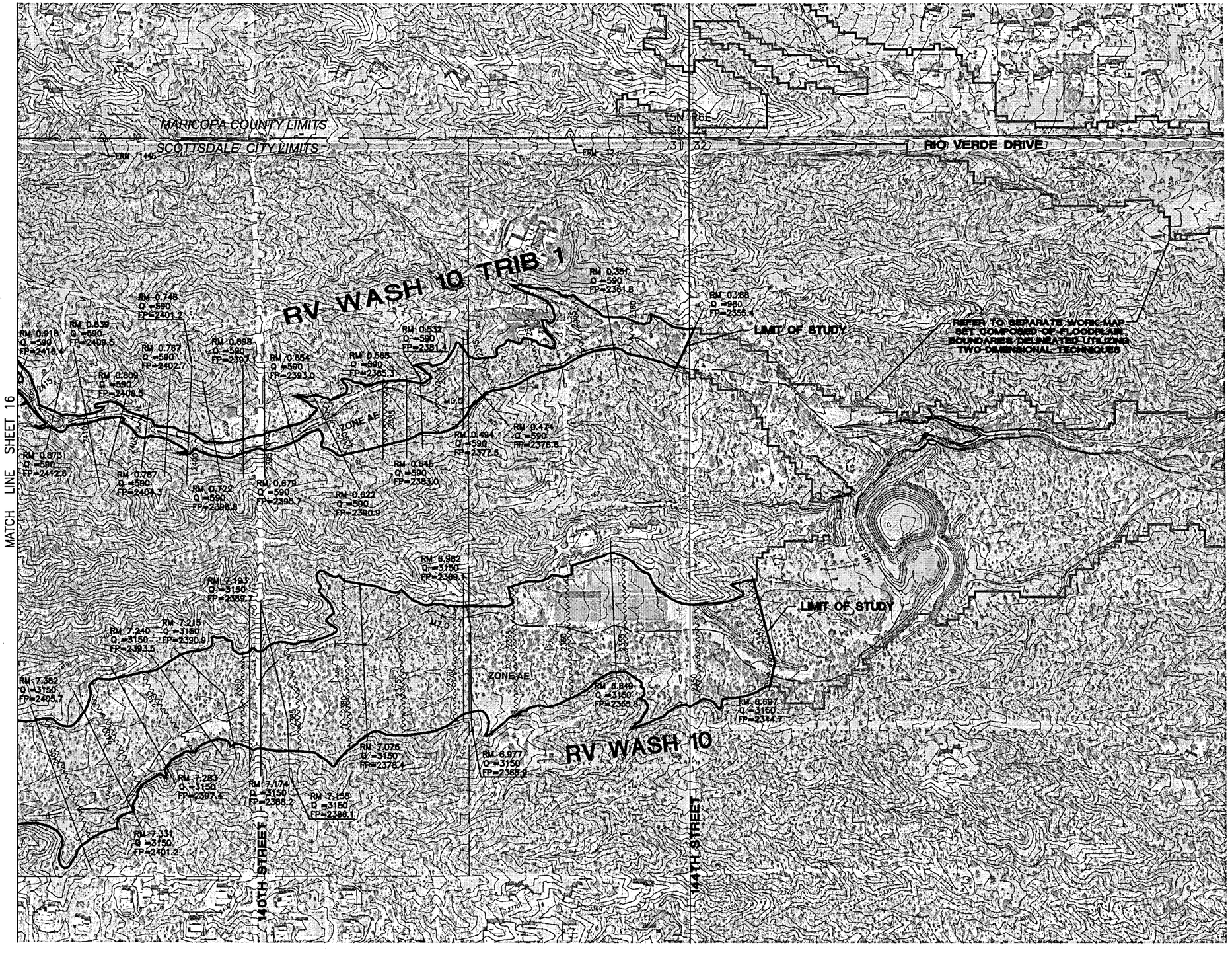
FILE:J:\2006\10-0606.1\CAD\plsh14.dwg DATE:Nov. 01 2007 TIME: 10:29 am

AERIAL PHOTOGRAPHY PROVIDED BY FCDMC.
2006 FLIGHT DATE.

THIS MAP WAS PREPARED BY PHOTOGRAMMETRIC METHODS TO NATIONAL MAP ACCURACY STANDARDS FOR 1"= 200' HORIZONTAL SCALE AND 2'CONTOUR INTERVALS.

AERIAL MAPPING PROVIDED BY FCDMC AND PERFORMED FOR FCDMC UNDER SEPARATE CONTRACTS. SEE TABLE ON THE COVER SHEET FOR MORE INFORMATION.

GROUND CONTROL SURVEY DATA PROVIDED BY FCDMC AND PERFORMED FOR FCDMC UNDER SEPARATE CONTRACTS. SEE TABLE ON THE COVER SHEET FOR MORE INFORMATION.



LEGEND

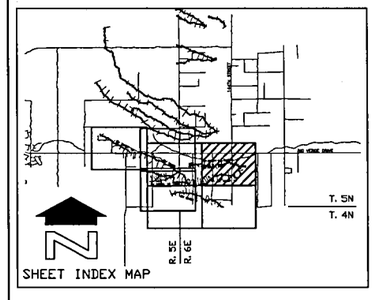
100-YR FLOODPLAIN BOUNDARY	
FLOODWAY BOUNDARY	
HYDRAULIC BASE LINE WITH RIVER MILE	M12.0 — M13.0
CROSS SECTION	CROSS SECTION SCOPE OF STUDY DESIGNATION; RM 0.100; Q = CFS (100 YEAR DISCHARGE); FP= 1888.7 (FLOODPLAIN WATER SURFACE ELEVATION)
ELEVATION REFERENCE MARK	ERM XXX
BASE FLOOD ELEVATIONS	1221
ZONE DESIGNATIONS	ZONE AE
CORPORATE LIMITS	Corporate Limits
COUNTY, PARISH, STATE OR INTERNATIONAL BOUNDARY	County Boundary

ELEVATION REFERENCE MARKS

NOTE: ALL ELEVATIONS ARE BASED ON NORTH AMERICAN VERTICAL DATUM OF 1988.
CONVERSION FACTOR 1988 NAVD = 1929 NGVD + 1.99'

I.D. NUMBER	ELEVATION (FT)	DESCRIPTION/LOCATION
12	2375.42	1/2" REBAR WITH AL CAP, APPROX 60.0 FT N OF RIO VERDE DR AND APPROX 550.0 FT W OF 144TH ST.
1445	2423.28	BLM CADASTRAL BC UP 0.4FT, S 1/4 COR. OF SEC30, T5N, R6E

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



SHEET INDEX MAP

NO.	REVISION	BY	DATE
2			
1			

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

RIO VERDE ADMP
FLOODPLAIN DELINEATION
RV WASH 10 &
RV WASH 10 TRIB 1
F.C.D. CONTRACT NO. 2001C056

Registered Professional Engineer (Civil) CERTIFICATE 21684 BRIAN J. FRY Date Signed VIRGINIA, U.S.A.

Dibble Engineering

	BY	DATE
DESIGN	JWL	11/01/07
DESIGN CHK.	JEP	11/01/07
PLANS	JWL/RAK	11/01/07
PLANS CHK.	JEP	11/01/07

SHEET 15 OF 22

FILE:J:\2006\10-0606.1\CAD\plsh15.dwg DATE:Nov. 01 2007 TIME: 10:30 am

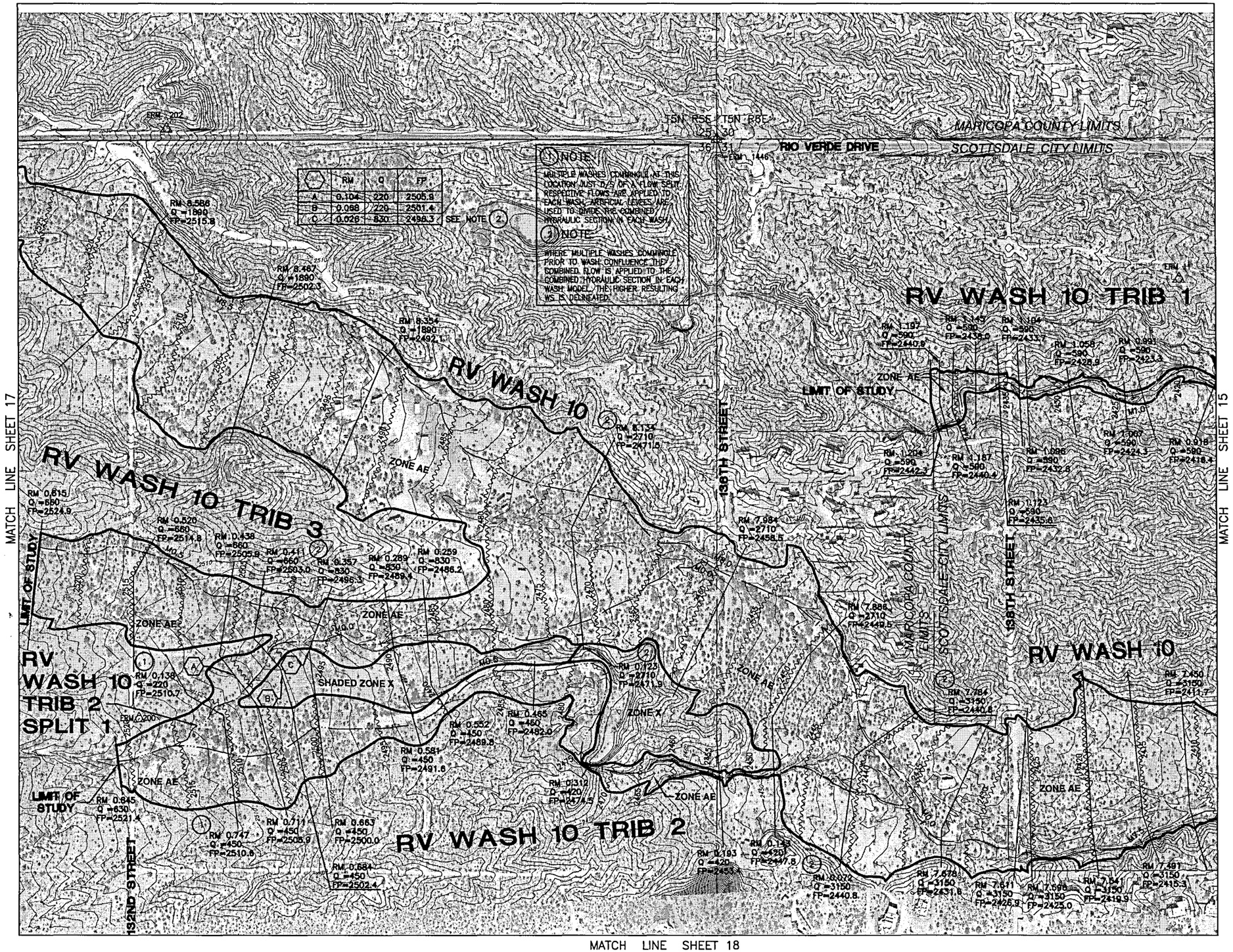
AERIAL PHOTOGRAPHY PROVIDED BY FCDMC.
2006 FLIGHT DATE.

THIS MAP WAS PREPARED BY PHOTOGRAMMETRIC METHODS TO NATIONAL MAP ACCURACY STANDARDS FOR 1"= 200' HORIZONTAL SCALE AND 2'CONTOUR INTERVALS.

AERIAL MAPPING PROVIDED BY FCDMC AND PERFORMED FOR FCDMC UNDER SEPARATE CONTRACTS. SEE TABLE ON THE COVER SHEET FOR MORE INFORMATION.

GROUND CONTROL SURVEY DATA PROVIDED BY FCDMC AND PERFORMED FOR FCDMC UNDER SEPARATE CONTRACTS. SEE TABLE ON THE COVER SHEET FOR MORE INFORMATION.

MATCH LINE SHEET 10



	RM	Q	FP
A	0.104	220	2505.9
B	0.068	220	2501.4
C	0.026	830	2498.3

SEE NOTE 2

NOTE 1

MULTIPLE WASHES COMMINGLE AT THIS LOCATION JUST D/S OF A FLOW SPLIT. RESPECTIVE FLOWS ARE APPLIED TO EACH WASH. ARTIFICIAL LEVEES ARE USED TO DIVIDE THE COMBINED HYDRAULIC SECTION IN EACH WASH.

NOTE 2

WHERE MULTIPLE WASHES COMMINGLE PRIOR TO WASH CONFLUENCE THE COMBINED FLOW IS APPLIED TO THE COMBINED HYDRAULIC SECTION IN EACH WASH MODEL. THE HIGHER RESULTING WS IS DELINEATED.

LEGEND

100-YR FLOODPLAIN BOUNDARY	
FLOODWAY BOUNDARY	
HYDRAULIC BASE LINE WITH RIVER MILE	M12.0 — M13.0
CROSS SECTION	CROSS SECTION RIVER MILE DESIGNATION: RM 0.100; Q = CFS (100 YEAR DISCHARGE); FP= 1888.7 (FLOODPLAIN WATER SURFACE ELEVATION)
ELEVATION REFERENCE MARK	ERM XXX
BASE FLOOD ELEVATIONS	1221
ZONE DESIGNATIONS	ZONE AE
CORPORATE LIMITS	Corporate Limits
COUNTY, PARISH, STATE OR INTERNATIONAL BOUNDARY	County Boundary

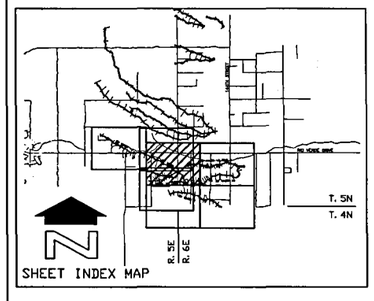
ELEVATION REFERENCE MARKS

NOTE: ALL ELEVATIONS ARE BASED ON NORTH AMERICAN VERTICAL DATUM OF 1988. CONVERSION FACTOR 1988 NAVD = 1929 NGVD + 2.00'

I.D. NUMBER	ELEVATION (FT)	DESCRIPTION/LOCATION
11	2436.40	1/2" REBAR WITH AL CAP, APPROX. 800.0 FT E of 138TH ST, APPROX. 800.0 FT S OF RIO VERDE DR
1446	2479.60	USGLO BC DOWN 1.5FT, SW COR. OF SEC30, T5N, R6E
200	2518.79	FCDMC BC SET FLUSH NEAR CNTR OF SEC 36, T5N, R5E
202	2518.20	FCDMC BC SET FLUSH NEAR SET NEAR N 1/4 COR. OF SEC 36, T5N, R5E

-200' 0' 200' 400'

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



SHEET INDEX MAP

NO.	REVISION	BY	DATE
2			
1			

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

RIO VERDE ADMP
FLOODPLAIN DELINEATION
RV WASH 10, TRIB 1, TRIB 2, TRIB 3, TRIB 2 SPLIT 1
F.C.D. CONTRACT NO. 2001C056

Registered Professional Engineer (Civil) CERTIFICATE NO. 21684 BRIAN J. FRY Date Signed 11/01/07 ARIZONA, U.S.A.

Dibble Engineering

	BY	DATE
DESIGN	JWL	11/01/07
DESIGN CHK.	JEP	11/01/07
PLANS	JWL/RAK	11/01/07
PLANS CHK.	JEP	11/01/07

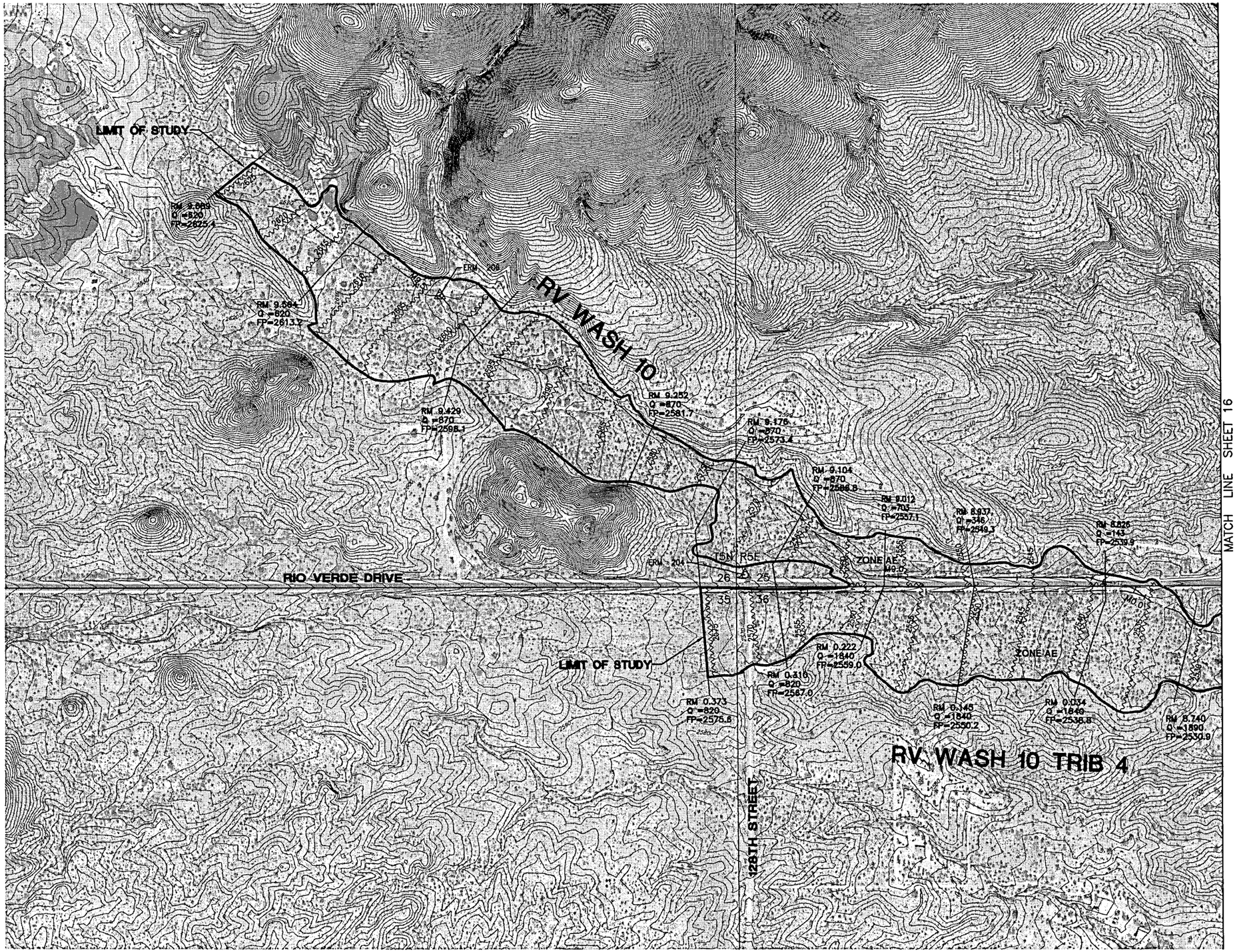
FILE:J:\2006\10-0606-1\CAD\plsh16.dwg DATE:Nov, 01 2007 TIME: 10:31 am

AERIAL PHOTOGRAPHY PROVIDED BY FCDMC.
2006 FLIGHT DATE.

THIS MAP WAS PREPARED BY PHOTOGRAMMETRIC METHODS TO NATIONAL MAP ACCURACY STANDARDS FOR 1"= 200' HORIZONTAL SCALE AND 2'CONTOUR INTERVALS.

AERIAL MAPPING PROVIDED BY FCDMC AND PERFORMED FOR FCDMC UNDER SEPARATE CONTRACTS. SEE TABLE ON THE COVER SHEET FOR MORE INFORMATION.

GROUND CONTROL SURVEY DATA PROVIDED BY FCDMC AND PERFORMED FOR FCDMC UNDER SEPARATE CONTRACTS. SEE TABLE ON THE COVER SHEET FOR MORE INFORMATION.



LEGEND

100-YR FLOODPLAIN BOUNDARY	
FLOODWAY BOUNDARY	
HYDRAULIC BASE LINE WITH RIVER MILE	M12.0 M13.0
CROSS SECTION	CROSS SECTION RIVER MILE DESIGNATION: RM 0.100; Q = CFS (100 YEAR DISCHARGE); FP= 1888.7 (FLOODPLAIN BOTTO SURFACE ELEVATION)
ELEVATION REFERENCE MARK	ERM XXX
BASE FLOOD ELEVATIONS	1221
ZONE DESIGNATIONS	ZONE AE
CORPORATE LIMITS	Corporate Limits
COUNTY, PARISH, STATE OR INTERNATIONAL BOUNDARY	County Boundary

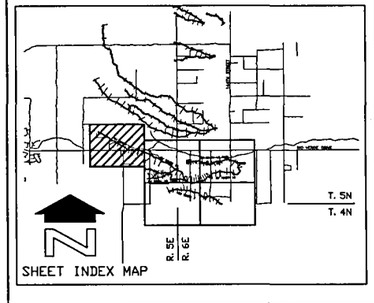
ELEVATION REFERENCE MARKS

NOTE: ALL ELEVATIONS ARE BASED ON NORTH AMERICAN VERTICAL DATUM OF 1988.
CONVERSION FACTOR 1988 NAVD = 1929 NGVD + 2.00'

I.D. NUMBER	ELEVATION (FT)	DESCRIPTION/LOCATION
204	2569.74	FCDMC BC SET FLUSH NEAR COR. OF SEC 25, 26, 35, 36, T5N, R5E
206	2602.62	FCDMC BC SET FLUSH APPROX. 1800' NW OF SE COR. OF SEC26, T5N, R5E

N

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



NO.	REVISION	BY	DATE
2			
1			

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

RIO VERDE ADMP
FLOODPLAIN DELINEATION
RV WASH 10 &
RV WASH 10 TRIB 4
F.C.D. CONTRACT NO. 2001C056

Dibble Engineering

21684 BRIAN J. FRY

	BY	DATE
DESIGN	JWL	11/01/07
DESIGN CHK.	JEP	11/01/07
PLANS	JWL/RAK	11/01/07
PLANS CHK.	JEP	11/01/07

SHEET 17 OF 22

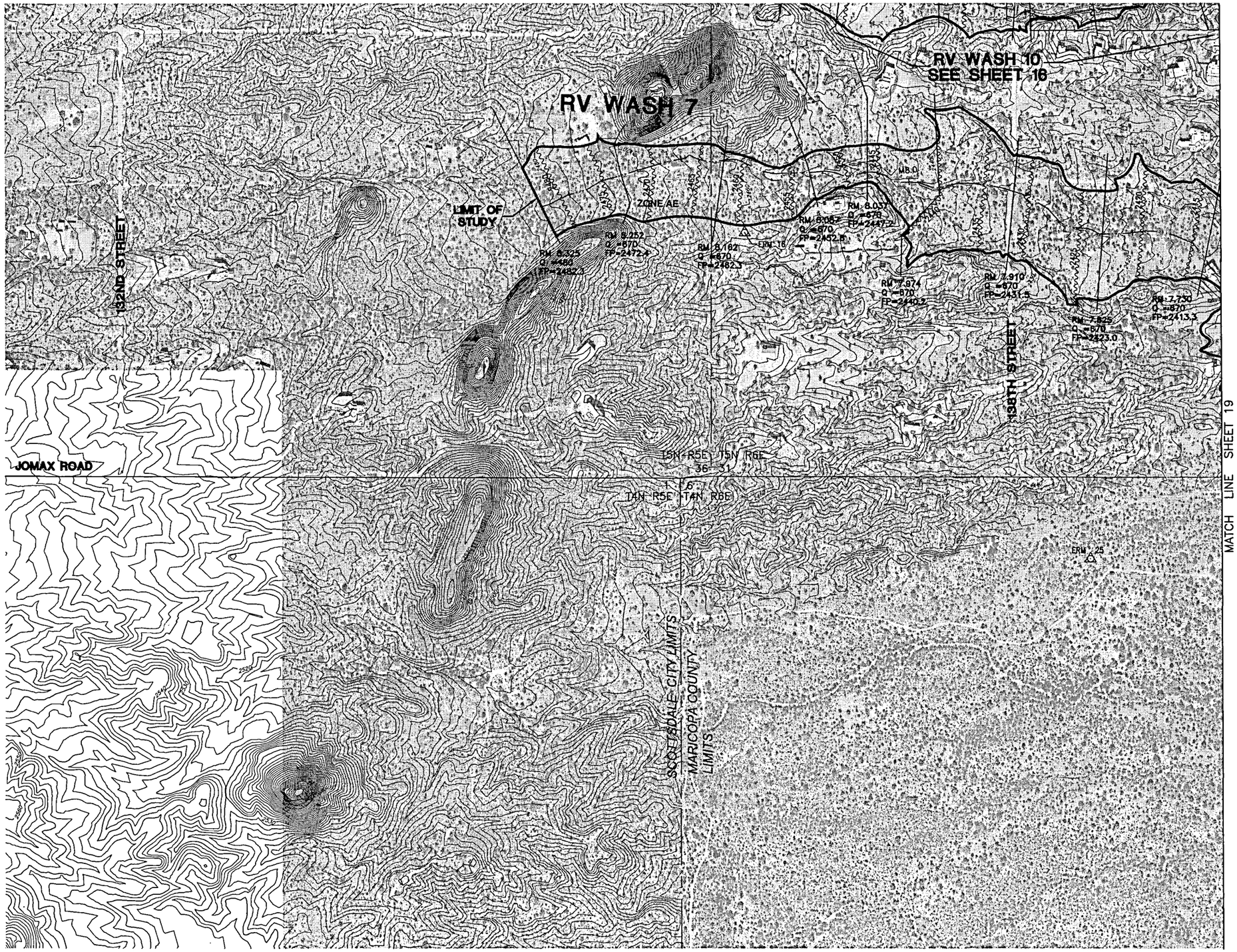
FILE:J:\2006\10-0606.1\CAD\plsh17.dwg DATE:Nov, 01 2007 TIME: 10:33 am

AERIAL PHOTOGRAPHY PROVIDED BY FCDMC.
2006 FLIGHT DATE.

THIS MAP WAS PREPARED BY PHOTOGRAMMETRIC METHODS TO NATIONAL MAP ACCURACY STANDARDS FOR 1"= 200' HORIZONTAL SCALE AND 2'CONTOUR INTERVALS.

AERIAL MAPPING PROVIDED BY FCDMC AND PERFORMED FOR FCDMC UNDER SEPARATE CONTRACTS. SEE TABLE ON THE COVER SHEET FOR MORE INFORMATION.

GROUND CONTROL SURVEY DATA PROVIDED BY FCDMC AND PERFORMED FOR FCDMC UNDER SEPARATE CONTRACTS. SEE TABLE ON THE COVER SHEET FOR MORE INFORMATION.



LEGEND

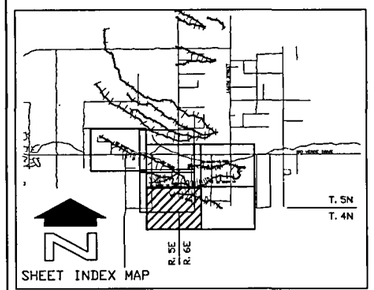
100-YR FLOODPLAIN BOUNDARY	
FLOODWAY BOUNDARY	
HYDRAULIC BASE LINE WITH RIVER MILE	M12.0 — M13.0
CROSS SECTION	CROSS SECTION DESIGNATION: RM 0.100; Q = CFS (100 YEAR DISCHARGE); FP= 1888.7 (FLOODPLAIN WATER SURFACE ELEVATION)
ELEVATION REFERENCE MARK	ERM XXX
BASE FLOOD ELEVATIONS	1221
ZONE DESIGNATIONS	ZONE AE
CORPORATE LIMITS	Corporate Limits
COUNTY, PARISH, STATE OR INTERNATIONAL BOUNDARY	County Boundary

ELEVATION REFERENCE MARKS

NOTE: ALL ELEVATIONS ARE BASED ON NORTH AMERICAN VERTICAL DATUM OF 1988.
CONVERSION FACTOR 1988 NAVD = 1929 NGVD + 1.99'

I.D. NUMBER	ELEVATION (FT)	DESCRIPTION/LOCATION
16	2460.94	1/2" REBAR WITH AL CAP, APPROX. 230.0 FT NW OF SW FENCE CRNR OF HOUSE AT 26912 N 137TH ST
25	2430.32	1/2" REBAR WITH AL CAP, APPROX. 90.0 FT N FROM BIKE AND HORSE TRAIL.

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



NO.	REVISION	BY	DATE
2			
1			

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

RIO VERDE ADMP
FLOODPLAIN DELINEATION
RV WASH 7

F.C.D. CONTRACT NO. 2001C056

Dibble Engineering

Registered Professional Engineer (Civil) CERTIFICATE NO. 21684 BRIAN J. FRY State of Arizona, U.S.A.

	BY	DATE
DESIGN	JWL	11/01/07
DESIGN CHK.	JEP	11/01/07
PLANS	JWL/RAK	11/01/07
PLANS CHK.	JEP	11/01/07

SHEET 18 OF 22

FILE:J:\2006\10-0606.1\CAD\plsh18.dwg DATE:Nov, 01 2007 TIME: 10:34 am

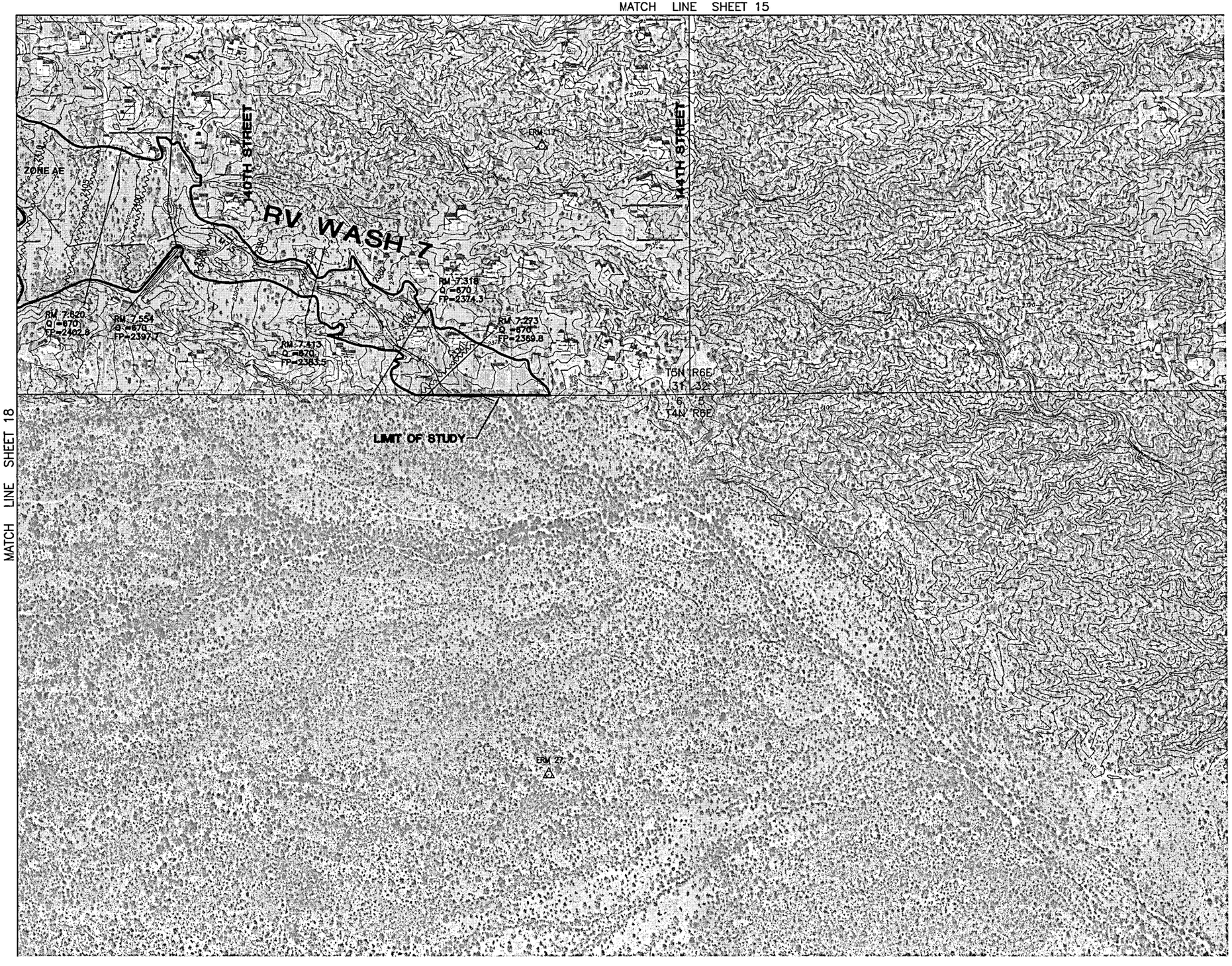
AERIAL PHOTOGRAPHY PROVIDED BY FCDMC.
2006 FLIGHT DATE.

THIS MAP WAS PREPARED BY PHOTOGRAMMETRIC METHODS TO NATIONAL MAP ACCURACY STANDARDS FOR 1"= 200' HORIZONTAL SCALE AND 2'CONTOUR INTERVALS.

AERIAL MAPPING PROVIDED BY FCDMC AND PERFORMED FOR FCDMC UNDER SEPARATE CONTRACTS. SEE TABLE ON THE COVER SHEET FOR MORE INFORMATION.

GROUND CONTROL SURVEY DATA PROVIDED BY FCDMC AND PERFORMED FOR FCDMC UNDER SEPARATE CONTRACTS. SEE TABLE ON THE COVER SHEET FOR MORE INFORMATION.

MATCH LINE SHEET 15



MATCH LINE SHEET 18

LEGEND

100-YR FLOODPLAIN BOUNDARY	
FLOODWAY BOUNDARY	
HYDRAULIC BASE LINE WITH RIVER MILE	M12.0 — M13.0
CROSS SECTION	RM 0.100 (CROSS SECTION DOT IS DESIGNATION); Q = CFS (100 YEAR DISCHARGE); FP= 1888.7 (FLOODWAY WATER SURFACE ELEVATION)
ELEVATION REFERENCE MARK	ERM XXX
BASE FLOOD ELEVATIONS	1221
ZONE DESIGNATIONS	ZONE AE
CORPORATE LIMITS	Corporate Limits
COUNTY, PARISH, STATE OR INTERNATIONAL BOUNDARY	County Boundary

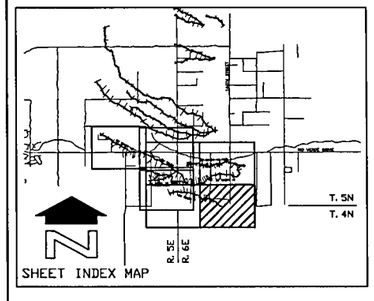
ELEVATION REFERENCE MARKS

NOTE: ALL ELEVATIONS ARE BASED ON NORTH AMERICAN VERTICAL DATUM OF 1988.
CONVERSION FACTOR 1988 NAVD = 1929 NGVD + 1.99'

I.D. NUMBER	ELEVATION (FT)	DESCRIPTION/LOCATION
17	2369.49	1/2" REBAR WITH AL CAP APPROX. 660 FT W AND 1110 FT N OF SE CRNR OF SEC31, T5N, R6E
27	2361.93	1/2" REBAR WITH AL CAP APPROX. 1690 FT S AND 640 FT W OF NE CRNR OF SEC6, T4N, R6E STAMPED 27

N

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



SHEET INDEX MAP

NO.	REVISION	BY	DATE
2			
1			

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

RIO VERDE ADMP
FLOODPLAIN DELINEATION

RV WASH 7

F.C.D. CONTRACT NO. 2001C056

Registered Professional Engineer (Civil) CERTIFICATE NO. 21684 BRIAN J. FRY Date Signed ARIZONA, U.S.A.

Dibble Engineering

	BY	DATE
DESIGN	JWL	11/01/07
DESIGN CHK.	JEP	11/01/07
PLANS	JWL/RAK	11/01/07
PLANS CHK.	JEP	11/01/07

SHEET 19 OF 22

FILE:J:\2006\10-0606.1\CAD\plsh19.dwg DATE:Nov. 01 2007 TIME: 10:36 am

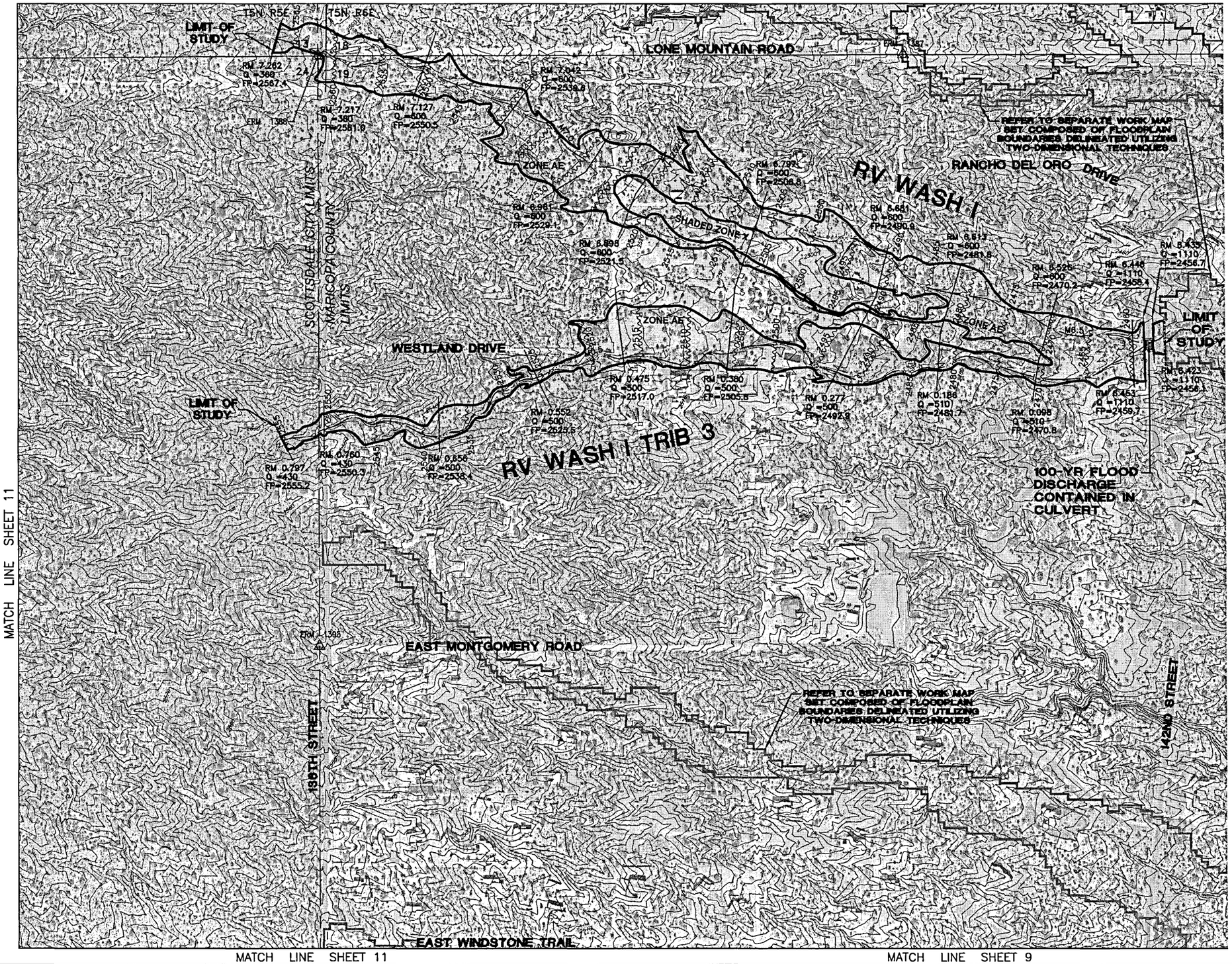
AERIAL PHOTOGRAPHY PROVIDED BY FCDMC.
2006 FLIGHT DATE.

THIS MAP WAS PREPARED BY PHOTOGRAMMETRIC METHODS TO NATIONAL MAP ACCURACY STANDARDS FOR 1"= 200' HORIZONTAL SCALE AND 2'CONTOUR INTERVALS.

AERIAL MAPPING PROVIDED BY FCDMC AND PERFORMED FOR FCDMC UNDER SEPARATE CONTRACTS. SEE TABLE ON THE COVER SHEET FOR MORE INFORMATION.

GROUND CONTROL SURVEY DATA PROVIDED BY FCDMC AND PERFORMED FOR FCDMC UNDER SEPARATE CONTRACTS. SEE TABLE ON THE COVER SHEET FOR MORE INFORMATION.

MATCH LINE SHEET 21



LEGEND

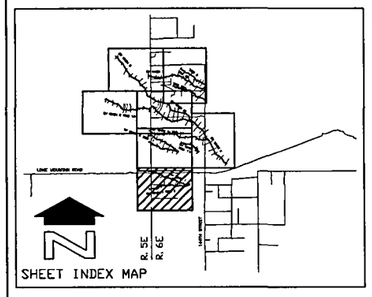
100-YR FLOODPLAIN BOUNDARY	
FLOODWAY BOUNDARY	
HYDRAULIC BASE LINE WITH RIVER MILE	M12.0 M13.0
CROSS SECTION	RM 0.100 (CROSS SECTION RIVER MILE DESIGNATION); Q = CFS (100 YEAR DISCHARGE); FP= 1888.7 (FLOODPLAIN WATER SURFACE ELEVATION)
ELEVATION REFERENCE MARK	ERM XXX
BASE FLOOD ELEVATIONS	1221
ZONE DESIGNATIONS	ZONE AE
CORPORATE LIMITS	Corporate Limits
COUNTY, PARISH, STATE OR INTERNATIONAL BOUNDARY	County Boundary

ELEVATION REFERENCE MARKS

NOTE: ALL ELEVATIONS ARE BASED ON NORTH AMERICAN VERTICAL DATUM OF 1988.
CONVERSION FACTOR 1988 NAVD = 1929 NGVD + 2.02'

I.D. NUMBER	ELEVATION (FT)	DESCRIPTION/LOCATION
1387	2491.21	BLM CADASTRAL BC UP 0.4FT, S 1/4 COR. OF SEC18, T5N, R6E
1388	2563.90	USGLO BC UP 1.2FT, SW COR. OF SEC18, T5N, R6E
1395	2551.50	USGLO BC UP 1.7FT, W 1/4 COR. OF SEC19, T5N, R6E

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



NO	REVISION	BY	DATE
2			
1			

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

RIO VERDE ADMP
FLOODPLAIN DELINEATION
RV WASH I &
RV WASH I TRIB 3
F.C.D. CONTRACT NO. 2001C056

Registered Professional Engineer (Civil) CERTIFICATE NO. 21684 BRIAN J. FRY ARIZONA, U.S.A.

Dibble Engineering

	BY	DATE
DESIGN	JWL	11/01/07
DESIGN CHK.	JEP	11/01/07
PLANS	JWL/RAK	11/01/07
PLANS CHK.	JEP	11/01/07

SHEET 20 OF 22

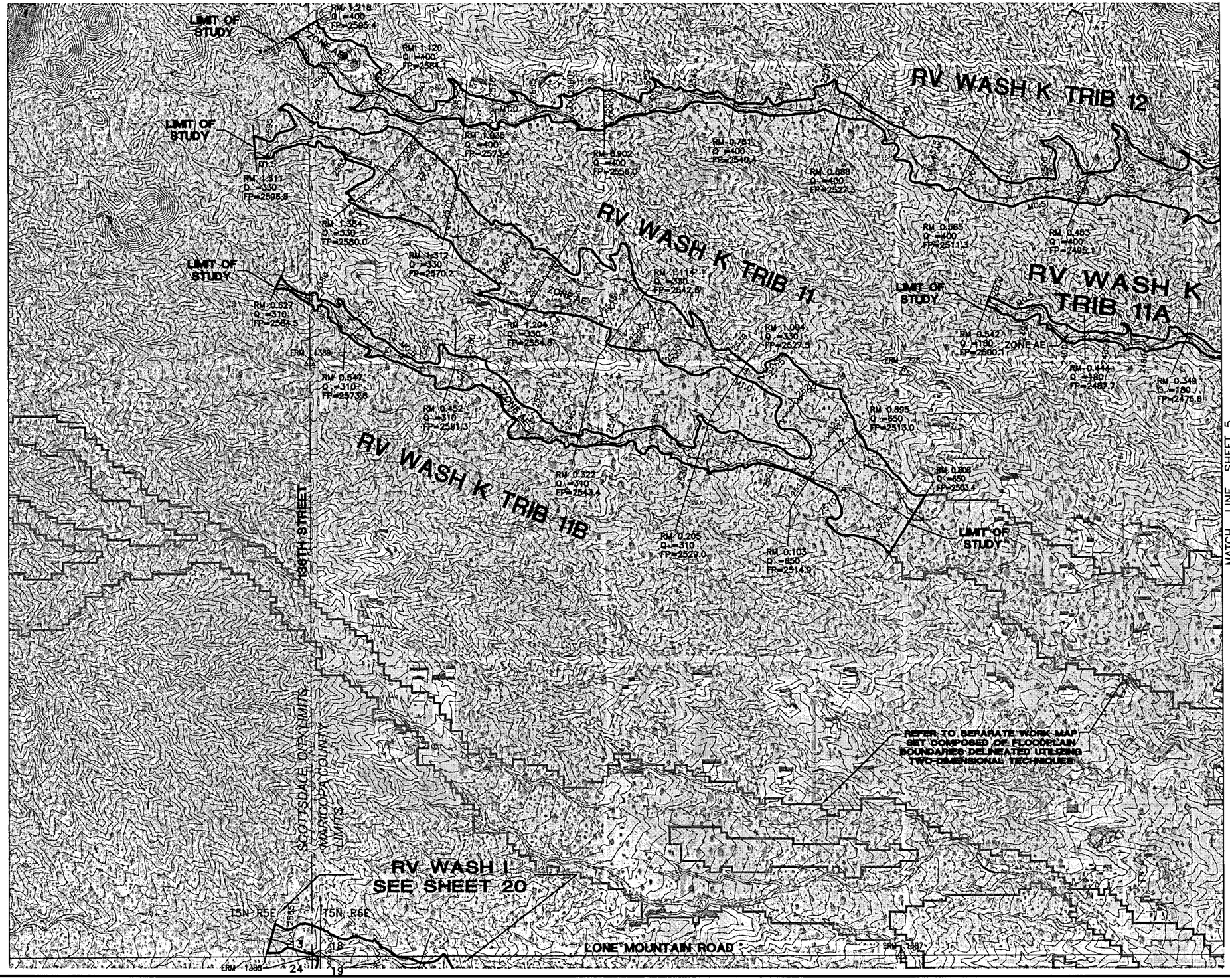
FILE:J:\2006\10-0606.1\CAD\plsh20.dwg DATE:Nov. 01 2007 TIME: 10:37 am

AERIAL PHOTOGRAPHY PROVIDED BY FCDMC.
2006 FLIGHT DATE.

THIS MAP WAS PREPARED BY PHOTOGRAMMETRIC METHODS TO NATIONAL MAP ACCURACY STANDARDS FOR 1"= 200' HORIZONTAL SCALE AND 2'CONTOUR INTERVALS.

AERIAL MAPPING PROVIDED BY FCDMC AND PERFORMED FOR FCDMC UNDER SEPARATE CONTRACTS. SEE TABLE ON THE COVER SHEET FOR MORE INFORMATION.

GROUND CONTROL SURVEY DATA PROVIDED BY FCDMC AND PERFORMED FOR FCDMC UNDER SEPARATE CONTRACTS. SEE TABLE ON THE COVER SHEET FOR MORE INFORMATION.



LEGEND

100-YR FLOODPLAIN BOUNDARY	
FLOODWAY BOUNDARY	
HYDRAULIC BASE LINE WITH RIVER MILE	M12.0 — M13.0
CROSS SECTION	CROSS SECTION DESIGNATION: RM 0.100; Q = CFS (100 YEAR DISCHARGE); FP= 1888.7 (FLOODPLAIN WATER SURFACE ELEVATION)
ELEVATION REFERENCE MARK	ERM XXX
BASE FLOOD ELEVATIONS	1221
ZONE DESIGNATIONS	ZONE AE
CORPORATE LIMITS	Corporate Limits
COUNTY, PARISH, STATE OR INTERNATIONAL BOUNDARY	County Boundary

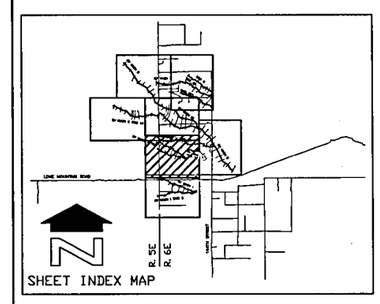
ELEVATION REFERENCE MARKS

NOTE: ALL ELEVATIONS ARE BASED ON NORTH AMERICAN VERTICAL DATUM OF 1988.
CONVERSION FACTOR 1988 NAVD = 1929 NGVD + 2.03'

I.D. NUMBER	ELEVATION (FT)	DESCRIPTION/LOCATION
1389	2581.58	USGLO BC UP 1FT, W 1/4 COR. OF SEC18, T5N, R6E
1387	2491.21	BLM CADASTRAL BC UP 0.4FT, S 1/4 COR. OF SEC18, T5N, R6E
1388	2563.90	USGLO BC UP 1.2FT, SW COR. OF SEC18, T5N, R6E
226	2512.88	SET NEAR C/4 S18 T5N R6E

N

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



NO.	REVISION	BY	DATE
2			
1			

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

RIO VERDE ADMP
FLOODPLAIN DELINEATION
RV WASH K TRIB 11, 11A, 11B;
& RV WASH K TRIB 12
F.C.D. CONTRACT NO. 2001C056

Registered Professional Engineer (Civil) Certificate No. 21684 BRIAN J. FRY Date Signed 11/01/07 ARIZONA, U.S.A.

Dibble Engineering

	BY	DATE
DESIGN	JWL	11/01/07
DESIGN CHK.	JEP	11/01/07
PLANS	JWL/RAK	11/01/07
PLANS CHK.	JEP	11/01/07

SHEET 21 OF 22

FILE:J:\2006\10-0606.1\CAD\plsh21.dwg DATE:Nov. 01 2007 TIME: 10:39 am

AERIAL PHOTOGRAPHY PROVIDED BY FCDMC.
2006 FLIGHT DATE.

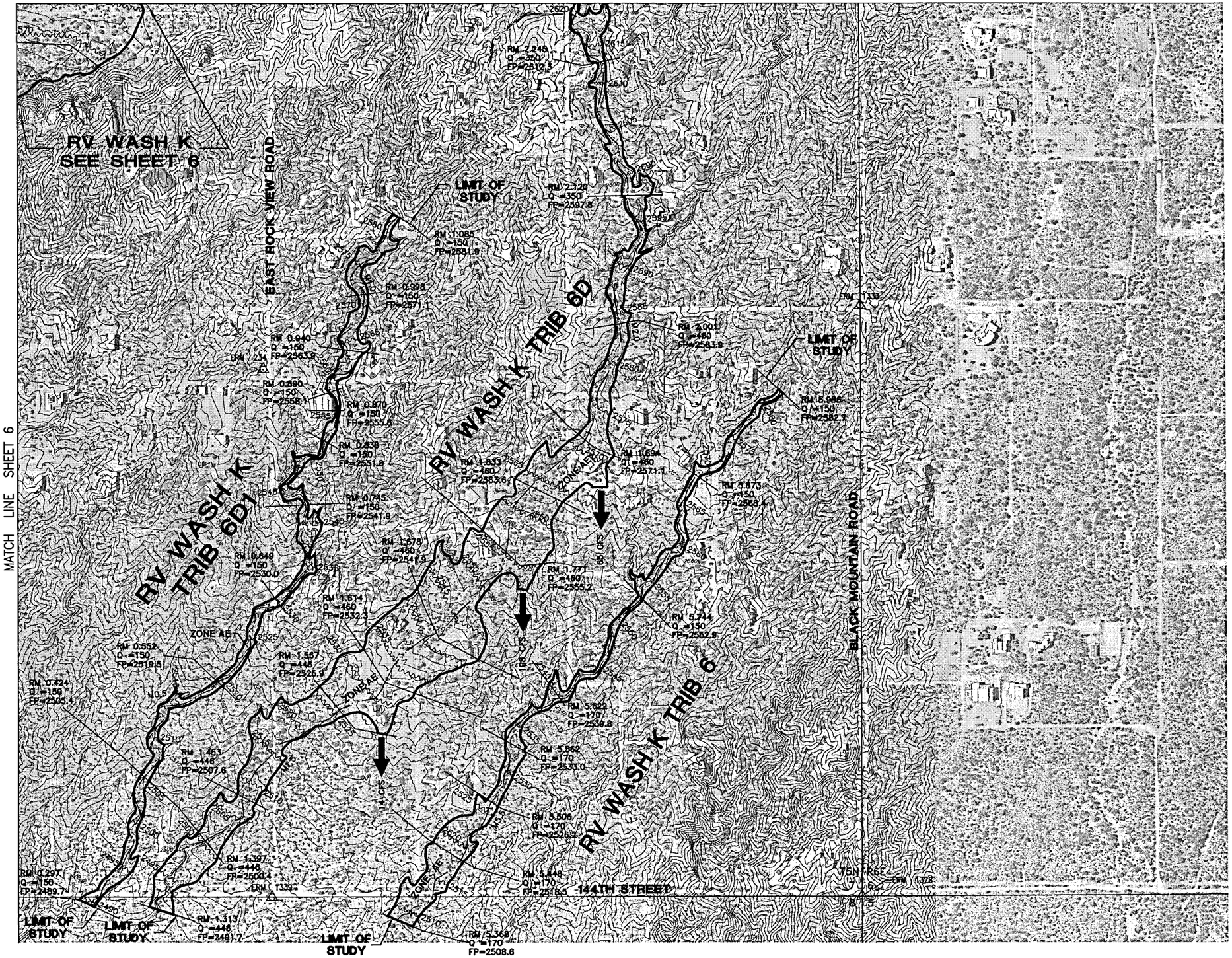
THIS MAP WAS PREPARED BY PHOTOGRAMMETRIC METHODS TO NATIONAL MAP ACCURACY STANDARDS FOR 1"= 200' HORIZONTAL SCALE AND 2'CONTOUR INTERVALS.

AERIAL MAPPING PROVIDED BY FCDMC AND PERFORMED FOR FCDMC UNDER SEPARATE CONTRACTS. SEE TABLE ON THE COVER SHEET FOR MORE INFORMATION.

GROUND CONTROL SURVEY DATA PROVIDED BY FCDMC AND PERFORMED FOR FCDMC UNDER SEPARATE CONTRACTS. SEE TABLE ON THE COVER SHEET FOR MORE INFORMATION.

MATCH LINE SHEET 8

MATCH LINE SHEET 6



LEGEND

100-YR FLOODPLAIN BOUNDARY	
FLOODWAY BOUNDARY	
HYDRAULIC BASE LINE WITH RIVER MILE	M12.0 — M13.0
CROSS SECTION	RM 0.100 (CROSS SECTION RIVER MILE DESIGNATION); Q = CFS (100 YEAR DISCHARGE); FP= 1888.7 (FLOODPLAIN WATER SURFACE ELEVATION)
ELEVATION REFERENCE MARK	ERM XXX
BASE FLOOD ELEVATIONS	1221
ZONE DESIGNATIONS	ZONE AE
CORPORATE LIMITS	Corporate Limits
COUNTY, PARISH, STATE OR INTERNATIONAL BOUNDARY	County Boundary

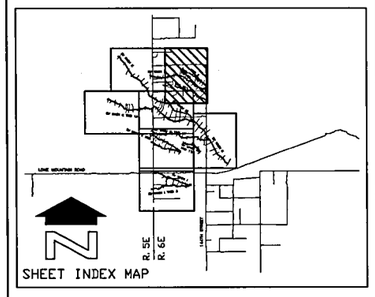
ELEVATION REFERENCE MARKS

NOTE: ALL ELEVATIONS ARE BASED ON NORTH AMERICAN VERTICAL DATUM OF 1988.
CONVERSION FACTOR 1988 NAVD = 1929 NGVD + 2.07'

I.D. NUMBER	ELEVATION (FT)	DESCRIPTION/LOCATION
1328	2520.39	BLM CADASTRAL BC UP 0.8FT
1333	2800.02	BLM CADASTRAL BC UP 0.5FT, N 1/4 COR. OF SEC7, T5N, R6E
1339	2502.40	BLM CADASTRAL BC UP 0.6FT, E 1/4 COR. OF SEC7, T5N, R6E
234	2561.80	FCDMC BC SET FLUSH NEAR CNTR OF SEC 7, T5N, R6E

N

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



NO	REVISION	BY	DATE
2			
1			

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

RIO VERDE ADMP
FLOODPLAIN DELINEATION
RV WASH K TRIB 6,
TRIB 6D, & TRIB 6D1
F.C.D. CONTRACT NO. 2001C056

Registered Professional Engineer (Civil) CERTIFICATE NO. 21684 BRIAN J. FRY Date Signed ARIZONA, U.S.A.

Dibble Engineering

	BY	DATE
DESIGN	JWL	11/01/07
DESIGN CHK.	JEP	11/01/07
PLANS	JWL/RAK	11/01/07
PLANS CHK.	JEP	11/01/07

SHEET 22 OF 22

FILE:J:\2006\10-0606.1\CAD\plsh22.dwg DATE:Nov, 01 2007 TIME: 10:40 am