CAMELBACK ROAD WASH FLOODPLAIN ANALYSIS

Loop 303 Corridor/White Tanks
Area Drainage Master Plan Update
Contract FCD 99-40

Prepared for

Flood Control District of Maricopa County

URS

URS Job No. E1-00001526

March 24, 2003

Federal Emergency Management Agency

Washington, D.C. 20472

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The Honorable Elaine M. Scruggs
Mayor, City of Glendale
5850 West Glendale Avenue
Glendale, AZ 85301

IN REPLY REFER TO:
Case No.: 04-09-0318P
Community Name: City of Glendale, AZ
Community No.: 040045
Effective Date of This Revision: DEC 30 2004

CANALBACK RMD WASH

Dear Mayor Scruggs:

The Flood Insurance Study report and Flood Insurance Rate Map for your community have been revised by this Letter of Map Revision (LOMR). Please use the enclosed annotated map panel(s) revised by this LOMR for floodplain management purposes and for all flood insurance policies and renewals issued in your community.

Additional documents are enclosed which provide information regarding this LOMR. Please see the List of Enclosures below to determine which documents are included. Other attachments specific to this request may be included as referenced in the Determination Document. If you have any questions regarding floodplain management regulations for your community or the National Flood Insurance Program (NFIP) in general, please contact the Consultation Coordination Officer for your community. If you have any technical questions regarding this LOMR, please contact the Director, Federal Insurance and Mitigation Division of the Department of Homeland Security's Federal Emergency Management Agency (FEMA) in Oakland, California, at (510) 627-7103, or the FEMA Map Assistance Center toll free at 1-877-336-2627 (1-877-FEMA MAP). Additional information about the NFIP is available on our website at http://www.fema.gov/nfip.

Sincerely,

Max H. Yuan, P.E., Project Engineer
Hazard Identification Section
Mitigation Division
Emergency Preparedness
and Response Directorate

For: Doug Bellomo, P.E., CFM, Acting Chief
Hazard Identification Section
Mitigation Division
Emergency Preparedness
and Response Directorate

List of Enclosures:
- Letter of Map Revision Determination Document
- Annotated Flood Insurance Rate Map
- Annotated Flood Insurance Study Report

cc: (See attached list.)

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Registered Professional Engineer (Civil) CERTIFICATE NO. 21674 ROBERT L. DAVIES Date Signed 11-04-02 ARIZONA, U.S.A.

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Registered Professional Engineer (Civil)
CERTIFICATE NO.
21874
ROBERT L.
DAVIES
Date Signed 11-04-02
ARIZONA, U.S.A.

1.0 INTRODUCTION

1.1 PURPOSE OF STUDY

This study is for the delineation of the 100-year floodplain for Camelback Wash located within Maricopa County, Arizona. The purpose of this work is to apply for and ultimately receive a Letter of Map Revision (LOMR) or a Physical Map Revision from the Federal Emergency Management Agency (FEMA). Updated hydrologic analysis and recent field survey data were used in this study. The analysis and survey took place after the effective Flood Insurance Study (FIS) hydraulic models were developed.

1.2 AUTHORITY FOR STUDY

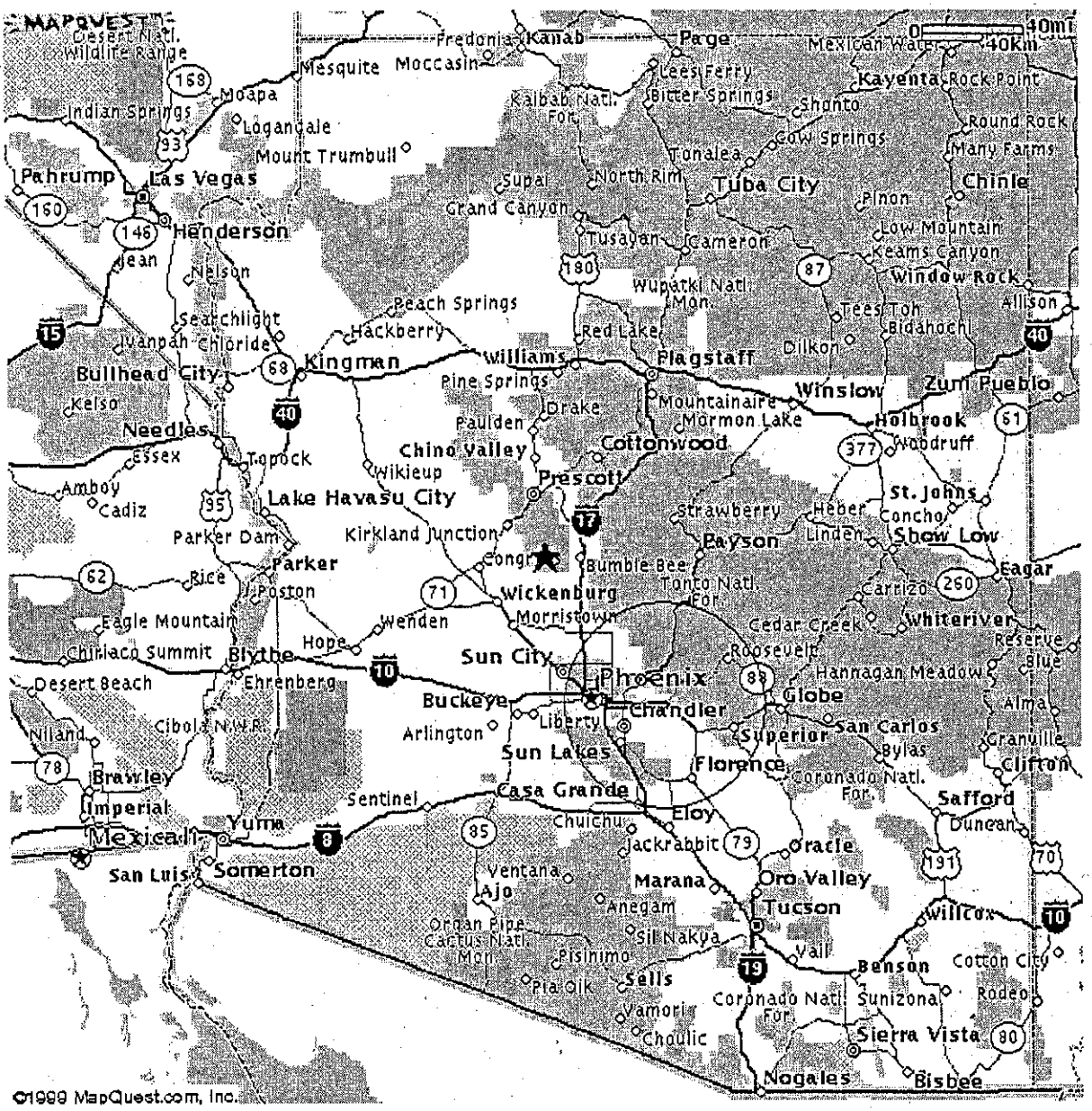
Under contract number FCD 99-40, URS Corporation was tasked by the Flood Control District of Maricopa County (FCDMC) to perform this floodplain study. The FCDMC floodplain Project Manager is Mr. Michael Duncan, P.E.

1.3 LOCATION

A general location map and a vicinity map are shown in Figures 1.3.1 and 1.3.2. The study covers the I-10 Culvert Wash which has the following location description:

TABLE 1-1
LOCATION OF THE STUDY WASH

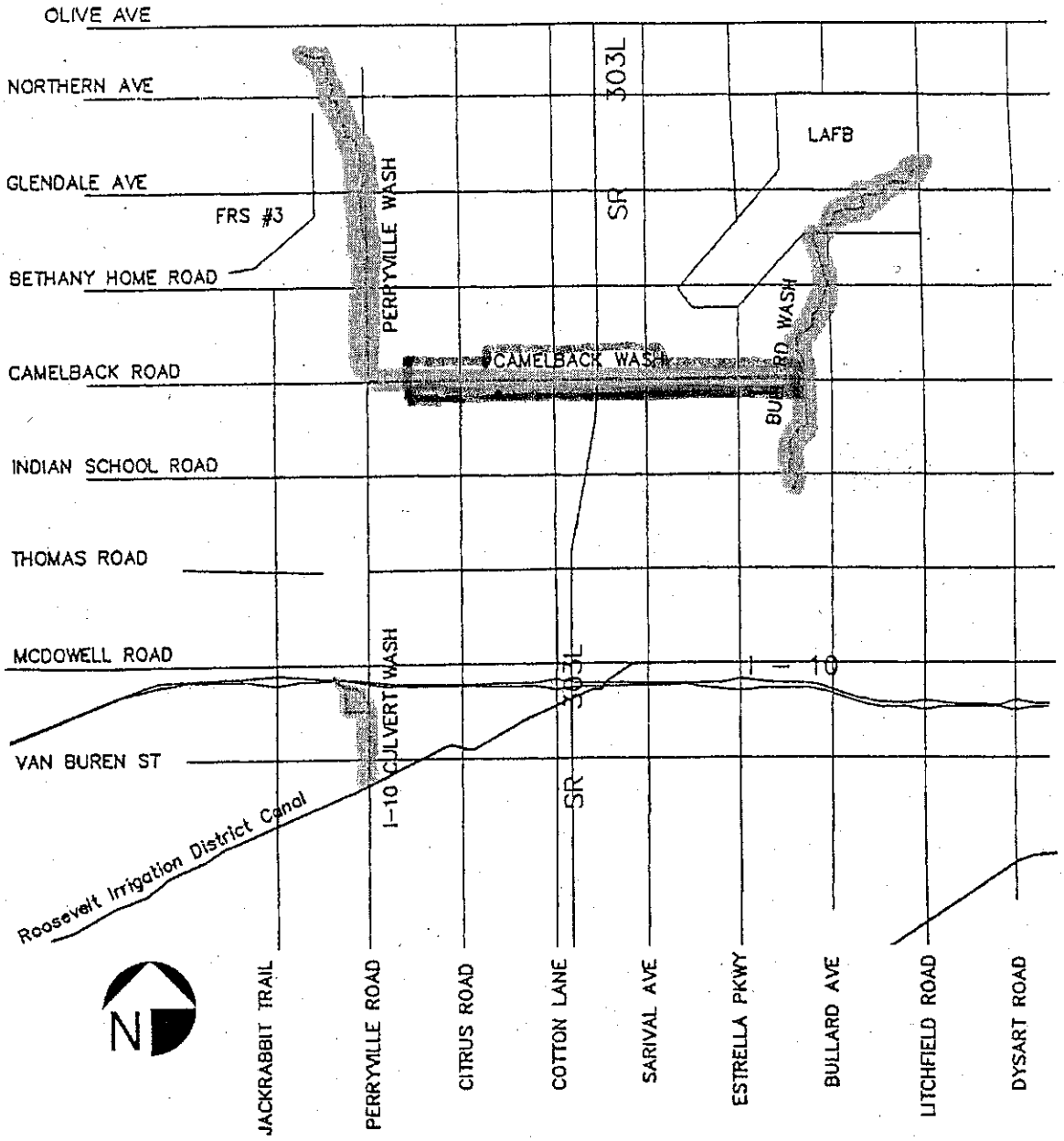
Wash	Section	Township	Range	Community(ies)	County
Camelback	13, 14, 18, 17	T2N	R1W, R2W	Maricopa County Unincorporated Areas, City of Glendale, City of Goodyear.	Maricopa County



Location Map

URS

Figure 1.3.1



Vicinity Map

URS

Figure 1.3.2

1.4 *METHODOLOGY*

The hydrologic analysis was originally performed by the WLB Group and has recently been updated by URS as part of the Loop 303 Corridor/White Tanks Area Drainage Master Plan Update (ADMP). The WLB study was submitted in 1992. Flow rates from the updated hydrologic model were used in the hydraulic analysis, which was conducted by step backwater calculations using the United States Army Corps of Engineers (USACE) HEC-RAS River Analysis System, Version 3.0.1.

1.5 ACKNOWLEDGEMENT

The FCDMC played an integral part in the accurate and timely conclusion of this study through maintaining effective and open channels of communication and valuable technical input.

1.6 RESULTS

This study incorporates the revised discharges resulting from an update to the Loop 303 Corridor/White Tanks Area Drainage Master Study. In summary, this study resulted in floodplain delineation for the Camelback Wash based on the updated flow rates. An detailed study has not previously been reviewed, accepted and mapped by FEMA. The hydraulic analyses, results and floodplain maps for this wash are included as part of this TDN.

2.0 ADWR/FEMA FORMS

2.1 STUDY DOCUMENTATION ABSTRACT

2.1.1 Date Study Accepted

Not determined as of date of submittal to FCDMC.

2.1.2 Study Contractor

URS Corporation
7720 N. 16th Street, Suite 100
Phoenix, Arizona 85020
Contact: Elliot Silverston, PhD, P.E.
Phone: (602) 371-1100
Fax: (602) 371-1615
Contract No. FCD 99-40

2.1.3 FEMA Mapping and Coordination Contractor

Michael Baker Jr., Inc.
3601 Eisenhower Avenue, Suite 600
Alexandria., Virginia 22304
Phone: (703) 960-8800
Fax: (703) 329-3023

2.1.4 FEMA Regional Reviewer

Not Applicable

2.1.5 State Technical Reviewer

Not Applicable

2.1.6 Local Technical Reviewer

Mr. Michael Duncan, P.E.
Flood Control District of Maricopa County
2801 West Durango Street
Phoenix, Arizona 85009
Phone: (602) 506-4732
Fax: (602) 506-4601

2.1.7 *Reach Description*

This study will result in the following:

- Camelback Wash: new delineation using detailed methods between ½ a mile east of Perryville Road downstream (east) to the intersection of Camelback Wash with Bullard Wash, approximately 2/3 of a mile east of Reems Road.

The study affects the following FIRM panels for Maricopa County and Incorporated Areas:

- Camelback Wash: FIRM panels 1590 and 1595.

2.1.8 USGS Quad Sheets

TABLE 2-1
USGS QUAD SHEETS COVERING THE STUDY AREA

Quadrangle Name	Photorevision Date	Size
Waddell	1971	7.5

2.1.9 Unique Conditions and Problems

A discussion of these problems is included in Section 5.7: Problems Encountered during the Study.

2.1.10 Coordination of Peak Discharges

Coordination related to peak discharges was done with the FCDMC as part of the ADMP Update.

2.2 FEMA FORMS

The latest version of the FEMA Certification forms dated September 2002 have been completed and included in the TDN.

2.3 HYDROLOGY

An update to the original hydrology (White Tanks ADMS) was done by URS under Contract No. FCD 99-40. A copy of the FCDC approved existing conditions hydrologic analysis has been included as part of this LOMR request.

2.3.1 Model or Method Used (see attached supporting hydrologic documentation)

HEC-1 Version 4.1 USACE.

2.3.2 *Storm Duration*

24-hour storm.

2.3.3 *Hydrograph Type*

Phoenix Valley S-Graph.

2.3.4 Frequencies Determined

100-year.

2.3.5 List of Gages Used in Frequency Analysis or Calibration

No gages were utilized. Calibration was not performed as part of this study.

2.3.6 Rainfall Amounts and Reference

A value of 4.03 inches was used for the 100-year 24-hour precipitation. This precipitation was taken from data excerpted from the NOAA Atlas II and included in the FCDMC Hydrology manual. The area reduction factor was taken from the depth-area reduction factor Table2.1A in the Drainage Design Manual for Maricopa County Volume I – Hydrology.

2.3.7 Unique Conditions and Problems

The Loop 303 Corridor/White Tanks watershed covers an approximate 220 square mile watershed with widely varying terrain, groundcover and land use. The watershed includes three large flood retarding structures constructed in the 1950s.

2.3.8 Coordination of Q's

The White Tanks HEC-1 model was reviewed by URS and updated using more detailed comprehensive land use, soils mapping, and currently accepted variable Green & Ampt soils parameters. The updated model was then submitted to the FCDMC for technical review and comment. The comments were incorporated. Pre-final coordination of discharges in October 2002. The contact person at the FCDMC is Mr. Bill Haas P.E.

2.4 HYDRAULICS

2.4.1 Model or Method Used

The United States Army Corps of Engineers (USACE) HEC-RAS River Analysis System, Version 3.0.1 was used for this study.

2.4.2 Regime

The flow regime used throughout the study was subcritical.

2.4.3 Frequencies for which Profiles were Computed

Profiles were developed for the 100-year flood only.

2.4.4 Method of Floodway Calculation

The initial floodway calculation was conducted using Method 4 (equal conveyance). Method 1 was then used to smooth the results of Method 4 by adjusting the left and right stationing for encroachment.

2.4.5 Unique Conditions and Problems

A discussion of these problems is included in Section 5.7: Problems Encountered during the Study.

2.5 ADDITIONAL STUDY INFORMATION

Not applicable.

3.0 SURVEY AND MAPPING INFORMATION

3.1 FIELD SURVEY INFORMATION

Field survey to obtain cross section information at each of the four washes was carried out by a URS Corp. survey team. The work started in August 2001 and was concluded by June 2002. The data that was collected and processed included:

1. Horizontal control for survey cross-sections used the adjusted state plane coordinate system. (NAD 1983 coordinate system)

2. Vertical control for survey cross-sections was collected in the NAVD 88 datum). A conversion factor applied to this data to convert it from NAVD 88 to NGVD 29.

3. Culvert structures were surveyed.

A copy of survey data was delivered to FCDMC in November 2002 and included the horizontal and vertical control and survey cross-sections.

3.2 MAPPING

The floodplain analysis was performed based on cross-section data collected as part of this study. Floodplain mapping was delineated using the original White Tanks ADMS base mapping. This study which was completed in 1992 utilized aerial mapping performed for that study. The map scale is 1"=400' with a 2' contour interval. The cross-section alignments collected as part of the URS study are plotted on the 1992 base mapping. The original mapping was established using a NAD 27 horizontal datum and a NGVD 29 vertical datum. The FCDMC translated the NAD horizontal datum to NAD 83 state plane coordinate system and provided it to URS for this project. An average vertical datum shift from NAVD 88 to NGVD 29 is -1.78 feet.

4.0 HYDROLOGY

4.1 METHOD DESCRIPTION

The hydrologic model utilized for this study was the HEC-1 rainfall-runoff model developed by the USACE. Version 4.1 was utilized in this study.

4.2 PARAMETER ESTIMATION

4.2.1 Drainage Area Boundaries

The main drainage area boundaries include the White Tank Mountains on the west side, the Gila River on the south side, the Agua Fria River on the east side, McMicken Dam on the northwest side and US 60 on the northeast side of the watershed boundary. See the attached 11"x17" watershed subbasin map.

4.2.2 Watershed Work Maps

1. Subbasin boundaries and concentration points: See the attached 11"x17" watershed boundary map. The subbasin boundary for the wash of interest can be established by starting at the concentration point on the Subbasin Map of interest, and including all the subbasins upstream which contribute to this concentration point. This is accomplished by including the super basin boundary shown on the Subbasin Map above the starting point of interest. In addition to this any diversions across the super basin boundaries require that super basin also be added to the contributing area for the wash of interest.

2. Time-of-concentration- or lag flow paths: Data, calculations, computer printouts, and summary tables of the time of concentration parameters are included in the hydrologic backup.

3. Hydrograph routing paths: (see 2)

4. Soils boundaries: The soils boundaries and land use boundaries are variable within the watershed. The FCDMC used GIS coverages of both the soils and land use data to overlay this information on a single map. From this composite GIS layering a weighted average RTIMP parameter was determined per subbasin. This parameter was used in the LG record for each subbasin. The FCDMC provided the RTIMP parameters for use in this ADMP Update. Summary tables are provided in the hydrologic backup.

5. Land-use boundaries: See 4.

4.2.3 Gage Data

None used

4.2.4 Statistical Parameters

A statistical discharge frequency analysis was not performed for this ADMP Update. The scope was to update the rainfall runoff model in areas where there had been changes since the original study performed by WLB. Stream gage data is not available for this watershed. The Phoenix Valley S-graph was used to compute the unit hydrographs and is based on a statistical analysis of streamflow in and around Maricopa County (U.S. Army Corps of Engineer, 1974).

4.2.5 Precipitation

The White Tanks watershed is approximately 220 square miles in size. The severe flooding that occurred in the early 1950's, 1970's and 1990's was the impetus for the major flood control structures that are in place today. In the early 1950's severe flooding created standing water which spread throughout the watershed. This flooding led to the construction of three flood retarding structures and a major drain to alleviate the standing water during floods. These structures are the Flood Retarding Structures No. 3 and No. 4, and the McMicken Dam. The major drain is the Dysart Drain along Northern Avenue.

In the early 70's there was also significant flooding which occurred. Due to groundwater overpumping throughout several decades, significant subsidence occurred which diminished the capacity of the Dysart Drain and contributed to the flooding of Luke Air Force base. The drain was improved in 1995, to provide conveyance for stormwater runoff resulting from the 100-year flood.

4.2.6 Physical Parameters

See supporting documentation. The Green Ampt methodology was utilized to determine rainfall losses. See discussion under section 4.2.2 (4 & 5) describing how soils and land use data and the use of a GIS database was used to establish RTIMP values for all subareas. This study is an ADMP Update to the White Tanks Study done in 1992. All physical parameters were not reestablished for the URS study, only those that had changed.

4.3 PROBLEMS ENCOUNTERED DURING THE STUDY

4.3.1 Special Problems and Solutions

No special problems were encountered outside the TDN outline.

4.3.2 Modeling Warning and Error Messages

Occasionally routing warning messages occurred for either a subarea channel routing or a storage routing stating that the "routed outflow is greater than that given in the table provided". Usually, a close examination and correction of the NSTPS parameter for the normal depth routing eliminated this warning. In some cases even with the adjustment of the NSTPS parameter and time interval it is difficult to eliminate the warning message. In other cases elimination of the warning message did not change the routed discharge. The impact and significance of all the messages was examined. The effect on the accuracy of the results varied. For large differences

routing parameters were examined closely and revised. Hydrologic calibration was not performed.

4.4 FINAL RESULTS

4.4.1 Hydrologic Analysis Results

See attached supporting documentation for summary results.

4.4.2 Verification of Results

In the 1992 White Tanks study in the Section entitled Calibration, WLB discusses methods by which results were compared to several and hydraulic analyses to determine whether the results seemed reasonable. In some cases differences were due to modeling techniques, in other cases differences were attributed to a difference in precipitation amounts. In some instances the loss rate used was different. An SCS Curve number loss rate was used in some studies while WLB used the Green Ampt method. Additional verification efforts were not performed as part of the URS study and were not in the scope of work.

5.0 HYDRAULICS

5.1 METHOD DESCRIPTION

This study reach is as follows:

- Camelback Wash: new delineation using detailed methods between ½ a mile east of Perryville Road downstream (east) to the intersection of Camelback Wash with Bullard Wash, approximately 2/3 of a mile east of Reems Road.

In general, the above reaches pass through sparsely populated areas of Maricopa County. The channel beds are sandy with gravel and small cobbles. The overbank areas range from undisturbed desert to cotton fields, with some exceptions of larger trees at some locations. Photo logs were organized as part of the Manning's 'n' report and provide a good overview of the physical characteristics of the study area.

The USACE hydraulic model HEC-RAS Version 3.0.1 was used for this study to calculate the Base Flood Elevations (BFEs) using step backwater calculations. The name of the HEC-RAS electronic file for this wash is listed below:

Camelback Wash: Camelbackfinalrev.prj

The starting water surface elevation was calculated using the normal depth method.

5.2 WORK STUDY MAPS

The following maps are included:

- 11" x 17" report figure showing a general overview of the study area, floodplain delineation reaches, and key features of the study area.
- 11" x 17" figures of reduced scale work-study maps.
- Full scale work-study maps.

The work maps for this study are full size (24" x 36") sheets. 1"=400' was used at a contour interval of 2 ft. The maps show a hydraulic baseline, which was also identified as the station 10,000 line for all the cross sections.

The floodplain delineation was generated using the computed water surface elevations from HEC-RAS and the available 2-ft contour maps. These floodplains were then traced using AutoCAD to create electronic files. BFEs are shown on all floodplains.

5.3 PARAMETER ESTIMATION

5.3.1 Roughness Coefficients

Manning's 'n' values were estimated based on field reconnaissance and photo logs, and according to the procedure in the reference *"Estimated Manning's Roughness Coefficients for Stream Channels and Floodplains in Maricopa County, Arizona"*, which was developed by the USGS in 1991 for the FCDMC. A Manning's 'n' values determination report including all calculations and assumptions used was developed and submitted to the FCDMC.

For most of the study cross sections the n values were fairly uniform and applied through HEC-RAS to the main channel and the left and right overbank areas. In some areas, horizontal variations were applied to the cross section geometry to reflect unique conditions such as buildings.

5.3.2 Expansion and Contraction Coefficients

Expansion and contraction coefficients used were 0.1 and 0.3 for all the study washes. Typical values of 0.3 and 0.5 were used at culvert crossings for the two cross sections immediately upstream of the culvert and the cross section immediately downstream of the culvert crossing.

5.4 CROSS SECTION DESCRIPTION

Cross sections were chosen to be at approximately 500-ft spacing and immediately upstream and downstream of culvert crossings. The orientation of the cross sections was at a right angle to the expected 100-year flow. Geometry data for the cross sections were obtained through field survey.

5.5 MODELING CONSIDERATIONS

5.5.1 Hydraulic Jump and Drop Analysis

No hydraulic jumps or drops occurred.

5.5.2 Bridges and Culverts

No bridge crossings existed in this study, only culvert crossings. Culvert modeling in HEC-RAS was used to model all the culvert crossings. All culverts were modeled as clean culverts and the geometry of the cross sections at the upstream and downstream faces of the culvert were amended to reflect such conditions. As built dimensions were obtained by field survey. A list of all culverts is included here:

Camelback Wash:

- At Citrus Road and Camelback: CMP culvert consisting of two pipes of 4-ft and 2-ft diameters.

- At 175th Ave and Camelback: concrete 3-ft diameter pipe.
- At Cotton Lane and Camelback: concrete box culvert consisting of two 8'x4' boxes.
- At Loop303 and Camelback: concrete box culvert consisting of two 8'x3' boxes.
- At Sarival Road: CMP culvert two 4-ft pipes and two 7'x5' ellipses.
- At Alsup Road: CMP culvert consisting of three 5-ft and two 4-ft pipes.

5.5.3 Levees and Dikes

No certified levees exist in the study area.

5.5.4 Islands and Flow Splits

Camelback Wash

There were several location where the computed water surface elevation exceeded the wash bank on the south side causing split flows. To quantify these split flows lateral weir analyses were performed at these location. These flow splits occurred between 183 rd Avenue extended on the upstream end of the reach and Alsup Road on the downstream end of the study reach. The computed 100-year split flow discharges are shown on the work maps. Eight lateral weirs were utilized to model the split flows along Camelback Wash. A detailed discussion on how these models were developed and how the results from each lateral weir were used model the final floodplain model for Camelback Wash is included in the HEC-RAS report Section of the TDN. Divided flow messages occur where localized high ground rises above the CWSEL.

5.5.5 Ineffective Flow Areas

A blocked obstruction area was defined at cross-sections 26, 25, 24 to code out a vertical ineffective area which is used as a pump-back pond. An ineffective area was defined in the left overbank area of cross-section 1. No other areas of ineffective flow were defined.

5.5.6 Supercritical Flow

There were no reaches of supercritical flow in this model. Two isolated cross sections had a Froude number equal to one, sections 16.9 at the outlet of a culvert and 20.

5.6 FLOODWAY MODELING

There was no floodway developed for this wash.

5.7 PROBLEMS ENCOUNTERED DURING THE STUDY

5.7.1 Special Problems and Solutions

A description of some of the special problems encountered during the study are listed below and divided into general problems and wash specific problems:

General Problems:

- In the beginning of the study test sections were surveyed at several locations of the study area to evaluate the accuracy of the available topographic mapping (1989 topographic maps provided by the FCDMC). The results of this comparison showed several areas were the differences warranted surveying of all the cross sections on all the washes. However, whenever field surveyed cross sections needed to be extended, or cross sections needed to be developed to provide additional needed detail, attention was paid to the correspondence between the survey data and topographic information in the neighboring areas.

- Almost all of the culverts in the study area showed accumulation of sediments at the culvert reducing its capacity. The FCDMC has requested that all culverts be modeled as "clean" and that the cross sections immediately upstream and downstream of the structure reflect such conditions. This entailed adjusting the surveyed ground data for these cross sections in the vicinity of the culverts to match the invert elevations of the culverts.

Wash-specific problems:

Camelback Wash:

The topography in the area of Camelback Wash slopes away (southeasterly) from Camelback Road and leads to flow breakouts from the channel running along the north side of the road. A HEC-RAS hydraulic analysis using Camelback Road as a weir was utilized to estimate flow capacity of the channel and areas north of the road. It also estimates the quantity of flow lost by weir flow over Camelback Road.

Several cross sections were surveyed across Camelback Road and include elevations for the top of the road. This information was used to develop a road profile, which defined the weir input-data for the HEC-RAS model. Due to model limitations HEC-RAS does not accept a weir that spans over more than eight cross sections or a model having more than two weirs. More than two concurrent weirs in the same model prevents numeric convergence. To resolve this issue, eight HEC-RAS models were developed with one weir in each model.

Flow data used in the first model utilized the existing conditions HEC-1 analysis. This analysis was done as part of the Loop 303 / White Tanks Area Drainage Master Plan (ADMP) Update project under Contract FCD 99-40. The resulting flow rates continuing east in the output of the first weir model are lower than those of the input. These resulting flow rates account for flow discharging over Camelback Road. The output flow rates from the first model are used as the input for the second model. The second model uses a weir to cover the next few cross sections

downstream of the weir used in the first model. The flow rates reflecting the effect of the second weir in the second model (output flow rates) are used as the input flow rates for the third model, and so on. All of these models take into account local runoff between the main concentration points.

An HEC-RAS model that utilizes the remaining flow rates in the channel, which reflect weir flow over Camelback Road was developed without including weirs. This is the final model and was used in delineating the floodplain for Camelback Wash.

The supporting calculations include sections presented in the following sequence:

1) HEC-RAS report, output tables, water surface profile, cross section plots, reach boundary conditions, and CHECK-RAS reports for the final HEC-RAS model. This model includes the results of the flow breakout analysis from the eight initial runs.

The weir flow analysis was included in the hydrology section, since it was an integral part of estimating the flow rates to be used in the final hydraulic model. This section also includes a summary of total and local inflow rates at the different concentration points used in the hydraulic models. Tables summarizing the results of the eight HEC-RAS runs and how the flow rates for the different runs were calculated are included in this section. A hand check was done using 15 iterations to evaluate the accuracy of the results of the HEC-RAS weir analysis.

5.7.2 Modeling Warning and Error Messages

The CHECK-RAS program was run and the majority of all warning messages were addressed. The HEC-RAS warning messages were also reviewed. All error messages were reviewed and eliminated. The warning messages were reviewed and eliminated wherever possible.

5.8 CALIBRATION

Calibration was not performed.

5.9 FINAL RESULTS

5.9.1 Hydraulic Analysis Results

Summary tables are provided in the TDN.

5.9.2 Verification of Results

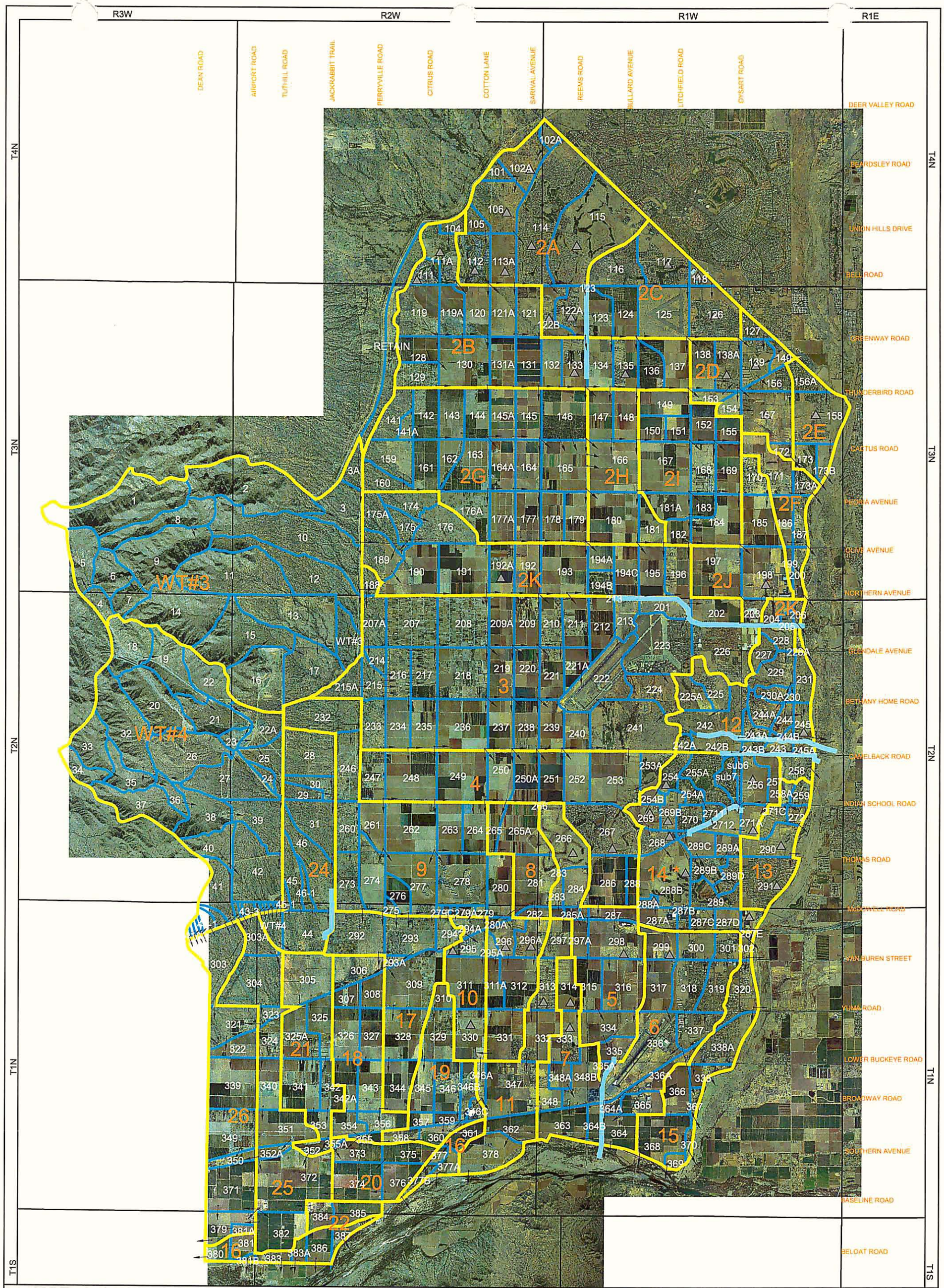
No previous studies have been performed in this area. There is no effective study. As discussed in Section 5.7.1 a manual weir example calculation was performed to verify the output of a lateral weir calculation in HEC-RAS.

6.0 EROSION AND SEDIMENT TRANSPORT

Sediment transport was not performed for this study.

7.0 DRAFT FIS REPORT DATA

The Draft FIS Report Data section in the TDN contains a draft Summary of Discharges results table, an annotated FIRM map, and a Flood Profile.



Legend

- Super Basin Boundary
- Drainage Area Boundary
- 2C Super Basins
- Flow Path
- Retention
- Sub-basin Identification No.
- Off-line Detention Basin
- Existing Flood Control Facility

1 0 1 2

Scale in Miles

Map Produced 06/08/01

SUB BASIN/AERIAL MAP
Loop 303 Corridor/White Tanks Area
Drainage Master Plan Update
Existing Condition

Figure 4.1

FLOOD CONTROL DISTRICT of MARICOPA COUNTY

URS

x:\loop303\e1-00001526\gis\aprs\11x17_photo.apr

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 480287	City of Katy Harris County	TX TX	480301 48201C	0005D 0220G	02/08/83 09/28/90
040037	Maricopa County	AZ	04013C	1590G	07/19/01
040037	Maricopa County	AZ	04013C	1595G	07/19/01

2. Flooding Source: Camelback Wash

3. Project Name/Identifier: Loop 303 White Tanks ADMP Update Floodpllain Delineations

4. FEMA zone designations affected: AE, X (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: $

☒ 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: Michael Duncan PE - Senior Engineer	Company: Flood Control District Maricopa County	
Mailing Address: 2801 West Durango Street Phoenix, Arizona 85009-6399	Daytime Telephone No.: 602-506-4732	Fax No.: 602-506-4601
	E-Mail Address: MWD@MAIL.MARICOPA.GOV	
Signature of Requester (required): Michael Duncan		Date: 11-10-03

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: Michael S. Ellegood, P.E., - Chief Engineer and General Manager		Telephone No.: 602-506-4700
Community Name: Maricopa County	Community Official's Signature (required):	Date: 12/1/03

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: Robert L. Davies Jr. P.E.	License No.: 21674	Expiration Date: 9-30-2005
Company Name: URS Corporation	Telephone No.: 602-648-2464	Fax No.: 602-371-1615
Signature: Robert L Davies Jr		Date: 11-04-02

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

Registered Professional Engineer (Civil) CERTIFICATE NO. 21674 ROBERT L. DAVIES Date Signed ARIZONA, U.S.A.

Seal (Optional)

FEDERAL EMERGENCY MANAGEMENT AGENCY

OVERVIEW & CONCURRENCE FORM

O.M.B No. 3067-0148
Expires September 30, 2005

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B. OVERVIEW

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480287	Harris County	TX	48201C	0220G	09/28/90
~~040037~~ 040045	City of Glendale	AZ	04013C	1590G	07/19/01
~~040037~~ 040045	City of Glendale	AZ	04013C	1595G	07/19/01

2. Flooding Source: Camelback Wash

3. Project Name/Identifier: Loop 303 White Tanks ADMP Update Floodplain Delineations

4. FEMA zone designations affected: AE, X (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: $

☒ 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

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	E-Mail Address: MWD@MAIL.MARICOPA.GOV	
Signature of Requester (required): Michael Duncan		Date: 11-10-03

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Community Official's Name and Title: Daniel A. Sherwood SENIOR CIVIL ENGINEER		Telephone No.:
Community Name: City of Glendale	Community Official's Signature (required): Daniel A. Sherwood	Date: 2-25-03

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: Robert L. Davies Jr. P.E.	License No.: 21674	Expiration Date: 9-30-2005
Company Name: URS Corporation	Telephone No.: 602-648-2464	Fax No.: 602-371-1615
Signature: Robert L Davies Jr		Date: 11-04-02

Ensure the forms that are appropriate to your revision request are included in your submittal.

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☐ Coastal Analysis Form (Form 4)	New or revised coastal elevations
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Registered Professional Engineer (Civil) CERTIFICATE NO. 21674 ROBERT L. DAVIES Date Signed ..... ARIZONA U.S.A. Seal (Optional)

FEDERAL EMERGENCY MANAGEMENT AGENCY

OVERVIEW & CONCURRENCE FORM

O.M.B No. 3067-0148
Expires September 30, 2005

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~~040037~~ 040046	City of Goodyear	AZ	04013C	1590G	07/19/01
~~040037~~ 040046	City of Goodyear	AZ	04013C	1595G	07/19/01

2. Flooding Source: Camelback Wash

3. Project Name/Identifier: Loop 303 White Tanks ADMP Update Floodpllain Delineations

4. FEMA zone designations affected: AE, X (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)

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   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: $

☒ No, Attach Explanation

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Mailing Address: 2801 West Durango Street Phoenix, Arizona 85009-6399	Daytime Telephone No.: 602-506-4732	Fax No.: 602-506-4601
	E-Mail Address: MWD@MAIL.MARICOPA.GOV	
Signature of Requester (required): Michael Duncan		Date: 11-10-03

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Community Official's Name and Title: David Ramirez City Engineer		Telephone No.: 623-882-7954
Community Name: City of Goodyear	Community Official's Signature (required): David J. Ramirez	Date: 4/21/03

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: Robert L. Davies Jr. P.E.	License No.: 21674	Expiration Date: 9-30-2005
Company Name: URS Corporation	Telephone No.: 602-648-2464	Fax No.: 602-371-1615
Signature: Robert L. Davies		Date: 11-04-02

Ensure the forms that are appropriate to your revision request are included in your submittal.

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☒ *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*

Registered Professional Engineer (Civil) CERTIFICATE NO. 21674 ROBERT L. DAVIES Date Signed ..... ARIZONA, U.S.A. Seal (Optional)

Explanation for Section C. Review Fee

The review fee is not included in this submittal. The Flood Control District of Maricopa County (FCDMC) submits their request package to FEMA. FEMA then assesses the review fees required, assigns a case number, and the FCDC submits the fee.

This study is a new study.

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: Camelback Wash
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)
no effective study			

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	no effective study			
Upstream Limit				

2. Hydraulic Method Used

Hydraulic Analysis HEC-RAS [HEC-2 , HEC-RAS, Other (Attach description)]

FLOOD CONTROL DISTRICT
of
Maricopa County

2801 West Durango Street • Phoenix, Arizona 85009-6399
Telephone (602) 506-1501
Fax (602) 506-4601
TT (602) 506-5897

BOARD OF DIRECTORS
Fulton Brock
Andrew Kunasek
Don Stapley
Mary Rose Garrido Wilcox
Max W. Wilson

July 3, 2002

RE: Loop 303 / White Tanks Floodplain Studies

Dear Sir or Madam:

The hydrologic modeling for the referenced project has been approved by the Flood Control District of Maricopa County.

Project name:	Loop 303 White Tanks Area Drainage Master Plan Update
Consultant name:	URS
Date of model:	March 27, 2002
HEC-1 ver.:	V. 4.1 June 1998

If you have any questions or if we can be of further assistance, please contact me at 506-1501.

Sincerely,

William Haas P.E.
Civil Engineer
Flood Control District of Maricopa County

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:	Floodway File Name:
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 STRUCTURES FORM

O.M.B. No. 3067-0148
Expires September 30, 2005

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Flooding Source: Camelback Wash
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: Citrus Road Culvert**

   Type (check one): ☐ Channelization ☒ Bridge/Culvert ☐ Levee/Floodwall ☐ Dam

   Location of Structure: 36.9

   Downstream Limit/Cross Section: 36.4

   Upstream Limit/Cross Section: 37

2. **Name of Structure: 175 th Avenue Culvert**

   Type (check one): ☐ Channelization ☒ Bridge/Culvert ☐ Levee/Floodwall ☐ Dam

   Location of Structure: 31.9

   Downstream Limit/Cross Section: 31.4

   Upstream Limit/Cross Section: 32

3. **Name of Structure: Cotton Lane Culvert**

   Type (check one) ☐ Channelization ☒ Bridge/Culvert ☐ Levee/Floodwall ☐ Dam

   Location of Structure: 26.7

   Downstream Limit/Cross Section: 26.4

   Upstream Limit/Cross Section: 26.9

NOTE: For more structures, attach additional pages as needed.

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: Camelback Wash
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: Loop 303 Alignment Culvert**

   Type (check one): ☐ Channelization ☒ Bridge/Culvert ☐ Levee/Floodwall ☐ Dam

   Location of Structure: 22.3

   Downstream Limit/Cross Section: 22

   Upstream Limit/Cross Section: 23

2. **Name of Structure: Sarival Road Culvert**

   Type (check one): ☐ Channelization ☒ Bridge/Culvert ☐ Levee/Floodwall ☐ Dam

   Location of Structure: 16.9

   Downstream Limit/Cross Section: 16.4

   Upstream Limit/Cross Section: 17

3. **Name of Structure: Alsup Road Culvert**

   Type (check one) ☐ Channelization ☒ Bridge/Culvert ☐ Levee/Floodwall ☐ Dam

   Location of Structure: 10.7

   Downstream Limit/Cross Section: 10.4

   Upstream Limit/Cross Section: 11

NOTE: *For more structures, attach additional pages as needed.*

B. CHANNELIZATION

Flooding Source:

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: Camelback Wash

Name of Structure: Citrus Road 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.

B. CHANNELIZATION

Flooding Source:

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: Camelback Wash

Name of Structure: 175th Avenue 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.

B. CHANNELIZATION

Flooding Source:

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: Camelback Wash

Name of Structure: Cotton Lane 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.

B. CHANNELIZATION

Flooding Source:

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: Camelback Wash

Name of Structure: Loop 303 Alignment 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.

Explanation on availability of plans for this structure.

As-builts or design plans were not available for the structure. Surveyors picked up the location and dimensions for this structure. This information is included in the survey notes.

B. CHANNELIZATION

Flooding Source:

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: Camelback Wash

Name of Structure: Sarival Road 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.

B. CHANNELIZATION

Flooding Source:

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: Camelback Wash

Name of Structure: Sarival Road 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.

B. CHANNELIZATION

Flooding Source:

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: Camelback Wash

Name of Structure: Alsup Road 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.

Explanation on Sediment Transport Considerations

Culverts are periodically maintained by either the FCDMC or the appropriate local government maintenance staff. Culverts were modeled in a clean condition.

MT-2 Form 3 Pages 3 to 10 Section D through F

Explanation on Omission of pages 3 to 10.

Pages 3 to 10 are not applicable to this revision request and are omitted on purpose.

FLOODPLAIN

ADOPTION

LETTERS

Goodyear ARIZONA

April 21, 2003

Hazards Study Branch
Federal Emergency Management Agency
500 C Street SW
Washington, D.C. 20472

SUBJECT: Camelback Road Wash Floodplain Delineation Study

To Whom It May Concern:

I have reviewed the Letter of Map Revision (LOMR) package for the new floodplain of Camelback Road Wash. Concerning the portion of the LOMR that affects the City of Goodyear, as the person responsible for Floodplain Administration for the City of Goodyear, I will adopt, enforce, and regulate the floodplain.

Sincerely,

CITY OF GOODYEAR

David Ramirez
City Engineer

DR:at

Community Development Department - Engineering
190 North Litchfield Road P.O. Box 5100 Goodyear, Arizona 85338
623-932-3005 Fax 623-932-7748 1-800-872-1749 TDD 623-932-6500
www.ci.goodyear.az.us

GLENDALE

FLOOD CONTROL DISTRICT
RECEIVED
MAY 12 '03
CH & SY | FINANCE
PIO | LANDS
ADMIN | O & M
REG | P & PM
ENG | FILE
CONTRACTS
ROUTING MWD

May 8, 2003

Hazards Study Branch
Federal Emergency Management Agency
500 C Street SW
Washington, D.C. 20472

SUBJECT: CAMELBACK ROAD WASH FLOODPLAIN DELINEATION STUDY

To Whom It May Concern:

I have reviewed the Letter of Map Revision (LOMR) package for revising the floodplain of Camelback Road Wash. A portion of this floodplain lies within unincorporated Maricopa County Arizona but may be within the future City jurisdiction area upon annexation by the City. Concerning the portion of the LOMR that affects the City of Glendale, Arizona, as the person responsible for Floodplain Administration for the City of Glendale, I will adopt and enforce the related, modified regulatory floodway as it comes into the City's jurisdiction. The City does not assume liabilities or enforcement on areas that violate the floodplain regulations prior to coming into the City's jurisdiction.

Sincerely,

Larry J. Broyles, P.E.
City Engineer

DAS/LJB/kd

City of Glendale
Municipal Complex • 5850 West Glendale Avenue • Glendale, Arizona 85301-2599 • Phone (623) 930-2000
www.ci.glendale.az.us

FLOOD CONTROL DISTRICT
of
Maricopa County

2801 West Durango Street • Phoenix, Arizona 85009-6399
Telephone (602) 506-1501
Fax (602) 506-4601
TT (602) 506-5897

BOARD OF DIRECTORS
Fulton Brock
Andrew Kunasek
Don Stapley
Mary Rose Garrido Wilcox
Max W. Wilson

November 17, 2003

Hazards Study Branch
Federal Emergency Management Agency
500 C Street SW
Washington, D.C. 20472

SUBJECT: Camelback Road Wash Floodplain Delineation Study

To Whom It May Concern:

I have reviewed the Letter of Map Revision (LOMR) package for the new proposed floodplain for Camelback Road Wash. Concerning the portion of the LOMR that affects Unincorporated Maricopa County, as the person responsible for Floodplain Administration for Unincorporated Maricopa County, I will adopt and enforce the new proposed floodplain.

Yours truly,

Michael S. Ellegood, P.E.
Chief Engineer and General Manager

CORRESPONDENCE

FLOOD CONTROL DISTRICT
of
Maricopa County

2801 West Durango Street • Phoenix, Arizona 85009-6399
Telephone (602) 506-1501
Fax (602) 506-4601
TT (602) 506-5897

BOARD OF DIRECTORS
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Mary Rose Garrido Wilcox
Max W. Wilson

December 1, 2003

Pernille Buch-Pedersen
Regional Manager
Michael Baker Jr. Inc.
3601 Eisenhower Avenue, Suite 600
Alexandria, VA 22304

RE: Transmitting Camelback Road Wash Floodplain Delineation Study

Dear Ms. Buch-Pedersen:

I herewith submit for review and processing, a floodplain delineation study (two volumes, Floodplain Analysis and N-value Report) for Camelback Road Wash. This is a previously unstudied flooding reach. The upstream end of this study ties into the downstream end of the existing Perryville Road Wash floodplain, and the downstream end ties into the Bullard Wash floodplain.

A copy of the hydrology basis (entitled Loop 303/White Tanks Area Drainage Master Plan Update, November 4, 2002) for this delineation was sent to you in September 2003, as part of Case Number 03-09-1653P, Bullard Wash. A Survey Report for this area was also sent to you at that time.

AutoCAD 2000 dxf files are included at the back of the Floodplain Analysis volume. If you have any questions, please contact me at 602-506-4732, or mwd@mail.maricopa.gov.

Yours truly,

Michael Duncan

Michael Duncan, PE, CFM
Project Manager

Enclosures

cc: Max Yuan, P.E., Project Manager
Hazards Study Branch, Mitigation Directorate
Federal Emergency Management Agency
500 C Street SW
Washington, D.C. 20472-0001

Brian Cosson
Arizona State Floodplain Coordinator
Arizona Dept. of Water Resources
Office of Water Engineering
500 N 3rd ST
Phoenix, AZ 85004

Larry Broyles, P.E., City Engineer
Engineering Department
City of Glendale
5850 W Glendale Av, 3rd Floor
Glendale, AZ 85301-2599

David Ramirez, P.E., City Engineer
Community Development Dept. - Engineering
City of Goodyear
P.O. Box 5100
Goodyear, AZ 85338

Massoud Rezakhani, CFM
URS Corporation
7720 N. 16th St., Suite 100
Phoenix, AZ 85020

NATIONAL FLOOD INSURANCE PROGRAM

FEMA MAP COORDINATION CONTRACTOR

December 22, 2003

FLOOD CONTROL DISTRICT
RECEIVED
DEC 26 '03
CH & SW | FINANCE
PIO | LANDS
ADMIN | O & M
✓ REG | P & PM
ENG | FILE
CONTRACTS
ROUTING

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

IN REPLY REFER TO:
Case No.: 04-09-0318P
Communities: Cities of Glendale and Goodyear and Maricopa County, AZ
Community Nos.: 040045, 040046, and 040037

316-ACK.FRQ

Dear Mr. Duncan:

This responds to your request dated December 1, 2003, that the Department of Homeland Security's Federal Emergency Management Agency (FEMA) issue a revision to the Flood Insurance Rate Map (FIRM) for Maricopa County, Arizona and Incorporated Areas. Pertinent information about the request is listed below.

Identifier:	Loop 303, White Tanks ADMP Update, Floodplain Delineations
Flooding Source:	Camelback Road Wash
FIRM Panel(s) Affected:	04013C1590 G and 1595 G

FEMA has implemented a procedure to recover costs associated with reviewing and processing requests for modifications to published flood information and maps. Effective September 1, 2002, FEMA revised that fee schedule. A copy of the notice summarizing the current fee schedule, which was published in the *Federal Register*, is enclosed for your information. In accordance with this schedule, the fee for your request is $4,200 and must be submitted before we can continue processing your request. Payment of this fee must be made in the form of a check or money order, made payable in U.S. funds to the National Flood Insurance Program (NFIP), or credit card payment. For identification purposes, the case number referenced above must be included on the check or money order. We will not perform a detailed technical review of your request until we receive this payment.

Payment must be forwarded to one of the addresses listed below.

Using U.S. Postal Service:
Federal Emergency Management Agency
Fee-Charge System Administrator
P.O. Box 3173
Merrifield, VA 22116-3173

Using overnight service:
FEMA Fee-Charge System Administrator
c/o Dewberry & Davis
METS Division, Stop 19A
8401 Arlington Boulevard
Fairfax, VA 22031

We have completed an inventory of the items that you submitted. The items identified below are required before we can begin a detailed review of your request.

Our review of the submitted information revealed that the contour lines were not included on the work maps entitled "Loop 303 Corridor/White Tanks ADMP Update Flood Delineation Study F.C.D. Contract

No. 99-40," Sheets 35, 36, and 37 of 64, prepared by URS Corporation, dated October, 2002, and on the work maps in electronic format submitted on a diskette entitled "Camelback Road Wash Autocad 2000 dxf files," also prepared by URS Corporation, dated November 15, 2003. Please provide revised work maps, certified by a registered professional engineer, and work maps in electronic format that include contour lines that support the input data in the submitted Camelback Road Wash HEC-RAS model.

All required items (except the required fee) are to be submitted to us at the address shown at the bottom of the first page. If all required items are not submitted within 90 days of the date of this letter, we will treat any subsequent request as an original submittal, and it will be subject to all submittal/payment procedures.

If you are unable to meet the 90-day deadline for submittal of required items, and would like FEMA to continue processing your request, you must request an extension of the deadline. This request must be submitted to us in writing and must provide (1) the reason why the data cannot be submitted within the requested timeframe, and (2) a new date for the submittal of the data. FEMA receives a very large volume of requests and cannot maintain inactive requests for an indefinite period of time. Therefore, the fees will be forfeited for any request for which neither the requested data nor a written extension request is received within 90 days.

When you write us about your request, please include the case number referenced above in your letter.

If you have general questions about your request, FEMA policy, or the NFIP, please call the FEMA Map Assistance Center, toll free, at 1-877-FEMA MAP (1-877-336-2627). If you have specific questions concerning your request, please call the Revisions Coordinator for your State, Pernille Buch-Pedersen, who may be reached at (703) 317-6224.

Sincerely,

Andrea L. Ryon

Andrea L. Ryon, P.E., Director
Engineering Division
Michael Baker Jr., Inc.

Enclosure

cc: Mr. Michael Ellegood, P.E.
Chief Engineer and General Manager
Flood Control District of
Maricopa County

Mr. Daniel A. Sherwood, P.E.
Senior Civil Engineer
City of Glendale

Mr. David Ramirez, P.E.
City Engineer
Community Development
Department – Engineering
City of Goodyear

Ms. Shanna Yager, CFM
Principal
Floodplain Administration
Flood Control District of Maricopa County

Mr. Brian Cosson
NFIP Coordinator
Arizona Department of Water Resources

Mr. Massoud Razakhani, CFM
Project Engineer
URS Corporation

Federal Emergency Management Agency

Washington, D.C. 20472

FEE SCHEDULE FOR PROCESSING REQUESTS FOR MAP CHANGES

This notice contains the revised fee schedule for processing certain types of requests for changes to National Flood Insurance Program (NFIP) maps. The change in the fee schedule will allow FEMA to further reduce the expenses to the NFIP by more fully recovering the costs associated with processing conditional and final map change requests. The revised fee schedule for map changes is effective for all requests dated September 1, 2002, or later and supersedes the current fee schedule, which was established on June 1, 2000.

To develop the revised fee schedule for conditional and final map change requests, FEMA evaluated the actual costs of reviewing and processing requests for Conditional Letters of Map Amendment (CLOMAs), Conditional Letters of Map Revision – based on Fill (CLOMR-Fs), Conditional Letters of Map Revision (CLOMRs), Letters of Map Revision – based on Fill (LOMR-Fs), Letters of Map Revision (LOMRs), and Physical Map Revisions (PMRs).

Based on our review of actual cost data for Fiscal Years 2000 and 2001, FEMA has established the following review and processing fees, which are to be submitted with all requests submitted on or after September 1, 2002, that are not otherwise exempted under 44 CFR 72.5. Those fees below shown in bold format reflect a change in the fee established in June 1, 2000.

Fee Schedule for Requests for CLOMAs, CLOMR-Fs, and LOMR-Fs

Request for single-lot/single-structure CLOMA and CLOMR-F	**$500**
Request for single-lot/single-structure LOMR-F	**$425**
Request for single-lot/single-structure LOMR-F based on as-built information (CLOMR-F previously issued by us)	**$325**
Request for multiple-lot/multiple-structure CLOMA	**$700**
Request for multiple-lot/multiple-structure CLOMR-F and LOMR-F	**$800**
Request for multiple-lot/multiple-structure LOMR-F based on as-built information (CLOMR-F previously issued)	$700

Fee Schedule for Requests for CLOMRs

Request based on new hydrology, bridge, culvert, channel, or combination of any of these	**$4,000**
Request based on levee, berm, or other structural measure	**$4,500**

Fee Schedule for Requests for LOMRs and PMRs

Requesters must submit the review and processing fees shown below with requests for LOMRs and PMRs dated June 1, 2000, or later that are not based on structural measures or alluvial fans.

Request based on bridge, culvert, channel, or combination thereof	**$4,200**
Request based on levee, berm, or other structural measure	**$6,000**
Request based on as-built information submitted as follow-up to CLOMR	**$3,800**

Fees for CLOMRs, LOMRs, and PMRs Based on Structural Measures on Alluvial Fans

FEMA has maintained $5,000 as the initial fee for requests for CLOMRs and LOMRs based on structural measures on alluvial fans. FEMA will also continue to recover the remainder of the review and processing costs by invoicing the requester before issuing a determination letter, consistent with current practice. The prevailing private-sector labor rate charged to FEMA ($50 per hour) will continue to be used to calculate the total reimbursable fees.

Payment Submission Requirements

Requesters must make fee payments for non-exempt requests before we render services. This payment must be in the form of a check or money order or by credit card payment. Please make all checks and money orders in U.S. funds payable to the *National Flood Insurance Program*. We will deposit all fees collected to the National Flood Insurance Fund, which is the source of funding for providing this service.

FLOOD CONTROL DISTRICT of Maricopa County
2801 West Durango Street
Phoenix, Arizona 85009-6399
(602) 506-1501
FAX: (602) 506-4601
TT: (602) 506-5897

LETTER OF TRANSMITTAL

TO: David Ramirez, PE
City of Goodyear
190 N Litchfield Rd
Goodyear AZ

02-05-04

SUBJECT: Draft copy of Camelback Road Wash Floodplain Analysis

WE ARE SENDING YOU THE FOLLOWING ITEMS: ☒ Enclosed ☐ Under separate cover

☐ Shop Drawings ☐ Prints ☐ Legal Description ☐ Samples ☐ Reports
☐ Specification ☐ Change Order ☐ Copy of Letter ☐ Plans ☐ Other

COPIES	DATE	NO.	DESCRIPTION
1	3-24-03	draft	Camelback Road Wash Floodplain Analysis
			Manning's 'n' Values Determination Report for Camelback Road Wash
			(2 volumes)

THESE ARE TRANSMITTED:

☐ For approval
☒ For your use
☐ As requested
☐ Resubmit copies for approval
☐ Submit copies for distribution
☐ FOR ESTIMATE DUE:

☐ Approved as submitted
☐ Approved as noted
☐ Returned for corrections
☐ For review and comments
☐ Return corrected prints
☐ Borrowed prints being returned

Remarks:

SIGNED: Mike Duncan

Mike Duncan, PE, CFM
Flood Delineation Group
602-506-4732

FLOOD CONTROL DISTRICT
of
Maricopa County

2801 West Durango Street • Phoenix, Arizona 85009-6399
Telephone (602) 506-1501
Fax (602) 506-4601
TT (602) 506-5897

BOARD OF DIRECTORS
Fulton Brock
Andrew Kunasek
Don Stapley
Mary Rose Garrido Wilcox
Max W. Wilson

March 17, 2004

Pernille Buch-Pedersen, Regional Manager
Baker Civil
3601 Eisenhower Avenue, Suite 600
Alexandria, Virginia 22304

Subject: Response to review comments of December 22, 2003

Case No: 04-09-0318P

Identifier: Loop 303, white Tanks ADMP Update
Flooding Sources: Camelback Road Wash

Communities: 040037 Maricopa County Unincorporated Areas, Arizona
040045 City of Glendale, AZ
040046 City of Goodyear, AZ

Map No.: 04013C

Dear Ms. Buch-Pedersen:

In response to the comments of your letter of December 22, 2003, topographic contours (from a previous study) have been added to the Floodplain Work Map Sheets 35, 36, and 37. I have enclosed one copy of each in full size and one copy of each in 11" x 17" size, for your use. As stated in the map notes, please keep in mind that this LOMR is based on field survey, and that the contours are provided to show locations of roads, ditches, etc. only.

Downstream of this LOMR, there is a LOMR for Bullard Wash, which your group is also processing (case no. 03-09-1653P). We are preparing responses to your comments for this LOMR and expect to send them to you in the near future.

If you have any questions, please contact me at (602) 506-4732, or mwd@mail.maricopa.gov.

Sincerely,

Michael Duncan

Michael Duncan, PE, CFM
Project Manager
Flood Delineation Group

Enclosures

Copies to: Max Yuan, P.E., Project Engineer
Hazards Study Branch, Mitigation Directorate
Federal Emergency Management Agency
500 C Street SW
Washington, D.C. 20472-0001

Elliot Silverston, Ph.D., P.E.
URS Corporation
7720 N 16th St, Suite 100
Phoenix AZ 85020

NATIONAL FLOOD INSURANCE PROGRAM
FEMA MAP COORDINATION CONTRACTOR

May 26, 2004

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

IN REPLY REFER TO:
Case No.: 04-09-0318P
Communities: Cities of Glendale and Goodyear and Maricopa County, AZ
Community Nos.: 040045, 040046, and 040037

316-ACK.FRQ

Dear Mr. Duncan:

This responds to your submittal dated ~~May 13~~ March 17, 2004, concerning a December ~~1~~ 22, 2003, request that the Department of Homeland Security's Federal Emergency Management Agency (FEMA) issue a revision to the Flood Insurance Rate Map (FIRM) for Maricopa County, Arizona and Incorporated Areas. Pertinent information about the request is listed below.

FLOOD CONTROL DISTRICT
RECEIVED
JUN 01 '04

CH & GM	FINANCE
PIO	LANDS
ADMIN	O&M
REG	P&PM
ENG	FIL
CONTRACTS	
ROUTING	MWP

Identifier:	Loop 303, White Tanks ADMP Update, Floodplain Delineations
Flooding Source:	Camelback Road Wash
FIRM Panel(s) Affected:	04013C1590 G and 1595 G

We have completed an inventory of the items that you submitted. We have received the data and the review and processing fee ($4,200) required to begin a detailed technical review of your request. If additional data are required, we will inform you within 60 days of the date of this letter.

Please direct questions concerning your request to us at the address shown at the bottom of this page. For identification purposes, please include the case number referenced above on all correspondence.

If you have general questions about your request, FEMA policy, or the National Flood Insurance Program, please call the FEMA Map Assistance Center, toll free, at 1-877-FEMA MAP (1-877-336-2627). If you

3601 Eisenhower Avenue, Alexandria, Virginia 22304-6425 PH: 703.960.8800 FX: 703.960.9125

have specific questions concerning your request, please call the Revisions Coordinator for your State, Mr. Craig Kennedy, who may be reached at (703) 960-8800, ext. 3091.

Sincerely,

Sheila M. Norlin
National LOMC Manager
Michael Baker Jr., Inc.

cc: Mr. Michael Ellegood, P.E.
Chief Engineer and General Manager
Flood Control District of Maricopa County

Mr. Ted Collins
Principal
Floodplain Administration
Flood Control District of Maricopa County

Mr. Daniel A. Sherwood, P.E.
Senior Civil Engineer
City of Glendale

Mr. David Ramirez, P.E.
City Engineer
Community Development
Department – Engineering
City of Goodyear

Mr. Brian Cosson
NFIP Coordinator
Arizona Department of Water Resources

Mr. Massoud Razakhani, CFM
Project Engineer
URS Corporation

NATIONAL FLOOD INSURANCE PROGRAM

FEMA MAP COORDINATION CONTRACTOR

AUG 20 2004

CAMELBACK RD. WASH

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

IN REPLY REFER TO:
Case No.: 04-09-0318P
Communities: Cities of Glendale and Goodyear and Maricopa County, AZ
Community Nos.: 040045, 040046, and 040037

316-INTc

Dear Mr. Duncan:

This is in regard to your September 15, 2003, request that the Department of Homeland Security's Federal Emergency Management Agency (FEMA) issue a Letter of Map Revision for the above-referenced communities. In our letter to you dated May 26, 2004, we indicated we were reviewing the data submitted in support of your request and, within 60 days of the date of that letter, we would notify you if we needed additional data or if we encountered delays. Because we have encountered such delays, we will need additional time to complete our review. Therefore, we will inform you of our findings within 30 days of the date of this letter.

If you have general questions about your request, FEMA policy, or the National Flood Insurance Program, please call the FEMA Map Assistance Center, toll free, at 1-877-FEMA MAP (1-877-336-2627). If you have specific questions concerning your request, please call the Revisions Coordinator for your State, Mr. Craig Kennedy, who may be reached at (703) 960-8800, ext. 3091.

PHONE MESSAGE FROM IRWAN AT BAKER, 8-23-04: WILL BE MORE LIKE 1 WEEK THAN 30 DAYS

Sincerely,

Sheila M. Norlin
National LOMC Manager
Michael Baker Jr., Inc.

cc: Mr. Timothy S. Phillips, P.E.
Acting Chief Engineer and General Manager
Flood Control District of Maricopa County

Mr. Ted Collins
Principal Floodplain Coordinator
Flood Control District of Maricopa County

Mr. Daniel A. Sherwood, P.E.
Senior Civil Engineer
City of Glendale

Mr. David Ramirez, P.E.
City Engineer
Community Development Department – Engineering
City of Goodyear

Mr. Brian Cosson
NFIP Coordinator
Arizona Department of Water Resources

3601 Eisenhower Avenue, Alexandria, Virginia 22304-6425 PH: 703.960.8800 FX: 703.960.9125

Michael Baker Jr., Inc., under contract with the FEDERAL EMERGENCY MANAGEMENT AGENCY, is a Map Coordination Contractor for the National Flood Insurance Program

Federal Emergency Management Agency

Washington, D.C. 20472

SEP 15 2004

FLOOD CONTROL DISTRICT
RECEIVED
SEP 2004
CH & GM | FINANCE
PIO | LANDS
C & M
REG | P & PM
ENG | FILE
CONTRACTS
ROUTING MWD

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

The Honorable Elaine M. Scruggs
Mayor, City of Glendale
5850 West Glendale Avenue
Glendale, AZ 85301

IN REPLY REFER TO:
Case No.: 04-09-0318P
Community Name: City of Glendale, AZ
Community No.: 040045
Effective Date of This Revision: DEC 30 2004

CAMELBACK ROAD WASH

Dear Mayor Scruggs:

The Flood Insurance Study report and Flood Insurance Rate Map for your community have been revised by this Letter of Map Revision (LOMR). Please use the enclosed annotated map panel(s) revised by this LOMR for floodplain management purposes and for all flood insurance policies and renewals issued in your community.

Additional documents are enclosed which provide information regarding this LOMR. Please see the List of Enclosures below to determine which documents are included. Other attachments specific to this request may be included as referenced in the Determination Document. If you have any questions regarding floodplain management regulations for your community or the National Flood Insurance Program (NFIP) in general, please contact the Consultation Coordination Officer for your community. If you have any technical questions regarding this LOMR, please contact the Director, Federal Insurance and Mitigation Division of the Department of Homeland Security's Federal Emergency Management Agency (FEMA) in Oakland, California, at (510) 627-7103, or the FEMA Map Assistance Center toll free at 1-877-336-2627 (1-877-FEMA MAP). Additional information about the NFIP is available on our website at http://www.fema.gov/nfip.

Sincerely,

Max H. Yuan, P.E., Project Engineer
Hazard Identification Section
Mitigation Division
Emergency Preparedness
and Response Directorate

For: Doug Bellomo, P.E., CFM, Acting Chief
Hazard Identification Section
Mitigation Division
Emergency Preparedness
and Response Directorate

List of Enclosures:
- Letter of Map Revision Determination Document
- Annotated Flood Insurance Rate Map
- Annotated Flood Insurance Study Report

cc: (See attached list.)

Courtesy Copies List – City of Glendale

The Honorable Andrew W. Kunasek
Chairman, Maricopa County
Board of Supervisors

The Honorable James M. Cavanaugh
Mayor, City of Goodyear

Mr. Daniel A. Sherwood, P.E.
Senior Civil Engineer
City of Glendale

Mr. Timothy S. Phillips, P.E.
Acting Chief Engineer and General Manager
Flood Control District of Maricopa County

Mr. Michael Duncan, P.E., CFM
Senior Engineer
Flood Control District of Maricopa County

Mr. Ted Collins
Principal Floodplain Coordinator
Flood Control District of Maricopa County

Mr. David Ramirez, P.E.
City Engineer
Engineering Division
Community Development Department
City of Goodyear

Mr. Brian Cosson
NFIP Coordinator
Arizona Department of Water Resources

Mr. Massoud Rezakhani, CFM
Project Engineer
URS Corporation

Federal Emergency Management Agency
Washington, D.C. 20472

LETTER OF MAP REVISION DETERMINATION DOCUMENT

COMMUNITY AND REVISION INFORMATION		PROJECT DESCRIPTION	BASIS OF REQUEST
COMMUNITY	City of Glendale Maricopa County Arizona	NO PROJECT	BASE MAP CHANGES HYDROLOGIC ANALYSIS HYDRAULIC ANALYSIS NEW TOPOGRAPHIC DATA
	COMMUNITY NO.: 040045		
IDENTIFIER	Loop 303 White Tanks ADMP Update Floodplain Delineations	APPROXIMATE LATITUDE & LONGITUDE: 33.500, -112.437 SOURCE: USGS QUADRANGLE DATUM: NAD 83	
FLOODING SOURCE(S) & REVISED REACH(ES)	Camelback Wash – from its confluence with Bullard Wash to approximately 2,300 feet upstream of Curtis Road		

SUMMARY OF REVISIONS

Effective Flooding:	Zone X (shaded)	No BFEs*
Revised Flooding:	Zone AE	BFEs
Increases:	YES	YES
Decreases:	NONE	NONE

* BFEs – Base Flood Elevations

ANNOTATED MAPPING ENCLOSURES	ANNOTATED STUDY ENCLOSURES
TYPE: FIRM* NO.: 04013C1590 G Date: July 19, 2001 TYPE: FIRM NO.: 04013C1595 G Date: July 19, 2001	DATE OF EFFECTIVE FLOOD INSURANCE STUDY REPORT: July 19, 2001 SUMMARY OF DISCHARGES TABLE 3 PROFILE: 1267P

* FIRM – Flood Insurance Rate Map; ** FBFM – Flood Boundary and Floodway Map; *** FHBM – Flood Hazard Boundary Map

DETERMINATION

This document provides the determination from the Department of Homeland Security's Federal Emergency Management Agency (FEMA) regarding a request for a Letter of Map Revision (LOMR) for the area described above. Using the information submitted, we have determined that a revision to the flood hazards depicted in the Flood Insurance Study (FIS) report and/or National Flood Insurance Program (NFIP) map is warranted. This document revises the effective NFIP map, as indicated in the attached documentation. Please use the enclosed annotated map panels revised by this LOMR for floodplain management purposes and for all flood insurance policies and renewals in your community.

This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA Map Assistance Center toll free at 1-877-336-2677 (1-877-FEMA MAP) or by letter addressed to the LOMR Depot, 3601 Eisenhower Avenue, Alexandria, VA 22304. Additional information about the NFIP is available on our website at http://www.fema.gov/nfip.

Max H. Yuan, P.E., Project Engineer
Hazard Identification Section
Mitigation Division
Emergency Preparedness and Response Directorate

102426 D.A04090318 102IAC

Federal Emergency Management Agency
Washington, D.C. 20472

LETTER OF MAP REVISION DETERMINATION DOCUMENT (CONTINUED)

OTHER COMMUNITIES AFFECTED BY THIS REVISION

CID Number: 040046 **Name:** City of Goodyear, Maricopa County, Arizona

AFFECTED MAP PANELS			AFFECTED PORTIONS OF THE FLOOD INSURANCE STUDY REPORT
TYPE: FIRM	NO.: 04013C1590 G	Date: July 19, 2001	DATE OF EFFECTIVE FLOOD INSURANCE STUDY REPORT: July 19, 2001
TYPE: FIRM	NO.: 04013C1595 G	Date: July 19, 2001	SUMMARY OF DISCHARGES TABLE 3

CID Number: 040037 **Name:** Maricopa County, Arizona

AFFECTED MAP PANELS			AFFECTED PORTIONS OF THE FLOOD INSURANCE STUDY REPORT
TYPE: FIRM	NO.: 04013C1590 G	Date: July 19, 2001	DATE OF EFFECTIVE FLOOD INSURANCE STUDY REPORT: July 19, 2001
TYPE: FIRM	NO.: 04013C1595 G	Date: July 19, 2001	SUMMARY OF DISCHARGES TABLE 3
			PROFILES: 1266P and 1267P

This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA Map Assistance Center toll free at 1-877-336-2677 (1-877-FEMA MAP) or by letter addressed to the LOMR Depot, 3601 Eisenhower Avenue, Alexandria, VA 22304. Additional information about the NFIP is available on our website at http://www.fema.gov/nfip.

Max H. Yuan, P.E., Project Engineer
Hazard Identification Section
Mitigation Division
Emergency Preparedness and Response Directorate 102426 D.A04090318 102IAC

Federal Emergency Management Agency
Washington, D.C. 20472

LETTER OF MAP REVISION DETERMINATION DOCUMENT (CONTINUED)

COMMUNITY INFORMATION

APPLICABLE NFIP REGULATIONS/COMMUNITY OBLIGATION

We have made this determination pursuant to Section 206 of the Flood Disaster Protection Act of 1973 (P.L. 93-234) and in accordance with the National Flood Insurance Act of 1968, as amended (Title XIII of the Housing and Urban Development Act of 1968, P.L. 90-448), 42 U.S.C. 4001-4128, and 44 CFR Part 65. Pursuant to Section 1361 of the National Flood Insurance Act of 1968, as amended, communities participating in the NFIP are required to adopt and enforce floodplain management regulations that meet or exceed NFIP criteria. These criteria, including adoption of the FIS report and FIRM, and the modifications made by this LOMR, are the minimum requirements for continued NFIP participation and do not supersede more stringent State/Commonwealth or local requirements to which the regulations apply.

COMMUNITY REMINDERS

We based this determination on the 1-percent-annual-chance discharges computed in the submitted hydrologic model. Future development of projects upstream could cause increased discharges, which could cause increased flood hazards. A comprehensive restudy of your community's flood hazards would consider the cumulative effects of development on discharges and could, therefore, indicate that greater flood hazards exist in this area.

Your community must regulate all proposed floodplain development and ensure that permits required by Federal and/or State/Commonwealth law have been obtained. State/Commonwealth or community officials, based on knowledge of local conditions and in the interest of safety, may set higher standards for construction or may limit development in floodplain areas. If your State/Commonwealth or community has adopted more restrictive or comprehensive floodplain management criteria, those criteria take precedence over the minimum NFIP requirements.

We will not print and distribute this LOMR to primary users, such as local insurance agents or mortgage lenders; instead, the community will serve as a repository for the new data. We encourage you to disseminate the information in this LOMR by preparing a news release for publication in your community's newspaper that describes the revision and explains how your community will provide the data and help interpret the NFIP maps. In that way, interested persons, such as property owners, insurance agents, and mortgage lenders, can benefit from the information.

This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA Map Assistance Center toll free at 1-877-336-2677 (1-877-FEMA MAP) or by letter addressed to the LOMR Depot, 3601 Eisenhower Avenue, Alexandria, VA 22304. Additional information about the NFIP is available on our website at http://www.fema.gov/nfip.

Max H. Yuan, P.E., Project Engineer
Hazard Identification Section
Mitigation Division
Emergency Preparedness and Response Directorate

102426 D.A04090318 102IAC

Federal Emergency Management Agency
Washington, D.C. 20472

LETTER OF MAP REVISION DETERMINATION DOCUMENT (CONTINUED)

COMMUNITY INFORMATION (CONTINUED)

We have designated a Consultation Coordination Officer (CCO) to assist your community. The CCO will be the primary liaison between your community and FEMA. For information regarding your CCO, please contact:

Ms. Sally M. Ziolkowski
Director, Federal Insurance and Mitigation Division
Federal Emergency Management Agency, Region IX
1111 Broadway Street, Suite 1200
Oakland, CA 94607-4052
(510) 627-7103

STATUS OF THE COMMUNITY NFIP MAPS

We are processing a revised FIRM and FIS report for Maricopa County; therefore, we will not physically revise and republish the FIRM and FIS report for your community to incorporate the modifications made by this LOMR at this time. Preliminary copies of the revised FIRM and FIS report were submitted to your community for review on June 17, 2004. We will incorporate the modifications made by this LOMR into the revised FIRM and FIS report before they become effective.

This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA Map Assistance Center toll free at 1-877-336-2677 (1-877-FEMA MAP) or by letter addressed to the LOMR Depot, 3601 Eisenhower Avenue, Alexandria, VA 22304. Additional information about the NFIP is available on our website at http://www.fema.gov/nfip.

Max H. Yuan, P.E., Project Engineer
Hazard Identification Section
Mitigation Division
Emergency Preparedness and Response Directorate 102426 D.A04090318 102IAC

Federal Emergency Management Agency
Washington, D.C. 20472

LETTER OF MAP REVISION DETERMINATION DOCUMENT (CONTINUED)

PUBLIC NOTIFICATION OF REVISION

Within 90 days of the second publication in the local newspaper, a citizen may request that we reconsider this determination. Any request for reconsideration must be based on scientific or technical data. Therefore, this letter will be effective only after the 90-day appeal period has elapsed and we have resolved any appeals that we receive during this appeal period. Until this LOMR is effective, the revised BFEs presented in this LOMR may be changed.

A notice of changes will be published in the *Federal Register*. This information also will be published in your local newspaper on or about the dates listed below.

LOCAL NEWSPAPER Name: *Arizona Business Gazette*
Dates: 09/23/2004 09/30/2004

PUBLIC NOTIFICATION

FLOODING SOURCE	LOCATION OF REFERENCED ELEVATION	BFE (FEET NGVD)		MAP PANEL NUMBER(S)
		EFFECTIVE	REVISED	
Camelback Wash	Approximately 2,300 feet downstream of Reems Road+	NONE	1,049	04013C1595 G
	Approximately 2,200 feet upstream of Curtis Road*	NONE	1,118	04013C1590 G

+Unincorporated Areas of Maricopa County.
*In City of Glendale

This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA Map Assistance Center toll free at 1-877-336-2677 (1-877-FEMA MAP) or by letter addressed to the LOMR Depot, 3601 Eisenhower Avenue, Alexandria, VA 22304. Additional information about the NFIP is available on our website at http://www.fema.gov/nfip.

Max H. Yuan, P.E., Project Engineer
Hazard Identification Section
Mitigation Division
Emergency Preparedness and Response Directorate 102426 D.A04090318 102IAC

CHANGES ARE MADE IN DETERMINATIONS OF BASE FLOOD ELEVATIONS FOR THE CITIES OF GLENDALE AND GOODYEAR AND THE UNINCORPORATED AREAS OF MARICOPA COUNTY, ARIZONA, UNDER THE NATIONAL FLOOD INSURANCE PROGRAM

On July 19, 2001, the Department of Homeland Security's Federal Emergency Management Agency identified Special Flood Hazard Areas (SFHAs) in the Cities of Glendale and Goodyear and in the unincorporated areas of Maricopa County, Arizona, through issuance of a Flood Insurance Rate Map (FIRM). The Mitigation Division has determined that modification of the elevations of the flood having a 1-percent chance of being equaled or exceeded in any given year (base flood) for certain locations in these communities is appropriate. The modified Base Flood Elevations (BFEs) revise the FIRM for the communities.

The changes are being made pursuant to Section 206 of the Flood Disaster Protection Act of 1973 (Public Law 93-234) and are in accordance with the National Flood Insurance Act of 1968, as amended (Title XIII of the Housing and Urban Development Act of 1968, Public Law 90-448), 42 U.S.C. 4001-4128, and 44 CFR Part 65.

A detailed hydraulic analysis was performed for Camelback Wash to incorporate a new hydrologic analysis and floodplain delineation study from the confluence with Bullard Wash to approximately 2,300 feet upstream of Curtis Road. This has resulted in the establishment of an SFHA and BFEs for the revised reach of Camelback Wash. The table below indicates existing and modified BFEs for selected locations along the affected lengths of the flooding source(s) cited above.

Location	Existing BFE (feet)*	Modified BFE (feet)*
Camelback Wash:		
+Approximately 2,300 feet downstream of Reems Road	None	1,049
#Approximately 2,200 feet upstream of Curtis Road	None	1,118

*National Geodetic Vertical Datum, rounded to nearest whole foot
+Unincorporated Areas of Maricopa County
#City of Glendale

Under the above-mentioned Acts of 1968 and 1973, the Mitigation Division must develop criteria for floodplain management. To participate in the National Flood Insurance Program (NFIP), the community must use the modified BFEs to administer the floodplain management measures of the NFIP. These modified BFEs will also be used to calculate the appropriate flood insurance premium rates for new buildings and their contents and for the second layer of insurance on existing buildings and contents.

Upon the second publication of notice of these changes in this newspaper, any person has 90 days in which he or she can request, through the Chief Executive Officer of the community, that the Mitigation Division reconsider the determination. Any request for reconsideration must be based on knowledge of changed conditions or new scientific or technical data. All interested parties are on notice that until the 90-day period elapses, the Mitigation Division's determination to modify the BFEs may itself be changed.

Any person having knowledge or wishing to comment on these changes should immediately notify:

The Honorable Elaine M. Scruggs
Mayor, City of Glendale
5850 West Glendale Avenue
Glendale, AZ 85301

OR

The Honorable James M. Cavanaugh
Mayor, City of Goodyear
190 North Litchfield Road
Goodyear, AZ 85338

OR

The Honorable Andrew W. Kunasek
Chairman, Maricopa County
Board of Supervisors
301 West Jefferson Street, 10th Floor
Phoenix, AZ 85003

Federal Emergency Management Agency

Washington, D.C. 20472

SEP 15 2004

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

The Honorable James M. Cavanaugh
Mayor, City of Goodyear
190 North Litchfield Road
Goodyear, AZ 85338

IN REPLY REFER TO:

Case No.:	04-09-0318P
Community Name:	City of Goodyear, AZ
Community No.:	040046
Effective Date of This Revision:	DEC 30 2004

Dear Mayor Cavanaugh:

The Flood Insurance Study report and Flood Insurance Rate Map for your community have been revised by this Letter of Map Revision (LOMR). Please use the enclosed annotated map panel(s) revised by this LOMR for floodplain management purposes and for all flood insurance policies and renewals issued in your community.

Additional documents are enclosed which provide information regarding this LOMR. Please see the List of Enclosures below to determine which documents are included. Other attachments specific to this request may be included as referenced in the Determination Document. If you have any questions regarding floodplain management regulations for your community or the National Flood Insurance Program (NFIP) in general, please contact the Consultation Coordination Officer for your community. If you have any technical questions regarding this LOMR, please contact the Director, Federal Insurance and Mitigation Division of the Department of Homeland Security's Federal Emergency Management Agency (FEMA) in Oakland, California, at (510) 627-7103, or the FEMA Map Assistance Center toll free at 1-877-336-2627 (1-877-FEMA MAP). Additional information about the NFIP is available on our website at http://www.fema.gov/nfip.

Sincerely,

Max H. Yuan, P.E., Project Engineer
Hazard Identification Section
Mitigation Division
Emergency Preparedness
and Response Directorate

For: Doug Bellomo, P.E., CFM, Acting Chief
Hazard Identification Section
Mitigation Division
Emergency Preparedness
and Response Directorate

List of Enclosures:
- Letter of Map Revision Determination Document
- Annotated Flood Insurance Rate Map
- Annotated Flood Insurance Study Report

cc: (See attached list.)

Courtesy Copies List – City of Goodyear

The Honorable Andrew W. Kunasek
Chairman, Maricopa County
Board of Supervisors

The Honorable Elaine M. Scruggs
Mayor, City of Glendale

Mr. David Ramirez, P.E.
City Engineer
Engineering Division
Community Development Department
City of Goodyear

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Acting Chief Engineer and General Manager
Flood Control District of Maricopa County

Mr. Michael Duncan, P.E., CFM
Senior Engineer
Flood Control District of Maricopa County

Mr. Ted Collins
Principal Floodplain Coordinator
Flood Control District of Maricopa County

Mr. Daniel A. Sherwood, P.E.
Senior Civil Engineer
City of Glendale

Mr. Brian Cosson
NFIP Coordinator
Arizona Department of Water Resources

Mr. Massoud Rezakhani, CFM
Project Engineer
URS Corporation

Federal Emergency Management Agency

Washington, D.C. 20472

LETTER OF MAP REVISION DETERMINATION DOCUMENT

COMMUNITY AND REVISION INFORMATION		PROJECT DESCRIPTION	BASIS OF REQUEST
COMMUNITY	City of Goodyear Maricopa County Arizona	NO PROJECT	BASE MAP CHANGES HYDROLOGIC ANALYSIS HYDRAULIC ANALYSIS NEW TOPOGRAPHIC DATA
	COMMUNITY NO.: 040046		
IDENTIFIER	Loop 303 White Tanks ADMP Update Floodplain Delineations	APPROXIMATE LATITUDE & LONGITUDE: 33.500 , -112.437 SOURCE: USGS QUADRANGLE DATUM: NAD 83	
FLOODING SOURCE(S) & REVISED REACH(ES)	Camelback Wash – from its confluence with Bullard Wash to approximately 2,300 feet upstream of Curtis Road		

SUMMARY OF REVISIONS

Effective Flooding:	Zone X (shaded)	No BFEs*
Revised Flooding:	Zone AE	BFEs
Increases:	YES	YES
Decreases:	NONE	NONE

* BFEs – Base Flood Elevations

ANNOTATED MAPPING ENCLOSURES	ANNOTATED STUDY ENCLOSURES
TYPE: FIRM* NO.: 04013C1590 G Date: July 19, 2001 TYPE: FIRM NO.: 04013C1595 G Date: July 19, 2001	DATE OF EFFECTIVE FLOOD INSURANCE STUDY REPORT: July 19, 2001 SUMMARY OF DISCHARGES TABLE 3

* FIRM – Flood Insurance Rate Map; ** FBFM – Flood Boundary and Floodway Map; *** FHBM – Flood Hazard Boundary Map

DETERMINATION

This document provides the determination from the Department of Homeland Security's Federal Emergency Management Agency (FEMA) regarding a request for a Letter of Map Revision (LOMR) for the area described above. Using the information submitted, we have determined that a revision to the flood hazards depicted in the Flood Insurance Study (FIS) report and/or National Flood Insurance Program (NFIP) map is warranted. This document revises the effective NFIP map, as indicated in the attached documentation. Please use the enclosed annotated map panels revised by this LOMR for floodplain management purposes and for all flood insurance policies and renewals in your community.

This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA Map Assistance Center toll free at 1-877-336-2677 (1-877-FEMA MAP) or by letter addressed to the LOMR Depot, 3601 Eisenhower Avenue, Alexandria, VA 22304. Additional information about the NFIP is available on our website at http://www.fema.gov/nfip.

Max H. Yuan, P.E., Project Engineer
Hazard Identification Section
Mitigation Division
Emergency Preparedness and Response Directorate 102426 D.A04090318 102IAC

Federal Emergency Management Agency
Washington, D.C. 20472

LETTER OF MAP REVISION DETERMINATION DOCUMENT (CONTINUED)

OTHER COMMUNITIES AFFECTED BY THIS REVISION

CID Number: 040045 **Name:** City of Glendale, Maricopa County, Arizona

AFFECTED MAP PANELS	AFFECTED PORTIONS OF THE FLOOD INSURANCE STUDY REPORT
TYPE: FIRM NO.: 04013C1590 G Date: July 19, 2001 TYPE: FIRM NO.: 04013C1595 G Date: July 19, 2001	DATE OF EFFECTIVE FLOOD INSURANCE STUDY REPORT: July 19, 2001 SUMMARY OF DISCHARGES TABLE 3 PROFILE: 1267P

CID Number: 040037 **Name:** Maricopa County, Arizona

AFFECTED MAP PANELS	AFFECTED PORTIONS OF THE FLOOD INSURANCE STUDY REPORT
TYPE: FIRM NO.: 04013C1590 G Date: July 19, 2001 TYPE: FIRM NO.: 04013C1595 G Date: July 19, 2001	DATE OF EFFECTIVE FLOOD INSURANCE STUDY REPORT: July 19, 2001 SUMMARY OF DISCHARGES TABLE 3 PROFILES: 1266P and 1267P

This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA Map Assistance Center toll free at 1-877-336-2677 (1-877-FEMA MAP) or by letter addressed to the LOMR Depot, 3601 Eisenhower Avenue, Alexandria, VA 22304. Additional information about the NFIP is available on our website at http://www.fema.gov/nfip.

Max H. Yuan, P.E., Project Engineer
Hazard Identification Section
Mitigation Division
Emergency Preparedness and Response Directorate 102426 D.A04090318 102IAC

Federal Emergency Management Agency
Washington, D.C. 20472

LETTER OF MAP REVISION DETERMINATION DOCUMENT (CONTINUED)

COMMUNITY INFORMATION

APPLICABLE NFIP REGULATIONS/COMMUNITY OBLIGATION

We have made this determination pursuant to Section 206 of the Flood Disaster Protection Act of 1973 (P.L. 93-234) and in accordance with the National Flood Insurance Act of 1968, as amended (Title XIII of the Housing and Urban Development Act of 1968, P.L. 90-448), 42 U.S.C. 4001-4128, and 44 CFR Part 65. Pursuant to Section 1361 of the National Flood Insurance Act of 1968, as amended, communities participating in the NFIP are required to adopt and enforce floodplain management regulations that meet or exceed NFIP criteria. These criteria, including adoption of the FIS report and FIRM, and the modifications made by this LOMR, are the minimum requirements for continued NFIP participation and do not supersede more stringent State/Commonwealth or local requirements to which the regulations apply.

COMMUNITY REMINDERS

We based this determination on the 1-percent-annual-chance discharges computed in the submitted hydrologic model. Future development of projects upstream could cause increased discharges, which could cause increased flood hazards. A comprehensive restudy of your community's flood hazards would consider the cumulative effects of development on discharges and could, therefore, indicate that greater flood hazards exist in this area.

Your community must regulate all proposed floodplain development and ensure that permits required by Federal and/or State/Commonwealth law have been obtained. State/Commonwealth or community officials, based on knowledge of local conditions and in the interest of safety, may set higher standards for construction or may limit development in floodplain areas. If your State/Commonwealth or community has adopted more restrictive or comprehensive floodplain management criteria, those criteria take precedence over the minimum NFIP requirements.

We will not print and distribute this LOMR to primary users, such as local insurance agents or mortgage lenders; instead, the community will serve as a repository for the new data. We encourage you to disseminate the information in this LOMR by preparing a news release for publication in your community's newspaper that describes the revision and explains how your community will provide the data and help interpret the NFIP maps. In that way, interested persons, such as property owners, insurance agents, and mortgage lenders, can benefit from the information.

This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA Map Assistance Center toll free at 1-877-336-2677 (1-877-FEMA MAP) or by letter addressed to the LOMR Depot, 3601 Eisenhower Avenue, Alexandria, VA 22304. Additional information about the NFIP is available on our website at http://www.fema.gov/nfip.

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Hazard Identification Section
Mitigation Division
Emergency Preparedness and Response Directorate 102426 D.A04090318 102IAC

Federal Emergency Management Agency
Washington, D.C. 20472

LETTER OF MAP REVISION DETERMINATION DOCUMENT (CONTINUED)

COMMUNITY INFORMATION (CONTINUED)

We have designated a Consultation Coordination Officer (CCO) to assist your community. The CCO will be the primary liaison between your community and FEMA. For information regarding your CCO, please contact:

Ms. Sally M. Ziolkowski
Director, Federal Insurance and Mitigation Division
Federal Emergency Management Agency, Region IX
1111 Broadway Street, Suite 1200
Oakland, CA 94607-4052
(510) 627-7103

STATUS OF THE COMMUNITY NFIP MAPS

We are processing a revised FIRM and FIS report for Maricopa County; therefore, we will not physically revise and republish the FIRM and FIS report for your community to incorporate the modifications made by this LOMR at this time. Preliminary copies of the revised FIRM and FIS report were submitted to your community for review on June 17, 2004. We will incorporate the modifications made by this LOMR into the revised FIRM and FIS report before they become effective.

This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA Map Assistance Center toll free at 1-877-336-2677 (1-877-FEMA MAP) or by letter addressed to the LOMR Depot, 3601 Eisenhower Avenue, Alexandria, VA 22304. Additional information about the NFIP is available on our website at http://www.fema.gov/nfip.

Max H. Yuan, P.E., Project Engineer
Hazard Identification Section
Mitigation Division
Emergency Preparedness and Response Directorate 102426 D.A04090318 102IAC

Federal Emergency Management Agency
Washington, D.C. 20472

LETTER OF MAP REVISION DETERMINATION DOCUMENT (CONTINUED)

PUBLIC NOTIFICATION OF REVISION

Within 90 days of the second publication in the local newspaper, a citizen may request that we reconsider this determination. Any request for reconsideration must be based on scientific or technical data. Therefore, this letter will be effective only after the 90-day appeal period has elapsed and we have resolved any appeals that we receive during this appeal period. Until this LOMR is effective, the revised BFEs presented in this LOMR may be changed.

A notice of changes will be published in the *Federal Register*. This information also will be published in your local newspaper on or about the dates listed below.

LOCAL NEWSPAPER Name: *Arizona Business Gazette*
Dates: 09/23/2004 09/30/2004

PUBLIC NOTIFICATION

FLOODING SOURCE	LOCATION OF REFERENCED ELEVATION	BFE (FEET NGVD)		MAP PANEL NUMBER(S)
		EFFECTIVE	REVISED	
Camelback Wash	Approximately 2,300 feet downstream of Reems Road+	NONE	1,049	04013C1595 G
	Approximately 2,200 feet upstream of Curtis Road*	NONE	1,118	04013C1590 G

+Unincorporated Areas of Maricopa County.
*In City of Glendale

This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA Map Assistance Center toll free at 1-877-336-2677 (1-877-FEMA MAP) or by letter addressed to the LOMR Depot, 3601 Eisenhower Avenue, Alexandria, VA 22304. Additional information about the NFIP is available on our website at http://www.fema.gov/nfip.

Max H. Yuan, P.E., Project Engineer
Hazard Identification Section
Mitigation Division
Emergency Preparedness and Response Directorate 102426 D.A04090318 102IAC

CHANGES ARE MADE IN DETERMINATIONS OF BASE FLOOD ELEVATIONS FOR THE CITIES OF GLENDALE AND GOODYEAR AND THE UNINCORPORATED AREAS OF MARICOPA COUNTY, ARIZONA, UNDER THE NATIONAL FLOOD INSURANCE PROGRAM

On July 19, 2001, the Department of Homeland Security's Federal Emergency Management Agency identified Special Flood Hazard Areas (SFHAs) in the Cities of Glendale and Goodyear and in the unincorporated areas of Maricopa County, Arizona, through issuance of a Flood Insurance Rate Map (FIRM). The Mitigation Division has determined that modification of the elevations of the flood having a 1-percent chance of being equaled or exceeded in any given year (base flood) for certain locations in these communities is appropriate. The modified Base Flood Elevations (BFEs) revise the FIRM for the communities.

The changes are being made pursuant to Section 206 of the Flood Disaster Protection Act of 1973 (Public Law 93-234) and are in accordance with the National Flood Insurance Act of 1968, as amended (Title XIII of the Housing and Urban Development Act of 1968, Public Law 90-448), 42 U.S.C. 4001-4128, and 44 CFR Part 65.

A detailed hydraulic analysis was performed for Camelback Wash to incorporate a new hydrologic analysis and floodplain delineation study from the confluence with Bullard Wash to approximately 2,300 feet upstream of Curtis Road. This has resulted in the establishment of an SFHA and BFEs for the revised reach of Camelback Wash. The table below indicates existing and modified BFEs for selected locations along the affected lengths of the flooding source(s) cited above.

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*National Geodetic Vertical Datum, rounded to nearest whole foot
+Unincorporated Areas of Maricopa County
#City of Glendale

Under the above-mentioned Acts of 1968 and 1973, the Mitigation Division must develop criteria for floodplain management. To participate in the National Flood Insurance Program (NFIP), the community must use the modified BFEs to administer the floodplain management measures of the NFIP. These modified BFEs will also be used to calculate the appropriate flood insurance premium rates for new buildings and their contents and for the second layer of insurance on existing buildings and contents.

Upon the second publication of notice of these changes in this newspaper, any person has 90 days in which he or she can request, through the Chief Executive Officer of the community, that the Mitigation Division reconsider the determination. Any request for reconsideration must be based on knowledge of changed conditions or new scientific or technical data. All interested parties are on notice that until the 90-day period elapses, the Mitigation Division's determination to modify the BFEs may itself be changed.

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5850 West Glendale Avenue
Glendale, AZ 85301

OR

The Honorable James M. Cavanaugh
Mayor, City of Goodyear
190 North Litchfield Road
Goodyear, AZ 85338

OR

The Honorable Andrew W. Kunasek
Chairman, Maricopa County
Board of Supervisors
301 West Jefferson Street, 10th Floor
Phoenix, AZ 85003

Federal Emergency Management Agency

Washington, D.C. 20472

SEP 15 2004

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

The Honorable Andrew W. Kunasek
Chair, Maricopa County Board
of Supervisors
301 West Jefferson Street, 10th Floor
Phoenix, AZ 85003

IN REPLY REFER TO:

Case No.:	04-09-0318P
Community Name:	Maricopa County, AZ
Community No.:	040037
Effective Date of This Revision:	DEC 30 2004

Dear Mr. Kunasek:

The Flood Insurance Study report and Flood Insurance Rate Map for your community have been revised by this Letter of Map Revision (LOMR). Please use the enclosed annotated map panel(s) revised by this LOMR for floodplain management purposes and for all flood insurance policies and renewals issued in your community.

Additional documents are enclosed which provide information regarding this LOMR. Please see the List of Enclosures below to determine which documents are included. Other attachments specific to this request may be included as referenced in the Determination Document. If you have any questions regarding floodplain management regulations for your community or the National Flood Insurance Program (NFIP) in general, please contact the Consultation Coordination Officer for your community. If you have any technical questions regarding this LOMR, please contact the Director, Federal Insurance and Mitigation Division of the Department of Homeland Security's Federal Emergency Management Agency (FEMA) in Oakland, California, at (510) 627-7103, or the FEMA Map Assistance Center toll free at 1-877-336-2627 (1-877-FEMA MAP). Additional information about the NFIP is available on our website at http://www.fema.gov/nfip.

Sincerely,

Max H. Yuan, P.E., Project Engineer
Hazard Identification Section
Mitigation Division
Emergency Preparedness
and Response Directorate

For: Doug Bellomo, P.E., CFM, Acting Chief
Hazard Identification Section
Mitigation Division
Emergency Preparedness
and Response Directorate

List of Enclosures:
- Letter of Map Revision Determination Document
- Annotated Flood Insurance Rate Map
- Annotated Flood Insurance Study Report

cc: (See attached list.)

Courtesy Copies List – Maricopa County

The Honorable Elaine M. Scruggs
Mayor, City of Glendale

The Honorable James M. Cavanaugh
Mayor, City of Goodyear

Mr. Timothy S. Phillips, P.E.
Acting Chief Engineer and General Manager
Flood Control District of Maricopa County

Mr. Michael Duncan, P.E., CFM
Senior Engineer
Flood Control District of Maricopa County

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City Engineer
Engineering Division
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City of Goodyear

Mr. Brian Cosson
NFIP Coordinator
Arizona Department of Water Resources

Mr. Massoud Rezakhani, CFM
Project Engineer
URS Corporation

Federal Emergency Management Agency

Washington, D.C. 20472

LETTER OF MAP REVISION DETERMINATION DOCUMENT

COMMUNITY AND REVISION INFORMATION		PROJECT DESCRIPTION	BASIS OF REQUEST
COMMUNITY	Maricopa County Arizona (Unincorporated Areas)	NO PROJECT	BASE MAP CHANGES HYDROLOGIC ANALYSIS HYDRAULIC ANALYSIS NEW TOPOGRAPHIC DATA
	COMMUNITY NO.: 040037		
IDENTIFIER	Loop 303 White Tanks ADMP Update Floodplain Delineations	APPROXIMATE LATITUDE & LONGITUDE: 33.500, -112.437 SOURCE: USGS QUADRANGLE DATUM: NAD 83	
FLOODING SOURCE(S) & REVISED REACH(ES)	Camelback Wash – from its confluence with Bullard Wash to approximately 2,300 feet upstream of Curtis Road		

SUMMARY OF REVISIONS

Effective Flooding:	Zone X (shaded)	No BFEs*
Revised Flooding:	Zone AE	BFEs
Increases:	YES	YES
Decreases:	NONE	NONE

* BFEs – Base Flood Elevations

ANNOTATED MAPPING ENCLOSURES	ANNOTATED STUDY ENCLOSURES
TYPE: FIRM* NO.: 04013C1590 G Date: July 19, 2001 TYPE: FIRM NO.: 04013C1595 G Date: July 19, 2001	DATE OF EFFECTIVE FLOOD INSURANCE STUDY REPORT: July 19, 2001 SUMMARY OF DISCHARGES TABLE 3 PROFILES: 1266P and 1267P

* FIRM – Flood Insurance Rate Map; ** FBFM – Flood Boundary and Floodway Map; *** FHBM – Flood Hazard Boundary Map

DETERMINATION

This document provides the determination from the Department of Homeland Security's Federal Emergency Management Agency (FEMA) regarding a request for a Letter of Map Revision (LOMR) for the area described above. Using the information submitted, we have determined that a revision to the flood hazards depicted in the Flood Insurance Study (FIS) report and/or National Flood Insurance Program (NFIP) map is warranted. This document revises the effective NFIP map, as indicated in the attached documentation. Please use the enclosed annotated map panels revised by this LOMR for floodplain management purposes and for all flood insurance policies and renewals in your community.

This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA Map Assistance Center toll free at 1-877-336-2677 (1-877-FEMA MAP) or by letter addressed to the LOMR Depot, 3601 Eisenhower Avenue, Alexandria, VA 22304. Additional information about the NFIP is available on our website at http://www.fema.gov/nfip.

Max H. Yuan, P.E., Project Engineer
Hazard Identification Section
Mitigation Division
Emergency Preparedness and Response Directorate

102426 D.A04090318 102IAC

Federal Emergency Management Agency
Washington, D.C. 20472

LETTER OF MAP REVISION DETERMINATION DOCUMENT (CONTINUED)

OTHER COMMUNITIES AFFECTED BY THIS REVISION

CID Number: 040045 **Name:** City of Glendale, Maricopa County, Arizona

AFFECTED MAP PANELS	AFFECTED PORTIONS OF THE FLOOD INSURANCE STUDY REPORT
TYPE: FIRM NO.: 04013C1590 G Date: July 19, 2001 TYPE: FIRM NO.: 04013C1595 G Date: July 19, 2001	DATE OF EFFECTIVE FLOOD INSURANCE STUDY REPORT: July 19, 2001 SUMMARY OF DISCHARGES TABLE 3 PROFILE: 1267P

CID Number: 040046 **Name:** City of Goodyear, Maricopa County, Arizona

AFFECTED MAP PANELS	AFFECTED PORTIONS OF THE FLOOD INSURANCE STUDY REPORT
TYPE: FIRM NO.: 04013C1590 G Date: July 19, 2001 TYPE: FIRM NO.: 04013C1595 G Date: July 19, 2001	DATE OF EFFECTIVE FLOOD INSURANCE STUDY REPORT: July 19, 2001 SUMMARY OF DISCHARGES TABLE 3

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Max H. Yuan, P.E., Project Engineer
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LETTER OF MAP REVISION DETERMINATION DOCUMENT (CONTINUED)

COMMUNITY INFORMATION

APPLICABLE NFIP REGULATIONS/COMMUNITY OBLIGATION

We have made this determination pursuant to Section 206 of the Flood Disaster Protection Act of 1973 (P.L. 93-234) and in accordance with the National Flood Insurance Act of 1968, as amended (Title XIII of the Housing and Urban Development Act of 1968, P.L. 90-448), 42 U.S.C. 4001-4128, and 44 CFR Part 65. Pursuant to Section 1361 of the National Flood Insurance Act of 1968, as amended, communities participating in the NFIP are required to adopt and enforce floodplain management regulations that meet or exceed NFIP criteria. These criteria, including adoption of the FIS report and FIRM, and the modifications made by this LOMR, are the minimum requirements for continued NFIP participation and do not supersede more stringent State/Commonwealth or local requirements to which the regulations apply.

COMMUNITY REMINDERS

We based this determination on the 1-percent-annual-chance discharges computed in the submitted hydrologic model. Future development of projects upstream could cause increased discharges, which could cause increased flood hazards. A comprehensive restudy of your community's flood hazards would consider the cumulative effects of development on discharges and could, therefore, indicate that greater flood hazards exist in this area.

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This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA Map Assistance Center toll free at 1-877-336-2677 (1-877-FEMA MAP) or by letter addressed to the LOMR Depot, 3601 Eisenhower Avenue, Alexandria, VA 22304. Additional information about the NFIP is available on our website at http://www.fema.gov/nfip.

Max H. Yuan, P.E., Project Engineer
Hazard Identification Section
Mitigation Division
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LETTER OF MAP REVISION DETERMINATION DOCUMENT (CONTINUED)

COMMUNITY INFORMATION (CONTINUED)

We have designated a Consultation Coordination Officer (CCO) to assist your community. The CCO will be the primary liaison between your community and FEMA. For information regarding your CCO, please contact:

Ms. Sally M. Ziolkowski
Director, Federal Insurance and Mitigation Division
Federal Emergency Management Agency, Region IX
1111 Broadway Street, Suite 1200
Oakland, CA 94607-4052
(510) 627-7103

STATUS OF THE COMMUNITY NFIP MAPS

We are processing a revised FIRM and FIS report for Maricopa County; therefore, we will not physically revise and republish the FIRM and FIS report for your community to incorporate the modifications made by this LOMR at this time. Preliminary copies of the revised FIRM and FIS report were submitted to your community for review on June 17, 2004. We will incorporate the modifications made by this LOMR into the revised FIRM and FIS report before they become effective.

This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA Map Assistance Center toll free at 1-877-336-2677 (1-877-FEMA MAP) or by letter addressed to the LOMR Depot, 3601 Eisenhower Avenue, Alexandria, VA 22304. Additional information about the NFIP is available on our website at http://www.fema.gov/nfip.

Max H. Yuan, P.E., Project Engineer
Hazard Identification Section
Mitigation Division
Emergency Preparedness and Response Directorate 102426 D.A04090318 102IAC

Federal Emergency Management Agency
Washington, D.C. 20472

LETTER OF MAP REVISION DETERMINATION DOCUMENT (CONTINUED)

PUBLIC NOTIFICATION OF REVISION

Within 90 days of the second publication in the local newspaper, a citizen may request that we reconsider this determination. Any request for reconsideration must be based on scientific or technical data. Therefore, this letter will be effective only after the 90-day appeal period has elapsed and we have resolved any appeals that we receive during this appeal period. Until this LOMR is effective, the revised BFEs presented in this LOMR may be changed.

A notice of changes will be published in the *Federal Register*. This information also will be published in your local newspaper on or about the dates listed below.

LOCAL NEWSPAPER Name: *Arizona Business Gazette*
Dates: 09/23/2004 09/30/2004

PUBLIC NOTIFICATION

FLOODING SOURCE	LOCATION OF REFERENCED ELEVATION	BFE (FEET NGVD)		MAP PANEL NUMBER(S)
		EFFECTIVE	REVISED	
Camelback Wash	Approximately 2,300 feet downstream of Reems Road†	NONE	1,049	04013C1595 G
	Approximately 2,200 feet upstream of Curtis Road*	NONE	1,118	04013C1590 G

†Unincorporated Areas of Maricopa County.
*In City of Glendale

This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA Map Assistance Center toll free at 1-877-336-2677 (1-877-FEMA MAP) or by letter addressed to the LOMR Depot, 3601 Eisenhower Avenue, Alexandria, VA 22304. Additional information about the NFIP is available on our website at http://www.fema.gov/nfip.

Max H. Yuan, P.E., Project Engineer
Hazard Identification Section
Mitigation Division
Emergency Preparedness and Response Directorate 102426 D.A04090318 102IAC

CHANGES ARE MADE IN DETERMINATIONS OF BASE FLOOD ELEVATIONS FOR THE CITIES OF GLENDALE AND GOODYEAR AND THE UNINCORPORATED AREAS OF MARICOPA COUNTY, ARIZONA, UNDER THE NATIONAL FLOOD INSURANCE PROGRAM

On July 19, 2001, the Department of Homeland Security's Federal Emergency Management Agency identified Special Flood Hazard Areas (SFHAs) in the Cities of Glendale and Goodyear and in the unincorporated areas of Maricopa County, Arizona, through issuance of a Flood Insurance Rate Map (FIRM). The Mitigation Division has determined that modification of the elevations of the flood having a 1-percent chance of being equaled or exceeded in any given year (base flood) for certain locations in these communities is appropriate. The modified Base Flood Elevations (BFEs) revise the FIRM for the communities.

The changes are being made pursuant to Section 206 of the Flood Disaster Protection Act of 1973 (Public Law 93-234) and are in accordance with the National Flood Insurance Act of 1968, as amended (Title XIII of the Housing and Urban Development Act of 1968, Public Law 90-448), 42 U.S.C. 4001-4128, and 44 CFR Part 65.

A detailed hydraulic analysis was performed for Camelback Wash to incorporate a new hydrologic analysis and floodplain delineation study from the confluence with Bullard Wash to approximately 2,300 feet upstream of Curtis Road. This has resulted in the establishment of an SFHA and BFEs for the revised reach of Camelback Wash. The table below indicates existing and modified BFEs for selected locations along the affected lengths of the flooding source(s) cited above.

Location	Existing BFE (feet)*	Modified BFE (feet)*
Camelback Wash:		
+Approximately 2,300 feet downstream of Reems Road	None	1,049
#Approximately 2,200 feet upstream of Curtis Road	None	1,118

*National Geodetic Vertical Datum, rounded to nearest whole foot
+Unincorporated Areas of Maricopa County
#City of Glendale

Under the above-mentioned Acts of 1968 and 1973, the Mitigation Division must develop criteria for floodplain management. To participate in the National Flood Insurance Program (NFIP), the community must use the modified BFEs to administer the floodplain management measures of the NFIP. These modified BFEs will also be used to calculate the appropriate flood insurance premium rates for new buildings and their contents and for the second layer of insurance on existing buildings and contents.

Upon the second publication of notice of these changes in this newspaper, any person has 90 days in which he or she can request, through the Chief Executive Officer of the community, that the Mitigation Division reconsider the determination. Any request for reconsideration must be based on knowledge of changed conditions or new scientific or technical data. All interested parties are on notice that until the 90-day period elapses, the Mitigation Division's determination to modify the BFEs may itself be changed.

Any person having knowledge or wishing to comment on these changes should immediately notify:

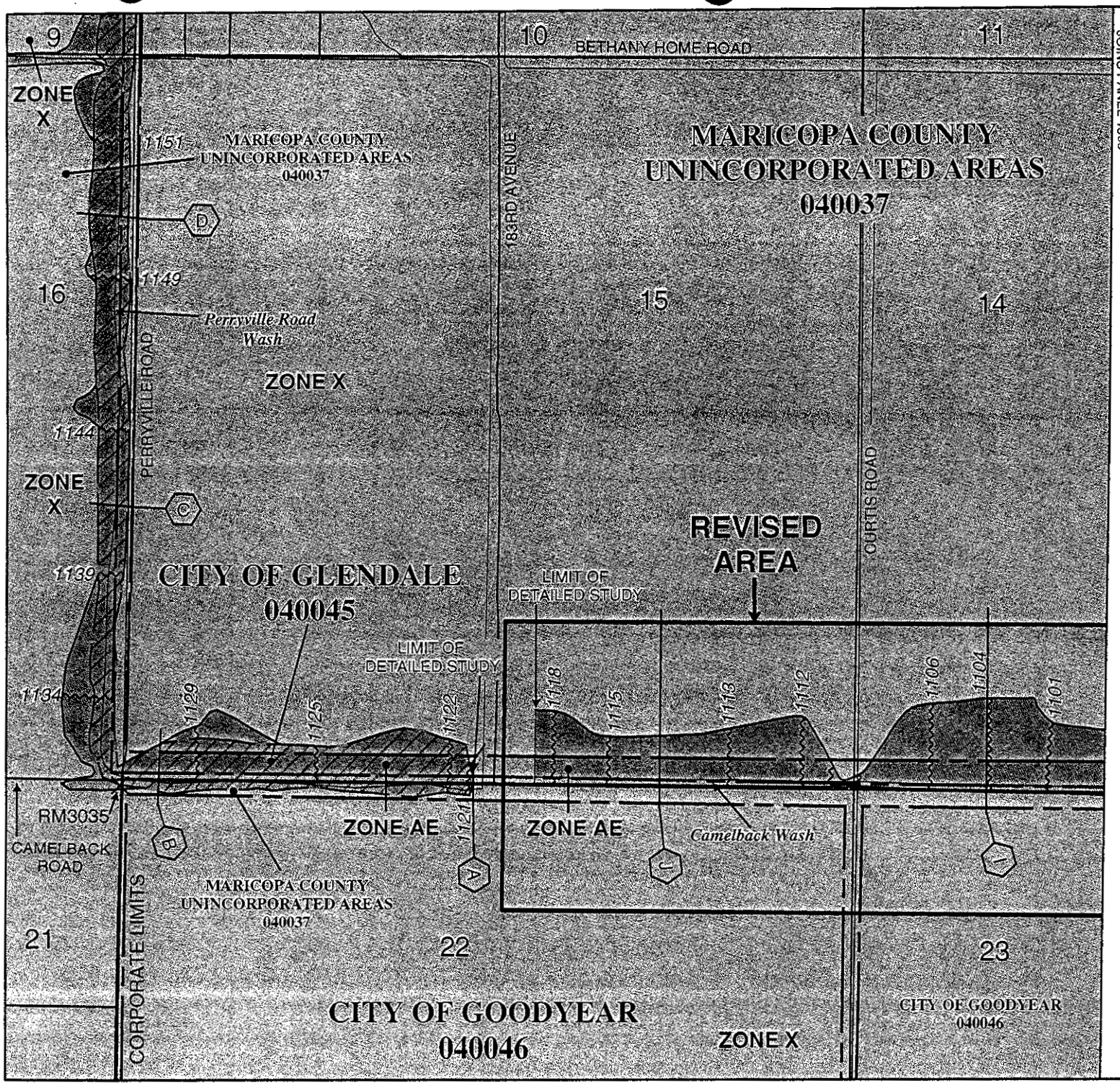
The Honorable Elaine M. Scruggs
Mayor, City of Glendale
5850 West Glendale Avenue
Glendale, AZ 85301

OR

The Honorable James M. Cavanaugh
Mayor, City of Goodyear
190 North Litchfield Road
Goodyear, AZ 85338

OR

The Honorable Andrew W. Kunasek
Chairman, Maricopa County
Board of Supervisors
301 West Jefferson Street, 10th Floor
Phoenix, AZ 85003



APPROXIMATE SCALE IN FEET

1,000 500 0 1,000

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

MARICOPA COUNTY, ARIZONA
AND INCORPORATED AREAS

PANEL 1590 OF 4350
(SEE MAP INDEX FOR PANELS NOT PRINTED)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
MARICOPA COUNTY, UNINCORPORATED AREAS	040037	1590	G
[illegible]	040[illegible]	[illegible]590	G
[illegible]	040[illegible]	[illegible]590	G

REVISED TO REFLECT LOMR DATED DEC 30 2004

MAP NUMBER
04013C1590 G

MAP REVISED:
JULY 19, 2001

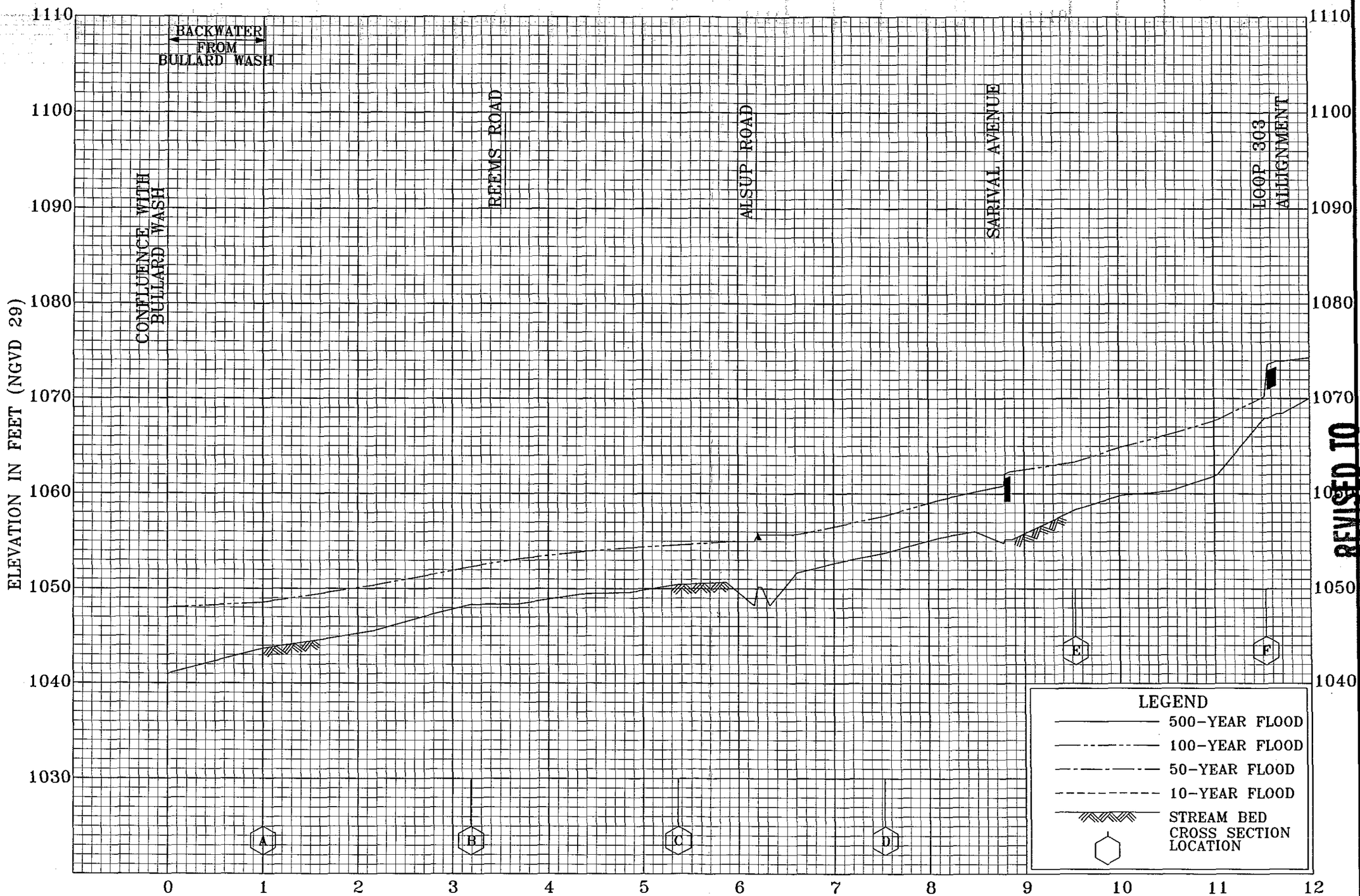
Federal Emergency Management Agency

Table 3. Summary of Discharges

Flooding Source and Location	Drainage Area (Square Miles)	Peak Discharges (Cubic Feet per Second) 10-Year	50-Year	100-Year	500-Year
Camelback Wash					
Just downstream of Perryville Road	13.17	--[1]	--[1]	883[2]	--[1]
At Cotton Lane	26.34	--[1]	--[1]	518[2]	--[1]
At Sarival Road	30.34	--[1]	--[1]	1,086[2]	--[1]
At Reems Road	32.16	--[1]	--[1]	206[2]	--[1]

REVISED TO
REFLECT LOMR
DATED DEC 30 2004

[1]Not computed
[2]Flow based on split-flow calculations



FEDERAL EMERGENCY MANAGEMENT AGENCY

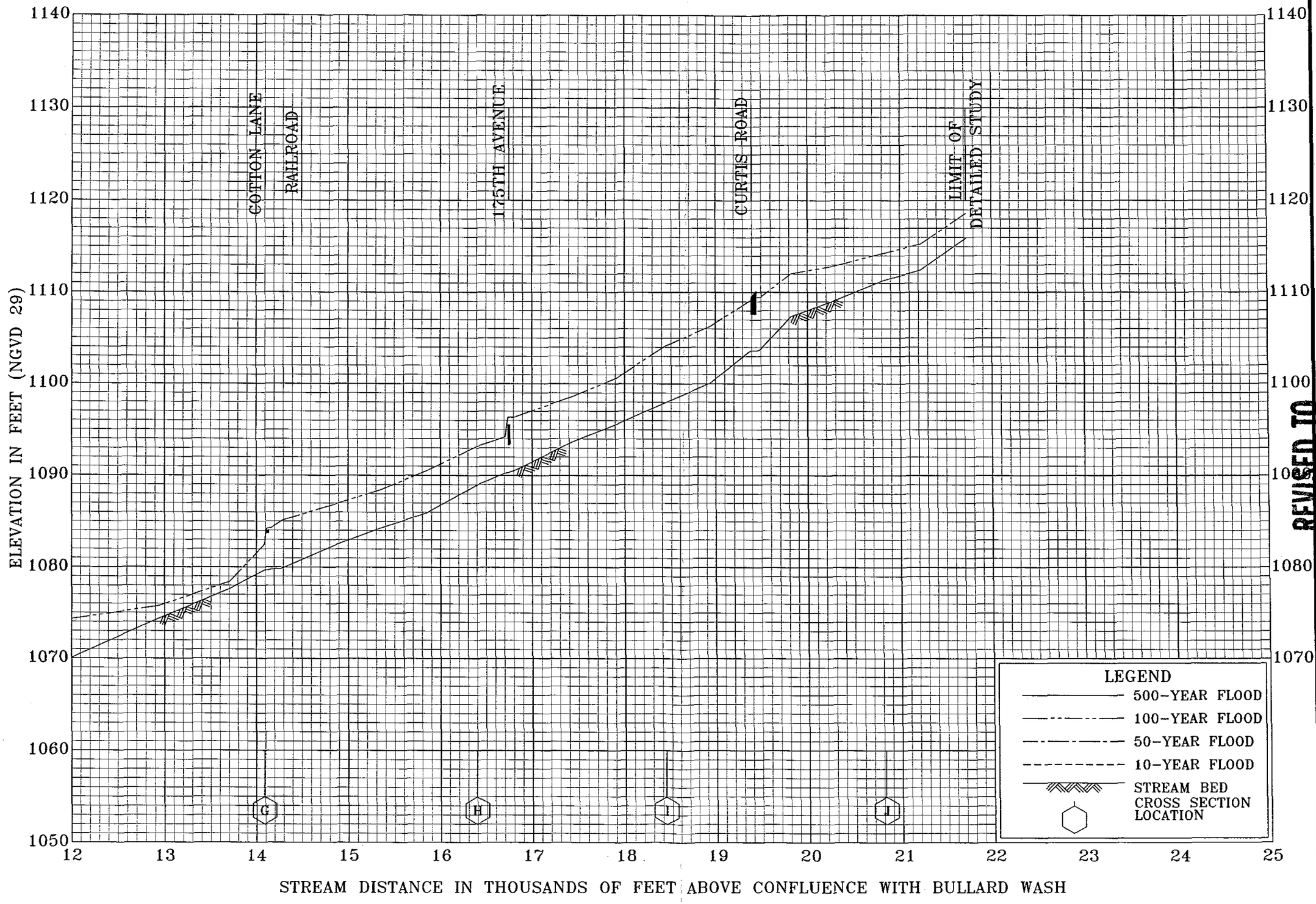
MARICOPA COUNTY, AZ
AND INCORPORATED AREAS

REVISED TO REFLECT LOMR
DATED DEC 30 2004

FLOOD PROFILES

CAMELBACK WASH

1266P



FEDERAL EMERGENCY MANAGEMENT AGENCY

MARICOPA COUNTY, AZ

AND INCORPORATED AREAS

FLOOD PROFILES

CAMELBACK WASH

REVISED TO REFLECT LOMR DATED DEC 30 2004

1267P

Federal Emergency Management Agency

JAN 07 2005

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

IN REPLY REFER TO:
Case No.: 04-09-0318P

The Honorable Andrew W. Kunasek
Chair, Maricopa County
Board of Supervisors
301 West Jefferson Street, 10th Floor
Phoenix, AZ 85003

Community: Maricopa County, AZ
Community No.: 040037
FIRM Panels Affected: 04013C1590 G
and 1595 G

116

Dear Mr. Kunasek:

In a Letter of Map Revision (LOMR) dated September 15, 2004, you were notified of proposed modified flood elevation determinations affecting the Flood Insurance Rate Map (FIRM) and Flood Insurance Study (FIS) report for the unincorporated areas of Maricopa County, Arizona. These determinations were for Camelback Wash from its confluence with Bullard Wash to approximately 2,300 feet upstream of Curtis Road. The 90-day appeal period that was initiated on September 30, 2004, when the Department of Homeland Security's Federal Emergency Management Agency (FEMA) published a notice of proposed Base Flood Elevations (BFEs) in the *Arizona Business Gazette*, has elapsed.

FEMA received no valid requests for changes to the modified BFEs. Therefore, the modified BFEs for your community that became effective on December 30, 2004, remain valid and revise the FIRM and FIS report that were in effect prior to that date.

The modifications are pursuant to Section 206 of the Flood Disaster Protection Act of 1973 (Public Law 93-234) and are in accordance with the National Flood Insurance Act of 1968, as amended (Title XIII of the Housing and Urban Development Act of 1968, Public Law 90-448), 42 U.S.C. 4001-4128, and 44 CFR Part 65. The community numbers and suffix codes are unaffected by this revision. The community number and appropriate suffix code as shown above will be used by the National Flood Insurance Program (NFIP) for all flood insurance policies and renewals issued for your community.

FEMA has developed criteria for floodplain management as required under the above-mentioned Acts of 1968 and 1973. To continue participation in the NFIP, your community must use the modified BFEs to carry out the floodplain management regulations for the NFIP. The modified BFEs will also be used to calculate the appropriate flood insurance premium rates for all new buildings and their contents and for the second layer of insurance on existing buildings and their contents.

If you have any questions regarding the necessary floodplain management measures for your community or the NFIP in general, please call the Director, Federal Insurance and Mitigation Division of FEMA in Oakland, California at (510) 627-7103.

If you have any questions regarding the LOMR, the proposed modified BFEs, or mapping issues in general, please call the FEMA Map Assistance Center, toll free, at 1-877-FEMA MAP (1-877-336-2627).

Sincerely,

Doug Bellomo, P.E., CFM, Acting Chief
Hazard Identification Section
Mitigation Division
Emergency Preparedness and Response Directorate

cc: The Honorable Elaine M. Scruggs
Mayor, City of Glendale

The Honorable James M. Cavanaugh
Mayor, City of Goodyear

Mr. Timothy S. Phillips, P.E.
Acting Chief Engineer and General Manager
Flood Control District of Maricopa County

Mr. Michael Duncan, P.E., CFM
Senior Engineer
Flood Control District of Maricopa County

Mr. Ted Collins
Principal Floodplain Coordinator
Flood Control District of Maricopa County

Mr. Daniel A. Sherwood, P.E.
Senior Civil Engineer
City of Glendale

Mr. David Ramirez, P.E.
City Engineer
Engineering Division
Community Development Department
City of Goodyear

Mr. Brian Cosson
NFIP Coordinator
Arizona Department of Water Resources

Mr. Massoud Rezakhani, CFM
Project Engineer
URS Corporation

Federal Emergency Management Agency

JAN 07 2005

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

IN REPLY REFER TO:
Case No.: 04-09-0318P

The Honorable James M. Cavanaugh
Mayor, City of Goodyear
190 North Litchfield Road
Goodyear, AZ 85338

Community: City of Goodyear, AZ
Community No.: 040046
FIRM Panels Affected: 04013C1590 G
and 1595 G

116

Dear Mayor Cavanaugh:

In a Letter of Map Revision (LOMR) dated September 15, 2004, you were notified of proposed modified flood elevation determinations affecting the Flood Insurance Rate Map (FIRM) and Flood Insurance Study (FIS) report for the City of Goodyear, Maricopa County, Arizona. These determinations were for Camelback Wash from its confluence with Bullard Wash to approximately 2,300 feet upstream of Curtis Road. The 90-day appeal period that was initiated on September 30, 2004, when the Department of Homeland Security's Federal Emergency Management Agency (FEMA) published a notice of proposed Base Flood Elevations (BFEs) in the *Arizona Business Gazette*, has elapsed.

FEMA received no valid requests for changes to the modified BFEs. Therefore, the modified BFEs for your community that became effective on December 30, 2004, remain valid and revise the FIRM and FIS report that were in effect prior to that date.

The modifications are pursuant to Section 206 of the Flood Disaster Protection Act of 1973 (Public Law 93-234) and are in accordance with the National Flood Insurance Act of 1968, as amended (Title XIII of the Housing and Urban Development Act of 1968, Public Law 90-448), 42 U.S.C. 4001-4128, and 44 CFR Part 65. The community numbers and suffix codes are unaffected by this revision. The community number and appropriate suffix code as shown above will be used by the National Flood Insurance Program (NFIP) for all flood insurance policies and renewals issued for your community.

FEMA has developed criteria for floodplain management as required under the above-mentioned Acts of 1968 and 1973. To continue participation in the NFIP, your community must use the modified BFEs to carry out the floodplain management regulations for the NFIP. The modified BFEs will also be used to calculate the appropriate flood insurance premium rates for all new buildings and their contents and for the second layer of insurance on existing buildings and their contents.

If you have any questions regarding the necessary floodplain management measures for your community or the NFIP in general, please call the Director, Federal Insurance and Mitigation Division of FEMA in Oakland, California at (510) 627-7103.

If you have any questions regarding the LOMR, the proposed modified BFEs, or mapping issues in general, please call the FEMA Map Assistance Center, toll free, at 1-877-FEMA MAP (1-877-336-2627).

Sincerely,

Doug Bellomo, P.E., CFM, Acting Chief
Hazard Identification Section
Mitigation Division
Emergency Preparedness and Response Directorate

cc: The Honorable Andrew W. Kunasek
Chairman, Maricopa County
Board of Supervisors

The Honorable Elaine M. Scruggs
Mayor, City of Glendale

Mr. David Ramirez, P.E.
City Engineer, City of Goodyear

Mr. Timothy S. Phillips, P.E.
Acting Chief Engineer and General Manager
Flood Control District of Maricopa County

Mr. Michael Duncan, P.E., CFM
Senior Engineer
Flood Control District of Maricopa County

Mr. Ted Collins
Principal Floodplain Coordinator
Flood Control District of Maricopa County

Mr. Daniel A. Sherwood, P.E.
Senior Civil Engineer
City of Glendale

Mr. Brian Cosson
NFIP Coordinator
Arizona Department of Water Resources

Mr. Massoud Rezakhani. CFM
Project Engineer
URS Corporation

Federal Emergency Management Agency

JAN 07 2005

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

IN REPLY REFER TO:
Case No.: 04-09-0318P

The Honorable Elaine M. Scruggs
Mayor, City of Glendale
5858 West Glendale Avenue
Glendale, AZ 85301

Community: City of Glendale, AZ
Community No.: 040045
FIRM Panels Affected: 04013C1590 G
and 1595 G

116

Dear Mayor Scruggs:

In a Letter of Map Revision (LOMR) dated September 15, 2004, you were notified of proposed modified flood elevation determinations affecting the Flood Insurance Rate Map (FIRM) and Flood Insurance Study (FIS) report for the City of Glendale, Arizona. These determinations were for Camelback Wash from its confluence with Bullard Wash to approximately 2,300 feet upstream of Curtis Road. The 90-day appeal period that was initiated on September 30, 2004, when the Department of Homeland Security's Federal Emergency Management Agency (FEMA) published a notice of proposed Base Flood Elevations (BFEs) in the *Arizona Business Gazette*, has elapsed.

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If you have any questions regarding the LOMR, the proposed modified BFEs, or mapping issues in general, please call the FEMA Map Assistance Center, toll free, at 1-877-FEMA MAP (1-877-336-2627).

Sincerely,

Doug Bellomo, P.E., CFM, Acting Chief
Hazard Identification Section
Mitigation Division
Emergency Preparedness and Response Directorate

cc: The Honorable Andrew W. Kunasek
Chairman, Maricopa County
Board of Supervisors

The Honorable James M. Cavanaugh
Mayor, City of Goodyear

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Senior Civil Engineer
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Flood Control District of Maricopa County

Mr. David Ramirez, P.E.
City Engineer, City of Goodyear

Mr. Brian Cosson
NFIP Coordinator
Arizona Department of Water Resources

Mr. Massoud Rezakhani, CFM
Project Engineer
URS Corporation

PUBLIC

INFORMATION

FLOOD CONTROL DISTRICT
of
Maricopa County

2801 West Durango Street • Phoenix, Arizona 85009-6399
Telephone (602) 506-1501
Fax (602) 506-4601
TT (602) 506-5897

BOARD OF DIRECTORS
Jan Brewer
Fulton Brock
Andrew Kunasek
Don Stapley
Mary Rose Garrido Wilcox

SUBJECT: FLOODPLAIN STUDY NOTIFICATION and
REQUEST FOR RIGHT OF ENTRY FOR SURVEYING AND RECONNAISSANCE

Dear Property Owner:

STUDY DESCRIPTION

The Flood Control District of Maricopa County is preparing to study a few floodplains in the West Valley. According to County Assessor records, you have property at or near the proposed floodplain-study corridors. The corridors are shown by white dots on the enclosed diagram. The purpose of this study is to identify areas subject to flooding during a "100-year flood" event. The study and resulting maps will be used for floodplain management purposes and will be submitted to the Federal Emergency Management Agency (FEMA) for Flood Insurance Rate Map revisions.

REQUEST

The intent of this letter is to notify you of the commencement of surveying and reconnaissance activities in support of the above-mentioned study. In order to perform these surveys, it **may** be necessary to briefly enter or cross your property. This activity should not result in any inconvenience to you or damage to your property. If you have any objection to the entry onto your property, please notify Mike Duncan, of the Flood Control District at (602)-506-4732. Otherwise, it will be assumed that you consent to the entry onto your property. The Flood Control District and its representatives appreciate your help in assuring the accuracy of this study by allowing us access to your property, and by providing any information you may have regarding past flooding or related problems.

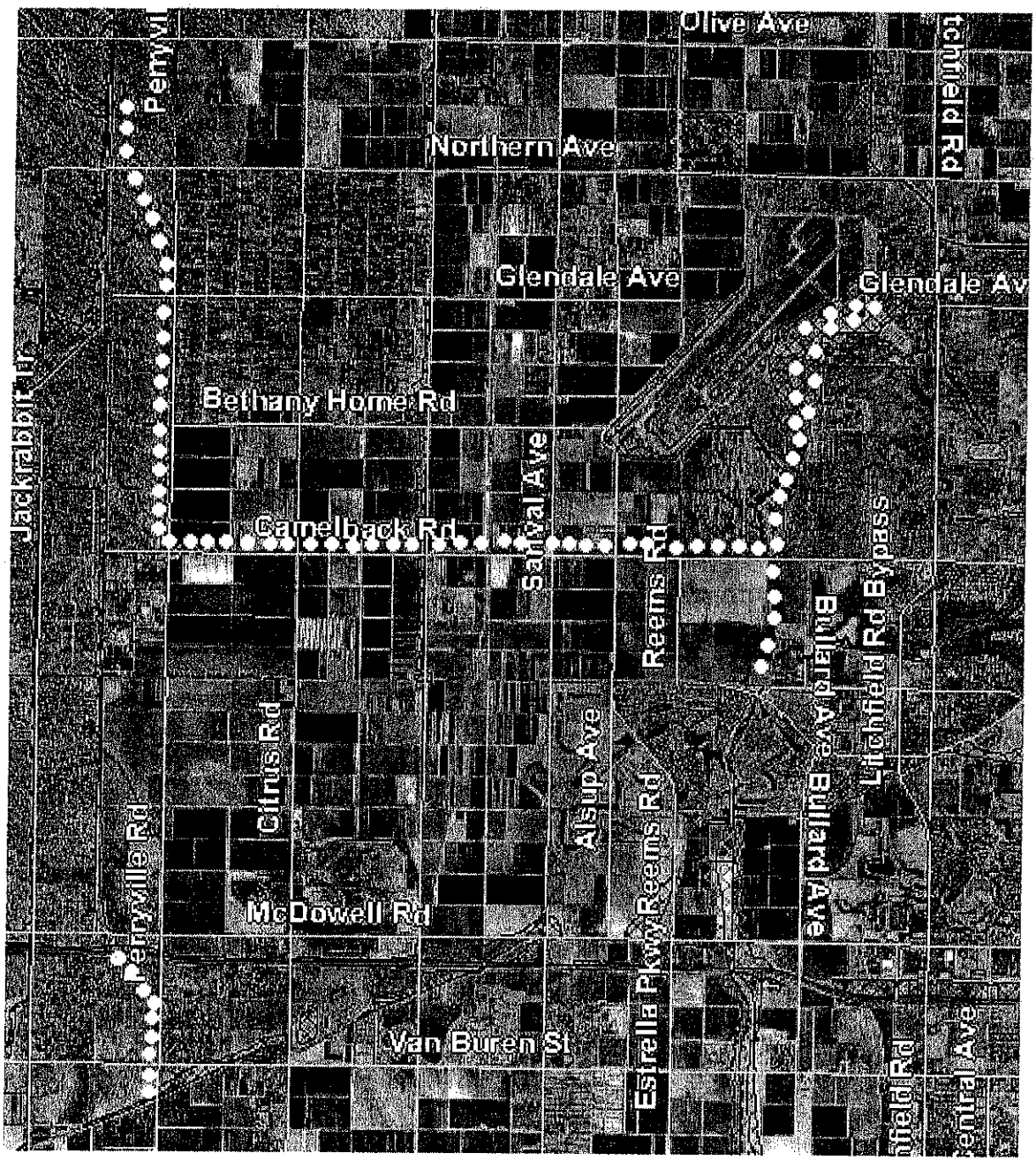
UPCOMING MEETING

This floodplain study is part of a drainage master study for the local watershed. The master study is called the Loop 303 Corridor / White Tanks Area Drainage Master Plan (ADMP) Update, and identifies stormwater hazards and solutions. The ADMP solution-alternatives will be presented at an upcoming public meeting for public comment. The meeting will have an open house format, so it is not necessary for everyone to arrive at 5:30 pm. For convenience, the same meeting will be held at these two locations:

(1) Tuesday August 28, 2001, from 5:30 to 8:00 pm, at Dysart High School, 11405 N. Dysart Road, in El Mirage
(2) Thursday August 30, 2001, from 5:30 to 8:00 pm, at Estrella Mountain Community College, 3000 N. Dysart Road, in Avondale

Sincerely,

Gregory L. Jones, Regional Planning Manager, Flood Control District of Maricopa County



Floodplain study corridor

K F & Enid Abel
5260 N Sarival Rd
Litchfield Park AZ 85340

C R Allen III
5015 N 7Th Ave
Phoenix AZ 85013

Mark E & Eileen E Angevine
7101 N187Th Ave
Waddle AZ 85355

Scott Mathew & Diana Marie Bauer
3601 W Tierra Buena Ln #238B
Phoenix AZ 85053

Donald Lee & Elizabeth Beal
19030 W Lynwood St
Buckeye AZ 85326

Wendell Ray & Linda Lee Becker
7303 N 187Th Ave
Waddle AZ 85355

Allen F & Gayle A Belluzzi
2009 S Cotton Ln
Buckeye AZ 85326

Douglas Richard & Karen E Benedict
515 N Perryville Rd
Buckeye AZ 85326

George Warren & Geneva Jo Benedict
919 N. Perryville Road
Goodyear AZ 85338

Robert D & Diana K Bible
19007 W Lynwood St
Buckeye AZ 85326

Dene L Bleeker
7117 N Perryville Rd
Waddle AZ 85355

John D & Jodi I Boozer
7330 N 157Th Ave
Litchfield Park AZ 85340

Jack C & Ida M Bramlette
19044 W Lynwood St
Buckeye AZ 85326

Thomas W & Ellen P Branch
19043 W Lynwood St
Buckeye AZ 85326

Bill H & Shirley R Buckner Sr.
611 N Perryville Rd
Buckeye AZ 85326

Clay S & Rhodine J Buse
7931 N 107Th Ave
Waddle AZ 85355

John A & Terah D Caratachea
527 N 4Th St #B
Avondale AZ 85323

Brian D & Peggy L Chandler
18649 W Orangewood Ave
Waddle AZ 85355

Gary S & Betty Jean Chestnut
7316 W Hazelwood St
Phoenix AZ 85033

Luigi & Anna Maria Ciulla
4139 W Ruth Ave
Phoenix AZ 85051

Irion D & Irene A Cole
19020 W Culver St
Buckeye AZ 85326

PUT THE 109 LETTERS IN THE MAIL ON 8-15-01

Vincent Como
7618 W Maui Ln
Peoria AZ 85381

nt & Melissa Como
28 N 186Th Ave
Waddle AZ 85355

Charles B & Helen C Criss
PO Box 872
Waddle AZ 85355

William V & Barbara E Cunningham
2115 W Danbury Rd
Phoenix AZ 85023

Ronald F & Robin L Dase
PO Box 874
Waddle AZ 85355

Gabriel A Diaz
Rr 1 Box 885
Buckeye AZ 85326

S & Gloria F Diaz Jr.
26976 Del Gado Rd
Capistrano Beach CA 92624

Ian A & Leslie Downing
6142 N 186Th Ave
Waddell AZ 85355

Billy A & Diana M Elledge
825 N Perryville Rd
Buckeye AZ 85326

Mario V Escudero
8943 W Cypress St
Phoenix AZ 85037

Michael Pierre & Yvonne A Espil
PO Box 672
Litchfield Park AZ 85340

Gary C & Carol Jo Ewert
PO Box 1192
Pine AZ 85544

Thomas G & Dolores Maria Fischrup
19019 W Lynwood St
Buckeye AZ 85326

Lloyd E & Mary V Fish
1801 E Claremont St
Phoenix AZ 85016

Robert D Fisher
1301 W Lawrence Ln
Phoenix AZ 85021

Dixie Lee Gross
4142 W Cheery Lynn Rd
Phoenix AZ 85019

Larry W & Edith A Hansen
615 N Perryville Rd
Buckeye AZ 85326

Jerry S Harper
6986 W Rose Garden Ln
Glendale AZ 85308

James A & Sandra R Hatfield
17641 W Northern Ave
Waddell AZ 85355

William D & Kimberly A Hindman
6742 N 186Th Ave
Waddle AZ 85355

Richard D & Karri L Hunt
PO Box 84021
Phoenix AZ 85071

Charles A & Val D Isleib
6842 N 186Th Ave
Waddell AZ 85355

Martyn S & Cammie L Jackson
6728 N 186Th Ave
Waddell AZ 85355

Therese H Kolberg
RR 1 Box 548
Buckeye AZ 85326

Harry L & Francine M Lantz
417 E Main St
Avondale AZ 85323

Robert F & Ladonna R Lovett
12710 N 74Th Ln
Peoria AZ 85381

William Lee & Caroline Lybarger
7298 W Shaw Butte Dr
Peoria AZ 85345

Patrick H & Beverly R Lynch
3650 W Tuckey Ln
Phoenix AZ 85019

Michael D & Juanita D Madden
815 N 187Th Ave
Buckeye AZ 85326

Augustine & Doris A Mancini
111162 W Almeria Rd
Avondale AZ 85323

Aniceto & Rebecca Diaz Martinez
310 N 94Th Ave
Tolleson AZ 85353

Michael & Susan McConaughey
6314 N 186Th Ave
Waddell AZ 85355

Kimalyn McWilliams
PO Box 5511
Glendale AZ 85312

Tommy L & Claudia B Morales
10420 W Lawrence Ln
Peoria AZ 85345

Lisa M Moreno
9036 W Roma Ave
Phoenix AZ 85037

Ruben & Tracy J Moreno Jr.
6642 N 186Th Ave
Waddell AZ 85355

Eudio Robert & Bridget M Neriz
7338 W Reade Ave
Glendale AZ 85303

Anthony & Elin B Nicholas
7319 N 187Th Ave
Waddell AZ 85355

James V & Betty J Odonnell
19008 W Culver
Litchfield Park AZ 85340

Mack C & Patricia Plummer
10550 N 52Nd St
Paradise Valley AZ 85253

Jackie & Joann Preston
501 Smith Dr
Carmi IL 62821

Elaine M Ransom
6342 N 186Th Ave
Waddle AZ 85355

Timothy K & Barbara L Redburn
7129 N 187Th Ave
Waddle AZ 85355

E & Keith R Reid III
4616 W Sahara Ave
Las Vegas NV 89102

Keith Riefkohl
22920 W Watkins St
Buckeye AZ 85326

Paul Riojas
PO Box 436
Cashion AZ 85329

Dennis E Set
5607 W Pierson St
Phoenix AZ 85031

Ajit & Jasbir Paul Singh
12733 W Wilshire Dr
Avondale AZ 85323

Lawrence B & Sandra G Slater
1228 W Edgewater Dr
Gilbert AZ 85233

Hensman John & Myrtle Lavada Smidt
11186 N Cottontail Ln
Parker CO 80138

Sterling R & Donna M Smith
901 N Perryville Rd
Buckeye AZ 85326

Edward T & Trudy M Soncrant
3405 W Danbury Rd #D101
Phoenix AZ 85023

James E & Cara R Steele
7401 N 187Th Ave
Waddle AZ 85355

Larry D & Darla M Stewart
2527 N 60Th Ln
Phoenix AZ 85035

Ed A & Angela M Stubenrach
9022 W Mclellan Rd
Glendale AZ 85305

Orville E & Sharon A Teel
7127 N Perryville Rd
Waddle AZ 85355

Ernest J & Ruth E Thornburg
4729 W La Mirada Dr
Laveen AZ 85339

Wayne & Dotty A Tucker
5632 W Whispering Wind Dr
Glendale AZ 85310

Glenn O Turnbow
7521 N 75Th Ave
Glendale AZ 85303

Arthur C Vega
22213 W Watkins St
Buckeye AZ 85326

Jayson R & Kelly A Vose
8622 W Davis Rd
Peoria AZ 85382

John C & Sandra K Willard
18864 W Culver St
Buckeye AZ 85326

Walter F & Janet K Wilson Jr.
7403 N Perryville Rd
Waddell AZ 85355

Mathew & Angela Wiseman
14968 N 85Th Dr
Peoria AZ 85381

Randy W & Rosa Wondrash
12541 W Windsor Ave
Avondale AZ 85323

Leonard B Wood
6756 N 186Th Ave
Waddell AZ 85355

[illegible]ter H Woolsey
7011 N 187Th Ave
Waddell AZ 85355

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Arizona Land Advisors
6710 N. Scottsdale Road, # 210
Scottsdale AZ 85253

Joe Blanton, Town Manager
Town of Buckeye
100 N. Apache Road
Buckeye AZ 85326

Mailed 3 more letters & diagrams on 8-21-01

MEMO TO FILE

PROJECT: FCD Contract 99-40, Loop 303 / White Tanks ADMP Update

SUBJECT: Meeting with city engineers of Glendale to present the floodplain corridors that will be studied under this contract

FROM: Mike Duncan, Floodplain Delineation Branch MWD 8-23-01

On August 22, 2001, at 11:40 am, I met with Dan Sherwood and Mark Ivanich (Land Development Engineer), at City of Glendale -- Engineering, at 5850 W. Glendale Av. (phone 623-930-3630). I showed them the existing floodplains and the study corridors of my 17" by 22" exhibit. I also gave a copy of the letter and exhibit that were mailed to landowners near the study-corridor. I told them about the open house meetings of next week for Alternatives and Public Comment.

Dan stated that Glendale had some concerns about a development and related CLOMR in the area of the Airline Canal and El Mirage Road (later determined to be Wigwam Creek), for which Coe and Van Loo was the engineer, and Lynn Thomas was one of the F.C.D. reviewers. He had not seen any revisions or responses. He has interest because it is unincorporated county that is within the City of Glendale strip annexes. I will talk to Lynn and get back to him.

Mark noted that he receives development plans from the County's Planning and Development for projects within Glendale's strip annexing, but nothing for the projects west of 115 th Ave. I told him I would talk to David Boggs (FCD Development Review Branch Manager) and get back to him with the best person to contact at Planning and Development.

Mark would also like copies of the Alternative maps of the ADMP Update. I plan to make copies for him of the latest maps in about 2 weeks.

MEMO TO FILE

PROJECT: FCD Contract 99-40, Loop 303 / White Tanks ADMP Update

SUBJECT: Meeting with City Engineer for Goodyear to present the floodplain corridors that will be studied under this contract

FROM: Mike Duncan, Floodplain Delineation Branch MWD 8-23-01

On August 22, 2001, at 10:30 am, I met with David Ramirez (City Engineer), Harvey Krauss (Community Development Director), and several of their planners and reviewers, at one of their weekly meetings, at their office, at 190 N. Litchfield Road (phone 623-[redacted] 882-7954). I showed them the existing floodplains and the study corridors of my 17" by 22" exhibit. I also gave them 5 copies of the letter and exhibit that were mailed to landowners near the study-corridor. I told them about the open house meetings of next week for Alternatives and Public Comment.

Harvey pointed out that a portion of Section 20 at the northwest corner of Indian School Road and Bullard Ave. alignment has transferred from Goodyear to Litchfield Park (this is not reflected in the 2001 Phx. Mapping Service street atlas). The area transferred is about 1/4 mile wide east-to-west and its south edge is immediately north of the Millennium High School.

Dave Ramirez pointed out that our floodplain study corridor along Perryville Road near Van Buren Street is just across the street from a City of Goodyear strip annex. Dave also discussed a development at the Bullard Wash floodplain just south of Thomas Road. A development company named Globe is building Goodyear Planned Regional Center (GPDC). The north part is residential and is underway. The south part is commercial and is planned for the future. He said no floodplain was on the FIRM in this area. I told him that the new FIRMs of 7-19-01 have floodplain for Bullard Wash all the way up to Indian School Road. I will check into the history of this segment and inform him of what I find.

MEMO TO FILE

PROJECT: FCD Contract 99-40, Loop 303 / White Tanks ADMP Update

SUBJECT: Meeting with Town Engineer for Buckeye to present the floodplain corridors that will be studied under this contract

FROM: Mike Duncan, Floodplain Delineation Branch MWD

On August 21, 2001, at 8:30 am, I met with Woody Scoutten, Consulting Engineer, at his office at 10410 N. 31st Avenue, # 412 (phone 602-993-5686). He is the Buckeye Town Engineer. I showed him the existing floodplains and the study corridors of my 17" by 22" exhibit, and I gave him a copy of the letter and exhibit that were mailed to landowners near the study-corridor.

He showed me his file for Parkman Ranch (by Arizona Land Advisors), which is a 160 acre subdivision of small residential lots at the northwest corner of Perryville Road and Van Buren St. One of our proposed floodplain study corridors is at the east edge of this parcel. While I was at Woody's office, he called Joe Blanton, the Town Manager for Buckeye, to see if the preliminary plat had been approved by Buckeye. It has been approved, and the developer has received a time extension for the preliminary plat. Joe has asked Woody to attend one of our Loop 303 / White Tanks ADMS Alternatives Open House meetings next week.

I made copies of some pages from Woody's copy of the Preliminary Drainage Report for Parkman Ranch by Bob Mitchell of Inifinity Engineering. I mailed copies of the letter-and-diagram-to-land-owners to Bob Mitchell, Dave Lords of Arizona Land Advisors, and Joe Blanton today (8-21-01).

Woody also said that Buckeye plans to annex some of the land between Roosevelt Street and McDowell Road and west of Perryville Road.

MEMO TO FILE

PROJECT: FCD Contract 99-40, Loop 303 / White Tanks ADMP Update

SUBJECT: Meeting with City Engineer for Litchfield Park to present the floodplain corridors that will be studied under this contract

FROM: Mike Duncan, Floodplain Delineation Branch MWD 8-16-01

On August 16, 2001, at 1:30 pm, I met with Doug Pike of Hook Engineering, at 3221 N. 24th Street (phone 602-956-3200). He is the City Engineer for the City of Litchfield Park. I showed him the existing floodplains and the study corridors of my 17" by 22" exhibit. He made a copy for himself. I also gave him a copy of the letter and exhibit that were mailed to landowners near the study-corridor. He plans to fax these two items to: Suncor (who is developing in the northwest part of Litchfield Park), Keough Engineering (who is Suncor's engineer), and the developers of Russell Ranch (mentioned below).

Horatio, the City Manager for Litchfield Park, starts his 2 week vacation today; so Doug plans to attend one of our public meetings at the end of the month. He also plans to invite someone from Suncor to meet him at he same public meeting.

Litchfield Greens is a master planned development by Suncor that has some phases planned at the northwest corner of the City of Litchfield Park. This city limit of Litchfield Park is close to the low part of the Bullard Wash "swale", just south of Camelback Road. Also, in this area Suncor sold a 40-acre-exp[redacted] to Millennium High School (Agua Fria Union District) for ball fiel[redacted]ing) and stormwater detention (existing).

Russell Ranch is an 80-acre d[redacted]pment at the northwest corner of Camelback Road and Citrus Road (Section15). Hook Engineering has done the engineering for this development. During the County's review process, they did some detailed surveying of the west half of Section 15, to compute breakouts and sheet flows. Doug said that we can have copies of this surveying if we want it. Doug indicated that there is an Addendum to the Russell Ranch Drainage Report that covers the breakouts, sheet flows, etc. He also mentioned that the southern-most 300 feet of the Russell Ranch corner is a commercial parcel and is not part of the residential development.

FLOOD CONTROL DISTRICT
of
Maricopa County

2801 West Durango Street • Phoenix, Arizona 85009-6399
Telephone (602) 506-1501
Fax (602) 506-4601
TT (602) 506-5897

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SUBJECT: REQUEST FOR RIGHT OF ENTRY FOR SURVEYING FOR FLOODPLAIN STUDY

Dear Property Owner:

The Flood Control District of Maricopa County is re-studying a floodplain in your area that is called "Perryville Road Wash." This floodplain is just west of the Perryville-Road-alignment, and extends from Northern Avenue to Camelback Road.

For the portion between Glendale Avenue and Bethany Home Road, survey crews will be surveying once about every 500 feet at homes along both sides of 186th Avenue and along the west side of 185th Avenue.

For those homes that fall at the 500-foot spacing, survey crews will need to briefly enter the yard to take a series of brief readings (each reading typically takes 10 seconds or less). This activity does not cause any damage to the yards. Also, yards that contain animals will not be entered, and locked yards will not be entered.

If you object to a survey crew entering your yard, please call:

Mike Duncan, Project Manager at 602-506-4732.

If you call after regular work hours, you may leave a message; and please include your address.

If you do not object, you may call, but you do not have to. If you have any questions, also please call.

Your cooperation is greatly appreciated, as this surveying will allow an accurate assessment of any flooding hazards that may be present in your neighborhood.

The survey crews are employed by URS Corporation, which is our engineering consultant for this study.

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I, Elliott Freireich, publisher of West Valley View and West Valley Business, newspapers of general circulation in Avondale, Buckeye, Goodyear, Litchfield Park and Tolleson, Arizona, attest that the legal advertisement for

URS. Corp
Flood Control District of Maricopa County
Tuesday, April 16, 2002 - Open House

was published on April 3, 2002 and April 10, 2002

E Freireich
Elliott Freireich

April 10, 2002
Date

SUBSCRIBED AND SWORN TO BEFORE ME ON THE

10 DAY OF April (Month), 2002 (YEAR)

NOTARY SIGNATURE: Rene Leeann Hartmann

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STATE OF ARIZONA
Maricopa County
RENE LEEANN HARTMANN
My Appointment Expires 09/30/03

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MAY 21 2002

****** INVOICE ****** PAGE: 1

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www.westvalleyview.com

(623) 535-8439

INVOICE NUMBER: 0160826-IN
INVOICE DATE: 04/10/02

ORDER NUMBER:
ORDER DATE:
SALESPERSON: 0016
CUSTOMER NO: URSCOR

SOLD TO:
URS Corporation
White Tanks Flood
7720 N 16th Street #100
Phoenix AZ 85020
CONFIRM TO: 17

SHIP TO:
URS Corporation
White Tanks Flood
7720 N 16th Street #100
Phoenix AZ 85020

CUSTOMER P.O.	SHIP VIA	F.O.B	TERMS
			Net 30 days

ITEM NO.	UNIT	ORDERED	SHIPPED	BACK ORD	PRICE	AMOUNT
16286	EACH	1.00	1.00	.00	286.000	286.000
1/6 PG, 1 WEEK OPEN RATE			WHSE: 000			
16286	EACH	1.00-	1.00-	.00	14.300	14.300-
1/6 PG, 1 WEEK OPEN RATE			WHSE: 000			

5% EMAIL DISCOUNT, FLOOD CONTROL DISTRICT OF
MARICOPA COUNTY, TUES. 4/16 OPEN HOUSE

PAID 5/16/02
Ck# 06036696

NET INVOICE:	271.70
LESS DISCOUNT:	.00
FREIGHT:	.00
SALES TAX:	5.43
INVOICE TOTAL:	277.13

MAY 21 2002

****** INVOICE ****** PAGE: 1

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200 W. Wigwam Blvd
Litchfield Park, AZ. 85340-4636
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(623) 535-8439

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1/6 PG, 1 WEEK OPEN RATE			WHSE: 000			
16286	EACH	1.00-	1.00-	.00	14.300	14.300-
1/6 PG, 1 WEEK OPEN RATE			WHSE: 000			

5% EMAIL DISCOUNT, FLOOD CONTROL DISTRICT OF
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PAID 5/16/02
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NET INVOICE:	271.70
LESS DISCOUNT:	.00
FREIGHT:	.00
SALES TAX:	5.43
INVOICE TOTAL:	277.13

The recently founded club has about six members, currently all from Goodyear's PebbleCreek community, but others are

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Flood Control District of Maricopa County Invites You to an

Open House

Tuesday, April 16th

Scott L. Libby Elementary School
18701 W. Thomas Rd.
Litchfield Park, AZ 85340
5:00 — 7:00 PM

Your property may be in a Flood Hazard Area. The Flood Control District of Maricopa County invites you to attend a public open house to see the preliminary results of a floodplain study. Come learn more about the study and see how the floodplains in your area might affect you and your property.

This particular study evaluated flood hazard areas and determined flood elevations in the area.

The four washes being studied are:

- Perryville Wash (approx. Perryville Rd. from Northern Ave. to Camelback Rd.)
- Camelback Wash (Camelback Rd. from Perryville Rd. to east of Sarival Ave.)
- Bullard Wash (from Glendale Ave. to Indian School Rd.)
- I-10 Culvert Wash (around Perryville Rd. from I-10 to R.I.D. Canal)

Exhibits of the floodplain delineations will be on display and representatives from Flood Control District and engineering consultants will be available to discuss the study and answer your questions.

Please contact Michael Duncan, P.E. Project Manager, Flood Control District at 602-506-4732 or mwd@mail.maricopa.gov for additional information.

Note: Materials in alternate formats (large print, audio cassette, Braille, FM listening systems or qualified sign language interpreters) are available with a 72-hour notice.

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staff writer

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member of the Friend
Park Library.

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75 years and when I n
I should pay back wha
me," Lurie said.

The 82-year-old has
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been important to Litc
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"In the early years,
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19

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04/11/2002

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Notary Public

White Tanks North Inlet Channel Improvement Study Open House

The Flood Control District of Maricopa County- 2801 W. Durango St., Phoenix, AZ 85009 – cordially invites interested residents and property owners to attend a public open house, Tuesday, April 16, 2002, from 5-7 p.m. at Scott Libby Elementary School (18701 West Thomas Road, Litchfield Park) to see the preliminary floodplain delineations for your area. In addition, alternative solutions will be presented to reduce the problem and potentially eliminate the flood hazard area.

The study limits are between Perryville and Citrus Road, and Peoria Avenue and Indian School Road.

Exhibits of the floodplain delineations and alternative solutions will be on display and representatives from the Flood Control District and engineering consultants will be available at the meeting to discuss the study and to answer any questions. For Additional information, contact Valerie Swick, Flood Control District Project Manager at 602-506-2929 or email vas@mail.maricopa.gov.

A sign language interpreter will be made available upon request with 72 hours notice. Alternative format materials or FM or Infra-Red Listening Devices are also available upon request with 72 hours notice. Additional reasonable accommodations will be made available to the extent possible within the timeframe of the request. Contact David Brozovsky, Flood Control District ADA Coordinator at 602-506-1501 if these services are required.

Published: April 4, 11, 2002

Flood Control District of Maricopa County Invites You to an Open House

Tuesday, April 16th

Scott L. Libby Elementary School
18701 W. Thomas Rd.
Litchfield Park, AZ 85340
5:00 – 7:00 PM

The Flood Control District of Maricopa County invites you to attend a public open house to see the preliminary results of a floodplain study in your area. Come learn more about the study and see how the floodplains in your area might affect you and your property.

Your property may be in a Flood Hazard Area.

This particular study evaluated flood hazard areas and determined flood elevations.

Four washes are being studied:

- Perryville Wash
- Camelback Wash
- Bullard Wash
- I-10 Culvert Wash

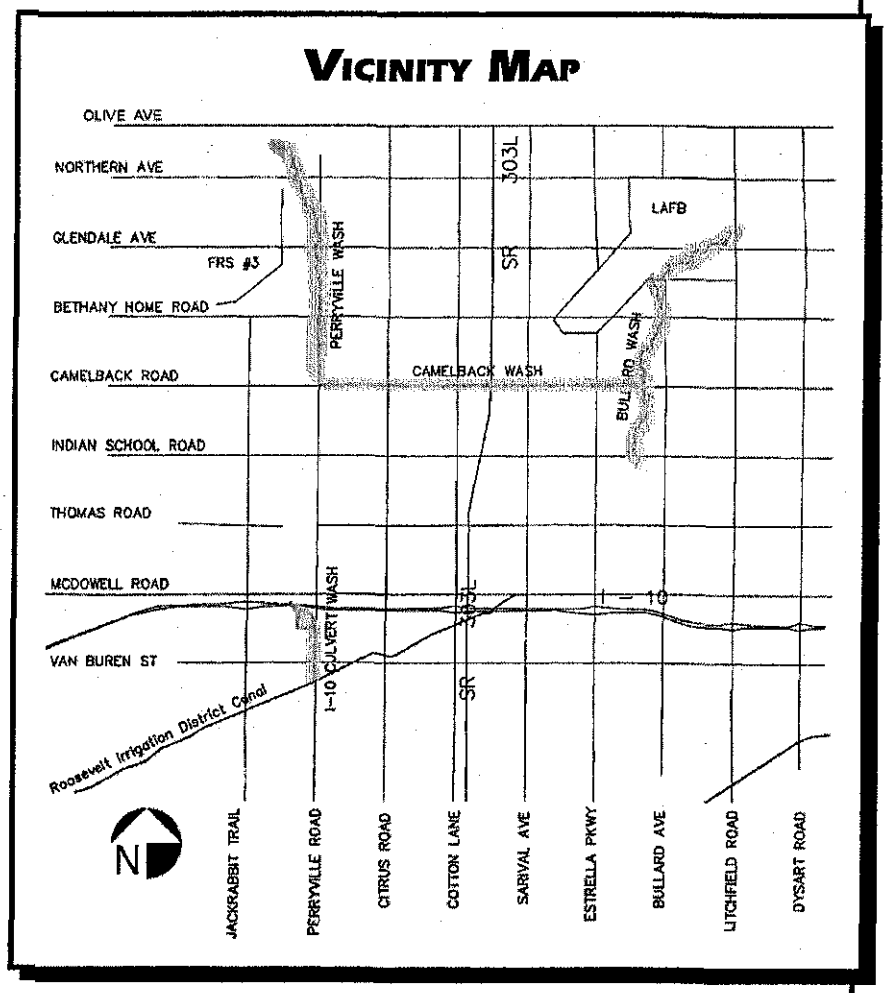
(See map)

The floodplain study will be used by the Flood Control District to better manage the floodplains, reduce or prevent flood damage, and maintain the integrity of the floodplains.

With an open house format, Flood Control District staff and engineering consultants will be available to discuss the study and answer your questions.

Please contact Michael Duncan, Project Manager, Flood Control District at 602-506-4732 or mwd@mail.maricopa.gov for additional information.

Note: Materials in alternate formats (large print, audio cassette, Braille, FM listening systems or qualified sign language interpreters) are available with a 72-hour notice.



www.fcd.maricopa.gov

Public Meeting

This public meeting is being held to present the preliminary findings of the study and to obtain input from the community. Exhibits of preliminary floodplain delineations will be on display at the meeting, in addition to diagrams of the various solutions. Futhermore, representatives from the Flood Control District and engineering consultants will be available to discuss the study and to answer any questions.

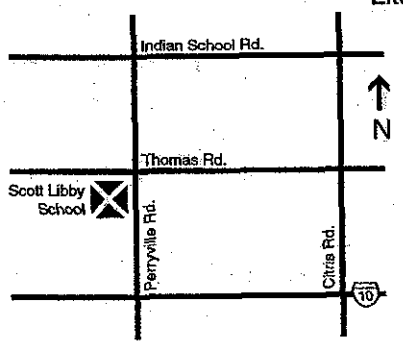
If you are unable to attend and have specific questions or comments, please contact any of the study representatives listed in this brochure by phone, e-mail, or mail.

Meeting Location

Tuesday, April 16
5-7 p.m.

CAFETERIA

Scott Libby School
18701 West Thomas Road
Litchfield Park



I-10 EXITS ONLY AT COTTON LANE & JACKRABBIT TRAIL

Contact Us

Valerie Swick
Project Manager
Flood Control District
(602) 506-2929
vas@mail.maricopa.gov

Ash Patel
Consultant
Wood Patel & Associates
(602) 335-8500
apatel@woodpatel.com

For more information on the Flood Control District of Maricopa County, visit www.fcd.maricopa.gov

Flood Control District of Maricopa County
2801 W. Durango Street
Phoenix, AZ 85009

OPEN HOUSE

Preliminary Floodplain Delineations & White Tanks North Inlet Channel Improvements

The Flood Control District of Maricopa County

Tuesday, April 16
5-7 p.m.

Scott Libby School
18701 West Thomas Road
Litchfield Park

civil engineers · land surveyors · hydrologists · const. managers
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Maricopa County Flood Control District
2801 W. Durango
Phoenix, AZ 85009

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Please attend an Open House

Tuesday, April 16th

Scott L. Libby Elementary School
18701 W. Thomas Rd.
Litchfield Park, AZ 85340
5:00 – 7:00 PM

Flood Control District Public Meeting

4-16-02

Name	Mailing Address	Phone
[illegible]	42 W Cooley # Chandler AZ 85225	480 892-1439
Lenny Dresch	6152 N. 183rd Ave Waddell AZ 85355	623 853-9
Jack + Lisa Hein	6728 N 186 Ave Waddell Az 85355	623 853 146
Curtis Coughlin	6151 S. Rural Rd. #103 Tempe AZ 85283	480-998-4004
Ben & Pat Zynek	3650 W. Tuckey Ln Phx AZ 85019	602-841-834
DENNIS & MARGARITE BURKHEN	6531 N. SYKIVAL AVE LITCHFIELD PK 85340	623-935-8
David Maguire	2051 W Northern Ave Ste 102 Phx Az 85021	602 841 159
John F Bailey	11885 W. McDowell #1063 Avondale, AZ 85323	623 322-0
Tim Rollins	7129 N Perryville Rd Waddell 85355	
John E. Bradley	PO Box 1030 Litchfield Park Az 85340	
Dave Eberhart	6821 W. Aster Peoria 85381	623-412-005
ROBERT BAYNE	14929 W BROADWAY Rd Goodyear, AZ 85338	623 932-08
JEANNETTE FISH	M.C.F.B. 4001 E. BROADWAY #B-9 PHX 85040	602 437-
Kent Xander, KAX Group	6929 E. Greenway Pkwy #152 Sc. 85254	
MIKE SMITH	6602 N. 183RD AVE WADDELL 85355	623 853 9550
Gabi Zaborac Tonett	12716 N 74th Lane Peoria, AZ 85381	623 878-5
Jackie Mayer	6207 N 184th ave Waddell AZ 85355	623 853-151
Ron Lelakowski	2224 N. 200th AVE Buckeye Az 85396	623 [illegible]
Carly + Vonda Kapetanatis	7723 N. 187th Ave Waddell, AZ 85355	623-935
Michael C Hughes	2198 E Camelback Rd #300 PHX AZ 85016	602 508-19
BILLY WOODS	1122 N 179 AVE BUCKEYE AZ	623-85

Flood Control District Public Meeting

Name	Mailing Address	Phone
P. FRITZ	6541 N. 186th Ave Waddell AZ 85355	623-853-0832
KAREN BRINKER	6506 N 183rd AVE WADDELL AZ	(623) 853-0469
HANS KOPPENHOEFER	2901 N. CENTRAL SUITE 1044 PHX AZ 85012	(602) 279-000
JIM STEELE	7401 N 187TH AVE WADDELL AZ 85355	(602)309-0163 (623)935-7295
Richard R. Harris	2801 N.	
Henry Rutschow	Lot 37 186th Ave	623 546 4613
Diana Rutschow	Lot 37 " "	" " "
BRUCE AGENTER	P.O. Box 6410 Scott AZ 85261	480-445-4225
Glen Vorthoms	PO Box 900 Waddell, AZ 85355	623-546-826
Jeff & Wendy Durfee	6220 N 183rd Ave Waddell, AZ 85355	(602) 565-201,
~~Dave~~		
Cindy Lee	3967 N. 150th Ave	Goodyear 85338
Mike Bradley	5809 N. 129th Ave	Litchfield Park 85340
George Patty Rooey	19300 W. Yuma Rd	Buckeye AZ 85326
DANIEL A. O'CONNOR	~~1300~~ P.O. Box 2471 - Litchfield Park	85340
Robert Wagenfehr	6427 N 186th Ave Waddell AZ	85355
Sandra Hatfield	17641 W Northern Waddell AZ	85355
Theresa Drauer	1914 N 193 Av	Buckeye 85326

Flood Control District Public Meeting

Name	Mailing Address	Phone
Ash Patel	W/P	
Bob Davier	URS	
Elliot Silverstein	URS	
Jeff Sims	W/P	
Michael Duncan	FCD	
Richard Harris	FCD	also on sheet 2
Greg Jones	FCD	
Valene Swick	FCD	
Angelia Fowler	FCD	
Dennis Peltz		
Shanna Yager	FCD	

OPEN HOUSE

White Tanks Floodplain Delineation/North Inlet Channel Improvements
Comment Sheet
April 16, 2002

Name: BRUCE AGENTER 85261
Address: P.O. BOX 6410 SCOTTSDALE AZ ~~85261~~
Phone Number: 480-443-4190 Email: _____

1. Please select the White Tanks North Inlet Channel alternative that you most prefer?

_____ Number 1 – Desertscaped Earthen Channel
_____ Number 2 – Concrete Channel with Desertscaped overbanks
_____ Number 3 – Detention Basin at Olive Avenue
X Number 4 – Additional channel on East side of Beardsley Canal
_____ Number 5 – No Action

2. The following will be used as part of the evaluation process to recommend the preferred alternative for the White Tanks North Inlet Channel. We would like your assistance in establishing the priorities of the community. Please rank the following items in the order that they are most important to you. (1 – most important, 9 – least important)

X Reduction in flooding
_____ Public safety during flooding
_____ Property acquisition/easements
X Cost
_____ Appearance/aesthetics
_____ Landscaping
_____ Construction impacts
_____ Multi-use/recreational opportunities
_____ Vehicular access/circulation during floodi

9 OTHER Comment Sheets ~~Draft~~ with CHANNEL draft

IMPROVEMENT ONLY

3. **Please provide any additional comments on the preliminary floodplain results or the White Tanks North Inlet Channel alternatives.**

4. **How did you hear about tonight's meeting?**
____ Newspaper __X__ Brochure in the Mail ____ Friend/Neighbor ____ Other

5. **How would you rate the overall knowledge and helpfulness of the staff members?**
__X__ Very Good ____ Good ____ Fair ____ Poor ____ Very Poor

6. **Was the project information presented in an understandable manner?**
__X__ Yes ____ No

7. **How would you rate this facility for holding future meetings?**
____ Very Good __X__ Good ____ Fair ____ Poor ____ Very Poor

THANK YOU FOR COMING TONIGHT

Flood Control District of Maricopa County
2801 West Durango Street
Phoenix, AZ 85009
Phone: (602) 506-1501
Fax: (602) 506-4601

OPEN HOUSE

White Tanks Floodplain Delineation/North Inlet Channel Improvements
Comment Sheet
April 16, 2002

Name: Dave Eberhart
Address: 6801 W. Aster Peoria AZ 85381
Phone Number: 623-412-0050 Email: tbirdgroup@cox.net

1. Please select the White Tanks North Inlet Channel alternative that you most prefer?

____ Number 1 – Desertscaped Earthen Channel
____ Number 2 –Concrete Channel with Desertscaped overbanks
____ Number 3 – Detention Basin at Olive Avenue
X Number 4 – Additional channel on East side of Beardsley Canal
____ Number 5 – No Action

2. The following will be used as part of the evaluation process to recommend the preferred alternative for the White Tanks North Inlet Channel. We would like your assistance in establishing the priorities of the community. Please rank the following items in the order that they are most important to you. (1 – most important, 9 – least important)

1 Reduction in flooding
2 Public safety during flooding
____ Property acquisition/easements
3 Cost
____ Appearance/aesthetics
____ Landscaping
4 Construction impacts
____ Multi-use/recreational opportunities
____ Vehicular access/circulation during flooding

3. **Please provide any additional comments on the preliminary floodplain results or the White Tanks North Inlet Channel alternatives.**

We need to make these improvements with full funding now.

4. **How did you hear about tonight's meeting?**

____ Newspaper X Brochure in the Mail ____ Friend/Neighbor ____ Other

5. **How would you rate the overall knowledge and helpfulness of the staff members?**

X Very Good ____ Good ____ Fair ____ Poor ____ Very Poor

6. **Was the project information presented in an understandable manner?**

X Yes ____ No

7. **How would you rate this facility for holding future meetings?**

X Very Good ____ Good ____ Fair ____ Poor ____ Very Poor

THANK YOU FOR COMING TONIGHT

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2801 West Durango Street
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Phone: (602) 506-1501
Fax: (602) 506-4601

OPEN HOUSE

White Tanks Floodplain Delineation/North Inlet Channel Improvements
Comment Sheet
April 16, 2002

Name: David Maguire
Address: 2051 W Northern Ste 102
Phone Number: 602 841 1845 Email: dmaguire@landsolutions.com

1. Please select the White Tanks North Inlet Channel alternative that you most prefer?

____ Number 1 – Desertscaped Earthen Channel
____ Number 2 – Concrete Channel with Desertscaped overbanks
____ Number 3 – Detention Basin at Olive Avenue
X Number 4 – Additional channel on East side of Beardsley Canal
____ Number 5 – No Action

2. The following will be used as part of the evaluation process to recommend the preferred alternative for the White Tanks North Inlet Channel. We would like your assistance in establishing the priorities of the community. Please rank the following items in the order that they are most important to you. (1 – most important, 9 – least important)

2 Reduction in flooding
1 Public safety during flooding
9 Property acquisition/easements
7 Cost
3 Appearance/aesthetics
6 Landscaping
8 Construction impacts
4 Multi-use/recreational opportunities
5 Vehicular access/circulation during flooding

3. **Please provide any additional comments on the preliminary floodplain results or the White Tanks North Inlet Channel alternatives.**

4. **How did you hear about tonight's meeting?**
____ Newspaper __X__ Brochure in the Mail ____ Friend/Neighbor ____ Other

5. **How would you rate the overall knowledge and helpfulness of the staff members?**
__X__ Very Good ____ Good ____ Fair ____ Poor ____ Very Poor

6. **Was the project information presented in an understandable manner?**
__X__ Yes ____ No

7. **How would you rate this facility for holding future meetings?**
__X__ Very Good ____ Good ____ Fair ____ Poor ____ Very Poor

THANK YOU FOR COMING TONIGHT

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Fax: (602) 506-4601

OPEN HOUSE

White Tanks Floodplain Delineation/North Inlet Channel Improvements
Comment Sheet
April 16, 2002

Name: JIM STEELE
Address: 7401 N 187TH AVE WADDELL
Phone Number: (623) 935-7285 Email: STEELEY EVR@AOL

1. Please select the White Tanks North Inlet Channel alternative that you most prefer?
1 = HIGHEST MOST PREFERRED 5 = LEAST PREFERRED

4 ____ Number 1 – Desertscaped Earthen Channel
3 ____ Number 2 – Concrete Channel with Desertscaped overbanks
2 ____ Number 3 – Detention Basin at Olive Avenue
1 X Number 4 – Additional channel on East side of Beardsley Canal
5 ____ Number 5 – No Action

2. The following will be used as part of the evaluation process to recommend the preferred alternative for the White Tanks North Inlet Channel. We would like your assistance in establishing the priorities of the community. Please rank the following items in the order that they are most important to you. (1 – most important, 9 – least important)

1 Reduction in flooding
3 Public safety during flooding
6 Property acquisition/easements
2 Cost
9 Appearance/aesthetics
8 Landscaping
5 Construction impacts
7 Multi-use/recreational opportunities
4 Vehicular access/circulation during flooding

3. **Please provide any additional comments on the preliminary floodplain results or the White Tanks North Inlet Channel alternatives.**

I WOULD PREFER PRESENTATION WITH Q/A SESSION AFTERWARDS.

4. **How did you hear about tonight's meeting?**

____ Newspaper X Brochure in the Mail ____ Friend/Neighbor ____ Other

5. **How would you rate the overall knowledge and helpfulness of the staff members?**

X Very Good ____ Good ____ Fair ____ Poor ____ Very Poor

6. **Was the project information presented in an understandable manner?**

X Yes ____ No

7. **How would you rate this facility for holding future meetings?**

____ Very Good X Good ____ Fair ____ Poor ____ Very Poor

THANK YOU FOR COMING TONIGHT

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OPEN HOUSE

White Tanks Floodplain Delineation/North Inlet Channel Improvements
Comment Sheet
April 16, 2002

Name: Tim Redburn
Address: 7129 N Pellyville Rd
Phone Number: 623 935 6219 Email: Rocking TKR @ Aol.com

1. Please select the White Tanks North Inlet Channel alternative that you most prefer?

NO Number 1 – Desertscaped Earthen Channel
NO Number 2 – Concrete Channel with Desertscaped overbanks
#2 choice Number 3 – Detention Basin at Olive Avenue
#1 choice Number 4 – Additional channel on East side of Beardsley Canal
NO Number 5 – No Action

2. The following will be used as part of the evaluation process to recommend the preferred alternative for the White Tanks North Inlet Channel. We would like your assistance in establishing the priorities of the community. Please rank the following items in the order that they are most important to you. (1 – most important, 9 – least important)

1 Reduction in flooding
2 Public safety during flooding
7 Property acquisition/easements
6 Cost
3 Appearance/aesthetics
4 Landscaping
5 Construction impacts
8 Multi-use/recreational opportunities
9 Vehicular access/circulation during flooding

3. **Please provide any additional comments on the preliminary floodplain results or the White Tanks North Inlet Channel alternatives.**

Keep the project simple but effective. #1 has a lot of problems in having placed established water well and land plot plans #2 I do not ~~think~~ like cementing the land channel #3 is OK with a retention basin and Trails.

4. **How did you hear about tonight's meeting?**
____ Newspaper X Brochure in the Mail ____ Friend/Neighbor ____ Other

5. **How would you rate the overall knowledge and helpfulness of the staff members?**
____ Very Good X Good ____ Fair ____ Poor ____ Very Poor

6. **Was the project information presented in an understandable manner?**
X Yes ____ No

7. **How would you rate this facility for holding future meetings?**
X Very Good ____ Good ____ Fair ____ Poor ____ Very Poor

THANK YOU FOR COMING TONIGHT

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Fax: (602) 506-4601

OPEN HOUSE

White Tanks Floodplain Delineation/North Inlet Channel Improvements
Comment Sheet
April 16, 2002

Name: John & Lisa Hein
Address: 6728 N 186 ave Waddell Az 85355
Phone Number: 623 853 1963 Email: Jackhein@earthlink.n

1. Please select the White Tanks North Inlet Channel alternative that you most prefer?

____ Number 1 – Desertscaped Earthen Channel
____ Number 2 – Concrete Channel with Desertscaped overbanks
____ Number 3 – Detention Basin at Olive Avenue – Continual maintenance - insect fact
X Number 4 – Additional channel on East side of Beardsley Canal
____ Number 5 – No Action

2. The following will be used as part of the evaluation process to recommend the preferred alternative for the White Tanks North Inlet Channel. We would like your assistance in establishing the priorities of the community. Please rank the following items in the order that they are most important to you. (1 – most important, 9 – least important)

1 Reduction in flooding
2 Public safety during flooding
8 Property acquisition/easements
7 Cost
4 Appearance/aesthetics
5 Landscaping
3 Construction impacts
6 Multi-use/recreational opportunities
____ Vehicular access/circulation during flooding

3. **Please provide any additional comments on the preliminary floodplain results or the White Tanks North Inlet Channel alternatives.**

— you need to consider - ATC's - to put more $ to widen the damage that they could do - would destroy all the work -

= with the 3.5 mil alternative - would still have money available to do future repairs / maintenance.

- the concrete channel is a HAZARD - would be A MAGNET TO Kids - Bikers - ATC Desert Parties ---
IS NOT THE TYPE of structure we need - Destroys OUR natural Beautiful LAND -
WE HAVE A Good thing going on the West Side - Pls don't Ruin it

- would be really nice to have some type of planned Development - for ATCs - horses, bikes, hiking - in White Tank area

4. **How did you hear about tonight's meeting?**
____ Newspaper X Brochure in the Mail ____ Friend/Neighbor ____ Other

5. **How would you rate the overall knowledge and helpfulness of the staff members?**
X Very Good ____ Good ____ Fair ____ Poor ____ Very Poor

6. **Was the project information presented in an understandable manner?**
X Yes ____ No

7. **How would you rate this facility for holding future meetings?**
____ Very Good X Good ____ Fair ____ Poor ____ Very Poor

THANK YOU FOR COMING TONIGHT

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Fax: (602) 506-4601

OPEN HOUSE

White Tanks Floodplain Delineation/North Inlet Channel Improvements
Comment Sheet
April 16, 2002

Name: Robert Wagenfehr
Address: 6427 N 186th AVE
Phone Number: 623 853-0237 Email: ~~Robert Wagenfehr~~ robert.o.wagenfehr@phoenix.b

1. Please select the White Tanks North Inlet Channel alternative that you most prefer?

____ Number 1 – Desertscaped Earthen Channel
____ Number 2 –Concrete Channel with Desertscaped overbanks
____ Number 3 – Detention Basin at Olive Avenue
X Number 4 – Additional channel on East side of Beardsley Canal
____ Number 5 – No Action

2. The following will be used as part of the evaluation process to recommend the preferred alternative for the White Tanks North Inlet Channel. We would like your assistance in establishing the priorities of the community. Please rank the following items in the order that they are most important to you. (1 – most important, 9 – least important)

1 Reduction in flooding
3 Public safety during flooding
6 Property acquisition/easements
2 Cost
5 Appearance/aesthetics
____ Landscaping
____ Construction impacts
4 Multi-use/recreational opportunities
7 Vehicular access/circulation during flooding

3. **Please provide any additional comments on the preliminary floodplain results or the White Tanks North Inlet Channel alternatives.**

I wasn't informed of this until I just bought my house

4. **How did you hear about tonight's meeting?**
____ Newspaper ___X___ Brochure in the Mail ____ Friend/Neighbor ____ Other

5. **How would you rate the overall knowledge and helpfulness of the staff members?**
____ Very Good ___X___ Good ____ Fair ____ Poor ____ Very Poor

6. **Was the project information presented in an understandable manner?**
___X___ Yes ____ No

7. **How would you rate this facility for holding future meetings?**
____ Very Good ___X___ Good ____ Fair ____ Poor ____ Very Poor

THANK YOU FOR COMING TONIGHT

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2801 West Durango Street
Phoenix, AZ 85009
Phone: (602) 506-1501
Fax: (602) 506-4601

FLOOD CONTROL DISTRICT
RECEIVED
APR 23 '02
CH & GM | FINANCE
PIO | LANDS
ADM'N | O & M
REG | P & M
ENG
CONTRACTS
ROUTING

OPEN HOUSE

White Tanks Floodplain Delineation/North Inlet Channel Improvements

Comment Sheet

April 16, 2002

Name: Patricia Fritz
Address: 6541 N. 186th Ave. Waddell Az 85355
Phone Number: _____ Email: _____

1. **Please select the White Tanks North Inlet Channel alternative that you most prefer?**

___ Number 1 – Desertscaped Earthen Channel
___ Number 2 – Concrete Channel with Desertscaped overbanks
✓ Number 3 – Detention Basin at Olive Avenue
___ Number 4 – Additional channel on East side of Beardsley Canal
___ Number 5 – No Action

2. **The following will be used as part of the evaluation process to recommend the preferred alternative for the White Tanks North Inlet Channel. We would like your assistance in establishing the priorities of the community. Please rank the following items in the order that they are most important to you. (1 – most important, 9 – least important)**

1 Reduction in flooding
2 Public safety during flooding If flooding is reduced, there is no concern for flooding safety.
6 Property acquisition/easements
3 Cost
4 Appearance/aesthetics
7 Landscaping
8 Construction impacts
5 Multi-use/recreational opportunities
9 Vehicular access/circulation during flooding

3. **Please provide any additional comments on the preliminary floodplain results or the White Tanks North Inlet Channel alternatives.**

Please provide suggestions as to how the money could be raised. I am impressed with the plan for Alternative three. This plan when FULLY implemented would increase the desirability of the surrounding areas.

How can we keep pace with plans as they develop?

Why is this a flood plain now and not 3 years ago?

Something needs to take place here or many residents will be living in a flood plain. Is this acceptable to Maricopa County? We trusted that this area was not in a flood plain when we bought our home, because that is what the appropriate authorities assured us.

This plan has been prioritized because there is a safety issue here. Maricopa County is trying to fix a bad situation. Please prioritize this project!

Approve Alternative 3 - An ounce of prevention is worth a pound of cure.

4. **How did you hear about tonight's meeting?**

___ Newspaper ✓ Brochure in the Mail ___ Friend/Neighbor ___ Other

5. **How would you rate the overall knowledge and helpfulness of the staff members?**

✓ Very Good ___ Good ___ Fair ___ Poor ___ Very Poor

6. **Was the project information presented in an understandable manner?**

✓ Yes ___ No

7. **How would you rate this facility for holding future meetings?**

✓ Very Good ___ Good ___ Fair ___ Poor ___ Very Poor

THANK YOU FOR COMING TONIGHT

Flood Control District of Maricopa County
2801 West Durango Street
Phoenix, AZ 85009
Phone: (602) 506-1501
Fax: (602) 506-4601

OPEN HOUSE

White Tanks Floodplain Delineation/North Inlet Channel Improvements
Comment Sheet
April 16, 2002

Name: Judy Meyer
Address: 6227 N 186th ave, Waddell AZ 85355
Phone Number: _____ Email: Hound8495@Aol.com

1. Please select the White Tanks North Inlet Channel alternative that you most prefer?

___ Number 1 – Desertscaped Earthen Channel
___ Number 2 –Concrete Channel with Desertscaped overbanks
X Number 3 – Detention Basin at Olive Avenue
___ Number 4 – Additional channel on East side of Beardsley Canal
___ Number 5 – No Action

2. The following will be used as part of the evaluation process to recommend the preferred alternative for the White Tanks North Inlet Channel. We would like your assistance in establishing the priorities of the community. Please rank the following items in the order that they are most important to you. (1 – most important, 9 – least important)

1 Reduction in flooding
7 Public safety during flooding
~~4~~ 6 Property acquisition/easements
~~1~~ 3 Cost
~~3~~ 5 Appearance/aesthetics
~~5~~ 4 Landscaping
2 Construction impacts
9 Multi-use/recreational opportunities
8 Vehicular access/circulation during flooding

3. **Please provide any additional comments on the preliminary floodplain results or the White Tanks North Inlet Channel alternatives.**

4. **How did you hear about tonight's meeting?**
____ Newspaper ___✓___ Brochure in the Mail ____ Friend/Neighbor ____ Other

5. **How would you rate the overall knowledge and helpfulness of the staff members?**
____ Very Good ____ Good ____ Fair ____ Poor ____ Very Poor

6. **Was the project information presented in an understandable manner?**
___X___ Yes ____ No

7. **How would you rate this facility for holding future meetings?**
____ Very Good ___X___ Good ____ Fair ____ Poor ____ Very Poor

THANK YOU FOR COMING TONIGHT

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2801 West Durango Street
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Phone: (602) 506-1501
Fax: (602) 506-4601

OPEN HOUSE

White Tanks Floodplain Delineation/North Inlet Channel Improvements
Comment Sheet
April 16, 2002

Name: Wendy Durfee
Address: 6220 N 183rd Ave Waddell, AZ 85355
Phone Number: (602) 565-2011 Email: wdurfee@earthlink.net

1. Please select the White Tanks North Inlet Channel alternative that you most prefer?

___ Number 1 – Desertscaped Earthen Channel
___ Number 2 –Concrete Channel with Desertscaped overbanks
___ Number 3 – Detention Basin at Olive Avenue
X Number 4 – Additional channel on East side of Beardsley Canal
___ Number 5 – No Action

2. The following will be used as part of the evaluation process to recommend the preferred alternative for the White Tanks North Inlet Channel. We would like your assistance in establishing the priorities of the community. Please rank the following items in the order that they are most important to you. (1 – most important, 9 – least important)

2 Reduction in flooding
1 Public safety during flooding
6 Property acquisition/easements
4 Cost
3 Appearance/aesthetics
5 Landscaping
7 Construction impacts
9 Multi-use/recreational opportunities
8 Vehicular access/circulation during flooding

3. **Please provide any additional comments on the preliminary floodplain results or the White Tanks North Inlet Channel alternatives.**

- Would also like to have alternatives reflected in a handout to reviewed markup.
- Would it be possible to have APS share or partner with the solution. APS is trying to put power lines in this general ~~vacent~~ vacenty. Maybe they could bury the power lines under the Flood control Solution?? It would be worth checking
- Additional information was needed on how often this area flood. Verbal was not since it has been documented. Also more information on the budget & approval process for the Flood District was also needed. Was explained verbally but it is a lot to absorb at once.
- Open House was a good idea. We appreciate the opportunity to talk with someone & have them explain it better. Thank you.

4. **How did you hear about tonight's meeting?**
____ Newspaper ____ Brochure in the Mail ____ Friend/Neighbor X Other

5. **How would you rate the overall knowledge and helpfulness of the staff members?**
X Very Good ____ Good ____ Fair ____ Poor ____ Very Poor

6. **Was the project information presented in an understandable manner?**
X Yes ____ No

7. **How would you rate this facility for holding future meetings?**
____ Very Good X Good ____ Fair ____ Poor ____ Very Poor

THANK YOU FOR COMING TONIGHT

Flood Control District of Maricopa County
2801 West Durango Street
Phoenix, AZ 85009
Phone: (602) 506-1501
Fax: (602) 506-4601

OPEN HOUSE

White Tanks Floodplain Delineation/North Inlet Channel Improvements
Comment Sheet
April 16, 2002

Name: KAREN P BRINKER
Address: 6506 N 183RD AVE, WADDELL, AZ 85355
Phone Number: (623) 853-0469 Email: KPBRINKER@hotmail.com

1. **Please select the White Tanks North Inlet Channel alternative that you most prefer?**

____ Number 1 – Desertscaped Earthen Channel
____ Number 2 – Concrete Channel with Desertscaped overbanks
X ② Number 3 – Detention Basin at Olive Avenue
X ① Number 4 – Additional channel on East side of Beardsley Canal
____ Number 5 – No Action

2. **The following will be used as part of the evaluation process to recommend the preferred alternative for the White Tanks North Inlet Channel. We would like your assistance in establishing the priorities of the community. Please rank the following items in the order that they are most important to you. (1 – most important, 9 – least important)**

1 Reduction in flooding
2 Public safety during flooding
~~3~~ 5 Property acquisition/easements
~~4~~ 3 Cost
4 Appearance/aesthetics
6 Landscaping
8 Construction impacts
9 Multi-use/recreational opportunities
7 Vehicular access/circulation during flooding

3. **Please provide any additional comments on the preliminary floodplain results or the White Tanks North Inlet Channel alternatives.**

A brochure with all the alternatives listed would be helpful so they can be read & an evaluation can be done. It was very difficult to go back & forth to digest all the alternatives as presented. It would be much easier for people to choose & digest if they had something to read & review.

4. **How did you hear about tonight's meeting?**
____ Newspaper X Brochure in the Mail ____ Friend/Neighbor ____ Other

5. **How would you rate the overall knowledge and helpfulness of the staff members?**
____ Very Good ____ Good X Fair ____ Poor ____ Very Poor

6. **Was the project information presented in an understandable manner?**
____ Yes * SOMEWHAT ____ No
A LITTLE CONFUSING WITH ALL THE FLOOD CHARTS

7. **How would you rate this facility for holding future meetings?**
____ Very Good X Good ____ Fair ____ Poor ____ Very Poor

THANK YOU FOR COMING TONIGHT

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2801 West Durango Street
Phoenix, AZ 85009
Phone: (602) 506-1501
Fax: (602) 506-4601

OPEN HOUSE

White Tanks Floodplain Delineation/North Inlet Channel Improvements
Comment Sheet
April 16, 2002

Name: MIKE SMITH
Address: ~~SMITH~~ 6602 N. 183RD AVE, WADDELL AZ 85355
Phone Number: 623 853-9550 Email: MWSMITH76@HOTMAIL.COM

1. Please select the White Tanks North Inlet Channel alternative that you most prefer?

____ Number 1 – Desertscaped Earthen Channel
____ Number 2 – Concrete Channel with Desertscaped overbanks
2ND (2) Number 3 – Detention Basin at Olive Avenue
1ST (1) Number 4 – Additional channel on East side of Beardsley Canal
____ Number 5 – No Action

2. The following will be used as part of the evaluation process to recommend the preferred alternative for the White Tanks North Inlet Channel. We would like your assistance in establishing the priorities of the community. Please rank the following items in the order that they are most important to you. (1 – most important, 9 – least important)

1 Reduction in flooding
6 Public safety during flooding
8 Property acquisition/easements
4 Cost
2 Appearance/aesthetics
5 Landscaping
7 Construction impacts
3 Multi-use/recreational opportunities
9 Vehicular access/circulation during flooding

3. **Please provide any additional comments on the preliminary floodplain results or the White Tanks North Inlet Channel alternatives.**

WHY SO LONG TO DETERMINE A STUDY WAS NECESSARY NOW THAT HOMES + PROPERTY VALUE HAVE INCREASED.

APS IS PROPOSING RUNNING POWERLINES + SUBSTATIONS IN THE AREA. MAYBE THE TWO OF YOU COULD SHARE IN THE COST OF ACQUIRING ACCESS TO PROPERTY

4. **How did you hear about tonight's meeting?**

____ Newspaper ✓ Brochure in the Mail ____ Friend/Neighbor ____ Other

5. **How would you rate the overall knowledge and helpfulness of the staff members?**

____ Very Good ✓ Good ____ Fair ____ Poor ____ Very Poor

6. **Was the project information presented in an understandable manner?**

✓ Yes ____ No

7. **How would you rate this facility for holding future meetings?**

____ Very Good ✓ Good ____ Fair ____ Poor ____ Very Poor

THANK YOU FOR COMING TONIGHT

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Phone: (602) 506-1501
Fax: (602) 506-4601

OPEN HOUSE

White Tanks Floodplain Delineation/North Inlet Channel Improvements
Comment Sheet
April 16, 2002

Name: JEFF A. DURFEE, SR.
Address: 6220 N. 183 AVE Waddell AZ. 85355
Phone Number: 602 - 565 - 2001 Email: - 0 -

1. Please select the White Tanks North Inlet Channel alternative that you most prefer?

____ Number 1 – Desertscaped Earthen Channel
____ Number 2 –Concrete Channel with Desertscaped overbanks
____ Number 3 – Detention Basin at Olive Avenue
yes Number 4 – Additional channel on East side of Beardsley Canal
____ Number 5 – No Action

2. The following will be used as part of the evaluation process to recommend the preferred alternative for the White Tanks North Inlet Channel. We would like your assistance in establishing the priorities of the community. Please rank the following items in the order that they are most important to you. (1 – most important, 9 – least important)

2 Reduction in flooding
1 Public safety during flooding
3 Property acquisition/easements
4 Cost
5 Appearance/aesthetics
8 Landscaping
6 Construction impacts
7 Multi-use/recreational opportunities
9 Vehicular access/circulation during flooding

3. **Please provide any additional comments on the preliminary floodplain results or the White Tanks North Inlet Channel alternatives.**

(1) Less cost more chance of getting something done

(2) Clear water Farms was not in Flood plane Before, according to INS. Should not Be after work is done.

4. **How did you hear about tonight's meeting?**

____ Newspaper ____ Brochure in the Mail X Friend/Neighbor ____ Other

5. **How would you rate the overall knowledge and helpfulness of the staff members?**

____ Very Good X Good ____ Fair ____ Poor ____ Very Poor

6. **Was the project information presented in an understandable manner?**

X Yes ____ No

7. **How would you rate this facility for holding future meetings?**

X Very Good ____ Good ____ Fair ____ Poor ____ Very Poor

THANK YOU FOR COMING TONIGHT

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OPEN HOUSE

White Tanks Floodplain Delineation/North Inlet Channel Improvements
Comment Sheet
April 16, 2002

Name: Larry W. Doescher
Address: 6152 N. 183rd Ave
Phone Number: (623) 853-9131 Email: lobescher@dot.state.az.us

1. Please select the White Tanks North Inlet Channel alternative that you most prefer?

____ Number 1 – Desertscaped Earthen Channel
____ Number 2 –Concrete Channel with Desertscaped overbanks
____ Number 3 – Detention Basin at Olive Avenue
✓ Number 4 – Additional channel on East side of Beardsley Canal
____ Number 5 – No Action

2. The following will be used as part of the evaluation process to recommend the preferred alternative for the White Tanks North Inlet Channel. We would like your assistance in establishing the priorities of the community. Please rank the following items in the order that they are most important to you. (1 – most important, 9 – least important)

1 Reduction in flooding
2 Public safety during flooding
9 Property acquisition/easements
5 Cost
7 Appearance/aesthetics
8 Landscaping
4 Construction impacts
6 Multi-use/recreational opportunities
3 Vehicular access/circulation during flooding

3. **Please provide any additional comments on the preliminary floodplain results or the White Tanks North Inlet Channel alternatives.**

Alternative #4 is my preferred alternative. It solves the problem with the least cost. All alternatives (except #5) eliminate the impact of 100 yr. storm impacts to the adjacent properties due to breeches in the existing facility. I like the inclusion of multi-use paths that will enhance the community and provide additional recreational opportunities. I am concerned about sharing the use of said facilities w/ ATVs and other motorized vehicles. These paths won't be usable for walkers, joggers, cyclists, or equestrians if motorized vehicles have access to these facilities. Can ATVs be effectively barred from the pathways?

Another unrelated impact to the community is being considered by APS. The utility is performing a siting study very near the Flood Control District's facility. Suggest contacting and coordinating with APS. There is an opportunity for a multilevel "Win" here. A shared facility can potentially reduce all parties' costs and reduce impacts to adjacent property owners.

Thank You!

4. **How did you hear about tonight's meeting?**

____ Newspaper ✓ Brochure in the Mail ____ Friend/Neighbor ____ Other

5. **How would you rate the overall knowledge and helpfulness of the staff members?**

____ Very Good ✓ Good ____ Fair ____ Poor ____ Very Poor

6. **Was the project information presented in an understandable manner?**

✓ Yes ____ No

7. **How would you rate this facility for holding future meetings?**

____ Very Good ____ Good ✓ Fair ____ Poor ____ Very Poor

THANK YOU FOR COMING TONIGHT

Flood Control District of Maricopa County
2801 West Durango Street
Phoenix, AZ 85009
Phone: (602) 506-1501
Fax: (602) 506-4601

PROJECT INTRODUCTION

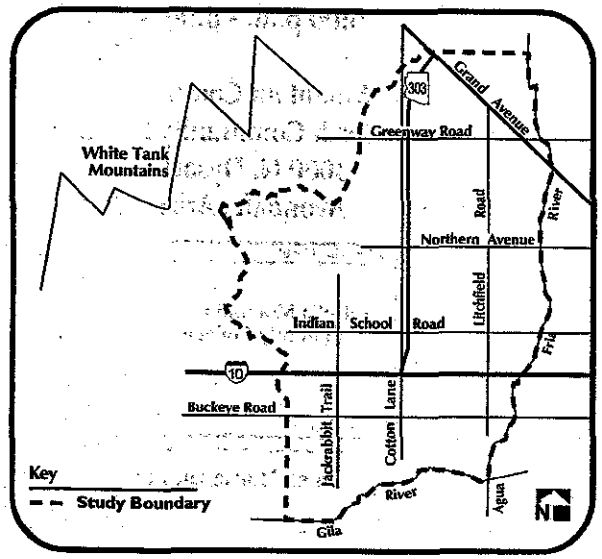
The purpose of this study, which is an update to the existing White Tanks Area Drainage Master Plan of the early 1990s, is to plan ahead of development.

Much of the watershed has changed significantly since the earlier plan was developed and the Arizona Department of Transportation is working on a major freeway corridor for the Loop 303.

This Area Drainage Master Plan is one of many projects that the Flood Control District of Maricopa County is conducting in order to protect both existing and future residents from possible damages associated with floods up to and including the 100-year storm.

Dramatic changes in population density and land use make an update of the plan necessary in order to continue to provide the best flood protection possible for those who live in the area. By identifying areas that may need flood protection now, the District may be able to provide services to residents at a lower cost and offer more efficient service.

PROJECT AREA



ABOUT THE PROJECT

This planning study lays the groundwork for further flood control activities in the area, such as the design and construction of facilities to reduce the identified flooding hazards.

The study team has identified a recommended drainage alternative, which consists of a series of channels and basins that convey flows to the Gila and Agua Fria rivers and maximizes use of the existing flood control facilities.

In addition, the study has also identified new areas of floodplains that are subject to flooding. The District has also identified several residences and parcels of land that are potentially at risk of flooding:

- Perryville Wash (approximately Perryville Road from Northern Avenue to Camelback Road)
- Camelback Wash (Camelback Road from Perryville Road to east of Sarival Avenue)
- Bullard Wash (from Glendale Avenue to Indian School Road)
- I-10 Culvert Wash (around Perryville Road from I-10 to R.I.D. Canal)

The implementation of some of the flood control facilities identified in the plan could eliminate the need to send the floodplain delineations to the Federal Emergency Management Agency (FEMA).

www.fcd.maricopa.gov

PROJECT PARTNERS

The District is working closely with area stakeholders and cities on this project. The cities of Avondale, Buckeye, El Mirage, Litchfield Park, Glendale, Goodyear, and Surprise all have interests in this project.

Cost-sharing patnerships on some parts of the recommended alternative have already been identified.

PROJECT CONTACTS

Greg Jones, Project Manager
Flood Control District of Maricopa County
Phone: (602) 506-5537
E-mail: glj@mail.maricopa.gov

Para informacion en Español, comuniquense con:

Joe Muñoz
Flood Control District of Maricopa County
Phone: (602) 506-2983
E-mail: jfm@mail.maricopa.gov

If you are unable to attend these open houses, information from the meetings will be posted on the District website.

This project is being done in cooperation with:

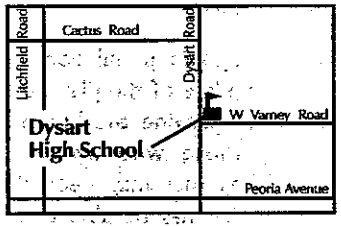
URS Corporation
Logan Simpson Design Inc.

PROJECT OPEN HOUSES

Two open houses are being held in your area, please attend whichever is most convenient for you. Both meetings will present the same information.

September 18, 2002
6:00 p.m. - 8:00 p.m.

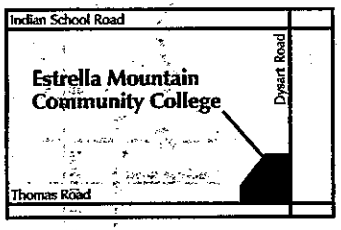
Dysart High School Cafeteria
11405 N. Dysart Rd.
El Mirage, Arizona



Open House Location

September 25, 2002
6:00 p.m. - 8:00 p.m.

Estrella Mountain Community College
North Community Room
3000 N. Dysart Rd.
Avondale, Arizona



Open House Location

Public Inform...ice
Flood Control District
of Maricopa County
2801 W. Durango Street
Phoenix, AZ 85009

U.S. POSTAGE
PB METER 7126051
PHOENIX AZ SEP 03 '02
TEMP-RETURN SERVICE REQUESTED
PRESORTED FIRST CLASS

NOTIFIED TO OWNERS WITHIN 4 MI. OF FACILITIES

Flood Control District of Maricopa County

Loop 303 Corridor/White Tanks Area Drainage Master Plan Update

Recommended Drainage Alternative and Final Floodplain Delineation Open Houses

If you received this brochure you most likely own property in an area that could be affected by this project.

September 2002

PHOENIX AZ SEP 4 '02
U.S. POSTAGE

White Tanks/Loop 303 Floodplain Delineation

The Flood Control District of Maricopa County invites interested residents and property owners to attend an open house on the completed floodplain delineation study in your area. The purpose of this study was to evaluate flood hazard areas in the White Tanks/Loop 303 area and to determine flood elevations for the study area.

If you received this flyer, it means that the new floodplain delineation affects your property. Come learn more about the study and how it affects you.

OPEN HOUSES

Both meetings will present the same information, please attend the most convenient meeting.

Wednesday, September 18
Dysart High School Cafeteria
(11405 N. Dysart Road, El Mirage)
6 - 8 p.m.

Wednesday, September 25
North Community Room
Estrella Mountain Community C
(3000 N. Dysart Road, Avonda
6 - 8 p.m.

THIS WAS MAILED TO PEOPLE NEAR THE FLOODPLAINS

Exhibits of the proposed floodplain delineations will be on displ ... n the Flood Control District and engineering consultants will be availab ... discuss the study and to answer any questions.

This study will be used by the District to better manage the floodplain, to reduce or prevent flood damage, and to maintain the integrity of the floodplains. The study will also be used by the Federal Emergency Management Agency (FEMA) to update the Flood Insurance Rate Maps for the National Flood Insurance Program.

The implementation of some of the flood control facilities identified in the White Tanks/Loop 303 Area Drainage Master Plan could eliminate the need to send the proposed floodplain delineations to

Additional information about the study or the meeting may be obtained by contacting:

Greg Jones, Project Manager
Flood Control District
602-506-5537
glj@mail.maricopa.gov

www.fcd.maricopa.gov

A sign language interpreter will be made available upon request with 72 hours notice. Alternative format materials or FM or Infra-Red Listening Devices are also available upon request with 72 hours notice. Additional reasonable accommodations will be made available to the extent possible within the timeframe of the request.

Flood Control District of Maricopa County

Your property might be located in a floodplain

Come learn more about the White Tanks/Loop 303 Floodplain Delineation Study and how it affects you.

The District has identified several residences and parcels of land that are potentially at risk of flooding:

- Perryville Wash (approximately Perryville Road from Northern Avenue to Camelback Road
- Camelback Wash (Camelback Road from Perryville Road to east of Sarival Avenue)
- Bullard Wash (from Glendale Avenue Indian School Road)
- I-10 Culvert Wash (around Perryville Road from I-10 to R.I.D. Canal)

A floodplain is the area adjoining a watercourse that may be covered by floodwater during a flood. Storm runoff and flood events may cause alterations in the floodplain in certain areas.

Floodplain delineation identifies special hazard areas that are subject to inundation by a 100-year flood (1 percent chance of occurring each year).

Delineation allows for sound floodplain management so that future development will not impede, divert, or retard the movement of floodwaters. The District performs detailed analysis to identify area flood hazard zones.

85354807 01

www.fcd.maricopa.gov

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

PHOENIX AZ
SEP 10 '02
PB METER 712605
U.S. POSTAGE
$.037

White Tanks Floodplain Delineations

Flood Control District of Maricopa County

OPEN HOUSE

September 2002

LOGAN SIMPSON DESIGN INC.

▷ Fax ▷ Memo ▷ Telecon ▷ Discussion ▷ Notes

To: Greg Jones

Fax Number: 602-506-4601

Date: September 19, 2002

Project: Loop 303

From: Mike Book

Subject:

Discussion with:

Page ____ of ____ Total Pages

Copy to: Angeline Fowler, Elliot Silverston

Original to follow: ▷ Yes ▷ No

Here are copies of the sign-in and comment sheets from last night's Loop 303 meeting.

51 West Third Street Suite 450 Tempe, AZ 85281 Phone: (480) 967-1343 Fax: (480) 966-9252 e-mail: lsd@lsdaz.com

Sign-in Sheet

Loop 303 Corridor/White Tanks Area Drainage Master Plan Update & Floodplain Delineations

Name	Address	Phone	E-mail
Jim STEELE	7404 N 187TH AVE WADDELL	(623) 935-7285	STEELEYEVA@AOL
Roy McDaniel	16685 N 28TH Ave, Phx	(602) 467-2200	rmcdaniel@rbf.com
HOANG NGUYEN	11009 W BELMONT AVE	623 772 9201	
Sam Chestnut	6356 N. 186TH AV. WADDELL	623 853 1557	
MIKE MOORE	11805 N COTTON LN. WADDELL	623-521-4712	mike.moore@mwi.com
~~[illegible]~~	~~10[illegible]~~ 95		
PAT LYNCH	3650 W. Turkey LN	(602) 841-8343	
Tom & Karen Krause	17523 W Northern Ave Waddell	623-935 2618	

September 18, 2002

Sent By: HP LaserJet 3100; 480 966 9232; Sep-19-02 9:46AM; Page 2/5

Sign-in Sheet

Loop 303 Corridor/White Tanks Area Drainage Master Plan Update & Floodplain Delineations

Name	Address	Phone	E-mail
Wayne Tucker	5632 W. Whispering Wind Dr. Glendale	623-516-7547	sanjuan72@
Jim Martin	3431 E. Kristal Way Phoenix	602 569-2857	qwest.net
Elaine M. Ranson	6342 N 186 AVE WADDELL	623-853-9417	
Ronald Rayner	14929 W. Broadway Rd Goodyear	623-932-1834	
Charles D. Criss	16056 N. 186th Ave	623-853-1618	
A. Mancini	6114 N 186 Ave	623 853 1818	
MARK BORUSHKO	4333 N. CIVIC CENTER PLAZA, SCOTTS. 85251	480-941-1444	mbgroupllc@msn.com
Mike McCONAUGHEY	6314 N 186th Ave Waddell, AZ 85355	623-853-1517	mccon@cox.net
George Patty Rovey	19300 W. Yuma Rd Buckeye AZ 85326	623-386-2131	

September 18, 2002

Sent By: HP LaserJet 3100; 480 966 9232; Sep-19-02 9:47AM; Page 3/5

Comment Sheet

Loop 303 Corridor/White Tanks Area Drainage Master Plan Update & Floodplain Delineations

Public Meeting
September 18, 2002

Please use this sheet to provide us with any additional comments. You can leave the comment sheet with us tonight, mail it by October 2, 2002, to Greg Jones, Project Manager, Flood Control District of Maricopa County, 2801 W. Durango Street, Phoenix, AZ 85009, email it to glj@mail.maricopa.gov or fax it to him at (602) 506-4601.

Please Print

Name: Roy McDaniel

Address: 16605 North 25th Ave Email: rbmcdaniel@cox.com

Phone Number: [redacted] 602 467 7200

General Comments:

Meeting Survey

How did you hear about the meeting tonight? ☐ Newspaper Notice ☐ Mailer ☒ Other Internet

How would you rate the overall knowledge and helpfulness of staff members who assisted you?

☒ Very Good ☐ Good ☐ Fair ☐ Poor ☐ Very Poor

Was the project information presented in an understandable manner? ☒ Yes ☐ No

How would you rate this facility for holding future meetings?

☐ Very Good ☐ Good ☐ Fair ☐ Poor ☐ Very Poor

Comment Sheet

Loop 303 Corridor/White Tanks
Area Drainage Master Plan Update
& Floodplain Delineations

Public Meeting
September 18, 2002

Please use this sheet to provide us with any additional comments. You can leave the comment sheet with us tonight, mail it by October 2, 2002, to Greg Jones, Project Manager, Flood Control District of Maricopa County, 2801 W. Durango Street, Phoenix, AZ 85009, email it to glj@mail.maricopa.gov or fax it to him at (602) 506-4601.

Please Print

Name: Ronald Rayner

Address: 14929 W. Broadway Rd Email:

Phone Number: 623-932-1834 Goodyear, Az 85338

General Comments: Alternative proposed looks good - work on it asap. I was alarmed to see the large floodplain delineation on our property at Camelback Rd (N side) and East of Perryville Rd. The more recent study (blue lines) is more correct. The steep gradient of the topography make the earlier green lines an impossibility - water would breakover Camelback long before it would back to the North as indicated on the maps.

Please work to change this on future maps /and/or FEMA designations.

Meeting Survey

How did you hear about the meeting tonight? ☒ Newspaper Notice ☐ Mailer ☐ Other

How would you rate the overall knowledge and helpfulness of staff members who assisted you?

☐ Very Good ☒ Good ☐ Fair ☐ Poor ☐ Very Poor

Was the project information presented in an understandable manner? ☒ Yes ☐ No

How would you rate this facility for holding future meetings?

☐ Very Good ☐ Good ☒ Fair ☐ Poor ☐ Very Poor

FLOOD CONTROL DISTRICT
RECEIVED
SEP 30 '02

CH.& GM	FINANCE
PIO	LANDS
ADMIN	O & M
REG	P & PM
ENG	FILE
CONTRACTS	
ROUTING	GLJ

Memorandum

To: Greg Jones, Flood Control District of Maricopa County
Copy: Angeline Fowler, Flood Control District of Maricopa County
Elliot Silverston, URS Corporation
From: Michael Book, Logan Simpson Design
Date: September 26, 2002
Re: Loop 303 Sign-in and Comment Forms

I am forwarding to you a copy of the sign-in and comment forms from the September 25, 2002, open house for the Loop 303/White Tanks project. Please let me know if you have any questions.

Thanks.

Sign-in Sheet

Loop 303 Corridor/White Tanks Area Drainage Master Plan Update & Floodplain Delineations

Name	Address	Phone	E-mail
Mike Ranney	10938 W. Pecan	623-936 6108	
Marilyn Nagy	3207 N. 151ST Drive, 85338 Goodyear	623-935-0262	mpnaggy1@cox.net
M/M Hernek	12713 W. SOLANO LN	—	—
Tom Hill	1616 W. Litchfield Rd.	602-390-7375	
Phyllis & Cloyd Harris	3359 N 151st DR Goodyear	623-935-0765	
Kelli Orth	15930 N. 182nd Lane	623-544.4431	
Terry R. Tucknoss	6256 N. 186th Av Waddell	(623) 878-0022	
MARY FLYNN	3010 E CAMELBACK RD #200 PHX	602.956.4100	mflynn@mdch.com
Mike Dillins	10517 Sahuro Ln	480.897.6925	mdining@excite.com
H B Coleman	3201 N. 152nd Ave	623 935-3600	hpcoleman11@hotmail.com
STEVEN BALES JR	20600 W BELOAT BUCKEYE 85326	6233862988	cotton@dancris.com
James & Elena Newman	5001 S Perryville Rd GOODYEAR	623 386-2195	
Karen L Pierson	18611 W. Van Buren, Goodyear	623-853-7275	
Ora E Johnson	18611 W Van Buren Goodyear AZ 85338		
Jolene Lindley	205 N Perryville Rd Goodyear AZ 85338		
John R. Lindley	" " " "		
David Ramirez	190 N. Litchfield Rd. Goodyear	623-882-7954	dramirez@ci.goodyear.az.us

Sign-in Sheet

Loop 303 Corridor/White Tanks Area Drainage Master Plan Update & Floodplain Delineations

Name	Address	Phone	E-mail
William Strowix	3221 N 15/st Dr	623-535-8286	
Norm Ehren	3907 N 150th Lane, Goodyear, AZ 85338	623-935-6094	NLEHREN@Cox.NET
Bill Hahn	MCDOT	602-506 4614	billhahn@maricopa.gov
Jo Tuckness	6256 N. 186th Ave Waddell AZ 85355	623-878-0022	jo.tuckness@luke.af.mil
Philip Miller	8505 N. Scottsdale Rd Suite 206	480-889-6900	pmiller@Prottlement.com
Mike Smith	City of Buckeye	623-932-1909	MSMITH@BUCKEYEAZ.ORG
Leon Johnson	18611 W. Van Buren Goodyear AZ 85338	623-853-9275	
Robin Dase	6156 N. 186th Ave Waddell, AZ 85355	mailing: P.O. Box 874, Waddell 85355	ArdieAZ@earthlink.net

Sign-in Sheet

Loop 303 Corridor/White Tanks Area Drainage Master Plan Update & Floodplain Delineations

Name	Address	Phone	E-mail
ERNEST NAGY	3207 N. 151ST DR. GOODYEAR AZ	(623) 935-0262	
Bob Davis	8403 S. Los Feliz	602-371-1100	
ROBERT SHAW	12015 N. 65TH AVENUE, GLENDALE AZ	623-979-0859	
Todd Topper	3010 E Camelback H 100 Phx, Az 85016	602-468-0800	todd@juncap.com
Stephanie Raiter	18535 W. Van Buren Goodyear AZ 85338	623-853-0857	
Bob Pendergast	6970 S. Perryville Rd Buckeye	623-386-2717	
LARRY DIXON	20501 W. BELOAT BUCKEYE AZ		
Sal Garcia	4550 N. 12TH Street PHX, AZ 85014	(602) 264-6831	
Punya P. Khanal	City of Avondale	623-932-1909	PKhanal@avondale.org
RICHARD LAIRA	P.O. Box 356 BUCKEYE	602-376-1589	Bycotn@aol.com

September 25, 2002

Comment Sheet

Loop 303 Corridor/White Tanks Area Drainage Master Plan Update & Floodplain Delineations

Public Meeting
September 25, 2002

Please use this sheet to provide us with any additional comments. You can leave the comment sheet with us tonight, mail it by October 9, 2002, to Greg Jones, Project Manager, Flood Control District of Maricopa County, 2801 W. Durango Street, Phoenix, AZ 85009, email it to glj@mail.maricopa.gov or fax it to him at (602) 506-4601.

Please Print

Name: WILLIAM C. BROWN

Address: 3221 N 15TH DR Email:

Phone Number: 623-535-8286

General Comments: I STILL HAVE CONCERNS WHAT WILL BE THE CHANGES THRU PEBBLE CREEK. I LIVE ON THE WEST SIDE OF THE DRAIN AT THE 18TH FAIRWAY OF THE GOLF COURSE. I AM TOLD NOTHING WILL PUT MY HOME IN INSURANCE FLOOD PLAIN — TRUE ??

Meeting Survey

How did you hear about the meeting tonight? ☐ Newspaper Notice ☐ Mailer ☒ Other HOME OWNERS ASSOC.

How would you rate the overall knowledge and helpfulness of staff members who assisted you?

☒ Very Good ☐ Good ☐ Fair ☐ Poor ☐ Very Poor

Was the project information presented in an understandable manner? ☐ Yes ☒ No

How would you rate this facility for holding future meetings?

☒ Very Good ☐ Good ☐ Fair ☐ Poor ☐ Very Poor

Comment Sheet

Loop 303 Corridor/White Tanks Area Drainage Master Plan Update & Floodplain Delineations

Public Meeting
September 25, 2002

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Please Print

Name: MARY A FLYNN

Address: 3010 E CAMELBACK RD #200 Email: mflynne MOCH.COM

Phone Number: 602.522-6141

General Comments: Very Informative + proactive

Meeting Survey

How did you hear about the meeting tonight? ☐ Newspaper Notice ☑ Mailer ☐ Other

How would you rate the overall knowledge and helpfulness of staff members who assisted you?

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How would you rate this facility for holding future meetings?

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Comment Sheet

Loop 303 Corridor/White Tanks Area Drainage Master Plan Update & Floodplain Delineations

Public Meeting
September 25, 2002

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Please Print

Name: H. B. Coleman

Address: 3201 N. 152nd. Ave

Email: hpcoleman11@hotmail.com

Phone Number: 623/935-3600

General Comments: Previous planning was inadequate as it is forcing questionable decisions now. Two options: 1. your selected favored route is poor design. Buckeye basin should be located north at turn in waterflow. Will minimize impact on residential housing area. Insurance impact on homeowners appears not addressed especially in view of recent insurance company cancellation and problems on water related claims.

Meeting Survey

How did you hear about the meeting tonight? ☐ Newspaper Notice ☐ Mailer ☒ Other neighbor

How would you rate the overall knowledge and helpfulness of staff members who assisted you?

☐ Very Good ☒ Good ☐ Fair ☐ Poor ☐ Very Poor

Was the project information presented in an understandable manner? ☒ Yes ☐ No

How would you rate this facility for holding future meetings?

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Comment Sheet

Loop 303 Corridor/White Tanks Area Drainage Master Plan Update & Floodplain Delineations

Public Meeting
September 25, 2002

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Please Print

Name: SAMUEL BARBER

Address: 18535 W. VAN BUREN RD Email: SSAS BARBER@AOL.COM

Phone Number (623) 853-0857

General Comments: THE INTERSECTION OF VAN BUREN & PERRYVILLE BECOMES A RIVER WHEN IT RAINS. WE NEED SOME HELP RETAINING THE WATER NORTH OF VAN BUREN. WATER ACCUMULATES AT THE CANAL JUST SOUTH OF VAN BUREN AND MAY STAND FOR SEVERAL DAY AFTER THE RAIN. YOUR REPRESENTATIVE HAVE TOLD US THERE IS NO PLANS TO HELP PLEASE TAKE A LOOK AT THIS AREA

THANKS

Meeting Survey

How did you hear about the meeting tonight? ☐ Newspaper Notice ☐ Mailer ☑ Other

How would you rate the overall knowledge and helpfulness of staff members who assisted you?

☐ Very Good ☐ Good ☑ Fair ☐ Poor ☐ Very Poor

Was the project information presented in an understandable manner? ☑ Yes ☐ No

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☐ Very Good ☑ Good ☐ Fair ☐ Poor ☐ Very Poor

TABLE OF CONTENTS

- HEC-RAS REPORT (input & output)
- SUMMARY TABLES
- PROFILE AND CROSS SECTIONS
- CHECK-RAS
- REACH BOUNDARY CONDITIONS
- HYDROLOGY
- CROSS SECTION LAYOUT
- FLOODPLAIN MAP
- DISK - HEC-RAS MODEL ELECTRONIC COPY

Camelback Wash HEC-RAS Model

The topography in the area of Camelback Wash slopes away (southeasterly) from Camelback Road and leads to flow breakouts from the channel running along the north side of the road. A HEC-RAS hydraulic analysis using Camelback Road as a weir was utilized to estimate flow capacity of the channel and areas north of the road. It also estimates the quantity of flow lost by weir flow over Camelback Road.

Several cross sections were surveyed across Camelback Road and include elevations for the top of the road. This information was used to develop a road profile, which defined the weir input-data for the HEC-RAS model. Due to model limitations HEC-RAS does not accept a weir that spans over more than eight cross sections or a model having more than two weirs. More than two concurrent weirs in the same model prevents numeric convergence. To resolve this issue, eight HEC-RAS models were developed with one weir in each model.

Flow data used in the first model utilized the existing conditions HEC-1 analysis. This analysis was done as part of the Loop 303 / White Tanks Area Drainage Master Plan (ADMP) Update project under Contract FCD 99-40. The resulting flow rates continuing east in the output of the first weir model are lower than those of the input. These resulting flow rates account for flow discharging over Camelback Road. The output flow rates from the first model are used as the input for the second model. The second model uses a weir to cover the next few cross sections downstream of the weir used in the first model. The flow rates reflecting the effect of the second weir in the second model (output flow rates) are used as the input flow rates for the third model, and so on. All of these models take into account local runoff between the main concentration points.

An HEC-RAS model that utilizes the remaining flow rates in the channel, which reflect weir flow over Camelback Road was developed without including weirs. This is the final model and was used in delineating the floodplain for Camelback Wash.

The supporting calculations include sections presented in the following sequence:

1) HEC-RAS report, output tables, water surface profile, cross section plots, reach boundary conditions, and CHECK-RAS reports for the final HEC-RAS model. This model includes the results of the flow breakout analysis from the eight initial runs.

2) The weir flow analysis was included in the hydrology section, since it was an integral part of estimating the flow rates to be used in the final hydraulic model. This section also includes a summary of total and local inflow rates at the different concentration points used in the hydraulic models. Tables summarizing the results of the eight HEC-RAS runs and how the flow rates for the different runs were calculated are included in this section. A hand check was done using 15 iterations to evaluate the accuracy of the results of the HEC-RAS weir analysis.

3) At the end of the calculation package two maps are included, a map with the cross section layout and an aerial map. The right hand side of the cross sections (looking downstream) was

truncated up to Camelback Road in the hydraulic model only but shown in full length on the maps. This is because all the right overbank areas beyond Camelback Road are lower in elevation than the road and flow losses to these areas have already been accounted for in the weir flow analysis.

CAMELBACK WASH

HEC-RAS REPORT

```
HEC-RAS Version 3.0.1  Mar 2001
U.S. Army Corp of Engineers
Hydrologic Engineering Center
609 Second Street, Suite D
Davis, California 95616-4687
(916) 756-1104

X     X  XXXXXX    XXXX        XXXX       XX      XXXX
X     X  X        X    X       X   X     X  X    X
X     X  X        X            X   X    X    X   X
XXXXXXX  XXXX     X       XXX  XXXX     XXXXXX    XXXX
X     X  X        X            X  X     X    X        X
X     X  X        X     X      X   X    X    X        X
X     X  XXXXXX    XXXX        X    X   X    X   XXXXX

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

PROJECT DATA
Project Title: CAMELBACK WASH - FINAL
Project File : camelbackfinalrev.prj
Run Date and Time: 10/22/2002 9:21:28 AM

Project in English Units

Project Description:
Floodplain Analysis Along Camelback Road - Final

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

PLAN DATA

Plan Title: Camelback Plan
Plan File : P:\FCDMC\E152600\Floodplain Study\HEC-RAS Analysis\RAS\Camelback\1-camelback final rev\camelbackfinalrev.p01

        Geometry Title: Camelback Geometry
        Geometry File : P:\FCDMC\E152600\Floodplain Study\HEC-RAS Analysis\RAS\Camelback\1-camelback final rev\camelbackfinalrev.g01

        Flow Title    : Camelback Flow
        Flow File     : P:\FCDMC\E152600\Floodplain Study\HEC-RAS Analysis\RAS\Camelback\1-camelback final rev\camelbackfinalrev.f01

Plan Summary Information:
Number of:  Cross Sections =   48    Mulitple Openings =    0
            Culverts       =    6    Inline Weirs      =    0
            Bridges        =    0

Computational Information
    Water surface calculation tolerance =  0.01
    Critical depth calculaton tolerance =  0.01
    Maximum number of interations       =  40
    Maximum difference tolerance        =  0.3
    Flow tolerance factor               =  0.001

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

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

FLOW DATA

Flow Title: Camelback Flow
Flow File : P:\FCDMC\E152600\Floodplain Study\HEC-RAS Analysis\RAS\Camelback\1-camelback final rev\camelbackfinalrev.f01

Flow Data (cfs)
*************************************************************
* River          Reach          RS      *          PF 1 *
* Camelback Road WCamelback Main  42      *        883.17 *
* Camelback Road WCamelback Main  41      *        639.53 *
* Camelback Road WCamelback Main  40      *        826.68 *
* Camelback Road WCamelback Main  39      *       1054.85 *
* Camelback Road WCamelback Main  38      *       1009.55 *
* Camelback Road WCamelback Main  37      *       1127.62 *
* Camelback Road WCamelback Main  36.4    *       1133.01 *
* Camelback Road WCamelback Main  36      *       1153.64 *
* Camelback Road WCamelback Main  35      *        996.64 *
* Camelback Road WCamelback Main  34      *        697.85 *
* Camelback Road WCamelback Main  33      *        673.99 *
* Camelback Road WCamelback Main  32      *        702.49 *
* Camelback Road WCamelback Main  31.4    *        696.72 *
* Camelback Road WCamelback Main  31      *        711.49 *
* Camelback Road WCamelback Main  30      *        737.27 *
* Camelback Road WCamelback Main  29      *        759.99 *
* Camelback Road WCamelback Main  28      *        755.31 *
* Camelback Road WCamelback Main  27      *        567.89 *
* Camelback Road WCamelback Main  26.9    *         518.3 *
* Camelback Road WCamelback Main  26.4    *        526.89 *
* Camelback Road WCamelback Main  26      *        582.34 *
* Camelback Road WCamelback Main  25      *        696.88 *
* Camelback Road WCamelback Main  24      *        748.18 *
* Camelback Road WCamelback Main  23      *        575.19 *
* Camelback Road WCamelback Main  22      *        437.32 *
* Camelback Road WCamelback Main  21      *        556.83 *
* Camelback Road WCamelback Main  20      *        676.33 *
* Camelback Road WCamelback Main  19      *        795.84 *
* Camelback Road WCamelback Main  18      *           910 *
* Camelback Road WCamelback Main  17      *       1065.71 *
* Camelback Road WCamelback Main  16.4    *        971.81 *
* Camelback Road WCamelback Main  16      *       1033.84 *
* Camelback Road WCamelback Main  15      *        951.62 *
* Camelback Road WCamelback Main  14      *        592.57 *
* Camelback Road WCamelback Main  13      *        393.66 *
* Camelback Road WCamelback Main  12      *        362.96 *
* Camelback Road WCamelback Main  11      *        469.34 *
* Camelback Road WCamelback Main  10.4    *        220.59 *
* Camelback Road WCamelback Main  10      *        110.85 *
* Camelback Road WCamelback Main  9       *        133.06 *
* Camelback Road WCamelback Main  8       *        154.84 *
* Camelback Road WCamelback Main  7       *        177.06 *
* Camelback Road WCamelback Main  6       *        205.81 *
*************************************************************

Boundary Conditions
*****************************************************************************************************
* River          Reach          Profile        *          Upstream                  Downstream      *
*****************************************************************************************************
* Camelback Road WCamelback Main  PF 1          *                                Normal S = .0015 *
*****************************************************************************************************
Changes in WS and EG
*****************************************************************************
* River          Reach          RS      Profile        Type       Value *
* Camelback Road WCamelback Main  42      PF 1  Known WS   1118.61 *
*****************************************************************************
```

```
*****************************************************************************

GEOMETRY DATA

Geometry Title: Camelback Geometry
Geometry File : P:\FCDMC\E152600\Floodplain Study\HEC-RAS Analysis\RAS\Camelback\1-camelback final rev\camelbackfinalrev.g01

CROSS SECTION          RIVER: Camelback Road W
REACH: Camelback Main     RS: 42

INPUT
Description: Cross Section 42
Station Elevation Data    num=      15
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
 8932.63 1121.18 9134.02 1120.48  9373.6 1119.33 9572.95 1118.27 9749.77 1117.53
 9967.32 1116.59 9973.57 1115.72 9978.67 1116.65 9992.54 1117.01    10000 1115.92
10013.27 1115.9410018.79  1117.110020.82 1116.0310032.84 1117.0510060.63 1117.65

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*****************************************
 8932.63    .036 9992.54    .07810018.79    .034

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9992.5410018.79              500     500     500            .1       .3

CROSS SECTION OUTPUT    Profile #PF 1
*****************************************************************************************
* E.G. Elev (ft)          * 1118.64  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.03  * Wt. n-Val.              *   0.036  *   0.078  *   0.034  *
* W.S. Elev (ft)          * 1118.61  * Reach Len. (ft)         *  500.00  *  500.00  *  500.00  *
* Crit W.S. (ft)          *          * Flow Area (sq ft)       *  526.00  *   63.10  *   64.05  *
* E.G. Slope (ft/ft)      *0.000944  * Area (sq ft)            *  526.00  *   63.10  *   64.05  *
* Q Total (cfs)           *  883.17  * Flow (cfs)              *  705.30  *   65.93  *  111.94  *
* Top Width (ft)          *  551.62  * Top Width (ft)          *  483.53  *   26.25  *   41.84  *
* Vel Total (ft/s)        *    1.35  * Avg. Vel. (ft/s)        *    1.34  *    1.04  *    1.75  *
* Max Chl Dpth (ft)       *    2.89  * Hydr. Depth (ft)        *    1.09  *    2.40  *    1.53  *
* Conv. Total (cfs)       * 28750.0  * Conv. (cfs)             * 22959.7  *  2146.3  *  3644.1  *
* Length Wtd. (ft)        *          * Wetted Per. (ft)        *  483.68  *   26.45  *   43.11  *
* Min Ch El (ft)          * 1115.92  * Shear (lb/sq ft)        *    0.06  *    0.14  *    0.09  *
* Alpha                   *    1.04  * Stream Power (lb/ft s)   *    0.09  *    0.15  *    0.15  *
* Frctn Loss (ft)         *          * Cum Volume (acre-ft)    *   77.21  *   34.74  *    4.92  *
* C & E Loss (ft)         *          * Cum SA (acres)          *  112.62  *   10.93  *    7.96  *
*****************************************************************************************

Warning: The cross-section end points had to be extended vertically for the computed water surface.
Warning: The conveyance ratio (upstream 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:    The user has entered a known water surface elevation at this cross section.

CROSS SECTION          RIVER: Camelback Road W
REACH: Camelback Main     RS: 41

INPUT
Description: Cross Section 41
Station Elevation Data    num=      17
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
 8775.42 1119.28 8976.15 1118.59 9183.05 1117.59 9386.85  1116.5 9575.14 1115.65
 9779.05 1114.95 9963.13 1114.65 9967.46 1114.07 9970.77 1114.01 9973.88 1114.97
 9987.91 1115.08   10000  1112.410006.41 1112.7810011.37 1115.8410015.17 1114.48
10025.44 1114.8610052.62 1115.34

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*****************************************
 8775.42    .036 9987.91    .07810011.37    .034

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9987.9110011.37              400     400     400            .1       .3

CROSS SECTION OUTPUT    Profile #PF 1
*****************************************************************************************
* E.G. Elev (ft)          * 1115.51  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.24  * Wt. n-Val.              *   0.036  *   0.078  *   0.034  *
* W.S. Elev (ft)          * 1115.26  * Reach Len. (ft)         *  400.00  *  400.00  *  400.00  *
* Crit W.S. (ft)          * 1115.26  * Flow Area (sq ft)       *  113.11  *   40.54  *   11.53  *
* E.G. Slope (ft/ft)      *0.028559  * Area (sq ft)            *  113.11  *   40.54  *   11.53  *
* Q Total (cfs)           *  639.53  * Flow (cfs)              *  411.67  *  187.53  *   40.34  *
* Top Width (ft)          *  357.74  * Top Width (ft)          *  299.95  *   22.52  *   35.26  *
* Vel Total (ft/s)        *    3.87  * Avg. Vel. (ft/s)        *    3.64  *    4.63  *    3.50  *
* Max Chl Dpth (ft)       *    2.86  * Hydr. Depth (ft)        *    0.38  *    1.80  *    0.33  *
* Conv. Total (cfs)       *  3784.3  * Conv. (cfs)             *  2436.0  *  1109.7  *   238.7  *
* Length Wtd. (ft)        *  400.00  * Wetted Per. (ft)        *  300.14  *   23.53  *   35.41  *
* Min Ch El (ft)          * 1112.40  * Shear (lb/sq ft)        *    0.67  *    3.07  *    0.58  *
* Alpha                   *    1.04  * Stream Power (lb/ft s)   *    2.45  *   14.21  *    2.03  *
* Frctn Loss (ft)         *    0.18  * Cum Volume (acre-ft)    *   73.54  *   34.14  *    4.49  *
* C & E Loss (ft)         *    0.01  * Cum SA (acres)          *  108.13  *   10.65  *    7.52  *
*****************************************************************************************

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.

CROSS SECTION          RIVER: Camelback Road W
REACH: Camelback Main     RS: 40

INPUT
Description: Cross Section 40
Station Elevation Data    num=      26
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
 8765.49 1118.17 8862.85    1118 8865.04 1116.78 8867.05 1117.92 8884.09 1117.46
 9036.53 1116.86 9239.83 1115.74 9443.17 1115.26 9646.94 1114.44 9842.71 1113.35
 9845.56 1111.78 9848.22 1111.77 9849.92  1113.3  9874.3 1113.67 9894.16 1116.49
 9904.87 1116.29 9914.87 1109.97 9952.49 1109.97 9961.67 1116.59 9977.44 1116.92
  9986.9 1111.33   10000 1111.2910004.22 1113.4810004.96  1112.710019.54  1113.5
10047.66 1114.21

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*****************************************
 8765.49    .036 9977.44    .07810004.22    .034

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9977.4410004.22              550     550     550            .1       .3

CROSS SECTION OUTPUT    Profile #PF 1
*****************************************************************************************
* E.G. Elev (ft)          * 1114.36  * Element                 *  Left OB *  Channel * Right OB *
```

* Vel Head (ft)	* 0.08	* Wt. n-Val.	* 0.036	* 0.078	* 0.034	*
* W.S. Elev (ft)	* 1114.28	* Reach Len. (ft)	* 550.00	* 550.00	* 550.00	*
* Crit W.S. (ft)	*	* Flow Area (sq ft)	* 301.90	* 54.20	* 29.92	*
* E.G. Slope (ft/ft)	*0.001165	* Area (sq ft)	* 301.90	* 54.20	* 29.92	*
* Q Total (cfs)	* 826.68	* Flow (cfs)	* 730.83	* 61.27	* 34.57	*
* Top Width (ft)	* 318.56	* Top Width (ft)	* 252.82	* 22.31	* 43.44	*
* Vel Total (ft/s)	* 2.14	* Avg. Vel. (ft/s)	* 2.42	* 1.13	* 1.16	*
* Max Chl Dpth (ft)	* 4.31	* Hydr. Depth (ft)	* 1.19	* 2.43	* 0.69	*
* Conv. Total (cfs)	* 24219.4	* Conv. (cfs)	* 21411.3	* 1795.2	* 1012.9	*
* Length Wtd. (ft)	* 550.00	* Wetted Per. (ft)	* 256.49	* 23.65	* 43.87	*
* Min Ch El (ft)	* 1111.29	* Shear (lb/sq ft)	* 0.09	* 0.17	* 0.05	*
* Alpha	* 1.16	* Stream Power (lb/ft s)	* 0.21	* 0.19	* 0.06	*
* Frctn Loss (ft)	* 1.27	* Cum Volume (acre-ft)	* 71.63	* 33.71	* 4.30	*
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	* 105.59	* 10.44	* 7.15	*

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Camelback Road W
REACH: Camelback Main RS: 39

INPUT
Description: Cross Section 39
Station Elevation Data num= 21

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
8714.76	1115.84	8731.91	1117.27	8732.91	1118.37	8735.04	1116.38	8735.98	1116.39
8737.92	1118.29	8741.34	1116.88	8936.66	1116.1	9134.15	1115.24	9334.22	1114.39
9550.93	1113.39	9748.51	1112.27	9978.47	1111.4	9982.24	1112.88	9994.57	1113.17
10000	1109.22	10008.96	1110.28	10016.37	1112.06	10017.29	1111.48	10030.62	1112.21
10058	1112.85								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
8714.76	.033	9994.57	.078	10016.37	.032

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9994.57	10016.37	500	500	500	.1	.3

CROSS SECTION OUTPUT Profile #PF 1

* E.G. Elev (ft)	* 1113.08	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 0.12	* Wt. n-Val.	* 0.033	* 0.078	* 0.032 *
* W.S. Elev (ft)	* 1112.96	* Reach Len. (ft)	* 500.00	* 500.00	* 500.00 *
* Crit W.S. (ft)	*	* Flow Area (sq ft)	* 305.35	* 51.72	* 27.90 *
* E.G. Slope (ft/ft)	*0.004947	* Area (sq ft)	* 305.35	* 51.72	* 27.90 *
* Q Total (cfs)	* 1054.85	* Flow (cfs)	* 866.49	* 118.93	* 69.43 *
* Top Width (ft)	* 422.87	* Top Width (ft)	* 359.72	* 21.52	* 41.63 *
* Vel Total (ft/s)	* 2.74	* Avg. Vel. (ft/s)	* 2.84	* 2.30	* 2.49 *
* Max Chl Dpth (ft)	* 3.74	* Hydr. Depth (ft)	* 0.85	* 2.40	* 0.67 *
* Conv. Total (cfs)	* 14998.2	* Conv. (cfs)	* 12320.0	* 1691.0	* 987.2 *
* Length Wtd. (ft)	* 500.00	* Wetted Per. (ft)	* 360.01	* 23.01	* 41.94 *
* Min Ch El (ft)	* 1109.22	* Shear (lb/sq ft)	* 0.26	* 0.69	* 0.21 *
* Alpha	* 1.01	* Stream Power (lb/ft s)	* 0.74	* 1.60	* 0.51 *
* Frctn Loss (ft)	* 0.92	* Cum Volume (acre-ft)	* 67.80	* 33.04	* 3.93 *
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	* 101.72	* 10.17	* 6.62 *

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Camelback Road W
REACH: Camelback Main RS: 38

INPUT
Description: Cross Section 38
Station Elevation Data num= 20

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
8709.95	1114.17	8723.43	1114.45	8724.99	1115.37	8727.06	1113.47	8727.95	1113.48
8730	1115.48	8734.1	1114.12	8849.49	1113.58	9000.71	1113.16	9208.03	1112.65
9404.86	1112.37	9611.98	1111.77	9810.46	1110.93	9981.82	1110.4	9987.28	1107.44
10000	1107.35	10009.86	1110.05	10012.58	1109.38	10025.24	1110.61	10052.33	1111.5

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
8709.95	.033	9981.82	.026	10009.86	.032

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9981.82	10009.86	330	330	330	.3	.5

CROSS SECTION OUTPUT Profile #PF 1

* E.G. Elev (ft)	* 1112.16	* Element	* Left OB	* Channel	* Right OB *
* Vel Head (ft)	* 0.14	* Wt. n-Val.	* 0.033	* 0.026	* 0.032 *
* W.S. Elev (ft)	* 1112.02	* Reach Len. (ft)	* 330.00	* 330.00	* 330.00 *
* Crit W.S. (ft)	*	* Flow Area (sq ft)	* 377.52	* 108.59	* 58.39 *
* E.G. Slope (ft/ft)	*0.000925	* Area (sq ft)	* 377.52	* 108.59	* 58.39 *
* Q Total (cfs)	* 1009.55	* Flow (cfs)	* 455.03	* 453.60	* 100.91 *
* Top Width (ft)	* 527.83	* Top Width (ft)	* 457.32	* 28.04	* 42.47 *
* Vel Total (ft/s)	* 1.85	* Avg. Vel. (ft/s)	* 1.21	* 4.18	* 1.73 *
* Max Chl Dpth (ft)	* 4.67	* Hydr. Depth (ft)	* 0.83	* 3.87	* 1.37 *
* Conv. Total (cfs)	* 33187.6	* Conv. (cfs)	* 14958.6	* 14911.6	* 3317.4 *
* Length Wtd. (ft)	* 330.00	* Wetted Per. (ft)	* 457.33	* 29.15	* 43.15 *
* Min Ch El (ft)	* 1107.35	* Shear (lb/sq ft)	* 0.05	* 0.22	* 0.08 *
* Alpha	* 2.56	* Stream Power (lb/ft s)	* 0.06	* 0.90	* 0.14 *
* Frctn Loss (ft)	* 0.64	* Cum Volume (acre-ft)	* 63.88	* 32.12	* 3.44 *
* C & E Loss (ft)	* 0.45	* Cum SA (acres)	* 97.03	* 9.88	* 6.14 *

Warning: The cross-section end points had to be extended vertically for the computed water surface.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Camelback Road W
REACH: Camelback Main RS: 37

INPUT
Description: Cross Section 37
Station Elevation Data num= 14

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
8731.11	1112.76	5	8852.44	1112.012	9090.62	1111.414	9301.45	1110.928	9511.64
1110.579	9723.68	1110.573	9949.31	1109.736	9966.62	1110.778	9984.81	1110.309	9986.67
1103.79	10003.08	1103.73	10007.08	1109.14	110024.05	1109.56	410050.55	1110.228	

```
Manning's n Values          num=       3
     Sta   n Val      Sta   n Val      Sta   n Val
*******************************************
 8731.11    .033  9984.8    .02610007.08    .032

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        9984.810007.08              115     115     115            .3        .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
888        F
888        F

CROSS SECTION OUTPUT    Profile #PF 1
*****************************************************************************************
* E.G. Elev (ft)          * 1111.07  * Element                  *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    1.63  * Wt. n-Val.               *          *    0.026 *    0.032 *
* W.S. Elev (ft)          * 1109.45  * Reach Len. (ft)          *  115.00  *  115.00  *  115.00  *
* Crit W.S. (ft)          * 1108.74  * Flow Area (sq ft)        *          *  109.91  *    1.85  *
* E.G. Slope (ft/ft)      *0.005442  * Area (sq ft)             *          *  109.91  *    1.85  *
* Q Total (cfs)           * 1127.62  * Flow (cfs)               *          * 1125.82  *    1.80  *
* Top Width (ft)          *   34.22  * Top Width (ft)            *          *   22.03  *   12.18  *
* Vel Total (ft/s)        *   10.09  * Avg. Vel. (ft/s)          *          *   10.24  *    0.97  *
* Max Chl Dpth (ft)       *    5.71  * Hydr. Depth (ft)          *          *    4.99  *    0.15  *
* Conv. Total (cfs)       * 15286.2  * Conv. (cfs)               *          * 15261.7  *    24.5  *
* Length Wtd. (ft)        *  115.00  * Wetted Per. (ft)          *          *   29.02  *   12.19  *
* Min Ch El (ft)          * 1103.73  * Shear (lb/sq ft)          *          *    1.29  *    0.05  *
* Alpha                   *    1.03  * Stream Power (lb/ft s)    *          *   13.18  *    0.05  *
* Frctn Loss (ft)         *          * Cum Volume (acre-ft)      *   62.45  *   31.29  *    3.21  *
* C & E Loss (ft)         *          * Cum SA (acres)            *   95.30  *    9.69  *    5.93  *
*****************************************************************************************

CULVERT                 RIVER: Camelback Road W
REACH: Camelback Main     RS: 36.9

INPUT
Description: 2 CMPs (48" & 24") at Citrus Road and Camelback
Distance from Upstream XS =       40
Deck/Roadway Width        =       45
Weir Coefficient          =        3
Upstream  Deck/Roadway Coordinates
    num=       3
    Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
*******************************************************************************
 8731.11    1111         9993.11 1110.18           10050 1110.14

Upstream Bridge Cross Section Data
Station Elevation Data    num=      14
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
 8731.111112.765 8852.441112.012 9090.621111.414 9301.451110.928 9511.641110.579
 9723.681110.573 9949.311109.736 9966.621110.778  9984.81110.309 9986.67 1103.79
10003.08 1103.7310007.081109.14110024.051109.56410050.551110.228

Manning's n Values          num=       3
     Sta   n Val      Sta   n Val      Sta   n Val
*******************************************
 8731.11    .033  9984.8    .02610007.08    .032

Bank Sta: Left   Right    Coeff Contr.   Expan.
        9984.810007.08            .3        .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
888        F
888        F

Downstream  Deck/Roadway Coordinates
    num=       3
    Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
*******************************************************************************
 8727.44    1111         9986.44 1109.54           10040 1109.48

Downstream Bridge Cross Section Data
Station Elevation Data    num=       8
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*******************************************************************************
    8785    1112    9925    1110    9975    1108    9985 1103.5310007.18 1103.54
10007.18 1105.93   10010    1108   10040 1109.49

Manning's n Values          num=       3
     Sta   n Val      Sta   n Val      Sta   n Val
*******************************************
    8785    .033    9975    .026   10010    .032

Bank Sta: Left   Right    Coeff Contr.   Expan.
        9975   10010            .3        .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
888        F
888        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 =  2

Culvert Name     Shape      Rise    Span
Culvert #1      Circular      4
FHWA Chart # 2 - Corrugated Metal Pipe Culvert
FHWA Scale # 1 - Headwall
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    n Value   Entrance Loss Coef   Exit Loss Coef
                 40      60      .024                  .5                1
Upstream   Elevation =  1104.13
           Centerline Station =  9990
Downstream Elevation =  1103.54
           Centerline Station =  9998

Culvert Name     Shape      Rise    Span
Culvert #2      Circular      2
FHWA Chart # 2 - Corrugated Metal Pipe Culvert
FHWA Scale # 1 - Headwall
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    n Value   Entrance Loss Coef   Exit Loss Coef
                 43      60      .024                  .5                1
Upstream   Elevation =  1103.64
           Centerline Station =  9995
Downstream Elevation =  1103.52
           Centerline Station =  10003

CULVERT OUTPUT    Profile #PF 1
Culvert ID : Culvert #1
*****************************************************************************
* Culv Q (cfs)            *   90.29  * Culv Ful Lngh (ft)    *   60.00  *
* # Barrels               *       1  * Culv Vel US (ft/s)    *    7.18  *
```

```
* Q Barrel (cfs)          *   90.29  * Culv Vel DS (ft/s)     *    7.18  *
* E.G. US. (ft)           * 1111.08  * Culv Inv El Up (ft)   * 1104.13  *
* W.S. US. (ft)           * 1109.45  * Culv Inv El On (ft)   * 1103.54  *
* E.G. DS (ft)            * 1109.76  * Culv Frctn Ls (ft)    *    0.81  *
* W.S. DS (ft)            * 1109.07  * Culv Ext Lss (ft)     *    0.11  *
* Delta EG (ft)           *    1.32  * Culv Ent Lss (ft)     *    0.40  *
* Delta WS (ft)           *    0.38  * Q Weir (cfs)          * 1023.44  *
* E.G. IC (ft)            * 1108.76  * Weir Sta Lft (ft)     * 9236.52  *
* E.G. OC (ft)            * 1111.08  * Weir Sta Rgt (ft)     *10050.55  *
* Culvert Control         *  outlet  * Weir Submerg          *    0.00  *
* Culv WS Inlet (ft)      * 1108.13  * Weir Max Depth (ft)   *    0.94  *
* Culv WS Outlet (ft)     * 1107.54  * Weir Avg Depth (ft)   *    0.53  *
* Culv Nml Depth (ft)     *          * Wr Flw Area (sq ft)   *  433.28  *
* Culv Crt Depth (ft)     *    2.88  * Min El Weir Flow (ft) * 1110.15  *
*****************************************************************************

CULVERT OUTPUT    Profile #PF 1
Culvert ID : Culvert #2
*****************************************************************************
* Culv Q (cfs)            *   16.58  * Culv Ful Lngh (ft)     *   60.00  *
* # Barrels               *       1  * Culv Vel US (ft/s)     *    5.28  *
* Q Barrel (cfs)          *   16.58  * Culv Vel DS (ft/s)     *    5.28  *
* E.G. US. (ft)           * 1111.08  * Culv Inv El Up (ft)   * 1103.64  *
* W.S. US. (ft)           * 1109.45  * Culv Inv El On (ft)   * 1103.52  *
* E.G. DS (ft)            * 1109.76  * Culv Frctn Ls (ft)    *    1.10  *
* W.S. DS (ft)            * 1109.07  * Culv Ext Lss (ft)     *          *
* Delta EG (ft)           *    1.32  * Culv Ent Lss (ft)     *    0.22  *
* Delta WS (ft)           *    0.38  * Q Weir (cfs)          * 1023.44  *
* E.G. IC (ft)            * 1106.05  * Weir Sta Lft (ft)     * 9236.52  *
* E.G. OC (ft)            * 1111.08  * Weir Sta Rgt (ft)     *10050.55  *
* Culvert Control         *  outlet  * Weir Submerg          *    0.00  *
* Culv WS Inlet (ft)      * 1105.64  * Weir Max Depth (ft)   *    0.94  *
* Culv WS Outlet (ft)     * 1105.52  * Weir Avg Depth (ft)   *    0.53  *
* Culv Nml Depth (ft)     *          * Wr Flw Area (sq ft)   *  433.28  *
* Culv Crt Depth (ft)     *    1.47  * Min El Weir Flow (ft) * 1110.15  *
*****************************************************************************

CROSS SECTION           RIVER: Camelback Road W
REACH: Camelback Main      RS: 36.4

INPUT
Description: 36.4 - Added X-section D/S of Culvert Located Bet 36 & 37
Station Elevation Data     num=       8
    Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
    8785    1112    9925    1110    9975    1108    9985 1103.5310007.18 1103.54
10007.18 1105.93   10010    1108   10040 1109.49

Manning's n Values         num=       3
    Sta   n Val     Sta   n Val     Sta   n Val
*****************************************************
    8785    .033    9975    .026   10010    .032

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          9975   10010             440     440     440            .3        .5
Ineffactive Flow     num=       2
   Sta L   Sta R    Elev  Permanent
888        F
888        F

CROSS SECTION OUTPUT    Profile #PF 1
*****************************************************************************
* E.G. Elev (ft)          * 1109.76  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.69  * Wt. n-Val.              *   0.033  *   0.026  *   0.032  *
* W.S. Elev (ft)          * 1109.07  * Reach Len. (ft)        *  440.00  *  440.00  *  440.00  *
* Crit W.S. (ft)          * 1109.07  * Flow Area (sq ft)      *   14.25  *  161.67  *   11.47  *
* E.G. Slope (ft/ft)      *0.002120  * Area (sq ft)           *   14.25  *  161.67  *   11.47  *
* Q Total (cfs)           * 1133.01  * Flow (cfs)             *   19.43  * 1097.45  *   16.13  *
* Top Width (ft)          *   83.19  * Top Width (ft)         *   26.69  *   35.00  *   21.50  *
* Vel Total (ft/s)        *    6.05  * Avg. Vel. (ft/s)       *    1.36  *    6.79  *    1.41  *
* Max Chl Dpth (ft)       *    5.54  * Hydr. Depth (ft)       *    0.53  *    4.62  *    0.53  *
* Conv. Total (cfs)       * 24605.8  * Conv. (cfs)            *   421.9  * 23833.5  *   350.3  *
* Length Wtd. (ft)        *  440.00  * Wetted Per. (ft)       *   26.71  *   39.02  *   21.52  *
* Min Ch El (ft)          * 1103.53  * Shear (lb/sq ft)       *    0.07  *    0.55  *    0.07  *
* Alpha                   *    1.22  * Stream Power (lb/ft s) *    0.10  *    3.72  *    0.10  *
* Frctn Loss (ft)         *    1.58  * Cum Volume (acre-ft)   *   62.43  *   30.93  *    3.19  *
* C & E Loss (ft)         *    0.04  * Cum SA (acres)         *   95.26  *    9.62  *    5.88  *
*****************************************************************************

Warning: The energy equation could not be balanced within the specified number of iterations.  The
         program used critical depth for the water surface and continued on with the calculations.
Warning: The conveyance ratio (upstream 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.
Warning: The parabolic search method failed to converge on critical depth.  The program will try the
         cross section slice/secant method to find critical depth.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid,
         energy was used.

CROSS SECTION           RIVER: Camelback Road W
REACH: Camelback Main      RS: 36

INPUT
Description: Cross Section 36
Station Elevation Data     num=      14
    Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
 8727.44 1108.17 8914.12 1107.77 9186.82 1107.22 9427.62 1106.25 9698.14 1105.71
 9942.86 1104.95 9985.27 1105.81 9991.43 1106.19 9996.27  1100.1   10000 1100.04
10007.87 1106.4210011.08 1105.0410023.53 1105.9110050.36  1106.5

Manning's n Values         num=       3
    Sta   n Val     Sta   n Val     Sta   n Val
*****************************************************
 8727.44    .06 9991.43    .02610007.87    .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          9991.4310007.87           500     500     500            .1        .3

CROSS SECTION OUTPUT    Profile #PF 1
*****************************************************************************
* E.G. Elev (ft)          * 1107.07  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.82  * Wt. n-Val.              *   0.060  *   0.026  *   0.030  *
* W.S. Elev (ft)          * 1106.25  * Reach Len. (ft)        *  500.00  *  500.00  *  500.00  *
* Crit W.S. (ft)          *          * Flow Area (sq ft)      *  338.84  *   61.93  *   14.10  *
* E.G. Slope (ft/ft)      *0.007224  * Area (sq ft)           *  338.84  *   61.93  *   14.10  *
* Q Total (cfs)           * 1153.64  * Flow (cfs)             *  307.33  *  611.35  *   34.96  *
* Top Width (ft)          *  611.93  * Top Width (ft)         *  564.78  *   16.24  *   30.91  *
* Vel Total (ft/s)        *    2.78  * Avg. Vel. (ft/s)       *    1.50  *    9.87  *    2.48  *
* Max Chl Dpth (ft)       *    6.21  * Hydr. Depth (ft)       *    0.60  *    3.81  *    0.46  *
* Conv. Total (cfs)       * 13573.2  * Conv. (cfs)            *  5969.0  *  7192.8  *   411.3  *
* Length Wtd. (ft)        *  500.00  * Wetted Per. (ft)       *  564.80  *   21.38  *   31.20  *
* Min Ch El (ft)          * 1100.04  * Shear (lb/sq ft)       *    0.27  *    1.31  *    0.20  *
* Alpha                   *    6.83  * Stream Power (lb/ft s) *    0.41  *   12.90  *    0.51  *
* Frctn Loss (ft)         *    2.43  * Cum Volume (acre-ft)   *   60.65  *   29.80  *    3.06  *
```

```
* C & E Loss (ft)        *    0.13  * Cum SA (acres)        *   92.28  *     9.36  *     5.62  *
*****************************************************************************************************

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

CROSS SECTION          RIVER: Camelback Road W
REACH: Camelback Main     RS: 35

INPUT
Description: Cross Section 35
Station Elevation Data    num=      15
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************************
 8726.11 1105.92 8924.15 1105.69 9118.53 1104.83 9323.78 1104.25 9524.26 1103.71
 9724.59  1103.3 9933.72 1103.13 9987.36 1103.79 9992.56 1104.49   10000 1097.94
10004.06 1098.0510010.73 1103.6810014.49 1102.5710025.44 1102.9410052.13 1103.54

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
 8726.11     .06 9992.56    .02610010.73     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9992.5610010.73             500     500     500             .1        .3

CROSS SECTION OUTPUT    Profile #PF 1
*****************************************************************************************************
* E.G. Elev (ft)         * 1104.51  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.39  * Wt. n-Val.              *   0.060  *   0.026  *   0.030  *
* W.S. Elev (ft)         * 1104.13  * Reach Len. (ft)         *  500.00  *  500.00  *  500.00  *
* Crit W.S. (ft)         * 1104.13  * Flow Area (sq ft)       *  382.42  *   68.36  *   42.37  *
* E.G. Slope (ft/ft)     *0.003337  * Area (sq ft)            *  382.42  *   68.36  *   42.37  *
* Q Total (cfs)          *  996.64  * Flow (cfs)              *  396.61  *  478.37  *  121.66  *
* Top Width (ft)         *  678.73  * Top Width (ft)          *  619.57  *   17.76  *   41.40  *
* Vel Total (ft/s)       *    2.02  * Avg. Vel. (ft/s)        *    1.04  *    7.00  *    2.87  *
* Max Chl Dpth (ft)      *    6.18  * Hydr. Depth (ft)        *    0.62  *    3.85  *    1.02  *
* Conv. Total (cfs)      * 17251.7  * Conv. (cfs)             *  6865.3  *  8280.5  *  2105.9  *
* Length Wtd. (ft)       *  500.00  * Wetted Per. (ft)        *  619.60  *   22.15  *   42.16  *
* Min Ch El (ft)         * 1097.94  * Shear (lb/sq ft)        *    0.13  *    0.64  *    0.21  *
* Alpha                  *    6.11  * Stream Power (lb/ft s)  *    0.13  *    4.50  *    0.60  *
* Frctn Loss (ft)        *    1.70  * Cum Volume (acre-ft)    *   56.51  *   29.06  *    2.74  *
* C & E Loss (ft)        *    0.06  * Cum SA (acres)          *   85.48  *    9.16  *    5.20  *
*****************************************************************************************************

Warning: The energy equation could not 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 cross-section end points had to be extended vertically for the computed water surface.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less
         than 0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to
         critical depth, the calculated water surface came back below critical depth.  This indicates
         that there is not a valid subcritical answer.  The program defaulted to critical depth.

CROSS SECTION          RIVER: Camelback Road W
REACH: Camelback Main     RS: 34

INPUT
Description: Cross Section 34
Station Elevation Data    num=      14
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************************
 8722.91    1103 8923.12 1102.02 9123.27  1101.6 9323.04 1101.22 9522.97 1100.73
 9724.69 1100.34 9955.85 1099.75 9985.95 1101.15 9995.33 1095.91   10000 1095.66
10006.28 1100.1210008.29  1099.510019.01 1100.1310046.36 1100.61

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
 8722.91     .03 9985.95    .03510006.28     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9985.9510006.28             500     500     500             .1        .3

CROSS SECTION OUTPUT    Profile #PF 1
*****************************************************************************************************
* E.G. Elev (ft)         * 1100.91  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.19  * Wt. n-Val.              *   0.030  *   0.035  *   0.030  *
* W.S. Elev (ft)         * 1100.72  * Reach Len. (ft)         *  500.00  *  500.00  *  500.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)       *  204.64  *   61.58  *   21.20  *
* E.G. Slope (ft/ft)     *0.003479  * Area (sq ft)            *  204.64  *   61.58  *   21.20  *
* Q Total (cfs)          *  697.85  * Flow (cfs)              *  353.54  *  303.95  *   40.37  *
* Top Width (ft)         *  509.58  * Top Width (ft)          *  449.94  *   19.56  *   40.08  *
* Vel Total (ft/s)       *    2.43  * Avg. Vel. (ft/s)        *    1.73  *    4.94  *    1.90  *
* Max Chl Dpth (ft)      *    5.06  * Hydr. Depth (ft)        *    0.45  *    3.15  *    0.53  *
* Conv. Total (cfs)      * 11832.2  * Conv. (cfs)             *  5994.3  *  5153.5  *   684.4  *
* Length Wtd. (ft)       *  500.00  * Wetted Per. (ft)        *  449.96  *   22.25  *   40.31  *
* Min Ch El (ft)         * 1095.66  * Shear (lb/sq ft)        *    0.10  *    0.60  *    0.11  *
* Alpha                  *    2.09  * Stream Power (lb/ft s)  *    0.17  *    2.97  *    0.22  *
* Frctn Loss (ft)        *    2.04  * Cum Volume (acre-ft)    *   53.14  *   28.31  *    2.37  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)          *   79.34  *    8.95  *    4.74  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION          RIVER: Camelback Road W
REACH: Camelback Main     RS: 33

INPUT
Description: Cross Section 33
Station Elevation Data    num=      16
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************************
 8725.41 1101.07 8924.74 1100.22 9123.45  1099.7 9325.27 1099.18 9524.64 1098.77
 9725.71 1098.36 9950.84 1097.73 9989.62 1098.47 9991.71 1099.23   10000 1093.67
10004.51 1093.6710010.63 1098.2110014.55  1097.5 10025.9 1097.9210052.44 1098.45
10064.87 1098.58

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
 8725.41     .03 9991.71    .03510010.63     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9991.7110010.63             630     630     630             .3        .5

CROSS SECTION OUTPUT    Profile #PF 1
*****************************************************************************************************
* E.G. Elev (ft)         * 1098.87  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.28  * Wt. n-Val.              *   0.030  *   0.035  *   0.030  *
* W.S. Elev (ft)         * 1098.59  * Reach Len. (ft)         *  630.00  *  630.00  *  630.00  *
* Crit W.S. (ft)         * 1098.59  * Flow Area (sq ft)       *  155.47  *   56.49  *   24.66  *
```

```
* E.G. Slope (ft/ft)      *0.004905 * Area (sq ft)            *  155.47  *   56.49  *   24.66  *
* Q Total (cfs)           *  673.99 * Flow (cfs)              *  298.23  *  325.23  *   50.53  *
* Top Width (ft)          *  450.25 * Top Width (ft)          *  378.04  *   17.97  *   54.24  *
* Vel Total (ft/s)        *    2.85 * Avg. Vel. (ft/s)        *    1.92  *    5.76  *    2.05  *
* Max Chl Dpth (ft)       *    4.92 * Hydr. Depth (ft)        *    0.41  *    3.14  *    0.45  *
* Conv. Total (cfs)       *  9623.1 * Conv. (cfs)             *  4258.1  *  4643.5  *   721.5  *
* Length Wtd. (ft)        *  630.00 * Wetted Per. (ft)        *  378.07  *   20.97  *   54.33  *
* Min Ch El (ft)          * 1093.67 * Shear (lb/sq ft)        *    0.13  *    0.83  *    0.14  *
* Alpha                   *    2.21 * Stream Power (lb/ft s)  *    0.24  *    4.75  *    0.28  *
* Frctn Loss (ft)         *    1.34 * Cum Volume (acre-ft)    *   51.07  *   27.63  *    2.11  *
* C & E Loss (ft)         *    0.10 * Cum SA (acres)          *   74.59  *    8.73  *    4.19  *
**********************************************************************************************

Warning: The energy equation could not 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 cross-section end points had to be extended vertically for the computed water surface.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less
         than 0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m), between the current and previous cross
         section.  This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to
         critical depth, the calculated water surface came back below critical depth.  This indicates
         that there is not a valid subcritical answer.  The program defaulted to critical depth.

CROSS SECTION           RIVER: Camelback Road W
REACH: Camelback Main      RS: 32

INPUT
Description: Cross Section 32
Station Elevation Data    num=      12
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
**********************************************************************************
 9420.931096.489 9626.861095.641 9824.171095.561 9989.171095.842 9992.481096.324
 9997.69 1090.5210004.87 1090.5210010.11 1095.31 10012.91094.52410024.321094.956
10050.721095.52610075.451096.973

Manning's n Values        num=       3
     Sta   n Val      Sta   n Val      Sta   n Val
*********************************************
 9420.93    .031 9992.48    .03510010.11    .038

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9992.4810010.11                 95      95      95             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
888        F
888        F

CROSS SECTION OUTPUT    Profile #PF 1
**********************************************************************************************
* E.G. Elev (ft)          * 1096.43 * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.08 * Wt. n-Val.              *   0.035  *   0.035  *   0.038  *
* W.S. Elev (ft)          * 1096.35 * Reach Len. (ft)         *   95.00  *   95.00  *   95.00  *
* Crit W.S. (ft)          * 1096.07 * Flow Area (sq ft)       *  317.01  *   75.12  *   57.49  *
* E.G. Slope (ft/ft)      *0.001208 * Area (sq ft)            *  317.01  *   75.12  *   57.49  *
* Q Total (cfs)           *  702.49 * Flow (cfs)              *  371.15  *  250.72  *   80.62  *
* Top Width (ft)          *  610.27 * Top Width (ft)          *  537.94  *   17.63  *   54.70  *
* Vel Total (ft/s)        *    1.56 * Avg. Vel. (ft/s)        *    1.17  *    3.34  *    1.40  *
* Max Chl Dpth (ft)       *    5.83 * Hydr. Depth (ft)        *    0.59  *    4.26  *    1.05  *
* Conv. Total (cfs)       * 20215.2 * Conv. (cfs)             * 10680.5  *  7214.9  *  2319.9  *
* Length Wtd. (ft)        *   95.00 * Wetted Per. (ft)        *  537.97  *   22.08  *   54.85  *
* Min Ch El (ft)          * 1090.52 * Shear (lb/sq ft)        *    0.04  *    0.26  *    0.08  *
* Alpha                   *    2.02 * Stream Power (lb/ft s)  *    0.05  *    0.86  *    0.11  *
* Frctn Loss (ft)         *         * Cum Volume (acre-ft)    *   47.66  *   26.68  *    1.52  *
* C & E Loss (ft)         *         * Cum SA (acres)          *   67.97  *    8.48  *    3.41  *
**********************************************************************************************

CULVERT                 RIVER: Camelback Road W
REACH: Camelback Main      RS: 31.9

INPUT
Description: RCP (36") at 175th Ave and Camelback
Distance from Upstream XS =       45
Deck/Roadway Width        =       22
Weir Coefficient          =        3
Upstream  Deck/Roadway Coordinates
    num=        3
     Sta Hi Cord Lo Cord      Sta Hi Cord Lo Cord      Sta Hi Cord Lo Cord
**********************************************************************
 9420.93  1096.5         10001.93  1095.5         10260.93    1095

Upstream Bridge Cross Section Data
Station Elevation Data    num=      12
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
**********************************************************************************
 9420.931096.489 9626.861095.641 9824.171095.561 9989.171095.842 9992.481096.324
 9997.69 1090.5210004.87 1090.5210010.11 1095.31 10012.91094.52410024.321094.956
10050.721095.52610075.451096.973

Manning's n Values        num=       3
     Sta   n Val      Sta   n Val      Sta   n Val
*********************************************
 9420.93    .031 9992.48    .03510010.11    .038

Bank Sta: Left   Right    Coeff Contr.   Expan.
       9992.4810010.11             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
888        F
888        F

Downstream  Deck/Roadway Coordinates
    num=        3
     Sta Hi Cord Lo Cord      Sta Hi Cord Lo Cord      Sta Hi Cord Lo Cord
**********************************************************************
 8973.16  1096.5         10000.16  1095.5           10038    1095

Downstream Bridge Cross Section Data
Station Elevation Data    num=       7
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
**********************************************************************************
    8890    1100     9510    1098     9890    1096   10000 1090.28   10020 1090.28
   10028    1094    10038 1094.77

Manning's n Values        num=       3
     Sta   n Val      Sta   n Val      Sta   n Val
*********************************************
    8890    .031     9890    .035    10028    .038

Bank Sta: Left   Right    Coeff Contr.   Expan.
           9890   10028             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
888        F
888        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      Circular      3
FHWA Chart # 1 - Concrete Pipe Culvert
FHWA Scale # 1 - Square edge entrance with headwall
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    n Value   Entrance Loss Coef   Exit Loss Coef
              42       24       .014              .5                  1
Upstream   Elevation =  1090.49
           Centerline Station =  10001.93
Downstream Elevation =  1090.31
           Centerline Station =  10000

CULVERT OUTPUT    Profile #PF 1
Culvert ID : Culvert #1
*****************************************************************
* Culv Q (cfs)           *    64.90 * Culv Ful Lngh (ft)    *   24.00  *
* # Barrels              *        1 * Culv Vel Us (ft/s)    *    9.18  *
* Q Barrel (cfs)         *    64.90 * Culv Vel Ds (ft/s)    *    9.18  *
* E.G. Us. (ft)          * 1096.44  * Culv Inv El Up (ft)  * 1090.49  *
* W.S. Us. (ft)          * 1096.35  * Culv Inv El Dn (ft)  * 1090.31  *
* E.G. Ds (ft)           * 1094.34  * Culv Frctn Ls (ft)   *    0.26  *
* W.S. Ds (ft)           * 1094.21  * Culv Ext Lss (ft)    *    1.18  *
* Delta EG (ft)          *    2.10  * Culv Ent Lss (ft)    *    0.65  *
* Delta WS (ft)          *    2.14  * Q Weir (cfs)         *  639.41  *
* E.G. IC (ft)           * 1096.43  * Weir Sta Lft (ft)    * 9458.38  *
* E.G. OC (ft)           * 1096.44  * Weir Sta Rgt (ft)    *10066.26  *
* Culvert Control        *  Outlet  * Weir Submerg         *    0.00  *
* Culv WS Inlet (ft)     * 1093.49  * Weir Max Depth (ft)  *    1.02  *
* Culv WS Outlet (ft)    * 1093.31  * Weir Avg Depth (ft)  *    0.48  *
* Culv Nml Depth (ft)    *          * Wr Flw Area (sq ft)  *  291.80  *
* Culv Crt Depth (ft)    *    2.58  * Min El Weir Flow (ft) * 1095.43  *
*****************************************************************

CROSS SECTION          RIVER: Camelback Road W
REACH: Camelback Main     RS: 31.4

INPUT
Description: 31.4 - Added X-section D/S of Culvert Located Bet 31 & 32
Station Elevation Data     num=      7
     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev
*******************************************************************************
    8890     1100     9510     1098     9890     1096    10000 1090.28    10020 1090.28
   10028     1094    10038 1094.77

Manning's n Values         num=      3
     Sta    n Val     Sta    n Val     Sta    n Val
*********************************************
    8890     .031     9890     .035    10028     .038

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          9890   10028             315     315     315            .3        .5
Ineffective Flow     num=      2
   Sta L   Sta R    Elev  Permanent
888        F
888        F

CROSS SECTION OUTPUT    Profile #PF 1
*****************************************************************************************
* E.G. Elev (ft)         * 1094.34  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.13  * Wt. n-Val.              *          *    0.035 *    0.038 *
* W.S. Elev (ft)         * 1094.21  * Reach Len. (ft)         *  315.00  *   315.00 *   315.00 *
* Crit W.S. (ft)         * 1092.51  * Flow Area (sq ft)       *          *   243.50 *     0.28 *
* E.G. Slope (ft/ft)     *0.001469  * Area (sq ft)            *          *   243.50 *     0.28 *
* Q Total (cfs)          *  696.72  * Flow (cfs)              *          *   696.63 *     0.09 *
* Top Width (ft)         *  106.25  * Top Width (ft)          *          *   103.55 *     2.71 *
* Vel Total (ft/s)       *    2.86  * Avg. Vel. (ft/s)        *          *     2.86 *     0.33 *
* Max Chl Dpth (ft)      *    3.93  * Hydr. Depth (ft)        *          *     2.35 *     0.10 *
* Conv. Total (cfs)      * 18175.4  * Conv. (cfs)             *          * 18173.0  *      2.4 *
* Length Wtd. (ft)       *  315.00  * Wetted Per. (ft)        *          *   104.47 *     2.71 *
* Min Ch El (ft)         * 1090.28  * Shear (lb/sq ft)        *          *     0.21 *     0.01 *
* Alpha                  *    1.00  * Stream Power (lb/ft s)  *          *     0.61 *     0.00 *
* Frctn Loss (ft)        *    0.86  * Cum Volume (acre-ft)    *   47.31  *    26.33 *     1.45 *
* C & E Loss (ft)        *    0.04  * Cum SA (acres)          *   67.38  *     8.34 *     3.34 *
*****************************************************************************************

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

CROSS SECTION          RIVER: Camelback Road W
REACH: Camelback Main     RS: 31

INPUT
Description: Cross Section 31
Station Elevation Data     num=     16
     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev
*******************************************************************************
 8973.16  1096.2 9178.76  1095.4 9373.63 1094.42 9576.25 1093.57 9783.29 1092.68
 9965.82 1092.34 9968.38 1091.11 9970.53 1091.21  9972.5 1092.35 9991.55 1092.52
  9996.3 1088.96    10000 1088.94 10006.1 1093.0710010.23 1092.2510022.96 1092.65
10064.17 1094.09

Manning's n Values         num=      3
     Sta    n Val     Sta    n Val     Sta    n Val
*********************************************
 8973.16     .031  9991.55     .035 10006.1     .038

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          9991.55 10006.1           550     550     550            .1        .3

CROSS SECTION OUTPUT    Profile #PF 1
*****************************************************************************************
* E.G. Elev (ft)         * 1093.43  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.27  * Wt. n-Val.              *   0.031  *    0.035 *    0.038 *
* W.S. Elev (ft)         * 1093.16  * Reach Len. (ft)         *  550.00  *   550.00 *   550.00 *
* Crit W.S. (ft)         * 1093.14  * Flow Area (sq ft)       *  170.07  *    40.22 *    14.84 *
* E.G. Slope (ft/ft)     *0.006650  * Area (sq ft)            *  170.07  *    40.22 *    14.84 *
* Q Total (cfs)          *  711.49  * Flow (cfs)              *  435.63  *   247.25 *    28.61 *
* Top Width (ft)         *  366.03  * Top Width (ft)          *  320.02  *    14.55 *    31.47 *
* Vel Total (ft/s)       *    3.16  * Avg. Vel. (ft/s)        *    2.56  *     6.15 *     1.93 *
* Max Chl Dpth (ft)      *    4.22  * Hydr. Depth (ft)        *    0.53  *     2.76 *     0.47 *
* Conv. Total (cfs)      *  8724.7  * Conv. (cfs)             *  5342.0  *  3032.0  *   350.8  *
* Length Wtd. (ft)       *  550.00  * Wetted Per. (ft)        *  320.61  *    17.00 *    31.56 *
* Min Ch El (ft)         * 1088.94  * Shear (lb/sq ft)        *    0.22  *     0.98 *     0.20 *
* Alpha                  *    1.73  * Stream Power (lb/ft s)  *    0.56  *     6.04 *     0.38 *
* Frctn Loss (ft)        *    2.72  * Cum Volume (acre-ft)    *   46.70  *    25.31 *     1.40 *
* C & E Loss (ft)        *    0.03  * Cum SA (acres)          *   66.22  *     7.92 *     3.22 *
*****************************************************************************************

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

```
CROSS SECTION          RIVER: Camelback Road W
REACH: Camelback Main     RS: 30

INPUT
Description: Cross Section 30
Station Elevation Data    num=      20
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
 8801.58 1093.93  9001.8 1093.16 9201.35 1092.42 9400.95 1091.67 9601.34 1090.86
 9801.89 1089.86 9942.62 1089.16 9952.63 1089.34  9955.5 1090.14 9958.71 1088.35
 9960.45 1088.53 9962.37 1089.71 9981.59 1090.04 9991.27 1090.05 9997.14    1086
   10000 1085.9210007.53 1091.1410010.58 1090.2410021.95 1090.2810060.24  1091.5

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
 8801.58    .031 9991.27    .03210007.53    .038

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9991.2710007.53             500     500     500             .1       .3

CROSS SECTION OUTPUT    Profile #PF 1
*****************************************************************************************
* E.G. Elev (ft)          * 1090.68  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.18  * Wt. n-Val.              *   0.031  *   0.032  *   0.038  *
* W.S. Elev (ft)          * 1090.50  * Reach Len. (ft)         *  500.00  *  500.00  *  500.00  *
* Crit W.S. (ft)          * 1090.32  * Flow Area (sq ft)       *  220.96  *   42.60  *    3.55  *
* E.G. Slope (ft/ft)      *0.003864  * Area (sq ft)            *  220.96  *   42.60  *    3.55  *
* Q Total (cfs)           *  737.27  * Flow (cfs)              *  516.28  *  218.18  *    2.81  *
* Top Width (ft)          *  351.62  * Top Width (ft)          *  317.22  *   15.33  *   19.07  *
* Vel Total (ft/s)        *    2.76  * Avg. Vel. (ft/s)        *    2.34  *    5.12  *    0.79  *
* Max Chl Dpth (ft)       *    4.58  * Hydr. Depth (ft)        *    0.70  *    2.78  *    0.19  *
* Conv. Total (cfs)       * 11861.3  * Conv. (cfs)             * 8305.9  * 3510.0  *    45.3  *
* Length Wtd. (ft)        *  500.00  * Wetted Per. (ft)        *  318.15  *   18.03  *   19.11  *
* Min Ch El (ft)          * 1085.92  * Shear (lb/sq ft)        *    0.17  *    0.57  *    0.04  *
* Alpha                   *    1.52  * Stream Power (lb/ft s)  *    0.39  *    2.92  *    0.04  *
* Frctn Loss (ft)         *    2.04  * Cum Volume (acre-ft)    *   44.23  *   24.79  *    1.28  *
* C & E Loss (ft)         *    0.00  * Cum SA (acres)          *   62.20  *    7.73  *    2.90  *
*****************************************************************************************

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

CROSS SECTION          RIVER: Camelback Road W
REACH: Camelback Main     RS: 29

INPUT
Description: Cross Section 29
Station Elevation Data    num=      17
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
 8871.76 1091.75 9071.54 1090.89 9275.55 1090.07 9471.61 1089.26 9671.99 1088.46
 9875.94 1087.48 9965.97 1087.31 9967.86 1086.06 9970.29 1086.12 9971.85 1087.63
 9991.68 1088.11 9995.38 1084.52   10000 1084.2910006.45 1088.7710008.91 1087.81
10020.23 1087.9210046.88 1088.36

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
 8871.76    .031 9991.68    .03210006.45    .038

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9991.6810006.45             500     500     500             .1       .3

CROSS SECTION OUTPUT    Profile #PF 1
*****************************************************************************************
* E.G. Elev (ft)          * 1088.63  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.18  * Wt. n-Val.              *   0.031  *   0.032  *   0.038  *
* W.S. Elev (ft)          * 1088.45  * Reach Len. (ft)         *  500.00  *  500.00  *  500.00  *
* Crit W.S. (ft)          *          * Flow Area (sq ft)       *  218.34  *   39.02  *   15.34  *
* E.G. Slope (ft/ft)      *0.004291  * Area (sq ft)            *  218.34  *   39.02  *   15.34  *
* Q Total (cfs)           *  759.99  * Flow (cfs)              *  533.21  *  205.97  *   20.81  *
* Top Width (ft)          *  371.24  * Top Width (ft)          *  317.32  *   14.31  *   39.61  *
* Vel Total (ft/s)        *    2.79  * Avg. Vel. (ft/s)        *    2.44  *    5.28  *    1.36  *
* Max Chl Dpth (ft)       *    4.16  * Hydr. Depth (ft)        *    0.69  *    2.73  *    0.39  *
* Conv. Total (cfs)       * 11602.0  * Conv. (cfs)             * 8140.0  * 3144.4  *   317.7  *
* Length Wtd. (ft)        *  500.00  * Wetted Per. (ft)        *  318.32  *   17.07  *   39.82  *
* Min Ch El (ft)          * 1084.29  * Shear (lb/sq ft)        *    0.18  *    0.61  *    0.10  *
* Alpha                   *    1.52  * Stream Power (lb/ft s)  *    0.45  *    3.23  *    0.14  *
* Frctn Loss (ft)         *    1.66  * Cum Volume (acre-ft)    *   41.71  *   24.32  *    1.17  *
* C & E Loss (ft)         *    0.02  * Cum SA (acres)          *   58.56  *    7.56  *    2.57  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
Warning: The energy loss was greater than 1.0 ft (0.3 m), between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION          RIVER: Camelback Road W
REACH: Camelback Main     RS: 28

INPUT
Description: Cross Section 28
Station Elevation Data    num=      15
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
 9164.98 1088.43 9367.72 1087.63 9567.95 1086.79  9768.3 1086.09 9965.65 1085.81
 9967.86 1084.25 9970.33 1084.47 9971.34 1085.63 9990.54 1086.23 9996.27 1082.47
   10000 1082.3810005.65 1087.1110007.96 1085.9710017.99 1086.2110044.46 1086.76

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
 9164.98     .03 9990.54    .03310005.65     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9990.5410005.65             560     560     560             .1       .3

CROSS SECTION OUTPUT    Profile #PF 1
*****************************************************************************************
* E.G. Elev (ft)          * 1086.95  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.11  * Wt. n-Val.              *   0.030  *   0.033  *   0.030  *
* W.S. Elev (ft)          * 1086.84  * Reach Len. (ft)         *  560.00  *  560.00  *  560.00  *
* Crit W.S. (ft)          * 1086.63  * Flow Area (sq ft)       *  285.94  *   42.63  *   17.73  *
* E.G. Slope (ft/ft)      *0.002644  * Area (sq ft)            *  285.94  *   42.63  *   17.73  *
* Q Total (cfs)           *  755.31  * Flow (cfs)              *  549.92  *  178.49  *   26.90  *
* Top Width (ft)          *  487.81  * Top Width (ft)          *  434.75  *   14.79  *   38.26  *
* Vel Total (ft/s)        *    2.18  * Avg. Vel. (ft/s)        *    1.92  *    4.19  *    1.52  *
* Max Chl Dpth (ft)       *    4.46  * Hydr. Depth (ft)        *    0.66  *    2.88  *    0.46  *
* Conv. Total (cfs)       * 14688.5  * Conv. (cfs)             * 10694.3  * 3471.1  *   523.1  *
* Length Wtd. (ft)        *  560.00  * Wetted Per. (ft)        *  435.80  *   17.53  *   38.56  *
* Min Ch El (ft)          * 1082.38  * Shear (lb/sq ft)        *    0.11  *    0.40  *    0.08  *
* Alpha                   *    1.45  * Stream Power (lb/ft s)  *    0.21  *    1.68  *    0.12  *
* Frctn Loss (ft)         *    1.56  * Cum Volume (acre-ft)    *   38.81  *   23.85  *    0.98  *
* C & E Loss (ft)         *    0.02  * Cum SA (acres)          *   54.24  *    7.39  *    2.12  *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.
```

```
Warning: The cross-section end points had to be extended vertically for the computed water surface.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less
         than 0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION          RIVER: Camelback Road W
REACH: Camelback Main     RS: 27

INPUT
Description: Cross Section 27
Station Elevation Data    num=      10
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 9538.891085.573 9610.36 1085.29 9790.941084.589 9992.021084.768 9993.85 1079.94
10001.54 1079.8710011.721085.54310015.761084.49910024.721084.44210051.791084.718

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
 9538.89     .03 9992.02    .03310011.72     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
      9992.0210011.72               125     125     125            .3       .5

CROSS SECTION OUTPUT    Profile #PF 1
*************************************************************************************
* E.G. Elev (ft)          * 1085.38 * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.26 * Wt. n-Val.              *   0.030  *   0.033  *   0.030  *
* W.S. Elev (ft)          * 1085.12 * Reach Len. (ft)         *  125.00  *  125.00  *  125.00  *
* Crit W.S. (ft)          * 1085.12 * Flow Area (sq ft)       *  125.84  *   69.94  *   21.27  *
* E.G. Slope (ft/ft)      *0.002972 * Area (sq ft)            *  125.84  *   69.94  *   21.27  *
* Q Total (cfs)           *  567.89 * Flow (cfs)              *  175.72  *  353.79  *   38.38  *
* Top Width (ft)          *  395.81 * Top Width (ft)          *  338.42  *   18.95  *   38.44  *
* Vel Total (ft/s)        *    2.62 * Avg. Vel. (ft/s)        *    1.40  *    5.06  *    1.80  *
* Max Chl Dpth (ft)       *    5.25 * Hydr. Depth (ft)        *    0.37  *    3.69  *    0.55  *
* Conv. Total (cfs)       * 10416.4 * Conv. (cfs)             *  3223.0  *  6489.4  *   704.0  *
* Length Wtd. (ft)        *  125.00 * Wetted Per. (ft)        *  338.43  *   23.64  *   38.93  *
* Min Ch El (ft)          * 1079.87 * Shear (lb/sq ft)        *    0.07  *    0.55  *    0.10  *
* Alpha                   *    2.45 * Stream Power (lb/ft s)  *    0.10  *    2.78  *    0.18  *
* Frctn Loss (ft)         *    0.29 * Cum Volume (acre-ft)    *   36.16  *   23.13  *    0.73  *
* C & E Loss (ft)         *    0.01 * Cum SA (acres)          *   49.27  *    7.17  *    1.63  *
*************************************************************************************

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 cross-section end points had to be extended vertically for the computed water surface.
Warning: During the standard step iterations, when the assumed water surface was set equal to
         critical depth, the calculated water surface came back below critical depth.  This indicates
         that there is not a valid subcritical answer.  The program defaulted to critical depth.

CROSS SECTION          RIVER: Camelback Road W
REACH: Camelback Main     RS: 26.9

INPUT
Description: 26.9 - Added X-section D/S of Culvert Located Bet 26 & 27
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 9538.89    1086    9980    1084 9988.58 1079.7710009.73 1079.77   10010    1084
   10040  1084.1

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
 9538.89     .03    9980    .033   10010     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9980   10010               70      70      70            .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
888        F
888        F

CROSS SECTION OUTPUT    Profile #PF 1
*************************************************************************************
* E.G. Elev (ft)          * 1084.58 * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.29 * Wt. n-Val.              *   0.030  *   0.033  *   0.030  *
* W.S. Elev (ft)          * 1084.29 * Reach Len. (ft)         *   70.00  *   70.00  *   70.00  *
* Crit W.S. (ft)          * 1082.30 * Flow Area (sq ft)       *    9.46  *  116.97  *    7.29  *
* E.G. Slope (ft/ft)      *0.001849 * Area (sq ft)            *    9.46  *  116.97  *    7.29  *
* Q Total (cfs)           *  518.30 * Flow (cfs)              *    5.60  *  506.69  *    6.01  *
* Top Width (ft)          *  124.59 * Top Width (ft)          *   64.59  *   30.00  *   30.00  *
* Vel Total (ft/s)        *    3.88 * Avg. Vel. (ft/s)        *    0.59  *    4.33  *    0.83  *
* Max Chl Dpth (ft)       *    4.52 * Hydr. Depth (ft)        *    0.15  *    3.90  *    0.24  *
* Conv. Total (cfs)       * 12052.9 * Conv. (cfs)             *  130.1   * 11782.9  *   139.9  *
* Length Wtd. (ft)        *   70.00 * Wetted Per. (ft)        *   64.59  *   34.96  *   30.19  *
* Min Ch El (ft)          * 1079.77 * Shear (lb/sq ft)        *    0.02  *    0.39  *    0.03  *
* Alpha                   *    1.22 * Stream Power (lb/ft s)  *    0.01  *    1.67  *    0.02  *
* Frctn Loss (ft)         *         * Cum Volume (acre-ft)    *   35.97  *   22.86  *    0.69  *
* C & E Loss (ft)         *         * Cum SA (acres)          *   48.69  *    7.10  *    1.53  *
*************************************************************************************

CULVERT                RIVER: Camelback Road W
REACH: Camelback Main     RS: 26.7

INPUT
Description: 2 CBC (SxR = 8'x4' each) at Cotton Lane and Camelback
Distance from Upstream XS =      25
Deck/Roadway Width        =      25
Weir Coefficient          =       3
Upstream  Deck/Roadway Coordinates
    num=       2
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
*********************************************
 9538.89    1086        10038.89  1083.9

Upstream Bridge Cross Section Data
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 9538.89    1086    9980    1084 9988.58 1079.7710009.73 1079.77   10010    1084
   10040  1084.1

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
 9538.89     .03    9980    .033   10010     .03

Bank Sta: Left   Right    Coeff Contr.   Expan.
       9980   10010            .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
888        F
888        F

Downstream  Deck/Roadway Coordinates
```

```
    num=        2
    Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
*********************************************
    9185  1085.2            10040  1083.9

Downstream Bridge Cross Section Data
Station Elevation Data    num=       7
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
    9185    1084    9745    1082  9987.5    1082 9990.93 1079.6910012.26 1079.69
 10012.5    1082   10040  1083.9

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
    9185     .03  9987.5    .033 10012.5     .03

Bank Sta: Left   Right    Coeff Contr.   Expan.
        9987.5 10012.5          .3          .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
888        F
888        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 # 2 - Wingwall flared 90 or 15 deg.
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    n Value   Entrance Loss Coef   Exit Loss Coef
          20          33       .014                .4                    1
Number of Barrels =  2
Upstream   Elevation =  1079.79
Centerline Stations
    Sta.    Sta.
    9995   10005
Downstream Elevation =  1079.7
Centerline Stations
    Sta.    Sta.
    9995   10005

CULVERT OUTPUT    Profile #PF 1
Culvert ID : Culvert #1
*****************************************************************
* Culv Q (cfs)          *  424.42  * Culv Ful Lngh (ft)    *          *
* # Barrels             *       2  * Culv Vel US (ft/s)    *     8.76 *
* Q Barrel (cfs)        *  212.21  * Culv Vel DS (ft/s)    *     9.45 *
* E.G. US. (ft)         * 1084.58  * Culv Inv El Up (ft)   * 1079.79 *
* W.S. US. (ft)         * 1084.29  * Culv Inv El Dn (ft)   * 1079.70 *
* E.G. DS (ft)          * 1082.68  * Culv Frctn Ls (ft)    *     0.12 *
* W.S. DS (ft)          * 1082.51  * Culv Ext Lss (ft)     *     1.21 *
* Delta EG (ft)         *    1.89  * Culv Ent Lss (ft)     *     0.57 *
* Delta WS (ft)         *    1.79  * Q Weir (cfs)          *    93.88 *
* E.G. IC (ft)          * 1084.58  * Weir Sta Lft (ft)     * 9876.50 *
* E.G. OC (ft)          * 1084.56  * Weir Sta Rgt (ft)     *10040.00 *
* Culvert Control       *   Inlet  * Weir Submerg          *     0.00 *
* Culv WS Inlet (ft)    * 1082.82  * Weir Max Depth (ft)   *     0.57 *
* Culv WS Outlet (ft)   * 1082.51  * Weir Avg Depth (ft)   *     0.33 *
* Culv Nml Depth (ft)   *    3.25  * Wr Flw Area (sq ft)   *    53.37 *
* Culv Crt Depth (ft)   *    2.80  * Min El Weir Flow (ft) * 1084.02 *
*****************************************************************

CROSS SECTION          RIVER: Camelback Road W
REACH: Camelback Main     RS: 26.4

INPUT
Description: 26.4 - Added X-section D/S of Culvert Located Bet 26 & 27

A
            flow rate of 323 was added at this x-section to reflect flow
            expected to pass through the culvert based on field observation
            and culvert analysis (culvert capacity at this location is
            estimated at 323 cfs)
Station Elevation Data    num=       7
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
    9185    1084    9745    1082  9987.5    1082 9990.93 1079.6910012.26 1079.69
 10012.5    1082   10040  1083.9

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
    9185     .03  9987.5    .033 10012.5     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        9987.5 10012.5              380     380     380            .3          .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev .Permanent
888        F
888        F

CROSS SECTION OUTPUT    Profile #PF 1
*****************************************************************************************
* E.G. Elev (ft)          * 1082.68  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.18  * Wt. n-Val.              *   0.030  *   0.033  *   0.030  *
* W.S. Elev (ft)          * 1082.51  * Reach Len. (ft)         *  380.00  *  380.00  *  380.00  *
* Crit W.S. (ft)          * 1082.51  * Flow Area (sq ft)       *  159.15  *   66.20  *    1.86  *
* E.G. Slope (ft/ft)      *0.002931  * Area (sq ft)            *  159.15  *   66.20  *    1.86  *
* Q Total (cfs)           *  526.89  * Flow (cfs)              *  237.00  *  287.89  *    2.00  *
* Top Width (ft)          *  416.97  * Top Width (ft)          *  384.62  *   25.00  *    7.35  *
* Vel Total (ft/s)        *    2.32  * Avg. Vel. (ft/s)        *    1.49  *    4.35  *    1.07  *
* Max Chl Dpth (ft)       *    2.82  * Hydr. Depth (ft)        *    0.41  *    2.65  *    0.25  *
* Conv. Total (cfs)       *  9731.7  * Conv. (cfs)             *  4377.3  *  5317.4  *    37.0  *
* Length Wtd. (ft)        *  380.00  * Wetted Per. (ft)        *  384.62  *   27.79  *    7.36  *
* Min Ch El (ft)          * 1079.69  * Shear (lb/sq ft)        *    0.08  *    0.44  *    0.05  *
* Alpha                   *    2.11  * Stream Power (lb/ft s)   *    0.11  *    1.90  *    0.05  *
* Frctn Loss (ft)         *    1.70  * Cum Volume (acre-ft)     *   35.84  *   22.71  *    0.69  *
* C & E Loss (ft)         *    0.07  * Cum SA (acres)           *   48.33  *    7.06  *    1.50  *
*****************************************************************************************

Warning: The energy equation could not be balanced within the specified number of iterations.  The
         program used critical depth for the water surface and continued on with the calculations.
Warning: The conveyance ratio (upstream 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.
```

Warning: The parabolic search method failed to converge on critical depth. The program will try the *cross section slice/secant method* to find critical depth.

CROSS SECTION RIVER: Camelback Road W
REACH: Camelback Main RS: 26

INPUT
Description: Cross Section 26
Station Elevation Data num= 17

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9318.63	1083.24	9522.9	1082.53	9790.36	1081.06	9794.41	1082.27	9811.01	1081.63
9817.31	1077.03	9825.32	1077.25	9828.26	1081.31	9874.48	1080.78	9885.92	1071.18
9934.86	1071.18	9952.94	1083.32	9974.83	1083.26	9992.32	1078.15	10000	1077.68
10007.42	1081.57	10017.51	1081.91						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9318.63	.03	9974.83	.03	10007.42	.03

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9974.83	10007.42	785	785	785	.1	.3

Blocked Obstructions num= 1

Sta L	Sta R	Elev
9877.93	9944.37	1076.97

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1078.86	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.41	Wt. n-Val.	0.030	0.033	
W.S. Elev (ft)	1078.45	Reach Len. (ft)	785.00	785.00	785.00
Crit W.S. (ft)	1078.24	Flow Area (sq ft)	110.37	4.78	
E.G. Slope (ft/ft)	0.007192	Area (sq ft)	110.37	4.78	
Q Total (cfs)	582.34	Flow (cfs)	571.47	10.87	
Top Width (ft)	89.38	Top Width (ft)	79.23	10.15	
Vel Total (ft/s)	5.06	Avg. Vel. (ft/s)	5.18	2.27	
Max Chl Dpth (ft)	1.48	Hydr. Depth (ft)	1.39	0.47	
Conv. Total (cfs)	6866.9	Conv. (cfs)	6738.7	128.2	
Length Wtd. (ft)	785.00	Wetted Per. (ft)	81.29	10.40	
Min Ch El (ft)	1077.68	Shear (lb/sq ft)	0.61	0.21	
Alpha	1.03	Stream Power (lb/ft s)	3.16	0.47	
Frctn Loss (ft)	2.82	Cum Volume (acre-ft)	34.66	22.40	0.68
C & E Loss (ft)	0.05	Cum SA (acres)	46.31	6.91	1.47

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Camelback Road W
REACH: Camelback Main RS: 25

INPUT
Description: Cross Section 25
Station Elevation Data num= 20

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
9167.45	1079.68	9368.15	1078.89	9578.5	1077.96	9765.23	1077.68	9770.5	1080.41
9787.03	1078.37	9791.83	1073.43	9803.83	1073.43	9808.5	1080.82	9854.94	1081.85
9864.62	1079.89	9878.15	1079.49	9887.63	1071.26	9940.08	1071.46	9956.3	1084.26
9976.57	1083.41	9996.17	1074.36	10000	1074.33	10006.96	1077.69	10017.88	1077.63

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
9167.45	.03	9976.57	.078	10006.96	.078

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9976.57	10006.96	910	910	910	.1	.3

Blocked Obstructions num= 1

Sta L	Sta R	Elev
9883.28	9943.34	1073.37

CROSS SECTION OUTPUT Profile #PF 1

E.G. Elev (ft)	1075.98	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.24	Wt. n-Val.	0.030	0.078	
W.S. Elev (ft)	1075.74	Reach Len. (ft)	910.00	910.00	910.00
Crit W.S. (ft)	1074.82	Flow Area (sq ft)	174.62	9.47	
E.G. Slope (ft/ft)	0.002323	Area (sq ft)	174.62	9.47	
Q Total (cfs)	696.88	Flow (cfs)	688.70	8.18	
Top Width (ft)	88.48	Top Width (ft)	78.74	9.74	
Vel Total (ft/s)	3.79	Avg. Vel. (ft/s)	3.94	0.86	
Max Chl Dpth (ft)	2.37	Hydr. Depth (ft)	2.22	0.97	
Conv. Total (cfs)	14459.6	Conv. (cfs)	14289.8	169.8	
Length Wtd. (ft)	910.00	Wetted Per. (ft)	82.70	10.37	
Min Ch El (ft)	1074.33	Shear (lb/sq ft)	0.31	0.13	
Alpha	1.07	Stream Power (lb/ft s)	1.21	0.11	
Frctn Loss (ft)	1.46	Cum Volume (acre-ft)	32.09	22.27	0.68
C & E Loss (ft)	0.03	Cum SA (acres)	44.88	6.73	1.47

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

CROSS SECTION RIVER: Camelback Road W
REACH: Camelback Main RS: 24

INPUT
Description: Cross Section 24
Station Elevation Data num= 21

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
8734.16	1077.16	9068.43	1075.94	9267.52	1075.39	9467.64	1074.71	9736.74	1074.98
9741.17	1076.25	9757.97	1075.56	9762.53	1071.48	9774.53	1071.5	9780.74	1079.6
9860.72	1081.3	9868.45	1077.74	9883.89	1077.33	9892.79	1070.77	9947.16	1070.95
9959.24	1078.91	9981.07	1078.56	9993.96	1070.33	10000	1070.13	10005.6	1073.41
10018.37	1073.23								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
8734.16	.03	9981.07	.078	10005.6	.078

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
9981.07	10005.6	300	300	300	.3	.5

Blocked Obstructions num= 1

Sta L	Sta R	Elev
9888.74	9946.99	1071.48

```
CROSS SECTION OUTPUT    Profile #PF 1
*****************************************************************************************
* E.G. Elev (ft)         * 1074.48  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.14  * Wt. n-Val.              *   0.030  *   0.078  *   0.078  *
* W.S. Elev (ft)         * 1074.34  * Reach Len. (ft)         *  300.00  *  300.00  *  300.00  *
* Crit W.S. (ft)         *          * Flow Area (sq ft)       *  214.56  *   51.83  *   13.04  *
* E.G. Slope (ft/ft)     *0.001198  * Area (sq ft)            *  214.56  *   51.83  *   13.04  *
* Q Total (cfs)          *  748.18  * Flow (cfs)              *  675.43  *   64.51  *    8.25  *
* Top Width (ft)         *  112.43  * Top Width (ft)          *   81.74  *   17.92  *   12.77  *
* Vel Total (ft/s)       *    2.68  * Avg. Vel. (ft/s)        *    3.15  *    1.24  *    0.63  *
* Max Chl Dpth (ft)      *    4.21  * Hydr. Depth (ft)        *    2.63  *    2.89  *    1.02  *
* Conv. Total (cfs)      * 21614.3  * Conv. (cfs)             * 19512.6  * 1863.6  *   238.2  *
* Length Wtd. (ft)       *  300.00  * Wetted Per. (ft)        *   86.72  *   19.99  *   13.88  *
* Min Ch El (ft)         * 1070.13  * Shear (lb/sq ft)        *    0.19  *    0.19  *    0.07  *
* Alpha                  *    1.27  * Stream Power (lb/ft s)  *    0.58  *    0.24  *    0.04  *
* Frctn Loss (ft)        *    0.35  * Cum Volume (acre-ft)    *   28.03  *   21.63  *    0.54  *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)          *   43.21  *    6.44  *    1.33  *
*****************************************************************************************

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

CROSS SECTION          RIVER: Camelback Road W
REACH: Camelback Main     RS: 23

INPUT
Description: Cross Section 23
Station Elevation Data     num=      12
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
 9073.91 1076.42 9273.22 1076.14 9474.34 1076.17 9647.43 1076.67 9687.73 1079.35
 9856.21 1076.81 9915.68  1078.5    9980 1074.84 9991.97 1068.4410012.26 1068.44
10012.26 1070.9710023.79 1071.83

Manning's n Values         num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
 9073.91    .031    9980    .03410023.79    .031

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
          998010023.79              185     185     185              .3       .5
Ineffective Flow     num=        2
   Sta L   Sta R    Elev  Permanent
888        F
888        F

CROSS SECTION OUTPUT    Profile #PF 1
*****************************************************************************************
* E.G. Elev (ft)         * 1074.12  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.18  * Wt. n-Val.              *          *   0.034  *          *
* W.S. Elev (ft)         * 1073.94  * Reach Len. (ft)         *  185.00  *  185.00  *  185.00  *
* Crit W.S. (ft)         * 1071.27  * Flow Area (sq ft)       *          *  169.18  *          *
* E.G. Slope (ft/ft)     *0.001133  * Area (sq ft)            *          *  169.18  *          *
* Q Total (cfs)          *  575.19  * Flow (cfs)              *          *  575.19  *          *
* Top Width (ft)         *   42.11  * Top Width (ft)          *          *   42.11  *          *
* Vel Total (ft/s)       *    3.40  * Avg. Vel. (ft/s)        *          *    3.40  *          *
* Max Chl Dpth (ft)      *    5.50  * Hydr. Depth (ft)        *          *    4.02  *          *
* Conv. Total (cfs)      * 17086.6  * Conv. (cfs)             *          * 17086.6  *          *
* Length Wtd. (ft)       *  185.00  * Wetted Per. (ft)        *          *   48.16  *          *
* Min Ch El (ft)         * 1068.44  * Shear (lb/sq ft)        *          *    0.25  *          *
* Alpha                  *    1.00  * Stream Power (lb/ft s)  *          *    0.84  *          *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)    *   27.29  *   20.87  *    0.50  *
* C & E Loss (ft)        *          * Cum SA (acres)          *   42.93  *    6.23  *    1.29  *
*****************************************************************************************

CULVERT                RIVER: Camelback Road W
REACH: Camelback Main     RS: 22.3

INPUT
Description: CBC at Loop303 and Camelback
Distance from Upstream XS =       65
Deck/Roadway Width        =       85
Weir Coefficient          =        3
Upstream  Deck/Roadway Coordinates
    num=       3
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
*****************************************************************************
 9073.91    1075          9998.91 1073.43         10023.79 1072.52

Upstream Bridge Cross Section Data
Station Elevation Data     num=      12
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
 9073.91 1076.42 9273.22 1076.14 9474.34 1076.17 9647.43 1076.67 9687.73 1079.35
 9856.21 1076.81 9915.68  1078.5    9980 1074.84 9991.97 1068.4410012.26 1068.44
10012.26 1070.9710023.79 1071.83

Manning's n Values         num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
 9073.91    .031    9980    .03410023.79    .031

Bank Sta: Left   Right    Coeff Contr.   Expan.
          998010023.79          .3       .5
Ineffective Flow     num=        2
   Sta L   Sta R    Elev  Permanent
888        F
888        F

Downstream  Deck/Roadway Coordinates
    num=       3
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
*****************************************************************************
 8917.08    1075          9995.08    1073         10021.34 1072.52

Downstream Bridge Cross Section Data
Station Elevation Data     num=      19
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
 8917.081074.897 9067.331074.584 9276.47 1074.13 9489.581073.656 9624.861074.538
 9645.041072.175 9647.511070.682 9650.461070.649  9667.41074.348  9752.11075.418
 9853.11 1075.67  9928.31073.984 9954.55  1069.7 9958.951071.047 9981.741071.405
 9988.17 1068.0110010.47 1068.0110013.53 1070.6410021.341070.869

Manning's n Values         num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
 8917.08    .031 9981.74    .03410013.53    .031

Bank Sta: Left   Right    Coeff Contr.   Expan.
        9981.7410013.53          .3       .5
Ineffective Flow     num=        2
   Sta L   Sta R    Elev  Permanent
888        F
888        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         3       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    n Value   Entrance Loss Coef   Exit Loss Coef
                 60      94      .014                  .4                1
Number of Barrels =  2
Upstream   Elevation =  1068.42
Centerline Stations
    Sta.     Sta.
 9998.9110007.91
Downstream Elevation =  1067.985
Centerline Stations
    Sta.     Sta.
 9995.0810004.08

CULVERT OUTPUT    Profile #PF 1
Culvert ID : Culvert #1
*****************************************************************
* Culv Q (cfs)          *  456.09  * Culv Ful Lngh (ft)    *     *
* # Barrels             *       2  * Culv Vel US (ft/s)     *  9.50 *
* Q Barrel (cfs)        *  228.04  * Culv Vel DS (ft/s)     *  12.28 *
* E.G. US. (ft)         * 1074.13  * Culv Inv El Up (ft)   * 1068.42 *
* W.S. US. (ft)         * 1073.94  * Culv Inv El Dn (ft)   * 1067.99 *
* E.G. DS (ft)          * 1071.13  * Culv Frctn Ls (ft)    *  0.92 *
* W.S. DS (ft)          * 1070.23  * Culv Ext Lss (ft)     *  1.52 *
* Delta EG (ft)         *    3.00  * Culv Ent Lss (ft)     *  0.56 *
* Delta WS (ft)         *    3.71  * Q Weir (cfs)          * 119.10 *
* E.G. IC (ft)          * 1074.13  * Weir Sta Lft (ft)     * 9981.35 *
* E.G. OC (ft)          * 1073.41  * Weir Sta Rgt (ft)     *10023.79 *
* Culvert Control       *   Inlet  * Weir Submerg          *  0.00 *
* Culv WS Inlet (ft)    * 1071.42  * Weir Max Depth (ft)   *  1.60 *
* Culv WS Outlet (ft)   * 1070.31  * Weir Avg Depth (ft)   *  0.94 *
* Culv Nml Depth (ft)   *    2.82  * Wr Flw Area (sq ft)   *  39.87 *
* Culv Crt Depth (ft)   *    2.93  * Min El Weir Flow (ft) * 1072.68 *
*****************************************************************

Note:    The flow in the culvert is entirely supercritical.

CROSS SECTION          RIVER: Camelback Road W
REACH: Camelback Main     RS: 22

INPUT
Description: Cross Section 22

A flow rate of 204 was added at this x-section
            to reflect flow expected to pass through the culvert based on
            field observation and culvert analysis (culvert capacity at this
            location is estimated at 204 cfs)
Station Elevation Data    num=      19
     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev
*****************************************************************************
 8917.081074.897 9067.331074.584 9276.47 1074.13 9489.581073.656 9624.861074.538
 9645.041072.175 9647.511070.682 9650.461070.649  9667.41074.348  9752.11075.418
 9853.11 1075.67  9928.31073.984 9954.55  1069.7 9958.951071.047 9981.741071.405
 9988.17 1068.0110010.47 1068.0110013.53 1070.6410021.341070.869

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
 8917.08    .031 9981.74    .03410013.53    .031

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9981.7410013.53               500     500     500             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
888        F
888        F

CROSS SECTION OUTPUT    Profile #PF 1
*****************************************************************************************
* E.G. Elev (ft)         * 1071.13  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.90  * Wt. n-Val.              *   0.031  *   0.034  *         *
* W.S. Elev (ft)         * 1070.23  * Reach Len. (ft)         *  500.00  *  500.00  *  500.00 *
* Crit W.S. (ft)         * 1070.23  * Flow Area (sq ft)       *    1.32  *   57.01  *         *
* E.G. Slope (ft/ft)     *0.013173  * Area (sq ft)            *    1.32  *   57.01  *         *
* Q Total (cfs)          *   437.32  * Flow (cfs)              *    2.93  *  434.39  *         *
* Top Width (ft)         *   34.06  * Top Width (ft)          *    4.97  *   29.08  *         *
* Vel Total (ft/s)       *    7.50  * Avg. Vel. (ft/s)        *    2.23  *    7.62  *         *
* Max Chl Dpth (ft)      *    2.22  * Hydr. Depth (ft)        *    0.26  *    1.96  *         *
* Conv. Total (cfs)      *  3810.3  * Conv. (cfs)             *    25.6  *  3784.7  *         *
* Length Wtd. (ft)       *  500.00  * Wetted Per. (ft)        *    5.09  *   30.46  *         *
* Min Ch El (ft)         * 1068.01  * Shear (lb/sq ft)        *    0.21  *    1.54  *         *
* Alpha                  *    1.03  * Stream Power (lb/ft s)  *    0.47  *   11.73  *         *
* Frctn Loss (ft)        *    2.09  * Cum Volume (acre-ft)    *   27.28  *   20.39  *    0.50 *
* C & E Loss (ft)        *    0.30  * Cum SA (acres)          *   42.92  *    6.08  *    1.29 *
*****************************************************************************************

Warning: The energy equation could not be balanced within the specified number of iterations.  The
         program used critical depth for the water surface and continued on with the calculations.
Warning: 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.
Warning: The parabolic search method failed to converge on critical depth.  The program will try the
         cross section slice/secant method to find critical depth.

CROSS SECTION          RIVER: Camelback Road W
REACH: Camelback Main     RS: 21

INPUT
Description: Cross Section 21
Station Elevation Data    num=      13
     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev     Sta     Elev
*****************************************************************************
 8988.58 1071.34 9216.87 1070.53  9415.2 1069.97 9617.69  1069.4 9777.92 1068.27
 9961.33 1066.93 9966.53 1064.79 9971.13  1067.9 9981.18 1067.34 9992.18 1061.98
   10000 1062.3510008.22 1068.2910018.15 1068.71

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
 8988.58    .031 9981.18    .03410008.22    .031

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

```
      9981.1810008.22                 500      500      500              .1        .3

CROSS SECTION OUTPUT    Profile #PF 1
*********************************************************************************************
* E.G. Elev (ft)          * 1068.05  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.29  * Wt. n-Val.              *   0.031  *   0.034  *         *
* W.S. Elev (ft)          * 1067.76  * Reach Len. (ft)         *  500.00  *  500.00  *  500.00 *
* Crit W.S. (ft)          *          * Flow Area (sq ft)       *   65.24  *   98.13  *         *
* E.G. Slope (ft/ft)      *0.002314  * Area (sq ft)            *   65.24  *   98.13  *         *
* Q Total (cfs)           *  556.83  * Flow (cfs)              *   95.06  *  461.77  *         *
* Top Width (ft)          *  157.17  * Top Width (ft)          *  130.87  *   26.31  *         *
* Vel Total (ft/s)        *    3.41  * Avg. Vel. (ft/s)        *    1.46  *    4.71  *         *
* Max Chl Dpth (ft)       *    5.78  * Hydr. Depth (ft)        *    0.50  *    3.73  *         *
* Conv. Total (cfs)       * 11575.2  * Conv. (cfs)             *  1976.1  *  9599.1  *         *
* Length Wtd. (ft)        *  500.00  * Wetted Per. (ft)        *  132.21  *   29.30  *         *
* Min Ch El (ft)          * 1061.98  * Shear (lb/sq ft)        *    0.07  *    0.48  *         *
* Alpha                   *    1.61  * Stream Power (lb/ft s)   *    0.10  *    2.28  *         *
* Frctn Loss (ft)         *    1.22  * Cum Volume (acre-ft)     *   26.90  *   19.50  *    0.50 *
* C & E Loss (ft)         *    0.03  * Cum SA (acres)           *   42.14  *    5.76  *    1.29 *
*********************************************************************************************

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

CROSS SECTION           RIVER: Camelback Road W
REACH: Camelback Main      RS: 20

INPUT
Description: Cross Section 20
Station Elevation Data     num=      13
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 8929.58 1069.56 9153.98 1069.09  9374.2 1067.91  9566.3 1067.25 9737.73 1067.06
  9962.1 1065.58 9967.12 1063.92 9973.94 1066.35 9986.81 1066.16   10000 1060.29
10004.79 1060.3110015.46 1066.2510026.85 1066.65

Manning's n Values         num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
 8929.58    .039 9986.81    .02610015.46     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9986.8110015.46                 500      500      500              .1        .3

CROSS SECTION OUTPUT    Profile #PF 1
*********************************************************************************************
* E.G. Elev (ft)          * 1066.80  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.56  * Wt. n-Val.              *   0.039  *   0.026  *         *
* W.S. Elev (ft)          * 1066.24  * Reach Len. (ft)         *  500.00  *  500.00  *  500.00 *
* Crit W.S. (ft)          *          * Flow Area (sq ft)       *   48.50  *   99.86  *         *
* E.G. Slope (ft/ft)      *0.002554  * Area (sq ft)            *   48.50  *   99.86  *         *
* Q Total (cfs)           *  676.33  * Flow (cfs)              *   52.91  *  623.42  *         *
* Top Width (ft)          *  146.07  * Top Width (ft)          *  117.44  *   28.64  *         *
* Vel Total (ft/s)        *    4.58  * Avg. Vel. (ft/s)        *    1.09  *    6.24  *         *
* Max Chl Dpth (ft)       *    5.95  * Hydr. Depth (ft)        *    0.41  *    3.49  *         *
* Conv. Total (cfs)       * 13383.0  * Conv. (cfs)             *  1046.9  * 12336.1  *         *
* Length Wtd. (ft)        *  500.00  * Wetted Per. (ft)        *  118.11  *   31.42  *         *
* Min Ch El (ft)          * 1060.29  * Shear (lb/sq ft)        *    0.07  *    0.51  *         *
* Alpha                   *    1.73  * Stream Power (lb/ft s)   *    0.07  *    3.16  *         *
* Frctn Loss (ft)         *    1.31  * Cum Volume (acre-ft)     *   26.25  *   18.36  *    0.50 *
* C & E Loss (ft)         *    0.00  * Cum SA (acres)           *   40.71  *    5.45  *    1.29 *
*********************************************************************************************

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

CROSS SECTION           RIVER: Camelback Road W
REACH: Camelback Main      RS: 19

INPUT
Description: Cross Section 19
Station Elevation Data     num=      12
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 9063.95 1067.86  9243.2 1066.85  9458.9 1065.78 9661.24 1065.48 9954.47 1064.05
 9960.14 1062.25 9966.01 1064.36  9979.4 1063.99 9989.75 1059.88   10000 1059.86
10005.79 1065.1210016.73 1065.04

Manning's n Values         num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
 9063.95    .036  9979.4    .02610005.79     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9979.410005.79                 500      500      500              .1        .3

CROSS SECTION OUTPUT    Profile #PF 1
*********************************************************************************************
* E.G. Elev (ft)          * 1065.49  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.56  * Wt. n-Val.              *   0.036  *   0.026  *         *
* W.S. Elev (ft)          * 1064.93  * Reach Len. (ft)         *  500.00  *  500.00  *  500.00 *
* Crit W.S. (ft)          * 1064.87  * Flow Area (sq ft)       *  109.02  *   97.00  *         *
* E.G. Slope (ft/ft)      *0.002683  * Area (sq ft)            *  109.02  *   97.00  *         *
* Q Total (cfs)           *  795.84  * Flow (cfs)              *  152.54  *  643.30  *         *
* Top Width (ft)          *  231.44  * Top Width (ft)          *  205.26  *   26.18  *         *
* Vel Total (ft/s)        *    3.86  * Avg. Vel. (ft/s)        *    1.40  *    6.63  *         *
* Max Chl Dpth (ft)       *    5.07  * Hydr. Depth (ft)        *    0.53  *    3.70  *         *
* Conv. Total (cfs)       * 15364.1  * Conv. (cfs)             *  2944.9  * 12419.2  *         *
* Length Wtd. (ft)        *  500.00  * Wetted Per. (ft)        *  205.92  *   28.92  *         *
* Min Ch El (ft)          * 1059.86  * Shear (lb/sq ft)        *    0.09  *    0.56  *         *
* Alpha                   *    2.41  * Stream Power (lb/ft s)   *    0.12  *    3.73  *         *
* Frctn Loss (ft)         *    1.80  * Cum Volume (acre-ft)     *   25.35  *   17.23  *    0.50 *
* C & E Loss (ft)         *    0.09  * Cum SA (acres)           *   38.86  *    5.13  *    1.29 *
*********************************************************************************************

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

CROSS SECTION           RIVER: Camelback Road W
REACH: Camelback Main      RS: 18

INPUT
Description: Cross Section 18
Station Elevation Data     num=      10
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 9542.531063.216 9757.871062.539 9960.081062.827 9966.411061.323 9971.841063.042
 9982.851062.816 9996.811058.476   100001058.33810007.991063.32110020.481063.321

Manning's n Values         num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
 9542.53    .036 9982.85    .03610007.99     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9982.8510007.99                 660      660      660              .3        .5
```

```
CROSS SECTION OUTPUT    Profile #PF 1
*****************************************************************************************
* E.G. Elev (ft)         * 1063.59  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.25  * Wt. n-Val.              *   0.036  *   0.036  *   0.030  *
* W.S. Elev (ft)         * 1063.34  * Reach Len. (ft)         *  660.00  *  660.00  *  660.00  *
* Crit W.S. (ft)         * 1063.34  * Flow Area (sq ft)       *  252.18  *   73.46  *    0.26  *
* E.G. Slope (ft/ft)     *0.004863  * Area (sq ft)            *  252.18  *   73.46  *    0.26  *
* Q Total (cfs)          *  910.00  * Flow (cfs)              *  500.17  *  409.76  *    0.07  *
* Top Width (ft)         *  477.95  * Top Width (ft)          *  440.32  *   25.14  *   12.49  *
* Vel Total (ft/s)       *    2.79  * Avg. Vel. (ft/s)        *    1.98  *    5.58  *    0.26  *
* Max Chl Dpth (ft)      *    5.00  * Hydr. Depth (ft)        *    0.57  *    2.92  *    0.02  *
* Conv. Total (cfs)      * 13048.9  * Conv. (cfs)             * 7172.2  * 5875.7  *     1.0  *
* Length Wtd. (ft)       *  660.00  * Wetted Per. (ft)        *  440.89  *   27.23  *   12.51  *
* Min Ch El (ft)         * 1058.34  * Shear (lb/sq ft)        *    0.17  *    0.82  *    0.01  *
* Alpha                  *    2.07  * Stream Power (lb/ft s)  *    0.34  *    4.57  *    0.00  *
* Frctn Loss (ft)        *    0.83  * Cum Volume (acre-ft)    *   23.27  *   16.26  *    0.49  *
* C & E Loss (ft)        *    0.07  * Cum SA (acres)          *   35.15  *    4.84  *    1.22  *
*****************************************************************************************

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 cross-section end points had to be extended vertically for the computed water surface.
Warning: The conveyance ratio (upstream 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 cross section had to be extended vertically during the critical depth 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.
Warning: The parabolic search method failed to converge on critical depth.  The program will try the
         cross section slice/secant method to find critical depth.

CROSS SECTION           RIVER: Camelback Road W
REACH: Camelback Main      RS: 17

INPUT
Description: Cross Section 17
Station Elevation Data    num=      18
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
 9115.55 1063.39 9373.65 1063.43 9375.66 1061.39 9377.32 1061.24 9379.22 1063.45
 9552.87 1062.58 9740.45 1061.73 9913.28 1060.81 9917.13 1059.52 9922.79 1061.29
 9948.02 1061.31 9962.84 1059.37  9969.7 1061.64    9975 1055.1910004.17 1055.19
10006.97 1062.5110010.05 1061.5810019.44 1061.54

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
 9115.55    .035  9969.7    .03610006.97     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        9969.710006.97              85     85      85              .3       .5
Ineffective Flow      num=       2
   Sta L   Sta R    Elev  Permanent
888        F
888        F

CROSS SECTION OUTPUT    Profile #PF 1
*****************************************************************************************
* E.G. Elev (ft)         * 1062.46  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.11  * Wt. n-Val.              *   0.035  *   0.036  *   0.030  *
* W.S. Elev (ft)         * 1062.35  * Reach Len. (ft)         *   85.00  *   85.00  *   85.00  *
* Crit W.S. (ft)         * 1058.56  * Flow Area (sq ft)       *  319.58  *  239.46  *    8.38  *
* E.G. Slope (ft/ft)     *0.000625  * Area (sq ft)            *  319.58  *  239.46  *    8.38  *
* Q Total (cfs)          * 1065.71  * Flow (cfs)              *  307.05  *  750.86  *    7.80  *
* Top Width (ft)         *  418.45  * Top Width (ft)          *  369.31  *   37.21  *   11.94  *
* Vel Total (ft/s)       *    1.88  * Avg. Vel. (ft/s)        *    0.96  *    3.14  *    0.93  *
* Max Chl Dpth (ft)      *    7.16  * Hydr. Depth (ft)        *    0.87  *    6.44  *    0.70  *
* Conv. Total (cfs)      * 42643.4  * Conv. (cfs)             * 12286.4  * 30044.9  *   312.2  *
* Length Wtd. (ft)       *   85.00  * Wetted Per. (ft)        *  371.20  *   45.18  *   12.86  *
* Min Ch El (ft)         * 1055.19  * Shear (lb/sq ft)        *    0.03  *    0.21  *    0.03  *
* Alpha                  *    2.04  * Stream Power (lb/ft s)  *    0.03  *    0.65  *    0.02  *
* Frctn Loss (ft)        *          * Cum Volume (acre-ft)    *   18.94  *   13.88  *    0.43  *
* C & E Loss (ft)        *          * Cum SA (acres)          *   29.02  *    4.37  *    1.03  *
*****************************************************************************************

CULVERT                 RIVER: Camelback Road W
REACH: Camelback Main      RS: 16.9

INPUT
Description: 4 CMPs (2@48" & 2@84"x60" ellipse) at Sarival Road
Distance from Upstream XS =       15
Deck/Roadway Width        =       60
Weir Coefficient          =        3
Upstream  Deck/Roadway Coordinates
    num=       3
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
*************************************************************************
 9115.55    1062          9997.55 1061.86        10065.55 1061.17

Upstream Bridge Cross Section Data
Station Elevation Data    num=      18
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
 9115.55 1063.39 9373.65 1063.43 9375.66 1061.39 9377.32 1061.24 9379.22 1063.45
 9552.87 1062.58 9740.45 1061.73 9913.28 1060.81 9917.13 1059.52 9922.79 1061.29
 9948.02 1061.31 9962.84 1059.37  9969.7 1061.64    9975 1055.1910004.17 1055.19
10006.97 1062.5110010.05 1061.5810019.44 1061.54

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
 9115.55    .035  9969.7    .03610006.97     .03

Bank Sta: Left   Right    Coeff Contr.   Expan.
        9969.710006.97              .3       .5
Ineffective Flow      num=       2
   Sta L   Sta R    Elev  Permanent
888        F
888        F

Downstream  Deck/Roadway Coordinates
    num=       3
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
*************************************************************************
 9327.81    1062          9969.81 1061.86            10040 1061.17

Downstream Bridge Cross Section Data
Station Elevation Data    num=       8
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
  9332.5    1062  9922.5    1060 9979.86 1060.01 9983.33 1054.88   10000 1054.83
10011.11 1054.88   10015    1060   10040 1061.17

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
```

```
  9332.5    .039 9979.86    .052   10015     .03

Bank Sta: Left   Right    Coeff Contr.   Expan.
       9979.86   10015          .3        .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
888        F
888        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 =  2

Culvert Name     Shape      Rise    Span
Culvert #2      Circular       4
FHWA Chart # 2 - Corrugated Metal Pipe Culvert
FHWA Scale # 1 - Headwall
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    n Value   Entrance Loss Coef   Exit Loss Coef
                 15      60      .024                   .5                1
Number of Barrels =  2
Upstream   Elevation =  1056.14
Centerline Stations
    Sta.    Sta.
    9977    9985
Downstream Elevation =  1055.35
Centerline Stations
    Sta.    Sta.
    9985    9993

Culvert Name     Shape      Rise    Span
Culvert #3      Ellipse        5       7
FHWA Chart # 29- Horizontal Ellipse; Concrete
FHWA Scale # 1 - Square edge with headwall
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    n Value   Entrance Loss Coef   Exit Loss Coef
                 13      60      .014                   .5                1
Number of Barrels =  2
Upstream   Elevation =  1055.215
Centerline Stations
    Sta.    Sta.
    9992   10000
Downstream Elevation =  1054.825
Centerline Stations
    Sta.    Sta.
   10000   10008

CULVERT OUTPUT    Profile #PF 1
Culvert ID : Culvert #2
*********************************************************************
* Culv Q (cfs)          *  162.37  * Culv Ful Lngh (ft)    *   60.00  *
* # Barrels             *       2  * Culv Vel US (ft/s)    *    6.46  *
* Q Barrel (cfs)        *   81.19  * Culv Vel DS (ft/s)    *    6.46  *
* E.G. US. (ft)         * 1062.47  * Culv Inv El Up (ft)  * 1056.14  *
* W.S. US. (ft)         * 1062.35  * Culv Inv El Dn (ft)  * 1055.35  *
* E.G. DS (ft)          * 1061.06  * Culv Frctn Ls (ft)   *    0.63  *
* W.S. DS (ft)          * 1060.86  * Culv Ext Lss (ft)    *    0.44  *
* Delta EG (ft)         *    1.40  * Culv Ent Lss (ft)    *    0.32  *
* Delta WS (ft)         *    1.49  * Q Weir (cfs)         *  476.55  *
* E.G. IC (ft)          * 1060.40  * Weir Sta Lft (ft)    * 9374.61  *
* E.G. OC (ft)          * 1062.48  * Weir Sta Rgt (ft)    *10019.44  *
* Culvert Control       *  Outlet  * Weir Submerg         *    0.00  *
* Culv WS Inlet (ft)    * 1060.14  * Weir Max Depth (ft)   *    0.82  *
* Culv WS Outlet (ft)   * 1059.35  * Weir Avg Depth (ft)   *    0.49  *
* Culv Nml Depth (ft)   *          * Wr Flw Area (sq ft)   *  218.96  *
* Culv Crt Depth (ft)   *    2.73  * Min El Weir Flow (ft) * 1061.75  *
*********************************************************************

CULVERT OUTPUT    Profile #PF 1
Culvert ID : Culvert #3
*********************************************************************
* Culv Q (cfs)          *  426.79  * Culv Ful Lngh (ft)    *   60.00  *
* # Barrels             *       2  * Culv Vel US (ft/s)    *    7.76  *
* Q Barrel (cfs)        *  213.39  * Culv Vel DS (ft/s)    *    7.76  *
* E.G. US. (ft)         * 1062.47  * Culv Inv El Up (ft)  * 1055.22  *
* W.S. US. (ft)         * 1062.35  * Culv Inv El Dn (ft)  * 1054.83  *
* E.G. DS (ft)          * 1061.06  * Culv Frctn Ls (ft)   *    0.20  *
* W.S. DS (ft)          * 1060.86  * Culv Ext Lss (ft)    *    0.73  *
* Delta EG (ft)         *    1.40  * Culv Ent Lss (ft)    *    0.47  *
* Delta WS (ft)         *    1.49  * Q Weir (cfs)         *  476.55  *
* E.G. IC (ft)          * 1060.97  * Weir Sta Lft (ft)    * 9374.61  *
* E.G. OC (ft)          * 1062.46  * Weir Sta Rgt (ft)    *10019.44  *
* Culvert Control       *  Outlet  * Weir Submerg         *    0.00  *
* Culv WS Inlet (ft)    * 1060.22  * Weir Max Depth (ft)   *    0.82  *
* Culv WS Outlet (ft)   * 1059.83  * Weir Avg Depth (ft)   *    0.49  *
* Culv Nml Depth (ft)   *          * Wr Flw Area (sq ft)   *  218.96  *
* Culv Crt Depth (ft)   *    3.54  * Min El Weir Flow (ft) * 1061.75  *
*********************************************************************

CROSS SECTION          RIVER: Camelback Road W
REACH: Camelback Main     RS: 16.4

INPUT
Description: 16.4 - Added X-section D/S of Culvert Located Bet 16 & 17
Station Elevation Data     num=      8
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************
  9332.5    1062  9922.5    1060 9979.86 1060.01 9983.33 1054.88   10000 1054.83
10011.11 1054.88   10015    1060   10040 1061.17

Manning's n Values         num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
  9332.5    .039 9979.86    .052   10015     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9979.86   10015             305     305     305            .3        .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
888        F
888        F

CROSS SECTION OUTPUT    Profile #PF 1
*****************************************************************************************
* E.G. Elev (ft)          * 1061.06  * Element              *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.20  * Wt. n-Val.           *   0.039  *   0.052  *   0.030  *
* W.S. Elev (ft)          * 1060.86  * Reach Len. (ft)      *  305.00  *  305.00  *  305.00  *
* Crit W.S. (ft)          * 1058.11  * Flow Area (sq ft)    *  157.79  *  191.93  *    7.88  *
* E.G. Slope (ft/ft)      *0.002472  * Area (sq ft)         *  157.79  *  191.93  *    7.88  *
* Q Total (cfs)           *  971.81  * Flow (cfs)           *  190.23  *  770.54  *   11.04  *
* Top Width (ft)          *  364.22  * Top Width (ft)        *   35.14  *   18.35  *   18.35  *
* Vel Total (ft/s)        *    2.72  * Avg. Vel. (ft/s)      *    1.21  *    4.01  *    1.40  *
* Max Chl Dpth (ft)       *    6.03  * Hydr. Depth (ft)      *    0.51  *    5.46  *    0.43  *
```

```
* Conv. Total (cfs)       * 19547.2  * Conv. (cfs)            *  3826.4  * 15498.8  *   222.0  *
* Length Wtd. (ft)        *   305.00 * Wetted Per. (ft)       *   310.73  *    40.40  *    18.37  *
* Min Ch El (ft)          * 1054.83  * Shear (lb/sq ft)       *     0.08  *     0.73  *     0.07  *
* Alpha                   *    1.77  * Stream Power (lb/ft s) *     0.09  *     2.94  *     0.09  *
* Frctn Loss (ft)         *    0.72  * Cum Volume (acre-ft)   *    18.48  *    13.46  *     0.41  *
* C & E Loss (ft)         *    0.07  * Cum SA (acres)         *    28.36  *     4.30  *     1.00  *
*****************************************************************************************************

CROSS SECTION          RIVER: Camelback Road W
REACH: Camelback Main     RS: 16

INPUT
Description: Cross Section 16
Station Elevation Data    num=      14
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
 9327.81 1060.56 9380.02 1061.14 9585.38  1059.8 9863.08 1058.52 9967.06 1058.94
 9969.56 1057.45 9972.56 1057.44 9977.69 1060.25 9988.18 1059.93   10000 1056.05
10004.18 1056.1210012.53 1060.4310014.91 1059.7810027.69 1060.03

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
 9327.81    .039 9988.18    .05210012.53     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9988.1810012.53             360     360     360             .1       .3

CROSS SECTION OUTPUT    Profile #PF 1
*****************************************************************************************************
* E.G. Elev (ft)          * 1060.27  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.06  * Wt. n-Val.              *   0.039  *   0.052  *   0.030  *
* W.S. Elev (ft)          * 1060.21  * Reach Len. (ft)         *  360.00  *  360.00  *  360.00  *
* Crit W.S. (ft)          *          * Flow Area (sq ft)       *  478.36  *   59.60  *    4.19  *
* E.G. Slope (ft/ft)      *0.002240  * Area (sq ft)            *  478.36  *   59.60  *    4.19  *
* Q Total (cfs)           * 1033.84  * Flow (cfs)              *  887.72  *  141.85  *    4.27  *
* Top Width (ft)          *  501.85  * Top Width (ft)          *  463.59  *   23.92  *   14.34  *
* Vel Total (ft/s)        *    1.91  * Avg. Vel. (ft/s)        *    1.86  *    2.38  *    1.02  *
* Max Chl Dpth (ft)       *    4.16  * Hydr. Depth (ft)        *    1.03  *    2.49  *    0.29  *
* Conv. Total (cfs)       * 21844.8  * Conv. (cfs)             * 18757.3  *  2997.3  *   90.3  *
* Length Wtd. (ft)        *  360.00  * Wetted Per. (ft)        *  464.72  *   25.53  *   14.58  *
* Min Ch El (ft)          * 1056.05  * Shear (lb/sq ft)        *    0.14  *    0.33  *    0.04  *
* Alpha                   *    1.03  * Stream Power (lb/ft s) *    0.27  *    0.78  *    0.04  *
* Frctn Loss (ft)         *    0.83  * Cum Volume (acre-ft)   *   16.25  *   12.58  *    0.37  *
* C & E Loss (ft)         *    0.00  * Cum SA (acres)         *   25.65  *    4.09  *    0.89  *
*****************************************************************************************************

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

CROSS SECTION          RIVER: Camelback Road W
REACH: Camelback Main     RS: 15

INPUT
Description: Cross Section 15
Station Elevation Data    num=      14
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
 9117.39 1060.73 9320.29 1059.83 9372.49 1060.25 9600.89 1058.34 9855.33 1057.68
 9961.35 1062.08 9963.36 1060.69 9965.56 1060.47 9971.65 1059.38 9988.57 1075.16
 9995.87 1055.47   10000 1055.41 10008.3 1058.6410022.48  1058.9

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
 9117.39     .04 9988.57    .052 10008.3     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9988.57 10008.3             590     590     590             .1       .3

CROSS SECTION OUTPUT    Profile #PF 1
*****************************************************************************************************
* E.G. Elev (ft)          * 1059.44  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.06  * Wt. n-Val.              *   0.040  *   0.052  *   0.030  *
* W.S. Elev (ft)          * 1059.38  * Reach Len. (ft)         *  590.00  *  590.00  *  590.00  *
* Crit W.S. (ft)          *          * Flow Area (sq ft)       *  446.89  *   38.61  *    8.61  *
* E.G. Slope (ft/ft)      *0.002379  * Area (sq ft)            *  446.89  *   38.61  *    8.61  *
* Q Total (cfs)           *  951.62  * Flow (cfs)              *  844.77  *   92.26  *   14.59  *
* Top Width (ft)          *  447.42  * Top Width (ft)          *  419.37  *   13.88  *   14.18  *
* Vel Total (ft/s)        *    1.93  * Avg. Vel. (ft/s)        *    1.89  *    2.39  *    1.69  *
* Max Chl Dpth (ft)       *    3.97  * Hydr. Depth (ft)        *    1.07  *    2.78  *    0.61  *
* Conv. Total (cfs)       * 19509.5  * Conv. (cfs)             * 17318.9  *  1891.5  *  299.1  *
* Length Wtd. (ft)        *  590.00  * Wetted Per. (ft)        *  419.41  *   17.20  *   14.66  *
* Min Ch El (ft)          * 1055.41  * Shear (lb/sq ft)        *    0.16  *    0.33  *    0.09  *
* Alpha                   *    1.02  * Stream Power (lb/ft s) *    0.30  *    0.80  *    0.15  *
* Frctn Loss (ft)         *    1.63  * Cum Volume (acre-ft)   *   12.43  *   12.18  *    0.32  *
* C & E Loss (ft)         *    0.01  * Cum SA (acres)         *   22.00  *    3.93  *    0.77  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less
         than 0.7 or greater than 1.4.  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION          RIVER: Camelback Road W
REACH: Camelback Main     RS: 14

INPUT
Description: Cross Section 14
Station Elevation Data    num=      16
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
 8923.62 1059.75 9112.88 1059.19 9316.95  1058.6 9543.18 1057.65 9739.85 1057.05
 9957.33 1056.87 9961.64 1057.91 9967.34 1056.16 9970.54 1056.39 9974.72 1057.81
 9987.18 1057.76  9995.8 1053.81   10000 1053.7710007.77  1057.810009.84 1057.23
10023.89 1057.26

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
 8923.62    .036 9987.18    .03610007.77     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9987.1810007.77             510     510     510             .1       .3

CROSS SECTION OUTPUT    Profile #PF 1
*****************************************************************************************************
* E.G. Elev (ft)          * 1057.80  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.12  * Wt. n-Val.              *   0.036  *   0.036  *   0.030  *
* W.S. Elev (ft)          * 1057.68  * Reach Len. (ft)         *  510.00  *  510.00  *  510.00  *
* Crit W.S. (ft)          *          * Flow Area (sq ft)       *  233.83  *   47.43  *    6.49  *
* E.G. Slope (ft/ft)      *0.003627  * Area (sq ft)            *  233.83  *   47.43  *    6.49  *
* Q Total (cfs)           *  592.57  * Flow (cfs)              *  385.21  *  196.84  *   10.52  *
* Top Width (ft)          *  472.57  * Top Width (ft)          *  436.70  *   20.19  *   15.69  *
* Vel Total (ft/s)        *    2.06  * Avg. Vel. (ft/s)        *    1.65  *    4.15  *    1.62  *
* Max Chl Dpth (ft)       *    3.91  * Hydr. Depth (ft)        *    0.54  *    2.35  *    0.41  *
* Conv. Total (cfs)       *  9838.8  * Conv. (cfs)             *  6395.8  *  3268.2  *  174.8  *
```

```
* Length Wtd. (ft)        *  510.00  * Wetted Per. (ft)        *  437.24  *   21.98  *   16.17  *
* Min Ch El (ft)          * 1053.77  * Shear (lb/sq ft)        *    0.12  *    0.49  *    0.09  *
* Alpha                   *    1.78  * Stream Power (lb/ft s) *    0.20  *    2.03  *    0.15  *
* Frctn Loss (ft)         *    1.15  * Cum Volume (acre-ft)    *    7.82  *   11.59  *    0.22  *
* C & E Loss (ft)         *    0.02  * Cum SA (acres)          *   16.20  *    3.70  *    0.57  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
         section.  This may indicate the need for additional cross sections.

CROSS SECTION           RIVER: Camelback Road W
REACH: Camelback Main      RS: 13

INPUT
Description: Cross Section 13
Station Elevation Data     num=      19
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************************
 8799.23 1059.48 8927.18 1058.85 9038.91 1060.14 9046.28  1058.1 9248.66 1057.71
 9450.38 1056.86 9653.48 1056.23 9857.67 1055.66 9965.08 1055.99 9970.49 1056.17
 9973.52 1054.86 9974.87 1054.87 9978.89 1056.37 9992.58 1056.47   10000 1052.76
10004.41 1052.8210012.87 1056.8510014.74 1056.2710029.19 1056.27

Manning's n Values         num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
 8799.23    .033 9992.58    .03210012.87    .031

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9992.5810012.87             410     410     410              .1       .3

CROSS SECTION OUTPUT    Profile #PF 1
*****************************************************************************************************
* E.G. Elev (ft)          * 1056.63  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.05  * Wt. n-Val.              *   0.033  *   0.032  *   0.031  *
* W.S. Elev (ft)          * 1056.58  * Reach Len. (ft)         *  410.00  *  410.00  *  410.00  *
* Crit W.S. (ft)          * 1056.29  * Flow Area (sq ft)       *  243.45  *   46.08  *    4.59  *
* E.G. Slope (ft/ft)      *0.001299  * Area (sq ft)            *  243.45  *   46.08  *    4.59  *
* Q Total (cfs)           *  393.66  * Flow (cfs)              *  261.76  *  128.42  *    3.48  *
* Top Width (ft)          *  486.14  * Top Width (ft)          *  450.98  *   19.72  *   15.44  *
* Vel Total (ft/s)        *    1.34  * Avg. Vel. (ft/s)        *    1.08  *    2.79  *    0.76  *
* Max Chl Dpth (ft)       *    3.82  * Hydr. Depth (ft)        *    0.54  *    2.34  *    0.30  *
* Conv. Total (cfs)       * 10921.2  * Conv. (cfs)             *  7262.0  *  3562.7  *    96.5  *
* Length Wtd. (ft)        *  410.00  * Wetted Per. (ft)        *  451.53  *   21.44  *   15.79  *
* Min Ch El (ft)          * 1052.76  * Shear (lb/sq ft)        *    0.04  *    0.17  *    0.02  *
* Alpha                   *    1.85  * Stream Power (lb/ft s) *    0.05  *    0.49  *    0.02  *
* Frctn Loss (ft)         *    0.76  * Cum Volume (acre-ft)    *    5.02  *   11.05  *    0.15  *
* C & E Loss (ft)         *    0.01  * Cum SA (acres)          *   11.00  *    3.47  *    0.38  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less
         than 0.7 or greater than 1.4.  This may indicate the need for additional cross sections.

CROSS SECTION           RIVER: Camelback Road W
REACH: Camelback Main      RS: 12

INPUT
Description: Cross Section 12
Station Elevation Data     num=      15
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************************
 8099.41 1060.69  9353.3  1056.6 9568.66 1055.72 9756.98 1055.27 9962.65 1055.23
    9969 1055.87 9972.84 1054.07 9974.21 1054.14 9977.77 1056.18 9990.83 1056.42
   10000  1051.7 10002.4 1051.7410011.58 1056.2110014.04  1055.510028.39 1055.61

Manning's n Values         num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
 8099.41    .033 9990.83    .03210011.58    .031

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9990.8310011.58             280     280     280              .3       .5

CROSS SECTION OUTPUT    Profile #PF 1
*****************************************************************************************************
* E.G. Elev (ft)          * 1055.86  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.14  * Wt. n-Val.              *   0.033  *   0.032  *   0.031  *
* W.S. Elev (ft)          * 1055.72  * Reach Len. (ft)         *  280.00  *  280.00  *  280.00  *
* Crit W.S. (ft)          *          * Flow Area (sq ft)       *  148.31  *   41.60  *    2.48  *
* E.G. Slope (ft/ft)      *0.003003  * Area (sq ft)            *  148.31  *   41.60  *    2.48  *
* Q Total (cfs)           *  362.96  * Flow (cfs)              *  190.16  *  170.86  *    1.94  *
* Top Width (ft)          *  440.51  * Top Width (ft)          *  407.00  *   18.39  *   15.12  *
* Vel Total (ft/s)        *    1.89  * Avg. Vel. (ft/s)        *    1.28  *    4.11  *    0.78  *
* Max Chl Dpth (ft)       *    4.02  * Hydr. Depth (ft)        *    0.36  *    2.26  *    0.16  *
* Conv. Total (cfs)       *  6623.9  * Conv. (cfs)             *  3470.3  *  3118.2  *    35.4  *
* Length Wtd. (ft)        *  280.00  * Wetted Per. (ft)        *  407.82  *   20.28  *   15.26  *
* Min Ch El (ft)          * 1051.70  * Shear (lb/sq ft)        *    0.07  *    0.38  *    0.03  *
* Alpha                   *    2.47  * Stream Power (lb/ft s) *    0.09  *    1.58  *    0.02  *
* Frctn Loss (ft)         *    0.06  * Cum Volume (acre-ft)    *    3.18  *   10.63  *    0.12  *
* C & E Loss (ft)         *    0.05  * Cum SA (acres)          *    6.97  *    3.29  *    0.24  *
*****************************************************************************************************

Warning: Divided flow computed for this cross-section.
Warning: The cross-section end points had to be extended vertically for the computed water surface.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less
         than 0.7 or greater than 1.4.  This may indicate the need for additional cross sections.

CROSS SECTION           RIVER: Camelback Road W
REACH: Camelback Main      RS: 11

INPUT
Description: Cross Section 11
Station Elevation Data     num=      11
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************************
 9001.421059.027 9149.661056.857 9313.081056.068 9353.451056.235 9531.871055.656
 9744.121055.156 9963.881055.842 9975.38 1048.2410012.31 1048.24 10012.5 1054.94
 10028.51055.189

Manning's n Values         num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
 9001.42    .033 9963.88    .032 10012.5    .031

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9963.88 10012.5             160     160     160              .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
888        F
888        F

CROSS SECTION OUTPUT    Profile #PF 1
*****************************************************************************************************
* E.G. Elev (ft)          * 1055.74  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.03  * Wt. n-Val.              *   0.033  *   0.032  *   0.031  *
```

```
* W.S. Elev (ft)          * 1055.71  * Reach Len. (ft)         *   160.00  *   160.00  *   160.00  *
* Crit W.S. (ft)          * 1049.93  * Flow Area (sq ft)       *   114.96  *   318.96  *    10.36  *
* E.G. Slope (ft/ft)      *0.000091  * Area (sq ft)            *   114.96  *   318.96  *    10.36  *
* Q Total (cfs)           *   469.34 * Flow (cfs)              *    21.25  *   444.62  *     3.47  *
* Top Width (ft)          *   472.06 * Top Width (ft)          *   407.63  *    48.42  *    16.00  *
* Vel Total (ft/s)        *     1.06 * Avg. Vel. (ft/s)        *     0.18  *     1.39  *     0.34  *
* Max Chl Dpth (ft)       *     7.47 * Hydr. Depth (ft)        *     0.28  *     6.59  *     0.65  *
* Conv. Total (cfs)       * 49172.2  * Conv. (cfs)             *  2226.0   * 46582.4   *   363.8   *
* Length Wtd. (ft)        *   160.00 * Wetted Per. (ft)        *   407.63  *    57.18  *    16.53  *
* Min Ch El (ft)          * 1048.24  * Shear (lb/sq ft)        *     0.00  *     0.03  *     0.00  *
* Alpha                   *     1.65 * Stream Power (lb/ft s)  *     0.00  *     0.04  *     0.00  *
* Frctn Loss (ft)         *          * Cum Volume (acre-ft)    *     2.33  *     9.48  *     0.08  *
* C & E Loss (ft)         *          * Cum SA (acres)          *     4.35  *     3.07  *     0.14  *
*****************************************************************************************************

CULVERT                 RIVER: Camelback Road W
REACH: Camelback Main      RS: 10.7

INPUT
Description: 5 CMPs (3@60" & 2@48") at Alsup Rd.
Distance from Upstream XS =      90
Deck/Roadway Width        =      22
Weir Coefficient          =       3
Upstream  Deck/Roadway Coordinates
    num=       3
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
*********************************************************************
 9001.42 1056.26         9939.42 1056.26         10016.42 1054.52

Upstream Bridge Cross Section Data
Station Elevation Data    num=      11
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 9001.421059.027 9149.661056.857 9313.081056.068 9353.451056.235 9531.871055.656
 9744.121055.156 9963.881055.842 9975.38 1048.2410012.31 1048.24 10012.5 1054.94
 10028.51055.189

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
 9001.42    .033 9963.88    .032 10012.5    .031

Bank Sta: Left   Right    Coeff Contr.   Expan.
       9963.88 10012.5            .3        .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
888        F
888        F

Downstream  Deck/Roadway Coordinates
    num=       3
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
*********************************************************************
 9043.75 1056.26         9981.75 1056.26         10058.75 1054.52

Downstream Bridge Cross Section Data
Station Elevation Data    num=       9
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
    8805    1060    9315    1058    9930    1056 9959.49    1056 9977.44 1048.24
10006.15 1048.2410016.92 1048.2410031.28 1054.33   10050 1054.52

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
    8805     .03 9959.49    .03110031.28     .03

Bank Sta: Left   Right    Coeff Contr.   Expan.
       9959.4910031.28            .3        .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
888        F
888        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 =  2

Culvert Name     Shape      Rise    Span
Culvert #2      Circular      5
FHWA Chart # 2 - Corrugated Metal Pipe Culvert
FHWA Scale # 1 - Headwall
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    n Value   Entrance Loss Coef   Exit Loss Coef
              85      40       .024                .5                 1
Number of Barrels =  3
Upstream   Elevation =  1048.227
Centerline Stations
    Sta.    Sta.    Sta.
    9980   10000   10008
Downstream Elevation =  1048.226
Centerline Stations
    Sta.    Sta.    Sta.
    9982   10002   10010

Culvert Name     Shape      Rise    Span
Culvert #3      Circular      4
FHWA Chart # 2 - Corrugated Metal Pipe Culvert
FHWA Scale # 1 - Headwall
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    n Value   Entrance Loss Coef   Exit Loss Coef
              84      41       .024                .5                 1
Number of Barrels =  2
Upstream   Elevation =  1050.27
Centerline Stations
    Sta.    Sta.
    9985    9992
Downstream Elevation =  1050.26
Centerline Stations
    Sta.    Sta.
    9987    9994

CULVERT OUTPUT    Profile #PF 1
Culvert ID : Culvert #2
*********************************************************************
* Culv Q (cfs)           *  287.34  * Culv Ful Lngh (ft)     *   40.00  *
* # Barrels              *       3  * Culv Vel US (ft/s)     *    4.88  *
* Q Barrel (cfs)         *   95.78  * Culv Vel DS (ft/s)     *    4.88  *
* E.G. US. (ft)          * 1055.74  * Culv Inv El Up (ft)   * 1048.23  *
* W.S. US. (ft)          * 1055.71  * Culv Inv El Dn (ft)   * 1048.23  *
* E.G. DS (ft)           * 1055.01  * Culv Frctn Ls (ft)    *    0.18  *
* W.S. DS (ft)           * 1055.01  * Culv Ext Lss (ft)     *    0.36  *
* Delta EG (ft)          *    0.73  * Culv Ent Lss (ft)     *    0.18  *
```

```
* Delta WS (ft)          *    0.71  * Q Weir (cfs)          *   65.73  *
* E.G. IC (ft)           * 1052.33  * Weir Sta Lft (ft)     * 9964.04  *
* E.G. OC (ft)           * 1055.74  * Weir Sta Rgt (ft)     *10028.50  *
* Culvert Control        *  outlet  * Weir Submerg          *    0.00  *
* Culv WS Inlet (ft)     * 1053.23  * Weir Max Depth (ft)    *    0.80  *
* Culv WS Outlet (ft)    * 1053.23  * Weir Avg Depth (ft)    *    0.48  *
* Culv Nml Depth (ft)    *          * Wr Flw Area (sq ft)    *   30.99  *
* Culv Crt Depth (ft)    *    2.78  * Min El Weir Flow (ft) * 1054.73  *
*****************************************************************

CULVERT OUTPUT    Profile #PF 1
Culvert ID : Culvert #3
*****************************************************************
* Culv Q (cfs)           *  116.27  * Culv Ful Lngh (ft)     *   41.00  *
* # Barrels              *       2  * Culv Vel US (ft/s)     *    4.63  *
* Q Barrel (cfs)         *   58.14  * Culv Vel DS (ft/s)     *    4.63  *
* E.G. US. (ft)          * 1055.74  * Culv Inv El Up (ft)   * 1050.27  *
* W.S. US. (ft)          * 1055.71  * Culv Inv El Dn (ft)   * 1050.26  *
* E.G. DS (ft)           * 1055.01  * Culv Frctn Ls (ft)    *    0.24  *
* W.S. DS (ft)           * 1055.01  * Culv Ext Lss (ft)     *    0.33  *
* Delta EG (ft)          *    0.73  * Culv Ent Lss (ft)     *    0.17  *
* Delta WS (ft)          *    0.71  * Q Weir (cfs)          *   65.73  *
* E.G. IC (ft)           * 1053.68  * Weir Sta Lft (ft)     * 9964.04  *
* E.G. OC (ft)           * 1055.73  * Weir Sta Rgt (ft)     *10028.50  *
* Culvert Control        *  outlet  * Weir Submerg          *    0.00  *
* Culv WS Inlet (ft)     * 1054.27  * Weir Max Depth (ft)    *    0.80  *
* Culv WS Outlet (ft)    * 1054.26  * Weir Avg Depth (ft)    *    0.48  *
* Culv Nml Depth (ft)    *          * Wr Flw Area (sq ft)    *   30.99  *
* Culv Crt Depth (ft)    *    2.30  * Min El Weir Flow (ft) * 1054.73  *
*****************************************************************

CROSS SECTION          RIVER: Camelback Road W
REACH: Camelback Main     RS: 10.4

INPUT
Description: 10.4 - Added X-section D/S of Culvert Located Bet 10 & 11

A
            flow rate of 431 was added at this x-section to reflect flow
            expected to pass through the culvert based on field observation
            and culvert analysis (culvert capacity at this location is
            estimated at 634 cfs but only 431 was applied, which is the
            flowrate at the CP just U/S of X-section 11)
Station Elevation Data    num=      9
    Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
   8805    1060    9315    1058    9930    1056 9959.49    1056 9977.44 1048.24
10006.15 1048.2410016.92 1048.2410031.28 1054.33   10050 1054.52

Manning's n Values        num=      3
    Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
   8805     .03 9959.49    .03110031.28     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9959.4910031.28             300     300     300             .3       .5
Ineffective Flow     num=      2
   Sta L   Sta R   Elev  Permanent
888        F
888        F

CROSS SECTION OUTPUT    Profile #PF 1
*****************************************************************************************
* E.G. Elev (ft)         * 1055.01  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.01  * Wt. n-Val.              *          *    0.031 *    0.030 *
* W.S. Elev (ft)         * 1055.01  * Reach Len. (ft)         *  300.00  *   300.00 *   300.00 *
* Crit W.S. (ft)         * 1049.21  * Flow Area (sq ft)       *          *   368.31 *    10.86 *
* E.G. Slope (ft/ft)     *0.000016  * Area (sq ft)            *          *   373.46 *    10.86 *
* Q Total (cfs)          *  220.59  * Flow (cfs)              *          *   219.13 *     1.46 *
* Top Width (ft)         *   88.21  * Top Width (ft)          *          *    69.49 *    18.72 *
* Vel Total (ft/s)       *    0.58  * Avg. Vel. (ft/s)        *          *     0.59 *     0.13 *
* Max Chl Dpth (ft)      *    6.77  * Hydr. Depth (ft)        *          *     5.70 *     0.58 *
* Conv. Total (cfs)      * 55460.5  * Conv. (cfs)             *          * 55092.5 *   368.1 *
* Length Wtd. (ft)       *  300.00  * Wetted Per. (ft)        *          *    66.81 *    19.21 *
* Min Ch El (ft)         * 1048.24  * Shear (lb/sq ft)        *          *     0.01 *     0.00 *
* Alpha                  *    1.04  * Stream Power (lb/ft s)  *          *     0.00 *     0.00 *
* Frctn Loss (ft)        *    0.01  * Cum Volume (acre-ft)    *     2.12 *     8.20 *     0.04 *
* C & E Loss (ft)        *    0.01  * Cum SA (acres)          *     3.60 *     2.86 *     0.08 *
*****************************************************************************************

Warning: The cross-section end points had to be extended vertically for the computed water surface.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less
         than 0.7 or greater than 1.4.  This may indicate the need for additional cross sections.

CROSS SECTION          RIVER: Camelback Road W
REACH: Camelback Main     RS: 10

INPUT
Description: Cross Section 10
Station Elevation Data    num=     15
    Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*****************************************************************************
 9043.75 1058.29 9239.36 1057.22 9443.28 1056.52 9643.56 1055.84 9792.75 1055.26
 9950.77 1055.33 9954.58 1053.19 9957.07 1053.12 9961.53 1055.04 9986.05 1054.47
 9996.74 1050.93   10000  1050.710008.67 1055.6210013.49 1054.9310027.52 1055.08

Manning's n Values        num=      3
    Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
 9043.75     .03 9986.05    .03110008.67     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9986.0510008.67             510     510     510             .1       .3

CROSS SECTION OUTPUT    Profile #PF 1
*****************************************************************************************
* E.G. Elev (ft)         * 1054.99  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)          *    0.05  * Wt. n-Val.              *   0.030  *    0.031 *    0.030 *
* W.S. Elev (ft)         * 1054.94  * Reach Len. (ft)         *  510.00  *   510.00 *   510.00 *
* Crit W.S. (ft)         *          * Flow Area (sq ft)       *   15.87  *    53.31 *     0.01 *
* E.G. Slope (ft/ft)     *0.000471  * Area (sq ft)            *   15.87  *    53.31 *     0.01 *
* Q Total (cfs)          *  110.85  * Flow (cfs)              *   14.13  *    96.72 *     0.00 *
* Top Width (ft)         *   52.99  * Top Width (ft)          *   30.21  *    21.43 *     1.35 *
* Vel Total (ft/s)       *    1.60  * Avg. Vel. (ft/s)        *    0.89  *     1.81 *     0.04 *
* Max Chl Dpth (ft)      *    4.24  * Hydr. Depth (ft)        *    0.53  *     2.49 *     0.01 *
* Conv. Total (cfs)      *  5110.1  * Conv. (cfs)             *   651.4  *  4458.7  *      0.0 *
* Length Wtd. (ft)       *  510.00  * Wetted Per. (ft)        *   31.05  *    23.13 *     1.35 *
* Min Ch El (ft)         * 1050.70  * Shear (lb/sq ft)        *    0.02  *     0.07 *     0.00 *
* Alpha                  *    1.16  * Stream Power (lb/ft s)  *    0.01  *     0.12 *     0.00 *
* Frctn Loss (ft)        *    0.30  * Cum Volume (acre-ft)    *    2.07  *     6.73 *     0.00 *
* C & E Loss (ft)        *    0.00  * Cum SA (acres)          *    3.50  *     2.54 *     0.01 *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.

CROSS SECTION          RIVER: Camelback Road W
REACH: Camelback Main     RS: 9

INPUT
```

```
Description: Cross Section 9
Station Elevation Data    num=      14
     Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev
*****************************************************************************************
 9030.19 1058.14    9275 1057.27 9525.17 1056.24 9756.21 1055.38 9957.33 1055.29
 9961.82 1052.76 9965.55  1052.8 9968.85    1055 9990.28 1054.25   10000 1050.46
10003.27 1050.4810013.31 1056.2410015.77 1055.6110030.09 1055.62

Manning's n Values        num=       3
     Sta   n Val      Sta   n Val      Sta   n Val
*********************************************
 9030.19     .03 9990.28    .03110013.31     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.    Expan.
       9990.2810013.31              500     500     500             .1        .3

CROSS SECTION OUTPUT    Profile #PF 1
*****************************************************************************************
* E.G. Elev (ft)          * 1054.69  * Element                  *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.07  * Wt. n-Val.               *   0.030  *   0.031  *         *
* W.S. Elev (ft)          * 1054.62  * Reach Len. (ft)          *  500.00  *  500.00  *  500.00 *
* Crit W.S. (ft)          *          * Flow Area (sq ft)        *   14.40  *   50.55  *         *
* E.G. Slope (ft/ft)      *0.000730  * Area (sq ft)             *   14.40  *   50.55  *         *
* Q Total (cfs)           *  133.06  * Flow (cfs)               *   19.13  *  113.93  *         *
* Top Width (ft)          *   40.58  * Top Width (ft)            *   20.38  *   20.21  *         *
* Vel Total (ft/s)        *    2.05  * Avg. Vel. (ft/s)          *    1.33  *    2.25  *         *
* Max Chl Dpth (ft)       *    4.16  * Hydr. Depth (ft)          *    0.71  *    2.50  *         *
* Conv. Total (cfs)       *  4923.5  * Conv. (cfs)               *   707.7  *  4215.8  *         *
* Length Wtd. (ft)        *  500.00  * Wetted Per. (ft)          *   21.42  *   22.02  *         *
* Min Ch El (ft)          * 1050.46  * Shear (lb/sq ft)          *    0.03  *    0.10  *         *
* Alpha                   *    1.10  * Stream Power (lb/ft s)    *    0.04  *    0.24  *         *
* Frctn Loss (ft)         *    0.31  * Cum Volume (acre-ft)      *    1.89  *    6.13  *         *
* C & E Loss (ft)         *    0.00  * Cum SA (acres)            *    3.20  *    2.30  *         *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.

CROSS SECTION          RIVER: Camelback Road W
REACH: Camelback Main     RS: 8

INPUT
Description: Cross Section 8
Station Elevation Data    num=      14
     Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev
*****************************************************************************************
 9024.83 1058.07 9228.17 1057.29 9425.42 1056.38 9628.37 1055.59 9827.23 1054.81
 9954.52 1054.62 9958.67 1052.33 9963.36 1052.22 9968.44 1054.19 9983.11 1053.96
 9997.38 1049.81   10000 1049.6310009.69  1055.210024.55 1055.79

Manning's n Values        num=       3
     Sta   n Val      Sta   n Val      Sta   n Val
*********************************************
 9024.83     .03 9983.11    .03110009.69     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.    Expan.
       9983.1110009.69              510     510     510             .1        .3

CROSS SECTION OUTPUT    Profile #PF 1
*****************************************************************************************
* E.G. Elev (ft)          * 1054.38  * Element                  *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.06  * Wt. n-Val.               *   0.030  *   0.031  *         *
* W.S. Elev (ft)          * 1054.33  * Reach Len. (ft)          *  510.00  *  510.00  *  510.00 *
* Crit W.S. (ft)          *          * Flow Area (sq ft)        *   22.62  *   66.09  *         *
* E.G. Slope (ft/ft)      *0.000531  * Area (sq ft)             *   22.62  *   66.09  *         *
* Q Total (cfs)           *  154.84  * Flow (cfs)               *   21.91  *  132.93  *         *
* Top Width (ft)          *   53.12  * Top Width (ft)            *   28.06  *   25.06  *         *
* Vel Total (ft/s)        *    1.75  * Avg. Vel. (ft/s)          *    0.97  *    2.01  *         *
* Max Chl Dpth (ft)       *    4.70  * Hydr. Depth (ft)          *    0.81  *    2.64  *         *
* Conv. Total (cfs)       *  6717.4  * Conv. (cfs)               *   950.6  *  5766.8  *         *
* Length Wtd. (ft)        *  510.00  * Wetted Per. (ft)          *   28.94  *   26.91  *         *
* Min Ch El (ft)          * 1049.63  * Shear (lb/sq ft)          *    0.03  *    0.08  *         *
* Alpha                   *    1.18  * Stream Power (lb/ft s)    *    0.03  *    0.16  *         *
* Frctn Loss (ft)         *    0.37  * Cum Volume (acre-ft)      *    1.68  *    5.46  *         *
* C & E Loss (ft)         *    0.00  * Cum SA (acres)            *    2.92  *    2.04  *         *
*****************************************************************************************

CROSS SECTION          RIVER: Camelback Road W
REACH: Camelback Main     RS: 7

INPUT
Description: Cross Section 7
Station Elevation Data    num=      13
     Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev
*****************************************************************************************
 9028.13 1057.68  9289.8 1057.04 9544.77 1055.99 9762.15 1055.16 9959.26 1054.34
 9965.08 1051.82 9968.83 1051.87  9972.3 1054.98 9988.37 1054.77   10000 1049.48
10004.06 1049.48   10013 1054.9410028.95    1055

Manning's n Values        num=       3
     Sta   n Val      Sta   n Val      Sta   n Val
*********************************************
 9028.13     .03 9988.37    .031   10013     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.    Expan.
       9988.37   10013              660     660     660             .1        .3

CROSS SECTION OUTPUT    Profile #PF 1
*****************************************************************************************
* E.G. Elev (ft)          * 1054.02  * Element                  *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.10  * Wt. n-Val.               *   0.030  *   0.031  *         *
* W.S. Elev (ft)          * 1053.91  * Reach Len. (ft)          *  660.00  *  660.00  *  660.00 *
* Crit W.S. (ft)          *          * Flow Area (sq ft)        *   15.15  *   55.70  *         *
* E.G. Slope (ft/ft)      *0.000982  * Area (sq ft)             *   15.15  *   55.70  *         *
* Q Total (cfs)           *  177.06  * Flow (cfs)               *   27.34  *  149.72  *         *
* Top Width (ft)          *   31.93  * Top Width (ft)            *   10.87  *   21.07  *         *
* Vel Total (ft/s)        *    2.50  * Avg. Vel. (ft/s)          *    1.81  *    2.69  *         *
* Max Chl Dpth (ft)       *    4.43  * Hydr. Depth (ft)          *    1.39  *    2.64  *         *
* Conv. Total (cfs)       *  5648.8  * Conv. (cfs)               *   872.4  *  4776.5  *         *
* Length Wtd. (ft)        *  660.00  * Wetted Per. (ft)          *   12.08  *   23.27  *         *
* Min Ch El (ft)          * 1049.48  * Shear (lb/sq ft)          *    0.08  *    0.15  *         *
* Alpha                   *    1.06  * Stream Power (lb/ft s)    *    0.14  *    0.39  *         *
* Frctn Loss (ft)         *    0.73  * Cum Volume (acre-ft)      *    1.45  *    4.74  *         *
* C & E Loss (ft)         *    0.00  * Cum SA (acres)            *    2.69  *    1.77  *         *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.

CROSS SECTION          RIVER: Camelback Road W
REACH: Camelback Main     RS: 6

INPUT
Description: Cross Section 6
Station Elevation Data    num=      13
     Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev      Sta    Elev
*****************************************************************************************
 9402.141058.881 9607.461058.124 9802.691057.066 9845.831053.687 9950.881055.264
 9957.851051.065 9961.561051.123 9967.761054.244 9983.211054.419 9994.131048.613
   100001048.39310008.721053.79210024.591053.672
```

```
Manning's n Values          num=        3
     Sta   n Val      Sta   n Val      Sta   n Val
*********************************************
 9402.14    .061 9983.21    .03410008.72    .034

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9983.2110008.72              500     500     500            .1        .3

CROSS SECTION OUTPUT    Profile #PF 1
*****************************************************************************************
* E.G. Elev (ft)          * 1053.29  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.12  * Wt. n-Val.              *   0.061  *   0.034  *         *
* W.S. Elev (ft)          * 1053.16  * Reach Len. (ft)         *  500.00  *  500.00  *  500.00 *
* Crit W.S. (ft)          *         * Flow Area (sq ft)        *   15.48  *   65.23  *         *
* E.G. Slope (ft/ft)      *0.001219  * Area (sq ft)            *   15.48  *   65.23  *         *
* Q Total (cfs)           *  205.81  * Flow (cfs)              *   15.33  *  190.48  *         *
* Top Width (ft)          *   33.39  * Top Width (ft)          *   11.25  *   22.14  *         *
* Vel Total (ft/s)        *    2.55  * Avg. Vel. (ft/s)        *    0.99  *    2.92  *         *
* Max Chl Dpth (ft)       *    4.77  * Hydr. Depth (ft)        *    1.38  *    2.95  *         *
* Conv. Total (cfs)       *  5895.5  * Conv. (cfs)             *   439.0  *  5456.4  *         *
* Length Wtd. (ft)        *  500.00  * Wetted Per. (ft)        *   12.32  *   24.63  *         *
* Min Ch El (ft)          * 1048.39  * Shear (lb/sq ft)        *    0.10  *    0.20  *         *
* Alpha                   *    1.22  * Stream Power (lb/ft s)  *    0.09  *    0.59  *         *
* Frctn Loss (ft)         *    0.79  * Cum Volume (acre-ft)    *    1.22  *    3.83  *         *
* C & E Loss (ft)         *    0.01  * Cum SA (acres)          *    2.53  *    1.44  *         *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.

CROSS SECTION          RIVER: Camelback Road W
REACH: Camelback Main     RS: 5

INPUT
Description: Cross Section 5
Station Elevation Data     num=      17
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 9202.76 1059.15 9240.39 1058.05  9259.6 1057.99 9268.98 1058.44 9474.41 1055.44
 9672.13 1053.25 9838.64 1052.26 9882.21 1052.04 9945.73  1052.5  9952.9 1054.11
 9960.05 1050.98 9966.61 1053.74 9980.18 1054.73   10000 1048.35   10005 1048.35
10011.91 1052.5310025.85  1052.9

Manning's n Values          num=        3
     Sta   n Val      Sta   n Val      Sta   n Val
*********************************************
 9202.76    .061 9980.18    .03410011.91    .034

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9980.1810011.91              520     520     520            .1        .3

CROSS SECTION OUTPUT    Profile #PF 1
*****************************************************************************************
* E.G. Elev (ft)          * 1052.50  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.18  * Wt. n-Val.              *   0.061  *   0.034  *         *
* W.S. Elev (ft)          * 1052.32  * Reach Len. (ft)         *  520.00  *  520.00  *  520.00 *
* Crit W.S. (ft)          *         * Flow Area (sq ft)        *   17.19  *   57.33  *         *
* E.G. Slope (ft/ft)      *0.002143  * Area (sq ft)            *   17.19  *   57.33  *         *
* Q Total (cfs)           *  205.81  * Flow (cfs)              *    7.39  *  198.42  *         *
* Top Width (ft)          *  122.10  * Top Width (ft)          *   98.21  *   23.89  *         *
* Vel Total (ft/s)        *    2.76  * Avg. Vel. (ft/s)        *    0.43  *    3.46  *         *
* Max Chl Dpth (ft)       *    3.97  * Hydr. Depth (ft)        *    0.18  *    2.40  *         *
* Conv. Total (cfs)       *  4446.3  * Conv. (cfs)             *   159.7  *  4286.6  *         *
* Length Wtd. (ft)        *  520.00  * Wetted Per. (ft)        *   98.76  *   25.62  *         *
* Min Ch El (ft)          * 1048.35  * Shear (lb/sq ft)        *    0.02  *    0.30  *         *
* Alpha                   *    1.51  * Stream Power (lb/ft s)  *    0.01  *    1.04  *         *
* Frctn Loss (ft)         *    1.04  * Cum Volume (acre-ft)    *    1.04  *    3.12  *         *
* C & E Loss (ft)         *    0.00  * Cum SA (acres)          *    1.90  *    1.18  *         *
*****************************************************************************************

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

CROSS SECTION          RIVER: Camelback Road W
REACH: Camelback Main     RS: 4

INPUT
Description: Cross Section 4
Station Elevation Data     num=      15
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 9228.68 1060.21 9392.3  1057.8  9556.3 1056.31 9571.45 1055.42 9583.45 1056.22
 9748.81 1054.27 9952.09 1052.97  9957.3 1053.89 9964.61 1050.84 9971.56 1052.97
 9984.56 1053.72   10000 1047.0810005.67 1047.0110015.38 1052.1110029.33 1052.46

Manning's n Values          num=        3
     Sta   n Val      Sta   n Val      Sta   n Val
*********************************************
 9228.68    .051 9984.56    .03510015.38    .033

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9984.5610015.38              460     460     460            .1        .3

CROSS SECTION OUTPUT    Profile #PF 1
*****************************************************************************************
* E.G. Elev (ft)          * 1051.46  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.17  * Wt. n-Val.              *   0.051  *   0.035  *         *
* W.S. Elev (ft)          * 1051.29  * Reach Len. (ft)         *  460.00  *  460.00  *  460.00 *
* Crit W.S. (ft)          *         * Flow Area (sq ft)        *    0.58  *   62.14  *         *
* E.G. Slope (ft/ft)      *0.001855  * Area (sq ft)            *    0.58  *   62.14  *         *
* Q Total (cfs)           *  205.81  * Flow (cfs)              *    0.26  *  205.55  *         *
* Top Width (ft)          *   26.17  * Top Width (ft)          *    2.55  *   23.61  *         *
* Vel Total (ft/s)        *    3.28  * Avg. Vel. (ft/s)        *    0.45  *    3.31  *         *
* Max Chl Dpth (ft)       *    4.28  * Hydr. Depth (ft)        *    0.23  *    2.63  *         *
* Conv. Total (cfs)       *  4778.7  * Conv. (cfs)             *     6.0  *  4772.8  *         *
* Length Wtd. (ft)        *  460.00  * Wetted Per. (ft)        *    2.71  *   25.54  *         *
* Min Ch El (ft)          * 1047.01  * Shear (lb/sq ft)        *    0.02  *    0.28  *         *
* Alpha                   *    1.01  * Stream Power (lb/ft s)  *    0.01  *    0.93  *         *
* Frctn Loss (ft)         *    0.84  * Cum Volume (acre-ft)    *    0.93  *    2.41  *         *
* C & E Loss (ft)         *    0.00  * Cum SA (acres)          *    1.30  *    0.90  *         *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.

CROSS SECTION          RIVER: Camelback Road W
REACH: Camelback Main     RS: 3

INPUT
Description: Cross Section 3
Station Elevation Data     num=      29
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 9030.74 1058.93 9132.39  1058.1  9163.4 1060.16 9223.16 1056.76  9267.5 1056.58
 9327.47 1059.76 9364.08 1057.44 9380.87 1057.26 9405.27 1058.47 9426.58 1057.27
 9442.49  1057.2 9469.71 1058.23 9498.23  1056.4 9527.33 1058.75  9544.6 1058.61
 9572.15 1056.14 9636.63 1055.77 9670.22 1056.92 9769.93 1056.19 9798.96 1052.56
 9807.12 1052.54 9826.56  1055.1 9840.48 1053.64 9886.17 1053.44 9981.82 1052.45
   10000 1045.6510003.06 1046.0110014.09 1052.0210031.05    1052
```

```
Manning's n Values          num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
 9030.74    .051 9981.82    .03510014.09    .033

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9981.8210014.09              500     500     500            .1        .3

CROSS SECTION OUTPUT    Profile #PF 1
*****************************************************************************************
* E.G. Elev (ft)          * 1050.62  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.17  * Wt. n-Val.              *          *    0.035 *          *
* W.S. Elev (ft)          * 1050.45  * Reach Len. (ft)         *  500.00  *  500.00  *  500.00  *
* Crit W.S. (ft)          *          * Flow Area (sq ft)       *          *    63.10 *          *
* E.G. Slope (ft/ft)      *0.001817  * Area (sq ft)            *          *    63.10 *          *
* Q Total (cfs)           *  205.81  * Flow (cfs)              *          *   205.81 *          *
* Top Width (ft)          *   24.06  * Top Width (ft)          *          *    24.06 *          *
* Vel Total (ft/s)        *    3.26  * Avg. Vel. (ft/s)        *          *     3.26 *          *
* Max Chl Dpth (ft)       *    4.80  * Hydr. Depth (ft)        *          *     2.62 *          *
* Conv. Total (cfs)       *  4828.7  * Conv. (cfs)             *          *   4828.7 *          *
* Length Wtd. (ft)        *  500.00  * Wetted Per. (ft)        *          *    26.08 *          *
* Min Ch El (ft)          * 1045.65  * Shear (lb/sq ft)        *          *     0.27 *          *
* Alpha                   *    1.00  * Stream Power (lb/ft s)  *          *     0.90 *          *
* Frctn Loss (ft)         *    0.83  * Cum Volume (acre-ft)    *    0.93  *     1.75 *          *
* C & E Loss (ft)         *    0.02  * Cum SA (acres)          *    1.28  *     0.64 *          *
*****************************************************************************************

CROSS SECTION           RIVER: Camelback Road W
REACH: Camelback Main      RS: 2

INPUT
Description: Cross Section 2
Station Elevation Data      num=      19
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 8927.59 1056.41 9015.59 1055.97 9102.89 1055.56 9145.95 1053.87  9249.7 1054.87
 9266.27 1056.36 9357.72 1055.84  9510.5 1053.37 9723.64 1051.48 9825.09 1053.96
 9885.26 1054.45 9940.97 1048.58 9959.68 1048.67 9979.78 1051.59 9987.37  1051.3
   10000 1044.7710002.99  1044.910013.61 1051.0110028.42 1051.26

Manning's n Values          num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
 8927.59     .03 9987.37    .03810013.61     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9987.3710013.61              710     710     710            .1        .3

CROSS SECTION OUTPUT    Profile #PF 1
*****************************************************************************************
* E.G. Elev (ft)          * 1049.76  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.10  * Wt. n-Val.              *   0.030  *    0.038 *          *
* W.S. Elev (ft)          * 1049.66  * Reach Len. (ft)         *  710.00  *  710.00  *  710.00  *
* Crit W.S. (ft)          *          * Flow Area (sq ft)       *   28.11  *    57.15 *          *
* E.G. Slope (ft/ft)      *0.001528  * Area (sq ft)            *   28.11  *    57.15 *          *
* Q Total (cfs)           *  205.81  * Flow (cfs)              *   46.31  *   159.50 *          *
* Top Width (ft)          *   56.41  * Top Width (ft)          *   35.70  *    20.71 *          *
* Vel Total (ft/s)        *    2.41  * Avg. Vel. (ft/s)        *    1.65  *     2.79 *          *
* Max Chl Dpth (ft)       *    4.89  * Hydr. Depth (ft)        *    0.79  *     2.76 *          *
* Conv. Total (cfs)       *  5264.7  * Conv. (cfs)             *  1184.6  *   4080.1 *          *
* Length Wtd. (ft)        *  710.00  * Wetted Per. (ft)        *   35.83  *    23.17 *          *
* Min Ch El (ft)          * 1044.77  * Shear (lb/sq ft)        *    0.07  *     0.24 *          *
* Alpha                   *    1.14  * Stream Power (lb/ft s)  *    0.12  *     0.66 *          *
* Frctn Loss (ft)         *    1.08  * Cum Volume (acre-ft)    *    0.76  *     1.06 *          *
* C & E Loss (ft)         *    0.00  * Cum SA (acres)          *    1.08  *     0.39 *          *
*****************************************************************************************

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

CROSS SECTION           RIVER: Camelback Road W
REACH: Camelback Main      RS: 1

INPUT
Description: Cross Section 1 - Most Downstream Cross-Section
Station Elevation Data      num=      11
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
*********************************************************************************
 9623.481051.775 9668.541054.116  9781.41054.199 9850.711048.066 9930.691047.566
 9960.531050.221 9982.68 1049.63   10000  1043.710005.681044.63910014.45 1049.55
10027.62 1050.29

Manning's n Values          num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
*********************************************
 9623.48     .03 9982.68    .03810014.45     .03

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
       9982.6810014.45              0       0       0            .1        .3
Ineffective Flow      num=       1
   Sta L   Sta R    Elev  Permanent
888        F

CROSS SECTION OUTPUT    Profile #PF 1
*****************************************************************************************
* E.G. Elev (ft)          * 1048.68  * Element                 *  Left OB *  Channel * Right OB *
* Vel Head (ft)           *    0.12  * Wt. n-Val.              *          *    0.038 *          *
* W.S. Elev (ft)          * 1048.55  * Reach Len. (ft)         *          *          *          *
* Crit W.S. (ft)          * 1046.53  * Flow Area (sq ft)       *          *    72.97 *          *
* E.G. Slope (ft/ft)      *0.001503  * Area (sq ft)            *   65.75  *    72.97 *          *
* Q Total (cfs)           *  205.81  * Flow (cfs)              *          *   205.81 *          *
* Top Width (ft)          *  123.42  * Top Width (ft)          *   96.58  *    26.84 *          *
* Vel Total (ft/s)        *    2.82  * Avg. Vel. (ft/s)        *          *     2.82 *          *
* Max Chl Dpth (ft)       *    4.85  * Hydr. Depth (ft)        *          *     2.72 *          *
* Conv. Total (cfs)       *  5309.2  * Conv. (cfs)             *          *   5309.2 *          *
* Length Wtd. (ft)        *          * Wetted Per. (ft)        *          *    28.75 *          *
* Min Ch El (ft)          * 1043.70  * Shear (lb/sq ft)        *          *     0.24 *          *
* Alpha                   *    1.00  * Stream Power (lb/ft s)  *          *     0.67 *          *
* Frctn Loss (ft)         *          * Cum Volume (acre-ft)    *          *          *          *
* C & E Loss (ft)         *          * Cum SA (acres)          *          *          *          *
*****************************************************************************************

Warning: Divided flow computed for this cross-section.

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

SUMMARY OF MANNING'S N VALUES

River:Camelback Road W
*************************************************************
*      Reach       *   River Sta.   *   n1    *   n2    *   n3    *
*************************************************************
*Camelback Main  *    42          *    .036*    .078*    .034*
*Camelback Main  *    41          *    .036*    .078*    .034*
*Camelback Main  *    40          *    .036*    .078*    .034*
*Camelback Main  *    39          *    .033*    .078*    .032*
*Camelback Main  *    38          *    .033*    .026*    .032*
*Camelback Main  *    37          *    .033*    .026*    .032*
```

*Camelback Main	* 36.9	*Culvert *	*	*
*Camelback Main	* 36.4	* .033*	.026*	.032*
*Camelback Main	* 36	* .06*	.026*	.03*
*Camelback Main	* 35	* .06*	.026*	.03*
*Camelback Main	* 34	* .03*	.035*	.03*
*Camelback Main	* 33	* .03*	.035*	.03*
*Camelback Main	* 32	* .031*	.035*	.038*
*Camelback Main	* 31.9	*Culvert *	*	*
*Camelback Main	* 31.4	* .031*	.035*	.038*
*Camelback Main	* 31	* .031*	.035*	.038*
*Camelback Main	* 30	* .031*	.032*	.038*
*Camelback Main	* 29	* .031*	.032*	.038*
*Camelback Main	* 28	* .03*	.033*	.03*
*Camelback Main	* 27	* .03*	.033*	.03*
*Camelback Main	* 26.9	* .03*	.033*	.03*
*Camelback Main	* 26.7	*Culvert *	*	*
*Camelback Main	* 26.4	* .03*	.033*	.03*
*Camelback Main	* 26	* .03*	.033*	.03*
*Camelback Main	* 25	* .03*	.078*	.078*
*Camelback Main	* 24	* .03*	.078*	.078*
*Camelback Main	* 23	* .031*	.034*	.031*
*Camelback Main	* 22.3	*Culvert *	*	*
*Camelback Main	* 22	* .031*	.034*	.031*
*Camelback Main	* 21	* .031*	.034*	.031*
*Camelback Main	* 20	* .039*	.026*	.03*
*Camelback Main	* 19	* .036*	.026*	.03*
*Camelback Main	* 18	* .036*	.036*	.03*
*Camelback Main	* 17	* .035*	.036*	.03*
*Camelback Main	* 16.9	*Culvert *	*	*
*Camelback Main	* 16.4	* .039*	.052*	.03*
*Camelback Main	* 16	* .039*	.052*	.03*
*Camelback Main	* 15	* .04*	.052*	.03*
*Camelback Main	* 14	* .036*	.036*	.03*
*Camelback Main	* 13	* .033*	.032*	.031*
*Camelback Main	* 12	* .033*	.032*	.031*
*Camelback Main	* 11	* .033*	.032*	.031*
*Camelback Main	* 10.7	*Culvert *	*	*
*Camelback Main	* 10.4	* .03*	.031*	.03*
*Camelback Main	* 10	* .03*	.031*	.03*
*Camelback Main	* 9	* .03*	.031*	.03*
*Camelback Main	* 8	* .03*	.031*	.03*
*Camelback Main	* 7	* .03*	.031*	.03*
*Camelback Main	* 6	* .061*	.034*	.034*
*Camelback Main	* 5	* .061*	.034*	.034*
*Camelback Main	* 4	* .051*	.035*	.033*
*Camelback Main	* 3	* .051*	.035*	.033*
*Camelback Main	* 2	* .03*	.038*	.03*
*Camelback Main	* 1	* .03*	.038*	.03*

SUMMARY OF REACH LENGTHS

River: Camelback Road W

Reach	River Sta.	Left	Channel	Right
*Camelback Main	* 42	* 500*	500*	500*
*Camelback Main	* 41	* 400*	400*	400*
*Camelback Main	* 40	* 550*	550*	550*
*Camelback Main	* 39	* 500*	500*	500*
*Camelback Main	* 38	* 330*	330*	330*
*Camelback Main	* 37	* 115*	115*	115*
*Camelback Main	* 36.9	*Culvert *	*	*
*Camelback Main	* 36.4	* 440*	440*	440*
*Camelback Main	* 36	* 500*	500*	500*
*Camelback Main	* 35	* 500*	500*	500*
*Camelback Main	* 34	* 500*	500*	500*
*Camelback Main	* 33	* 630*	630*	630*
*Camelback Main	* 32	* 95*	95*	95*
*Camelback Main	* 31.9	*Culvert *	*	*
*Camelback Main	* 31.4	* 315*	315*	315*
*Camelback Main	* 31	* 550*	550*	550*
*Camelback Main	* 30	* 500*	500*	500*
*Camelback Main	* 29	* 500*	500*	500*
*Camelback Main	* 28	* 560*	560*	560*
*Camelback Main	* 27	* 125*	125*	125*
*Camelback Main	* 26.9	* 70*	70*	70*
*Camelback Main	* 26.7	*Culvert *	*	*
*Camelback Main	* 26.4	* 380*	380*	380*
*Camelback Main	* 26	* 785*	785*	785*
*Camelback Main	* 25	* 910*	910*	910*
*Camelback Main	* 24	* 300*	300*	300*
*Camelback Main	* 23	* 185*	185*	185*
*Camelback Main	* 22.3	*Culvert *	*	*
*Camelback Main	* 22	* 500*	500*	500*
*Camelback Main	* 21	* 500*	500*	500*
*Camelback Main	* 20	* 500*	500*	500*
*Camelback Main	* 19	* 500*	500*	500*
*Camelback Main	* 18	* 660*	660*	660*
*Camelback Main	* 17	* 85*	85*	85*
*Camelback Main	* 16.9	*Culvert *	*	*
*Camelback Main	* 16.4	* 305*	305*	305*
*Camelback Main	* 16	* 360*	360*	360*
*Camelback Main	* 15	* 590*	590*	590*
*Camelback Main	* 14	* 510*	510*	510*
*Camelback Main	* 13	* 410*	410*	410*
*Camelback Main	* 12	* 280*	280*	280*
*Camelback Main	* 11	* 160*	160*	160*
*Camelback Main	* 10.7	*Culvert *	*	*
*Camelback Main	* 10.4	* 300*	300*	300*
*Camelback Main	* 10	* 510*	510*	510*
*Camelback Main	* 9	* 500*	500*	500*
*Camelback Main	* 8	* 510*	510*	510*
*Camelback Main	* 7	* 660*	660*	660*
*Camelback Main	* 6	* 500*	500*	500*
*Camelback Main	* 5	* 520*	520*	520*
*Camelback Main	* 4	* 460*	460*	460*
*Camelback Main	* 3	* 500*	500*	500*
*Camelback Main	* 2	* 710*	710*	710*
*Camelback Main	* 1	* 0*	0*	0*

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: Camelback Road W

Reach	River Sta.	Contr.	Expan.
*Camelback Main	* 42	* .1*	.3*
*Camelback Main	* 41	* .1*	.3*
*Camelback Main	* 40	* .1*	.3*
*Camelback Main	* 39	* .1*	.3*
*Camelback Main	* 38	* .3*	.5*
*Camelback Main	* 37	* .3*	.5*
*Camelback Main	* 36.9	*Culvert *	*

*Camelback Main	36.4		.3*	.5*
*Camelback Main	36		.1*	.3*
*Camelback Main	35		.1*	.3*
*Camelback Main	34		.1*	.3*
*Camelback Main	33		.3*	.5*
*Camelback Main	32		.3*	.5*
*Camelback Main	31.9	*Culvert	*	*
*Camelback Main	31.4		.3*	.5*
*Camelback Main	31		.1*	.3*
*Camelback Main	30		.1*	.3*
*Camelback Main	29		.1*	.3*
*Camelback Main	28		.1*	.3*
*Camelback Main	27		.3*	.5*
*Camelback Main	26.9		.3*	.5*
*Camelback Main	26.7	*Culvert	*	*
*Camelback Main	26.4		.3*	.5*
*Camelback Main	26		.1*	.3*
*Camelback Main	25		.1*	.3*
*Camelback Main	24		.3*	.5*
*Camelback Main	23		.3*	.5*
*Camelback Main	22.3	*Culvert	*	*
*Camelback Main	22		.3*	.5*
*Camelback Main	21		.1*	.3*
*Camelback Main	20		.1*	.3*
*Camelback Main	19		.1*	.3*
*Camelback Main	18		.3*	.5*
*Camelback Main	17		.3*	.5*
*Camelback Main	16.9	*Culvert	*	*
*Camelback Main	16.4		.3*	.5*
*Camelback Main	16		.1*	.3*
*Camelback Main	15		.1*	.3*
*Camelback Main	14		.1*	.3*
*Camelback Main	13		.1*	.3*
*Camelback Main	12		.3*	.5*
*Camelback Main	11		.3*	.5*
*Camelback Main	10.7	*Culvert	*	*
*Camelback Main	10.4		.3*	.5*
*Camelback Main	10		.1*	.3*
*Camelback Main	9		.1*	.3*
*Camelback Main	8		.1*	.3*
*Camelback Main	7		.1*	.3*
*Camelback Main	6		.1*	.3*
*Camelback Main	5		.1*	.3*
*Camelback Main	4		.1*	.3*
*Camelback Main	3		.1*	.3*
*Camelback Main	2		.1*	.3*
*Camelback Main	1		.1*	.3*

Profile Output Table - Standard Table 1

Reach	River Sta	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Camelback Main	42	883.17	1115.92	1118.61		1118.64	0.000944	1.04	653.15	551.62	0.12
Camelback Main	41	639.33	1112.40	1115.26	1115.26	1115.51	0.028559	4.63	165.19	357.74	0.61
Camelback Main	40	826.68	1111.29	1114.28		1114.36	0.001165	1.13	386.02	318.56	0.13
Camelback Main	39	1054.85	1109.22	1112.96		1113.08	0.004947	2.30	384.98	422.87	0.26
Camelback Main	38	1009.55	1107.35	1112.02		1112.16	0.000925	4.18	544.50	527.83	0.37
Camelback Main	37	1127.62	1103.73	1109.45	1108.74	1111.07	0.005442	10.24	111.76	34.22	0.81
Camelback Main	36.9	Culvert									
Camelback Main	36.4	1133.01	1103.53	1109.07	1109.07	1109.76	0.002120	6.79	187.39	83.19	0.56
Camelback Main	36	1153.64	1100.04	1106.25		1107.07	0.007224	9.87	414.87	611.93	0.89
Camelback Main	35	996.64	1097.94	1104.13	1104.13	1104.51	0.003337	7.00	493.14	678.73	0.63
Camelback Main	34	697.85	1095.66	1100.72		1100.91	0.003479	4.94	287.42	509.58	0.49
Camelback Main	33	673.99	1093.67	1098.59	1098.59	1098.87	0.004905	5.76	236.62	450.25	0.57
Camelback Main	32	702.49	1090.52	1096.35	1096.07	1096.43	0.001208	3.34	449.63	610.27	0.28
Camelback Main	31.9	Culvert									
Camelback Main	31.4	696.72	1090.28	1094.21	1092.51	1094.34	0.001469	2.86	243.78	106.25	0.33
Camelback Main	31	711.49	1088.94	1093.16	1093.14	1093.43	0.006650	6.15	225.13	366.03	0.65
Camelback Main	30	737.27	1085.92	1090.50	1090.32	1090.68	0.003864	5.12	267.11	351.62	0.54
Camelback Main	29	759.99	1084.29	1088.45		1088.63	0.004291	5.28	273.71	371.24	0.56
Camelback Main	28	751.31	1082.38	1086.84	1086.63	1086.95	0.002644	4.19	346.30	487.81	0.43
Camelback Main	27	567.89	1079.87	1085.12	1085.12	1085.38	0.002972	5.06	217.05	395.81	0.46
Camelback Main	26.9	518.30	1079.77	1084.29	1082.30	1084.58	0.001849	4.33	133.71	124.59	0.39
Camelback Main	26.7	Culvert									
Camelback Main	26.4	526.89	1079.69	1082.51	1082.51	1082.68	0.002931	4.35	227.22	416.97	0.47
Camelback Main	26	582.34	1077.68	1078.45	1078.24	1078.86	0.007192	2.27	115.15	89.38	0.58
Camelback Main	25	696.88	1074.33	1075.74	1074.82	1075.98	0.002323	0.86	184.09	88.48	0.15
Camelback Main	24	748.18	1070.13	1074.34		1074.48	0.001198	1.24	279.43	112.43	0.13
Camelback Main	23	575.19	1068.44	1073.94	1071.27	1074.12	0.001133	3.40	169.18	42.11	0.30
Camelback Main	22.3	Culvert									
Camelback Main	22	437.32	1068.01	1070.23	1070.23	1071.13	0.013173	7.62	58.33	34.06	0.96
Camelback Main	21	556.83	1061.98	1067.76		1068.05	0.002314	4.71	163.37	157.17	0.43
Camelback Main	20	676.33	1060.29	1066.24		1066.80	0.002554	6.24	148.36	146.07	0.59
Camelback Main	19	795.84	1059.86	1064.93	1064.87	1065.49	0.002683	6.63	206.01	231.44	0.61
Camelback Main	18	910.00	1058.34	1063.34	1063.34	1063.59	0.004863	5.58	325.90	477.95	0.58
Camelback Main	17	1065.71	1055.19	1062.35	1058.56	1062.46	0.000625	3.14	567.42	418.45	0.22
Camelback Main	16.9	Culvert									
Camelback Main	16.4	971.81	1054.83	1060.86	1058.11	1061.06	0.002472	4.01	357.60	364.22	0.30
Camelback Main	16	1033.84	1056.05	1060.21		1060.27	0.002240	2.38	542.16	501.85	0.27
Camelback Main	15	951.62	1055.41	1059.38		1059.44	0.002379	2.39	494.12	447.42	0.25
Camelback Main	14	592.57	1053.77	1057.68		1057.80	0.003627	4.15	287.74	472.57	0.48
Camelback Main	13	393.66	1052.76	1056.58	1056.29	1056.63	0.001299	2.79	294.12	486.14	0.32
Camelback Main	12	362.96	1051.70	1055.72		1055.86	0.003003	4.11	192.39	440.51	0.48
Camelback Main	11	469.34	1048.24	1055.71	1049.93	1055.74	0.000091	1.39	444.27	472.06	0.10
Camelback Main	10.7	Culvert									
Camelback Main	10.4	220.59	1048.24	1055.01	1049.21	1055.01	0.000016	0.59	379.18	88.21	0.04
Camelback Main	10	110.85	1050.70	1054.94		1054.99	0.000471	1.81	69.19	52.99	0.20
Camelback Main	9	133.06	1050.46	1054.62		1054.69	0.000730	2.25	64.95	40.58	0.25
Camelback Main	8	154.84	1049.63	1054.33		1054.38	0.000531	2.01	88.71	53.12	0.22
Camelback Main	7	177.06	1049.48	1053.91		1054.02	0.000982	2.69	70.84	31.93	0.29
Camelback Main	6	205.81	1048.39	1053.16		1053.29	0.001219	2.92	80.71	33.39	0.30
Camelback Main	5	205.81	1048.35	1052.32		1052.50	0.002143	3.46	74.53	122.10	0.39
Camelback Main	4	205.81	1047.01	1051.29		1051.46	0.001855	3.31	62.71	26.17	0.36
Camelback Main	3	205.81	1045.65	1050.45		1050.62	0.001817	3.26	63.10	24.06	0.35
Camelback Main	2	205.81	1044.77	1049.66		1049.76	0.001528	2.79	85.25	56.41	0.30
Camelback Main	1	205.81	1043.70	1048.55	1046.53	1048.68	0.001503	2.82	72.97	123.42	0.30

Profile Output Table - Standard Table 2

Reach	River Sta	E.G. Elev (ft)	W.S. Elev (ft)	Vel Head (ft)	Frctn Loss (ft)	C & E Loss (ft)	Q Left (cfs)	Q Channel (cfs)	Q Right (cfs)	Top Width (ft)
Camelback Main	42	1118.64	1118.61	0.03			705.30	65.93	111.94	551.62
Camelback Main	41	1115.51	1115.26	0.24	0.18	0.01	411.67	187.53	40.34	357.74
Camelback Main	40	1114.36	1114.28	0.08	1.27	0.00	730.83	61.27	34.57	318.56
Camelback Main	39	1113.08	1112.96	0.12	0.92	0.00	866.49	118.93	69.43	422.87
Camelback Main	38	1112.16	1112.02	0.14	0.64	0.45	455.03	453.60	100.91	527.83
Camelback Main	37	1111.07	1109.45	1.63				1125.82	1.80	34.22
Camelback Main	36.9	Culvert								
Camelback Main	36.4	1109.76	1109.07	0.69	1.58	0.04	19.43	1097.45	16.13	83.19
Camelback Main	36	1107.07	1106.25	0.82	2.43	0.13	507.33	611.35	34.96	611.93
Camelback Main	35	1104.51	1104.13	0.39	1.70	0.06	396.61	478.37	121.66	678.73
Camelback Main	34	1100.91	1100.72	0.19	2.04	0.01	353.54	303.95	40.37	509.58
Camelback Main	33	1098.87	1098.59	0.28	1.34	0.10	298.23	325.23	50.53	450.25
Camelback Main	32	1096.43	1096.35	0.08			371.15	250.72	80.62	610.27
Camelback Main	31.9	Culvert								

Camelback Main 31.4		1094.34	1094.21	0.13	0.86	0.04		696.63	0.09	106.25
Camelback Main 31		1093.43	1093.16	0.27	2.72	0.03	435.63	247.25	28.61	366.03
Camelback Main 30		1090.68	1090.50	0.18	2.04	0.00	516.28	218.18	2.81	351.62
Camelback Main 29		1088.63	1088.45	0.18	1.66	0.02	533.21	205.97	20.81	371.24
Camelback Main 28		1086.95	1086.84	0.11	1.56	0.02	549.92	178.49	26.90	487.81
Camelback Main 27		1085.38	1085.12	0.26	0.29	0.01	175.72	353.79	38.38	395.81
Camelback Main 26.9		1084.58	1084.29	0.29			5.60	506.69	6.01	124.59
Camelback Main 26.7		Culvert								
Camelback Main 26.4		1082.68	1082.51	0.18	1.70	0.07	237.00	287.89	2.00	416.97
Camelback Main 26		1078.86	1078.45	0.41	2.82	0.05	571.47	10.87		89.38
Camelback Main 25		1075.98	1075.74	0.24	1.46	0.03	688.70	8.18		88.48
Camelback Main 24		1074.48	1074.34	0.14	0.35	0.01	675.43	64.51	8.25	112.43
Camelback Main 23		1074.12	1073.94	0.18				575.19		42.11
Camelback Main 22.3		Culvert								
Camelback Main 22		1071.13	1070.23	0.90	2.09	0.30	2.93	434.39		34.06
Camelback Main 21		1068.05	1067.76	0.29	1.22	0.03	95.06	461.77		157.17
Camelback Main 20		1066.80	1066.24	0.56	1.31	0.00	52.91	623.42		146.07
Camelback Main 19		1065.49	1064.93	0.56	1.80	0.09	152.54	643.30		231.44
Camelback Main 18		1063.59	1063.34	0.25	0.83	0.07	500.17	409.76	0.07	477.95
Camelback Main 17		1062.46	1062.35	0.11			307.05	750.86	7.80	418.45
Camelback Main 16.9		Culvert								
Camelback Main 16.4		1061.06	1060.86	0.20	0.72	0.07	190.23	770.54	11.04	364.22
Camelback Main 16		1060.27	1060.21	0.06	0.83	0.00	887.72	141.85	4.27	501.85
Camelback Main 15		1059.44	1059.38	0.06	1.63	0.01	844.77	92.26	14.59	447.42
Camelback Main 14		1057.80	1057.68	0.12	1.15	0.02	385.21	196.84	10.52	472.57
Camelback Main 13		1056.63	1056.58	0.05	0.76	0.01	261.76	128.42	3.48	486.14
Camelback Main 12		1055.86	1055.72	0.14	0.06	0.05	190.16	170.86	1.94	440.51
Camelback Main 11		1055.74	1055.71	0.03			21.25	444.62	3.47	472.06
Camelback Main 10.7		Culvert								
Camelback Main 10.4		1055.01	1055.01	0.01	0.01	0.01		219.13	1.46	88.21
Camelback Main 10		1054.99	1054.94	0.05	0.30	0.00	14.13	96.72	0.00	52.99
Camelback Main 9		1054.69	1054.62	0.07	0.31	0.00	19.13	113.93		40.58
Camelback Main 8		1054.38	1054.33	0.06	0.37	0.00	21.91	132.93		53.12
Camelback Main 7		1054.02	1053.91	0.10	0.73	0.00	27.34	149.72		31.93
Camelback Main 6		1053.29	1053.16	0.12	0.79	0.01	15.33	190.48		33.39
Camelback Main 5		1052.50	1052.32	0.18	1.04	0.00	7.39	198.42		122.10
Camelback Main 4		1051.46	1051.29	0.17	0.84	0.00	0.26	205.55		26.17
Camelback Main 3		1050.62	1050.45	0.17	0.83	0.02		205.81		24.06
Camelback Main 2		1049.76	1049.66	0.10	1.08	0.00	46.31	159.50		56.41
Camelback Main 1		1048.68	1048.55	0.12				205.81		123.42

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ERRORS WARNINGS AND NOTES
Errors Warnings and Notes for Plan : Plan 01

River: Camelback Road W Reach: Camelback Main RS: 42 Profile: PF 1
Warning:The cross-section end points had to be extended vertically for the computed water surface.
Warning:The conveyance ratio (upstream 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: The user has entered a known water surface elevation at this cross section.
River: Camelback Road W Reach: Camelback Main RS: 41 Profile: PF 1
Warning:Divided flow computed for this cross-section.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the 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: Camelback Road W Reach: Camelback Main RS: 40 Profile: PF 1
Warning:Divided flow computed for this cross-section.
Warning:The cross-section end points had to be extended vertically for the computed water surface.
Warning:The conveyance ratio (upstream 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: Camelback Road W Reach: Camelback Main RS: 39 Profile: PF 1
Warning:Divided flow computed for this cross-section.
Warning:The cross-section end points had to be extended vertically for the computed water surface.
Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
River: Camelback Road W Reach: Camelback Main RS: 38 Profile: PF 1
Warning:The cross-section end points had to be extended vertically for the computed water surface.
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: Camelback Road W Reach: Camelback Main RS: 36.4 Profile: PF 1
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:The conveyance ratio (upstream 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.
Warning:The parabolic search method failed to converge on critical depth. The program will try the cross section slice/secant method to find critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.
River: Camelback Road W Reach: Camelback Main RS: 36 Profile: PF 1
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: Camelback Road W Reach: Camelback Main RS: 35 Profile: PF 1
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:Divided flow computed for this cross-section.
Warning:The cross-section end points had to be extended vertically for the computed water surface.
Warning:The conveyance ratio (upstream 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: Camelback Road W Reach: Camelback Main RS: 34 Profile: PF 1
Warning:Divided flow computed for this cross-section.
Warning:The cross-section end points had to be extended vertically for the computed water surface.
Warning:The energy loss was 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: Camelback Road W Reach: Camelback Main RS: 33 Profile: PF 1
Warning:The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning:Divided flow computed for this cross-section.
Warning:The cross-section end points had to be extended vertically for the computed water surface.
Warning:The conveyance ratio (upstream 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: Camelback Road W Reach: Camelback Main RS: 31.4 Profile: PF 1

```
    Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
            This may indicate the need for additional cross sections.
River: Camelback Road W  Reach: Camelback Main     RS: 31     Profile: PF 1
    Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
            the need for additional cross sections.
River: Camelback Road W  Reach: Camelback Main     RS: 30     Profile: PF 1
    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: Camelback Road W  Reach: Camelback Main     RS: 29     Profile: PF 1
    Warning:Divided flow computed for this cross-section.
    Warning:The cross-section end points had to be extended vertically for the computed water surface.
    Warning:The energy loss was 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: Camelback Road W  Reach: Camelback Main     RS: 28     Profile: PF 1
    Warning:Divided flow computed for this cross-section.
    Warning:The cross-section end points had to be extended vertically for the computed water surface.
    Warning:The conveyance ratio (upstream 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: Camelback Road W  Reach: Camelback Main     RS: 27     Profile: PF 1
    Warning:The energy equation could not be balanced within the specified number of iterations.  The program selected the water
            surface that had the least amount of error between computed and assumed values.
    Warning:Divided flow computed for this cross-section.
    Warning:The cross-section end points had to be extended vertically for the computed water surface.
    Warning:During the standard step iterations, when the assumed water surface was set equal to critical depth, the 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: Camelback Road W  Reach: Camelback Main     RS: 26.4     Profile: PF 1
    Warning:The energy equation could not be balanced within the specified number of iterations.  The program used critical depth
            for the water surface and continued on with the calculations.
    Warning:The conveyance ratio (upstream 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.
    Warning:The parabolic search method failed to converge on critical depth.  The program will try the cross section
            slice/secant method to find critical depth.
River: Camelback Road W  Reach: Camelback Main     RS: 26     Profile: PF 1
    Warning:Divided flow computed for this cross-section.
    Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
            This may indicate the need for additional cross sections.
    Warning:The energy loss was 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: Camelback Road W  Reach: Camelback Main     RS: 25     Profile: PF 1
    Warning:Divided flow computed for this cross-section.
    Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
            This may indicate the need for additional cross sections.
    Warning:The energy loss was 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: Camelback Road W  Reach: Camelback Main     RS: 24     Profile: PF 1
    Warning:Divided flow computed for this cross-section.
    Warning:The cross-section end points had to be extended vertically for the computed water surface.
River: Camelback Road W  Reach: Camelback Main     RS: 22.3     Profile: PF 1     Culv: Culvert #1
    Note:   The flow in the culvert is entirely supercritical.
River: Camelback Road W  Reach: Camelback Main     RS: 22     Profile: PF 1
    Warning:The energy equation could not be balanced within the specified number of iterations.  The program used critical depth
            for the water surface and continued on with the calculations.
    Warning: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.
    Warning:The parabolic search method failed to converge on critical depth.  The program will try the cross section
            slice/secant method to find critical depth.
River: Camelback Road W  Reach: Camelback Main     RS: 21     Profile: PF 1
    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: Camelback Road W  Reach: Camelback Main     RS: 20     Profile: PF 1
    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: Camelback Road W  Reach: Camelback Main     RS: 19     Profile: PF 1
    Warning:The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate
            the need for additional cross sections.
River: Camelback Road W  Reach: Camelback Main     RS: 18     Profile: PF 1
    Warning:The energy equation could not be balanced within the specified number of iterations.  The program selected the water
            surface that had the least amount of error between computed and assumed values.
    Warning:The cross-section end points had to be extended vertically for the computed water surface.
    Warning:The conveyance ratio (upstream 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 cross section had to be extended vertically during the critical depth 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.
    Warning:The parabolic search method failed to converge on critical depth.  The program will try the cross section
            slice/secant method to find critical depth.
River: Camelback Road W  Reach: Camelback Main     RS: 16     Profile: PF 1
    Warning:Divided flow computed for this cross-section.
    Warning:The cross-section end points had to be extended vertically for the computed water surface.
River: Camelback Road W  Reach: Camelback Main     RS: 15     Profile: PF 1
    Warning:Divided flow computed for this cross-section.
    Warning:The cross-section end points had to be extended vertically for the computed water surface.
    Warning:The conveyance ratio (upstream 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: Camelback Road W  Reach: Camelback Main     RS: 14     Profile: PF 1
    Warning:Divided flow computed for this cross-section.
    Warning:The cross-section end points had to be extended vertically for the computed water surface.
    Warning:The energy loss was 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: Camelback Road W  Reach: Camelback Main     RS: 13     Profile: PF 1
    Warning:Divided flow computed for this cross-section.
    Warning:The cross-section end points had to be extended vertically for the computed water surface.
    Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
            This may indicate the need for additional cross sections.
River: Camelback Road W  Reach: Camelback Main     RS: 12     Profile: PF 1
    Warning:Divided flow computed for this cross-section.
    Warning:The cross-section end points had to be extended vertically for the computed water surface.
    Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
            This may indicate the need for additional cross sections.
River: Camelback Road W  Reach: Camelback Main     RS: 10.4     Profile: PF 1
    Warning:The cross-section end points had to be extended vertically for the computed water surface.
    Warning:The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
            This may indicate the need for additional cross sections.
River: Camelback Road W  Reach: Camelback Main     RS: 10     Profile: PF 1
    Warning:Divided flow computed for this cross-section.
River: Camelback Road W  Reach: Camelback Main     RS: 9     Profile: PF 1
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     Warning:Divided flow computed for this cross-section.
River: Camelback Road W  Reach: Camelback Main     RS: 7     Profile: PF 1
     Warning:Divided flow computed for this cross-section.
River: Camelback Road W  Reach: Camelback Main     RS: 6     Profile: PF 1
     Warning:Divided flow computed for this cross-section.
River: Camelback Road W  Reach: Camelback Main     RS: 5     Profile: PF 1
     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: Camelback Road W  Reach: Camelback Main     RS: 4     Profile: PF 1
     Warning:Divided flow computed for this cross-section.
River: Camelback Road W  Reach: Camelback Main     RS: 2     Profile: PF 1
     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: Camelback Road W  Reach: Camelback Main     RS: 1     Profile: PF 1
     Warning:Divided flow computed for this cross-section.
```

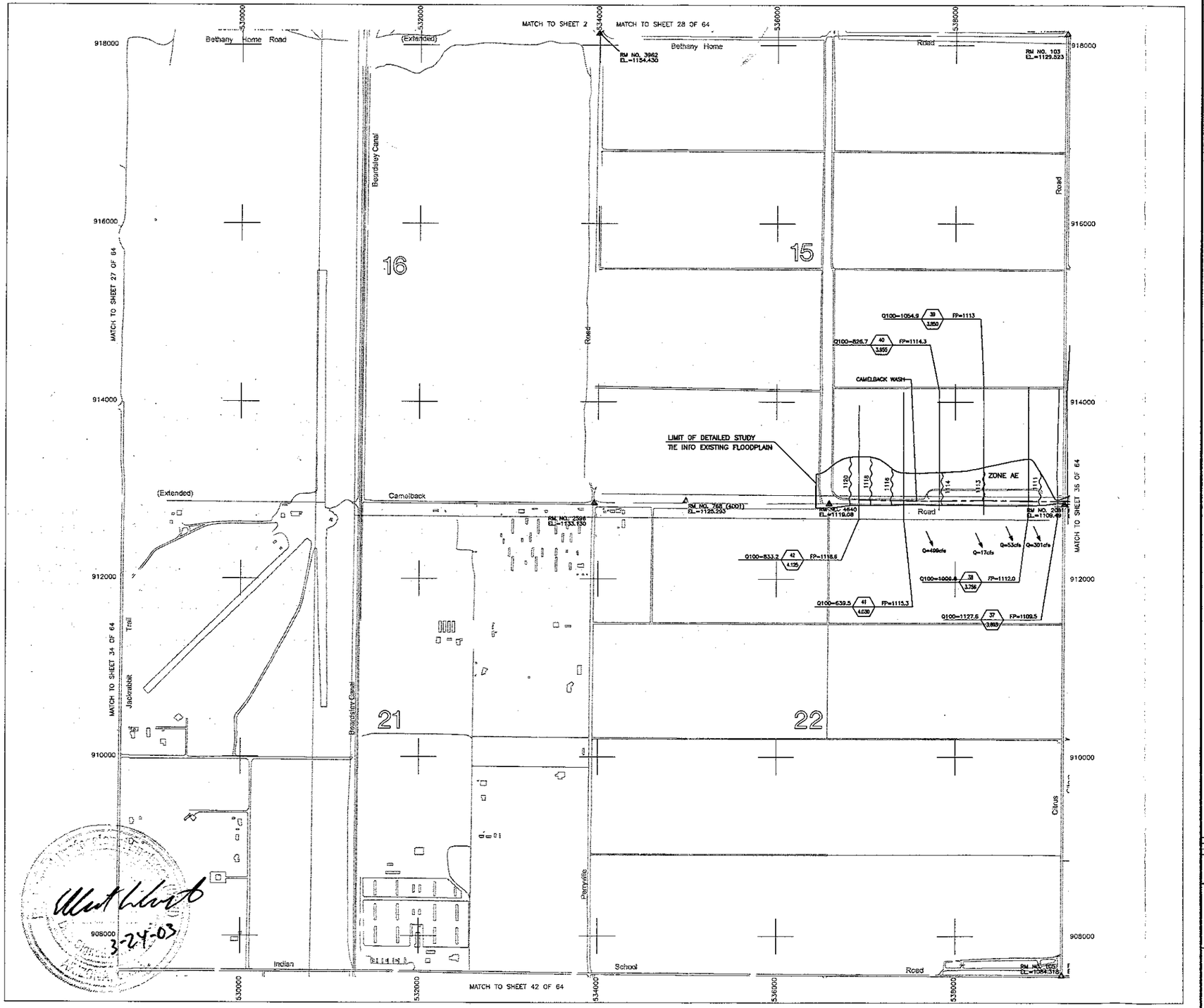
SUMMARY TABLES

HEC-RAS Plan: Plan 01 River: Camelback Road W Reach: Camelback Main Profile: PF 1

Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Camelback Main	42	883.17	1115.92	1118.61		1118.64	0.000944	1.04	653.15	551.62	0.12
Camelback Main	41	839.53	1112.40	1115.26	1115.26	1115.51	0.028559	4.63	165.19	357.74	0.61
Camelback Main	40	828.68	1111.29	1114.28		1114.36	0.001165	1.13	386.02	318.56	0.13
Camelback Main	39	1054.85	1109.22	1112.96		1113.08	0.004947	2.30	384.98	422.87	0.26
Camelback Main	38	1009.55	1107.35	1112.02		1112.16	0.000925	4.18	544.50	527.83	0.37
Camelback Main	37	1127.62	1103.73	1109.45	1108.74	1111.07	0.005442	10.24	111.76	34.22	0.81
Camelback Main	36.9	Culvert									
Camelback Main	36.4	1133.01	1103.53	1109.07	1109.07	1109.76	0.002120	6.79	187.39	83.19	0.56
Camelback Main	36	1153.64	1100.04	1106.25		1107.07	0.007224	9.87	414.87	611.93	0.89
Camelback Main	35	996.64	1097.94	1104.13	1104.13	1104.51	0.003337	7.00	493.14	678.73	0.63
Camelback Main	34	697.85	1095.66	1100.72		1100.91	0.003479	4.94	287.42	509.58	0.49
Camelback Main	33	673.99	1093.67	1098.59	1098.59	1098.87	0.004905	5.76	236.62	450.25	0.57
Camelback Main	32	702.49	1090.52	1096.35	1096.07	1096.43	0.001208	3.34	449.63	610.27	0.28
Camelback Main	31.9	Culvert									
Camelback Main	31.4	696.72	1090.28	1094.21	1092.51	1094.34	0.001469	2.86	243.78	106.25	0.33
Camelback Main	31	711.49	1088.94	1093.16	1093.14	1093.43	0.006650	6.15	225.13	366.03	0.65
Camelback Main	30	737.27	1085.92	1090.50	1090.32	1090.68	0.003864	5.12	267.11	351.62	0.54
Camelback Main	29	759.99	1084.29	1088.45		1088.63	0.004291	5.29	272.71	371.24	0.56
Camelback Main	28	755.31	1082.38	1086.84	1086.63	1086.95	0.002644	4.19	346.30	487.81	0.43
Camelback Main	27	567.89	1079.87	1085.12	1085.12	1085.38	0.002972	5.06	217.05	395.81	0.46
Camelback Main	26.9	518.30	1079.77	1084.29	1082.30	1084.58	0.001849	4.33	133.71	124.59	0.39
Camelback Main	26.7	Culvert									
Camelback Main	26.4	528.89	1079.69	1082.51	1082.51	1082.68	0.002931	4.35	227.22	416.97	0.47
Camelback Main	26	582.34	1077.68	1078.45	1078.24	1078.86	0.007192	2.27	115.15	89.38	0.58
Camelback Main	25	696.88	1074.33	1075.74	1074.82	1075.98	0.002323	0.86	184.09	88.48	0.15
Camelback Main	24	748.18	1070.13	1074.34		1074.48	0.001198	1.24	279.43	112.43	0.13
Camelback Main	23	575.19	1068.44	1073.94	1071.27	1074.12	0.001133	3.40	169.18	42.11	0.30
Camelback Main	22.3	Culvert									
Camelback Main	22	437.32	1068.01	1070.23	1070.23	1071.13	0.013173	7.62	58.33	34.06	0.96
Camelback Main	21	556.83	1061.98	1067.76		1068.05	0.002314	4.71	163.37	157.17	0.43
Camelback Main	20	576.33	1060.29	1066.24		1066.80	0.002554	6.24	148.36	146.07	0.59
Camelback Main	19	795.84	1059.86	1064.93	1064.87	1065.49	0.002683	6.83	206.01	231.44	0.61
Camelback Main	18	910.00	1058.34	1063.34	1063.34	1063.59	0.004863	5.58	325.90	477.95	0.58
Camelback Main	17	1065.71	1055.19	1062.35	1058.56	1062.46	0.000625	3.14	567.42	418.45	0.22
Camelback Main	16.9	Culvert									
Camelback Main	16.4	971.81	1054.83	1060.86	1058.11	1061.06	0.002472	4.01	357.60	364.22	0.30
Camelback Main	16	1033.84	1056.05	1060.21		1060.27	0.002240	2.38	542.16	501.85	0.27
Camelback Main	15	951.62	1055.41	1059.38		1059.44	0.002379	2.39	494.12	447.42	0.25
Camelback Main	14	592.57	1053.77	1057.68		1057.80	0.003627	4.15	287.74	472.57	0.48
Camelback Main	13	393.66	1052.76	1056.58	1056.29	1056.63	0.001299	2.79	294.12	486.14	0.32
Camelback Main	12	362.96	1051.70	1055.72		1055.86	0.003003	4.11	192.39	440.51	0.48
Camelback Main	11	469.34	1048.24	1055.71	1049.93	1055.74	0.000091	1.39	444.27	472.06	0.10
Camelback Main	10.7	Culvert									
Camelback Main	10.4	220.59	1048.24	1055.01	1049.21	1055.01	0.000016	0.59	379.18	88.21	0.04
Camelback Main	10	110.85	1050.70	1054.94		1054.99	0.000471	1.81	69.19	52.99	0.20
Camelback Main	9	133.06	1050.46	1054.62		1054.69	0.000730	2.25	64.95	40.58	0.25
Camelback Main	8	154.84	1049.63	1054.33		1054.38	0.000531	2.01	88.71	53.12	0.22
Camelback Main	7	177.06	1049.48	1053.91		1054.02	0.000982	2.69	70.84	31.93	0.29
Camelback Main	6	205.81	1048.39	1053.16		1053.29	0.001219	2.92	80.71	33.39	0.30
Camelback Main	5	205.81	1048.35	1052.32		1052.50	0.002143	3.46	74.53	122.10	0.39
Camelback Main	4	205.81	1047.01	1051.29		1051.46	0.001855	3.31	62.71	26.17	0.36
Camelback Main	3	205.81	1045.65	1050.45		1050.62	0.001817	3.26	63.10	24.06	0.35
Camelback Main	2	205.81	1044.77	1049.66		1049.76	0.001528	2.79	85.26	56.41	0.30
Camelback Main	1	205.81	1043.70	1048.55	1046.53	1048.68	0.001503	2.82	72.97	123.42	0.30

HEC-RAS Plan: Plan 01 River: Camelback Road W Reach: Camelback Main Profile: PF 1

Reach	River Sta	E.G. Elev	W.S. Elev	Vel Head	Frctn Loss	C & E Loss	Q Left	Q Channel	Q Right	Top Width
		(ft)	(ft)	(ft)	(ft)	(ft)	(cfs)	(cfs)	(cfs)	(ft)
Camelback Main	42	1118.64	1118.61	0.03			705.30	65.93	111.94	551.62
Camelback Main	41	1115.51	1115.26	0.24	0.18	0.01	411.67	187.53	40.34	357.74
Camelback Main	40	1114.36	1114.28	0.08	1.27	0.00	730.83	61.27	34.57	318.56
Camelback Main	39	1113.08	1112.96	0.12	0.92	0.00	866.49	118.93	69.43	422.87
Camelback Main	38	1112.16	1112.02	0.14	0.64	0.45	455.03	453.60	100.91	527.83
Camelback Main	37	1111.07	1109.45	1.63				1125.82	1.80	34.22
Camelback Main	36.9	Culvert								
Camelback Main	36.4	1109.76	1109.07	0.69	1.58	0.04	19.43	1097.45	16.13	83.19
Camelback Main	36	1107.07	1106.25	0.82	2.43	0.13	507.33	611.35	34.96	611.93
Camelback Main	35	1104.51	1104.13	0.39	1.70	0.06	396.61	478.37	121.66	678.73
Camelback Main	34	1100.91	1100.72	0.19	2.04	0.01	353.54	303.95	40.37	509.58
Camelback Main	33	1098.87	1098.59	0.28	1.34	0.10	298.23	325.23	50.53	450.25
Camelback Main	32	1096.43	1096.35	0.08			371.15	250.72	80.62	610.27
Camelback Main	31.9	Culvert								
Camelback Main	31.4	1094.34	1094.21	0.13	0.86	0.04		696.63	0.09	108.25
Camelback Main	31	1093.43	1093.16	0.27	2.72	0.03	435.63	247.25	28.61	366.03
Camelback Main	30	1090.68	1090.50	0.18	2.04	0.00	516.28	218.18	2.81	351.62
Camelback Main	29	1088.63	1088.45	0.18	1.66	0.02	533.21	205.97	20.81	371.24
Camelback Main	28	1086.95	1086.84	0.11	1.56	0.02	549.92	178.49	28.90	487.81
Camelback Main	27	1085.38	1085.12	0.26	0.29	0.01	175.72	353.79	38.38	395.81
Camelback Main	26.9	1084.58	1084.29	0.29			5.80	506.69	6.01	124.59
Camelback Main	26.7	Culvert								
Camelback Main	26.4	1082.68	1082.51	0.18	1.70	0.07	237.00	287.89	2.00	416.97
Camelback Main	26	1078.86	1078.45	0.41	2.82	0.05	571.47	10.87		89.38
Camelback Main	25	1075.98	1075.74	0.24	1.46	0.03	688.70	8.18		88.48
Camelback Main	24	1074.48	1074.34	0.14	0.35	0.01	675.43	64.51	8.25	112.43
Camelback Main	23	1074.12	1073.94	0.18				575.19		42.11
Camelback Main	22.3	Culvert								
Camelback Main	22	1071.13	1070.23	0.90	2.09	0.30	2.93	434.39		34.06
Camelback Main	21	1068.05	1067.76	0.29	1.22	0.03	95.06	461.77		157.17
Camelback Main	20	1066.80	1066.24	0.56	1.31	0.00	52.91	623.42		146.07
Camelback Main	19	1065.49	1064.93	0.56	1.80	0.09	152.54	643.30		231.44
Camelback Main	18	1063.59	1063.34	0.25	0.83	0.07	500.17	409.76	0.07	477.95
Camelback Main	17	1062.46	1062.35	0.11			307.05	750.86	7.80	418.45
Camelback Main	16.9	Culvert								
Camelback Main	16.4	1061.06	1060.86	0.20	0.72	0.07	190.23	770.54	11.04	364.22
Camelback Main	16	1060.27	1060.21	0.06	0.83	0.00	887.72	141.85	4.27	501.85
Camelback Main	15	1059.44	1059.38	0.06	1.63	0.01	844.77	92.26	14.59	447.42
Camelback Main	14	1057.80	1057.68	0.12	1.15	0.02	385.21	196.84	10.52	472.57
Camelback Main	13	1056.63	1056.58	0.05	0.76	0.01	261.76	128.42	3.48	486.14
Camelback Main	12	1055.86	1055.72	0.14	0.06	0.05	190.16	170.86	1.94	440.51
Camelback Main	11	1055.74	1055.71	0.03			21.25	444.62	3.47	472.06
Camelback Main	10.7	Culvert								
Camelback Main	10.4	1055.01	1055.01	0.01	0.01	0.01		219.13	1.46	88.21
Camelback Main	10	1054.99	1054.94	0.05	0.30	0.00	14.13	96.72	0.00	52.99
Camelback Main	9	1054.69	1054.62	0.07	0.31	0.00	19.13	113.93		40.58
Camelback Main	8	1054.38	1054.33	0.06	0.37	0.00	21.91	132.93		53.12
Camelback Main	7	1054.02	1053.91	0.10	0.73	0.00	27.34	149.72		31.93
Camelback Main	6	1053.29	1053.16	0.12	0.79	0.01	15.33	190.48		33.39
Camelback Main	5	1052.50	1052.32	0.18	1.04	0.00	7.39	198.42		122.10
Camelback Main	4	1051.46	1051.29	0.17	0.84	0.00	0.26	205.55		26.17
Camelback Main	3	1050.62	1050.45	0.17	0.83	0.02		205.81		24.06
Camelback Main	2	1049.76	1049.66	0.10	1.08	0.00	46.31	159.50		56.41
Camelback Main	1	1048.68	1048.55	0.12				205.81		123.42



LEGEND

100-YR FLOODPLAIN BOUNDARY	
FLOODWAY BOUNDARY	
HYDRAULIC BASE LINE WITH RIVER MILE	
EROSION SETBACK (WHEN APPLICABLE)	
CROSS SECTION	13 / 4.563 — FP= 1888.74, FW= 1889.55, Q = CFS
BASE FLOOD ELEVATIONS	1221
ZONE DESIGNATIONS	ZONE AE
CORPORATE LIMITS	Corporate Limits
COUNTY, PARISH, STATE OR INTERNATIONAL BOUNDARY	County Boundary

NOTES: ALL ELEVATIONS ARE BASED ON, **"NATIONAL GEODETIC VERTICAL DATUM OF 1929"**

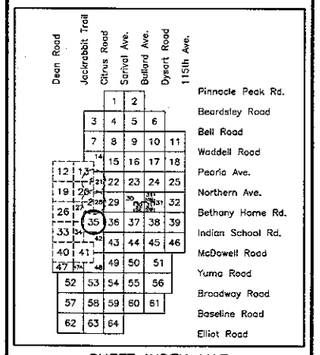
ALL FLOODPLANS BY URS ARE BASED ON CROSS SECTIONS FIELD-SURVEYED BY URS.

ELEVATION REFERENCE FOR HYDRAULIC CROSS SECTIONS BY URS, 2001

I.D. NUMBER	ELEVATION (FT)	DESCRIPTION/LOCATION
768 (4001)	1125.293	S.S. ROD IN HAND HOLE WITH ALUMINUM SLEEVE, ±0.2 MI. EAST OF INTERSECTION OF CAMELBACK RD. AND PERRYVILLE RD., ±22' NORTH OF CENTERLINE OF CAMELBACK RD.
103	1129.523	2" I.P. IN AC. POTHOLE AT INTERSECTION OF BETHANY HOME RD. AND CITRUS RD.
105	1054.316	MARICOPA COUNTY HIGHWAY DEPT. BRASS CAP IN HAND HOLE, INDIAN SCHOOL RD. AND CITRUS RD.
2081	1109.490	MCDOT BRASS CAP IN HAND HOLE, AT INTERSECTION OF CITRUS RD. AND CAMELBACK RD.
3962	1154.430	1" IRON ROD IN POTHOLE AT CENTERLINE OF BETHANY HOME RD. AND PERRYVILLE RD.
2596	1133.130	BRASS CAP IN HAND HOLE AT INTERSECTION OF CAMELBACK RD. AND PERRYVILLE RD.
4640	1119.080	MCDOT BRASS CAP IN HAND HOLE, ±0.5 MI. WEST OF CITRUS RD. IN EAST BOUND LANE OF CAMELBACK RD. (7-10-43 IN CONC.)

NOTES

1- THE HYDRAULIC BASE LINE IS CROSS SECTION STATION 10,000 UNLESS NOTED OTHERWISE



SHEET INDEX MAP

400' 0' 400' 800'

SCALE: 1"= 400'
HORIZONTAL DATUM: NAD 1983
STATEPLANE PROJECTION

NO.	REVISION	BY	DATE
2			
1			

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

LOOP 303 CORRIDOR/WHITE TANKS
ADMP UPDATE
FLOOD DELINEATION STUDY
F.C.D. CONTRACT NO. 99-40

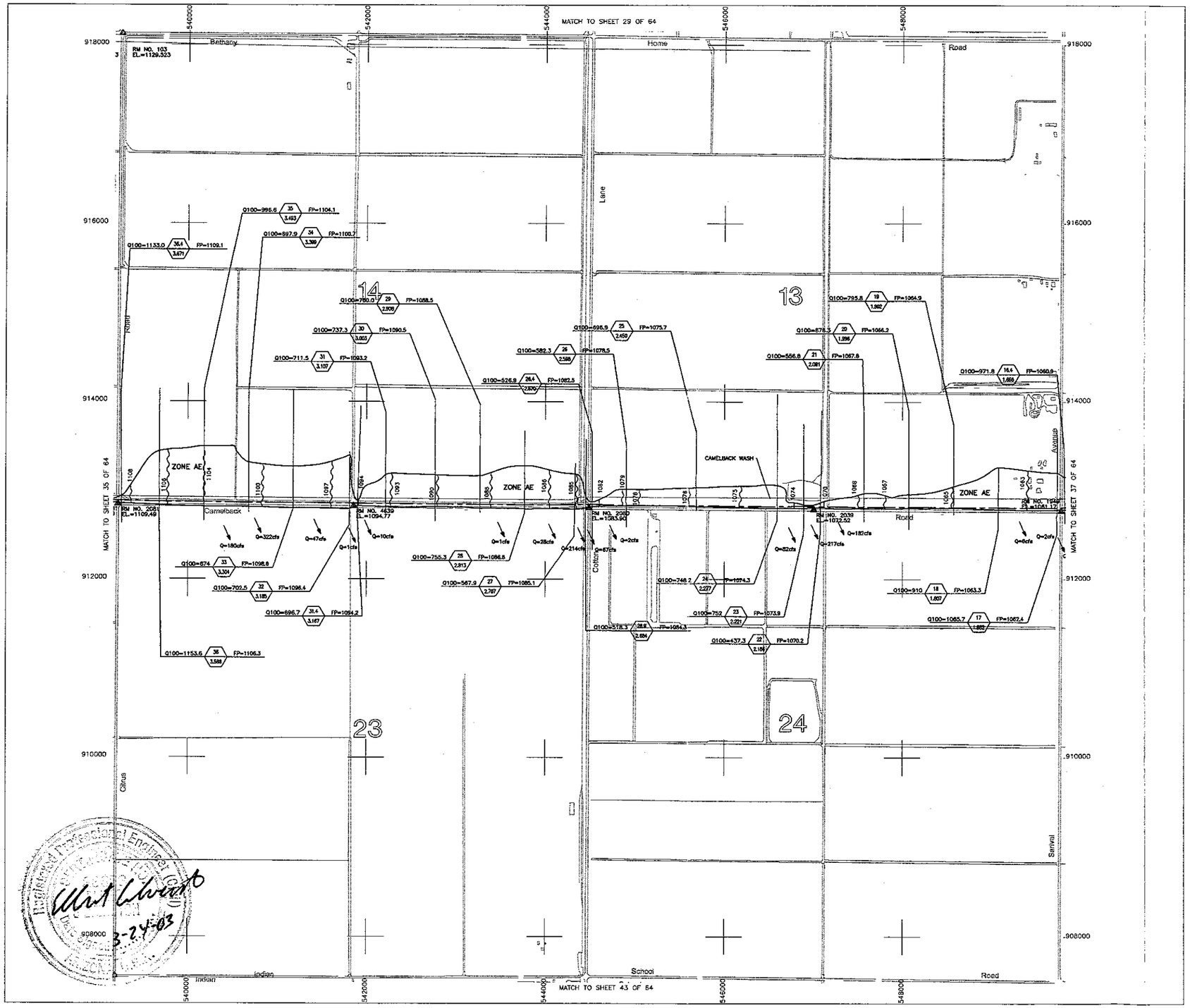
URS
7720 N. 16th Street
Phoenix, Arizona 85020
(602) 371-1100

	BY	DATE
DESIGN	RLD	10-02
DESIGN CHK.	CL	10-02
PLANS	MH	10-02
PLANS CHK.	RLD	10-02

SHEET 35 OF 64

Albert Lilbert
3-24-03

P:\FCDM\L1530\GIS\MAP SHEETS\FIGURE-18.DWG LATEST REV. 2-26-03
REF: P:\FCDM\L1530\CAD\MP SHEETS\REF\ RASTER, PCM1-NO-PERIMETER, TOPO.MOD



LEGEND

100-YR FLOODPLAIN BOUNDARY	
FLOODWAY BOUNDARY	
HYDRAULIC BASE LINE WITH RIVER MILE	
EROSION SETBACK (WHEN APPLICABLE)	
CROSS SECTION	13 / 4.563 — FP= 1888.74, FW= 1889.54, Q = CFS
BASE FLOOD ELEVATIONS	1221
ZONE DESIGNATIONS	ZONE AE
CORPORATE LIMITS	Corporate Limits
COUNTY, PARISH, STATE OR INTERNATIONAL BOUNDARY	County Boundary

NOTES: ALL ELEVATIONS ARE BASED ON, **"NATIONAL GEODETIC VERTICAL DATUM OF 1929"**

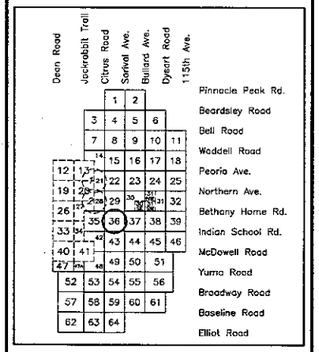
ALL FLOODPLAINS BY URS ARE BASED ON CROSS SECTIONS FIELD-SURVEYED BY URS.

ELEVATION REFERENCE FOR HYDRAULIC CROSS SECTIONS BY URS, 2001

I.D. NUMBER	ELEVATION (FT)	DESCRIPTION/LOCATION
103	1129.523	2" I.P. IN AC. POTHOLE AT INTERSECTION OF BETHANY HOME RD. AND CITRUS RD.
105	1084.318	MARICOPA COUNTY HIGHWAY DEPT. BRASS CAP IN HAND HOLE, INDIAN SCHOOL RD. AND CITRUS RD.
2080	1083.900	CITY OF PHOENIX BRASS CAP IN HAND HOLE, AT INTERSECTION OF COTTON LN. AND CAMELBACK RD.
1949	1061.170	BRASS CAP IN HAND HOLE, INTERSECTION OF CAMELBACK RD. AND SAVIRAL AVE.
2039	1072.520	ALUMINUM CAP FLUSH AT INTERSECTION OF CAMELBACK RD. AND LOOP 303
2081	1109.490	MCDOT BRASS CAP IN HAND HOLE, AT INTERSECTION OF CITRUS RD. AND OF CAMELBACK RD.
4629	1094.770	1" I.P. IN POTHOLE, 0.5 MI. WEST OF COTTON LN. IN WEST BOUND LANE OF CAMELBACK RD.

NOTES

1- THE HYDRAULIC BASE LINE IS CROSS SECTION STATION 10,000 UNLESS NOTED OTHERWISE



SHEET INDEX MAP

400' 0' 400' 800'

SCALE: 1"= 400'

HORIZONTAL DATUM: NAD 1983 STATEPLANE PROJECTION

NO.	REVISION	BY	DATE
2			
1			

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

LOOP 303 CORRIDOR/WHITE TANKS
ADMP UPDATE
FLOOD DELINEATION STUDY
F.C.D. CONTRACT NO. 99-40

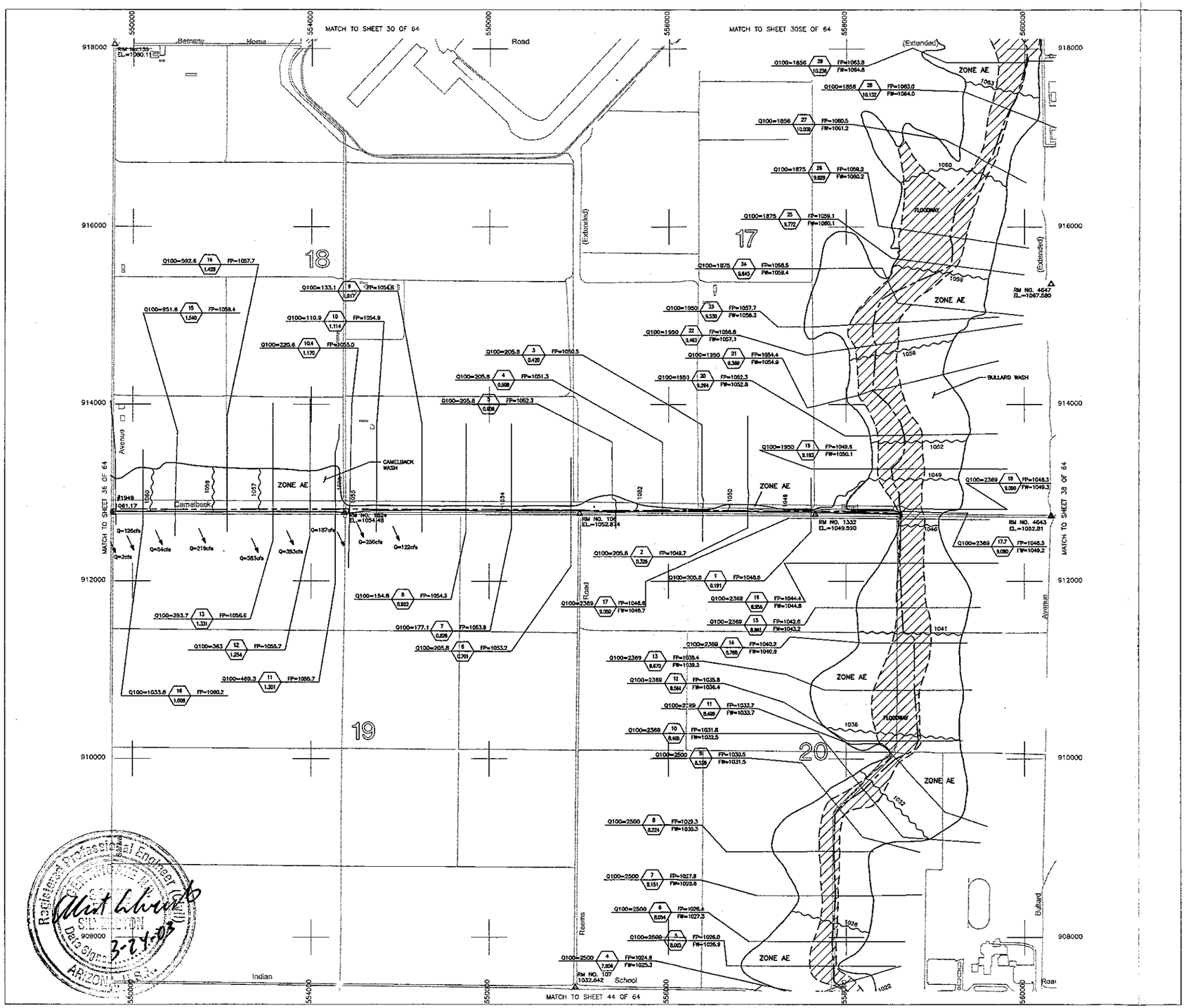
URS
7720 N. 16th Street
Phoenix, Arizona 85020
(602) 371-1100

	BY	DATE
DESIGN	RLD	10-02
DESIGN CHK.	DL	10-02
PLANS	MH	10-02
PLANS CHK.	RLD	10-02

SHEET 36 OF 64

Registered Professional Engineer (CIVIL) Date 3-24-03

P:\FCD99-40\MAPS\MAP_SHEETS\FDMS-01.DGN LAYOUT: 0-1-1-36
PLOT: P:\FCD99-40\FDMS\CAD\MAP_SHEETS\MAP3_FDMS-01.DWG



LEGEND

100-YR FLOODPLAIN BOUNDARY	
FLOODWAY BOUNDARY	
HYDRAULIC BASE LINE WITH RIVER MILE	
EROSION SETBACK (WHEN APPLICABLE)	
CROSS SECTION	13 / 4.563 — FP= 1888.74, FW= 1889.54, Q = CFS
BASE FLOOD ELEVATIONS	1221
ZONE DESIGNATIONS	ZONE AE
CORPORATE LIMITS	Corporate Limits
COUNTY, PARISH, STATE OR INTERNATIONAL BOUNDARY	County Boundary

NOTES: ALL ELEVATIONS ARE BASED ON, **"NATIONAL GEODETIC VERTICAL DATUM OF 1929"**

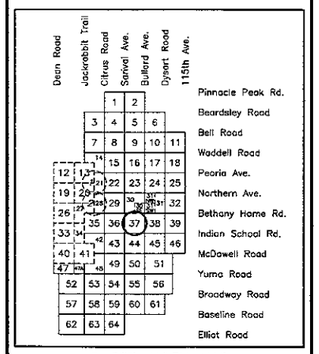
ALL FLOODPLAINS BY URS ARE BASED ON CROSS SECTIONS FIELD-SURVEYED BY URS.

ELEVATION REFERENCE FOR HYDRAULIC CROSS SECTIONS BY URS, 2001

I.D. NUMBER	ELEVATION (FT)	DESCRIPTION/LOCATION
106	1052.874	CITY OF PHOENIX BRASS CAP IN HAND HOLE, REEMS RD. AND CAMELBACK RD.
1332	1049.590	BRASS CAP IN HAND HOLE 0.5 MI. EAST OF REEMS RD. AND CAMELBACK RD.
1824	1054.480	CITY OF PHOENIX BRASS CAP IN HAND HOLE, 156TH AVE. AND CAMELBACK RD.
1949	1061.170	CITY OF PHOENIX BRASS CAP IN HAND HOLE, SAVIRAL AVE. AND CAMELBACK RD.
4643	1052.810	CITY OF PHOENIX BRASS CAP IN HAND HOLE, BULLARD RD. AND CAMELBACK RD.
4647	1067.580	2" IRON PIPE WITH NAIL ±0.5 MI. NORTH OF BULLARD AVE. AND CAMELBACK RD. (AT MISSOURI AVE.)

NOTES

1- THE HYDRAULIC BASE LINE IS CROSS SECTION STATION 10,000 UNLESS NOTED OTHERWISE



SHEET INDEX MAP

SCALE: 1" = 400'
HORIZONTAL DATUM: NAD 1983
STATEPLANE PROJECTION

NO.	REVISION	BY	DATE
1			
2			

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

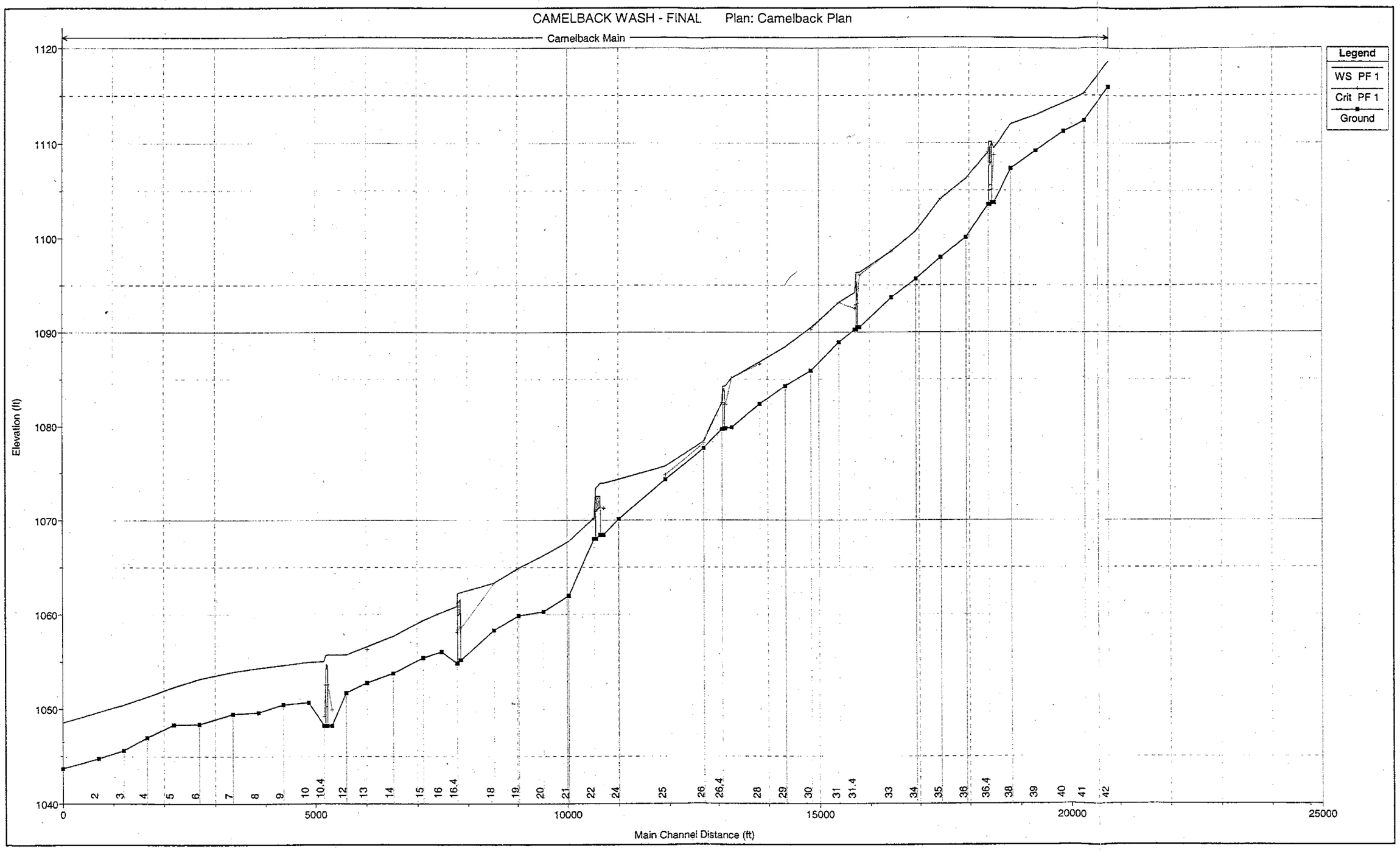
LOOP 303 CORRIDOR/WHITE TANKS
ADMP UPDATE
FLOOD DELINEATION STUDY
F.C.D. CONTRACT NO. 99-40

URS
7720 N. 16th Street
Phoenix, Arizona 85020
(602) 371-1100

	BY	DATE
DESIGN	MR/DL	10-02
DESIGN CHK.	RLD	10-02
PLANS	MDH	10-02
PLANS CHK.	RLD	10-02

SHEET 37 OF 64

Registered Professional Engineer (Civil) CERTIFICATE NO. 22140 Date Signed 3-27-03 ARIZONA U.S.A.


CAMELBACK WASH - FINAL Plan: Camelback Plan
Camelback Main
Legend
WS PF 1
Crit PF 1
Ground
Elevation (ft)
1120
1110
1100
1090
1080
1070
1060
1050
1040
0
5000
10000
15000
20000
25000
Main Channel Distance (ft)
2
3
4
5
6
7
8
9
10
10.4
12
13
14
15
16
16.4
18
19
20
21
22
24
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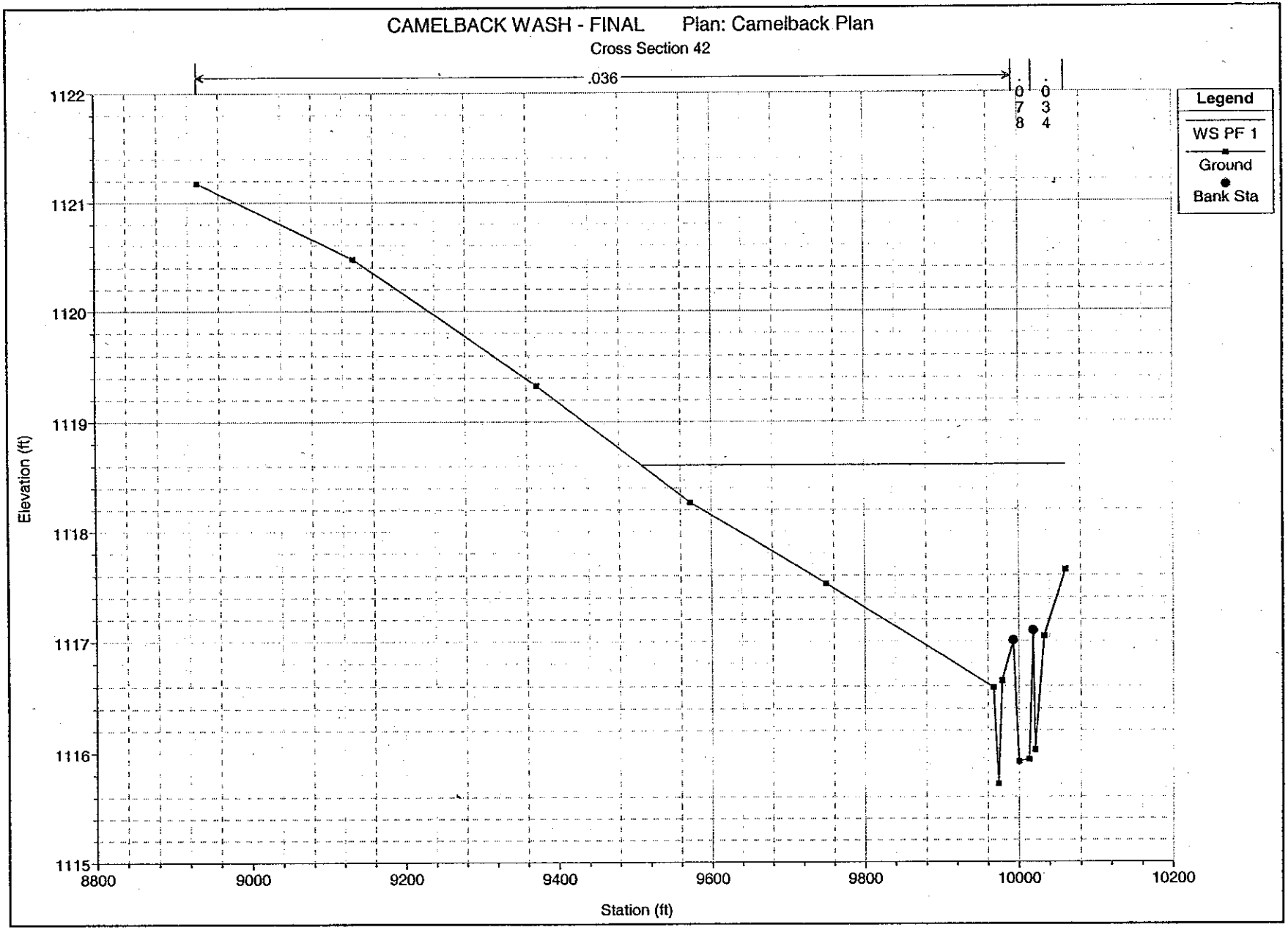
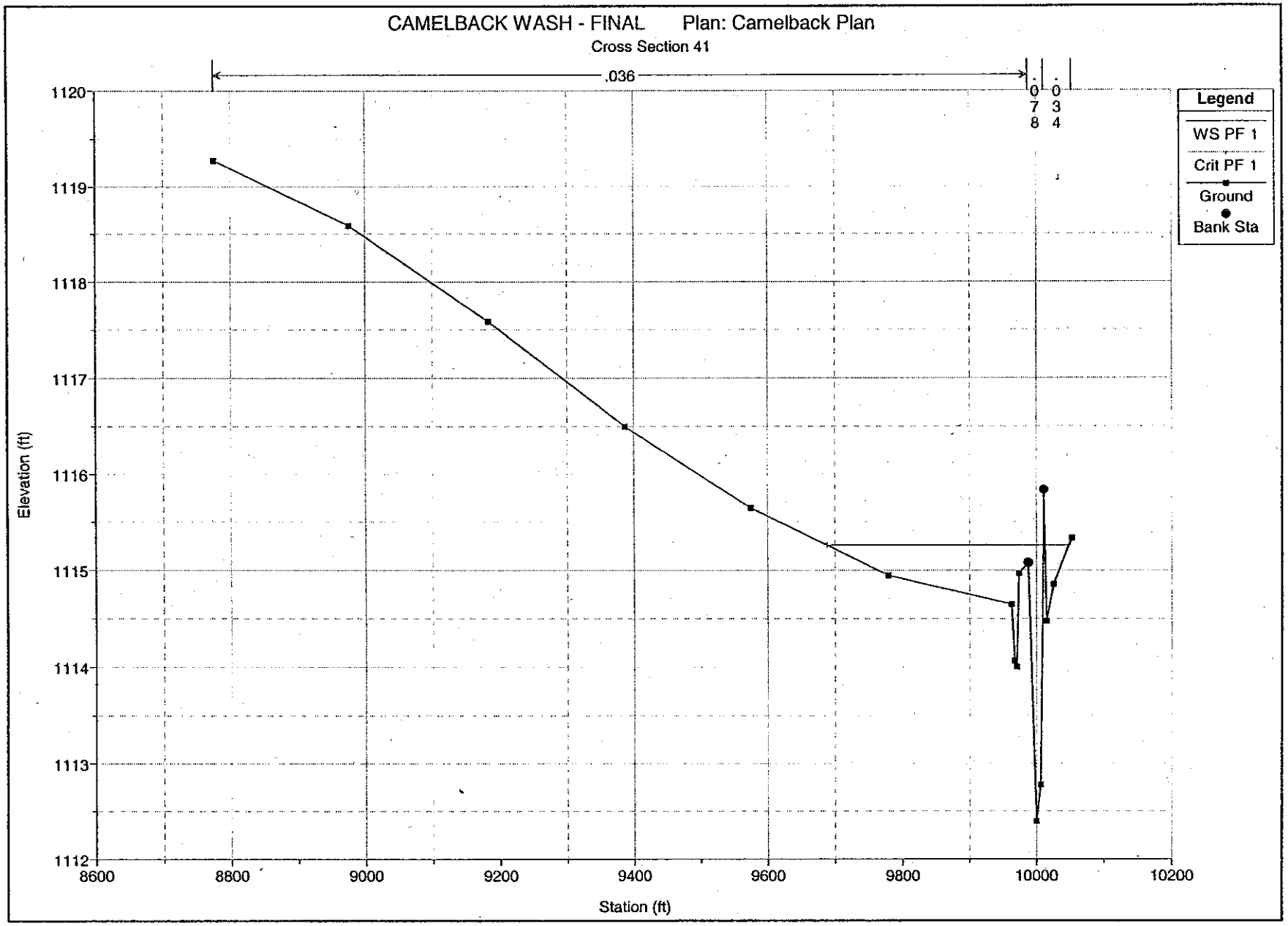
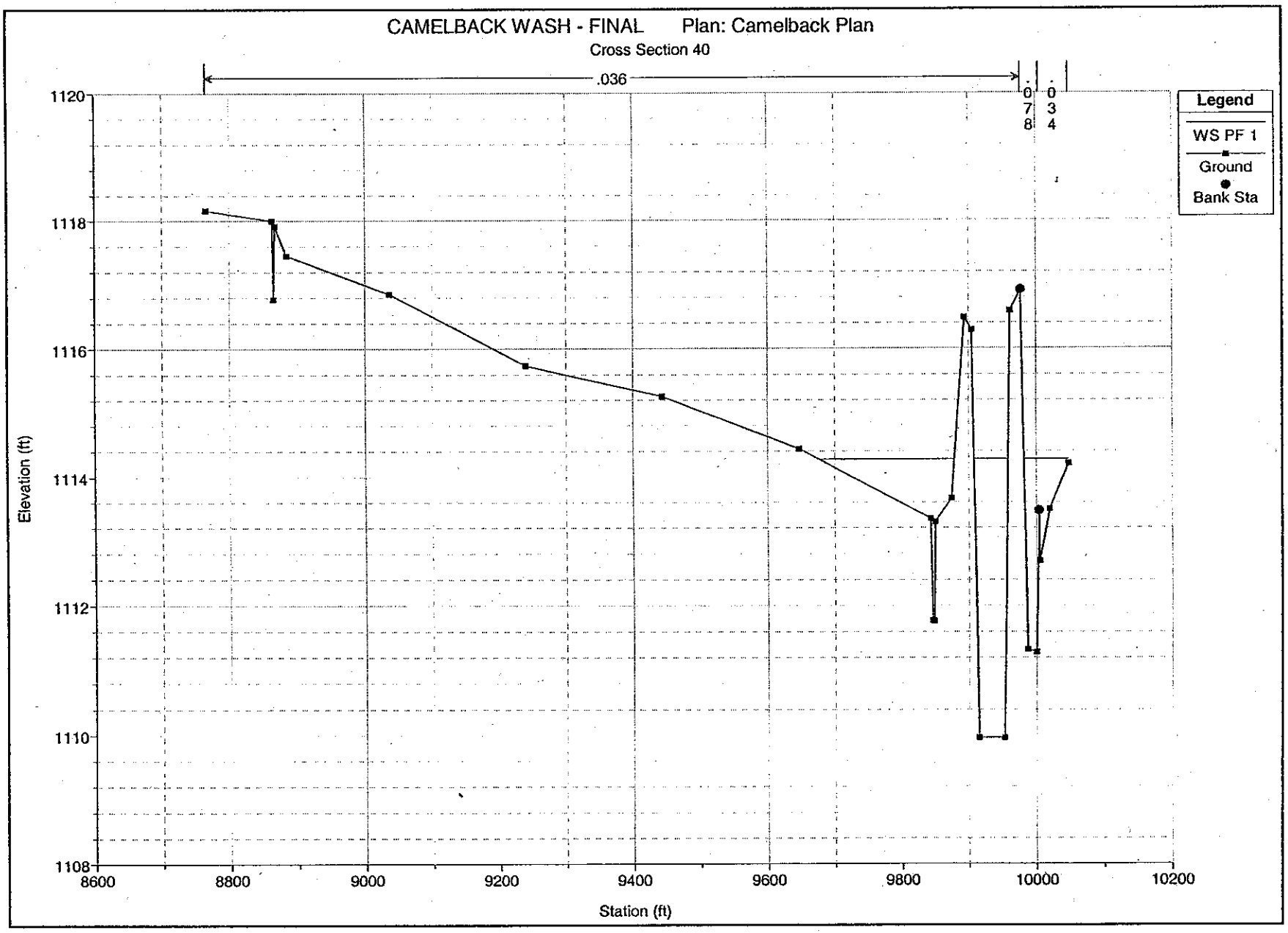
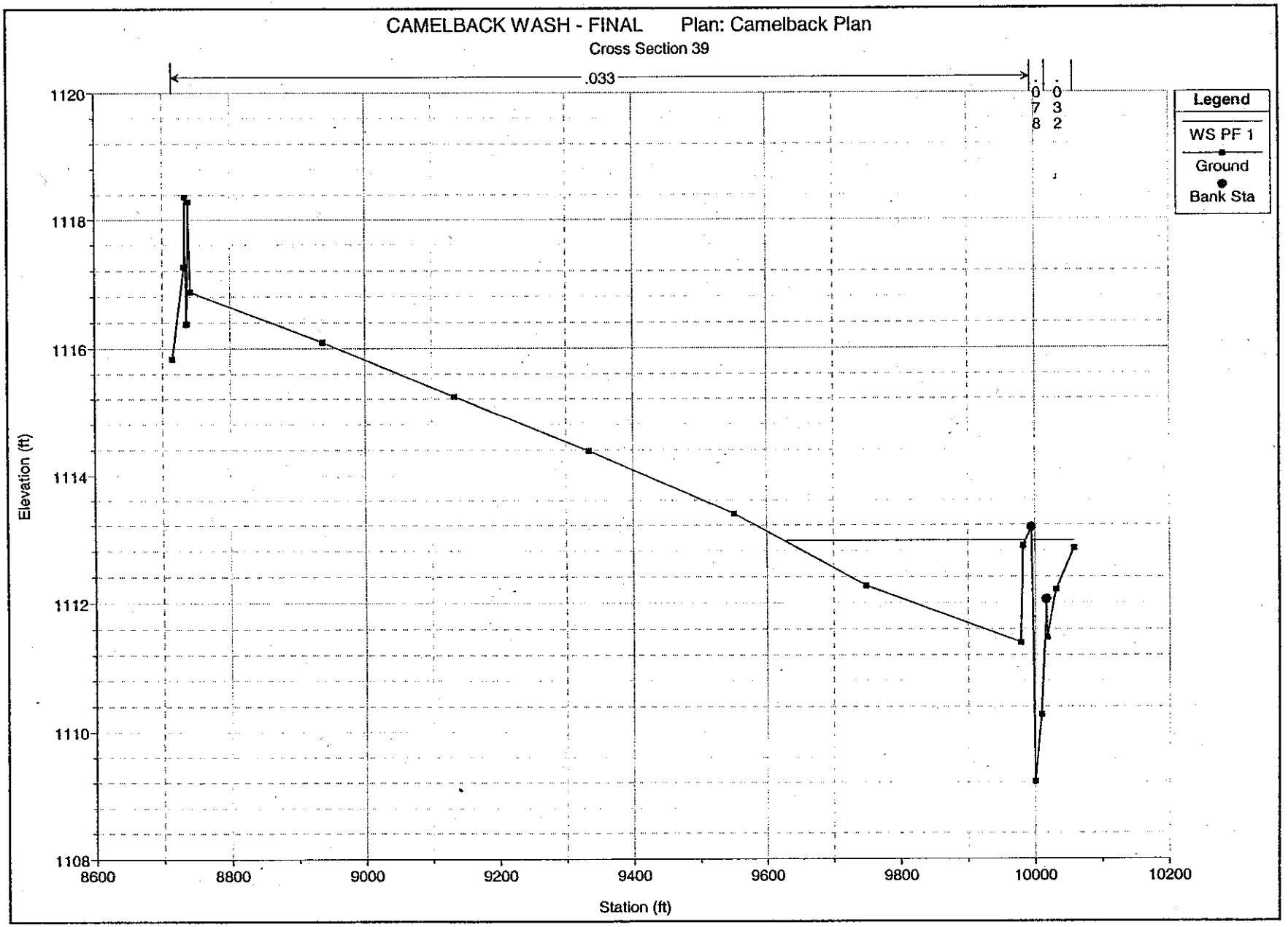
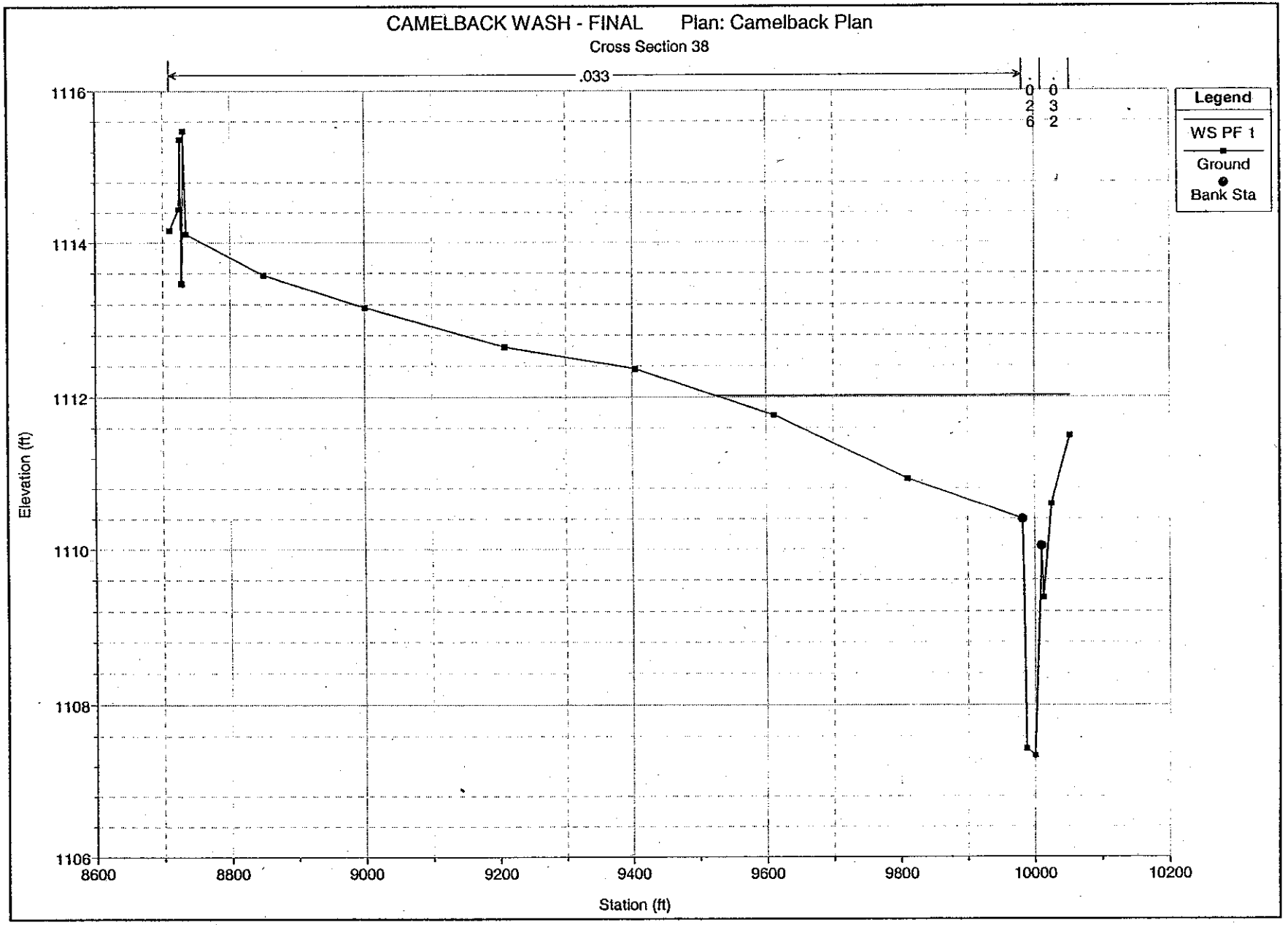
36.4
38
39
40
41
42

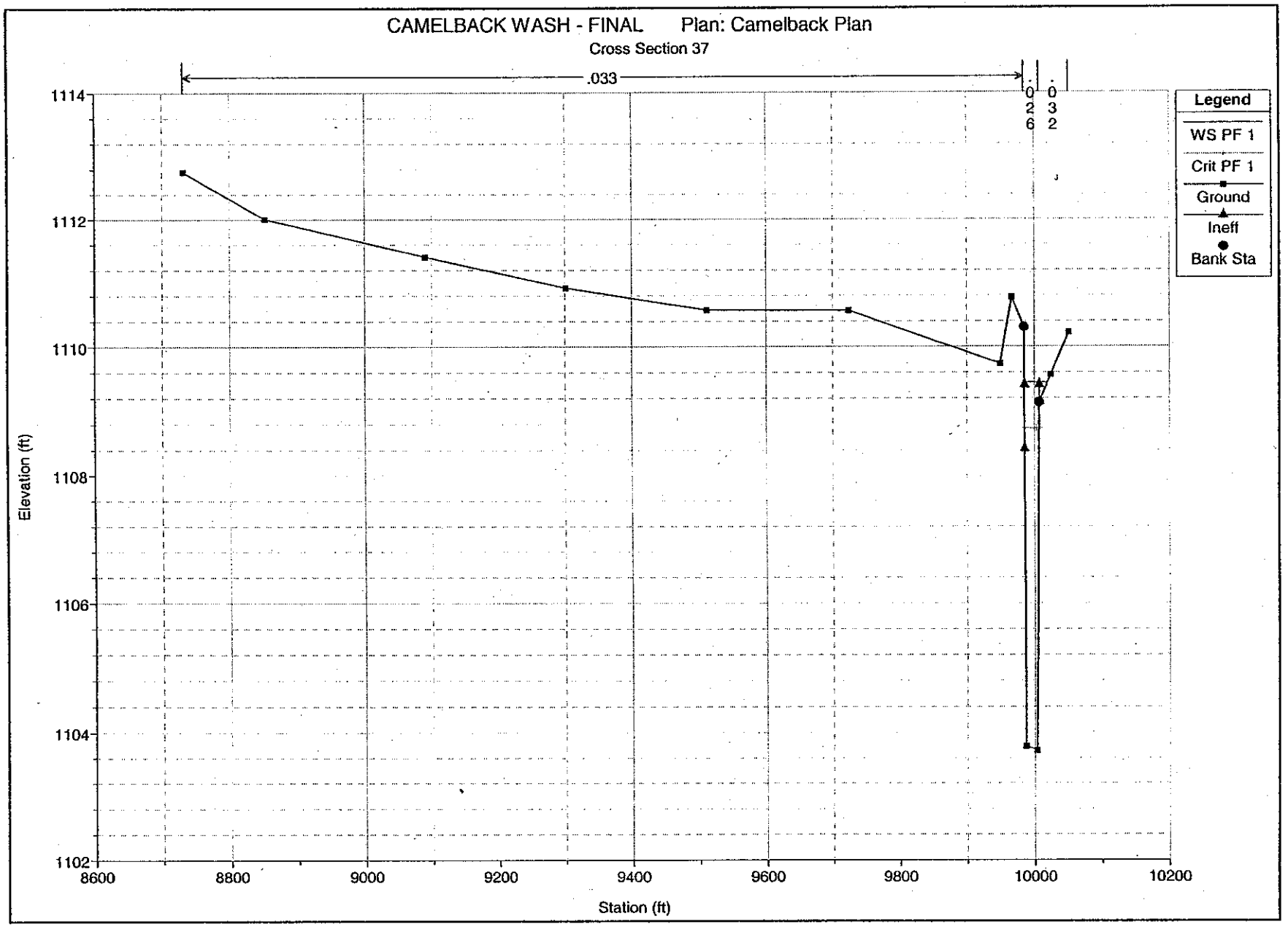

CAMELBACK WASH - FINAL Plan: Camelback Plan
Cross Section 42
.036
.078
.034
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
1122
1121
1120
1119
1118
1117
1116
1115
8800
9000
9200
9400
9600
9800
10000
10200
Station (ft)

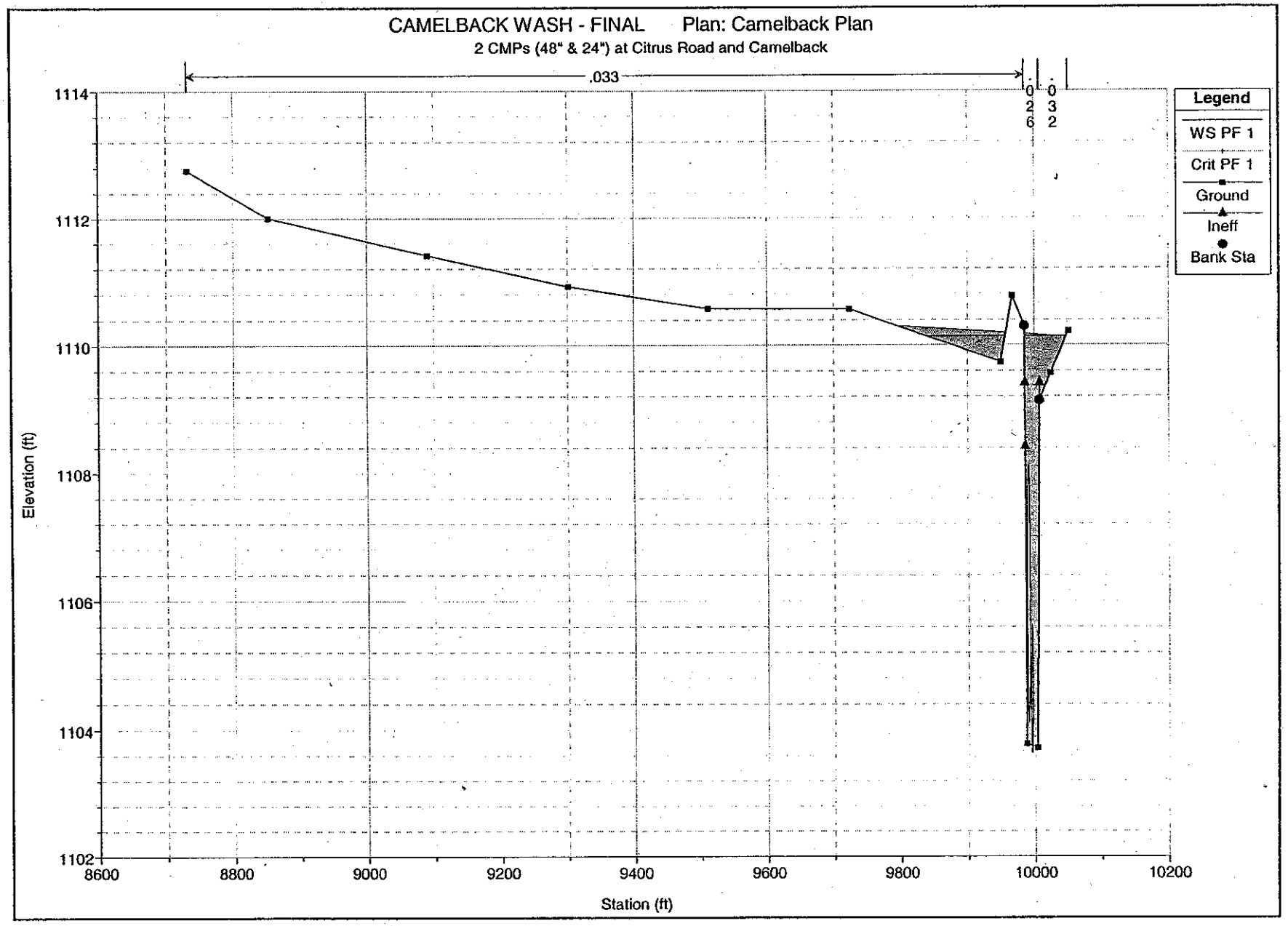

CAMELBACK WASH - FINAL Plan: Camelback Plan
Cross Section 41
.036
.078
.034
Legend
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
1120
1119
1118
1117
1116
1115
1114
1113
1112
8600
8800
9000
9200
9400
9600
9800
10000
10200
Station (ft)

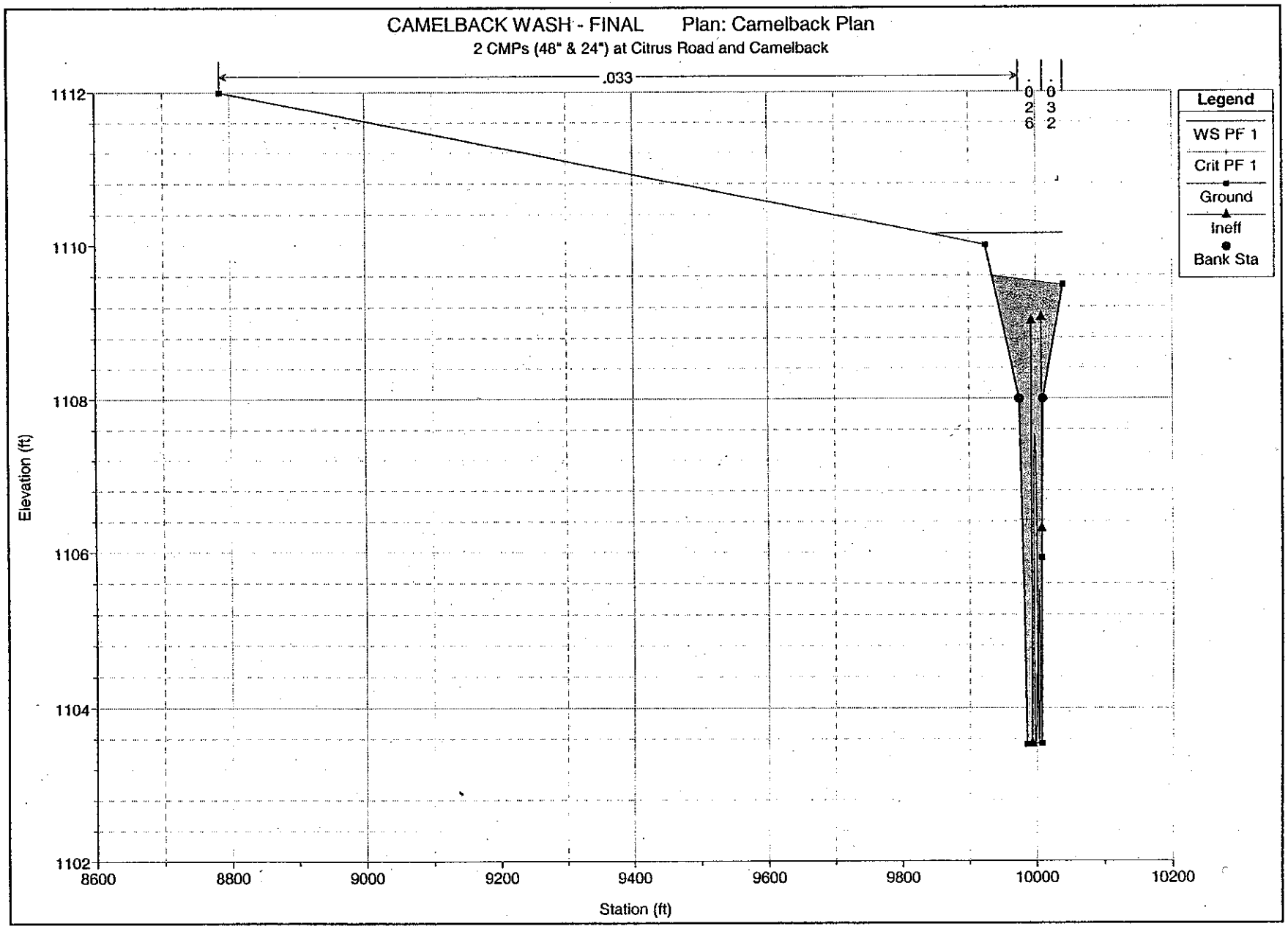

CAMELBACK WASH - FINAL Plan: Camelback Plan
Cross Section 40
.036
.078
.034
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
1120
1118
1116
1114
1112
1110
1108
8600
8800
9000
9200
9400
9600
9800
10000
10200
Station (ft)

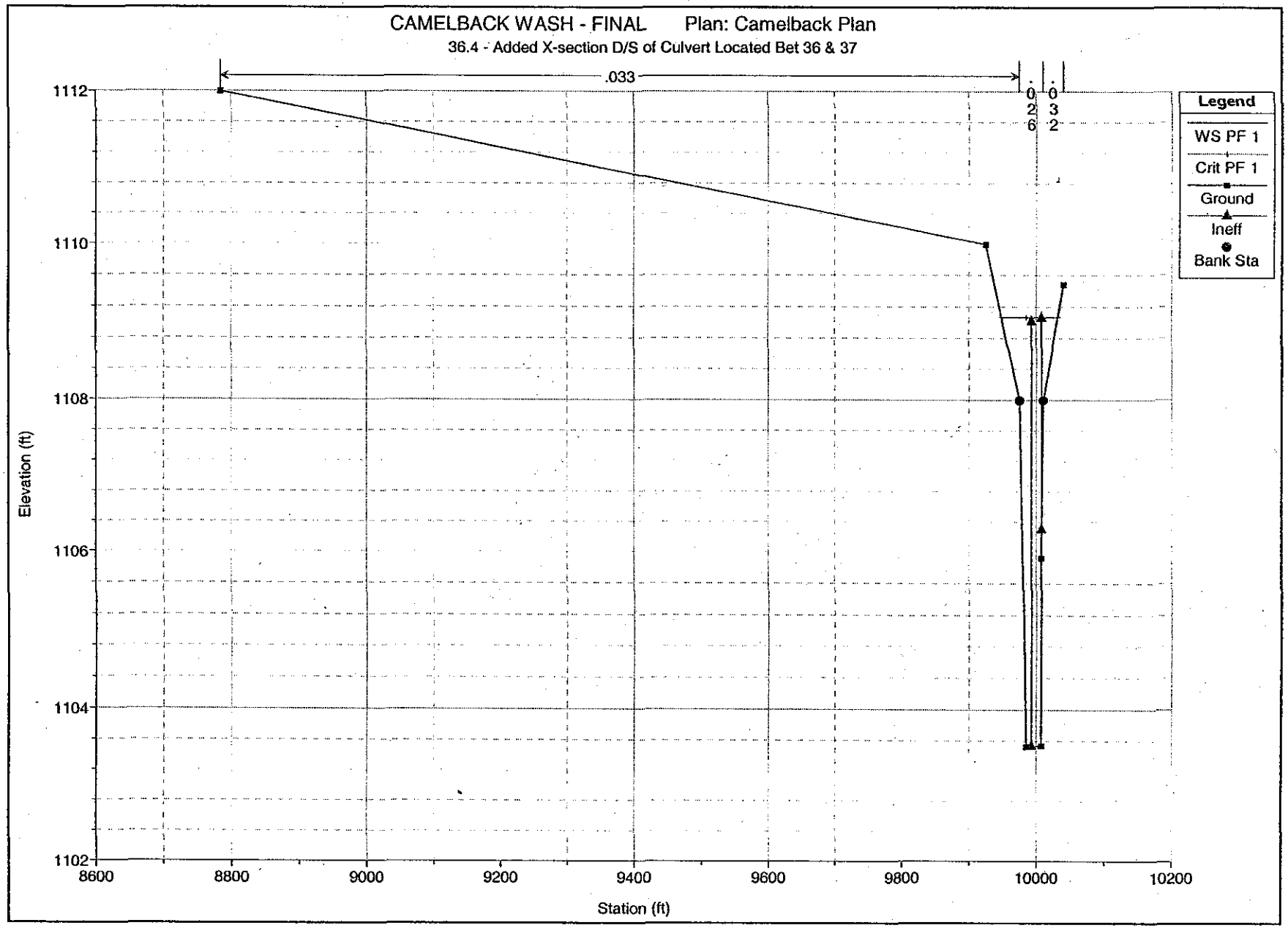

CAMELBACK WASH - FINAL Plan: Camelback Plan
Cross Section 39
.033
.078
.032
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
1120
1118
1116
1114
1112
1110
1108
8600
8800
9000
9200
9400
9600
9800
10000
10200
Station (ft)

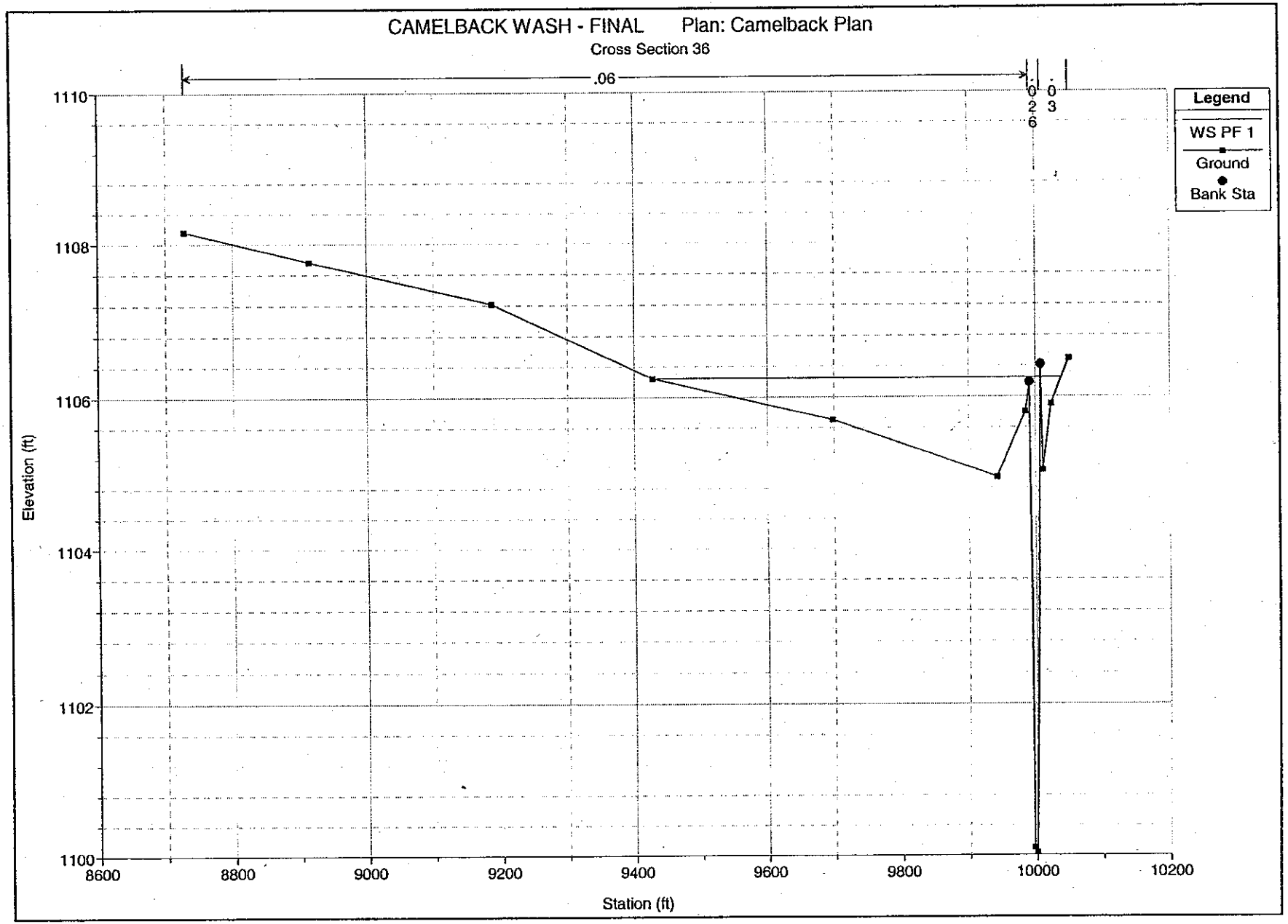

CAMELBACK WASH - FINAL Plan: Camelback Plan
Cross Section 38
.033
.026
.032
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
1116
1114
1112
1110
1108
1106
8600
8800
9000
9200
9400
9600
9800
10000
10200
Station (ft)

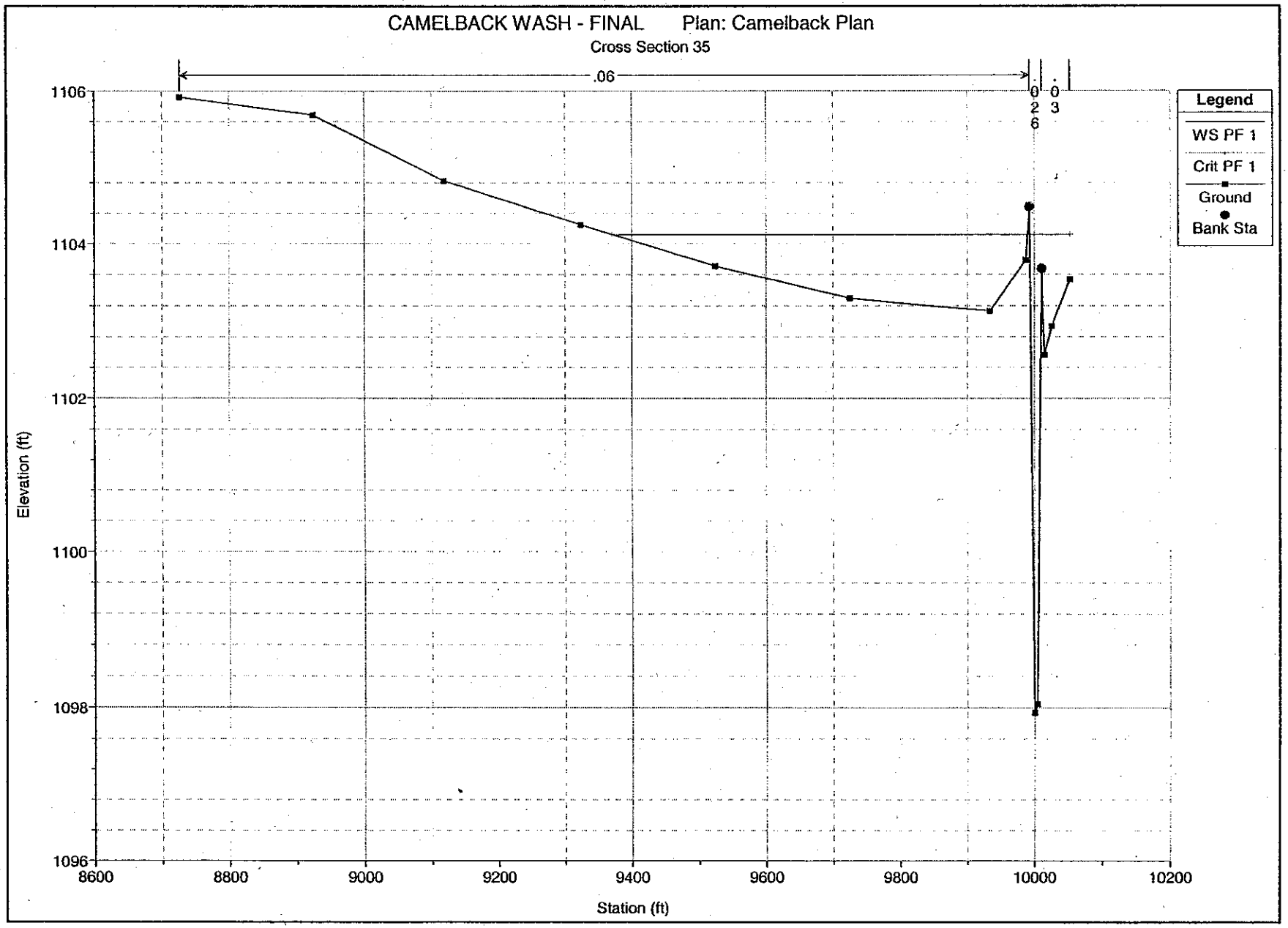

CAMELBACK WASH - FINAL Plan: Camelback Plan
Cross Section 37
.033
.026
.032
Legend
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
1114
1112
1110
1108
1106
1104
1102
8600
8800
9000
9200
9400
9600
9800
10000
10200
Station (ft)

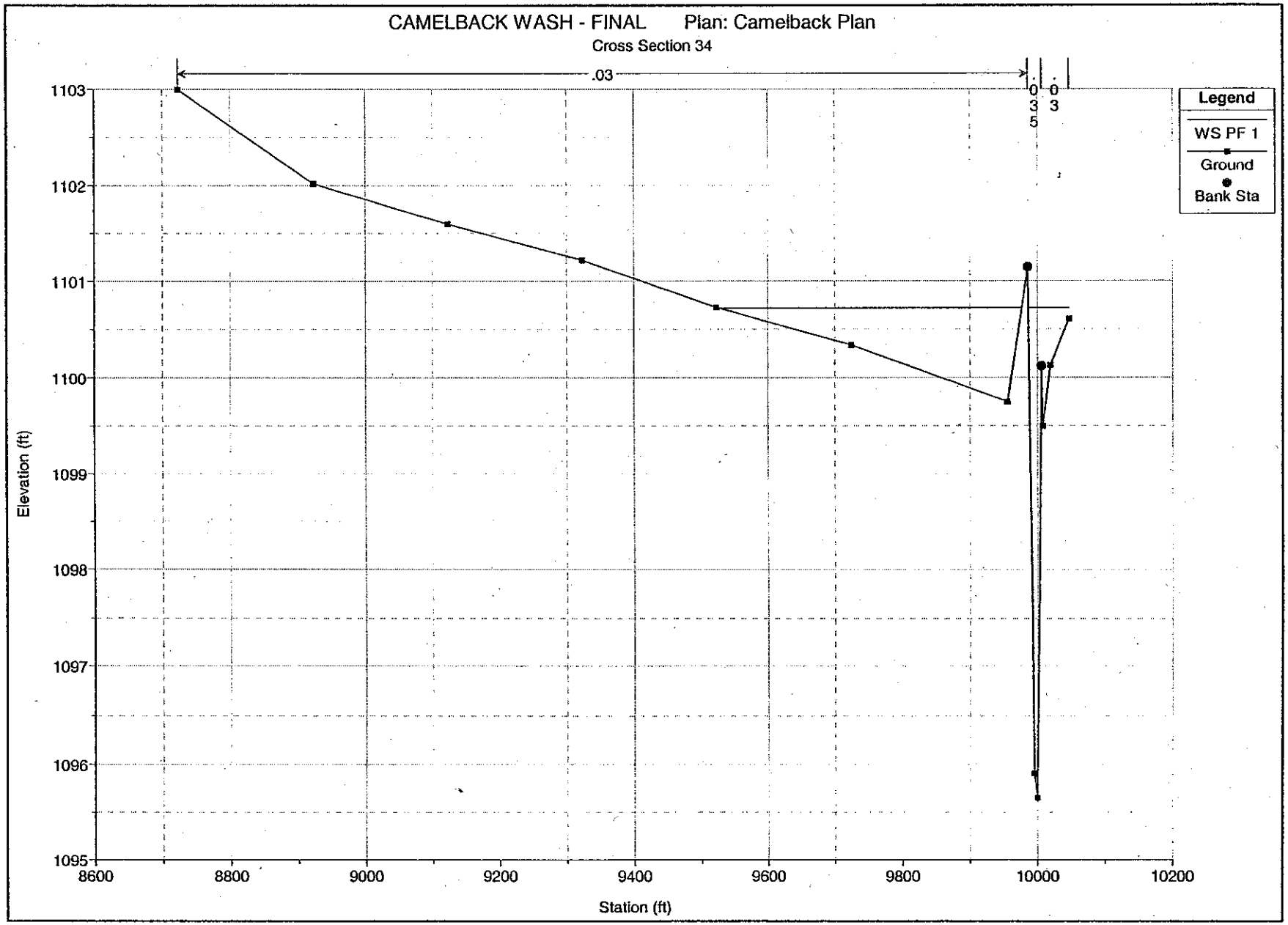

CAMELBACK WASH - FINAL Plan: Camelback Plan
2 CMPs (48" & 24") at Citrus Road and Camelback
.033
0.026
0.032
Legend
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
1114
1112
1110
1108
1106
1104
1102
8600
8800
9000
9200
9400
9600
9800
10000
10200
Station (ft)

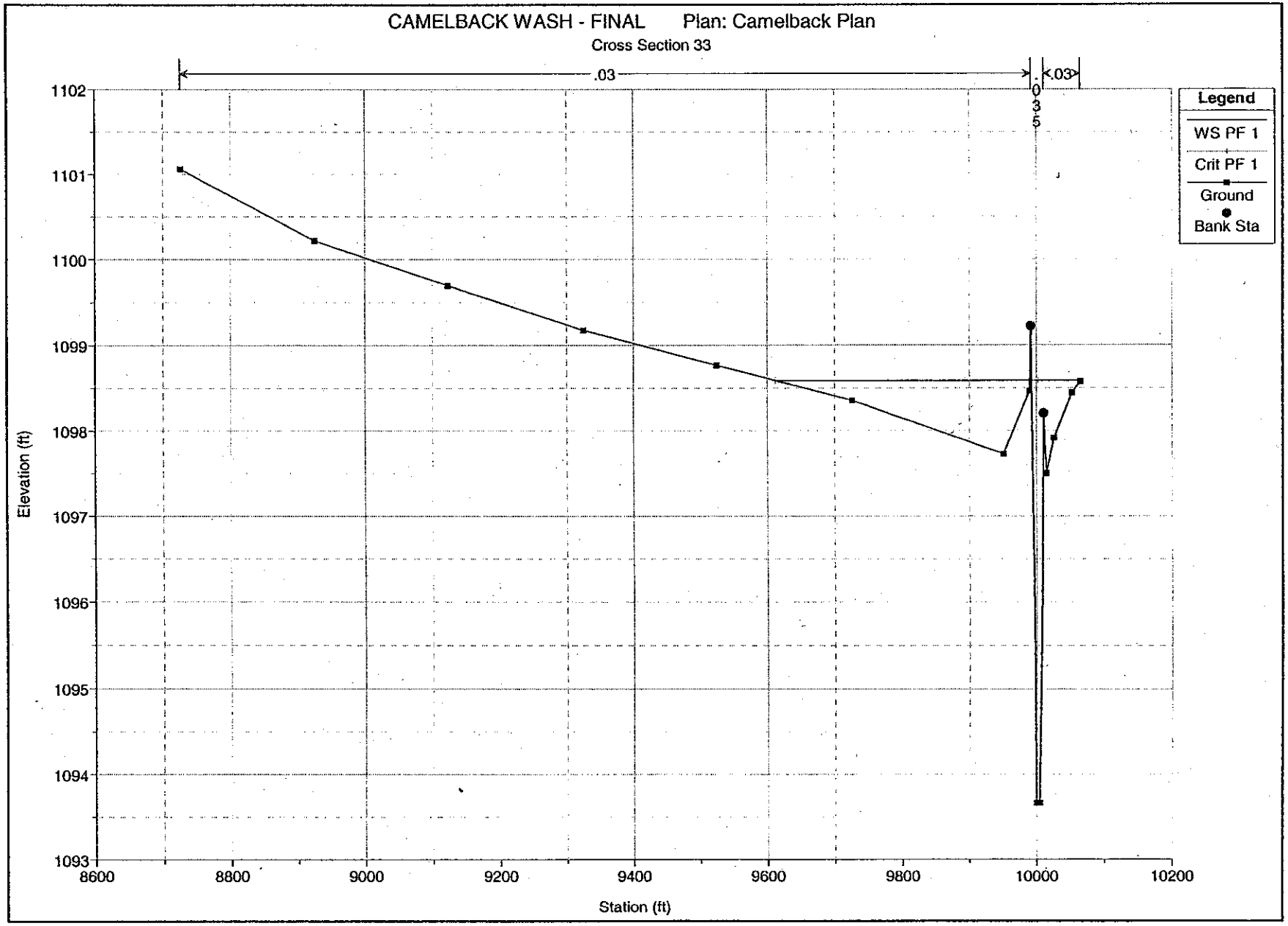

CAMELBACK WASH - FINAL
Plan: Camelback Plan
2 CMPs (48" & 24") at Citrus Road and Camelback
.033
.026
.032
Legend
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
1112
1110
1108
1106
1104
1102
8600
8800
9000
9200
9400
9600
9800
10000
10200
Station (ft)

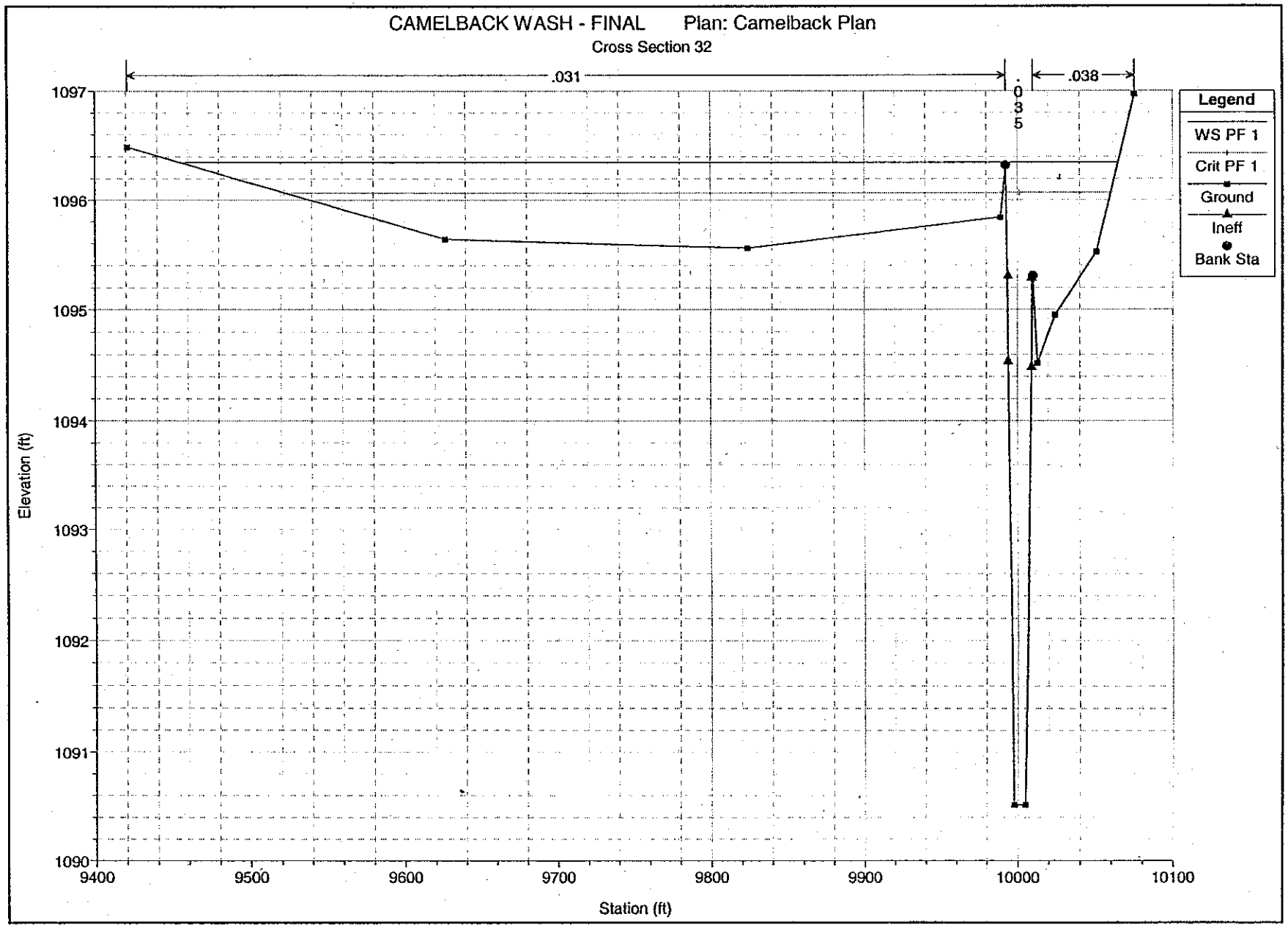

CAMELBACK WASH - FINAL Plan: Camelback Plan
36.4 - Added X-section D/S of Culvert Located Bet 36 & 37
.033
.026
.032
Legend
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
1112
1110
1108
1106
1104
1102
8600
8800
9000
9200
9400
9600
9800
10000
10200
Station (ft)

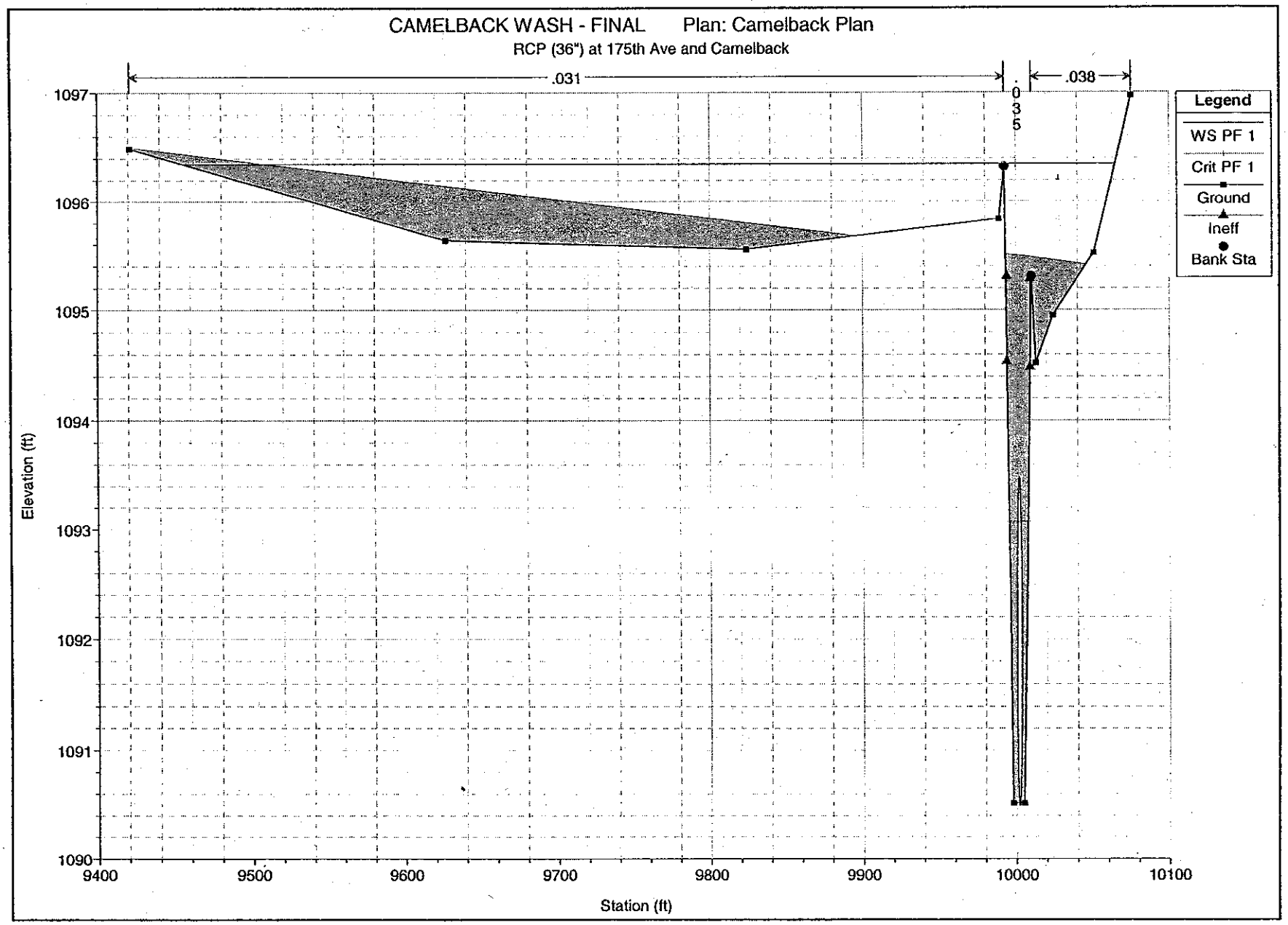

CAMELBACK WASH - FINAL Plan: Camelback Plan
Cross Section 36
.06
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
1110
1108
1106
1104
1102
1100
8600
8800
9000
9200
9400
9600
9800
10000
10200

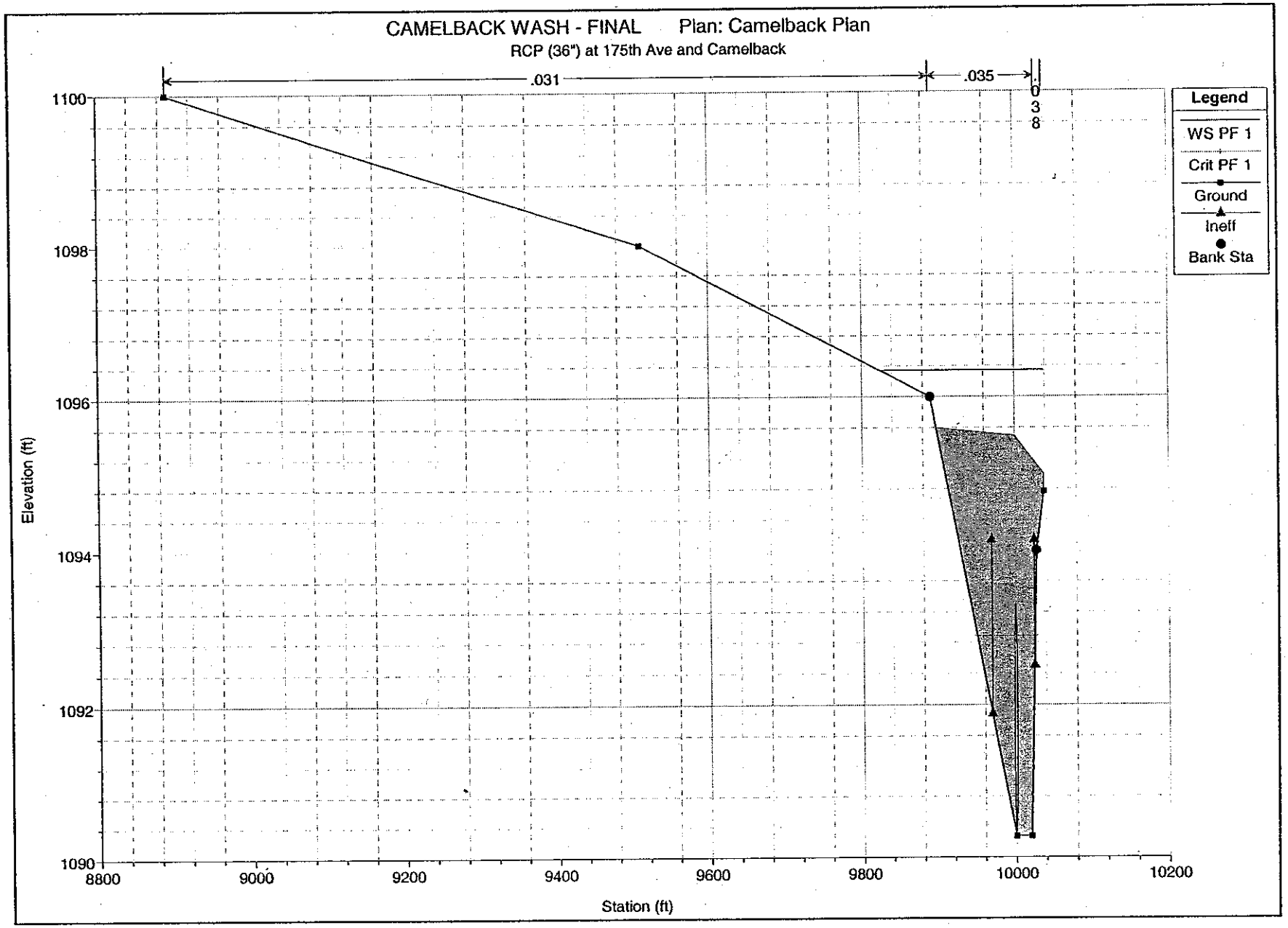

CAMELBACK WASH - FINAL Plan: Camelback Plan
Cross Section 35
.06
.026
.03
Legend
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
1106
1104
1102
1100
1098
1096
8600
8800
9000
9200
9400
9600
9800
10000
10200
Station (ft)

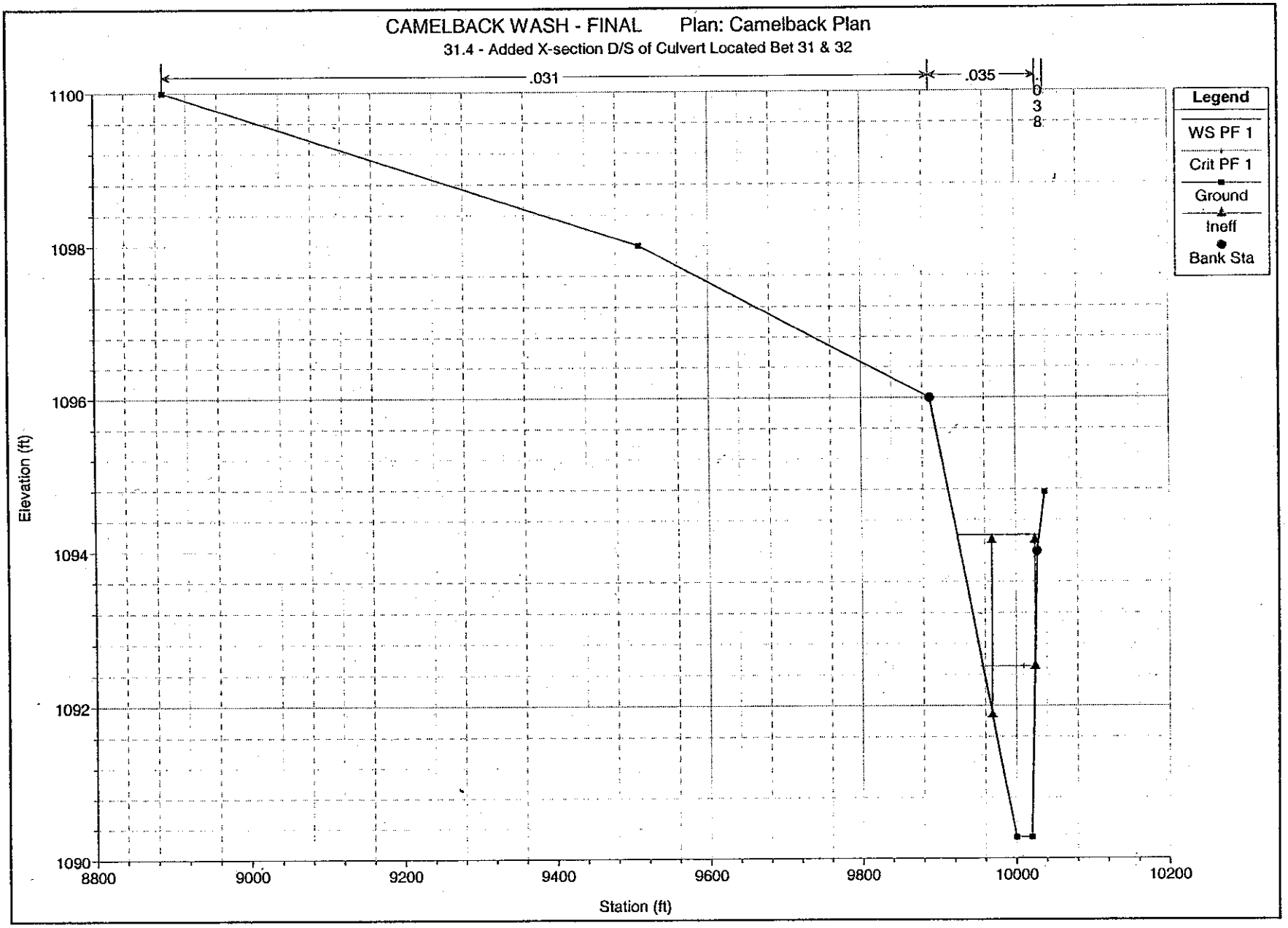

CAMELBACK WASH - FINAL Plan: Camelback Plan
Cross Section 34
.03
.035
.03
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
1103
1102
1101
1100
1099
1098
1097
1096
1095
8600
8800
9000
9200
9400
9600
9800
10000
10200
Station (ft)

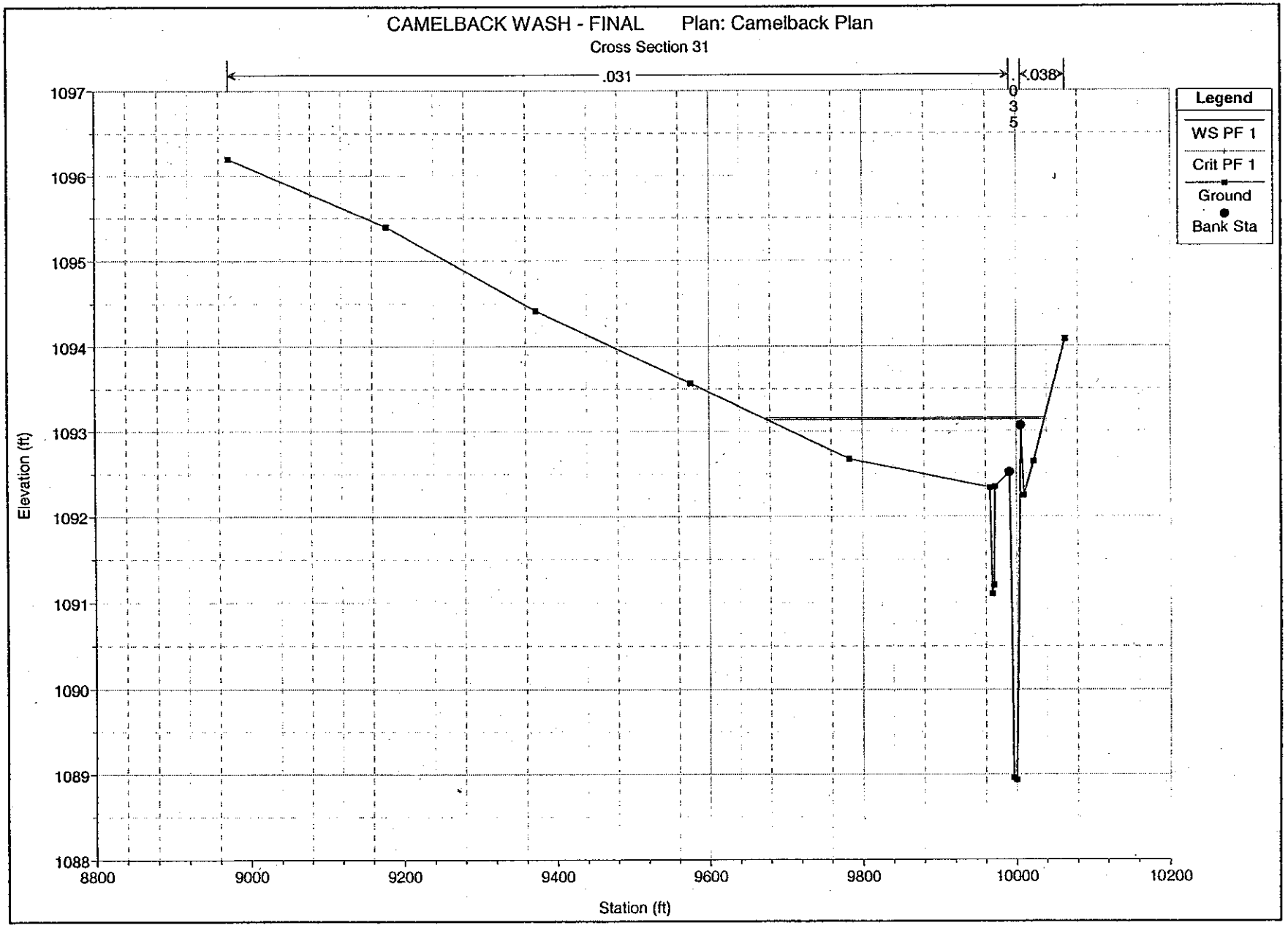

CAMELBACK WASH - FINAL Plan: Camelback Plan
Cross Section 33
.03
.03
Legend
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
1102
1101
1100
1099
1098
1097
1096
1095
1094
1093
8600
8800
9000
9200
9400
9600
9800
10000
10200
Station (ft)

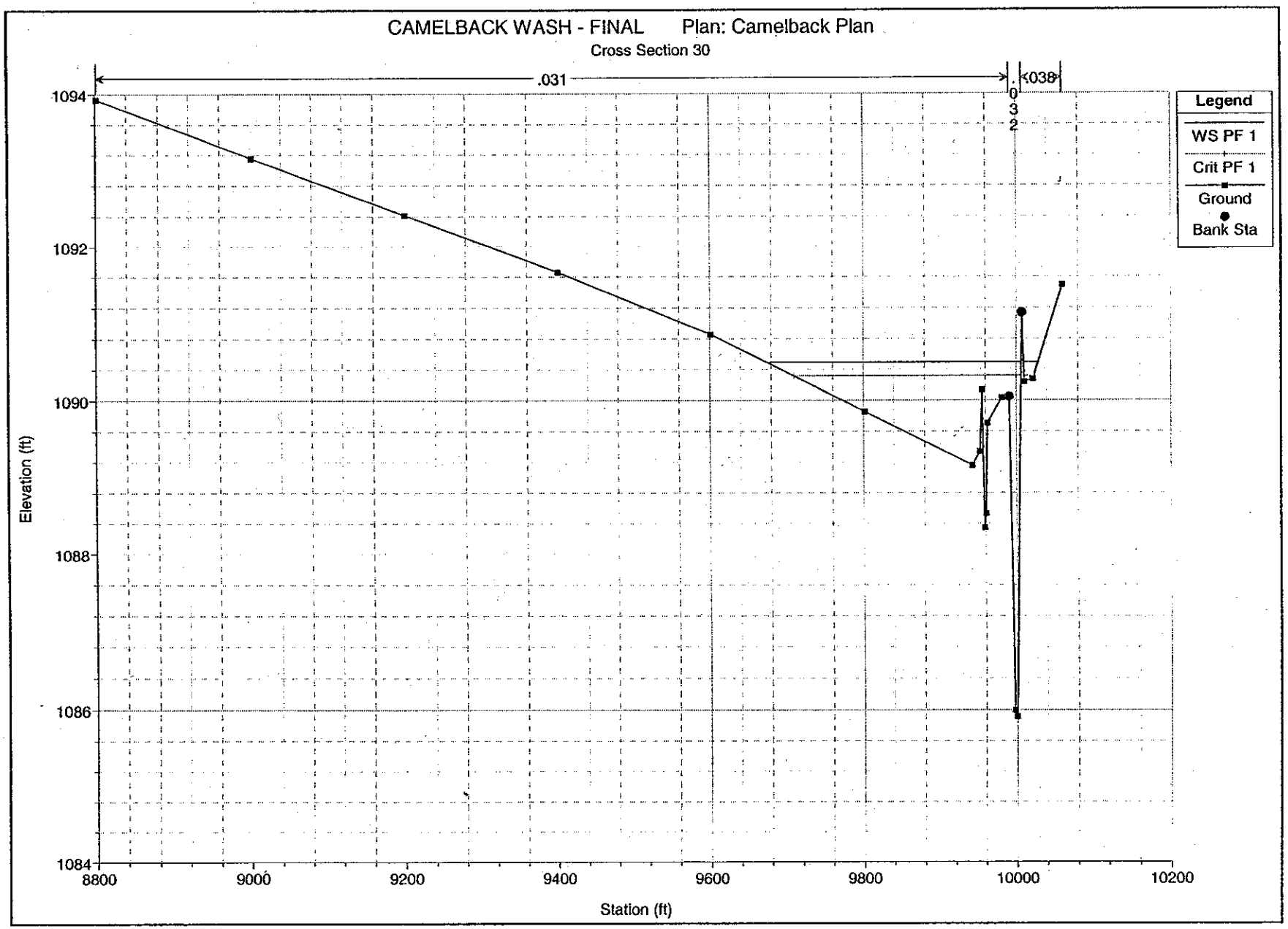

CAMELBACK WASH - FINAL Plan: Camelback Plan
Cross Section 32
.031
.035
.038
Legend
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
1097
1096
1095
1094
1093
1092
1091
1090
9400
9500
9600
9700
9800
9900
10000
10100
Station (ft)

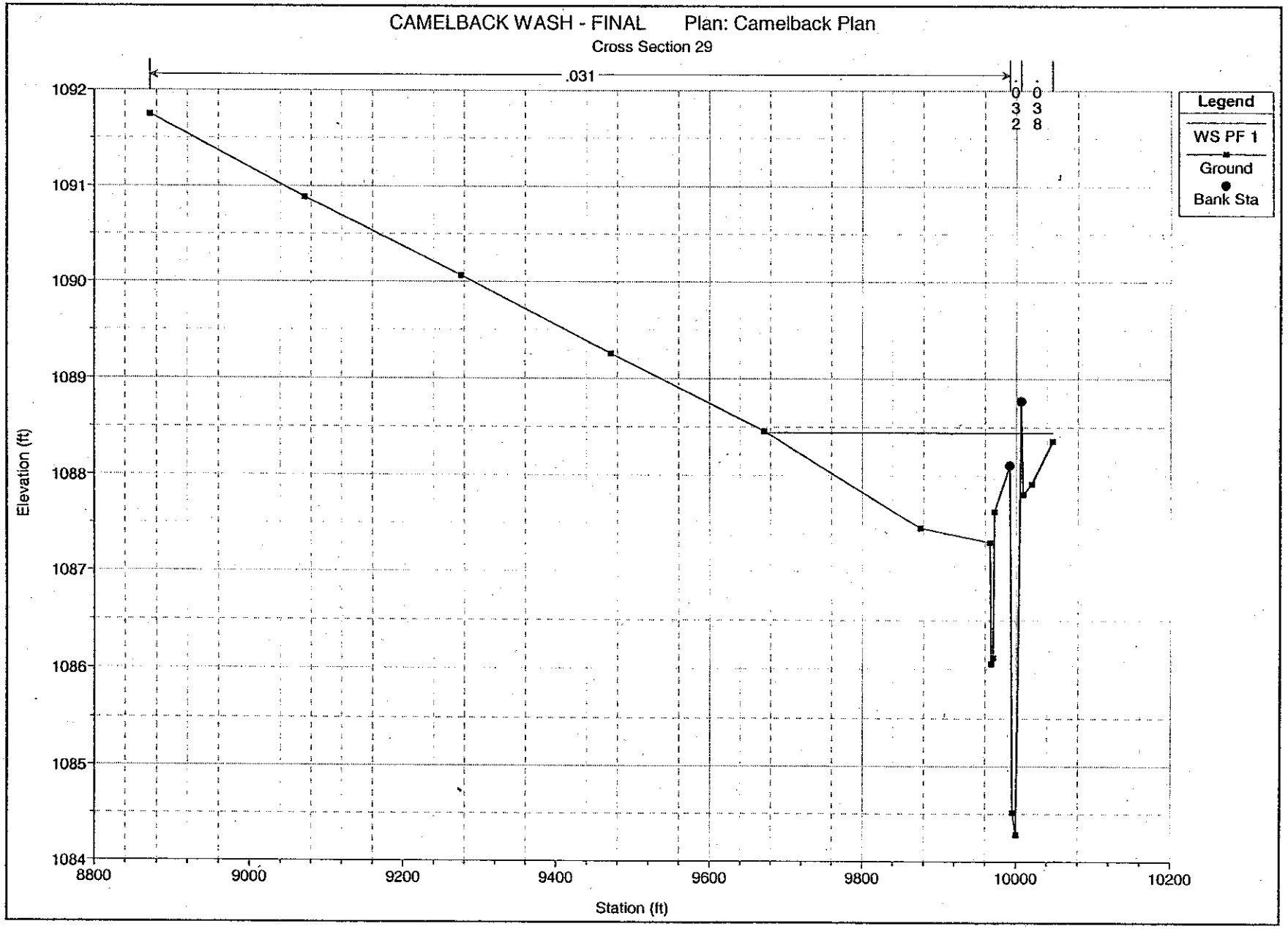

CAMELBACK WASH - FINAL Plan: Camelback Plan
RCP (36") at 175th Ave and Camelback
.031
.035
.038
Legend
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
1097
1096
1095
1094
1093
1092
1091
1090
9400
9500
9600
9700
9800
9900
10000
10100
Station (ft)

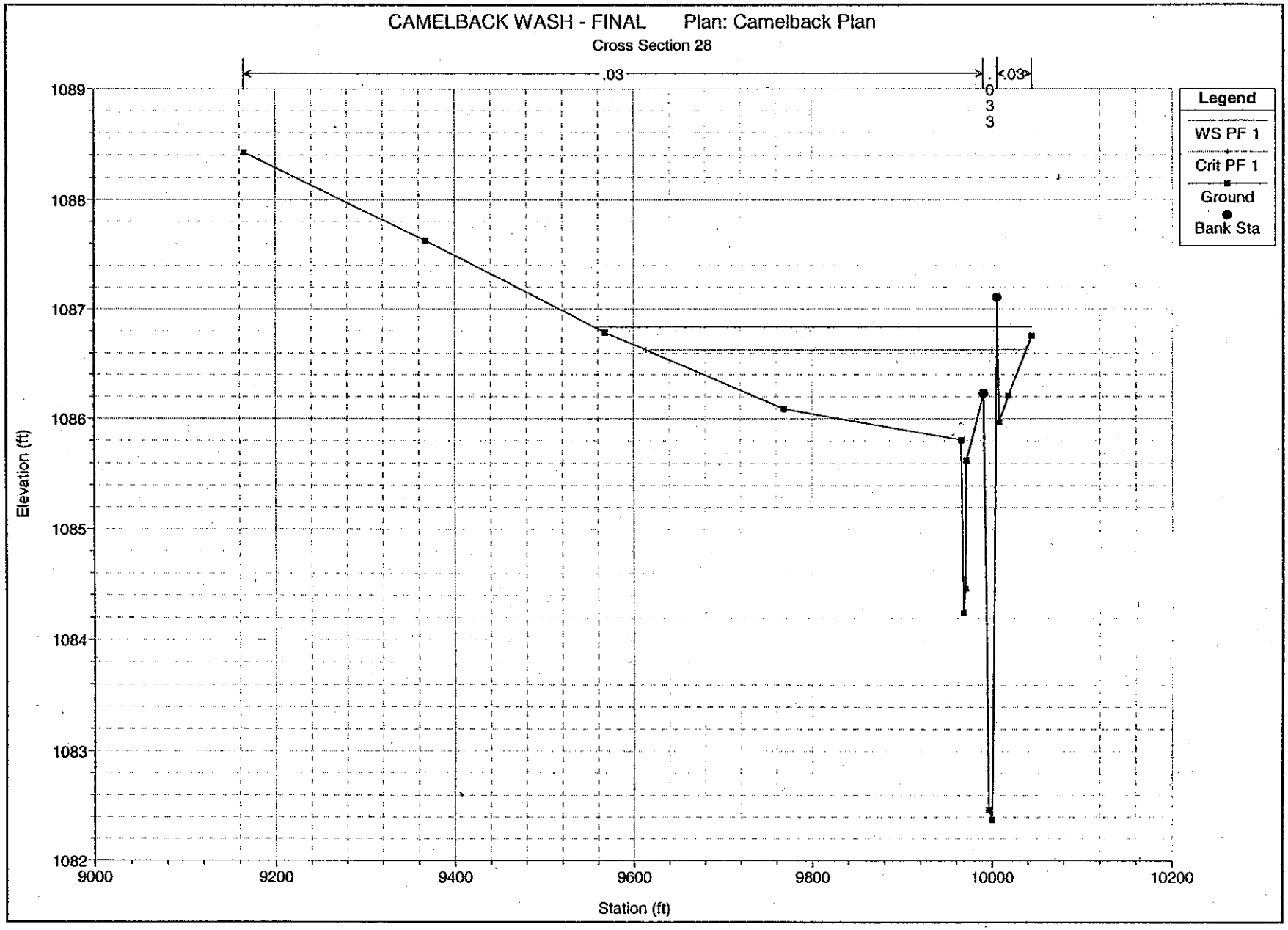

CAMELBACK WASH - FINAL Plan: Camelback Plan
RCP (36") at 175th Ave and Camelback
.031
.035
0
3
8
Legend
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
1100
1098
1096
1094
1092
1090
8800
9000
9200
9400
9600
9800
10000
10200
Station (ft)

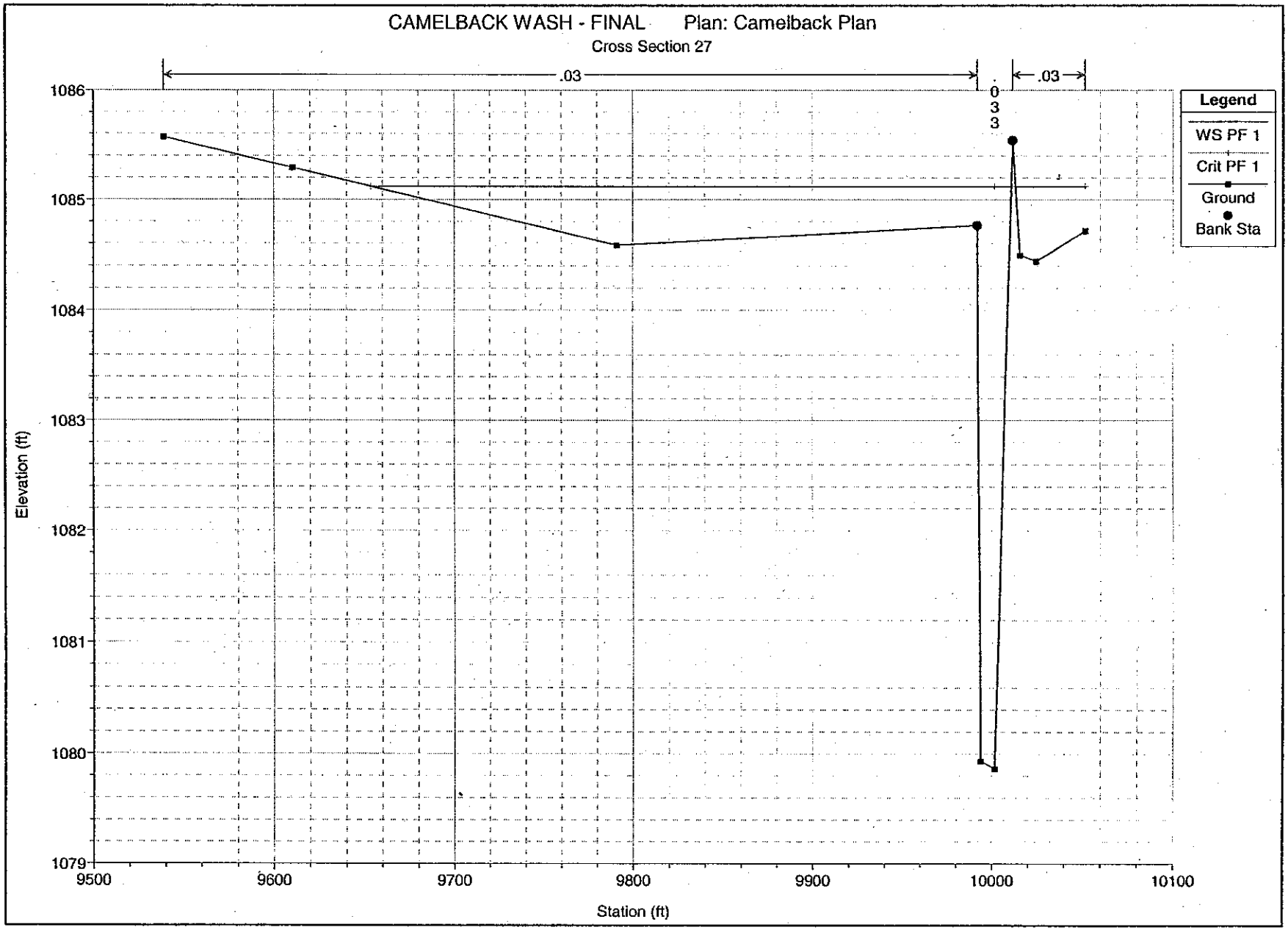

CAMELBACK WASH - FINAL Plan: Camelback Plan
31.4 - Added X-section D/S of Culvert Located Bet 31 & 32
.031
.035
0
3
8
Legend
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
1100
1098
1096
1094
1092
1090
8800
9000
9200
9400
9600
9800
10000
10200
Station (ft)

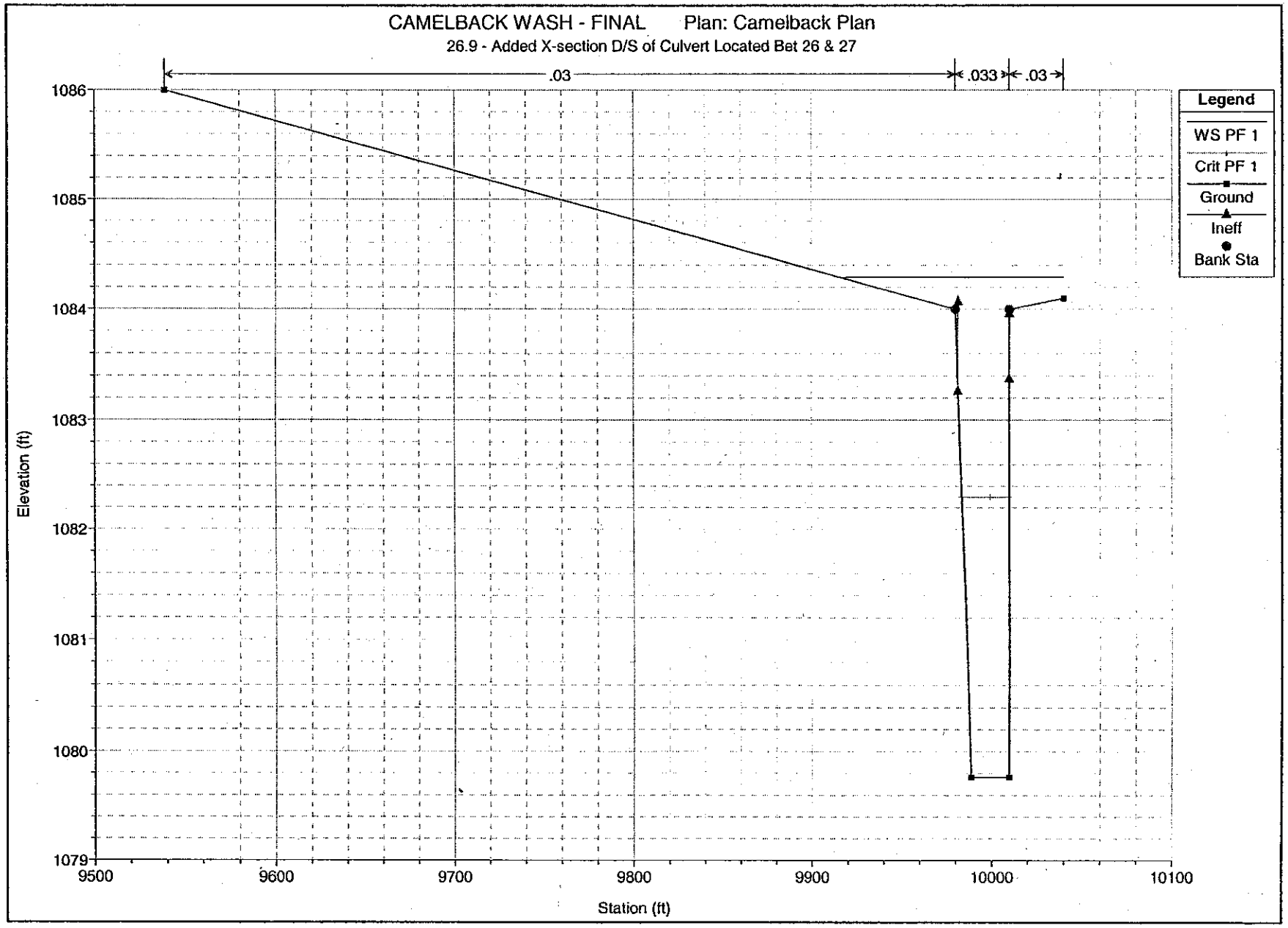

CAMELBACK WASH - FINAL Plan: Camelback Plan
Cross Section 31
.031
.038
0
3
5
Legend
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
1097
1096
1095
1094
1093
1092
1091
1090
1089
1088
8800
9000
9200
9400
9600
9800
10000
10200
Station (ft)

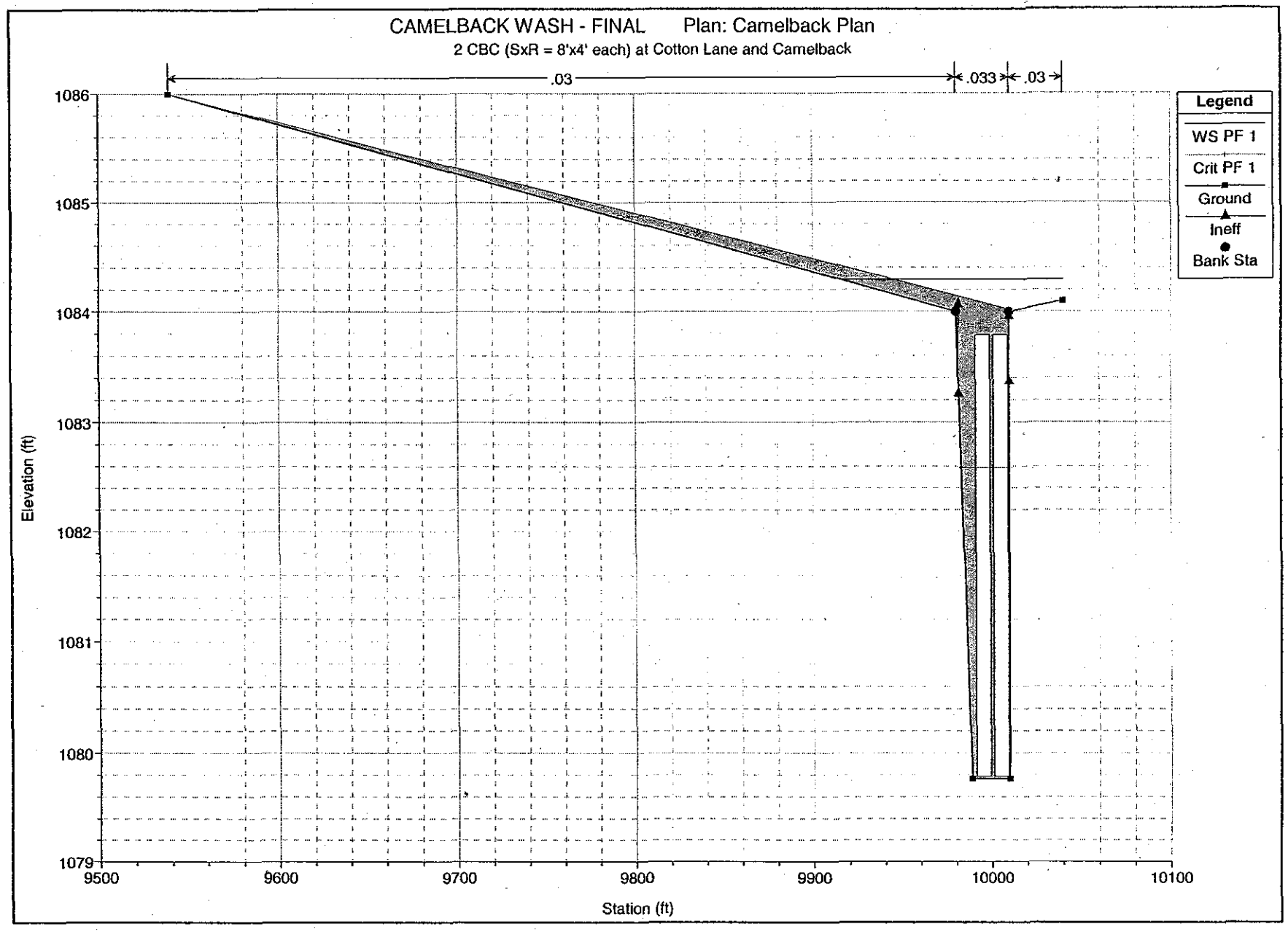

CAMELBACK WASH - FINAL Plan: Camelback Plan
Cross Section 30
.031
.038
.032
Legend
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
1094
1092
1090
1088
1086
1084
8800
9000
9200
9400
9600
9800
10000
10200
Station (ft)

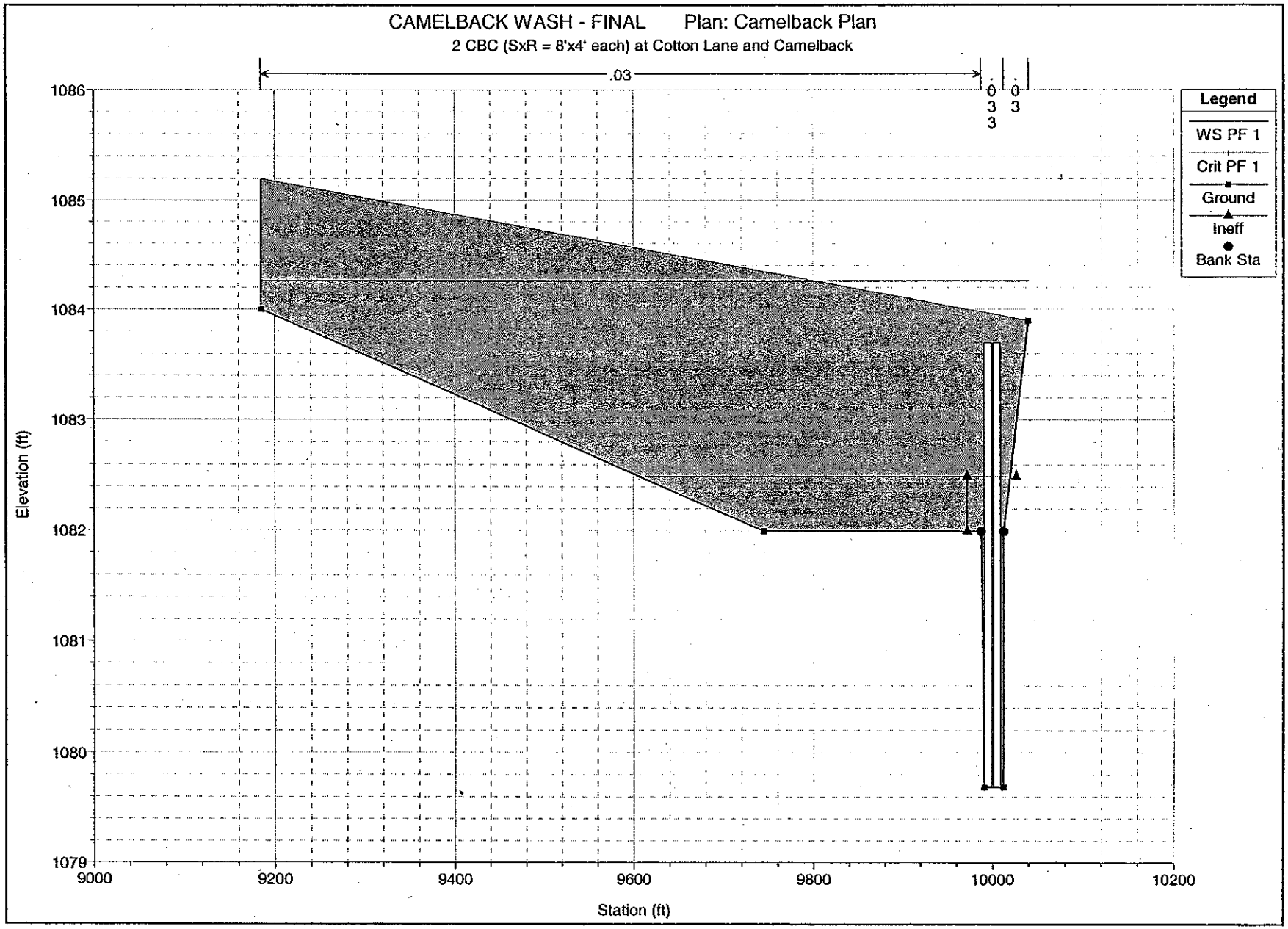

CAMELBACK WASH - FINAL Plan: Camelback Plan
Cross Section 29
.031
0 0
3 3
2 8
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
1092
1091
1090
1089
1088
1087
1086
1085
1084
8800
9000
9200
9400
9600
9800
10000
10200
Station (ft)

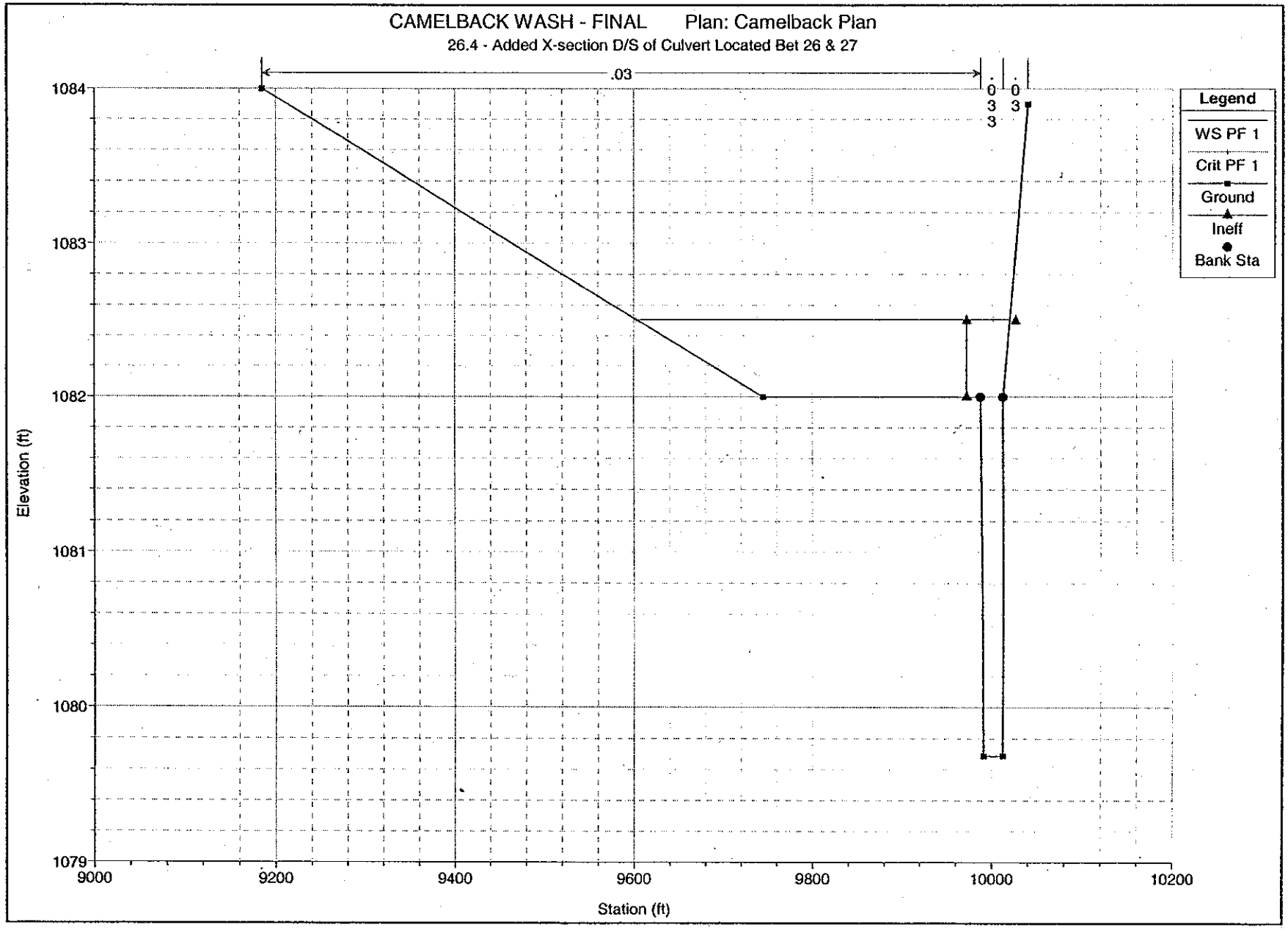

CAMELBACK WASH - FINAL Plan: Camelback Plan
Cross Section 28
.03
.03
.033
Legend
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
1089
1088
1087
1086
1085
1084
1083
1082
9000
9200
9400
9600
9800
10000
10200
Station (ft)

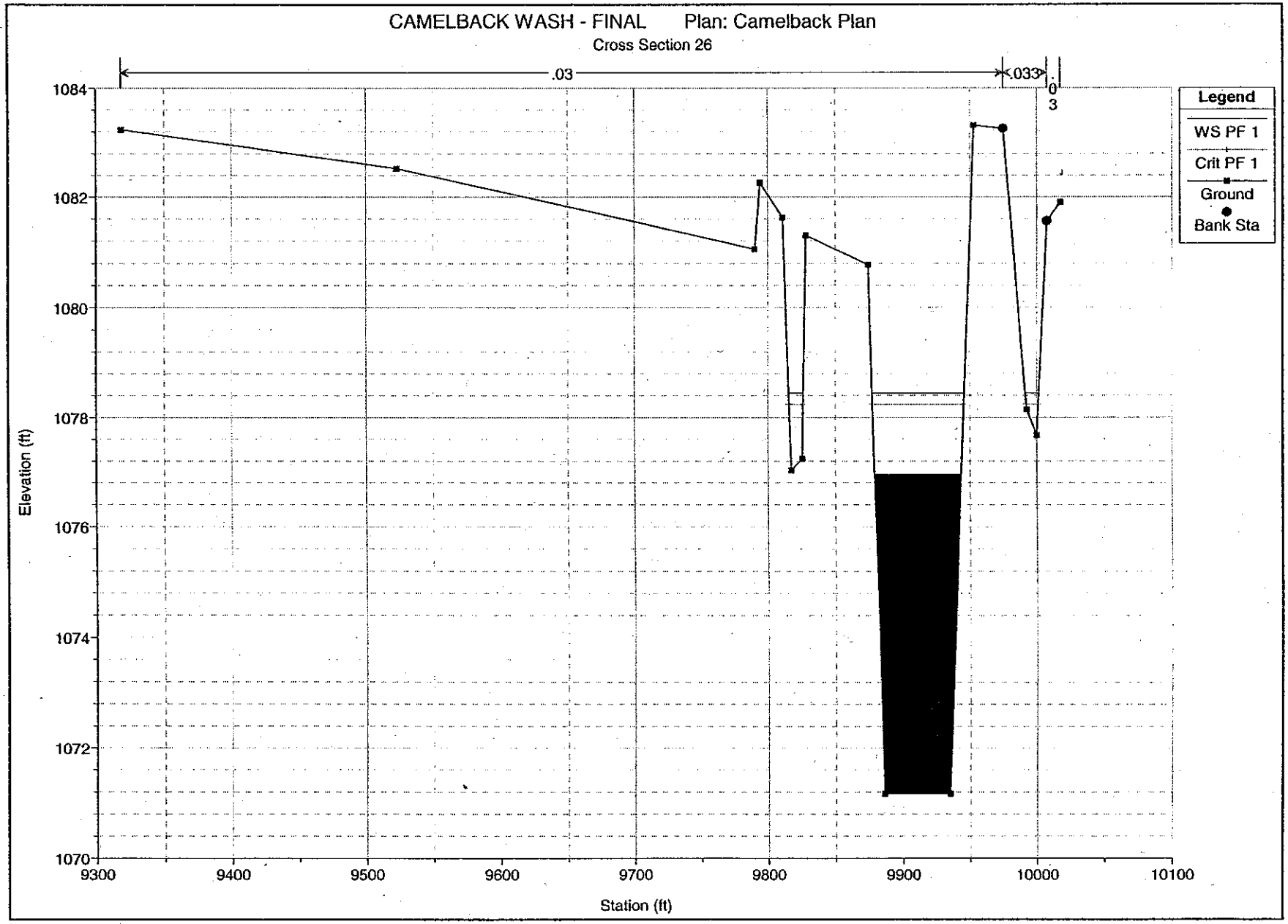

CAMELBACK WASH - FINAL Plan: Camelback Plan
Cross Section 27
.03
.03
.033
Legend
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
1086
1085
1084
1083
1082
1081
1080
1079
9500
9600
9700
9800
9900
10000
10100
Station (ft)

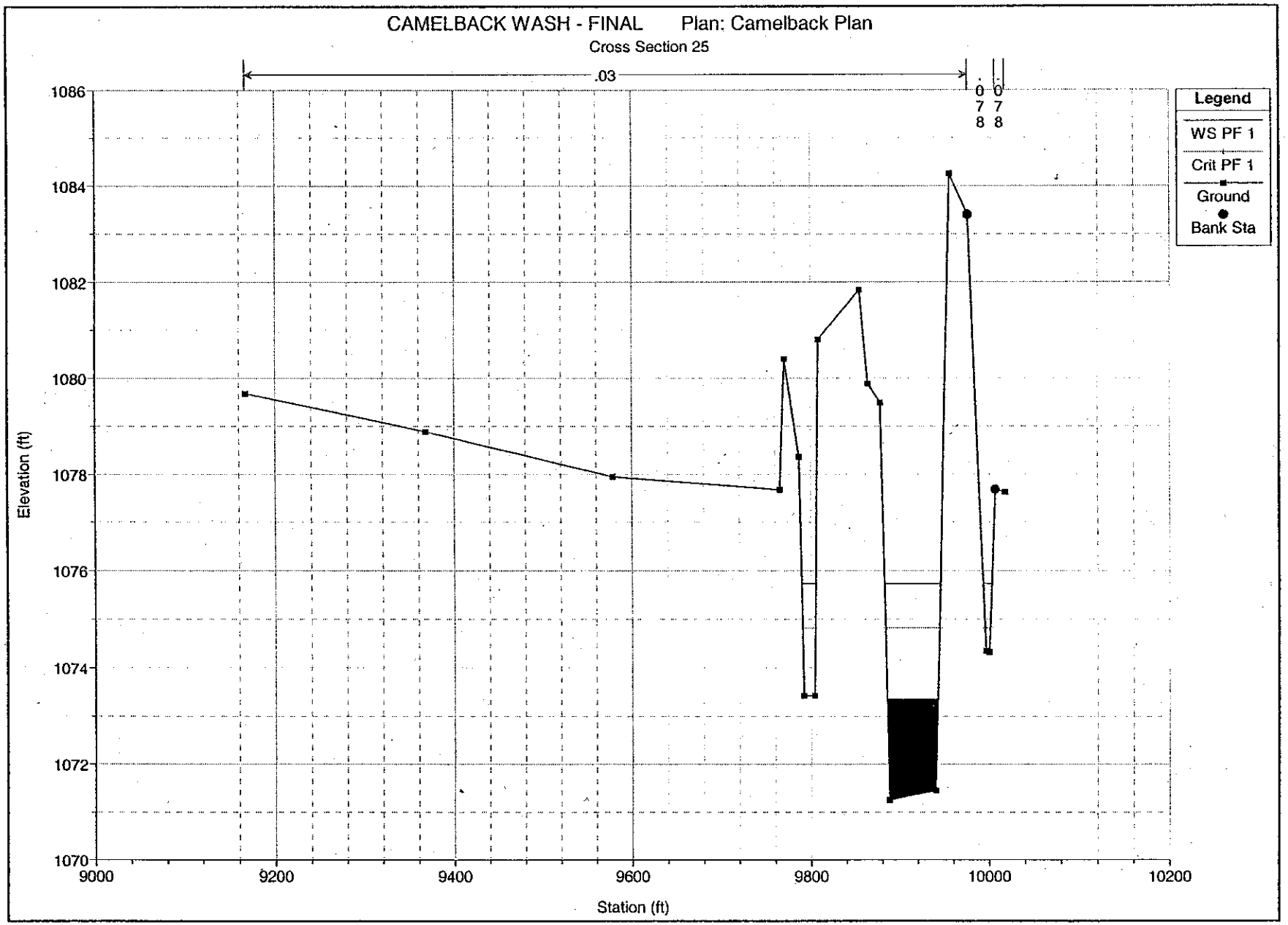

CAMELBACK WASH - FINAL Plan: Camelback Plan
26.9 - Added X-section D/S of Culvert Located Bet 26 & 27
.03
.033
.03
Legend
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
1086
1085
1084
1083
1082
1081
1080
1079
9500
9600
9700
9800
9900
10000
10100
Station (ft)

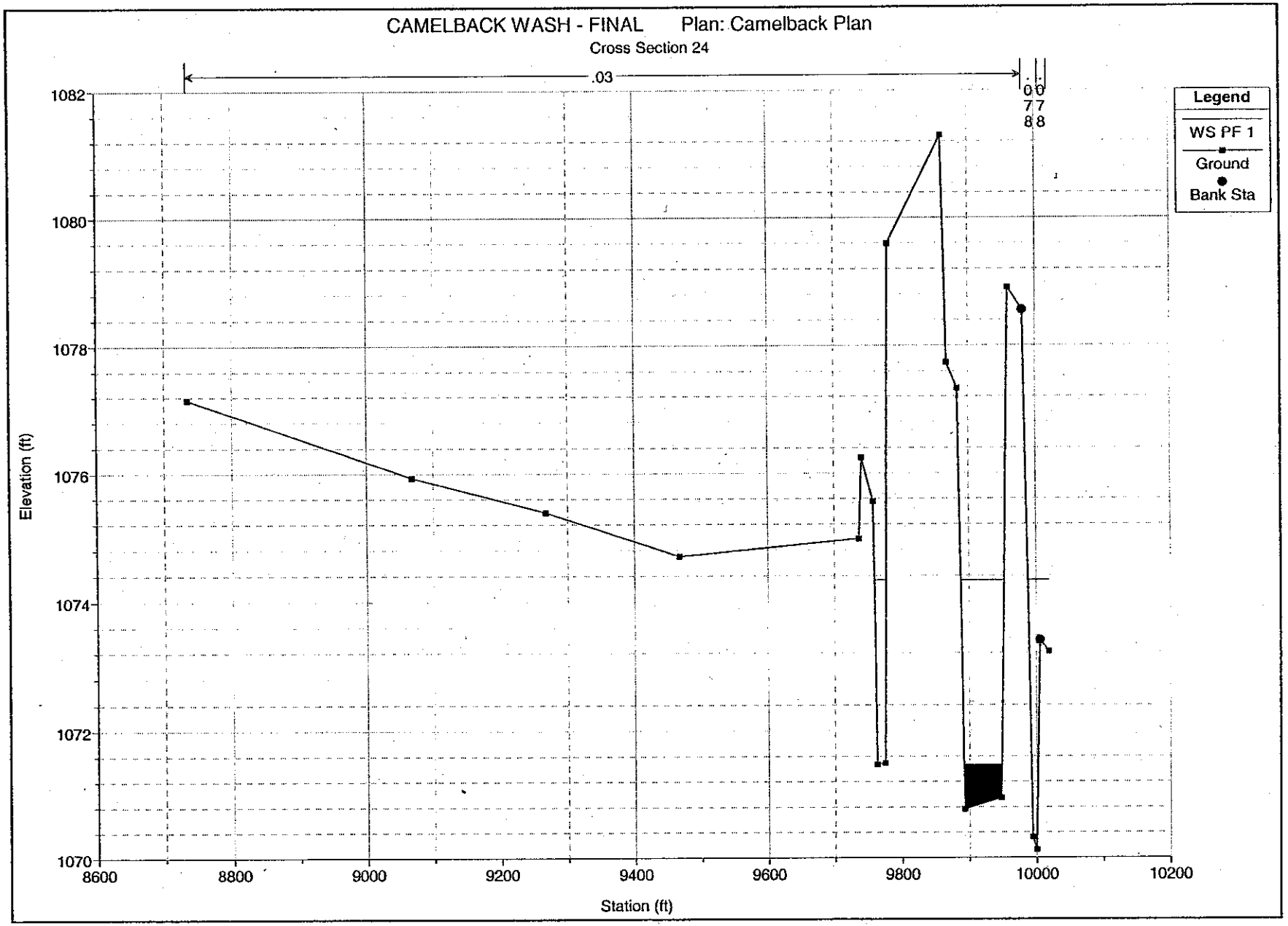

CAMELBACK WASH - FINAL Plan: Camelback Plan
2 CBC (SxR = 8'x4' each) at Cotton Lane and Camelback
.03
.033
.03
Legend
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
1086
1085
1084
1083
1082
1081
1080
1079
9500
9600
9700
9800
9900
10000
10100
Station (ft)

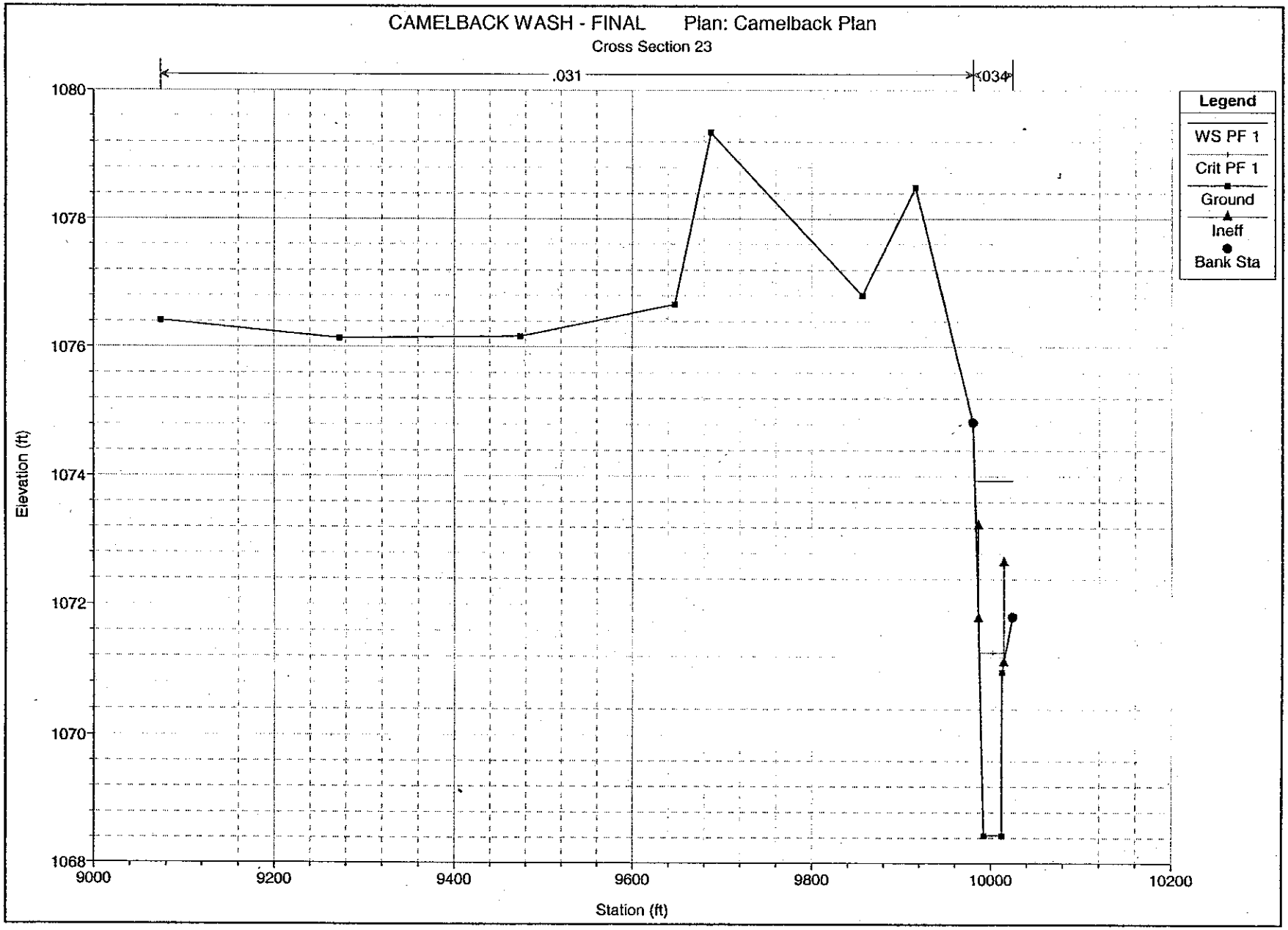

CAMELBACK WASH - FINAL Plan: Camelback Plan
2 CBC (SxR = 8'x4' each) at Cotton Lane and Camelback
.03
.033
.03
Legend
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
1086
1085
1084
1083
1082
1081
1080
1079
9000
9200
9400
9600
9800
10000
10200
Station (ft)

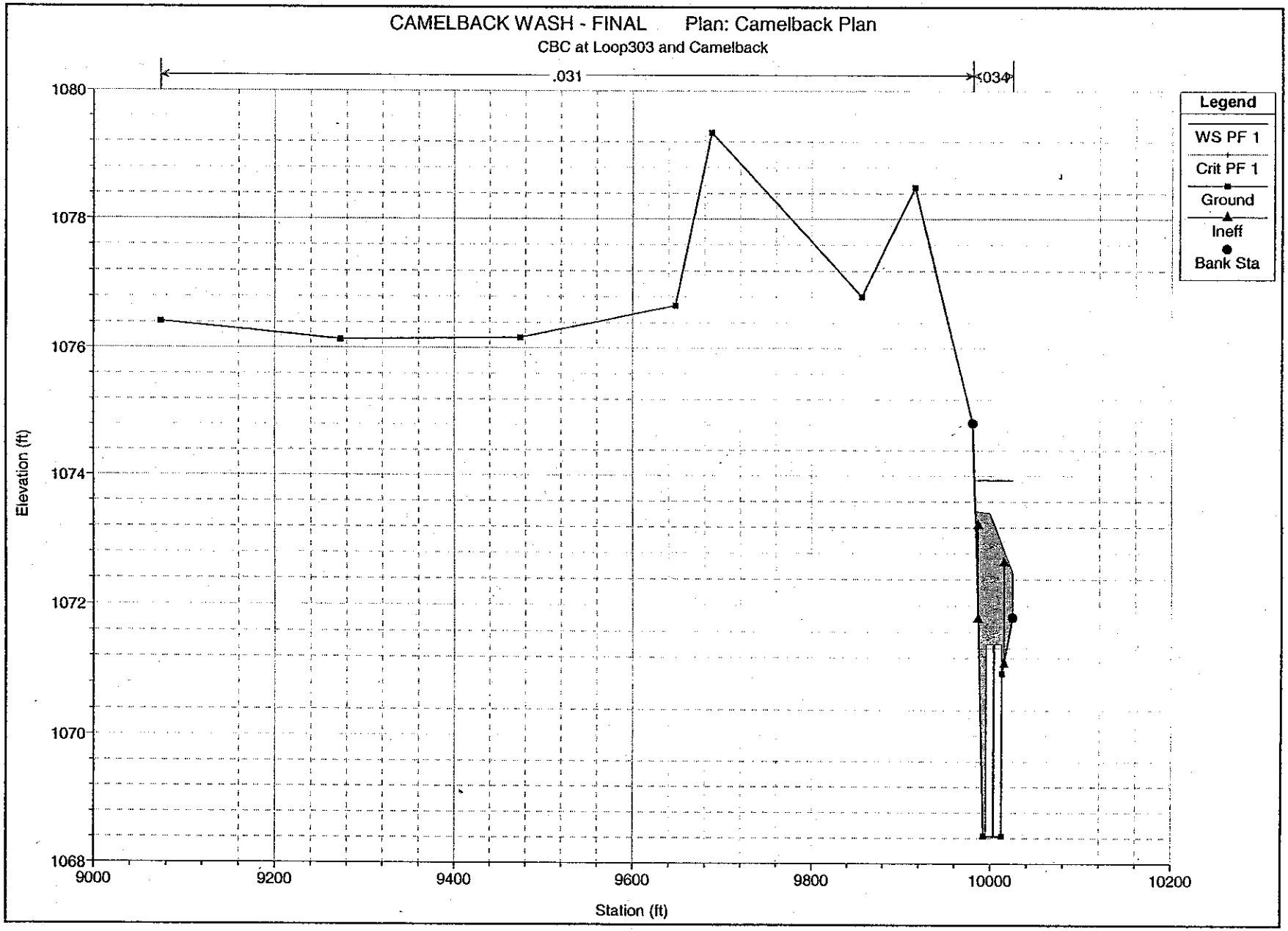

CAMELBACK WASH - FINAL Plan: Camelback Plan
26.4 - Added X-section D/S of Culvert Located Bet 26 & 27
.03
.033
.033
Legend
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
1084
1083
1082
1081
1080
1079
9000
9200
9400
9600
9800
10000
10200
Station (ft)

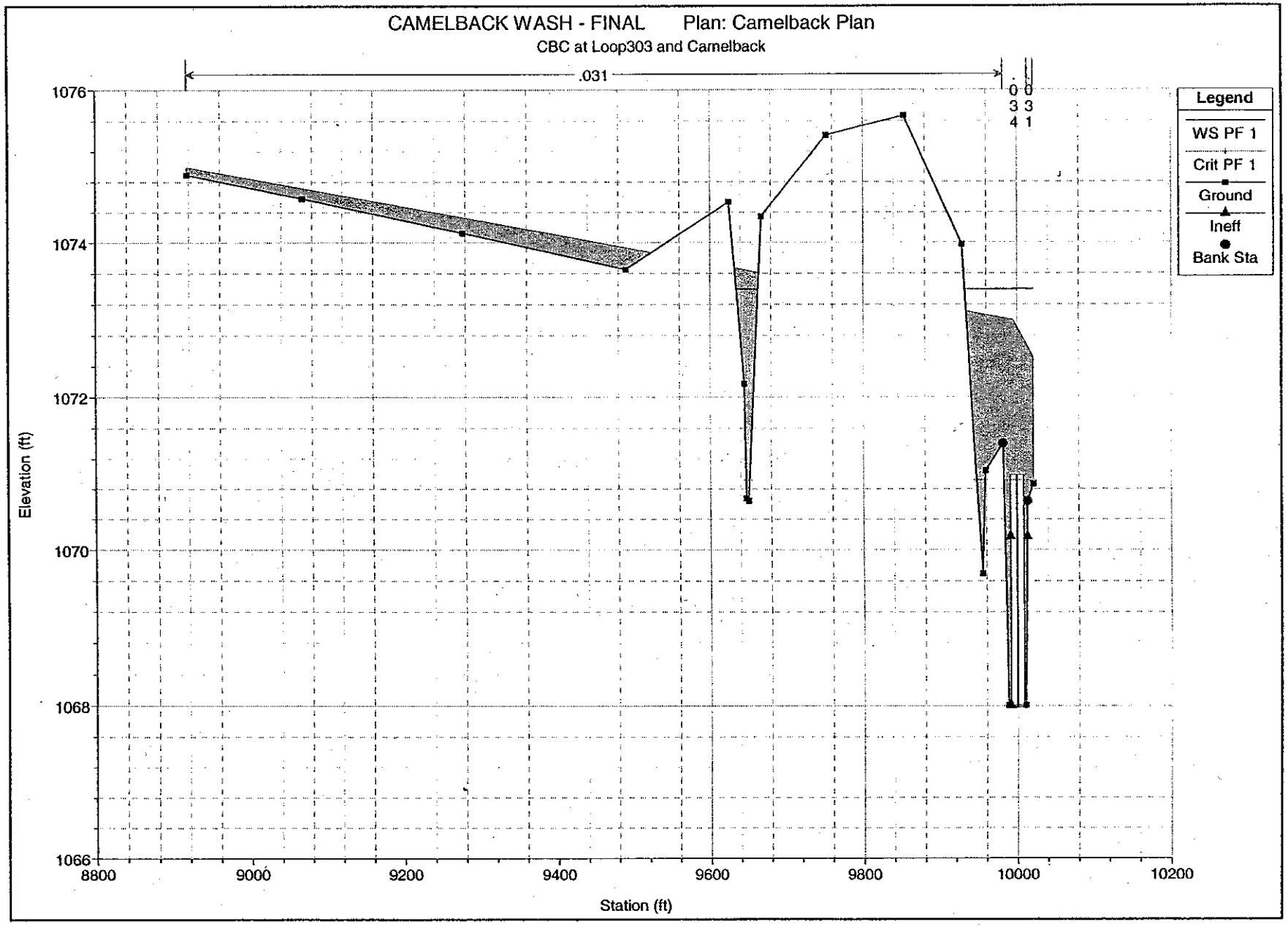

CAMELBACK WASH - FINAL Plan: Camelback Plan
Cross Section 26
.03
.033
.03
Legend
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
1084
1082
1080
1078
1076
1074
1072
1070
9300
9400
9500
9600
9700
9800
9900
10000
10100
Station (ft)

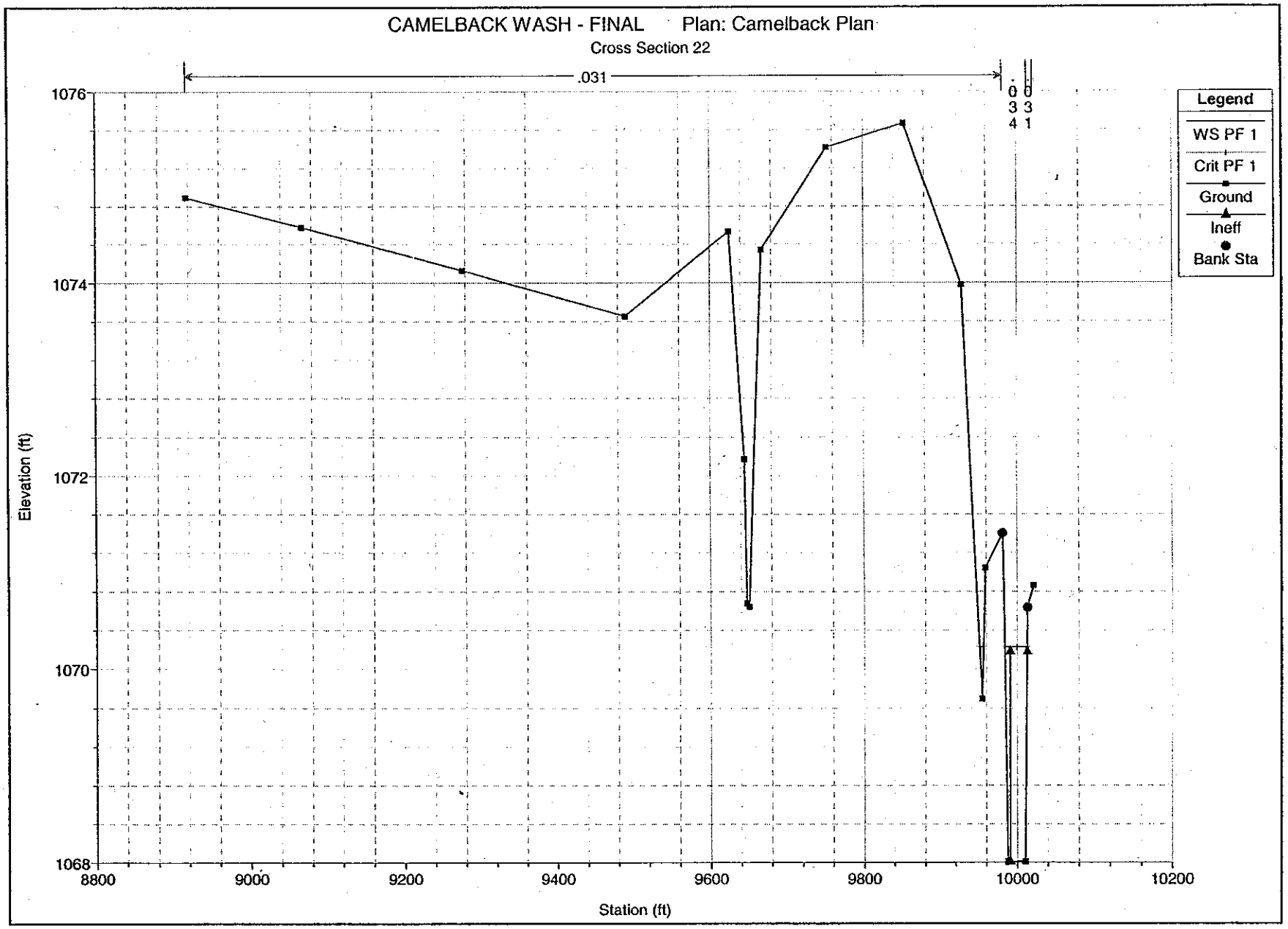

CAMELBACK WASH - FINAL Plan: Camelback Plan
Cross Section 25
.03
.078
.078
Legend
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
1086
1084
1082
1080
1078
1076
1074
1072
1070
9000
9200
9400
9600
9800
10000
10200
Station (ft)

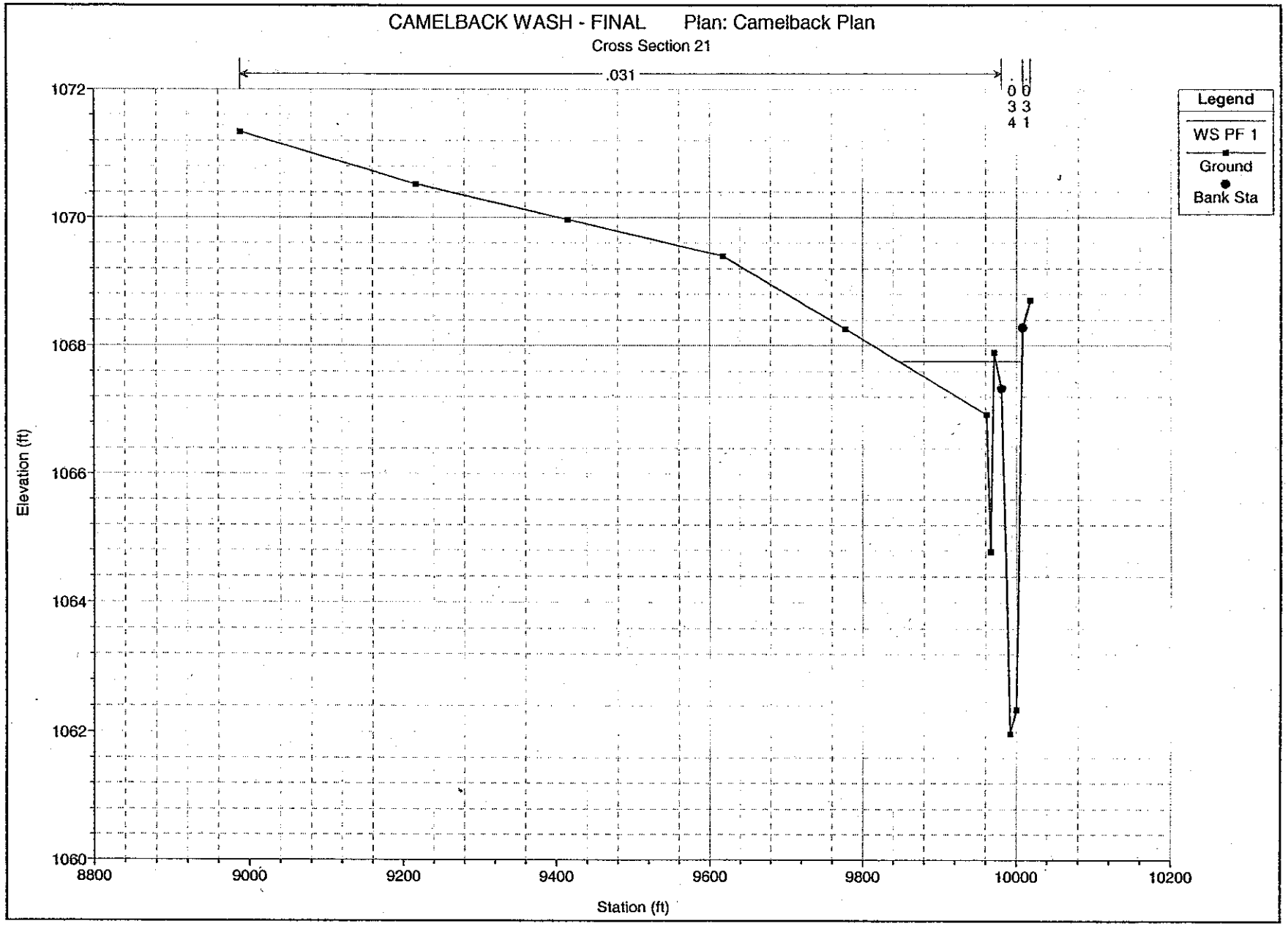

CAMELBACK WASH - FINAL Plan: Camelback Plan
Cross Section 24
.03
.00
.07
.08
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
1082
1080
1078
1076
1074
1072
1070
8600
8800
9000
9200
9400
9600
9800
10000
10200
Station (ft)

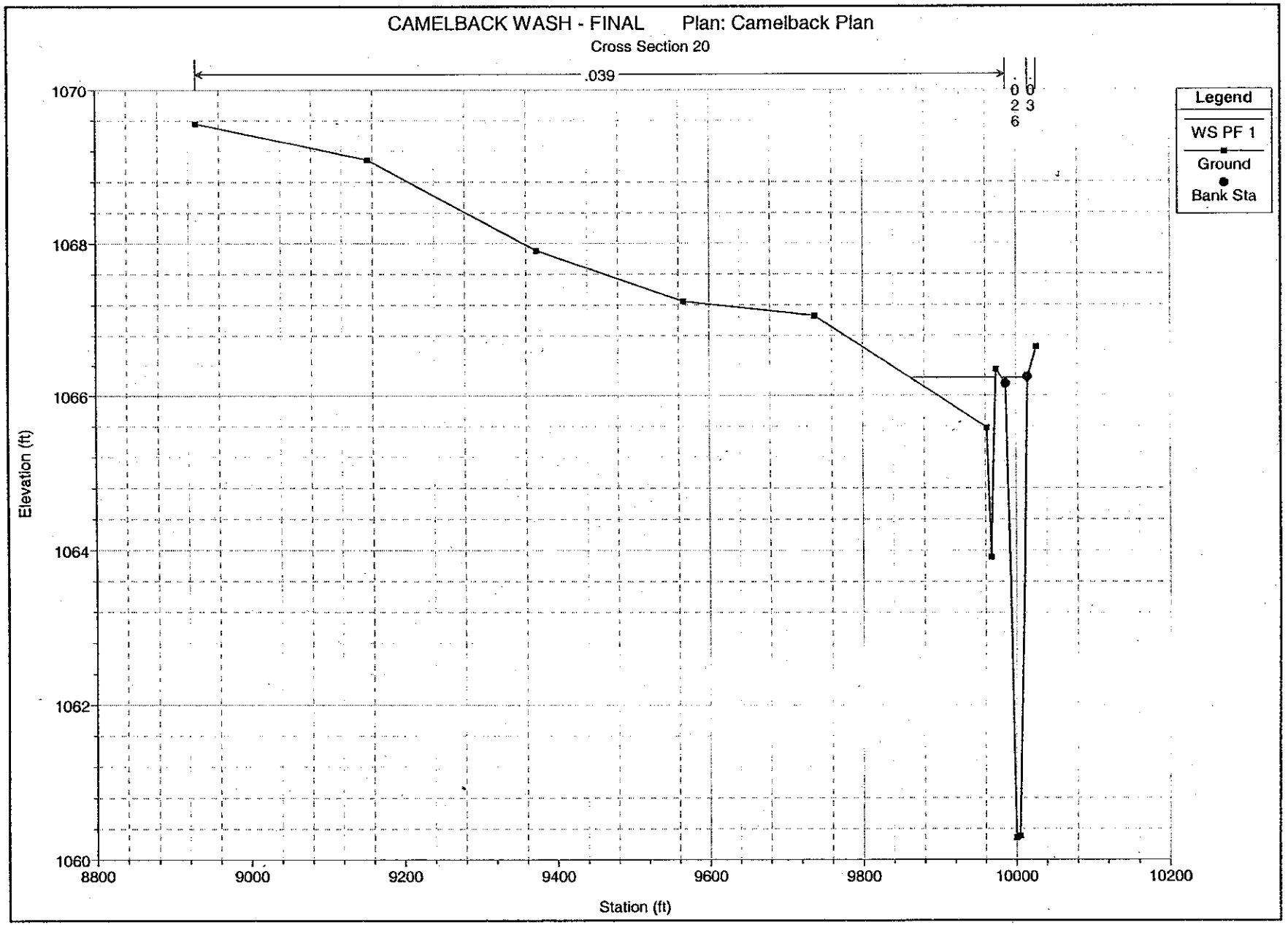

CAMELBACK WASH - FINAL Plan: Camelback Plan
Cross Section 23
.031
.034
Legend
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
1080
1078
1076
1074
1072
1070
1068
9000
9200
9400
9600
9800
10000
10200
Station (ft)

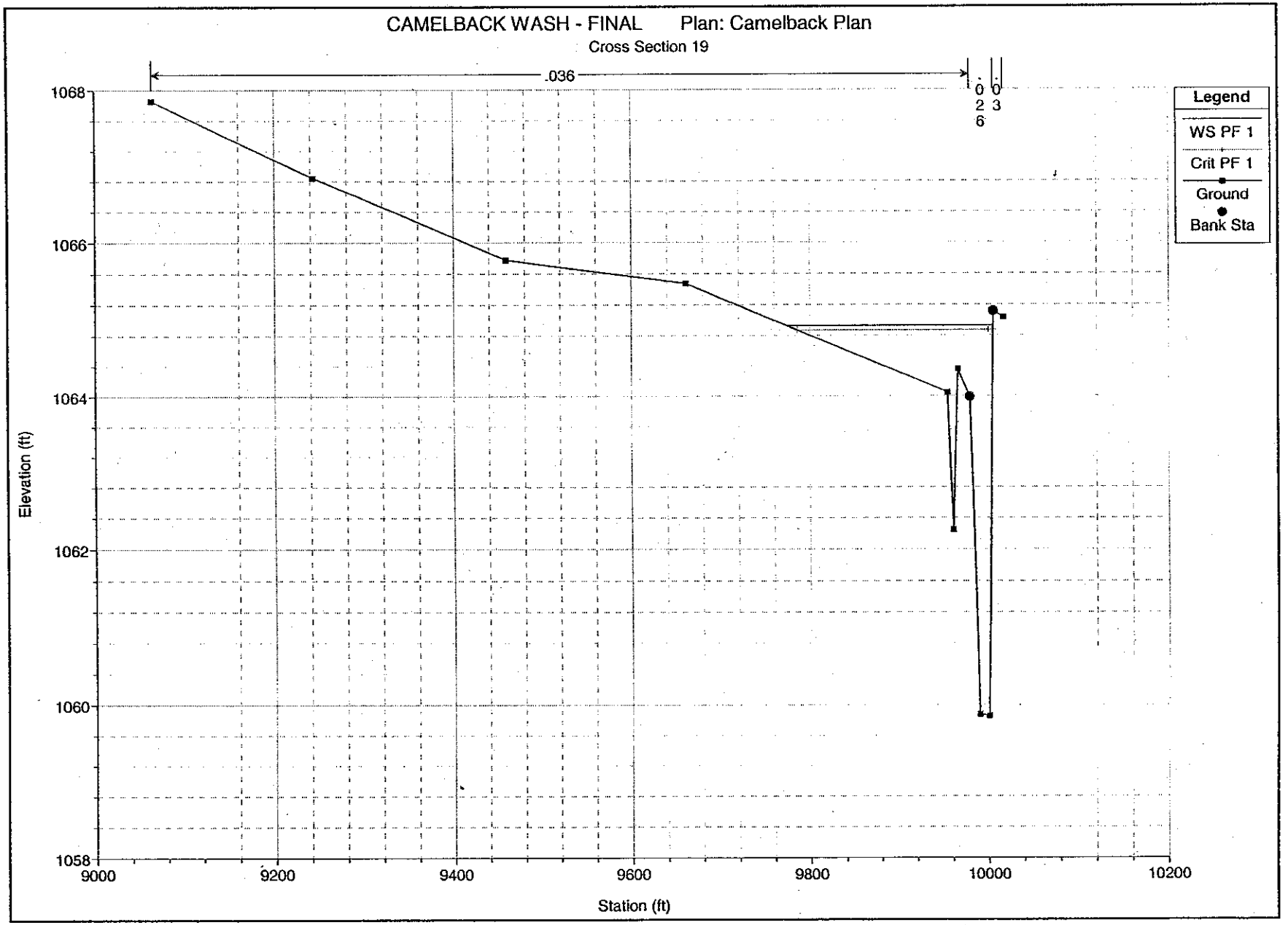

CAMELBACK WASH - FINAL Plan: Camelback Plan
CBC at Loop303 and Camelback
.031
.034
Legend
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
1080
1078
1076
1074
1072
1070
1068
9000
9200
9400
9600
9800
10000
10200
Station (ft)

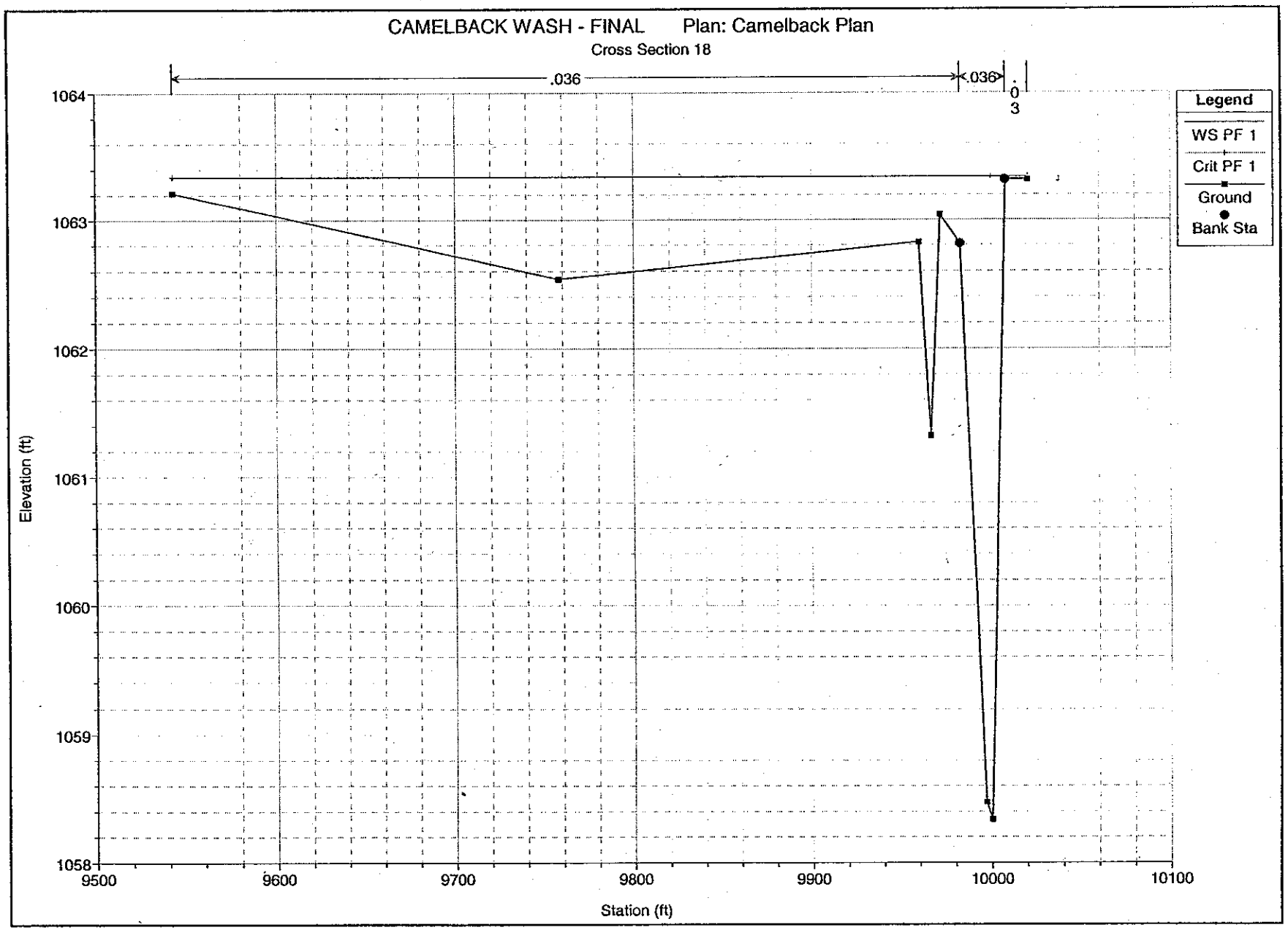

CAMELBACK WASH - FINAL Plan: Camelback Plan
CBC at Loop303 and Camelback
.031
.0033
.0041
Legend
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
1076
1074
1072
1070
1068
1066
8800
9000
9200
9400
9600
9800
10000
10200
Station (ft)

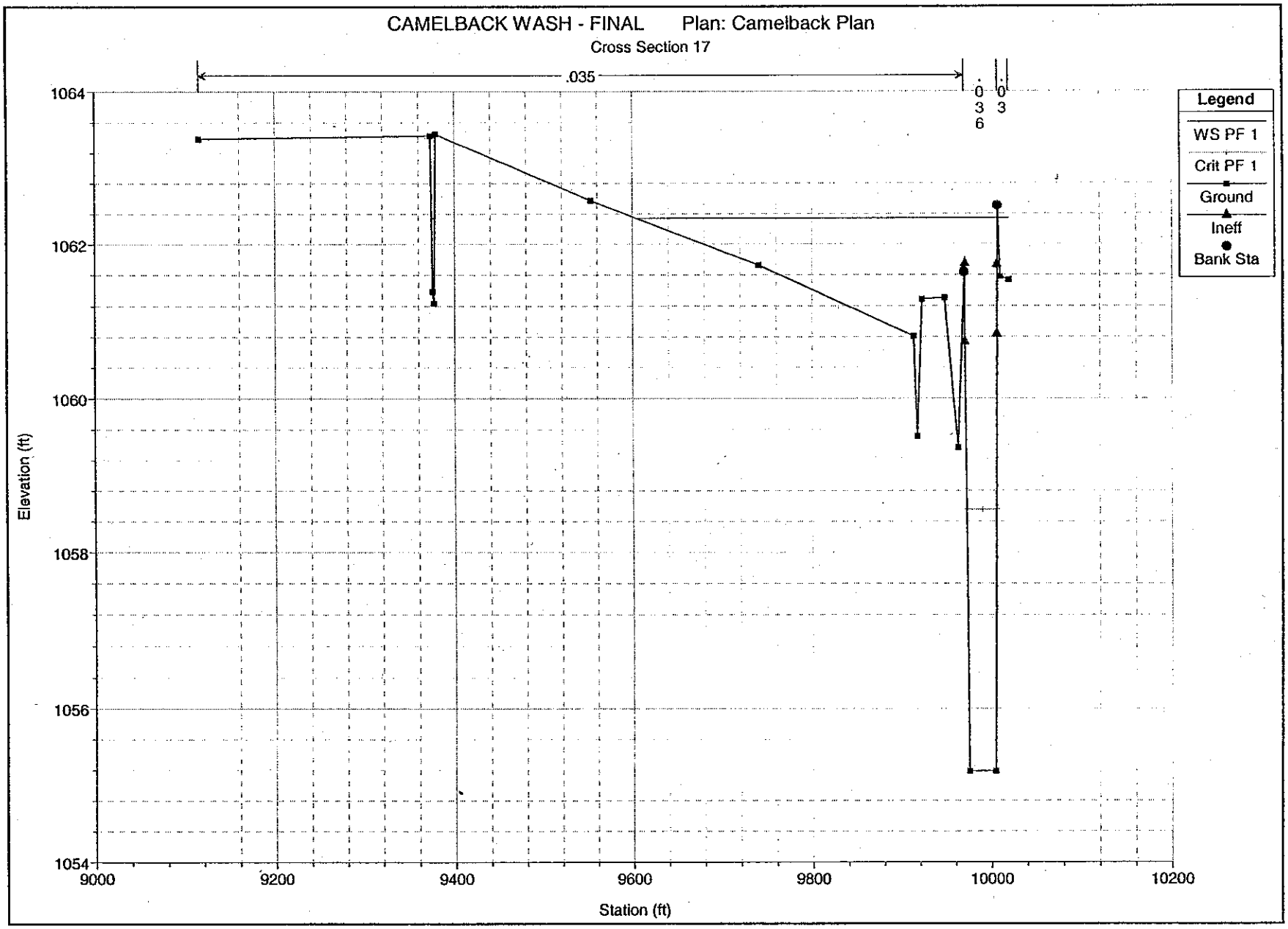

CAMELBACK WASH - FINAL Plan: Camelback Plan
Cross Section 22
.031
.034
.031
Legend
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
1076
1074
1072
1070
1068
8800
9000
9200
9400
9600
9800
10000
10200
Station (ft)

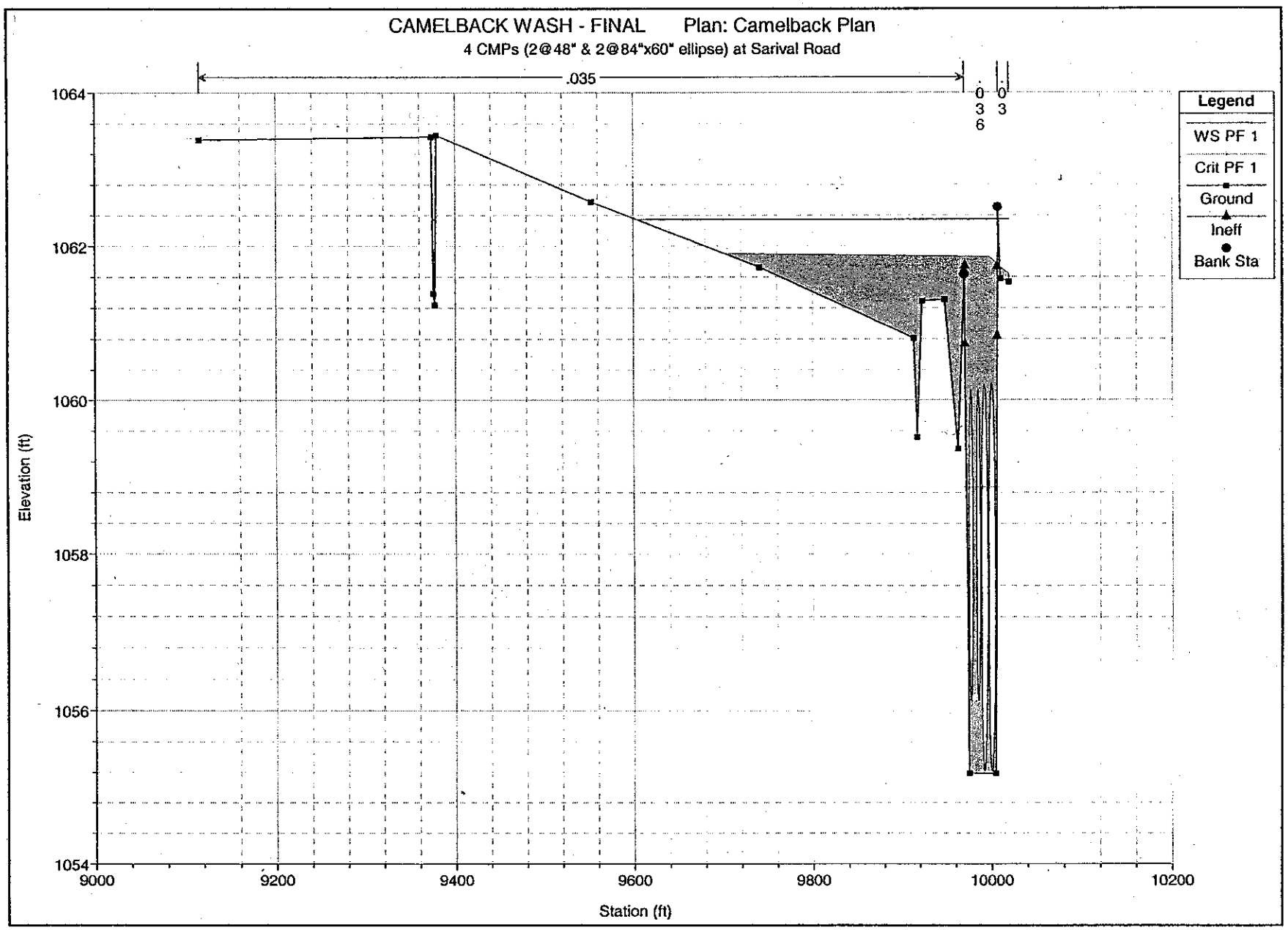

CAMELBACK WASH - FINAL Plan: Camelback Plan
Cross Section 21
.031
.0034
.0031
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
1072
1070
1068
1066
1064
1062
1060
8800
9000
9200
9400
9600
9800
10000
10200
Station (ft)

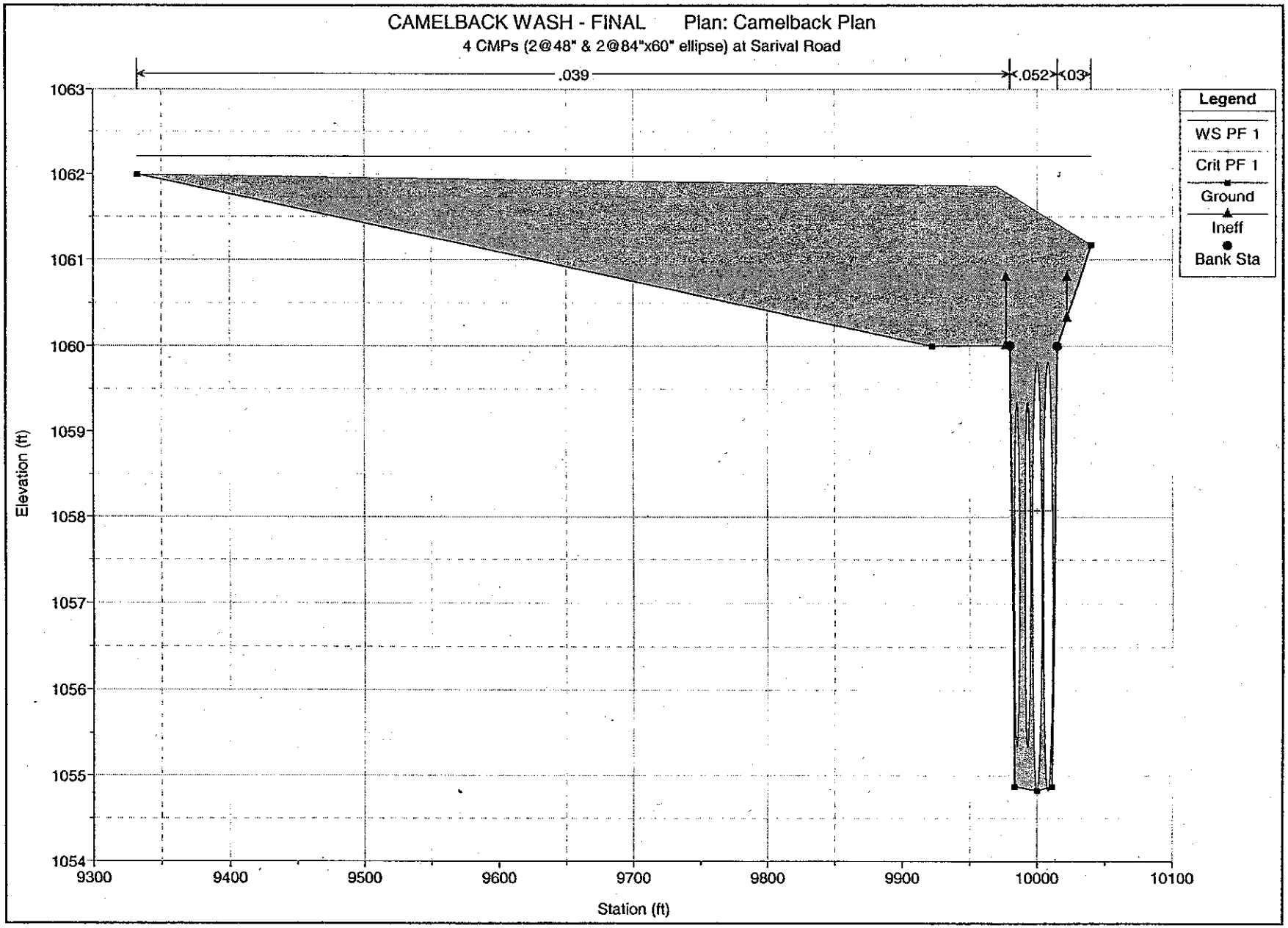

CAMELBACK WASH - FINAL Plan: Camelback Plan
Cross Section 20
.039
.026
.003
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
1070
1068
1066
1064
1062
1060
8800
9000
9200
9400
9600
9800
10000
10200
Station (ft)

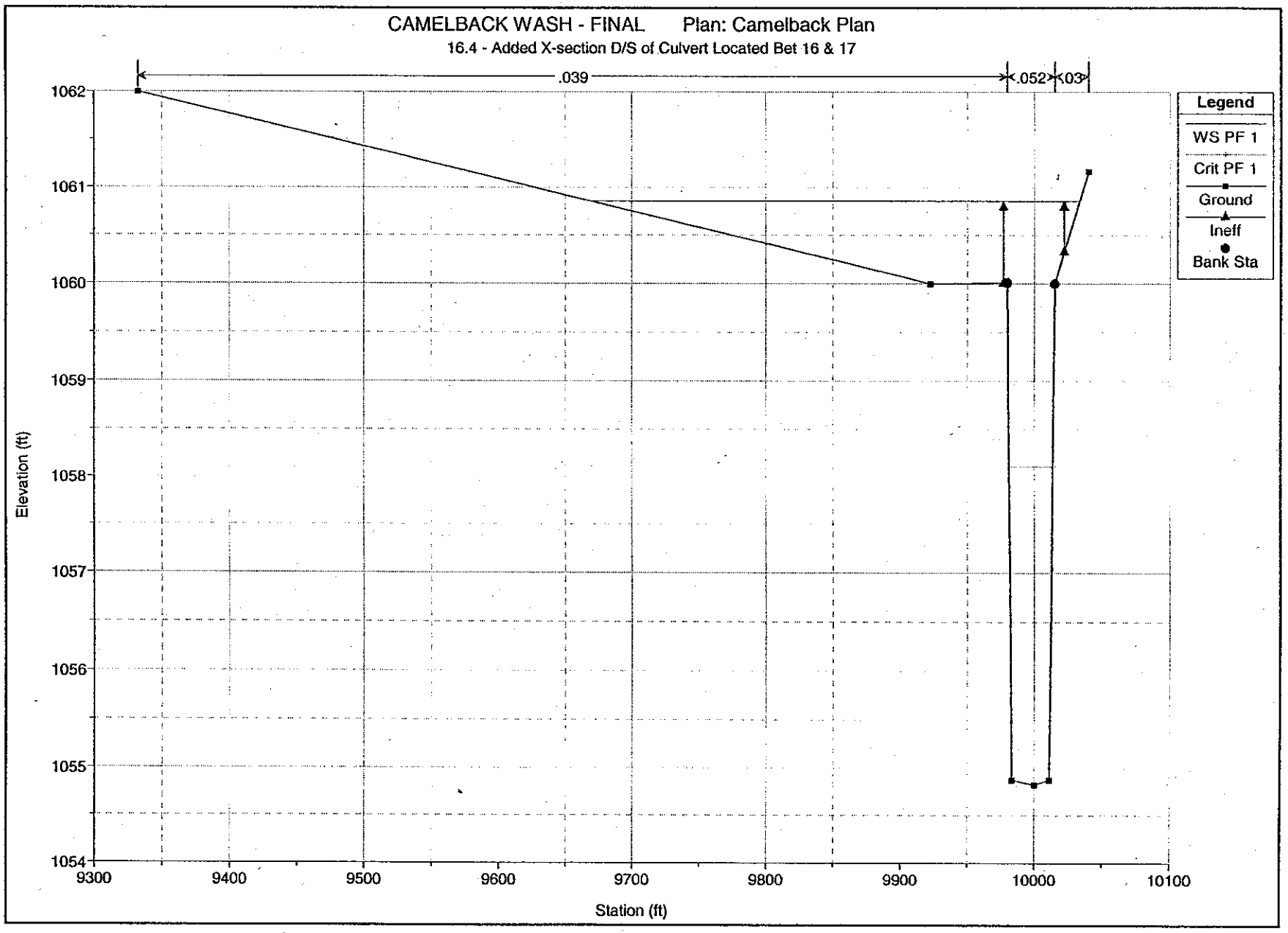

CAMELBACK WASH - FINAL Plan: Camelback Plan
Cross Section 19
.036
.026
.003
Legend
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
1068
1066
1064
1062
1060
1058
9000
9200
9400
9600
9800
10000
10200
Station (ft)

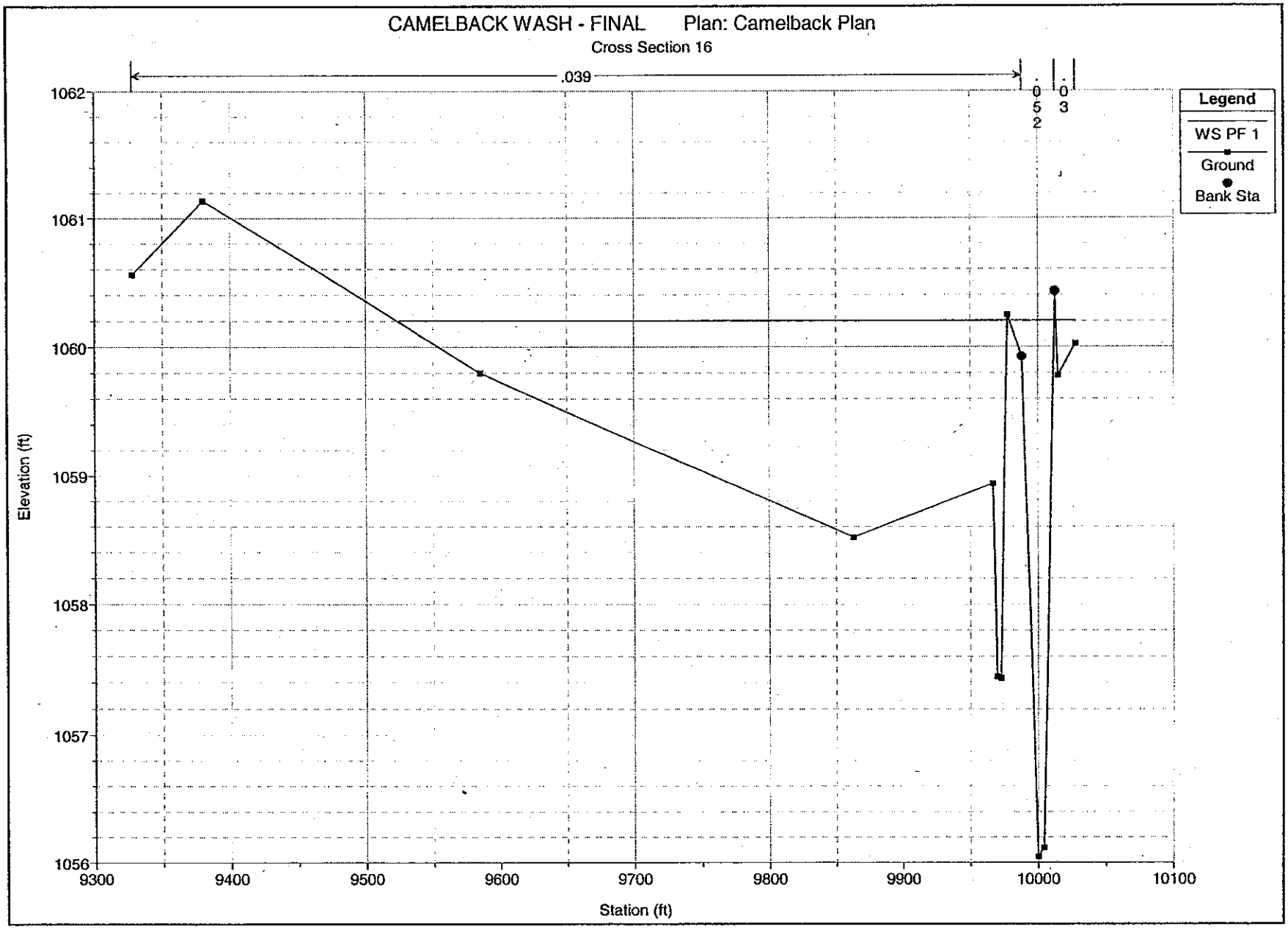

CAMELBACK WASH - FINAL Plan: Camelback Plan
Cross Section 18
.036
.036
.0
3
Legend
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
1064
1063
1062
1061
1060
1059
1058
9500
9600
9700
9800
9900
10000
10100
Station (ft)

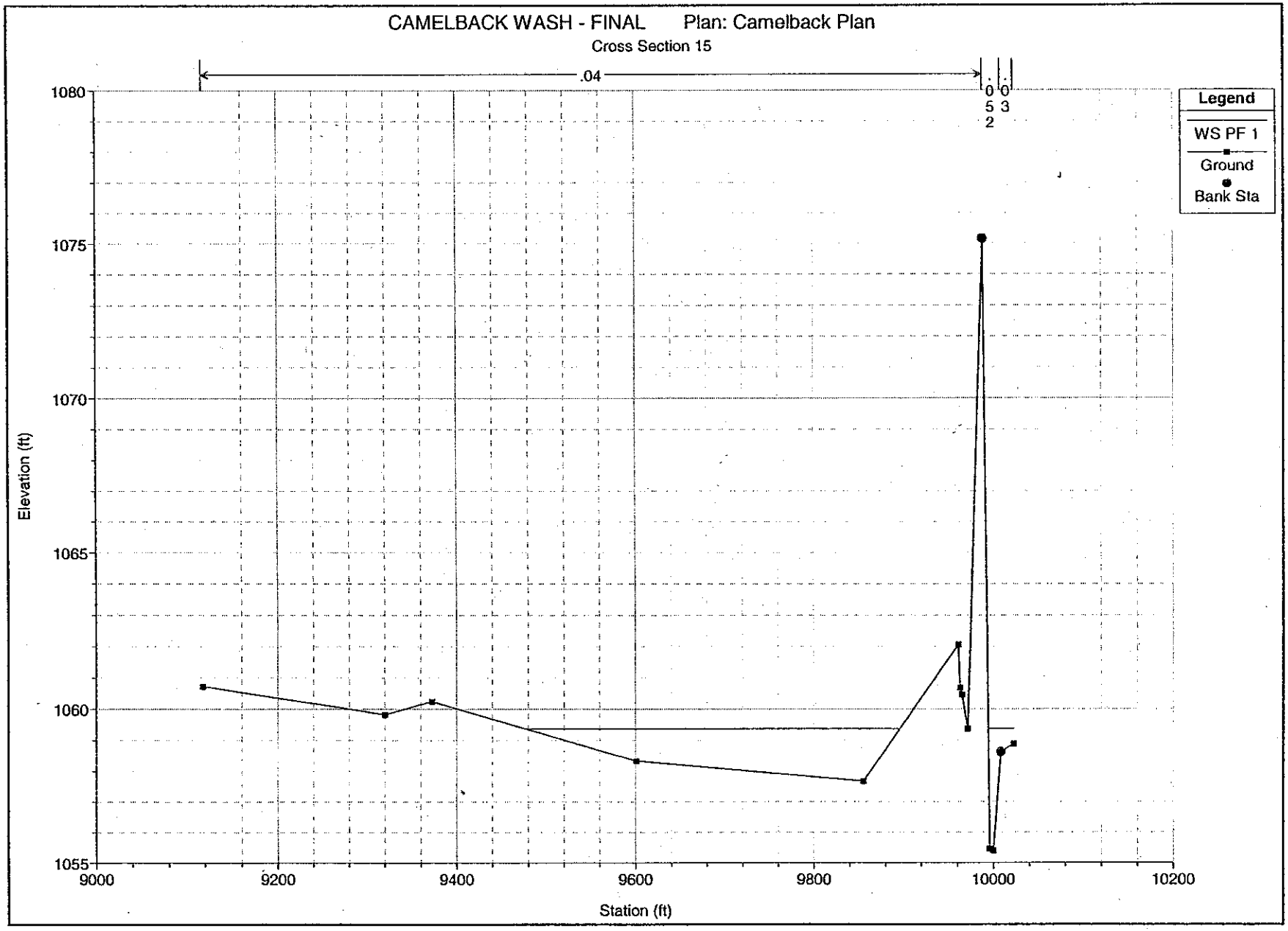

CAMELBACK WASH - FINAL Plan: Camelback Plan
Cross Section 17
.035
.036
.03
Legend
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
1064
1062
1060
1058
1056
1054
9000
9200
9400
9600
9800
10000
10200
Station (ft)

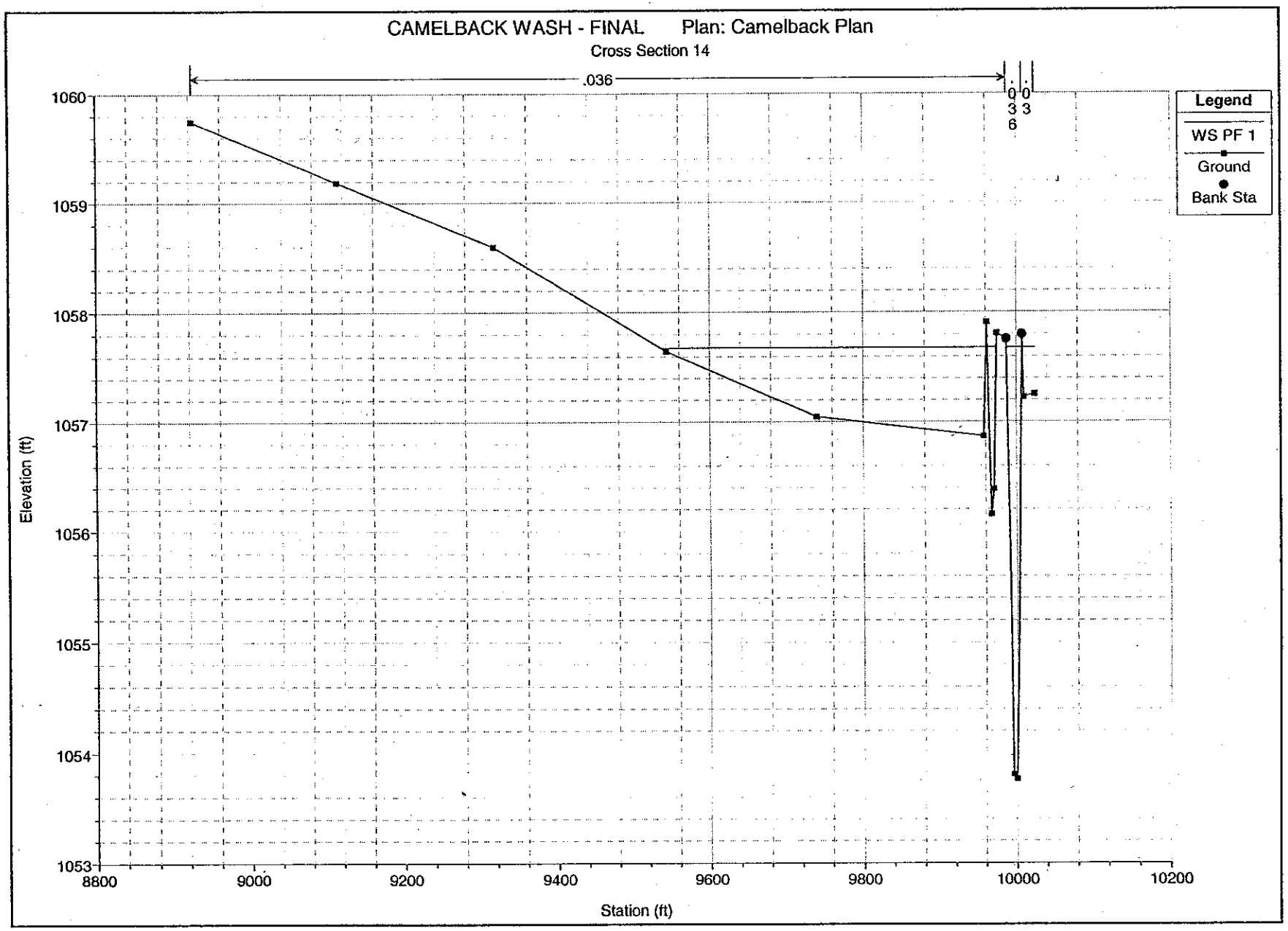

CAMELBACK WASH - FINAL Plan: Camelback Plan
4 CMPs (2@48" & 2@84"x60" ellipse) at Sarival Road
.035
.036
.03
Legend
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
1064
1062
1060
1058
1056
1054
9000
9200
9400
9600
9800
10000
10200
Station (ft)

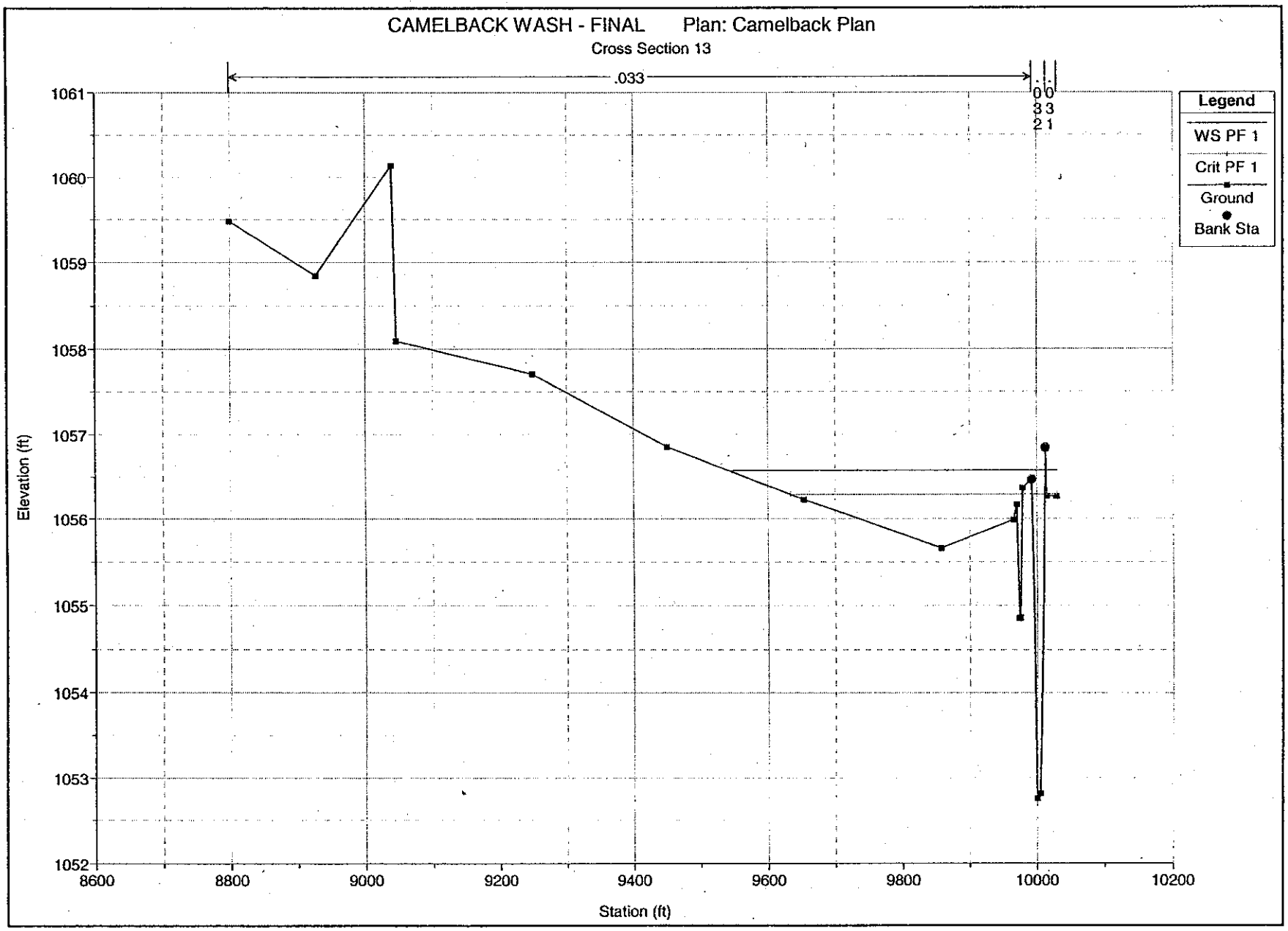

CAMELBACK WASH - FINAL Plan: Camelback Plan
4 CMPs (2@48" & 2@84"x60" ellipse) at Sarival Road
.039
.052
.03
Legend
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
1063
1062
1061
1060
1059
1058
1057
1056
1055
1054
9300
9400
9500
9600
9700
9800
9900
10000
10100
Station (ft)

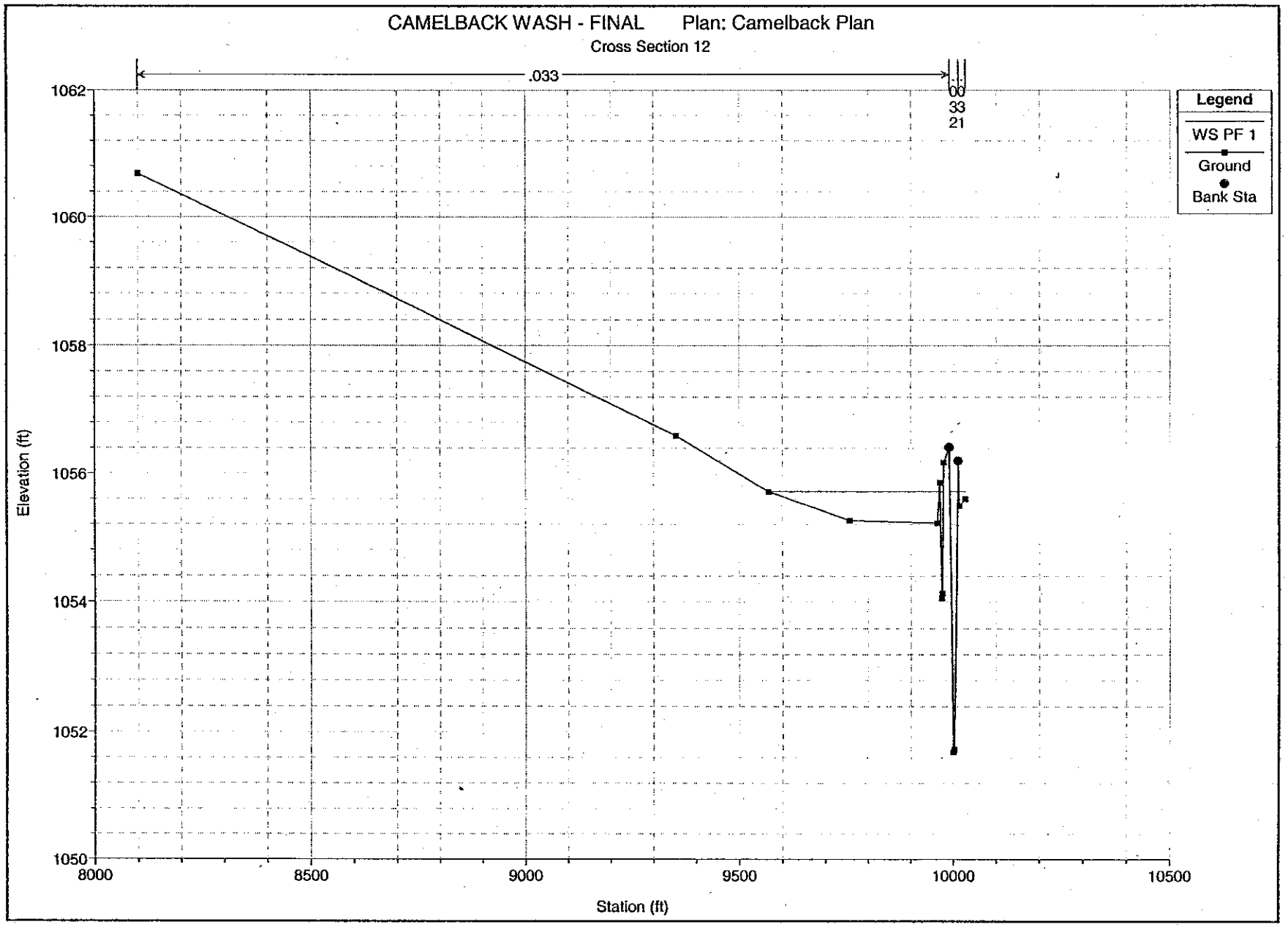

CAMELBACK WASH - FINAL Plan: Camelback Plan
16.4 - Added X-section D/S of Culvert Located Bet 16 & 17
.039
.052
.03
Legend
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
1062
1061
1060
1059
1058
1057
1056
1055
1054
9300
9400
9500
9600
9700
9800
9900
10000
10100
Station (ft)

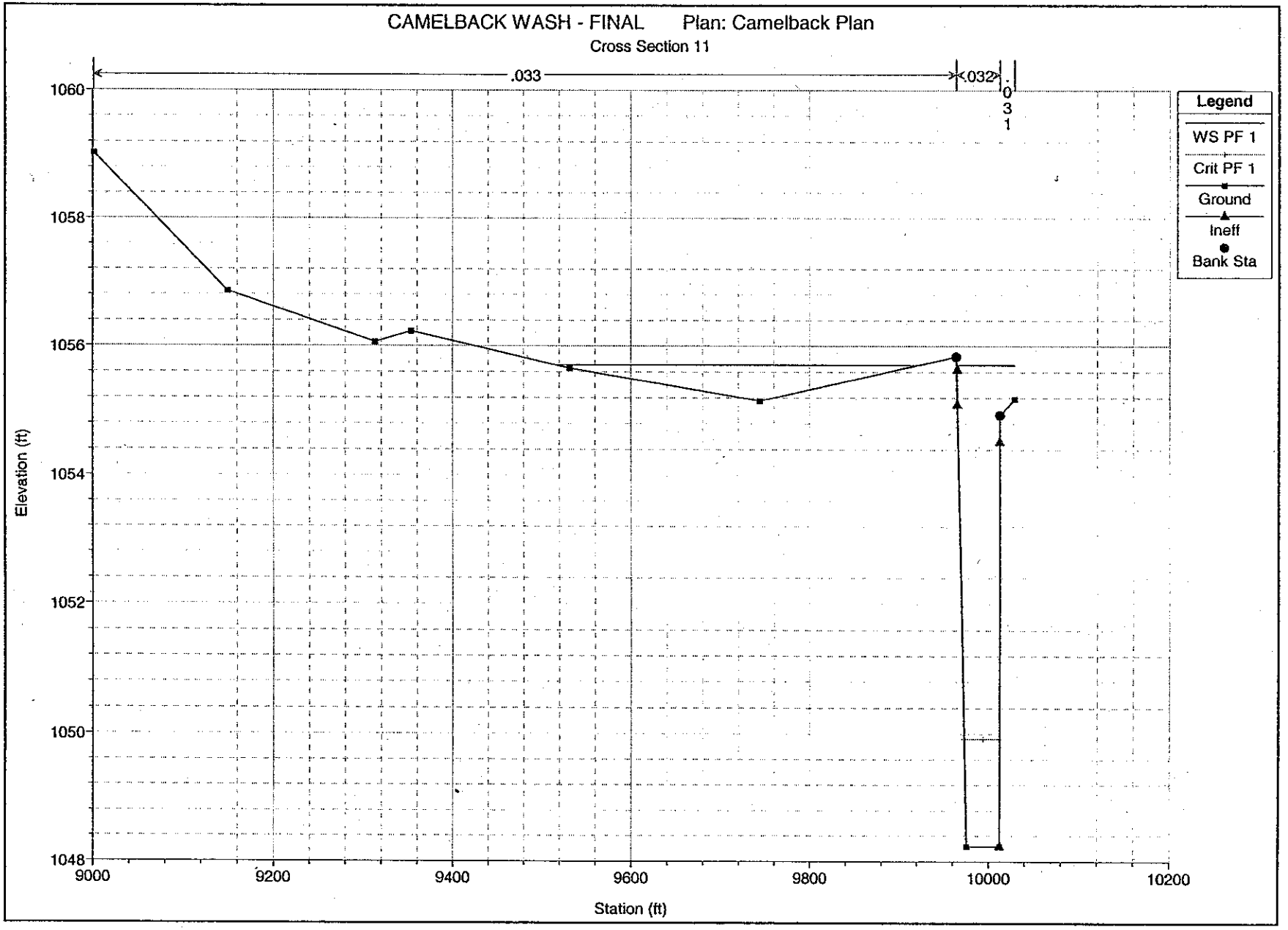

CAMELBACK WASH - FINAL Plan: Camelback Plan
Cross Section 16
.039
.052
.03
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
1062
1061
1060
1059
1058
1057
1056
9300
9400
9500
9600
9700
9800
9900
10000
10100
Station (ft)

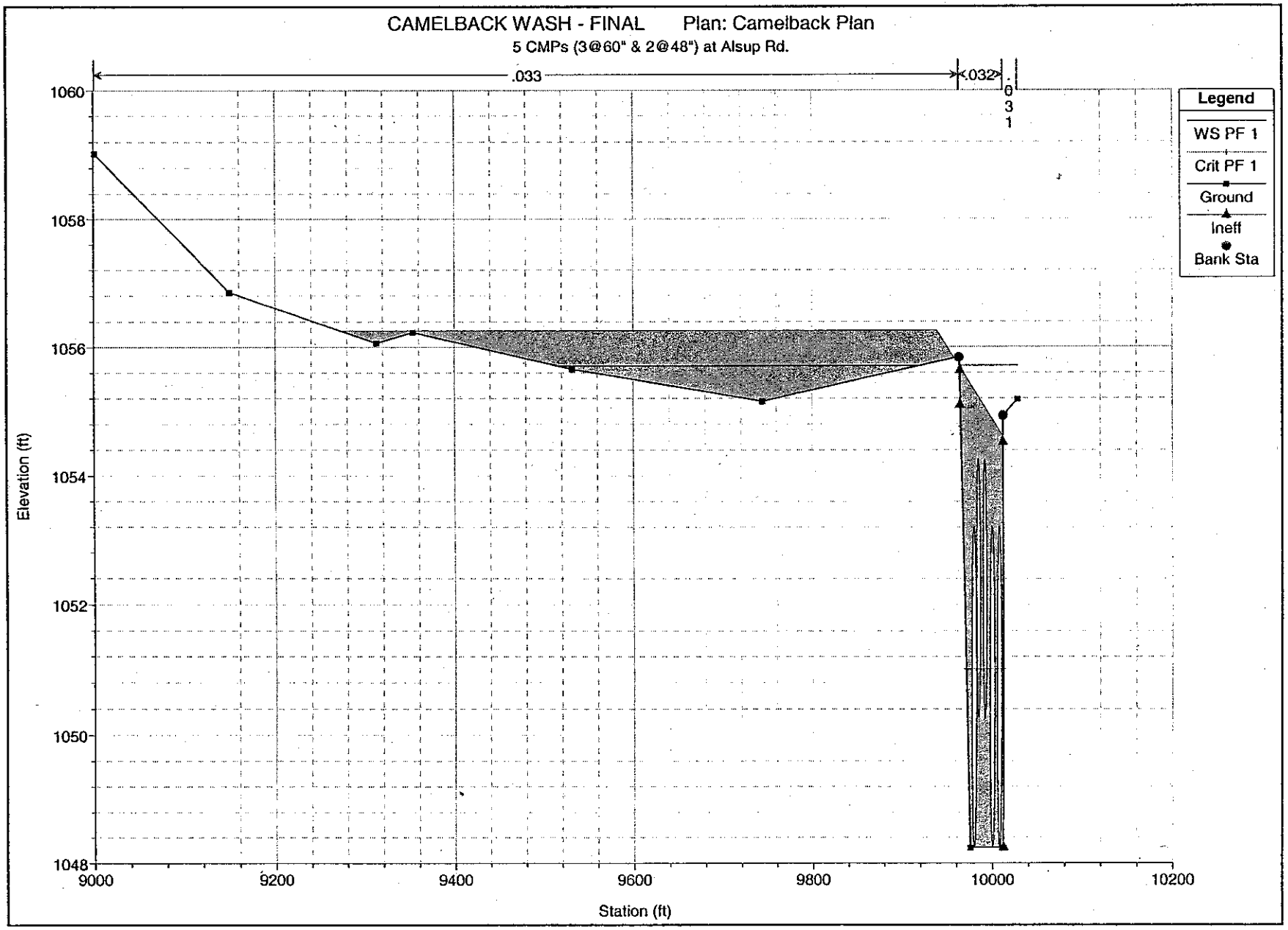

CAMELBACK WASH - FINAL Plan: Camelback Plan
Cross Section 15
.04
.052
.03
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
1080
1075
1070
1065
1060
1055
9000
9200
9400
9600
9800
10000
10200
Station (ft)

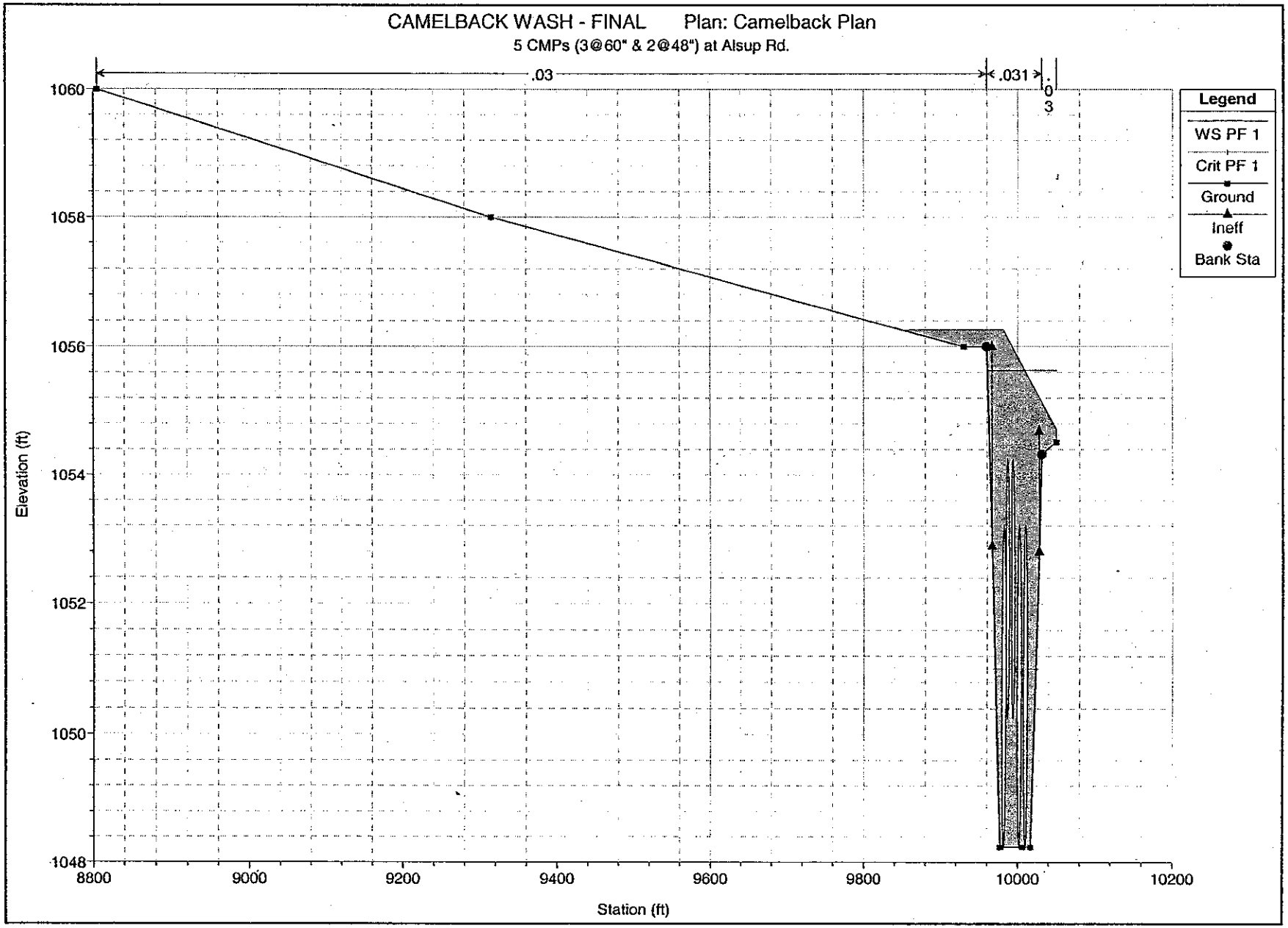

CAMELBACK WASH - FINAL Plan: Camelback Plan
Cross Section 14
.036
.0
3
6
.0
3
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
1060
1059
1058
1057
1056
1055
1054
1053
8800
9000
9200
9400
9600
9800
10000
10200
Station (ft)

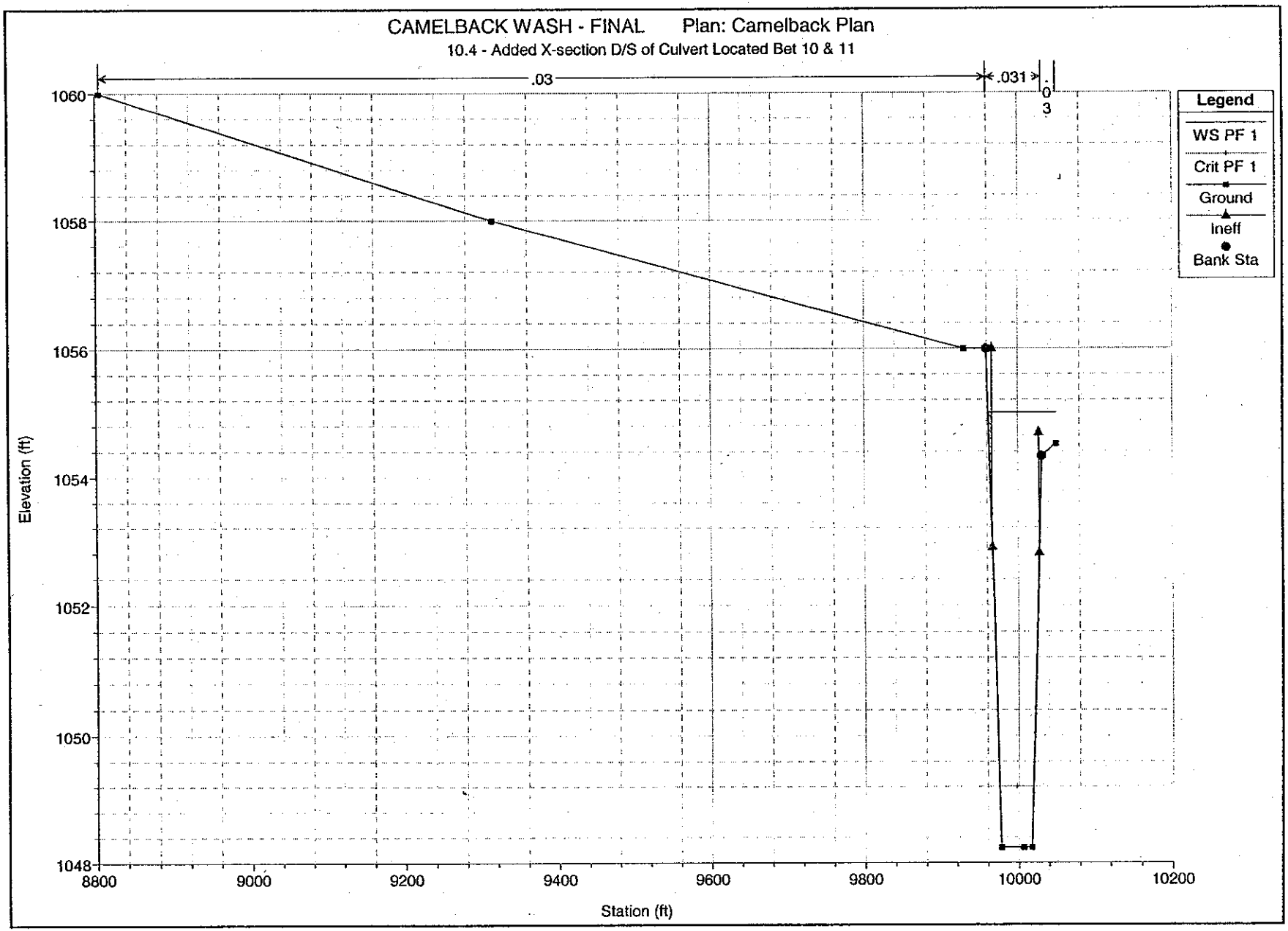

CAMELBACK WASH - FINAL Plan: Camelback Plan
Cross Section 13
.033
Legend
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
1061
1060
1059
1058
1057
1056
1055
1054
1053
1052
8600
8800
9000
9200
9400
9600
9800
10000
10200

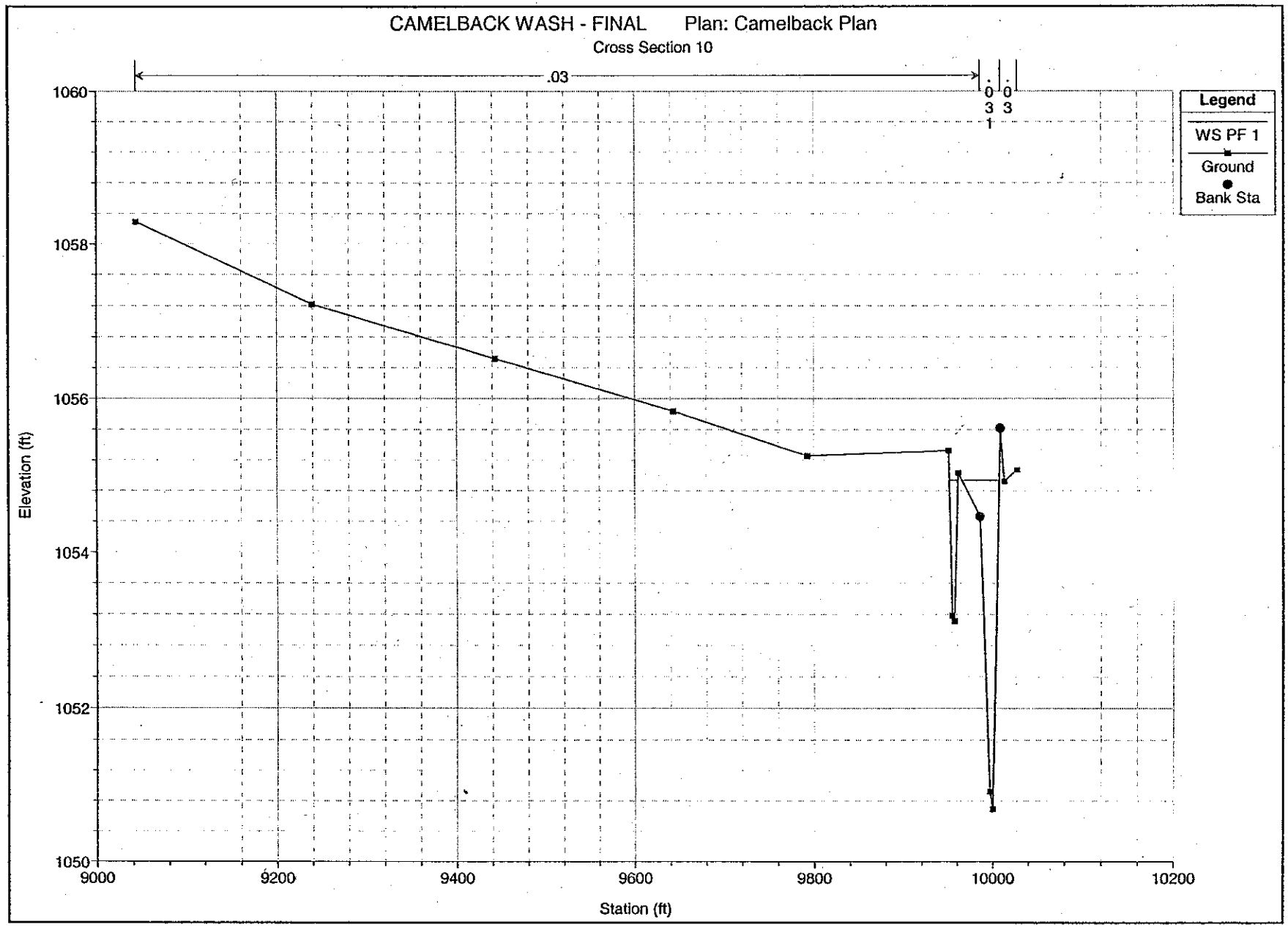

CAMELBACK WASH - FINAL Plan: Camelback Plan
Cross Section 12
.033
00
33
21
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
1062
1060
1058
1056
1054
1052
1050
8000
8500
9000
9500
10000
10500
Station (ft)

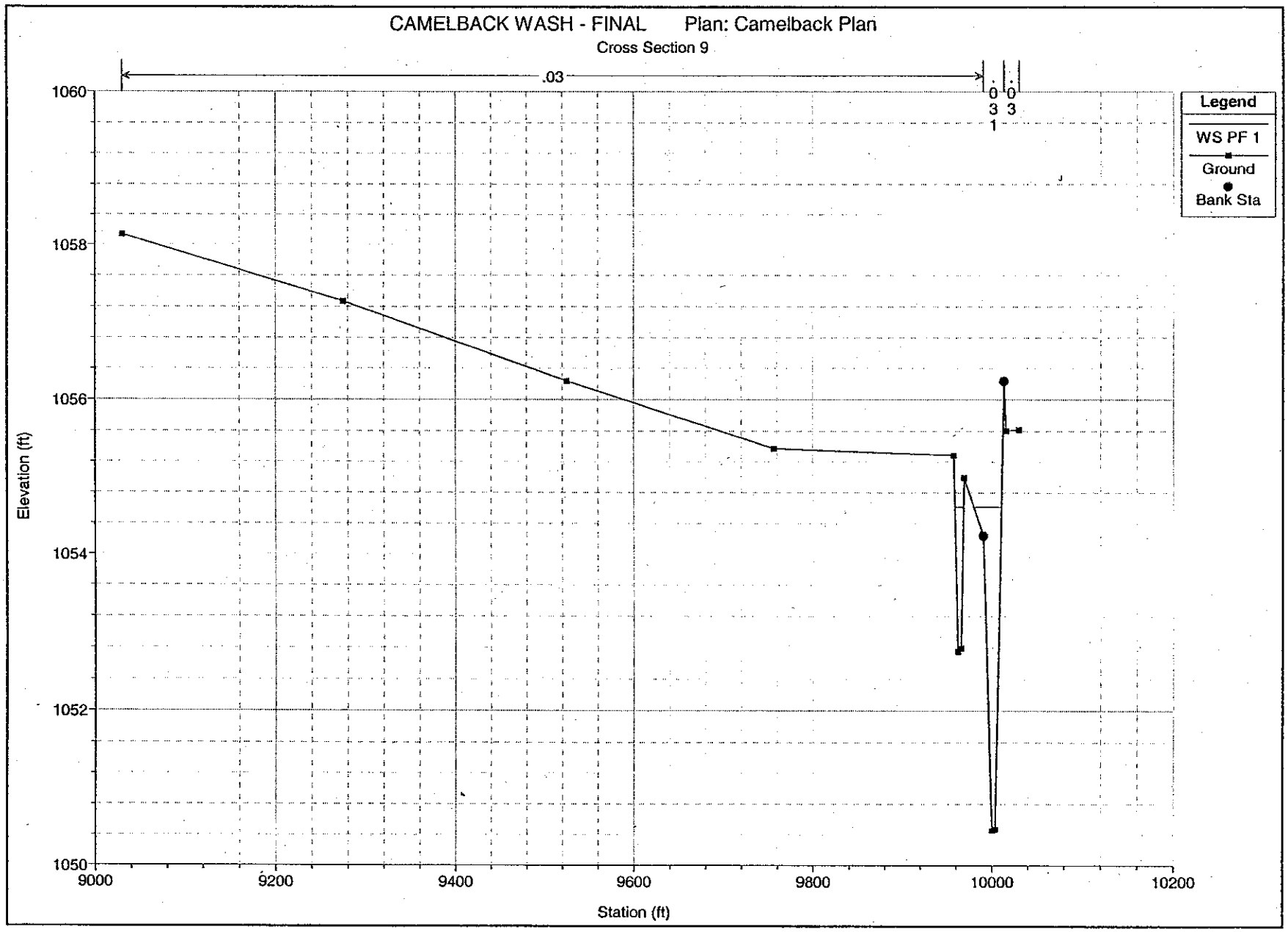

CAMELBACK WASH - FINAL Plan: Camelback Plan
Cross Section 11
.033
.032
.031
Legend
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
1060
1058
1056
1054
1052
1050
1048
9000
9200
9400
9600
9800
10000
10200
Station (ft)

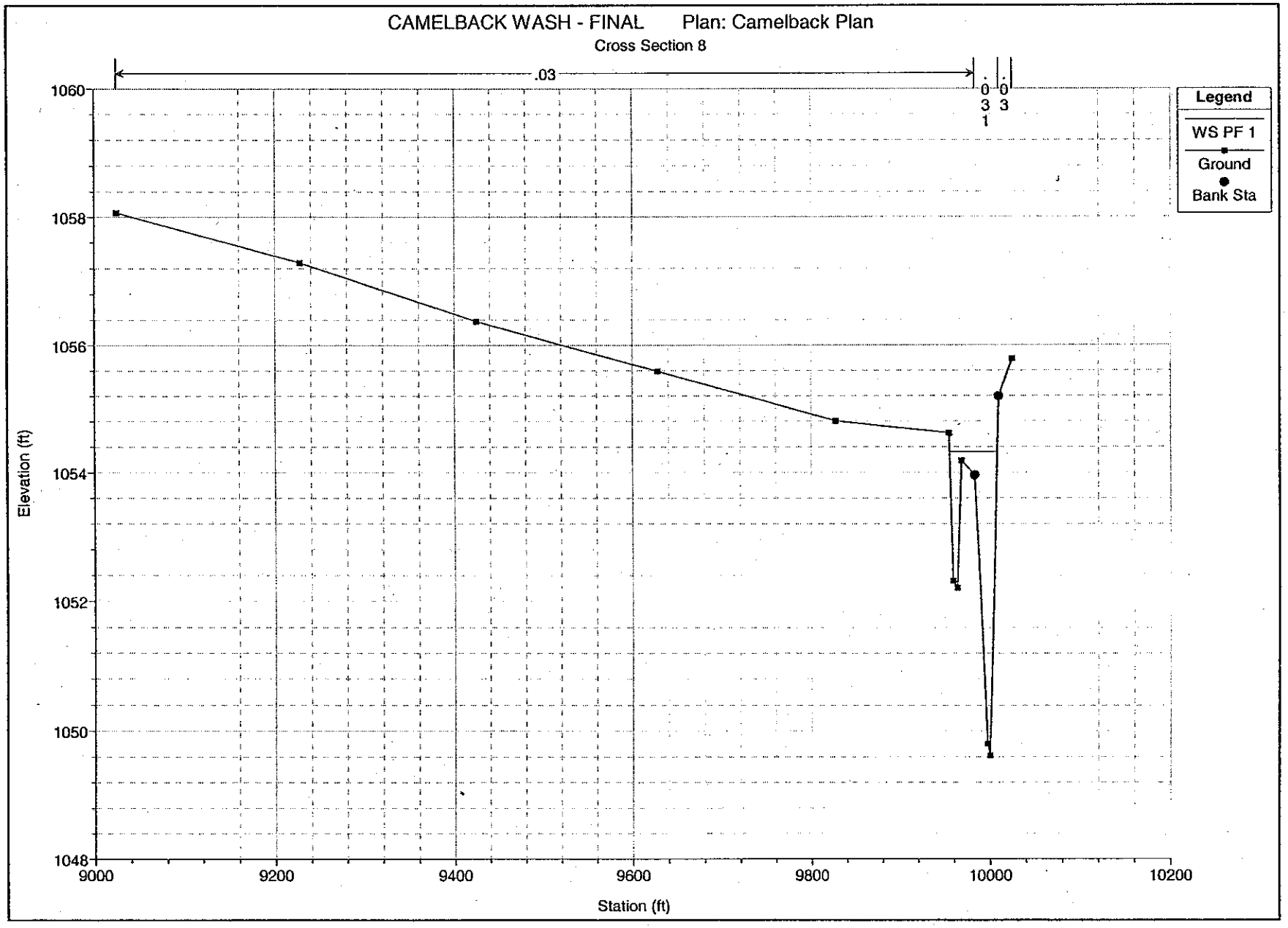

CAMELBACK WASH - FINAL Plan: Camelback Plan
5 CMPs (3@60" & 2@48") at Alsup Rd.
.033
.032
.031
Legend
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
1060
1058
1056
1054
1052
1050
1048
9000
9200
9400
9600
9800
10000
10200
Station (ft)

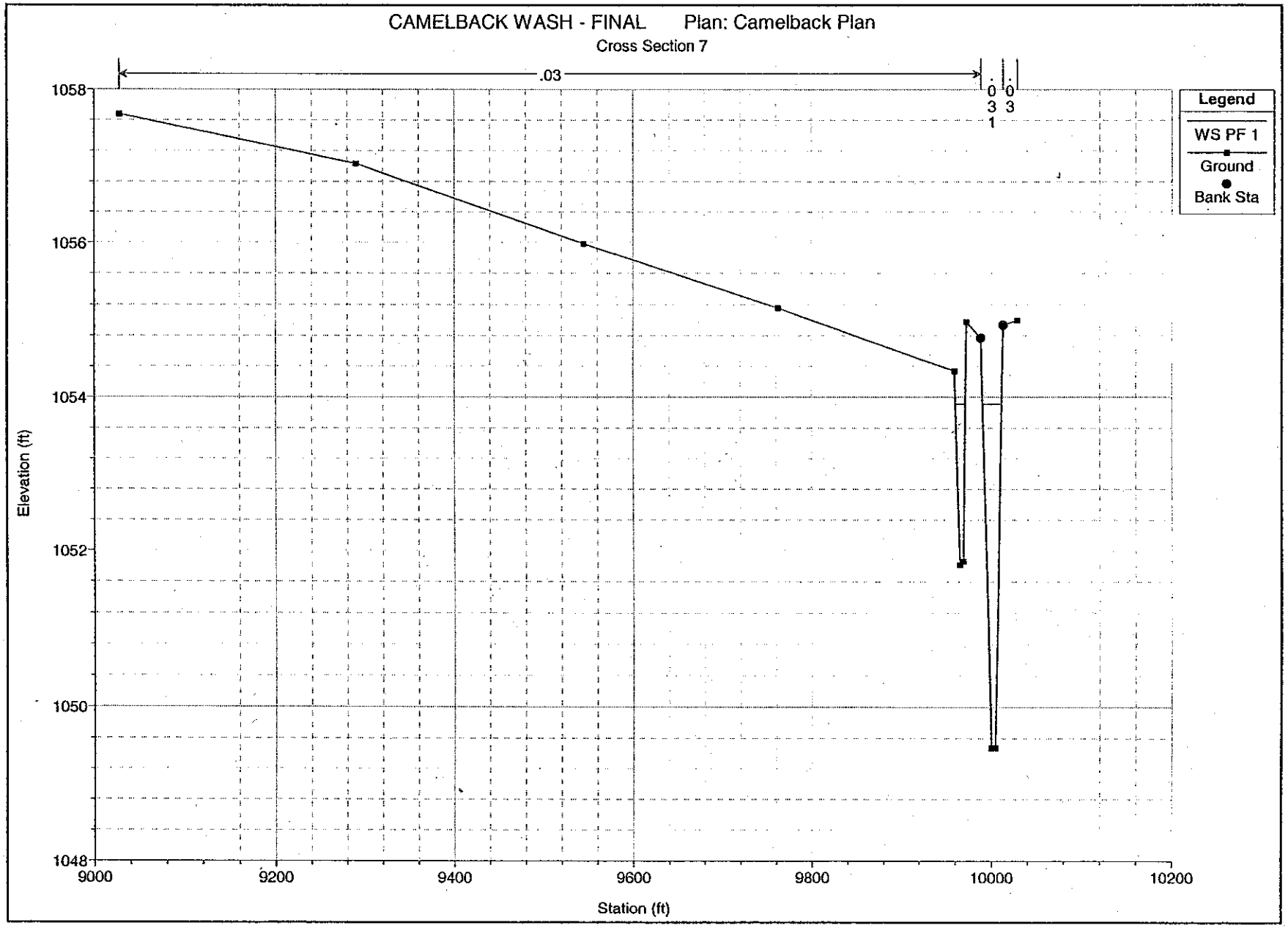

CAMELBACK WASH - FINAL Plan: Camelback Plan
5 CMPs (3@60" & 2@48") at Alsup Rd.
.03
.031
.03
Legend
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
1060
1058
1056
1054
1052
1050
1048
8800
9000
9200
9400
9600
9800
10000
10200
Station (ft)

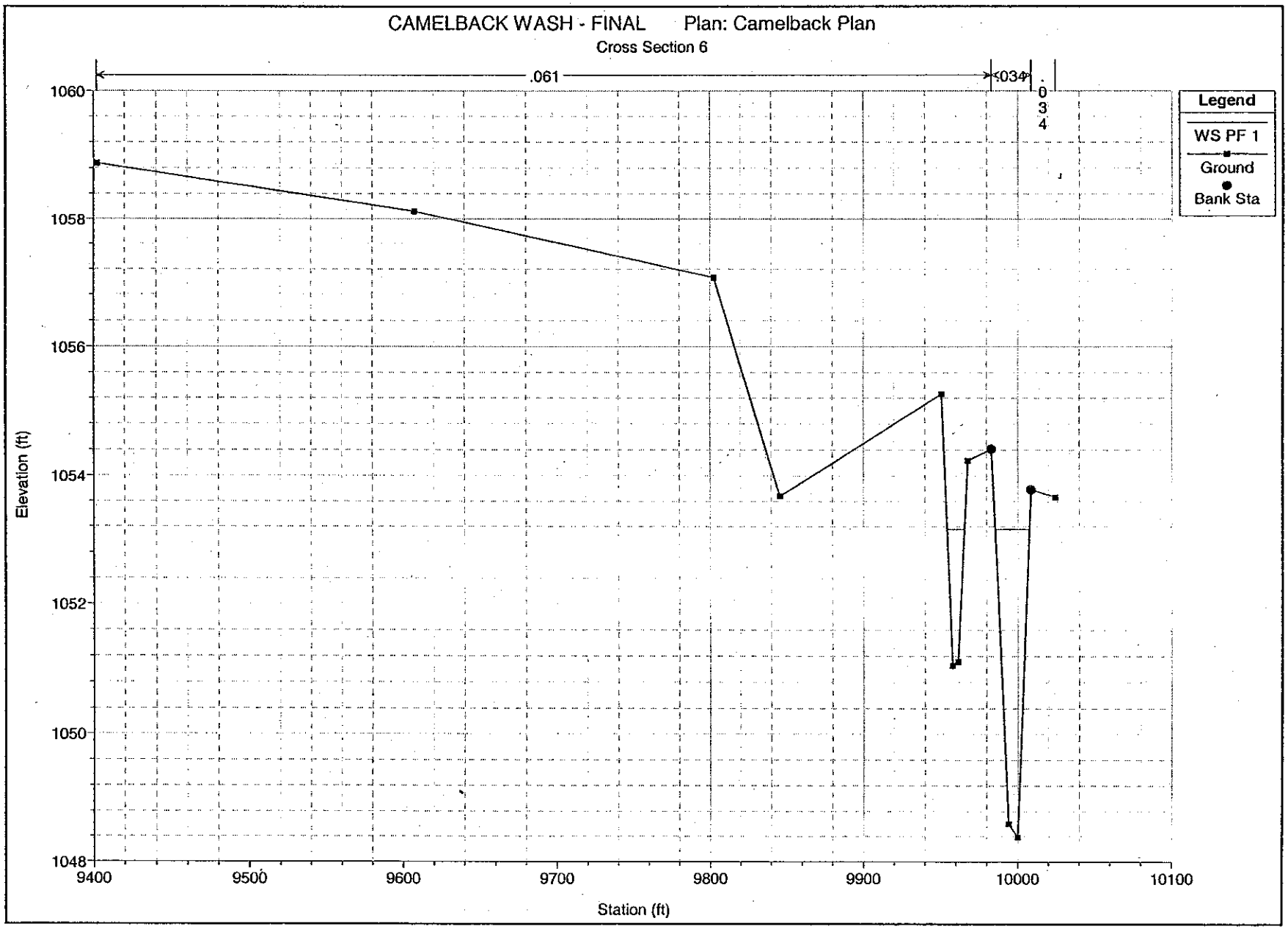

CAMELBACK WASH - FINAL Plan: Camelback Plan
10.4 - Added X-section D/S of Culvert Located Bet 10 & 11
.03
.031
.03
Legend
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
1060
1058
1056
1054
1052
1050
1048
8800
9000
9200
9400
9600
9800
10000
10200
Station (ft)

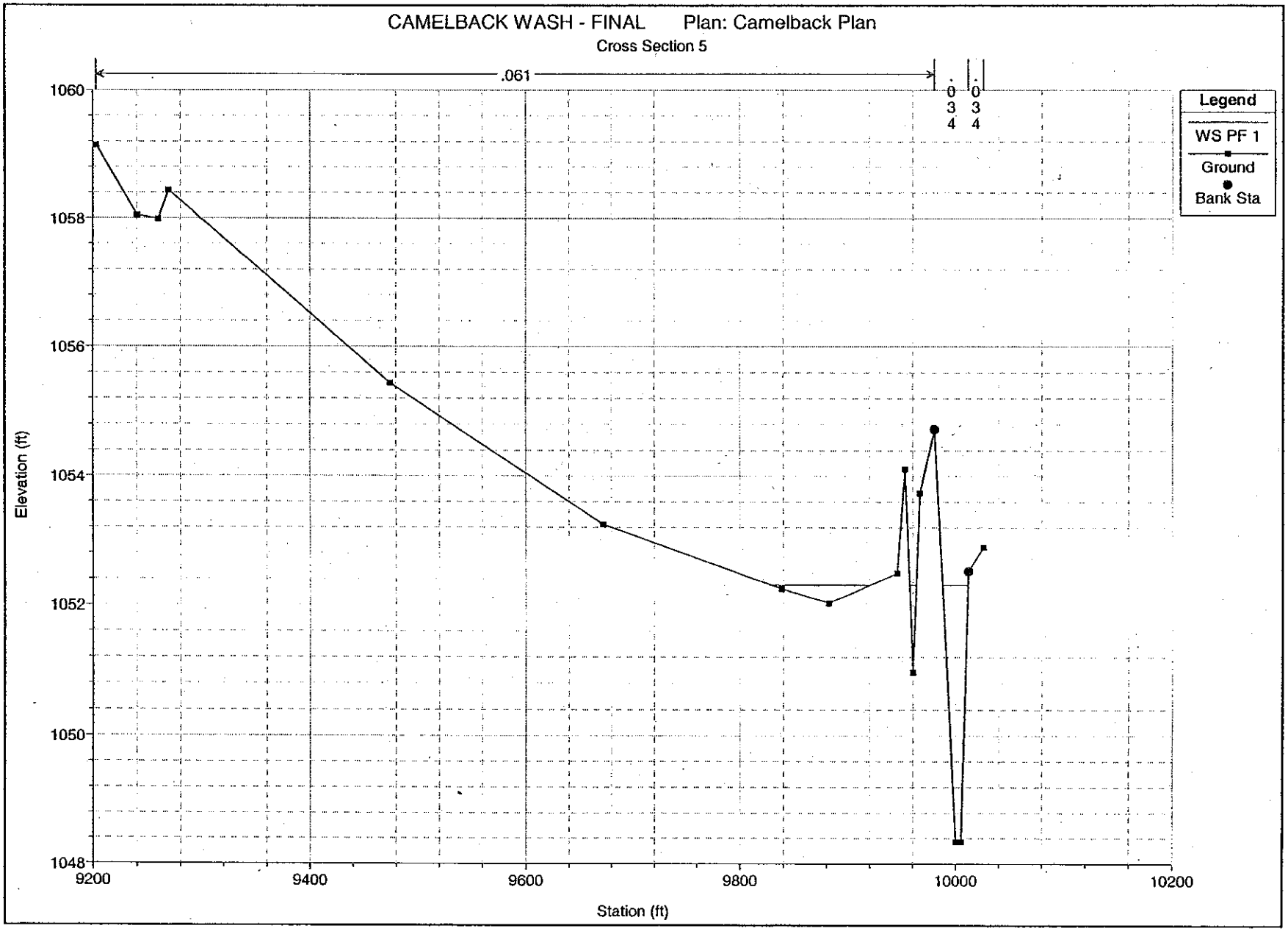

CAMELBACK WASH - FINAL Plan: Camelback Plan
Cross Section 10
.03
.031
.031
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
1060
1058
1056
1054
1052
1050
9000
9200
9400
9600
9800
10000
10200
Station (ft)

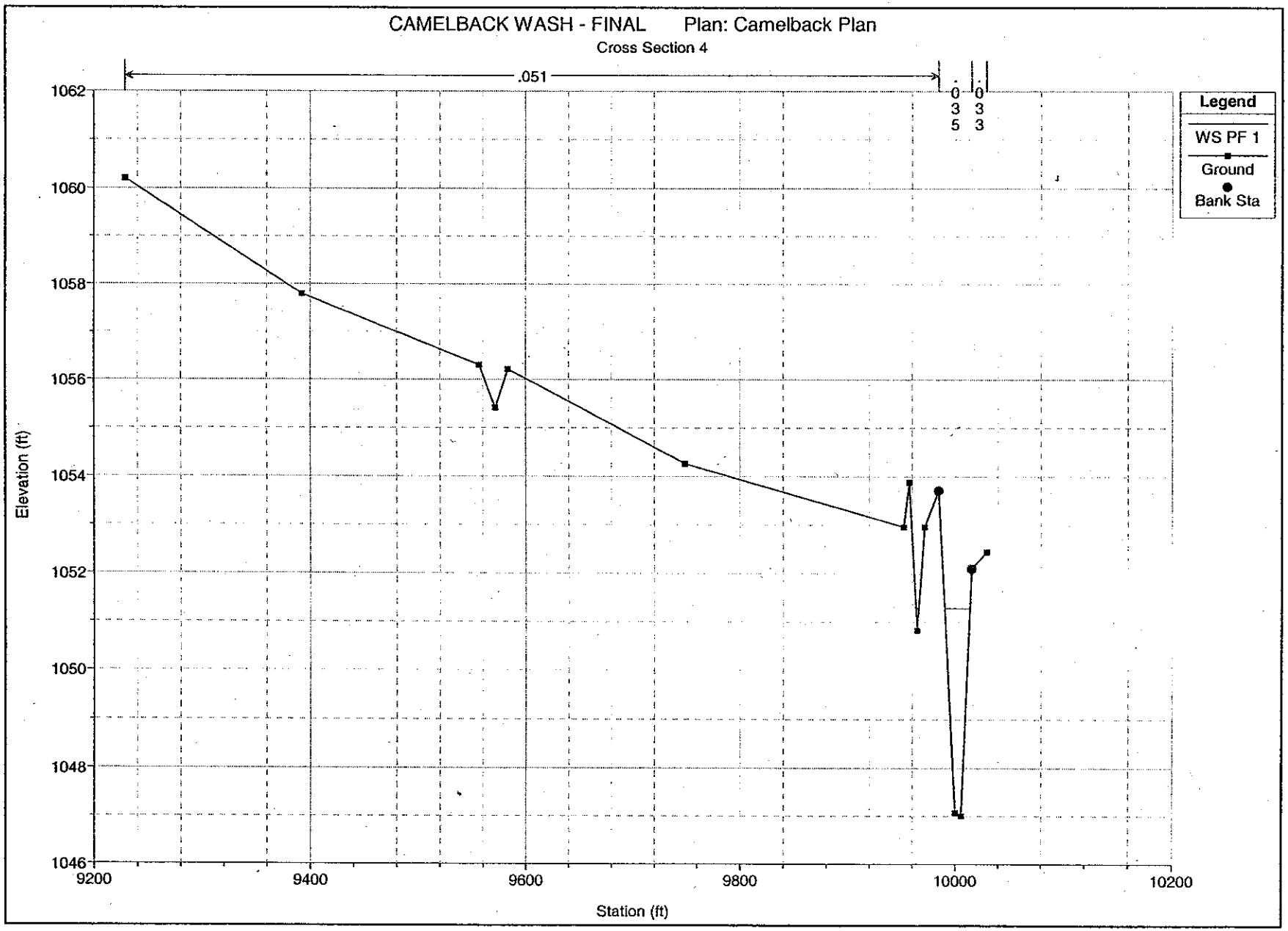

CAMELBACK WASH - FINAL Plan: Camelback Plan
Cross Section 9
.03
.031
.031
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
1060
1058
1056
1054
1052
1050
9000
9200
9400
9600
9800
10000
10200
Station (ft)

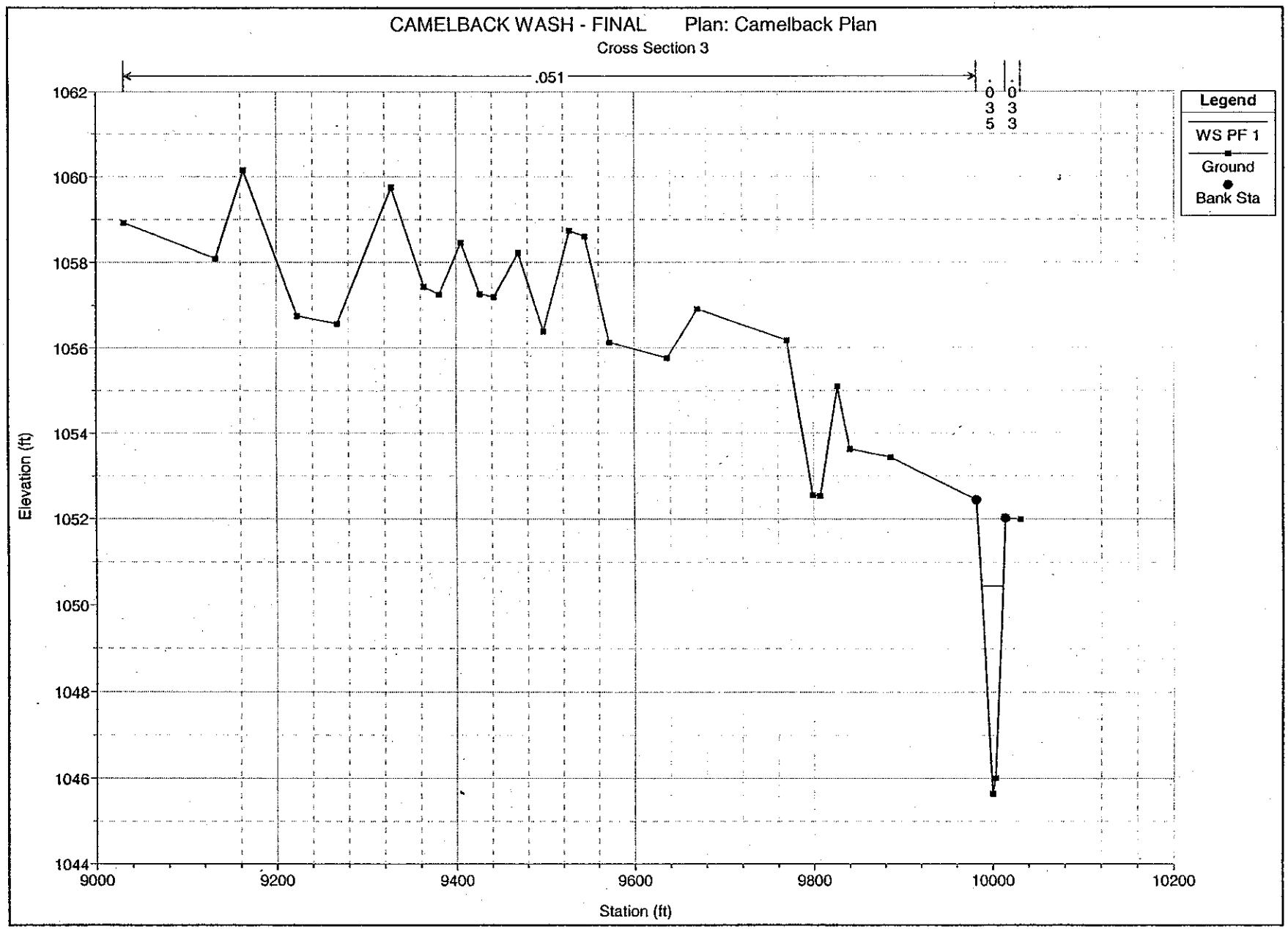

CAMELBACK WASH - FINAL Plan: Camelback Plan
Cross Section 8
.03
.031
.031
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
1060
1058
1056
1054
1052
1050
1048
9000
9200
9400
9600
9800
10000
10200
Station (ft)

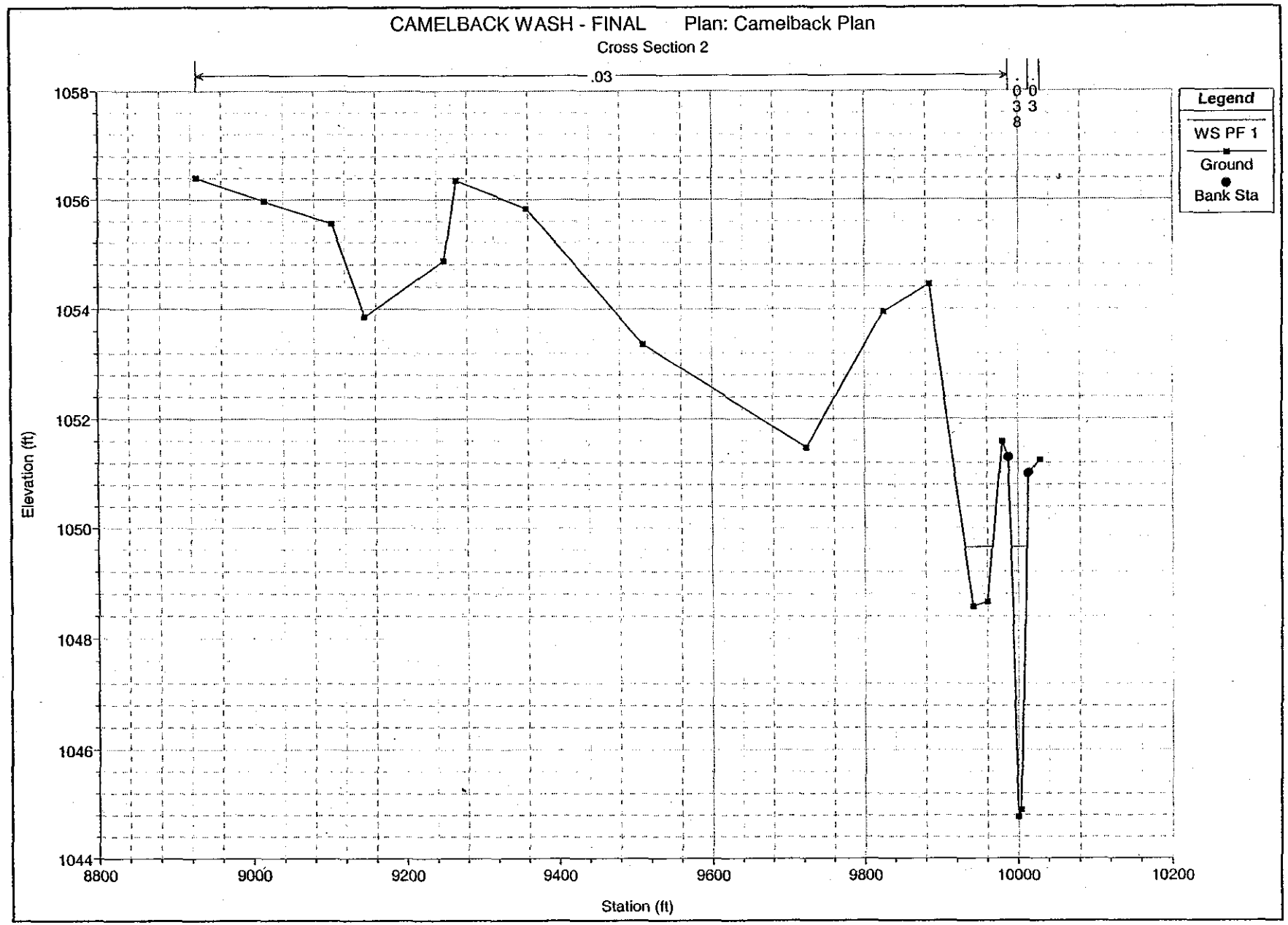

CAMELBACK WASH - FINAL Plan: Camelback Plan
Cross Section 7
.03
.031
.031
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
1058
1056
1054
1052
1050
1048
9000
9200
9400
9600
9800
10000
10200
Station (ft)

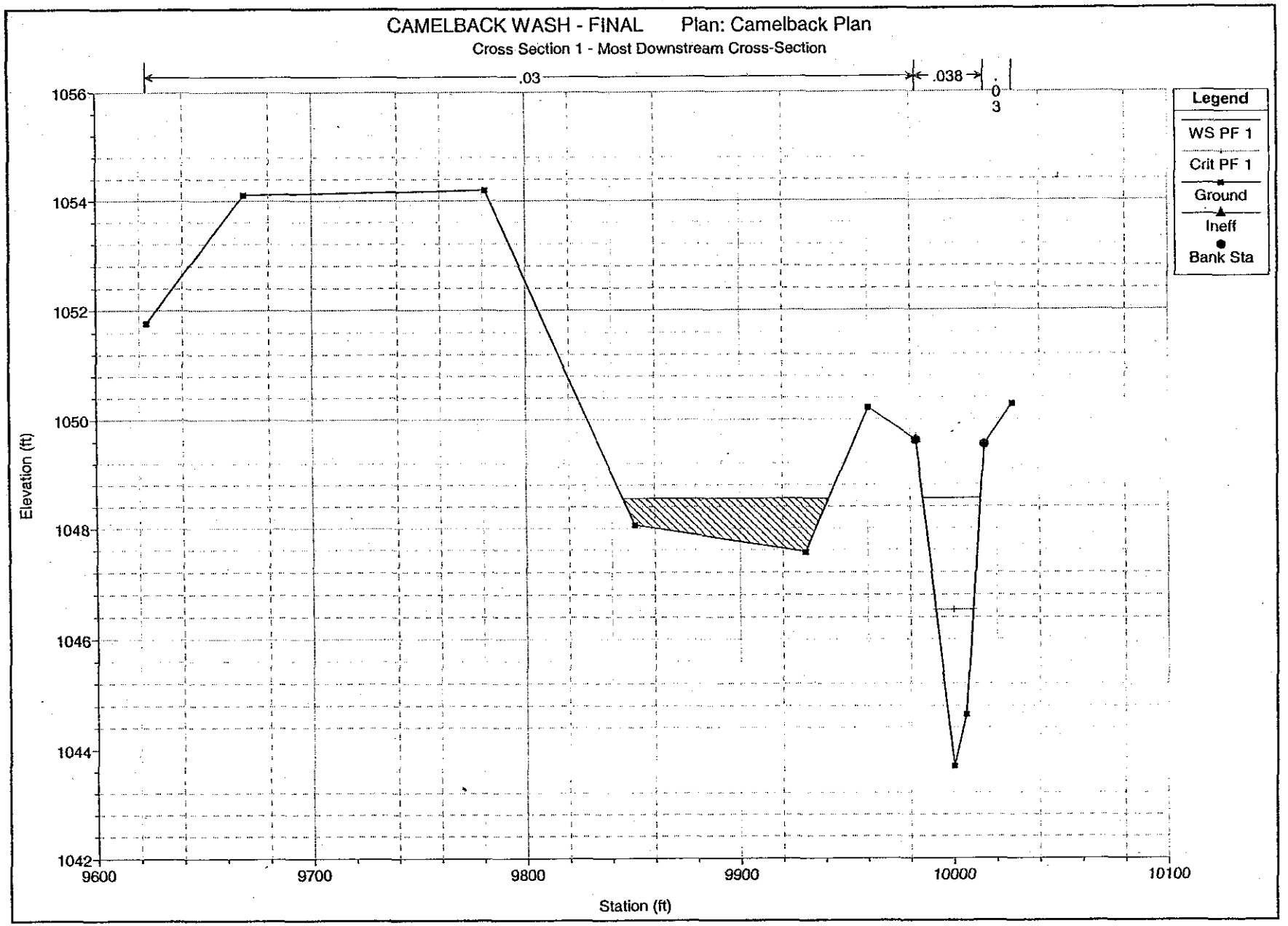

CAMELBACK WASH - FINAL Plan: Camelback Plan
Cross Section 6
.061
.034
.034
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
1060
1058
1056
1054
1052
1050
1048
9400
9500
9600
9700
9800
9900
10000
10100
Station (ft)


CAMELBACK WASH - FINAL Plan: Camelback Plan
Cross Section 5
.061
.034
.034
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
1060
1058
1056
1054
1052
1050
1048
9200
9400
9600
9800
10000
10200
Station (ft)


CAMELBACK WASH - FINAL Plan: Camelback Plan
Cross Section 4
.051
.035
.033
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
1062
1060
1058
1056
1054
1052
1050
1048
1046
9200
9400
9600
9800
10000
10200
Station (ft)


CAMELBACK WASH - FINAL Plan: Camelback Plan
Cross Section 3
.051
.035
.033
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
1062
1060
1058
1056
1054
1052
1050
1048
1046
1044
9000
9200
9400
9600
9800
10000
10200
Station (ft)


CAMELBACK WASH - FINAL Plan: Camelback Plan
Cross Section 2
.03
.03
.03
Legend
WS PF 1
Ground
Bank Sta
Elevation (ft)
1058
1056
1054
1052
1050
1048
1046
1044
8800
9000
9200
9400
9600
9800
10000
10200
Station (ft)


CAMELBACK WASH - FINAL Plan: Camelback Plan
Cross Section 1 - Most Downstream Cross-Section
.03
.038
.03
Legend
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
1056
1054
1052
1050
1048
1046
1044
1042
9600
9700
9800
9900
10000
10100
Station (ft)

REACH BOUNDARY CONDITIONS

URS

Job Loop 303 - Floodplain
Description Reach Boundary Conditions using normal depth

Project No.
Computed by MKR
Checked by RLD

Page ___ of ___
Sheet ___ of ___
Date
Date
Reference

$$\text{Normal Slope} = \frac{(\text{Min Elev @ x-section 2}) - (\text{Min Elev @ X-section 1})}{\text{Distance}}$$

$$= \frac{1044.77 - 1043.7}{710}$$

$$= 0.0015 \checkmark$$

CHECK-RAS Program: NT Check
Manning's n Value and Transition Loss Coefficient Review

Project File: P:\FCDMC\E152600\Floodplain Study\HEC-RAS Analysis\RAS\Camelback\1-camelback final rev \camelbackfinalrev.prj
Plan File: P:\FCDMC\E152600\Floodplain Study\HEC-RAS Analysis\RAS\Camelback\1-camelback final rev \camelbackfinalrev.p01
Geometry File: P:\FCDMC\E152600\Floodplain Study\HEC-RAS Analysis\RAS\Camelback\1-camelback final rev \camelbackfinalrev.g01
Flow File: P:\FCDMC\E152600\Floodplain Study\HEC-RAS Analysis\RAS\Camelback\1-camelback final rev \camelbackfinalrev.f01
Report File: P:\FCDMC\E152600\Floodplain Study\HEC-RAS Analysis\RAS\Camelback\1-camelback final rev \camelbackfinalrev.nt
Selected profiles: PF 1
Date: 10/22/2002
Time: 7:30:05 AM

SECNO	STRUCTURE	NLOB	NCHL	NROB	CNTR	EXP
Camelback Road W,Camelback Main						
42		0.036	0.078	0.034	0.1	0.3
41		0.036	0.078	0.034	0.1	0.3
40		0.036	0.078	0.034	0.1	0.3
39		0.033	0.078	0.032	0.1	0.3
38		0.033	0.026	0.032	0.3	0.5
37		0.033	0.026	0.032	0.3	0.5
36.9	Culvert-Up	0.033	0.026	0.032	0.3	0.5
36.9	Culvert-Dn	0.033	0.026	0.032	0.3	0.5
36.4		0.033	0.026	0.032	0.3	0.5
36		0.06	0.026	0.03	0.1	0.3
35		0.06	0.026	0.03	0.1	0.3
34		0.03	0.035	0.03	0.1	0.3
33		0.03	0.035	0.03	0.3	0.5
32		0.031	0.035	0.038	0.3	0.5
31.9	Culvert-Up	0.031	0.035	0.038	0.3	0.5
31.9	Culvert-Dn	0.031	0.035	0.038	0.3	0.5
31.4		0.031	0.035	0.038	0.3	0.5
31		0.031	0.035	0.038	0.1	0.3
30		0.031	0.032	0.038	0.1	0.3
29		0.031	0.032	0.038	0.1	0.3
[illegible]		0.03	0.033	0.03	0.1	0.3
[illegible]		0.03	0.033	0.03	0.3	0.5
[illegible].9		0.03	0.033	0.03	0.3	0.5
26.7	Culvert-Up	0.03	0.033	0.03	0.3	0.5
26.7	Culvert-Dn	0.03	0.033	0.03	0.3	0.5
26.4		0.03	0.033	0.03	0.3	0.5
26		0.03	0.033	0.03	0.1	0.3
25		0.03	0.078	0.078	0.1	0.3
24		0.03	0.078	0.078	0.3	0.5
23		0.031	0.034	0.031	0.3	0.5
22.3	Culvert-Up	0.031	0.034	0.031	0.3	0.5
22.3	Culvert-Dn	0.031	0.034	0.031	0.3	0.5
22		0.031	0.034	0.031	0.3	0.5
21		0.031	0.034	0.031	0.1	0.3
20		0.039	0.026	0.03	0.1	0.3
19		0.036	0.026	0.03	0.1	0.3
18		0.036	0.036	0.03	0.3	0.5
17		0.035	0.036	0.03	0.3	0.5
16.9	Culvert-Up	0.035	0.036	0.03	0.3	0.5
16.9	Culvert-Dn	0.039	0.052	0.03	0.3	0.5
16.4		0.039	0.052	0.03	0.3	0.5
16		0.039	0.052	0.03	0.1	0.3
15		0.04	0.052	0.03	0.1	0.3
14		0.036	0.036	0.03	0.1	0.3
13		0.033	0.032	0.031	0.1	0.3
12		0.033	0.032	0.031	0.3	0.5
11		0.033	0.032	0.031	0.3	0.5
10.7	Culvert-Up	0.033	0.032	0.031	0.3	0.5
10.7	Culvert-Dn	0.03	0.031	0.03	0.3	0.5
10.4		0.03	0.031	0.03	0.3	0.5
10		0.03	0.031	0.03	0.1	0.3
9		0.03	0.031	0.03	0.1	0.3
8		0.03	0.031	0.03	0.1	0.3
7		0.03	0.031	0.03	0.1	0.3
6		0.061	0.034	0.034	0.1	0.3
[illegible]		0.061	0.034	0.034	0.1	0.3
[illegible]		0.051	0.035	0.033	0.1	0.3
3		0.051	0.035	0.033	0.1	0.3
2		0.03	0.038	0.03	0.1	0.3
1		0.03	0.038	0.03	0.1	0.3

---Summary of Statistics---

	Minimum	Maximum

Left Overbank n Value:	0.03	0.061
Right Overbank n Value:	0.03	0.078
Channel n Value:	0.026	0.078
Contraction Coefficient:	0.1	0.3
Expansion Coefficient:	0.3	0.5

GHNESS COEFFICIENT CHECK

RS: 42
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 42
NT RC 05 The left overbank n value of 0.036 and the right overbank n value
of 0.034 are less than or equal to the channel n value of 0.078
The overbank n values should be reevaluated.

RS: 41
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 41
NT RC 05 The left overbank n value of 0.036 and the right overbank n value
of 0.034 are less than or equal to the channel n value of 0.078
The overbank n values should be reevaluated.

RS: 40
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 40
NT RC 05 The left overbank n value of 0.036 and the right overbank n value
of 0.034 are less than or equal to the channel n value of 0.078
The overbank n values should be reevaluated.

39
RC 01 Left overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 39
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 39
NT RC 05 The left overbank n value of 0.033 and the right overbank n value
of 0.032 are less than or equal to the channel n value of 0.078
The overbank n values should be reevaluated.

RS: 38
NT RC 01 Left overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 38
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 37
NT RC 01 Left overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 37
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

36.9
RC 01 Left overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 36.9
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

```
RS:       36.9
NT RC 01 Left overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.

RS:       36.9
RC 01 Right overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.

RS:       36.4
NT RC 01 Left overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.

RS:       36.4
NT RC 01 Right overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.

RS:       36
NT RC 01 Right overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.

RS:       35
NT RC 01 Right overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.

RS:       34
NT RC 01 Left overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.

RS:       34
NT RC 01 Right overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.

         34
RC 05 The left overbank n value of 0.03 and the right overbank n value
         of 0.03 are less than or equal to the channel n value of 0.035
         The overbank n values should be reevaluated.

RS:       33
NT RC 01 Left overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.

RS:       33
NT RC 01 Right overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.

RS:       33
NT RC 05 The left overbank n value of 0.03 and the right overbank n value
         of 0.03 are less than or equal to the channel n value of 0.035
         The overbank n values should be reevaluated.

RS:       32
NT RC 01 Left overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.

RS:       31.9
NT RC 01 Left overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.

RS:       31.9
NT RC 01 Left overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.

         31.4
RC 01 Left overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.

RS:       31
NT RC 01 Left overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.
```

RS: 30
NT RC 01 Left overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 29
RC 01 Left overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 28
NT RC 01 Left overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 28
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 28
NT RC 05 The left overbank n value of 0.03 and the right overbank n value
of 0.03 are less than or equal to the channel n value of 0.033
The overbank n values should be reevaluated.

RS: 27
NT RC 01 Left overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 27
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 27
NT RC 05 The left overbank n value of 0.03 and the right overbank n value
of 0.03 are less than or equal to the channel n value of 0.033
The overbank n values should be reevaluated.

26.9
RC 01 Left overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 26.9
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 26.9
NT RC 05 The left overbank n value of 0.03 and the right overbank n value
of 0.03 are less than or equal to the channel n value of 0.033
The overbank n values should be reevaluated.

RS: 26.7
NT RC 01 Left overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 26.7
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 26.7
NT RC 05 The left overbank n value of 0.03 and the right overbank n value
of 0.03 are less than or equal to the channel n value of 0.033
The overbank n values should be reevaluated.

RS: 26.7
NT RC 01 Left overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

26.7
RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 26.7
NT RC 05 The left overbank n value of 0.03 and the right overbank n value
of 0.03 are less than or equal to the channel n value of 0.033
The overbank n values should be reevaluated.

RS: 26.4
NT RC 01 Left overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 26.4
RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 26.4
NT RC 05 The left overbank n value of 0.03 and the right overbank n value
of 0.03 are less than or equal to the channel n value of 0.033
The overbank n values should be reevaluated.

RS: 26
NT RC 01 Left overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 26
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 26
NT RC 05 The left overbank n value of 0.03 and the right overbank n value
of 0.03 are less than or equal to the channel n value of 0.033
The overbank n values should be reevaluated.

RS: 25
NT RC 01 Left overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 25
NT RC 05 The left overbank n value of 0.03 and the right overbank n value
of 0.078 are less than or equal to the channel n value of 0.078
The overbank n values should be reevaluated.

24
RC 01 Left overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 24
NT RC 05 The left overbank n value of 0.03 and the right overbank n value
of 0.078 are less than or equal to the channel n value of 0.078
The overbank n values should be reevaluated.

RS: 23
NT RC 01 Left overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 23
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 23
NT RC 05 The left overbank n value of 0.031 and the right overbank n value
of 0.031 are less than or equal to the channel n value of 0.034
The overbank n values should be reevaluated.

RS: 22.3
NT RC 01 Left overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 22.3
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

22.3
RC 05 The left overbank n value of 0.031 and the right overbank n value
of 0.031 are less than or equal to the channel n value of 0.034
The overbank n values should be reevaluated.

RS: 22.3
NT RC 01 Left overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 22.3
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 22.3
RC 05 The left overbank n value of 0.031 and the right overbank n value
of 0.031 are less than or equal to the channel n value of 0.034
The overbank n values should be reevaluated.

RS: 22
NT RC 01 Left overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 22
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 22
NT RC 05 The left overbank n value of 0.031 and the right overbank n value
of 0.031 are less than or equal to the channel n value of 0.034
The overbank n values should be reevaluated.

RS: 21
NT RC 01 Left overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 21
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 21
NT RC 05 The left overbank n value of 0.031 and the right overbank n value
of 0.031 are less than or equal to the channel n value of 0.034
The overbank n values should be reevaluated.

20
RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 19
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 18
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 18
NT RC 05 The left overbank n value of 0.036 and the right overbank n value
of 0.03 are less than or equal to the channel n value of 0.036
The overbank n values should be reevaluated.

RS: 17
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 17
NT RC 05 The left overbank n value of 0.035 and the right overbank n value
of 0.03 are less than or equal to the channel n value of 0.036
The overbank n values should be reevaluated.

RS: 16.9
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

16.9
RC 05 The left overbank n value of 0.035 and the right overbank n value
of 0.03 are less than or equal to the channel n value of 0.036
The overbank n values should be reevaluated.

RS: 16.9
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 16.9
NT RC 05 The left overbank n value of 0.039 and the right overbank n value of 0.03 are less than or equal to the channel n value of 0.052
The overbank n values should be reevaluated.

RS: 16.4
RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 16.4
NT RC 05 The left overbank n value of 0.039 and the right overbank n value of 0.03 are less than or equal to the channel n value of 0.052
The overbank n values should be reevaluated.

RS: 16
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 16
NT RC 05 The left overbank n value of 0.039 and the right overbank n value of 0.03 are less than or equal to the channel n value of 0.052
The overbank n values should be reevaluated.

RS: 15
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 15
NT RC 05 The left overbank n value of 0.04 and the right overbank n value of 0.03 are less than or equal to the channel n value of 0.052
The overbank n values should be reevaluated.

RS: 14
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

14
RC 05 The left overbank n value of 0.036 and the right overbank n value of 0.03 are less than or equal to the channel n value of 0.036
The overbank n values should be reevaluated.

RS: 13
NT RC 01 Left overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 13
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 12
NT RC 01 Left overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 12
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 11
NT RC 01 Left overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 11
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

10.7
RC 01 Left overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

RS: 10.7
NT RC 01 Right overbank n value is less than 0.035
The n value for overbank is usually larger then 0.035.
The n value should be reevaluated.

```
RS:       10.7
NT RC 01 Left overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.

RS:       10.7
   RC 01 Right overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.

RS:       10.7
NT RC 05 The left overbank n value of 0.03 and the right overbank n value
         of 0.03 are less than or equal to the channel n value of 0.031
         The overbank n values should be reevaluated.

RS:       10.4
NT RC 01 Left overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.

RS:       10.4
NT RC 01 Right overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.

RS:       10.4
NT RC 05 The left overbank n value of 0.03 and the right overbank n value
         of 0.03 are less than or equal to the channel n value of 0.031
         The overbank n values should be reevaluated.

RS:       10
NT RC 01 Left overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.

RS:       10
NT RC 01 Right overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.

          10
   RC 05 The left overbank n value of 0.03 and the right overbank n value
         of 0.03 are less than or equal to the channel n value of 0.031
         The overbank n values should be reevaluated.

RS:       9
NT RC 01 Left overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.

RS:       9
NT RC 01 Right overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.

RS:       9
NT RC 05 The left overbank n value of 0.03 and the right overbank n value
         of 0.03 are less than or equal to the channel n value of 0.031
         The overbank n values should be reevaluated.

RS:       8
NT RC 01 Left overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.

RS:       8
NT RC 01 Right overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.

RS:       8
NT RC 05 The left overbank n value of 0.03 and the right overbank n value
         of 0.03 are less than or equal to the channel n value of 0.031
         The overbank n values should be reevaluated.

          7
   RC 01 Left overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.

RS:       7
NT RC 01 Right overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.
```

```
RS:       7
NT RC 05 The left overbank n value of 0.03 and the right overbank n value
         of 0.03 are less than or equal to the channel n value of 0.031
         The overbank n values should be reevaluated.

RS:       6
NT RC 01 Right overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.

RS:       5
NT RC 01 Right overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.

RS:       4
NT RC 01 Right overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.

RS:       3
NT RC 01 Right overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.

RS:       2
NT RC 01 Left overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.

RS:       2
NT RC 01 Right overbank n value is less than 0.035
         The n value for overbank is usually larger then 0.035.
         The n value should be reevaluated.

RS:       2
NT RC 05 The left overbank n value of 0.03 and the right overbank n value
         of 0.03 are less than or equal to the channel n value of 0.038
         The overbank n values should be reevaluated.

TRANSITION LOSS COEFFICIENT CHECK
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ROUGHNESS COEFFICIENT AT STRUCTURES
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RS:       23
NT RS 01 This is Section 3.
         Channel n value of 0.034 is less than the channel n value of 0.078
         at Section 4.

---END---
```

CHECK-RAS Program, XS Check
Cross Section Location and Alignment Review

Project File: P:\FCDMC\E152600\Floodplain Study\HEC-RAS Analysis\RAS\Camelback\1-camelback final rev \camelbackfinalrev.prj
Plan File: P:\FCDMC\E152600\Floodplain Study\HEC-RAS Analysis\RAS\Camelback\1-camelback final rev \camelbackfinalrev.p01
Geometry File: P:\FCDMC\E152600\Floodplain Study\HEC-RAS Analysis\RAS\Camelback\1-camelback final rev \camelbackfinalrev.g01
Flow File: P:\FCDMC\E152600\Floodplain Study\HEC-RAS Analysis\RAS\Camelback\1-camelback final rev \camelbackfinalrev.f01
Report File: P:\FCDMC\E152600\Floodplain Study\HEC-RAS Analysis\RAS\Camelback\1-camelback final rev \camelbackfinalrev.xs
Selected profiles: PF 1
Date: 10/22/2002
Time: 7:30:24 AM

SECNO	Len Lob	Len Chl	Len Rob	TopWdthAct	Q Total	Flow Code
Camelback Road W,Camelback Main						
42	500	500	500	551.62	883.17	E
41	400	400	400	357.74	639.53	D,C
40	550	550	550	318.73	826.68	D,E
39	500	500	500	422.52	1054.85	D,E
38	330	330	330	529.22	1009.55	E
37	115	115	115	22.16	1127.62	
36.9	Culvert #1-Up					
36.9	Culvert #1-Dn					
36.9	Culvert #2-Up					
36.9	Culvert #2-Dn					
36.4	440	440	440	83.19	1133.01	C
36	500	500	500	612.91	1153.64	D
35	500	500	500	677.94	996.64	D,E,C
34	500	500	500	489.2	697.85	D,E
33	630	630	630	470.84	673.99	D,E,C
32	95	95	95	608.81	702.49	
31.9	Culvert #1-Up					
31.9	Culvert #1-Dn					
31.4	315	315	315	55.74	696.72	
[illegible]	550	550	550	366.03	711.49	
[illegible]	500	500	500	351.62	737.27	D
[illegible]	500	500	500	371.24	759.99	D,E
28	560	560	560	487.81	755.31	D,E
27	125	125	125	395.81	567.89	D,E,C
26.9	70	70	70	129.57	518.3	E
26.7	Culvert #1-Up					
26.7	Culvert #1-Dn					
26.4	380	380	380	47.65	526.89	C
26	785	785	785	89.36	582.34	D,B
25	910	910	910	88.5	696.88	D,B
24	300	300	300	111.95	748.18	D,E,B
23	185	185	185	41.9	575.19	E
22.3	Culvert #1-Up					
22.3	Culvert #1-Dn					
22	500	500	500	28.94	437.32	C
21	500	500	500	157.17	556.83	D
20	500	500	500	146.1	676.33	D
19	500	500	500	231.42	795.84	
18	660	660	660	477.95	910	E,C
17	85	85	85	415.75	1065.71	D,E
16.9	Culvert #2-Up					
16.9	Culvert #2-Dn					
16.9	Culvert #3-Up					
16.9	Culvert #3-Dn					
16.4	305	305	305	45.13	971.81	
16	360	360	360	501.85	1033.84	D,E
15	590	590	590	447.42	951.62	D,E
14	510	510	510	472.57	592.57	D,E
13	410	410	410	486.14	393.66	D,E
12	280	280	280	440.51	362.96	D,E
11	160	160	160	472.06	469.34	D,E
10.7	Culvert #2-Up					
10.7	Culvert #2-Dn					
10.7	Culvert #3-Up					
[illegible].7	Culvert #3-Dn					
[illegible].4	300	300	300	83.33	220.59	E
10	510	510	510	52.99	110.85	D
9	500	500	500	40.58	133.06	D
8	510	510	510	53.12	154.84	
7	660	660	660	31.93	177.06	D
6	500	500	500	33.39	205.81	D
5	520	520	520	122.1	205.81	D
4	460	460	460	26.17	205.81	D

3	500	500	500	24.06	205.81	
2	710	710	710	56.41	205.81	D
1	0	0	0	26.84	205.81	

B=blocked obstruction XS SC 05
C=critial depth XS SC 03
D=divided flow XS SC 01
[illegible]ross section extended XS SC 02
[illegible]nown water-surface XS SC 04

DISTANCE CHECK

SPACING CHECK

INEFFECTIVE FLOW CHECK

DISCHARGE CHECK

RS: 41
XS DC 01 Discharge decreases in the downstream direction.

RS: 38
XS DC 01 Discharge decreases in the downstream direction.

RS: 36.4
XS DC 03 Discharge is different between the upstream side and downstream side of the structure

RS: 35
XS DC 01 Discharge decreases in the downstream direction.

RS: 34
[illegible] DC 01 Discharge decreases in the downstream direction.

[illegible] 33
XS DC 01 Discharge decreases in the downstream direction.

RS: 31.4
XS DC 01 Discharge decreases in the downstream direction.

RS: 31.4
XS DC 03 Discharge is different between the upstream side and downstream side of the structure

RS: 28
XS DC 01 Discharge decreases in the downstream direction.

RS: 27
XS DC 01 Discharge decreases in the downstream direction.

RS: 26.9
XS DC 01 Discharge decreases in the downstream direction.

RS: 26.4
XS DC 03 Discharge is different between the upstream side and downstream side of the structure

RS: 23
XS DC 01 Discharge decreases in the downstream direction.

RS: 22
XS DC 01 Discharge decreases in the downstream direction.

RS: 22
XS DC 03 Discharge is different between the upstream side and downstream side of the structure

[illegible] 16.4
[illegible]DC 01 Discharge decreases in the downstream direction.

RS: 16.4
XS DC 03 Discharge is different between the upstream side and downstream side of the structure

RS: 15
XS DC 01 Discharge decreases in the downstream direction.

```
RS:       14
XS DC 01 Discharge decreases in the downstream direction.

RS:       13
XS DC 01 Discharge decreases in the downstream direction.

          12
DC 01 Discharge decreases in the downstream direction.

RS:       10.4
XS DC 01 Discharge decreases in the downstream direction.

RS:       10.4
XS DC 03 Discharge is different between the upstream side and downstream
         side of the structure

RS:       10
XS DC 01 Discharge decreases in the downstream direction.


LOCATION CHECK
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BOUNDARY CONDITION CHECK
------------------------

XS BC 02 The name of the stream is Camelback Road W,Camelback Main
         Normal S = .0015 is specified as the downstream boundary
         for profile PF 1


LATERAL WEIRS CHECK
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---END---
```

CHECK-RAS Program: Structure Check

Project File: P:\FCDMC\E152600\Floodplain Study\HEC-RAS Analysis\RAS\Camelback\1-camelback final rev \camelbackfinalrev.prj
Plan File: P:\FCDMC\E152600\Floodplain Study\HEC-RAS Analysis\RAS\Camelback\1-camelback final rev \camelbackfinalrev.p01
Geometry File: P:\FCDMC\E152600\Floodplain Study\HEC-RAS Analysis\RAS\Camelback\1-camelback final rev \camelbackfinalrev.g01
Flow File: P:\FCDMC\E152600\Floodplain Study\HEC-RAS Analysis\RAS\Camelback\1-camelback final rev \camelbackfinalrev.f01
Report File: P:\FCDMC\E152600\Floodplain Study\HEC-RAS Analysis\RAS\Camelback\1-camelback final rev \camelbackfinalrev.br
Selected profiles: PF 1
Date: 10/22/2002
Time: 9:20:24 AM

RS	MaxLoChord	MnTpRd	EGEL	WSEL	MinChEl	Structure
Camelback Road W,Camelback Main						
42			1118.64	1118.61	1115.92	
41			1115.51	1115.26	1112.4	
40			1114.36	1114.28	1111.29	
39			1113.08	1112.96	1109.22	
38			1112.16	1112.02	1107.35	
37			1111.07	1109.45	1103.73	
36.9	1108.13	1110.16	0	1108.13	1104.13	Culvert #1-Up
36.9	1107.54	1109.49	0	1107.54	1103.54	Culvert #1-Dn
36.9	1105.64	1110.16	0	1105.64	1103.64	Culvert #2-Up
36.9	1105.52	1109.49	0	1105.52	1103.52	Culvert #2-Dn
36.4			1109.76	1109.07	1103.53	
36			1107.07	1106.25	1100.04	
35			1104.51	1104.13	1097.94	
34			1100.91	1100.72	1095.66	
33			1098.87	1098.59	1093.67	
32			1096.43	1096.35	1090.52	
31.9	1093.49	1095.46	0	1093.49	1090.49	Culvert #1-Up
31.9	1093.31	1095	0	1093.31	1090.31	Culvert #1-Dn
31.4			1094.34	1094.21	1090.28	
31			1093.43	1093.16	1088.94	
30			1090.68	1090.5	1085.92	
[illegible]			1088.63	1088.45	1084.29	
[illegible]			1086.95	1086.84	1082.38	
[illegible]			1085.38	1085.12	1079.87	
26.9			1084.58	1084.29	1079.77	
26.7	1083.79	1084.02	0	1082.82	1079.79	Culvert #1-Up
26.7	1083.7	1083.9	0	1082.51	1079.7	Culvert #1-Dn
26.4			1082.68	1082.51	1079.69	
26			1078.86	1078.45	1077.68	
25			1075.98	1075.74	1074.33	
24			1074.48	1074.34	1070.13	
23			1074.12	1073.94	1068.44	
22.3	1071.42	1072.52	0	1071.42	1068.42	Culvert #1-Up
22.3	1070.99	1072.52	0	1070.31	1067.99	Culvert #1-Dn
22			1071.13	1070.23	1068.01	
21			1068.05	1067.76	1061.98	
20			1066.8	1066.24	1060.29	
19			1065.49	1064.93	1059.86	
18			1063.59	1063.34	1058.34	
17			1062.46	1062.35	1055.19	
16.9	1060.14	1061.64	0	1060.14	1056.14	Culvert #2-Up
16.9	1059.35	1061.17	0	1059.35	1055.35	Culvert #2-Dn
16.9	1060.22	1061.64	0	1060.22	1055.22	Culvert #3-Up
16.9	1059.83	1061.17	0	1059.83	1054.83	Culvert #3-Dn
16.4			1061.27	1060.9	1054.83	
16			1060.27	1060.21	1056.05	
15			1059.44	1059.38	1055.41	
14			1057.8	1057.68	1053.77	
13			1056.63	1056.58	1052.76	
12			1055.86	1055.72	1051.7	
11			1055.74	1055.71	1048.24	
10.7	1053.23	1054.61	0	1053.23	1048.23	Culvert #2-Up
10.7	1053.23	1054.72	0	1053.23	1048.23	Culvert #2-Dn
10.7	1054.27	1054.61	0	1054.27	1050.27	Culvert #3-Up
10.7	1054.26	1054.72	0	1054.26	1050.26	Culvert #3-Dn
10.4			1055.01	1055.01	1048.24	
[illegible]			1054.99	1054.94	1050.7	
[illegible]			1054.69	1054.62	1050.46	
8			1054.38	1054.33	1049.63	
7			1054.02	1053.91	1049.48	
6			1053.29	1053.16	1048.39	
5			1052.5	1052.32	1048.35	
4			1051.46	1051.29	1047.01	
3			1050.62	1050.45	1045.65	
2			1049.76	1049.66	1044.77	

1	1048.68	1048.55	1043.7

RIVER/REACH: Camelback Road W, Camelback Main
RIVER STATION: 36.9
TYPE OF STRUCTURE: Culvert

Description:	2 CMPs (48" & 24") at Citrus Road and Camelback
Distance from Upstream XS:	40
Deck/Roadway Width:	45
Weir Coefficient:	3
Maximum allowable submergence for weir flow:	0.95
Elevation at which weir flow begins:	0
Weir crest shape:	Broad Crested

Sec	River Station	Length Channel	WSEL	Surch.	EGEL	TopWidth Actual	
4	38	330.00	1112.02		1112.16	527.83	
3	37	115.00	1109.45		1111.07	34.22	
	36.9	60.00	1108.13		0	0	Culvert #1-Up
	36.9	15.00	1107.54		0	0	Culvert #1-Dn
	36.9	60.00	1105.64		0	0	Culvert #2-Up
	36.9	12.00	1105.52		0	0	Culvert #2-Dn
2	36.4	440.00	1109.07		1109.76	83.19	
1	36	500.00	1106.25		1107.07	611.93	

	Ineffective Flow, Section 3			Ineffective Flow, Section 2		
	Sta L	Sta R	Elev	Sta L	Sta R	Elev
1	8731.11	9985.34	1109.41	8785	9992.92	1109.02
2	10007.5	10050.55	1109.41	10007.69	10040	1109.06

Opening Type	StagStaL	StagStaR	EncStaL	EncStaR	LIfStaS	RIfStaS
Culvert Group					9985.34	10007.5U
					9992.92	10007.69 D

Opening Type	StagStaL	StagStaR	EncStaL	EncStaR	LIfStaS	RIfStaS
Culvert Group					9985.34	10007.5U
					9992.92	10007.69 D

CULVERT:
Culvert Name: Culvert #1
Shape: Circular Rise: 4 Span: 0 Barrels: 1
FHWA Chart #: # 2 - Corrugated Metal Pipe C
FHWA Scale #: # 1 - Headwall
Solution Crit:Highest U.S. EG

UpstrmDist:	40	Length:	60	n-Value:	0.024		
EntLossCoef:	0.5	ExtLossCoef:	1	CulvInvElU	1104.13	CulvInvElD	1103.54
LCntStaU:	9990	RCntStaU:	9990	LCntStaD	9998	RCntStaD	9998
Culvert Depth Blocked:	0						

Culv Area:	12.57	CulvQ:	90.29	MinTopRd:	1110.15

	LAbutSt	RAbutSt	LMnTpRd	RMnTpRd	MnTpRd	MxLoCd	
Culvert #1	9988	9992	1110.18	1110.16	1110.16	1108.13	U
	9996	10000	1109.54	1109.49	1109.49	1107.54	D

CULVERT:
Culvert Name: Culvert #2
Shape: Circular Rise: 2 Span: 0 Barrels: 1
FHWA Chart #: # 2 - Corrugated Metal Pipe C
FHWA Scale #: # 1 - Headwall
Solution Crit:Highest U.S. EG

UpstrmDist:	43	Length:	60	n-Value:	0.024

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EntLossCoef:   0.5      ExtLossCoef:    1        CulvInvElU      1103.64  CulvInvElD      1103.52
LCntStaU:      9995     RCntStaU:       9995     LCntStaD        10003    RCntStaD        10003
Culvert Depth Blocked:   0

-----------------------------------------------------------------------------
Culv Area:     3.14     CulvQ:          16.58    MinTopRd:       1110.15
-----------------------------------------------------------------------------

                    LAbutSt   RAbutSt   LMnTpRd   RMnTpRd   MnTpRd    MxLoCd
-----------------------------------------------------------------------------
Culvert #2          9994      9996      1110.18   1110.16   1110.16   1105.64  U
                    10002     10004     1109.54   1109.49   1109.49   1105.52  D
-----------------------------------------------------------------------------


Name           Q Total.  Q Struc   Q Weir    Selected Method     Flow Type
-----------------------------------------------------------------------------
Culvert #1               90.29     1023.44   Highest U.S. EG     Pressure and Weir Flow
Culvert #2               16.58     1023.44   Highest U.S. EG     Pressure and Weir Flow
-----------------------------------------------------------------------------

GEOMETRIC CHECK
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TYPE OF FLOW CHECK
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RS:       36.9 This is Culvert #1
CV PW 01  Type of flow is pressure and weir flow because,
          1. EGEL 3 of 1111.07 is greater than MinTopRd of 1110.15.
          2. CulvWSIn of 1108.13 is greater than or equal to MxLoCdU of 1108.13.
          3. CulvWSOut of 1107.54 is greater than or equal to MxLoCdD of 1107.54.

RS:       36.9 This is Culvert #2
CV PW 01  Type of flow is pressure and weir flow because,
          1. EGEL 3 of 1111.07 is greater than MinTopRd of 1110.15.
          2. CulvWSIn of 1105.64 is greater than or equal to MxLoCdU of 1105.64.
          3. CulvWSOut of 1105.52 is greater than or equal to MxLoCdD of 1105.52.

DISTANCE CHECK
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CULVERT COEFFICIENT CHECK
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CULVERT CRITERIA CHECK
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INEFFECTIVE FLOW CHECK
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RS:       37 This is section 3
ST GD 05  Weir flow occurs at Culvert Group 1
          All ineffective flow elevations at Section 3 are less than
          the WSEL at Section 3.
          The velocity head at Section 3 is more than 0.5 foot and more than
          the velocity head at Section 4.
          Section 3 should be recoded to represent the natural valley
          cross section.

RS:       36.4 This is section 2
ST GD 07  Weir flow occurs at the structure. All ineffective flow
          elevations at Section 2 are less than the WSEL at Section 2.
          Critical depth occurs at Section 2.
          However, critical depth does not occur at Section 1.
          Section 2 should be recoded to represent the natural valley
          cross section.


-----------------------------------------------------------------------------
RIVER/REACH:        Camelback Road W, Camelback Main
RIVER STATION:      31.9
TYPE OF STRUCTURE:  Culvert
-----------------------------------------------------------------------------
Description:                                        RCP (36") at 175th Ave and Camelback
Distance from Upstream XS:                          45
Deck/Roadway Width:                                 22
Weir Coefficient:                                   3
Maximum allowable submergence for weir flow:        0.95
Elevation at which weir flow begins:                0
Weir crest shape:                                   Broad Crested
-----------------------------------------------------------------------------
```

Sec	River Station	Length Channel	WSEL	Surch.	EGEL	TopWidth Actual	
4	33	630.00	1098.59		1098.87	450.25	
3	32	95.00	1096.35		1096.43	610.27	
	31.9	24.00	1093.49		0	0	Culvert #1-Up
	31.9	29.00	1093.31		0	0	Culvert #1-Dn
	31.4	315.00	1094.21		1094.34	106.25	
	31	550.00	1093.16		1093.43	366.03	

	Ineffective Flow, Section 3			Ineffective Flow, Section 2		
	Sta L	Sta R	Elev	Sta L	Sta R	Elev
1	9420.93	9994.08	1095.31	8890	9969.06	1094.14
2	10009.21	10075.45	1095.29	10024.8	10038	1094.14

Opening Type	StagStaL	StagStaR	EncStaL	EncStaR	LIfStaS	RIfStaS
Culvert Group					9994.08	10009.21 U
					9969.06	10024.8D

CULVERT:
Culvert Name: Culvert #1
Shape: Circular Rise: 3 Span: 0 Barrels: 1
FHWA Chart #: # 1 - Concrete Pipe Culvert
FHWA Scale #: # 1 - Square edge entrance with headwall
Solution Crit:Highest U.S. EG

UpstrmDist:	42	Length:	24	n-Value:	0.014		
EntLossCoef:	0.5	ExtLossCoef:	1	CulvInvElU	1090.49	CulvInvElD	1090.31
LCntStaU:	10001	RCntStaU:	10001	LCntStaD	10000	RCntStaD	10000

Culvert Depth Blocked: 0

Culv Area: 7.07 CulvQ: 64.9 MinTopRd: 1095.43

	LAbutSt	RAbutSt	LMnTpRd	RMnTpRd	MnTpRd	MxLoCd	
Culvert #1	9999.5	10002.5	1095.5	1095.46	1095.46	1093.49	U
	9998.5	10001.5	1095.5	1095	1095	1093.31	D

Name	Q Total.	Q Struc	Q Weir	Selected Method	Flow Type
Culvert #1		64.9	639.41	Highest U.S. EG	Pressure and Weir Flow

GEOMETRIC CHECK

TYPE OF FLOW CHECK

RS: 31.9 This is Culvert #1
CV PW 01 Type of flow is pressure and weir flow because,
1. EGEL 3 of 1096.43 is greater than MinTopRd of 1095.43.
2. CulvWSIn of 1093.49 is greater than or equal to MxLoCdU of 1093.49.
3. CulvWSOut of 1093.31 is greater than or equal to MxLoCdD of 1093.31.

DISTANCE CHECK

CULVERT COEFFICIENT CHECK

CULVERT CRITERIA CHECK

?FFECTIVE FLOW CHECK

RIVER/REACH: Camelback Road W, Camelback Main
RIVER STATION: 26.7
TYPE OF STRUCTURE: Culvert

Description:	2 CBC (SxR = 8'x4' each) at Cotton Lane and Camel
Distance from Upstream XS:	25
Deck/Roadway Width:	25
Weir Coefficient:	3
Maximum allowable submergence for weir flow:	0.95
Elevation at which weir flow begins:	0
Weir crest shape:	Broad Crested

Sec	River Station	Length Channel	WSEL	Surch.	EGEL	TopWidth Actual	
4	27	125.00	1085.12		1085.38	395.81	
3	26.9	70.00	1084.29		1084.58	124.59	
	26.7	33.00	1082.82		0	0	Culvert #1-Up
	26.7	17.00	1082.51		0	0	Culvert #1-Dn
2	26.4	380.00	1082.51		1082.68	416.97	
1	26	785.00	1078.45		1078.86	89.38	

	Ineffective Flow, Section 3			Ineffective Flow, Section 2		
	Sta L	Sta R	Elev	Sta L	Sta R	Elev
1	9538.89	9981.5	1084.07	9185	9972.01	1082.5
2	10009.96	10040	1083.96	10026.62	10040	1082.5

Opening Type	StagStaL	StagStaR	EncStaL	EncStaR	LIfStaS	RIfStaS
Culvert Group					9981.5	10009.96 U
					9972.01	10026.62 D

CULVERT:
Culvert Name: Culvert #1

Shape:	Box	Rise:	4	Span:	8	Barrels:	2

FHWA Chart #: # 8 - flared wingwalls
FHWA Scale #: # 2 - Wingwall flared 90 or 15 deg.
Solution Crit:Highest U.S. EG

UpstrmDist:	20	Length:	33	n-Value:	0.014		
EntLossCoef:	0.4	ExtLossCoef:	1	CulvInvElU	1079.79	CulvInvElD	1079.7
LCntStaU:	9995	RCntStaU:	10005	LCntStaD	9995	RCntStaD	10005

Culvert Depth Blocked: 0

Culv Area:	64	CulvQ:	424.42	MinTopRd:	1084.02

	LAbutSt	RAbutSt	LMnTpRd	RMnTpRd	MnTpRd	MxLoCd	
Culvert #1	9991	10009	1084.11	1084.02	1084.02	1083.79	U
	9991	10009	1083.98	1083.9	1083.9	1083.7	D

Name	Q Total.	Q Struc	Q Weir	Selected Method	Flow Type
Culvert #1		424.42	93.88	Highest U.S. EG	Low and Weir Flow

GEOMETRIC CHECK

TYPE OF FLOW CHECK

RS: 26.7 This is Culvert #1
CV LW 01 Type of flow is low and weir flow because,
1. EGEL 3 of 1084.58 is greater than MinTopRd of 1084.02.
2. CulvWSIn of 1082.82 is less than MxLoCdU of 1083.79.
3. CulvWSOut of 1082.51 is less than MxLoCdD of 1083.70.
4. Q/AD^0.5 of 3.32 is less than 4.0.

DISTANCE CHECK

CULVERT COEFFICIENT CHECK

CULVERT CRITERIA CHECK

INEFFECTIVE FLOW CHECK

ER/REACH: Camelback Road W, Camelback Main
RIVER STATION: 22.3
TYPE OF STRUCTURE: Culvert

Description:	CBC at Loop303 and Camelback
Distance from Upstream XS:	65
Deck/Roadway Width:	85
Weir Coefficient:	3
Maximum allowable submergence for weir flow:	0.95
Elevation at which weir flow begins:	0
Weir crest shape:	Broad Crested

Sec	River Station	Length Channel	WSEL	Surch.	EGEL	TopWidth Actual	
4	24	300.00	1074.34		1074.48	112.43	
3	23	185.00	1073.94		1074.12	42.11	
	22.3	94.00	1071.42		0	0	Culvert #1-Up
	22.3	31.00	1070.31		0	0	Culvert #1-Dn
2	22	500.00	1070.23		1071.13	34.06	
1	21	500.00	1067.76		1068.05	157.17	

	Ineffective Flow, Section 3			Ineffective Flow, Section 2		
	Sta L	Sta R	Elev	Sta L	Sta R	Elev
1	9073.91	9985.67	1073.24	8917.08	9991.08	1070.18
2	10014.33	10023.79	1072.67	10013.33	10021.34	1070.18

ning Type	StagStaL	StagStaR	EncStaL	EncStaR	LIfStaS	RIfStaS	
Culvert Group					9985.67	10014.33	U
					9991.08	10013.33	D

CULVERT:
Culvert Name: Culvert #1
Shape: Box Rise: 3 Span: 8 Barrels: 2
FHWA Chart #: # 8 - flared wingwalls
FHWA Scale #: # 1 - Wingwall flared 30 to 75 deg.
Solution Crit:Highest U.S. EG

UpstrmDist:	60	Length:	94	n-Value:	0.014		
EntLossCoef:	0.4	ExtLossCoef:	1	CulvInvElU	1068.42	CulvInvElD	1067.99
LCntStaU:	9998.91	RCntStaU:	10007.91	LCntStaD	9995.08	RCntStaD	10004.08

Culvert Depth Blocked: 0

Culv Area:	48	CulvQ:	456.09	MinTopRd:	1072.68

	LAbutSt	RAbutSt	LMnTpRd	RMnTpRd	MnTpRd	MxLoCd	
Culvert #1	9994.91	10011.91	1073.43	1072.52	1072.52	1071.42	U
	9991.08	10008.08	1073	1072.52	1072.52	1070.99	D

Name	Q Total.	Q Struc	Q Weir	Selected Method	Flow Type
Culvert #1		456.09	119.1	Highest U.S. EG	Pressure and Weir Flow

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GEOMETRIC CHECK

TYPE OF FLOW CHECK

RS: 22.3 This is Culvert #1

```
CV PW 01  Type of flow is pressure and weir flow because,
          1. EGEL 3 of 1074.12 is greater than MinTopRd of 1072.68.
          2. CulvWSIn of 1071.42 is greater than or equal to MxLoCdU of 1071.42.
          3. CulvWSOut of 1070.31 is less than MxLoCdD of 1070.99.
          4. Q/AD^0.5 of 5.49 is greater than or equal to 4.0.

DISTANCE CHECK
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CULVERT COEFFICIENT CHECK
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CULVERT CRITERIA CHECK
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INEFFECTIVE FLOW CHECK
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RS:       22 This is section 2
ST GD 05  Weir flow occurs at Culvert Group 1
          All ineffective flow elevations at Section 2 are less than
          the WSEL at Section 2.
          The velocity head at Section 2 is more than 0.5 foot and more than
          the velocity head at Section 1.
          Section 2 should be recoded to represent the natural valley
          cross section.

RS:       22 This is section 2
ST GD 07  Weir flow occurs at the structure. All ineffective flow
          elevations at Section 2 are less than the WSEL at Section 2.
          Critical depth occurs at Section 2.
          However, critical depth does not occur at Section 1.
          Section 2 should be recoded to represent the natural valley
          cross section.
```

RIVER/REACH: Camelback Road W, Camelback Main
RIVER STATION: 16.9
TYPE OF STRUCTURE: Culvert

Description:	4 CMPs (2@48" & 2@84"x60" ellipse) at Sarival Roa
Distance from Upstream XS:	15
Deck/Roadway Width:	60
Weir Coefficient:	3
Maximum allowable submergence for weir flow:	0.95
Elevation at which weir flow begins:	0
Weir crest shape:	Broad Crested

Sec	River Station	Length Channel	WSEL	Surch.	EGEL	TopWidth Actual	
4	18	660.00	1063.34		1063.59	477.95	
3	17	85.00	1062.35		1062.46	418.32	
	16.9	60.00	1060.14		0	0	Culvert #2-Up
	16.9	10.00	1059.35		0	0	Culvert #2-Dn
	16.9	60.00	1060.22		0	0	Culvert #3-Up
	16.9	12.00	1059.83		0	0	Culvert #3-Dn
2	16.4	305.00	1060.9		1061.27	45.13	
1	16	360.00	1060.21		1060.27	501.85	

	Ineffective Flow, Section 3			*Ineffective Flow, Section 2*		
	Sta L	Sta R	Elev	Sta L	Sta R	Elev
1	9115.55	9970.44	1061.75	9332.5	9976.92	1060.9
2	10006.33	10019.44	1061.74	10022.05	10040	1060.9

Opening Type	StagStaL	StagStaR	EncStaL	EncStaR	LIfStaS	RIfStaS
Culvert Group					9970.44	10006.33 U
					9976.92	10022.05 D

Opening Type	StagStaL	StagStaR	EncStaL	EncStaR	LIfStaS	RIfStaS
Culvert Group					9970.44	10006.33 U

9976.92 10022.05
D

CULVERT:
Culvert Name: Culvert #2
Shape: Circular Rise: 4 Span: 0 Barrels: 2
FHWA Chart #: # 2 - Corrugated Metal Pipe C
FHWA Scale #: # 1 - Headwall
Solution Crit:Highest U.S. EG

UpstrmDist:	15	Length:	60	n-Value:	0.024		
EntLossCoef:	0.5	ExtLossCoef:	1	CulvInvElU	1056.14	CulvInvElD	1055.35
LCntStaU:	9977	RCntStaU:	9985	LCntStaD	9985	RCntStaD	9993

Culvert Depth Blocked: 0

Culv Area: 25.13 CulvQ: 160.52 MinTopRd: 1061.75

	LAbutSt	RAbutSt	LMnTpRd	RMnTpRd	MnTpRd	MxLoCd	
Culvert #2	9975	9987	1061.86	1061.64	1061.64	1060.14	U
	9983	9995	1061.73	1061.17	1061.17	1059.35	D

CULVERT:
Culvert Name: Culvert #3
Shape: Ellipse Rise: 5 Span: 7 Barrels: 2
FHWA Chart #: # 29- Horizontal Ellipse; Con
FHWA Scale #: # 1 - Square edge with headwall
Solution Crit:Highest U.S. EG

UpstrmDist:	13	Length:	60	n-Value:	0.014		
EntLossCoef:	0.5	ExtLossCoef:	1	CulvInvElU	1055.22	CulvInvElD	1054.83
LCntStaU:	9992	RCntStaU:	10000	LCntStaD	10000	RCntStaD	10008

Culvert Depth Blocked: 0

Culv Area: 219.91 CulvQ: 421.44 MinTopRd: 1061.75

	LAbutSt	RAbutSt	LMnTpRd	RMnTpRd	MnTpRd	MxLoCd	
Culvert #3	9988.5	10003.5	1061.86	1061.64	1061.64	1060.22	U
	9996.5	10011.5	1061.45	1061.17	1061.17	1059.83	D

Name	Q Total.	Q Struc	Q Weir	Selected Method	Flow Type
Culvert #2		160.52	483.75	Highest U.S. EG	Pressure and Weir Flow
Culvert #3		421.44	483.75	Highest U.S. EG	Pressure and Weir Flow

GEOMETRIC CHECK

TYPE OF FLOW CHECK

RS: 16.9 This is Culvert #2
CV PW 01 Type of flow is pressure and weir flow because,
1. EGEL 3 of 1062.46 is greater than MinTopRd of 1061.75.
2. CulvWSIn of 1060.14 is greater than or equal to MxLoCdU of 1060.14.
3. CulvWSOut of 1059.35 is greater than or equal to MxLoCdD of 1059.35.

RS: 16.9 This is Culvert #3
CV PW 01 Type of flow is pressure and weir flow because,
1. EGEL 3 of 1062.46 is greater than MinTopRd of 1061.75.
2. CulvWSIn of 1060.22 is greater than or equal to MxLoCdU of 1060.22.
3. CulvWSOut of 1059.83 is greater than or equal to MxLoCdD of 1059.83.

DISTANCE CHECK

CULVERT COEFFICIENT CHECK

CULVERT CRITERIA CHECK

INEFFECTIVE FLOW CHECK

RS: 16.4 This is Section 2
ST IF 02 Weir flow occurs at Culvert Group 1
However, the ineffective flow elevation of 1060.9 between stations 10022.05 and 10040 is equal to or greater than the WSEL of 1060.9
The MnTpRd is 1061.638 and the MxLoCdD is 1059.35
The ineffective flow elevation should be between the MnTpRd and the MxLoCdD
It should also be less than the WSEL.

RIVER/REACH: Camelback Road W, Camelback Main
RIVER STATION: 10.7
TYPE OF STRUCTURE: Culvert

Description:	5 CMPs (3@60" & 2@48") at Alsup Rd.
Distance from Upstream XS:	90
Deck/Roadway Width:	22
Weir Coefficient:	3
Maximum allowable submergence for weir flow:	0.95
Elevation at which weir flow begins:	0
Weir crest shape:	Broad Crested

Sec	River Station	Length Channel	WSEL	Surch.	EGEL	TopWidth Actual	
4	12	280.00	1055.72		1055.86	440.51	
3	11	160.00	1055.71		1055.74	472.06	
	10.7	40.00	1053.23		0	0	Culvert #2-Up
	10.7	35.00	1053.23		0	0	Culvert #2-Dn
	10.7	41.00	1054.27		0	0	Culvert #3-Up
	10.7	35.00	1054.26		0	0	Culvert #3-Dn
2	10.4	300.00	1055.01		1055.01	83.33	
1	10	510.00	1054.94		1054.99	52.99	

Ineffective Flow, Section 3			Ineffective Flow, Section 2		
Sta L	Sta R	Elev	Sta L	Sta R	Elev
9001.42	9965	1055.64	8805	9966.67	1056
10012.29	10028.5	1054.53	10027.69	10050	1054.69

Opening Type	StagStaL	StagStaR	EncStaL	EncStaR	LIfStaS	RIfStaS	
Culvert Group					9965	10012.29	U
					9966.67	10027.69	D

Opening Type	StagStaL	StagStaR	EncStaL	EncStaR	LIfStaS	RIfStaS	
Culvert Group					9965	10012.29	U
					9966.67	10027.69	D

CULVERT:
Culvert Name: Culvert #2
Shape: Circular Rise: 5 Span: 0 Barrels: 3
FHWA Chart #: # 2 - Corrugated Metal Pipe C
FHWA Scale #: # 1 - Headwall
Solution Crit:Highest U.S. EG

UpstrmDist:	85	Length:	40	n-Value:	0.024		
EntLossCoef:	0.5	ExtLossCoef:	1	CulvInvElU	1048.23	CulvInvElD	1048.23
LCntStaU:	9980	RCntStaU:	10008	LCntStaD	9982	RCntStaD	10010

Culvert Depth Blocked: 0

---

v Area: 58.91 CulvQ: 287.34 MinTopRd: 1054.73

	LAbutSt	RAbutSt	LMnTpRd	RMnTpRd	MnTpRd	MxLoCd	
Culvert #2	9977.5	10010.5	1055.45	1054.61	1054.61	1053.23	U
	9979.5	10012.5	1055.71	1054.72	1054.72	1053.23	D

```
CULVERT:
Culvert Name: Culvert #3
Shape:        Circular       Rise:      4        Span:          0        Barrels:       2
FHWA Chart #: # 2 - Corrugated Metal Pipe C
FHWA Scale #: # 1 - Headwall
Solution Crit:Highest U.S. EG

strmDist:     84       Length:        41       n-Value:       0.024
LossCoef:     0.5      ExtLossCoef:   1        CulvInvElU     1050.27  CulvInvElD     1050.26
ntStaU:       9985     RCntStaU:      9992     LCntStaD       9987     RCntStaD       9994
Culvert Depth Blocked:   0


-------------------------------------------------------------------------------
Culv Area:     25.13    CulvQ:         116.27   MinTopRd:      1054.73
-------------------------------------------------------------------------------

                    LAbutSt   RAbutSt   LMnTpRd   RMnTpRd   MnTpRd    MxLoCd
-------------------------------------------------------------------------------
Culvert #3          9983      9994      1055.45   1054.61   1054.61   1054.27  U
                    9985      9996      1056.26   1054.72   1054.72   1054.26  D
-------------------------------------------------------------------------------


Name           Q Total.  Q Struc   Q Weir    Selected Method     Flow Type
-------------------------------------------------------------------------------
Culvert #2               287.34    65.73     Highest U.S. EG     Pressure and Weir Flow
Culvert #3               116.27    65.73     Highest U.S. EG     Pressure and Weir Flow
-------------------------------------------------------------------------------

GEOMETRIC CHECK
-----------------

TYPE OF FLOW CHECK
------------------

RS:        10.7 This is Culvert #2
CV PW 01   Type of flow is pressure and weir flow because,
           1. EGEL 3 of 1055.74 is greater than MinTopRd of 1054.73.
           2. CulvWSIn of 1053.23 is greater than or equal to MxLoCdU of 1053.23.
           3. CulvWSOut of 1053.23 is greater than or equal to MxLoCdD of 1053.23.

           10.7 This is Culvert #3
   PW 01   Type of flow is pressure and weir flow because,
           1. EGEL 3 of 1055.74 is greater than MinTopRd of 1054.73.
           2. CulvWSIn of 1054.27 is greater than or equal to MxLoCdU of 1054.27.
           3. CulvWSOut of 1054.26 is greater than or equal to MxLoCdD of 1054.26.

DISTANCE CHECK
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CULVERT COEFFICIENT CHECK
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CULVERT CRITERIA CHECK
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INEFFECTIVE FLOW CHECK
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---END
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HYDROLOGY & WEIR FLOW ANALYSIS

Notes on Split Flow Modeling

There are flow splits along the right overbank of Camelback Wash during the 100-year event. A lateral weir was added into the HEC-RAS to model the flow split from Camelback Wash. The HEC-RAS split flow approach using lateral weir has two limitations:

- The lateral weir can not span more than eight cross sections;
- If two or more lateral weirs are added into HEC-RAS model then the model sometimes fails to converge.

Because of the limitations mentioned above the following approach was used to model the split flow for Camelback Wash:

1- The scope of work for this study requires the use of the one-dimensional backwater model HEC-RAS. Although Camelback Wash is a subcritical stream, the assumption that there is no backwater effect in the split flow estimation was made because weir flow leaving the system must be computed in the direction of flow accumulation, being the downstream direction.

2- The study reach was subdivided into eight sub-reaches. Split flows along these sub-reaches were modeled using eight lateral weirs.

3- Starting from the most upstream reach (reach 1), lateral weir #1 was added into HEC-RAS model. The other seven reaches were not modeled. As shown earlier in Table 1, intermediate flows between HEC-1 concentration points were interpolated for HEC-RAS cross section locations. The interpolated 100-year peak discharges based on the latest Existing Conditions HEC-1 output (before diversion) were input into HEC-RAS. The boundary condition for the model was determined by normal depth computation and HEC-RAS split flow optimization option was turned on. After the first run, the split flows and remaining flows in the first reach (reach 1) were determined.

4- Lateral weir #2 was added into reach 2 of HEC-RAS model which includes reach 1 and reach 2. Lateral weir #1 was "turned off" to avoid convergence problems. The remaining flows in the channel (after the lateral weir #1 diversions) for reach 1 from the first run were then input into this HEC-RAS model. The flow values for reach 2 were adjusted based on the first run. The adjusted flows become equal to the remaining flow at the downstream end of lateral weir #1 plus local inflows from reach 2. HEC-RAS split flow optimization option was turned on. After the second run, the split flows and remaining flows in the channel for reach 2 were determined. This process was repeated for reach 3 to reach 8.

5- After eight runs, all the split flows along the right overbank were determined. Finally the HEC-RAS model was modeled without lateral weirs using the flows determined from the eight split flow analyses.

We have used hand calculations to estimate the split flows (checked three cross sections) and we found that the results were very close to those from HEC-RAS split flow approach (within approximately ~~1~~ 16 percent). URS believes the split flows along the right overbank of Camelback Wash determined by the eight HEC-RAS run are reasonable.

URS

Page ____ of ____

Job FCD MC LOOP 303 | Project No. ____ | Sheet ____ of ____

Description DISCHARGES FROM HEC-1 | Computed by RLD | Date 10-01-02

Checked by RS | Date 10-10/02

Reference

FLOW RATES ARE BASED ON THE LATEST "EXISTING CONDITIONS HYDROLOGY, LOOP 303/WHITE TANKS ADMP" HEC-1 MODEL.

CONCENTRATION POINT	CP 234	CP 235	CP 236 (COTTON)	CP 237	CP 238 (SARIVAL)	CP 239	CP 240 (REEMS)
DISCHARGE (CFS)	CP 234 1594 → D 234 ~~888~~	2048	969	1213	492	867	364
DIVERSIONS FROM HEC-1	706	1079	321	400	232	271	41
	1D248						
					1044	887	116
						1852	429
						1276	147
							544
							544
HEC-RAS X-SECTIONS	42	37	27	23	17	11	6
DISCHARGE USED IN HEC-RAS	~~888~~	2048	1213	867	1044	1852	544
LOCAL INFLOW	1164.83	244	375	680	965	115	

PERRYVILLE HEC-RAS MODEL SHOWS Q= 883.17 CFS.

(2048-883.17) (1213-969) (867-492) (1044-364) (1852-887) (544-429)

TABLE 1

Project: FCDMC Loop 303 Floodplain 10/7/02
Subject: Discharge Interpolation
Computed By: RLD Checked By: EL 37536.44

River Sta	Length Chnl	Cum Ch Len	Q-HEC-1	Q-Interploation
	(ft)	(ft)	(cfs)	(cfs)
42	0	0	**883.17**	**883.17**
41	500	500		1138.62
40	400	900		1342.97
39	550	1450		1623.96
38	500	1950		1879.41
37	**330**	**2280**	**2048.0**	**2048.00**
36.4	115	115		2029.55
36	440	555		1958.97
35	500	1055		1878.75
34	500	1555		1798.54
33	500	2055		1718.33
32	630	2685		1617.27
31.4	95	2780		1602.02
31	315	3095		1551.49
30	550	3645		1463.26
29	500	4145		1383.05
28	500	4645		1302.84
27	**560**	**5205**	**1213.0**	**1213.00**
26.9	125	125		1195.98
26.4	70	195		1186.44
26	380	575		1134.69
25	785	1360		1027.79
24	910	2270		903.86
23	**300**	**2570**	**863.0**	**863.00**
22	185	185		874.77
21	500	685		906.58
20	500	1185		938.39
19	500	1685		970.20
18	500	2185		1002.01
17	**660**	**2845**	**1044.0**	**1044.00**
16.4	85	85		1071.04
16	305	390		1168.06
15	360	750		1282.58
14	590	1340		1470.27
13	510	1850		1632.50
12	410	2260		1762.93
11	**280**	**2540**	**1852.0**	**1852.00**
10.4	160	160		1772.73
10	300	460		1624.09
9	510	970		1371.41
8	500	1470		1123.68
7	510	1980		871.00
6	**660**	**2640**	**544.0**	**544.00**
5	500	500		544.00
4	520	1020		544.00
3	460	1480		544.00
2	500	1980		544.00
1	710	2690		544.00

TABLE 2

Project: FCDMC Loop 303 Floodplain 10/7/2002
Subject: Local Discharge Interpolation
Computed By: RLD Checked By: GLI

River Sta	Length Chnl	Cum Ch Len	Qlocal-HEC-1	Qlocal-Interploation
	(ft)	(ft)	(cfs)	(cfs)
42	0	0		
41	500	500		255.45
40	400	900		204.36
39	550	1450		280.99
38	500	1950		255.45
37	330	2280	1164.8	168.59
36.4	115	115		5.39
36	440	555		20.63
35	500	1055		23.44
34	500	1555		23.44
33	500	2055		23.44
32	630	2685		29.53
31.4	95	2780		4.45
31	315	3095		14.77
30	550	3645		25.78
29	500	4145		23.44
28	500	4645		23.44
27	560	5205	244.0	26.25
26.9	125	125		18.24
26.4	70	195		10.21
26	380	575		55.45
25	785	1360		114.54
24	910	2270		132.78
23	300	2570	375.0	43.77
22	185	185		44.22
21	500	685		119.51
20	500	1185		119.51
19	500	1685		119.51
18	500	2185		119.51
17	660	2845	680.0	157.75
16.4	85	85		32.29
16	305	390		115.88
15	360	750		136.77
14	590	1340		224.15
13	510	1850		193.76
12	410	2260		155.77
11	280	2540	965.0	106.38
10.4	160	160		6.97
10	300	460		13.07
9	510	970		22.22
8	500	1470		21.78
7	510	1980		22.22
6	660	2640	115.0	28.75
5	500	500		
4	520	1020		
3	460	1480		
2	500	1980		
1	710	2690		

TABLE 3

Project: FCDMC Loop 303 Floodplain
Subject: Split Flows and Remaining Flows in the Channel
Computed By: RLD

Location	River Sta	Q_local	Q_initial	Q_remaining	Q_split
		(cfs)	(cfs)	(cfs)	(cfs)
	42	0.00	883.17	883.17	0.00
	41	255.45	1138.62	639.53	499.09
	40	204.36	1342.97	826.68	17.21
	39	280.99	1623.96	1054.85	52.82
	38	255.45	1879.41	1009.55	300.75
	37	168.59	2048.00	1127.62	50.52
Citrus Road					
	36.4	5.39	2029.55	1133.01	0.00
	36	20.63	1958.97	1153.64	0.00
	35	23.44	1878.75	996.64	180.44
	34	23.44	1798.54	697.85	322.23
	33	23.44	1718.33	673.99	47.30
	32	29.53	1617.27	702.49	1.03
175th Avenue					
	31.4	4.45	1602.02	696.72	10.22
	31	14.77	1551.49	711.49	0.00
	30	25.78	1463.26	737.27	0.00
	29	23.44	1383.05	759.99	0.72
	28	23.44	1302.84	755.31	28.12
	27	26.25	1213.00	567.89	213.67
	26.9	18.24	1195.98	518.30	67.83
Cotton Lane					
	26.4	10.21	1186.44	526.89	1.62
	26	55.45	1134.69	582.34	0.00
	25	114.54	1027.79	696.88	0.00
	24	132.78	903.86	748.18	81.48
	23	43.77	863.00	575.19	216.76
Loop 303					
	22	44.22	874.77	437.32	182.09
	21	119.51	906.58	556.83	0.00
	20	119.51	938.39	676.33	0.01
	19	119.51	970.20	795.84	0.00
	18	119.51	1002.01	909.64	5.71
	17	157.75	1044.00	1065.71	1.68
Sarival Avenue					
	16.4	32.29	1071.04	971.81	126.19
	16	115.88	1168.06	1033.84	53.85
	15	136.77	1282.58	951.62	218.99
	14	224.15	1470.27	592.57	583.20
	13	193.76	1632.50	393.66	392.67
	12	155.77	1762.93	362.96	186.47
	11	106.38	1852.00	469.34	0.00
Alsup Road					
	10.4	6.97	1772.73	220.59	255.72
	10	13.07	1624.09	110.85	122.81
	9	22.22	1371.41	133.06	0.01
	8	21.78	1123.68	154.84	0.00
	7	22.22	871.00	177.06	0.00

TABLE 3

Project: FCDMC Loop 303 Floodplain
Subject: Split Flows and Remaining Flows in the Channel
Computed By: RLD

6	28.75	544.00	205.81	0.00
5	0.00	544.00	205.81	0.00
4	0.00	544.00	205.81	0.00
3	0.00	544.00	205.81	0.00
2	0.00	544.00	205.81	0.00
1	0.00	544.00	205.81	0.00

TABLE 4

Project: FCDMC Loop 303 Floodplain

Subject: Split Flow Calculation to Determine the Remaining Flows in the Channel

Computed By: RLD

Ckd - GLI

River Sta	Q_local	Q-initial	Qweir1(input)	Qweir1(output	Qweir2(input)	Qweir2(output)	Qweir3(input)	Qweir3(output	Qweir4(input)	Qweir4(output)	Qweir5(input)	Qweir5(output)	Qweir6(input)	Qweir6(output)	Qweir7(input)	Qweir7(output)	Qweir8(input)	Qweir8(output)	Qsplit
	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
42		883.17	883.17	883.17	883.17	883.17	883.17	883.17	883.17	883.17	883.17	883.17	883.17	883.17	883.17	883.17	883.17	883.17	0
41	255.45	1138.62	1138.62	639.53	639.53	639.53	639.53	639.53	639.53	639.53	639.53	639.53	639.53	639.53	639.53	639.53	639.53	639.53	499.09
40	204.36	1342.97	1342.97	826.68	826.68	826.68	826.68	826.68	826.68	826.68	826.68	826.68	826.68	826.68	826.68	826.68	826.68	826.68	17.21
39	280.99	1623.96	1623.96	1054.85	1054.85	1054.85	1054.85	1054.85	1054.85	1054.85	1054.85	1054.85	1054.85	1054.85	1054.85	1054.85	1054.85	1054.85	52.82
38	255.45	1879.41	1879.41	1009.55	1009.55	1009.55	1009.55	1009.55	1009.55	1009.55	1009.55	1009.55	1009.55	1009.55	1009.55	1009.55	1009.55	1009.55	300.75
37	168.59	2048.00	2048.00	1127.62	1127.62	1127.62	1127.62	1127.62	1127.62	1127.62	1127.62	1127.62	1127.62	1127.62	1127.62	1127.62	1127.62	1127.62	50.52
36.4	5.39	2029.55			1133.01	1133.01	1133.01	1133.01	1133.01	1133.01	1133.01	1133.01	1133.01	1133.01	1133.01	1133.01	1133.01	1133.01	0.00
36	20.63	1958.97			1153.64	1153.64	1153.64	1153.64	1153.64	1153.64	1153.64	1153.64	1153.64	1153.64	1153.64	1153.64	1153.64	1153.64	0.00
35	23.44	1878.75			1177.08	996.64	996.64	996.64	996.64	996.64	996.64	996.64	996.64	996.64	996.64	996.64	996.64	996.64	180.44
34	23.44	1798.54			1200.52	697.85	697.85	697.85	697.85	697.85	697.85	697.85	697.85	697.85	697.85	697.85	697.85	697.85	322.23
33	23.44	1718.33			1223.95	673.99	673.99	673.99	673.99	673.99	673.99	673.99	673.99	673.99	673.99	673.99	673.99	673.99	47.30
32	29.53	1637.27			1253.49	702.49	702.49	702.49	702.49	702.49	702.49	702.49	702.49	702.49	702.49	702.49	702.49	702.49	1.03
31.4	4.45	1602.02					706.94	696.72	696.72	696.72	696.72	696.72	696.72	696.72	696.72	696.72	696.72	696.72	10.22
31	14.77	1551.49					721.71	711.49	711.49	711.49	711.49	711.49	711.49	711.49	711.49	711.49	711.49	711.49	0.00
30	25.78	1463.26					747.49	737.27	737.27	737.27	737.27	737.27	737.27	737.27	737.27	737.27	737.27	737.27	0.00
29	23.44	1383.05					770.93	759.99	759.99	759.99	759.99	759.99	759.99	759.99	759.99	759.99	759.99	759.99	0.72
28	23.44	1302.84					794.37	755.31	755.31	755.31	755.31	755.31	755.31	755.31	755.31	755.31	755.31	755.31	28.12
27	26.25	1213.00					820.62	567.89	567.89	567.89	567.89	567.89	567.89	567.89	567.89	567.89	567.89	567.89	213.67
26.9	18.24	1195.98							586.13	518.3	518.3	518.3	518.3	518.3	518.3	518.3	518.3	518.3	67.83
26.4	10.21	1186.44							596.34	526.89	526.89	526.89	526.89	526.89	526.89	526.89	526.89	526.89	1.62
26	55.45	1134.69							651.79	582.34	582.34	582.34	582.34	582.34	582.34	582.34	582.34	582.34	0.00
25	114.54	1027.79							766.33	696.88	696.88	696.88	696.88	696.88	696.88	696.88	696.88	696.88	0.00
24	132.78	903.86							899.12	748.18	748.18	748.18	748.18	748.18	748.18	748.18	748.18	748.18	81.48
23	43.77	863.00							942.89	575.19	575.19	575.19	575.19	575.19	575.19	575.19	575.19	575.19	216.76
22	44.22	874.77									619.41	437.32	437.32	437.32	437.32	437.32	437.32	437.32	182.09
21	119.51	906.58									738.92	556.83	556.83	556.83	556.83	556.83	556.83	556.83	0.00
20	119.51	938.39									858.42	676.33	676.33	676.33	676.33	676.33	676.33	676.33	0.01
19	119.51	970.20									977.93	795.84	795.84	795.84	795.84	795.84	795.84	795.84	0.00
18	119.51	1002.01									1097.44	910	910	910	910	910	910	910	5.71
17	157.75	1044.00									1255.19	1065.71	1065.71	1065.71	1065.71	1065.71	1065.71	1065.71	1.68
16.4	32.29	1071.04											1098.00	971.81	971.81	971.81	971.81	971.81	126.19

Project: FCDMC Loop 303 Floodplain

Subject: Split Flow Calculation to Determine the Remaining Flows in the Channel

Computed By: RLD

River Sta	Q_local	Q-initial	Qweir1(input)	Qweir1(output	Qweir2(input)	Qweir2(output)	Qweir3(input)	Qweir3(output	Qweir4(input)	Qweir4(output)	Qweir5(input)	Qweir5(output)	Qweir6(input)	Qweir6(output)	Qweir7(input)	Qweir7(output)	Qweir8(input)	Qweir8(output)	Qsplit
	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(cfs)
16	115.88	1168.06											1213.88	1033.84	1033.84	1033.84	1033.84	1033.84	53.85
15	136.77	1282.58											1350.65	951.62	951.62	951.62	951.62	951.62	218.99
14	224.15	1470.27											1574.80	592.57	592.57	592.57	592.57	592.57	583.20
13	193.76	1632.50											1768.56	393.66	393.66	393.66	393.66	393.66	392.67
12	155.77	1762.93											1924.33	362.96	362.96	362.96	362.96	362.96	186.47
11	106.38	1852.00											2030.71	469.34	469.34	469.34	469.34	469.34	0.00
10.4	6.97	1772.73													476.31	220.59	220.59	220.59	255.72
10	13.07	1624.09													489.38	110.85	110.85	110.85	122.81
9	22.22	1371.41													511.59	133.06	133.06	133.06	0.01
8	21.78	1123.68													533.37	154.84	154.84	154.84	0.00
7	22.22	871.00													555.59	177.06	177.06	177.06	0.00
6	28.75	544.00													584.34	205.81	205.81	205.81	0.00
5	0.00	544.00															205.81	205.81	0.00
4	0.00	544.00															205.81	205.81	0.00
3	0.00	544.00															205.81	205.81	0.00
2	0.00	544.00															205.81	205.81	0.00
1	0.00	544.00															205.81	205.81	0.00

TABLE 5

Project: FCDMC Loop 303 Floodplain
Subject: Comparisons of Split Flow Between Hand Calculation and HEC-RAS Split Flow Routine
Computed By: GL

X-section	Results of Hand Calculations*		Results of HEC-RAS Split flow Routine		Difference
	Q-Remaining (cfs)	Q-Split (cfs)	Q-Channel (cfs)	Q-split (cfs)	(%)
42	1572.00	0.00	1572	0.00	
41	955.22	679.78	923.98	710.96	
40	982.99	22.22	853.6	120.73	
Total		**702**		**831.69**	**15.59**

% Difference = [(831.69-702) / 831.69] * 100

* This is a sample comparison from a previous iteration which is included at the end of Table 6. These numbers do not match the final results (Table 4) used to plot the floodplain. It is shown for illustrative purposes only.

TABLE 6

Project: FCDMC Loop 303 Floodplain
Subject: Split Flow Calculations By Hand
Computed By: GL

2/14/02

Iteration #1

A	B	C	D	E	F	G	H	I	J	K	L	M
X-section	Q-Local[1]	Q-Total[1]	WSEL[2]	WSEL-avg	EL-weir[3]	EL-weir-avg	Head-avg[4]	Length-weir[5]	C-weir	Q-Split[6]	Q-Remaining[7]	Difference[8]
	(cfs)	(cfs)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)		(cfs)	(cfs)	(ft)
42	0	1572	1118.47		1117.65			0	3	0.00	1572.00	N/A
41	63	1526	1116.07	1117.27	1115.34	1116.50	0.78	500	3	1023.40	611.60	N/A
40	50	1490	1114.48	1115.28	1114.21	1114.78	0.50	400	3	424.26	237.34	N/A

The purpose of these iterations is to verify the results of the final HEC-RAS run, which is included in the beginning of this calculation package. This is done by several iterations with the purpose of arriving at a minimal difference in WSELs between each two consecutive runs (column M). Once acceptable difference values are reached then the Q-remaining in the channel after the weir flow (column L) should be comparable to that calculated by the final HEC-RAS run. Intermediate steps are explained below:

1-From Table 3 (HEC-1 model)
2-From a HEC-RAS model developed using X-sections 40-42
3-From survey data, equal to elevation of Camelback Road
4-Equals [(Avg WSEL)-(Avg Weir Elev)] = E - G
5-Equals distance between x-sections.
6-Using weir equation $Q=CLH^{3/2}$
7-Equals [Qremaining-Qsplit+Qlocal]. Example: Qremaining at X-section 40 = 237.34 cfs = 611.6 - 424.26 + 50
8-Equals difference between WSEL between consecutive iterations.

Iteration #2

X-section	Q-Local	Q-Total[9]	WSEL	WSEL-avg	EL-weir	EL-weir-avg	Head-avg	Length-weir	C-weir	Q-Split	Q-Remaining	Difference
	(cfs)	(cfs)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)		(cfs)	(cfs)	(ft)
42	0	1572.00	1118.44		1117.65			0	3	0.00	1572.00	-0.03
41	63	611.60	1115.33	1116.89	1115.34	1116.50	0.39	500	3	365.33	1269.67	-0.74
40	50	237.34	1111.83	1113.58	1114.21	1114.78	0.00	400	3	0.00	1319.67	-2.65

9- Same as Qremaining from Iteration 1 (column L).

Iteration #3

X-section	Q-Local	Q-Total	WSEL	WSEL-avg	EL-weir	EL-weir-avg	Head-avg	Length-weir	C-weir	Q-Split	Q-Remaining	Difference
	(cfs)	(cfs)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)		(cfs)	(cfs)	(%)
42	0	1572.00	1118.44		1117.65			0	3	0.00	1572.00	0.00
41	63	1269.67	1115.94	1117.19	1115.34	1116.50	0.70	500	3	869.10	765.90	0.61
40	50	1319.67	1114.32	1115.13	1114.21	1114.78	0.36	400	3	253.82	562.08	2.49

Project: FCDMC Loop 303 Floodplain
Subject: Split Flow Calculations By Hand
Computed By: GL

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A	B	C	D	E	F	G	H	I	J	K	L	M

Iteration #4

X-section	Q-Local	Q-Total	WSEL	WSEL-avg	EL-weir	EL-weir-avg	Head-avg	Length-weir	C-weir	Q-Split	Q-Remaining	Difference
	(cfs)	(cfs)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)		(cfs)	(cfs)	(%)
42	0	1572.00	1118.46		1117.65			0	3	0.00	1572.00	0.02
41	63	765.90	1115.46	1116.96	1115.34	1116.50	0.47	500	3	475.63	1159.37	-0.48
40	50	562.08	1112.96	1114.21	1114.21	1114.78	0.00	400	3	0.00	1209.37	-1.36

Iteration #5

X-section	Q-Local	Q-Total	WSEL	WSEL-avg	EL-weir	EL-weir-avg	Head-avg	Length-weir	C-weir	Q-Split	Q-Remaining	Difference
	(cfs)	(cfs)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)		(cfs)	(cfs)	(%)
42	0	1572.00	1118.44		1117.65			0	3	0.00	1572.00	-0.02
41	63	1159.37	1115.87	1117.16	1115.34	1116.50	0.66	500	3	804.28	830.72	0.41
40	50	1209.37	1114.20	1115.04	1114.21	1114.78	0.26	400	3	159.09	721.63	1.24

Iteration #6

X-section	Q-Local	Q-Total	WSEL	WSEL-avg	EL-weir	EL-weir-avg	Head-avg	Length-weir	C-weir	Q-Split	Q-Remaining	Difference
	(cfs)	(cfs)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)		(cfs)	(cfs)	(%)
42	0	1572.00	1118.45		1117.65			0	3	0.00	1572.00	0.01
41	63	830.72	1115.57	1117.01	1115.34	1116.50	0.52	500	3	554.37	1080.63	-0.30
40	50	721.63	1113.40	1114.49	1114.21	1114.78	0.00	400	3	0.00	1130.63	-0.80

Iteration #7

X-section	Q-Local	Q-Total	WSEL	WSEL-avg	EL-weir	EL-weir-avg	Head-avg	Length-weir	C-weir	Q-Split	Q-Remaining	Difference
	(cfs)	(cfs)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)		(cfs)	(cfs)	(%)
42	0	1572.00	1118.43		1117.65			0	3	0.00	1572.00	-0.02
41	63	1080.63	1115.82	1117.13	1115.34	1116.50	0.63	500	3	750.07	884.93	0.25
40	50	1130.63	1114.11	1114.97	1114.21	1114.78	0.19	400	3	99.38	835.55	0.71

Project: FCDMC Loop 303 Floodplain
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A	B	C	D	E	F	G	H	I	J	K	L	M

Iteration #8

X-section	Q-Local	Q-Total	WSEL	WSEL-avg	EL-weir	EL-weir-avg	Head-avg	Length-weir	C-weir	Q-Split	Q-Remaining	Difference
	(cfs)	(cfs)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)		(cfs)	(cfs)	(%)
42	0	1572.00	1118.44		1117.65			0	3	0.00	1572.00	0.01
41	63	884.93	1115.64	1117.04	1115.34	1116.50	0.55	500	3	603.51	1031.49	-0.18
40	50	835.55	1113.66	1114.65	1114.21	1114.78	0.00	400	3	0.00	1081.49	-0.45

Iteration #9

X-section	Q-Local	Q-Total	WSEL	WSEL-avg	EL-weir	EL-weir-avg	Head-avg	Length-weir	C-weir	Q-Split	Q-Remaining	Difference
	(cfs)	(cfs)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)		(cfs)	(cfs)	(%)
42	0	1572.00	1118.43		1117.65			0	3	0.00	1572.00	-0.01
41	63	1031.49	1115.78	1117.11	1115.34	1116.50	0.61	500	3	714.64	920.36	0.14
40	50	1081.49	1114.04	1114.91	1114.21	1114.78	0.13	400	3	59.52	910.84	0.38

Iteration #10

X-section	Q-Local	Q-Total	WSEL	WSEL-avg	EL-weir	EL-weir-avg	Head-avg	Length-weir	C-weir	Q-Split	Q-Remaining	Difference
	(cfs)	(cfs)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)		(cfs)	(cfs)	(%)
42	0	1572.00	1118.44		1117.65			0	3	0.00	1572.00	0.01
41	63	920.36	1115.68	1117.06	1115.34	1116.50	0.57	500	3	637.04	997.96	-0.10
40	50	910.84	1113.79	1114.74	1114.21	1114.78	0.00	400	3	0.00	1047.96	-0.25

Iteration #11

X-section	Q-Local	Q-Total	WSEL	WSEL-avg	EL-weir	EL-weir-avg	Head-avg	Length-weir	C-weir	Q-Split	Q-Remaining	Difference
	(cfs)	(cfs)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)		(cfs)	(cfs)	(%)
42	0	1572.00	1118.43		1117.65			0	3	0.00	1572.00	-0.01
41	63	997.96	1115.76	1117.10	1115.34	1116.50	0.60	500	3	697.14	937.86	0.08
40	50	1047.96	1114.00	1114.88	1114.21	1114.78	0.11	400	3	40.83	947.03	0.21

Project: FCDMC Loop 303 Floodplain
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A	B	C	D	E	F	G	H	I	J	K	L	M

Iteration #12

X-section	Q-Local	Q-Total	WSEL	WSEL-avg	EL-weir	EL-weir-avg	Head-avg	Length-weir	C-weir	Q-Split	Q-Remaining	Difference
	(cfs)	(cfs)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)		(cfs)	(cfs)	(%)
42	0	1572.00	1118.43		1117.65			0	3	0.00	1572.00	0.00
41	63	937.86	1115.70	1117.07	1115.34	1116.50	0.57	500	3	645.51	989.49	-0.06
40	50	947.03	1113.85	1114.78	1114.21	1114.78	0.00	400	3	0.00	1039.49	-0.15

Iteration #13

X-section	Q-Local	Q-Total	WSEL	WSEL-avg	EL-weir	EL-weir-avg	Head-avg	Length-weir	C-weir	Q-Split	Q-Remaining	Difference
	(cfs)	(cfs)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)		(cfs)	(cfs)	(%)
42	0	1572.00	1118.43		1117.65			0	3	0.00	1572.00	0.00
41	63	989.49	1115.75	1117.09	1115.34	1116.50	0.60	500	3	688.44	946.56	0.05
40	50	1039.49	1113.99	1114.87	1114.21	1114.78	0.09	400	3	35.14	961.42	0.14

Iteration #14

X-section	Q-Local	Q-Total	WSEL	WSEL-avg	EL-weir	EL-weir-avg	Head-avg	Length-weir	C-weir	Q-Split	Q-Remaining	Difference
	(cfs)	(cfs)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)		(cfs)	(cfs)	(%)
42	0	1572.00	1118.43		1117.65			0	3	0.00	1572.00	0.00
41	63	946.56	1115.71	1117.07	1115.34	1116.50	0.58	500	3	654.02	980.98	-0.04
40	50	961.42	1113.87	1114.79	1114.21	1114.78	0.00	400	3	0.00	1030.98	-0.12

Iteration #15

X-section	Q-Local	Q-Total	WSEL	WSEL-avg	EL-weir	EL-weir-avg	Head-avg	Length-weir	C-weir	Q-Split	Q-Remaining	Difference
	(cfs)	(cfs)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)		(cfs)	(cfs)	(%)
42	0	1572.00	1118.43		1117.65			0	3	0.00	1572.00	0.00
41	63	980.98	1115.74	1117.09	1115.34	1116.50	0.59	500	3	679.78	955.22	0.03
40	50	1030.98	1113.98	1114.86	1114.21	1114.78	0.09	400	3	29.74	975.48	0.11

Iteration #16

X-section	Q-Local	Q-Total	WSEL	WSEL-avg	EL-weir	EL-weir-avg	Head-avg	Length-weir	C-weir	Q-Split	Q-Remaining	Difference
	(cfs)	(cfs)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)		(cfs)	(cfs)	(%)
42	0	1572.00	1118.43		1117.65			0	3	0.00	1572.00	0.00
41	63	955.22	1115.72	1117.08	1115.34	1116.50	0.58	500	3	662.57	972.43	-0.02
40	50	975.48	1113.90	1114.81	1114.21	1114.78	0.03	400	3	7.86	1014.57	-0.08

Iteration #17

X-section	Q-Local	Q-Total	WSEL	WSEL-avg	EL-weir	EL-weir-avg	Head-avg	Length-weir	C-weir	Q-Split	Q-Remaining	Difference
	(cfs)	(cfs)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)		(cfs)	(cfs)	(%)
42	0	1572.00	1118.43		1117.65			0	3	0.00	1572.00	0.00
41	63	972.43	1115.74	1117.09	1115.34	1116.50	0.59	500	3	679.78	955.22	0.02
40	50	1014.57	1113.95	1114.85	1114.21	1114.78	0.07	400	3	22.22	982.99	0.05

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A	B	C	D	E	F	G	H	I	J	K	L	M

Iteration #18

X-section	Q-Local	Q-Total	WSEL	WSEL-avg	EL-weir	EL-weir-avg	Head-avg	Length-weir	C-weir	Q-Split	Q-Remaining	Difference
	(cfs)	(cfs)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)		(cfs)	(cfs)	(%)
42	0	1572.00	1118.43		1117.65			0	3	0.00	1572.00	0.00
41	63	955.22	1115.72	1117.08	1115.34	1116.50	0.58	500	3	662.57	972.43	-0.02
40	50	982.99	1113.91	1114.82	1114.21	1114.78	0.04	400	3	9.60	1012.83	-0.04

Iteration #19

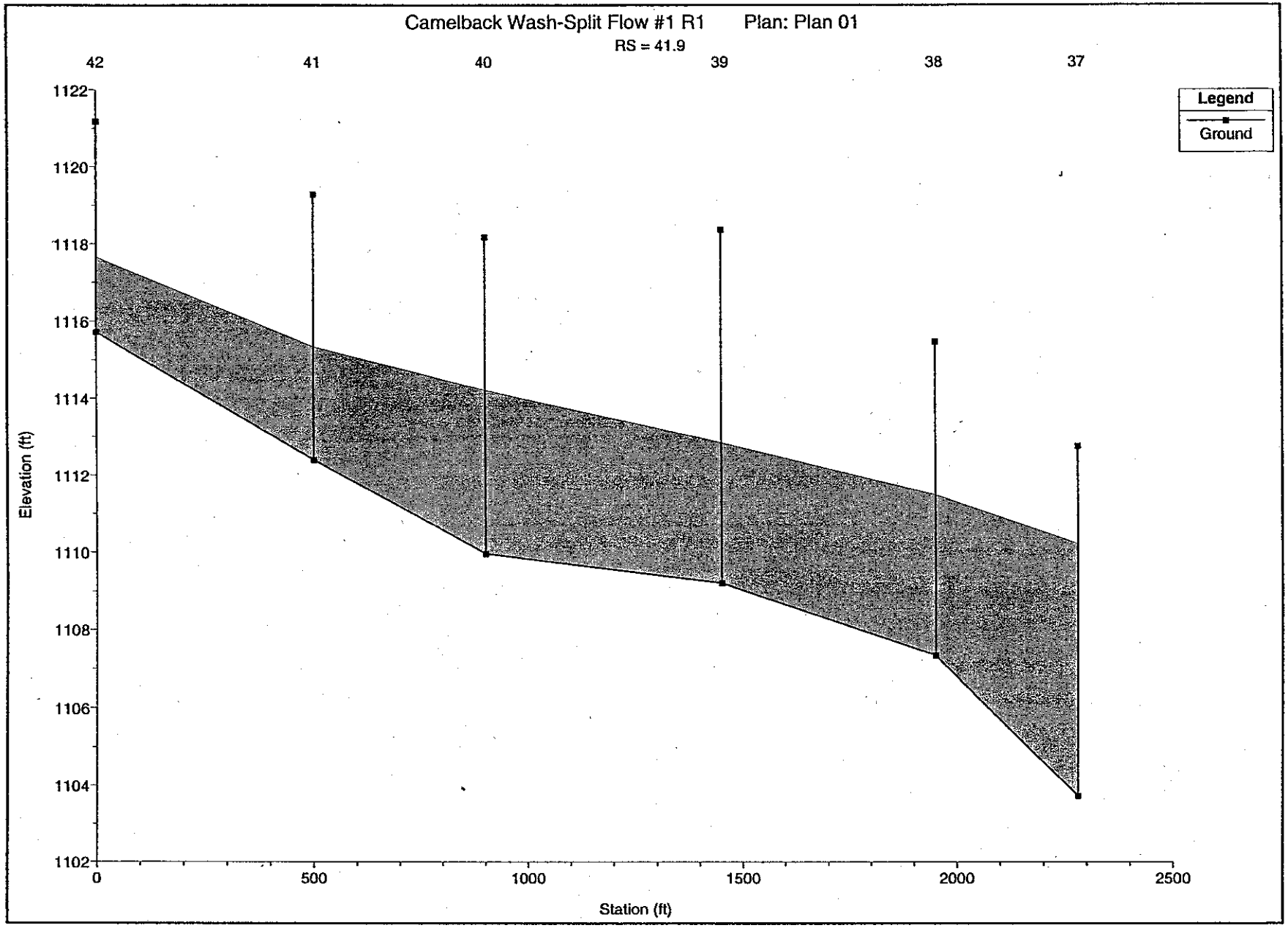
X-section	Q-Local	Q-Total	WSEL	WSEL-avg	EL-weir	EL-weir-avg	Head-avg	Length-weir	C-weir	Q-Split	Q-Remaining	Difference
	(cfs)	(cfs)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)		(cfs)	(cfs)	(%)
42	0	1572.00	1118.43		1117.65			0	3	0.00	1572.00	0.00
41	63	972.43	1115.74	1117.09	1115.34	1116.50	0.59	500	3	679.78	955.22	0.02
40	50	1012.83	1113.95	1114.85	1114.21	1114.78	0.07	400	3	22.22	982.99	0.04

HEC-RAS Plan: Plan 01 River: Camelback Road W Reach: Camelback Main Profile: PF 1

Reach	River Sta	Q Total	W.S. Elev	Top Width	Sta W.S. Lft	Sta W.S. Rgt
		(cfs)	(ft)	(ft)	(ft)	(ft)
Camelback Main	42	883.17	1118.61	551.62	9509.01	10060.63
Camelback Main	41.9	Lat. Weir				
Camelback Main	41	639.53	1115.26	357.35	9688.28	10048.18
Camelback Main	40	826.68	1114.28	319.78	9675.03	10047.66
Camelback Main	39	1054.85	1112.94	416.58	9631.13	10058.00
Camelback Main	38	1009.55	1112.11	558.26	9494.07	10052.33
Camelback Main	37	1127.62	1108.73	21.53	9985.25	10006.78

HEC-RAS Plan: Plan 01 River: Camelback Road W Reach: Camelback Main Profile: PF 1

Reach	River Sta	Q US	Q Leaving Total	Q DS	Q Weir	Total Gate Flow	Wr Top Width	Weir Max Depth	Weir Avg Depth	Min El Weir Flow	E.G. US.	W.S. US.	E.G. DS	W.S. DS
		(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)
Camelback Main	41.9	883.17	945.37	1127.62	945.37		1801.66	0.96	0.26	1110.23	1118.64	1118.51	1110.95	1108.73


Camelback Wash-Split Flow #1 R1 Plan: Plan 01
RS = 41.9
42
41
40
39
38
37
Legend
Ground
Elevation (ft)
1122
1120
1118
1116
1114
1112
1110
1108
1106
1104
1102
0
500
1000
1500
2000
2500
Station (ft)

HEC-RAS Plan: Plan 01 River: Camelback Road W Reach: Camelback Main Profile: PF 1

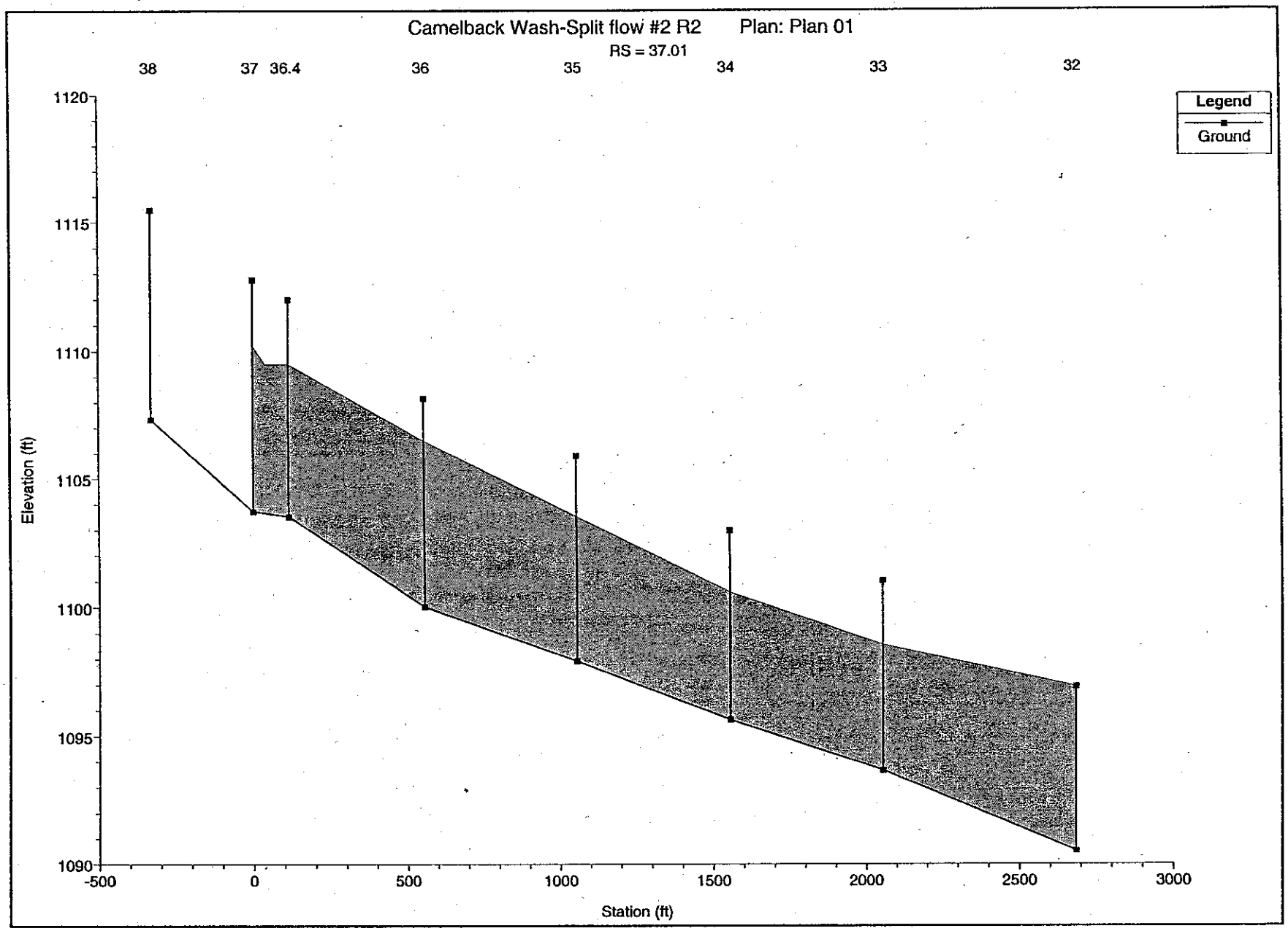
Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Camelback Main	42	883.17	1115.92	1118.21	1117.59	1118.27	0.002779	1.59	447.63	473.33	0.20
Camelback Main	41	839.53	1112.40	1115.26	1115.26	1115.51	0.028559	4.83	165.19	357.74	0.81
Camelback Main	40	826.68	1111.29	1114.28		1114.36	0.001164	1.13	386.30	318.73	0.13
Camelback Main	39	1054.85	1109.22	1112.96		1113.08	0.004970	2.30	384.31	422.52	0.26
Camelback Main	38	1009.55	1107.35	1112.03		1112.16	0.000918	4.16	546.63	529.22	0.37
Camelback Main	37.01	Lat. Weir									
Camelback Main	37	1127.62	1103.73	1109.41	1108.74	1111.07	0.005353	10.35	109.03	32.65	0.82
Camelback Main	36.9	Culvert									
Camelback Main	36.4	1133.01	1103.53	1109.07	1109.07	1109.76	0.002120	6.79	187.39	83.19	0.56
Camelback Main	36	1153.64	1100.04	1106.25		1107.07	0.007222	9.87	414.94	811.96	0.89
Camelback Main	35	996.64	1097.94	1104.13	1104.13	1104.51	0.003338	7.00	493.06	578.88	0.63
Camelback Main	34	897.85	1095.66	1100.72		1100.91	0.003478	4.94	287.42	509.58	0.49
Camelback Main	33	873.99	1093.67	1098.59	1098.59	1098.87	0.004903	5.76	236.67	450.31	0.57
Camelback Main	32	702.49	1090.52	1096.07	1096.07	1096.31	0.003183	5.23	289.83	535.84	0.46

HEC-RAS Plan: Plan 01 River: Camelback Road W Reach: Camelback Main Profile: PF 1

Reach	River Sta	Q Total	W.S. Elev	Top Width	Sta W.S. Lft	Sta W.S. Rgt
		(cfs)	(ft)	(ft)	(ft)	(ft)
Camelback Main	42	883.17	1118.21	473.33	9587.30	10060.63
Camelback Main	41	639.53	1115.26	357.74	9687.96	10048.24
Camelback Main	40	826.68	1114.28	318.73	9676.01	10047.86
Camelback Main	39	1054.85	1112.96	422.52	9626.37	10058.00
Camelback Main	38	1009.55	1112.03	529.22	9523.11	10052.33
Camelback Main	37.01	Lat. Weir				
Camelback Main	37	1127.62	1109.41	32.65	9985.06	10017.71
Camelback Main	36.9	Culvert				
Camelback Main	36.4	1133.01	1109.07	83.19	9948.31	10031.50
Camelback Main	36	1153.64	1106.25	611.96	9426.62	10039.17
Camelback Main	35	996.64	1104.13	678.68	9370.32	10052.13
Camelback Main	34	697.85	1100.72	509.58	9526.82	10046.36
Camelback Main	33	673.99	1098.59	450.31	9611.86	10064.87
Camelback Main	32	702.49	1096.07	535.84	9522.25	10060.05

HEC-RAS Plan: Plan 01 River: Camelback Road W Reach: Camelback Main Profile: PF 1

Reach	River Sta	Q US	Q Leaving Total	Q DS	Q Weir	Total Q Ble Flow	Wr Top Wdth	Weir Max Depth	Weir Avg Depth	Min El Weir Flow	E.G. US.	W.S. US.	E.G. DS	W.S. DS
		(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)
Camelback Main	37.01	1009.55	540.86	702.49	540.86		1360.38	0.58	0.23	1096.97	1111.07	1109.41	1096.31	1096.07

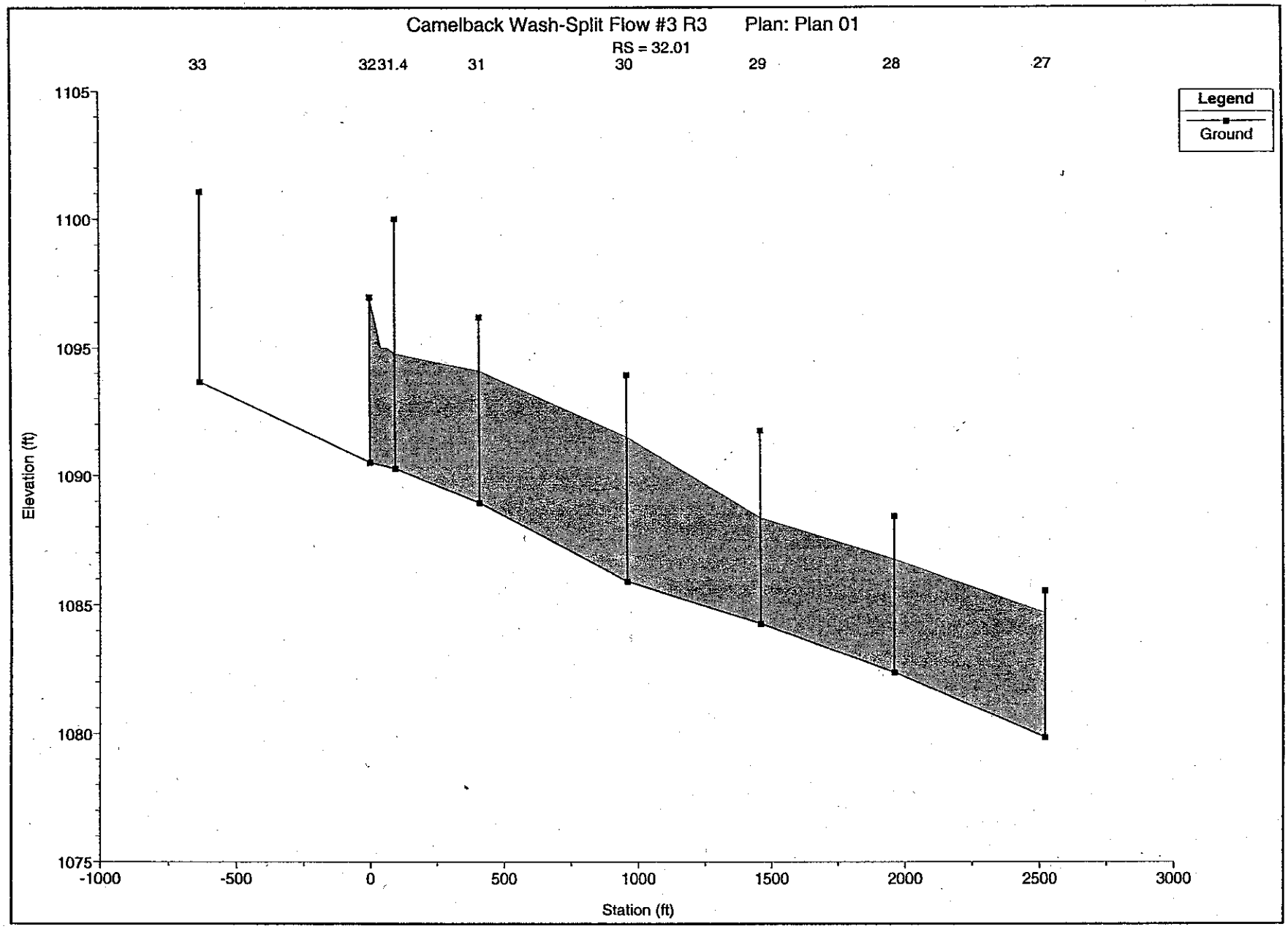

Camelback Wash-Split flow #2 R2 Plan: Plan 01
RS = 37.01
38
37
36.4
36
35
34
33
32
Legend
Ground
Elevation (ft)
1120
1115
1110
1105
1100
1095
1090
-500
0
500
1000
1500
2000
2500
3000
Station (ft)

HEC-RAS Plan: Plan 01 River: Camelback Road W Reach: Camelback Main Profile: PF 1

Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Camelback Main	42	883.17	1116.92	1118.21	1117.59	1118.27	0.002779	1.59	447.63	473.33	0.20
Camelback Main	41	639.53	1112.40	1115.26	1115.26	1115.51	0.028559	4.63	165.19	357.74	0.61
Camelback Main	40	826.68	1111.29	1114.28		1114.36	0.001164	1.13	386.30	318.73	0.13
Camelback Main	39	1054.85	1109.22	1112.96		1113.08	0.004970	2.30	384.31	422.52	0.26
Camelback Main	38	1009.55	1107.35	1112.03		1112.16	0.000918	4.16	546.63	529.22	0.37
Camelback Main	37	1127.82	1103.73	1109.41	1108.74	1111.07	0.005353	10.35	109.03	32.65	0.82
Camelback Main	36.9	Culvert									
Camelback Main	36.4	1133.01	1103.53	1109.07	1109.07	1109.76	0.002120	6.79	187.39	83.19	0.56
Camelback Main	36	1153.64	1100.04	1106.26		1107.07	0.007212	9.86	415.24	612.11	0.89
Camelback Main	35	996.64	1097.94	1104.12	1104.12	1104.51	0.003341	7.00	492.90	678.59	0.63
Camelback Main	34	697.85	1095.66	1100.71		1100.91	0.003679	5.07	279.71	501.34	0.50
Camelback Main	33	673.99	1093.67	1098.61	1098.61	1098.87	0.004572	5.57	245.00	459.37	0.55
Camelback Main	32.01	Lat. Weir									
Camelback Main	32	702.49	1090.52	1096.35	1096.07	1096.42	0.001223	3.36	447.32	609.28	0.29
Camelback Main	31.9	Culvert									
Camelback Main	31.4	696.72	1090.28	1094.14	1092.51	1094.36	0.001610	3.77	185.01	104.10	0.36
Camelback Main	31	711.49	1088.94	1093.16	1093.14	1093.43	0.006672	6.16	224.82	365.81	0.65
Camelback Main	30	737.27	1085.92	1090.50	1090.32	1090.68	0.003853	5.11	267.41	351.82	0.54
Camelback Main	29	759.99	1084.29	1088.44	1088.30	1088.63	0.004349	5.31	271.22	370.40	0.57
Camelback Main	28	755.31	1082.38	1086.85	1086.63	1086.95	0.002602	4.16	348.45	488.87	0.43
Camelback Main	27	567.89	1079.87	1085.12	1085.12	1085.38	0.003023	5.10	215.07	394.49	0.47

HEC-RAS Plan: Plan 01 River: Camelback Road W Reach: Camelback Main Profile: PF 1

Reach	River Sta	Q US	Q Leaving Total	Q DS	Q Weir	Total Gate Flow	Wt. Top Width	Weir Max Depth	Weir Avg Depth	Min El Weir Flow	E.G. US	W.S. US	E.G. DS	W.S. DS
		(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)
Camelback Main	32.01	873.99	256.39	567.59	256.39		1130.83	0.40	0.16	1084.72	1096.42	1096.35	1085.35	1085.12

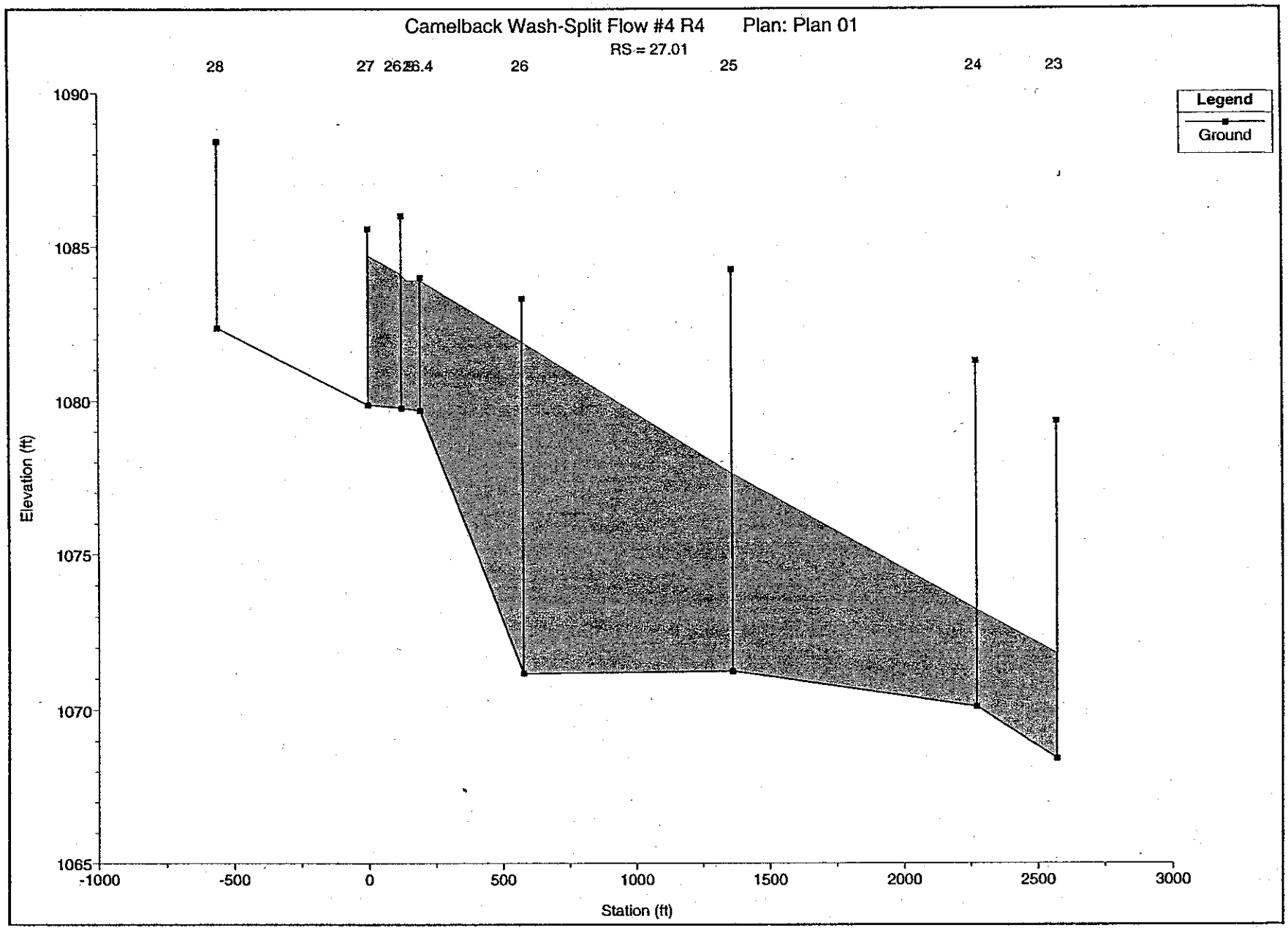

Camelback Wash-Split Flow #3 R3 Plan: Plan 01
RS = 32.01
33
3231.4
31
30
29
28
27
Legend
Ground
Elevation (ft)
1105
1100
1095
1090
1085
1080
1075
-1000
-500
0
500
1000
1500
2000
2500
3000
Station (ft)

HEC-RAS Plan: Plan 01 River: Camelback Road W Reach: Camelback Main Profile: PF 1

Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Camelback Main	42	883.17	1115.92	1118.21	1117.59	1118.27	0.002779	1.59	447.63	473.33	0.20
Camelback Main	41	639.53	1112.40	1115.26	1115.26	1115.51	0.028559	4.63	165.19	357.74	0.61
Camelback Main	40	826.68	1111.29	1114.28		1114.36	0.001164	1.13	386.30	318.73	0.13
Camelback Main	39	1054.85	1109.22	1112.96		1113.08	0.004970	2.30	384.31	422.52	0.26
Camelback Main	38	1009.55	1107.35	1112.03		1112.16	0.000918	4.16	546.63	529.22	0.37
Camelback Main	37	1127.62	1103.73	1109.41	1108.74	1111.07	0.005353	10.35	109.03	32.65	0.82
Camelback Main	36.9	Culvert									
Camelback Main	36.4	1133.01	1103.53	1109.07	1109.07	1109.76	0.002120	6.79	187.39	83.19	0.56
Camelback Main	36	1153.64	1100.04	1106.26		1107.07	0.007159	9.83	416.89	612.91	0.89
Camelback Main	35	996.64	1097.94	1104.12	1104.12	1104.51	0.003355	7.02	491.74	677.94	0.83
Camelback Main	34	697.85	1095.66	1100.69		1100.91	0.003997	5.26	268.58	489.20	0.52
Camelback Main	33	673.99	1093.67	1098.63	1098.63	1098.87	0.004186	5.35	255.79	470.84	0.53
Camelback Main	32	702.49	1090.52	1096.35	1096.07	1096.42	0.001230	3.37	446.21	608.81	0.29
Camelback Main	31.9	Culvert									
Camelback Main	31.4	696.72	1090.28	1094.14	1092.51	1094.36	0.001611	3.77	184.95	104.07	0.36
Camelback Main	31	711.49	1088.94	1093.16	1093.14	1093.43	0.006650	6.15	225.13	366.03	0.65
Camelback Main	30	737.27	1085.92	1090.50	1090.32	1090.68	0.003864	5.12	267.11	351.62	0.54
Camelback Main	29	759.99	1084.29	1088.45		1088.63	0.004291	5.28	272.71	371.24	0.56
Camelback Main	28	755.31	1082.38	1086.84	1086.53	1086.95	0.002644	4.19	346.30	487.81	0.43
Camelback Main	27.01	Lat. Weir									
Camelback Main	27	567.81	1079.87	1085.12	1085.12	1085.39	0.002987	5.07	216.42	395.39	0.47
Camelback Main	26.9	518.30	1079.77	1084.30	1082.30	1084.59	0.001826	4.31	135.35	129.57	0.38
Camelback Main	26.7	Culvert									
Camelback Main	26.4	526.89	1079.69	1082.51	1082.51	1083.36	0.008871	7.56	75.84	416.43	0.82
Camelback Main	26	582.34	1077.68	1078.36	1078.24	1078.83	0.008853	2.29	107.57	88.52	0.63
Camelback Main	25	696.88	1074.33	1075.86		1076.07	0.001968	0.83	194.65	89.46	0.14
Camelback Main	24	748.18	1070.13	1073.72		1073.96	0.002736	1.87	210.88	108.50	0.19
Camelback Main	23	575.19	1068.44	1072.10	1071.28	1072.75	0.005603	6.46	88.99	38.67	0.65

HEC-RAS Plan: Plan 01 River: Camelback Road W Reach: Camelback Main Profile: PF 1

Reach	River Sta	Q US	Q Leaving Total	Q DS	Q Weir	Total Gate Flow	Wr Top Width	Weir Max Depth	Weir Avg Depth	Min El Weir Flow	E.G. US	W.S. US	E.G. DS	W.S. DS
		(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)
Camelback Main	27.01	755.31	361.11	575.19	351.11		635.55	0.49	0.32	1071.83	1085.38	1085.12	1072.75	1072.10

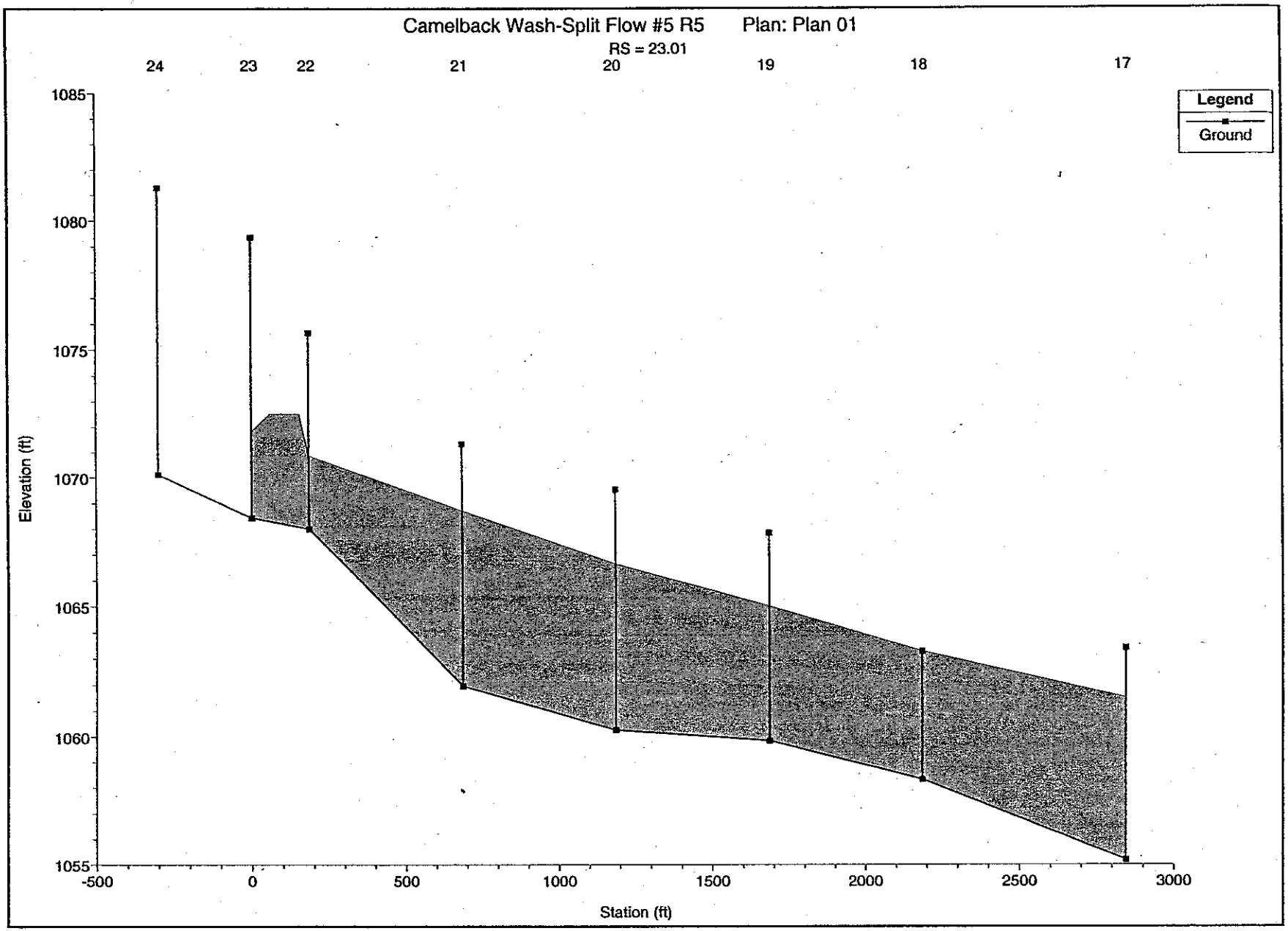

Camelback Wash-Split Flow #4 R4 Plan: Plan 01
RS = 27.01
28
27
26
26.4
26
25
24
23
Legend
Ground
Elevation (ft)
1090
1085
1080
1075
1070
1065
-1000
-500
0
500
1000
1500
2000
2500
3000
Station (ft)

HEC-RAS Plan: Plan 01 River: Camelback Road W Reach: Camelback Main Profile: PF 1

Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Camelback Main	42	883.17	1115.92	1118.21	1117.59	1118.27	0.002779	1.59	447.63	473.33	0.20
Camelback Main	41	839.53	1112.40	1115.26	1115.26	1115.51	0.028559	4.63	165.19	357.74	0.61
Camelback Main	40	826.68	1111.29	1114.28		1114.36	0.001164	1.13	386.30	318.73	0.13
Camelback Main	39	1054.85	1109.22	1112.96		1113.08	0.004970	2.30	384.31	422.52	0.26
Camelback Main	38	1009.55	1107.35	1112.03		1112.16	0.000918	4.16	546.63	529.22	0.37
Camelback Main	37	1127.62	1103.73	-1109.41	1108.74	1111.07	0.005353	10.35	109.03	32.65	0.82
Camelback Main	36.9	Culvert									
Camelback Main	36.4	1133.01	1103.53	1109.07	1109.07	1109.76	0.002120	6.79	187.39	83.19	0.56
Camelback Main	36	1153.64	1100.04	1106.28		1107.07	0.007159	9.83	416.89	612.91	0.89
Camelback Main	35	996.64	1097.94	1104.12	1104.12	1104.51	0.003355	7.02	491.74	677.94	0.63
Camelback Main	34	697.85	1095.66	1100.89		1100.91	0.003997	5.26	268.58	489.20	0.52
Camelback Main	33	673.99	1093.67	1098.63	1098.63	1098.87	0.004186	5.35	255.79	470.84	0.53
Camelback Main	32	702.49	1090.52	1096.35	1096.07	1096.42	0.001230	3.37	446.21	608.81	0.29
Camelback Main	31.9	Culvert									
Camelback Main	31.4	696.72	1090.28	1094.14	1092.51	1094.36	0.001611	3.77	184.95	104.07	0.36
Camelback Main	31	711.49	1088.94	1093.16	1093.14	1093.43	0.006650	6.15	225.13	366.03	0.65
Camelback Main	30	737.27	1085.92	1090.50	1090.32	1090.68	0.003864	5.12	267.11	351.82	0.54
Camelback Main	29	759.99	1084.29	1088.45		1088.63	0.004291	5.28	272.71	371.24	0.56
Camelback Main	28	755.31	1082.38	1086.84	1086.63	1086.95	0.002644	4.19	346.30	487.81	0.43
Camelback Main	27	567.89	1079.87	1085.12	1085.12	1085.38	0.002972	5.06	217.05	395.81	0.46
Camelback Main	26.9	518.30	1079.77	1084.30	1082.30	1084.58	0.001826	4.31	135.35	129.57	0.38
Camelback Main	26.7	Culvert									
Camelback Main	26.4	526.89	1079.69	1082.50	1082.50	1083.36	0.009021	7.60	75.33	413.26	0.83
Camelback Main	26	582.34	1077.68	1078.44	1078.24	1078.86	0.007223	2.28	114.98	89.36	0.59
Camelback Main	25	696.88	1074.33	1075.74	1074.82	1075.98	0.002314	0.86	184.33	88.50	0.15
Camelback Main	24	748.18	1070.13	1074.26		1074.41	0.001315	1.29	270.76	111.94	0.13
Camelback Main	23.01	Lat. Weir									
Camelback Main	23	574.48	1068.44	1073.83	1071.27	1074.02	0.001228	3.49	164.54	41.90	0.31
Camelback Main	22.3	Culvert									
Camelback Main	22	437.32	1068.01	1070.18	1070.18	1071.14	0.014400	7.86	55.60	33.45	1.00
Camelback Main	21	556.83	1061.98	1067.70		1068.02	0.002537	4.89	154.20	147.68	0.45
Camelback Main	20	676.33	1060.29	1066.39	1065.25	1066.86	0.002097	5.81	172.60	180.10	0.54
Camelback Main	19	795.84	1059.86	1064.78		1065.49	0.003411	7.31	173.44	200.34	0.68
Camelback Main	18	909.64	1058.34	1063.44	1063.35	1063.61	0.003467	4.81	370.82	477.95	0.49
Camelback Main	17	1065.71	1055.19	1059.97	1058.56	1060.72	0.004803	6.95	153.33	44.18	0.58

HEC-RAS Plan: Plan 01 River: Camelback Road W Reach: Camelback Main Profile: PF 1

Reach	River Sta	Q US	Q Leaving Total	Q DS	Q Weir	Total Gate Flow	Wr Top Width	Weir Max Depth	Weir Avg Depth	Min El Weir Flow	E.G. US.	W.S. US.	E.G. DS	W.S. DS
		(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)
Camelback Main	23.01	748.18	189.60	1065.71	189.60		256.32	2.00	0.29	1061.54	1074.02	1073.83	1060.73	1059.97

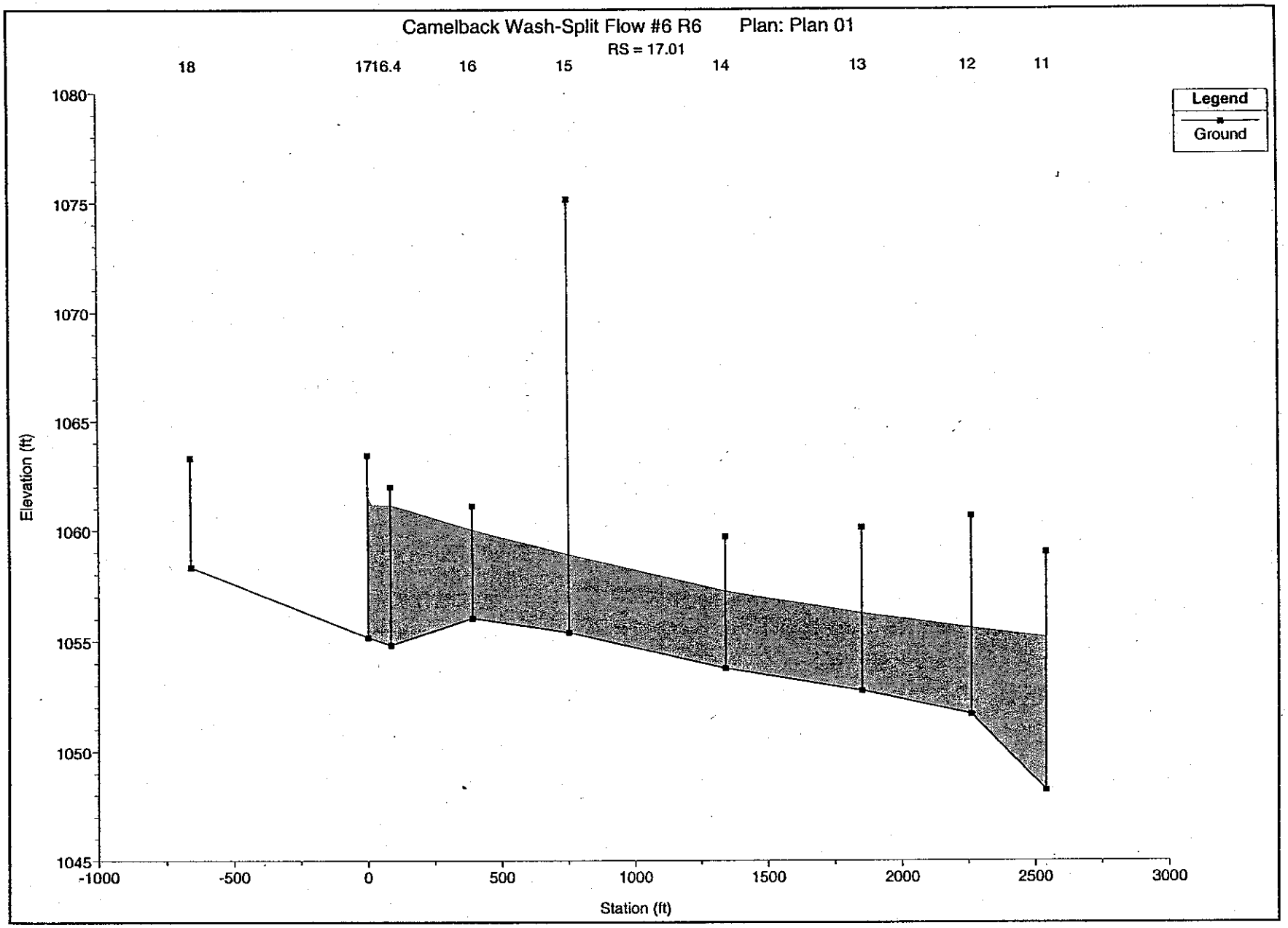

Camelback Wash-Split Flow #5 R5 Plan: Plan 01
RS = 23.01
24
23
22
21
20
19
18
17
Legend
Ground
Elevation (ft)
1085
1080
1075
1070
1065
1060
1055
-500
0
500
1000
1500
2000
2500
3000
Station (ft)

HEC-RAS Plan: Plan 01 River: Camelback Road W Reach: Camelback Main Profile: PF 1

Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Camelback Main	42	883.17	1115.92	1118.21	1117.59	1118.27	0.002779	1.59	447.63	473.33	0.20
Camelback Main	41	639.53	1112.40	1115.26	1115.26	1115.51	0.028559	4.63	165.19	367.74	0.61
Camelback Main	40	826.68	1111.29	1114.28		1114.36	0.001164	1.13	386.30	318.73	0.13
Camelback Main	39	1054.85	1109.22	1112.96		1113.08	0.004970	2.30	384.31	422.52	0.26
Camelback Main	38	1009.55	1107.35	1112.03		1112.16	0.000918	4.16	546.63	529.22	0.37
Camelback Main	37	1127.62	1103.73	1109.41	1108.74	1111.07	0.005353	10.35	109.03	32.65	0.82
Camelback Main	36.9	Culvert									
Camelback Main	36.4	1133.01	1103.53	1109.07	1109.07	1109.76	0.002120	5.79	187.39	83.19	0.56
Camelback Main	36	1153.64	1100.04	1106.26		1107.07	0.007159	9.83	416.89	612.91	0.89
Camelback Main	35	996.64	1097.94	1104.12	1104.12	1104.51	0.003355	7.02	491.74	677.94	0.63
Camelback Main	34	697.85	1095.66	1100.69		1100.91	0.003997	5.26	268.58	489.20	0.52
Camelback Main	33	673.99	1093.67	1098.63	1098.63	1098.87	0.004186	5.35	255.79	470.84	0.53
Camelback Main	32	702.49	1090.52	1096.35	1096.07	1096.42	0.001230	3.37	446.21	608.81	0.29
Camelback Main	31.9	Culvert									
Camelback Main	31.4	698.72	1090.28	1094.14	1092.51	1094.36	0.001611	3.77	184.95	104.07	0.38
Camelback Main	31	711.49	1088.94	1093.16	1093.14	1093.43	0.006650	6.15	225.13	366.03	0.65
Camelback Main	30	737.27	1085.92	1090.50	1090.32	1090.68	0.003864	5.12	267.11	351.62	0.54
Camelback Main	29	759.99	1084.29	1088.45		1088.63	0.004291	5.28	272.71	371.24	0.56
Camelback Main	28	755.31	1082.38	1086.84	1086.63	1086.95	0.002644	4.19	346.30	487.81	0.43
Camelback Main	27	567.89	1079.87	1085.12	1085.12	1085.38	0.002972	5.06	217.05	395.81	0.46
Camelback Main	26.9	518.30	1079.77	1084.30	1082.30	1084.58	0.001826	4.31	135.35	129.57	0.38
Camelback Main	26.7	Culvert									
Camelback Main	26.4	526.89	1079.69	1082.50	1082.50	1083.36	0.009021	7.60	75.33	413.26	0.83
Camelback Main	26	582.34	1077.68	1078.44	1078.24	1078.86	0.007223	2.28	114.98	89.38	0.59
Camelback Main	25	696.88	1074.33	1075.74	1074.82	1075.98	0.002314	0.86	184.32	88.50	0.15
Camelback Main	24	748.18	1070.13	1074.27		1074.42	0.001313	1.29	270.90	111.95	0.13
Camelback Main	23	575.19	1068.44	1073.83	1071.27	1074.02	0.001231	3.50	164.56	41.90	0.31
Camelback Main	22.3	Culvert									
Camelback Main	22	437.32	1068.01	1070.18	1070.18	1071.14	0.014383	7.86	55.63	33.46	1.00
Camelback Main	21	556.83	1061.98	1067.76		1068.05	0.002314	4.71	163.37	157.17	0.43
Camelback Main	20	676.33	1060.29	1066.24		1066.80	0.002554	6.24	148.38	146.10	0.59
Camelback Main	19	795.84	1059.86	1064.93	1064.87	1065.49	0.002684	6.63	205.99	231.42	0.61
Camelback Main	18	910.00	1058.34	1063.34	1063.34	1063.59	0.004863	5.58	325.90	477.95	0.58
Camelback Main	17.01	Lat. Weir									
Camelback Main	17	1065.04	1055.19	1062.38	1059.56	1062.48	0.000603	3.09	578.90	424.61	0.21
Camelback Main	16.9	Culvert									
Camelback Main	16.4	971.81	1054.83	1060.91	1058.11	1061.28	0.003677	4.92	201.43	379.01	0.37
Camelback Main	16	1033.84	1056.05	1060.21		1060.26	0.002242	2.38	541.97	501.78	0.27
Camelback Main	15	951.62	1055.41	1059.38		1059.44	0.002353	2.38	496.08	448.07	0.25
Camelback Main	14	592.57	1053.77	1057.67		1057.79	0.003772	4.23	283.20	470.10	0.49
Camelback Main	13	393.66	1052.76	1056.60		1056.64	0.001201	2.69	303.86	492.66	0.31
Camelback Main	12	362.96	1051.70	1055.68	1055.68	1055.85	0.003623	4.48	175.04	423.19	0.53
Camelback Main	11	469.34	1048.24	1049.95	1049.93	1050.75	0.012360	7.17	65.48	39.57	0.98

HEC-RAS Plan: Plan 01 River: Camelback Road W Reach: Camelback Main Profile: PF 1

Reach	River Sta	Q US	Q Leaving Total	Q DS	Q Weir	Total Gate Flow	Wr Top Width	Weir Max Depth	Weir Avg Depth	Min El Weir Flow	E.G. US.	W.S. US.	E.G. DS	W.S. DS
		(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)
Camelback Main	17.01	910.00	1560.84	469.34	1560.84		2260.30	1.10	0.41	1055.19	1062.48	1062.38	1050.78	1049.96

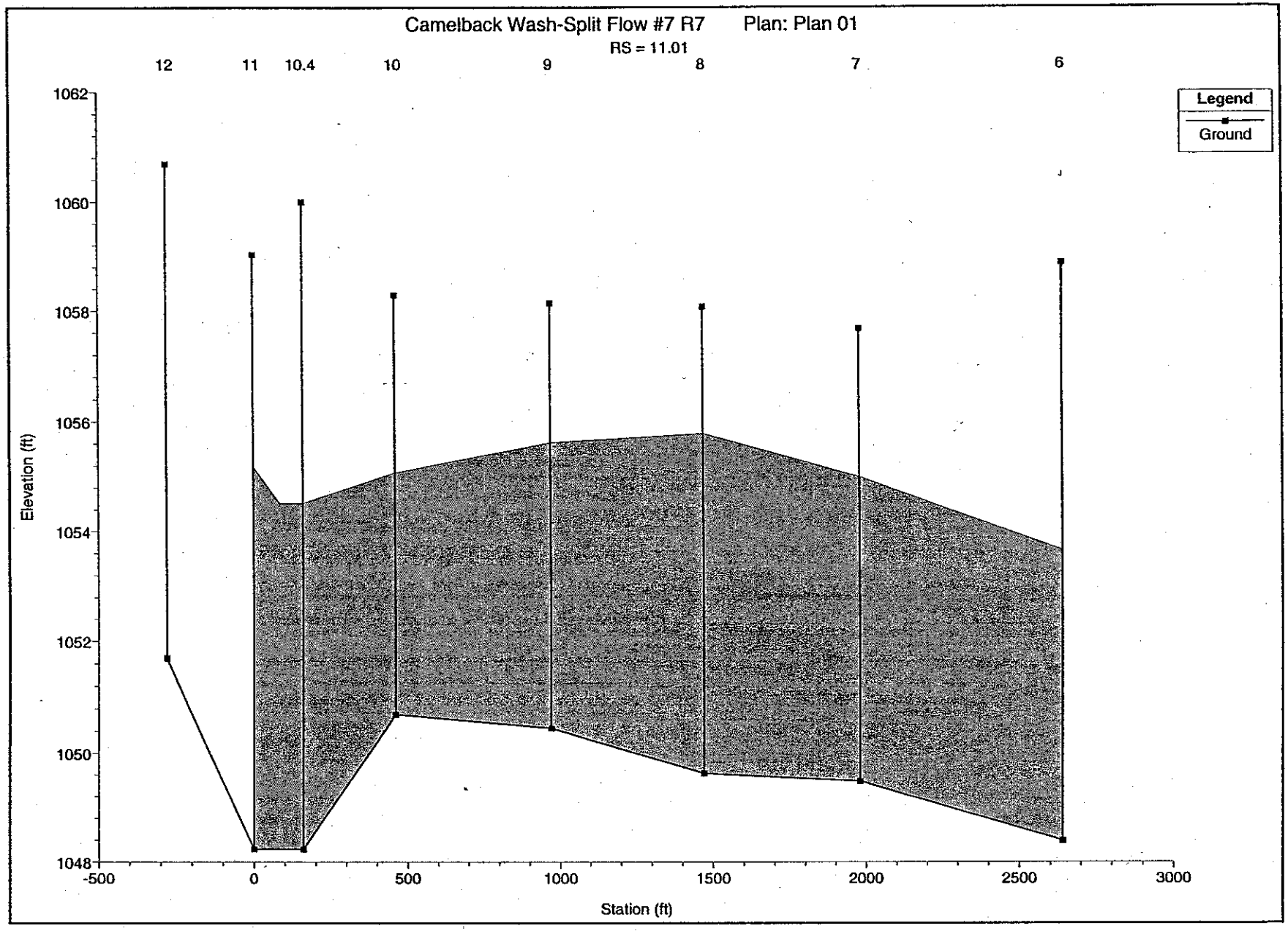

Camelback Wash-Split Flow #6 R6 Plan: Plan 01
RS = 17.01
18
1716.4
16
15
14
13
12
11
Legend
Ground
Elevation (ft)
1080
1075
1070
1065
1060
1055
1050
1045
-1000
-500
0
500
1000
1500
2000
2500
3000
Station (ft)

HEC-RAS Plan: Plan 01 River: Camelback Road W Reach: Camelback Main Profile: PF 1

Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Camelback Main	42	883.17	1115.92	1118.21	1117.59	1118.27	0.002822	1.60	445.15	472.07	0.20
Camelback Main	41	639.53	1112.40	1115.26	1115.26	1115.51	0.028620	4.63	165.05	357.61	0.61
Camelback Main	40	826.68	1111.29	1114.31		1114.39	0.001109	1.11	396.47	324.78	0.12
Camelback Main	39	1054.85	1109.22	1112.90		1113.04	0.005948	2.49	360.08	409.69	0.29
Camelback Main	38	1009.55	1107.35	1112.02		1112.16	0.000939	4.20	540.64	525.30	0.38
Camelback Main	37	1127.82	1103.73	1109.50	1108.74	1111.10	0.005038	10.16	111.06	36.36	0.79
Camelback Main	36.9	Culvert									
Camelback Main	36.4	1133.01	1103.53	1109.07	1109.07	1109.76	0.002120	6.79	187.39	83.19	0.56
Camelback Main	36	1153.64	1100.04	1106.23		1107.12	0.007777	10.21	397.22	596.87	0.92
Camelback Main	35	996.64	1097.94	1104.13	1104.13	1104.51	0.003339	7.00	493.06	878.68	0.83
Camelback Main	34	897.85	1095.66	1100.74		1100.92	0.003262	4.79	296.20	517.77	0.48
Camelback Main	33	873.99	1093.67	1098.59	1098.59	1098.87	0.004901	5.75	238.73	450.37	0.57
Camelback Main	32	702.49	1090.52	1096.45	1096.07	1096.50	0.000883	2.90	511.16	635.94	0.24
Camelback Main	31.9	Culvert									
Camelback Main	31.4	696.72	1090.28	1094.16	1092.51	1094.37	0.001589	3.75	185.73	104.52	0.36
Camelback Main	31	711.49	1088.94	1093.16	1093.14	1093.43	0.006740	6.18	223.88	365.14	0.66
Camelback Main	30	737.27	1085.92	1090.49	1090.32	1090.67	0.003987	5.19	263.61	349.25	0.55
Camelback Main	29	759.99	1084.29	1088.46		1088.84	0.004123	5.18	277.21	373.77	0.55
Camelback Main	28	755.31	1082.38	1086.84	1086.63	1086.95	0.002844	4.19	346.30	487.81	0.43
Camelback Main	27	567.89	1079.87	1085.12	1085.12	1085.38	0.002972	5.06	217.05	395.81	0.46
Camelback Main	26.9	518.30	1079.77	1084.34	1082.30	1084.61	0.001739	4.24	140.69	138.73	0.38
Camelback Main	26.7	Culvert									
Camelback Main	26.4	526.89	1079.69	1082.50	1082.50	1083.36	0.009021	7.60	75.33	413.26	0.83
Camelback Main	26	582.34	1077.68	1078.48	1078.24	1078.87	0.006633	2.26	118.24	89.73	0.57
Camelback Main	25	896.88	1074.33	1075.73	1074.82	1075.97	0.002347	0.87	183.45	88.42	0.16
Camelback Main	24	748.18	1070.13	1074.43		1074.56	0.001080	1.20	289.42	112.99	0.12
Camelback Main	23	575.19	1068.44	1074.07	1071.27	1074.24	0.001031	3.29	174.61	42.35	0.29
Camelback Main	22.3	Culvert									
Camelback Main	22	437.32	1068.01	1070.18	1070.18	1071.14	0.014383	7.86	55.63	33.46	1.00
Camelback Main	21	556.83	1061.98	1067.77		1068.05	0.002297	4.69	164.14	157.94	0.43
Camelback Main	20	676.33	1060.29	1066.23		1066.80	0.002606	6.29	146.07	142.52	0.59
Camelback Main	19	795.84	1059.86	1064.98	1064.87	1065.49	0.002481	6.42	217.38	241.36	0.58
Camelback Main	18	910.00	1058.34	1063.29	1063.29	1063.60	0.005823	6.04	303.36	465.42	0.63
Camelback Main	17	1065.71	1055.19	1062.31	1058.56	1062.43	0.000653	3.20	552.80	410.36	0.22
Camelback Main	16.9	Culvert									
Camelback Main	16.4	971.81	1054.83	1060.93	1058.12	1061.30	0.003608	4.89	202.71	387.97	0.37
Camelback Main	16	1033.84	1056.05	1060.22		1060.27	0.002180	2.35	547.50	503.91	0.26
Camelback Main	15	951.62	1055.41	1059.37		1059.43	0.002428	2.41	490.57	446.26	0.25
Camelback Main	14	592.57	1053.77	1057.70	1057.56	1057.81	0.003366	4.01	296.62	477.36	0.46
Camelback Main	13	393.66	1052.76	1056.55	1056.29	1056.60	0.001477	2.95	278.80	475.70	0.34
Camelback Main	12	362.96	1051.70	1055.87		1055.93	0.001521	2.99	261.00	480.15	0.34
Camelback Main	11.01	Lat. Weir									
Camelback Main	11	469.23	1048.24	1055.80	1049.93	1055.82	0.000084	1.35	487.23	526.27	0.09
Camelback Main	10.7	Culvert									
Camelback Main	10.4	220.59	1048.24	1055.11	1049.21	1055.11	0.000015	0.58	387.66	88.44	0.04
Camelback Main	10	110.85	1050.70	1054.96		1055.01	0.000458	1.80	70.15	55.64	0.20
Camelback Main	9	133.06	1050.46	1054.62		1054.69	0.000737	2.26	64.68	40.36	0.25
Camelback Main	8	154.84	1049.63	1054.27		1054.33	0.000583	2.08	85.63	52.91	0.23
Camelback Main	7	177.06	1049.48	1053.81		1053.93	0.001104	2.81	67.70	31.21	0.31
Camelback Main	6	205.81	1048.39	1052.87	1051.11	1053.03	0.001650	3.28	71.10	31.26	0.35

HEC-RAS Plan: Plan 01 River: Camelback Road W Reach: Camelback Main Profile: PF 1

Reach	River Sta	Q US	Q Left Wrg Total	Q DS	Q Weir	Total Gate Flow	Wr Top Width	Weir Max Depth	Weir Avg Depth	Min El Weir Flow	E.G. US.	W.S. US.	E.G. DS	W.S. DS
		(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)
Camelback Main	11.01	382.96	376.10	209.61	376.10		409.56	0.91	0.47	1053.67	1055.82	1055.80	1053.03	1052.87

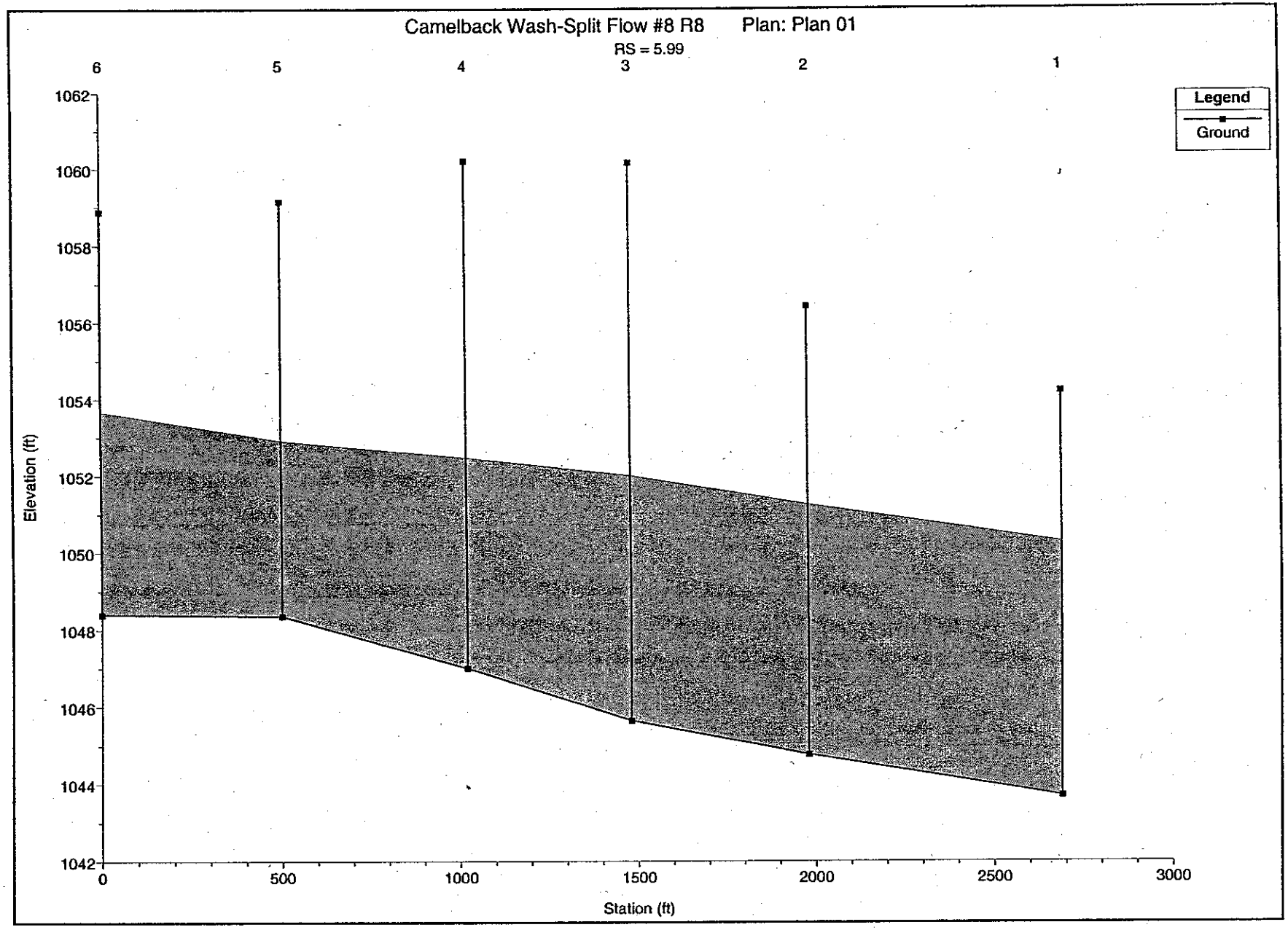

Camelback Wash-Split Flow #7 R7 Plan: Plan 01
RS = 11.01
12
11
10.4
10
9
8
7
6
Legend
Ground
Elevation (ft)
1062
1060
1058
1056
1054
1052
1050
1048
-500
0
500
1000
1500
2000
2500
3000
Station (ft)

HEC-RAS Plan: Plan 01 River: Camelback Road W Reach: Camelback Main Profile: PF 1

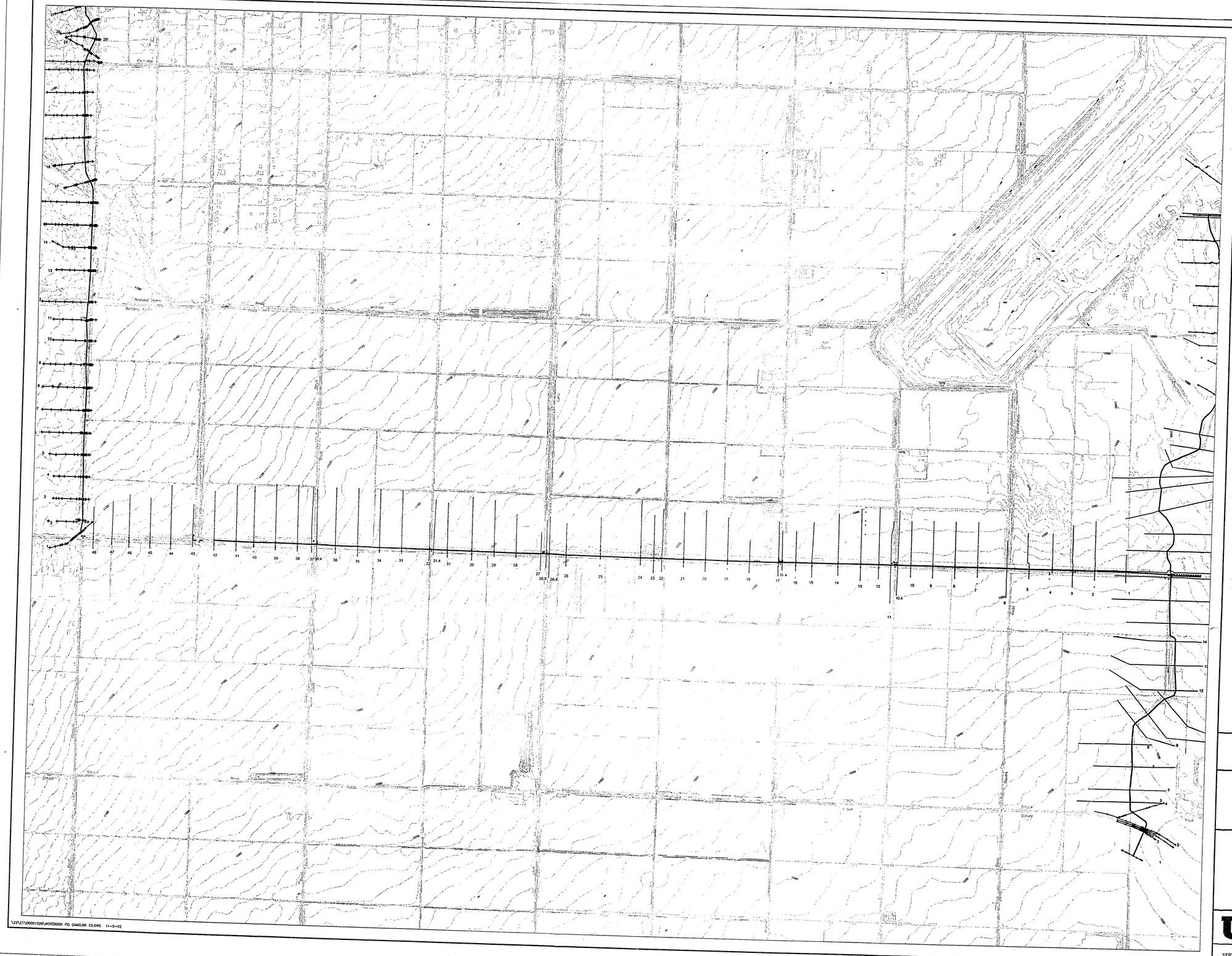
Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
		(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Camelback Main	42	883.17	1115.92	1118.21	1117.59	1118.27	0.002779	1.59	447.83	473.33	0.20
Camelback Main	41	639.53	1112.40	1115.26	1115.26	1115.51	0.028559	4.83	165.19	357.74	0.61
Camelback Main	40	826.68	1111.29	1114.28		1114.36	0.001164	1.13	386.30	318.73	0.13
Camelback Main	39	1054.85	1109.22	1112.96		1113.08	0.004970	2.30	384.31	422.52	0.26
Camelback Main	38	1009.55	1107.35	1112.03		1112.16	0.000918	4.16	546.63	529.22	0.37
Camelback Main	37	1127.82	1103.73	1109.41	1108.74	1111.07	0.005353	10.35	109.03	32.65	0.82
Camelback Main	36.9	Culvert									
Camelback Main	36.4	1133.01	1103.53	1109.07	1109.07	1109.76	0.002120	6.79	187.39	83.19	0.56
Camelback Main	36	1153.64	1100.04	1106.26		1107.07	0.007159	9.83	416.89	612.91	0.89
Camelback Main	35	996.84	1097.94	1104.12	1104.12	1104.51	0.003355	7.02	491.74	677.94	0.63
Camelback Main	34	697.85	1095.66	1100.69		1100.91	0.003997	5.26	268.58	489.20	0.52
Camelback Main	33	673.99	1093.67	1098.63	1098.63	1098.87	0.004186	5.35	255.79	470.84	0.53
Camelback Main	32	702.49	1090.52	1096.35	1096.07	1096.42	0.001230	3.37	446.21	608.81	0.29
Camelback Main	31.9	Culvert									
Camelback Main	31.4	696.72	1090.28	1094.14	1092.51	1094.36	0.001611	3.77	184.95	104.07	0.36
Camelback Main	31	711.49	1088.94	1093.16	1093.14	1093.43	0.006650	6.15	225.13	366.03	0.65
Camelback Main	30	737.27	1085.92	1090.50	1090.32	1090.68	0.003864	5.12	267.11	351.62	0.54
Camelback Main	29	759.99	1084.29	1088.45		1088.63	0.004291	5.28	272.71	371.24	0.56
Camelback Main	28	755.31	1082.38	1086.84	1086.63	1086.95	0.002644	4.19	346.30	487.81	0.43
Camelback Main	27	567.89	1079.87	1085.12	1085.12	1085.38	0.002972	5.06	217.05	395.81	0.46
Camelback Main	26.9	518.30	1079.77	1084.30	1082.30	1084.58	0.001826	4.31	135.35	129.57	0.38
Camelback Main	26.7	Culvert									
Camelback Main	26.4	526.89	1079.69	1082.50	1082.50	1083.36	0.009021	7.60	75.33	413.26	0.83
Camelback Main	26	582.34	1077.68	1078.44	1078.24	1078.86	0.007223	2.28	114.98	89.36	0.59
Camelback Main	25	696.88	1074.33	1075.74	1074.82	1075.98	0.002314	0.86	184.32	88.50	0.15
Camelback Main	24	748.18	1070.13	1074.27		1074.42	0.001313	1.29	270.90	111.95	0.13
Camelback Main	23	575.19	1068.44	1073.83	1071.27	1074.02	0.001231	3.50	164.56	41.90	0.31
Camelback Main	22.3	Culvert									
Camelback Main	22	437.32	1068.01	1070.18	1070.18	1071.14	0.014383	7.86	55.63	33.46	1.00
Camelback Main	21	556.83	1061.98	1067.76		1068.05	0.002314	4.71	163.37	157.17	0.43
Camelback Main	20	676.33	1060.29	1066.24		1066.80	0.002554	6.24	148.38	146.10	0.59
Camelback Main	19	795.84	1059.86	1064.93		1065.49	0.002684	6.63	205.99	231.42	0.61
Camelback Main	18	910.00	1058.34	1063.34	1063.34	1063.59	0.004863	5.58	325.90	477.95	0.58
Camelback Main	17	1065.71	1055.19	1062.34	1058.56	1062.45	0.000634	3.16	562.43	415.75	0.22
Camelback Main	16.9	Culvert									
Camelback Main	16.4	971.81	1054.83	1060.91	1058.11	1061.28	0.003678	4.92	201.43	378.98	0.37
Camelback Main	16	1033.84	1056.05	1060.21		1060.27	0.002240	2.38	542.16	501.85	0.27
Camelback Main	15	951.62	1055.41	1059.38		1059.44	0.002379	2.39	494.12	447.42	0.25
Camelback Main	14	592.57	1053.77	1057.68		1057.80	0.003627	4.15	287.74	472.57	0.48
Camelback Main	13	393.66	1052.76	1056.58	1056.29	1056.63	0.001299	2.79	294.12	486.14	0.32
Camelback Main	12	362.96	1051.70	1055.72		1055.86	0.003003	4.11	192.39	440.51	0.48
Camelback Main	11	469.34	1048.24	1055.71	1049.93	1055.74	0.000091	1.39	444.27	472.06	0.10
Camelback Main	10.7	Culvert									
Camelback Main	10.4	220.59	1048.24	1055.01	1049.21	1055.01	0.000016	0.59	379.18	88.21	0.04
Camelback Main	10	110.85	1050.70	1054.94		1054.99	0.000471	1.81	69.19	52.99	0.20
Camelback Main	9	133.06	1050.46	1054.62		1054.69	0.000730	2.25	64.95	40.58	0.25
Camelback Main	8	154.84	1049.63	1054.33		1054.38	0.000531	2.01	88.71	53.12	0.22
Camelback Main	7	177.06	1049.48	1053.91		1054.02	0.000982	2.69	70.84	31.93	0.29
Camelback Main	6	205.81	1048.39	1053.16		1053.29	0.001219	2.92	80.71	33.39	0.30
Camelback Main	5.99	Lat. Weir									
Camelback Main	5	205.81	1048.35	1052.32		1052.50	0.002142	3.46	74.54	122.14	0.39
Camelback Main	4	205.81	1047.01	1051.29		1051.46	0.001854	3.31	62.72	26.17	0.36
Camelback Main	3	205.81	1045.65	1050.45		1050.62	0.001815	3.26	63.12	24.06	0.35
Camelback Main	2	205.81	1044.77	1049.66		1049.76	0.001522	2.79	85.42	56.46	0.30
Camelback Main	1	205.81	1043.70	1048.55	1048.53	1048.68	0.001503	2.82	72.97	123.42	0.30

HEC-RAS Plan: Plan 01 River: Camelback Road W Reach: Camelback Main Profile: PF 1

Reach	River Sta	Q US	Q Leewrg Total	Q DS	Q Weir	Total Gate Flow	Wir Top Width	Weir Max Depth	Weir Avg Depth	Min El Weir Flow	E.G. US.	W.S. US.	E.G. DS.	W.S. DS.
		(cfs)	(cfs)	(cfs)	(cfs)	(cfs)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)
Camelback Main	5.99	205.81	0.00	205.81	0.00					1050.29	1053.29	1053.16	1048.68	1048.55


Camelback Wash-Split Flow #8 R8 Plan: Plan 01
RS = 5.99
6
5
4
3
2
1
Legend
Ground
Elevation (ft)
1062
1060
1058
1056
1054
1052
1050
1048
1046
1044
1042
0
500
1000
1500
2000
2500
3000
Station (ft)

CROSS SECTION LAYOUT



1000' 0' 1000' 2000'

SCALE: 1" = 1000'

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

FLOODPLAIN MAP FOR CAMELBACK WASH CROSS SECTIONS

LOOP 303 ADMP UPDATE

FLOOD DELINEATION STUDY

F.C.D. CONTRACT NO. 99-40

URS

7720 N. 16th Street
Phoenix, Arizona 85020
(602) 371-1100

SEPTEMBER 2002

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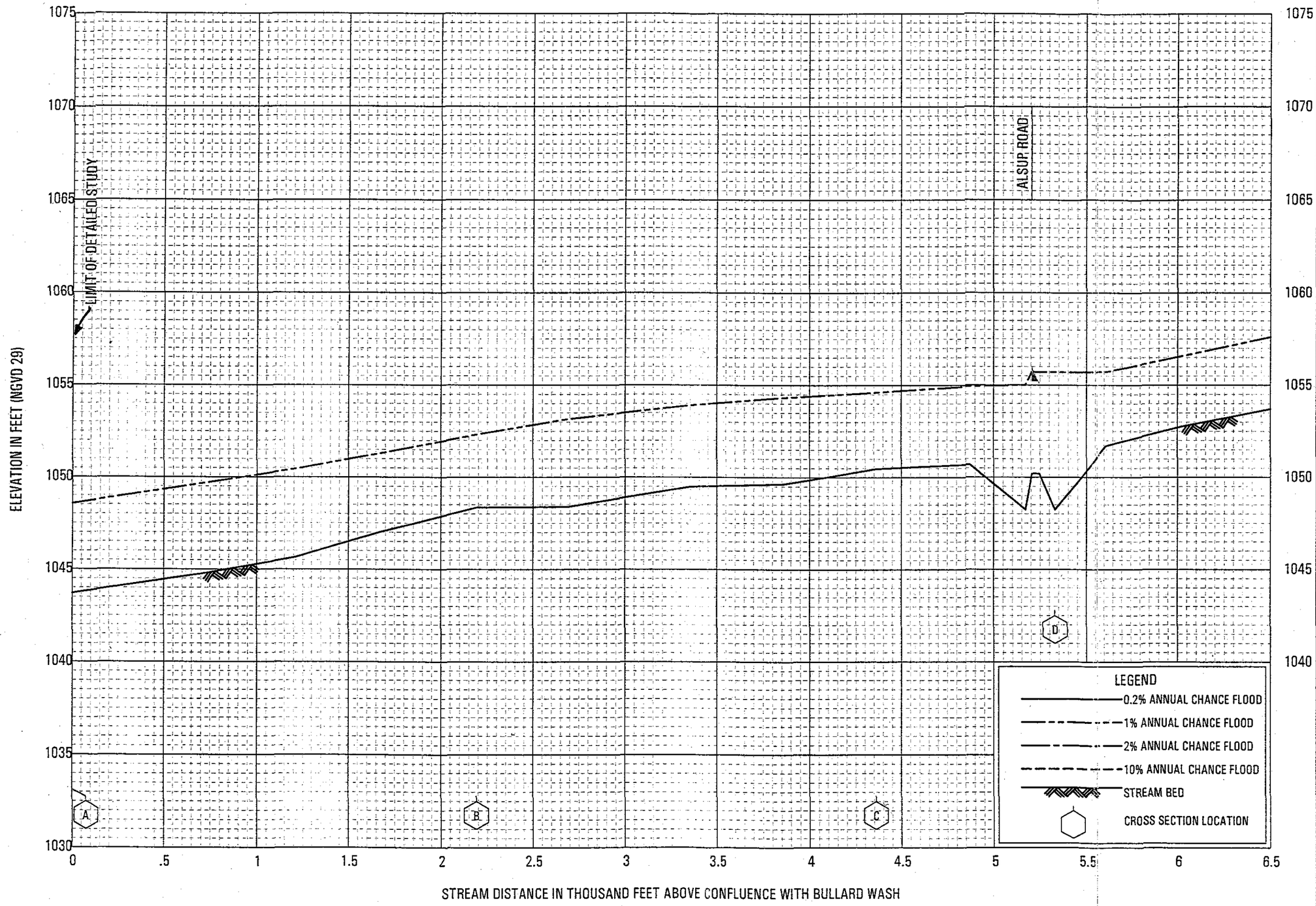
Table 1 Summary of Discharges

Flooding Sources and Locations	Drainage Area (mi^2)	100-year Discharge (cfs)
CAMELBACK WASH		
Just downstream of Perryville Road (tie to limit of study Perryville Wash)	13.17	883 [1]
Cotton Lane	26.34	518 [1]
Sarival Road	30.34	1086 [1]
Reems Road	32.16	206 [1]
At downstream limit of detailed study	[1]	206 [1]

[1] Flow based on flow split hydraulics, not drainage area.



FLOOD PROFILES

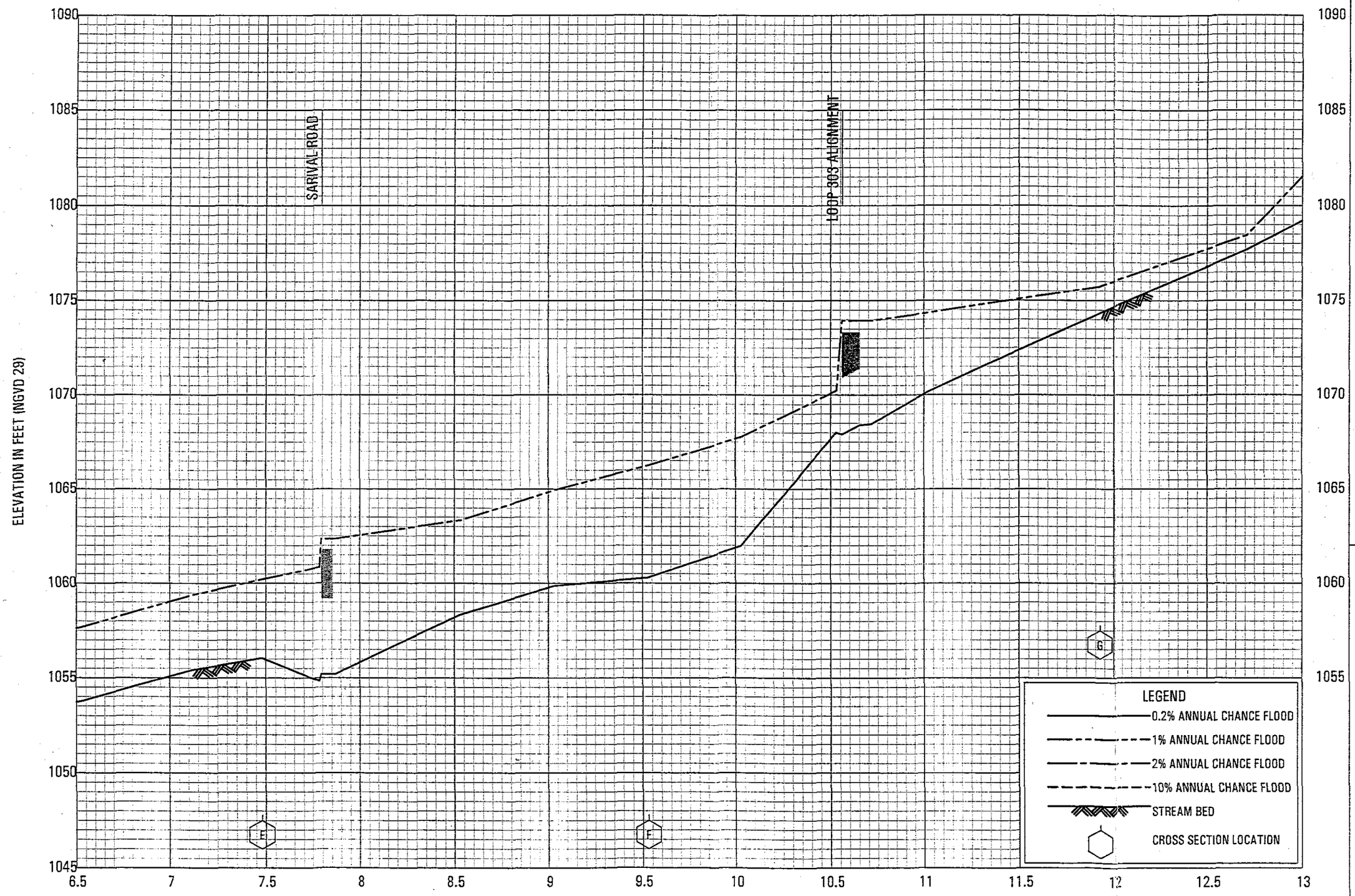
CAMELBACK WASH

FEDERAL EMERGENCY MANAGEMENT AGENCY

MARICOPA COUNTY AND INCORPORATED AREAS, AZ

MARICOPA

01P



FLOOD PROFILES

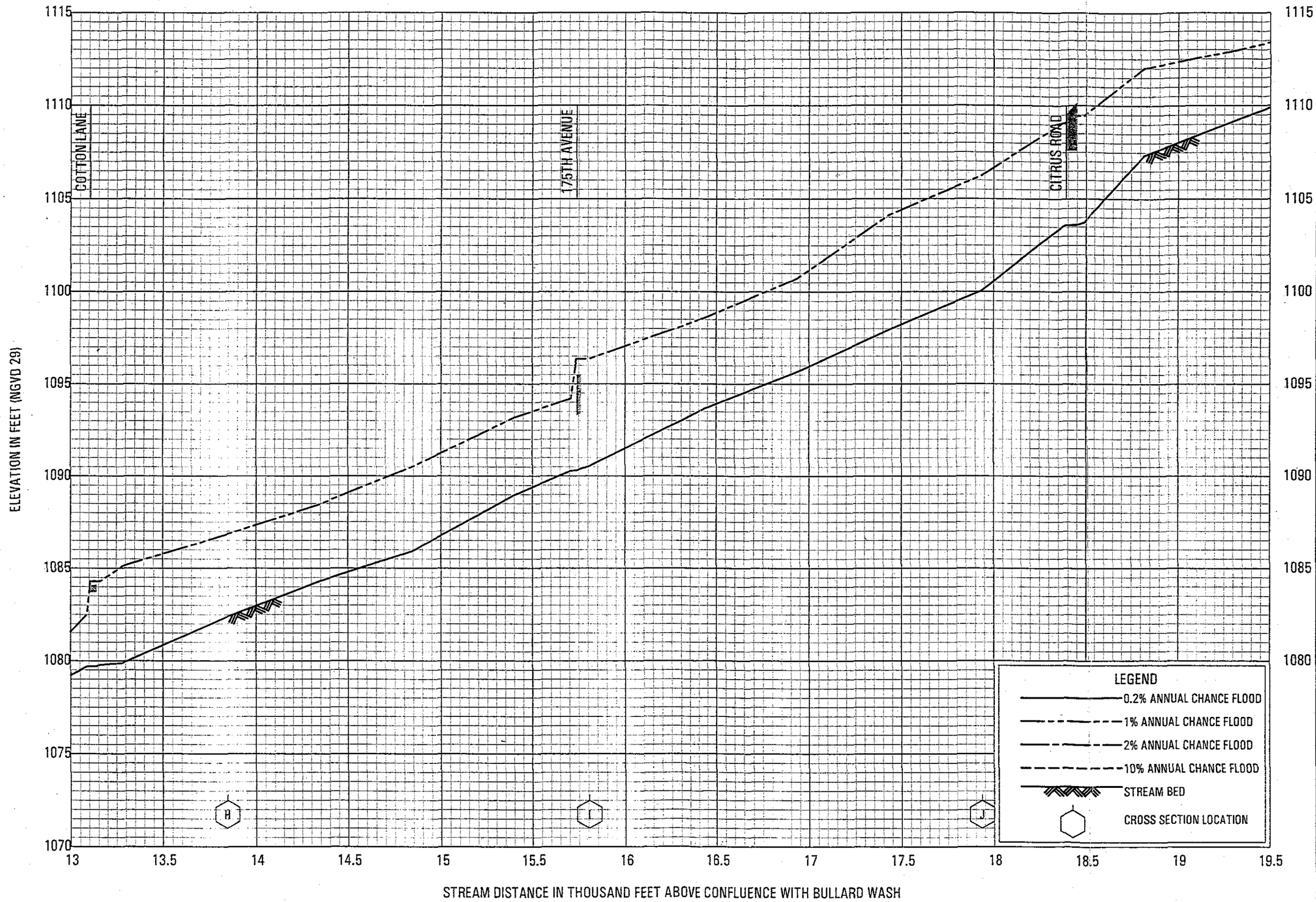
CAMELBACK WASH

FEDERAL EMERGENCY MANAGEMENT AGENCY

MARICOPA COUNTY AND INCORPORATED AREAS, AZ

MARICOPA

02P



FLOOD PROFILES

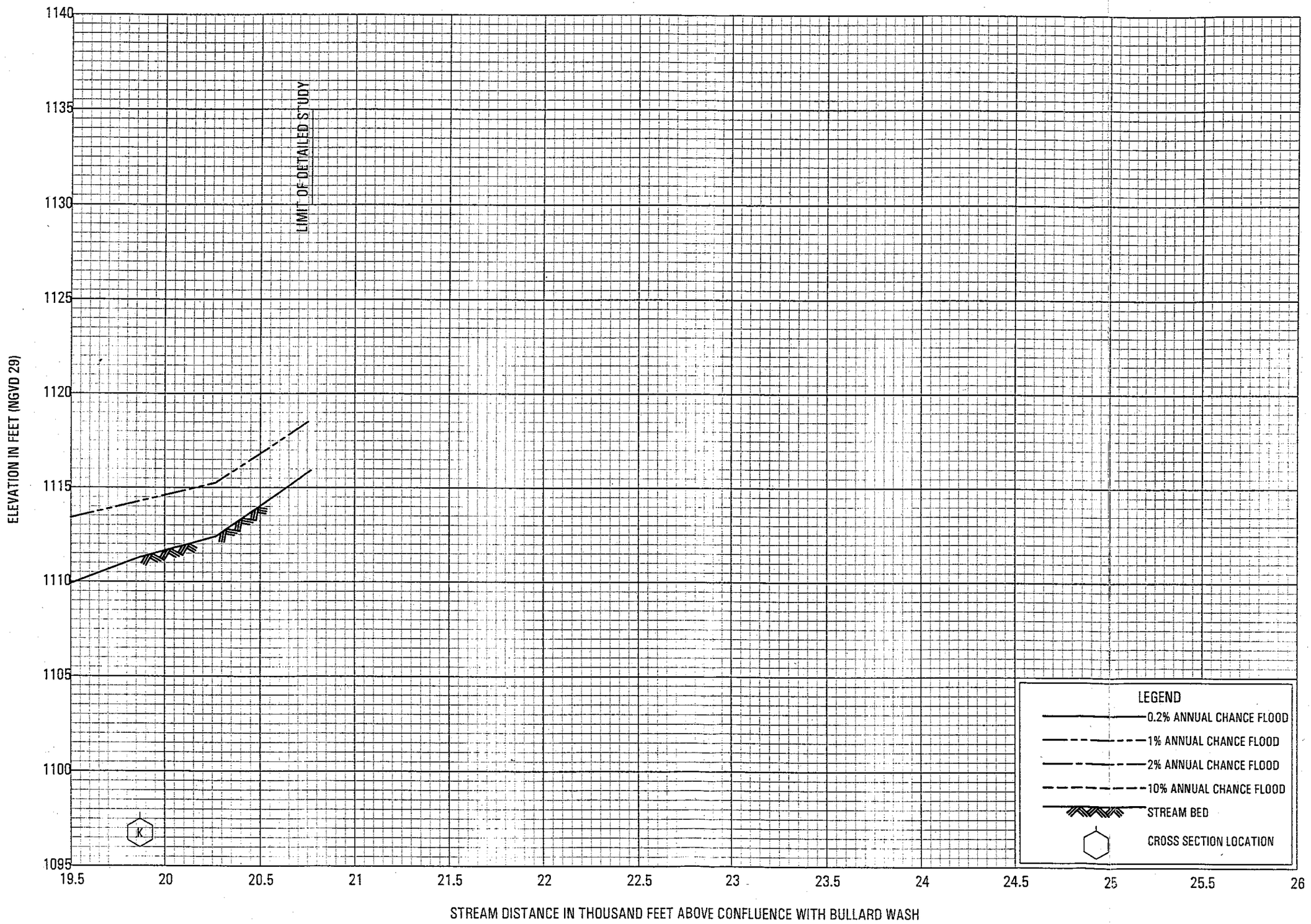
CAMELBACK WASH

FEDERAL EMERGENCY MANAGEMENT AGENCY

MARICOPA COUNTY AND INCORPORATED AREAS, AZ

MARICOPA

03P



FLOOD PROFILES

CAMELBACK WASH

FEDERAL EMERGENCY MANAGEMENT AGENCY

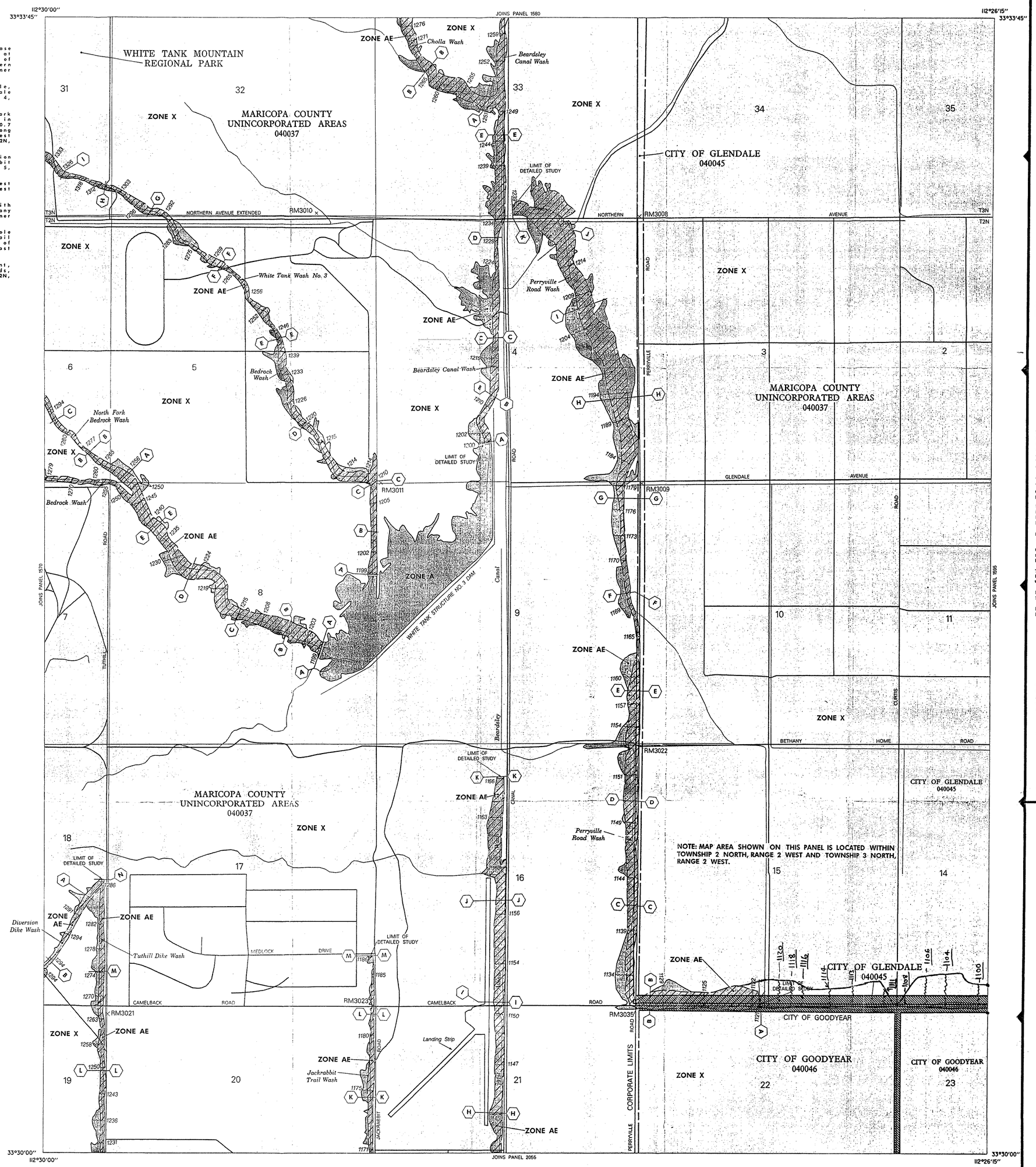
MARICOPA COUNTY AND INCORPORATED AREAS, AZ

MARICOPA

04P

ELEVATION REFERENCE MARKS

REFERENCE MARK	ELEVATION (FEET NGVD)	DESCRIPTION OF LOCATION
RM3008	1218.83	Chiseled square in concrete base electrical transformer WSC 363 at southeast corner of intersection of Perryville Road and Northern Avenue, near southeast corner section 33, T3N, R2W.
RM3009	1182.66	1-4-inch iron pin in pothole, Perryville Road and Glendale Avenue, southeast corner section 4, T2N, R2W.
RM3010	1264.23	National Geodetic Survey benchmark - stainless-steel rod encased in pipe and stamped L475 1981 0.7 mile west of Beardsley Canal along Northern Avenue, q 1050 feet west of northeast corner section 5, T2N, R2W.
RM3011	1213.89	Iron pin at centerline intersection of Glendale Avenue and Jackrabbit Trail, southeast corner section 5, T2N, R2W.
RM3021	1262.08	Inverted aluminum cap at southwest corner of section 17, southwest corner section 17, T2N, R2W.
RM3022	1153.06	1-inch iron pipe flush with pavement, Perryville and Bethany Home Roads, southeast corner section 9, T2N, R2W.
RM3023	1185.68	40d nail in west face of power pole on east side of Jackrabbit Trail approximately 1000 feet south of Medlock Drive, near southeast corner section 17, T2N, R2W.
RM3035	1132.41	Iron rod flush with pavement, Perryville and Camelback Roads, southeast corner section 16, T2N, R2W.



LEGEND

To obtain more detailed information in areas where Base Flood Elevations (BFEs)and /or floodways have been determined, users are encouraged to consult the Flood Profiles and Floodway Data tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations and therefore may not exactly reflect the flood elevation data presented in the FIS. BFEs shown on the FIRM are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS should be utilized in conjunction with the FIRM for purposes of construction and /or floodplain management.

ERM elevations listed on this map were obtained and/or developed to establish vertical control for determination of flood elevations and floodplain boundaries portrayed on this map. Users should be aware that these ERM elevations may have changed since the publication of this map. To obtain up-to-date elevation information on National Geodetic Survey (NGS) ERMs shown on this map, please contact the Information Services Branch of the NGS at (301) 713-3242, or visit their website at www.ngs.noaa.gov. Map users should seek verification of non-NGS ERM monument elevations when using these elevations for construction or floodplain management purposes.

Coastal BFE's shown on this map may apply only landward of 0.0' NGVD. Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study report for this community. Elevations shown in the Summary of Stillwater Elevations table should be used for construction, and /or floodplain management purposes when they are higher than the elevations shown on this FIRM.

LEGEND

SPECIAL FLOOD HAZARD AREAS INUNDATED BY 100-YEAR FLOOD

ZONE A No base flood elevations determined.

ZONE AE Base flood elevations determined.

ZONE AH Flood depths of 1 to 3 feet (usually areas of ponding); base flood elevations determined.

ZONE AO Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.

ZONE A99 To be protected from 100-year flood by Federal flood protection system under construction ; no base flood elevations determined.

ZONE V Coastal flood with velocity hazard (wave action); no base flood elevations determined.

ZONE VE Coastal flood with velocity hazard (wave action); base flood elevations determined.

FLOODWAY AREAS IN ZONE AE

OTHER FLOOD AREAS

ZONE X Areas of 500-year flood; areas of 100-year flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 100-year flood.

OTHER AREAS

ZONE X Areas determined to be outside 500-year floodplain.

ZONE D Areas in which flood hazards are undetermined.

UNDEVELOPED COASTAL BARRIERS

Identified 1983 | Identified 1990 | Otherwise Protected Areas

Coastal barrier areas are normally located within or adjacent to Special Flood Hazard Areas.

Floodplain Boundary

Floodway Boundary

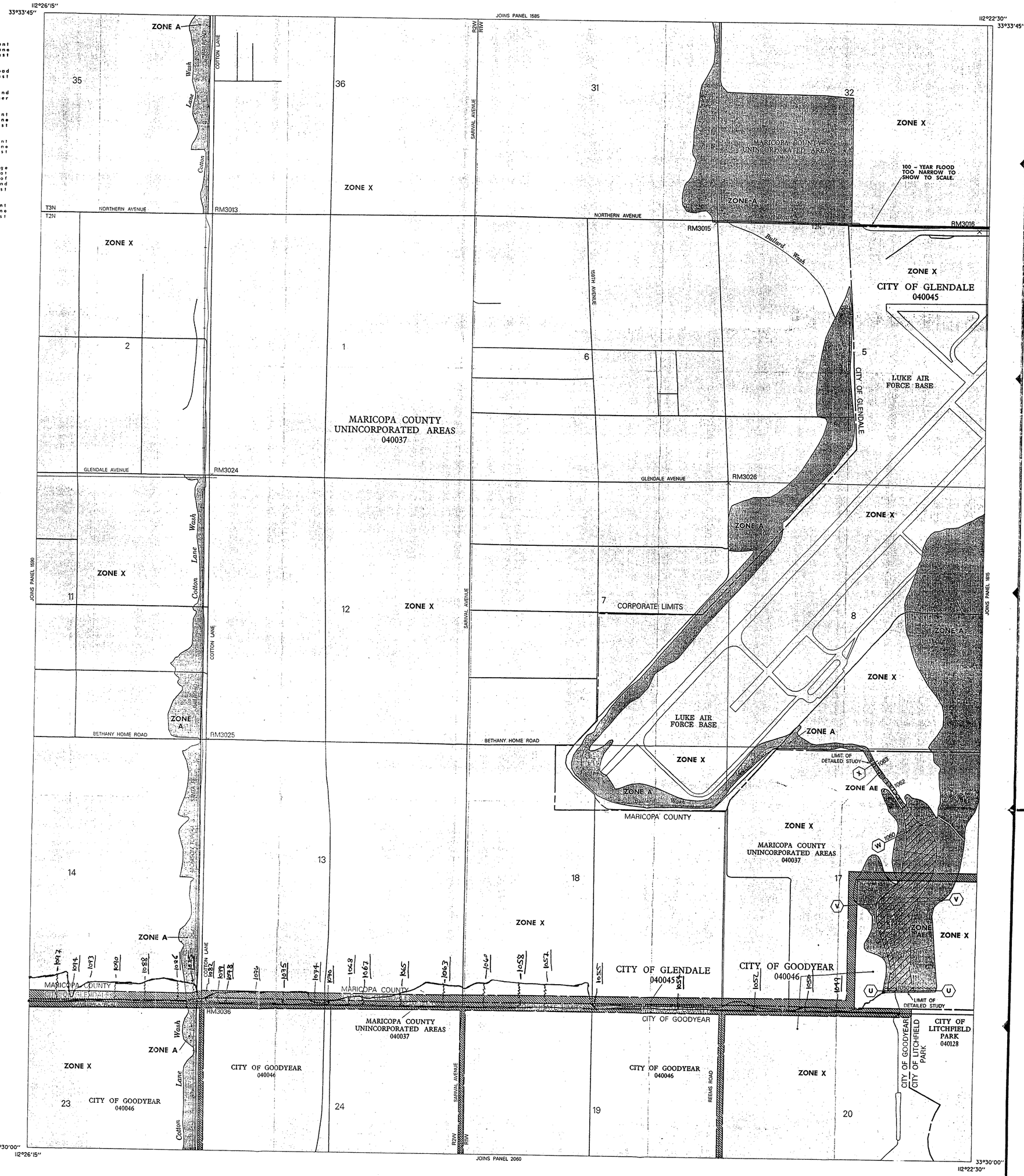
Zone D Boundary

Boundary Dividing Special Flood Hazard Zones, and Boundary Dividing Areas of Different Coastal Base Flood Elevations Within Special Flood Hazard Zones.

~~~513~~~ Base Flood Elevation Line; Elevation in Feet. See Map Index for Elevation Datum.

(D)———(D) Cross Section Line

(EL 987) Base Flood Elevation in Feet Where Uniform Within Zone. See Map Index for Elevation Datum.

RM7 × Elevation Reference Mark

● M2 River Mile

97°07'30", 32°22'30" Horizontal Coordinates Based on North American Datum of 1927 (NAD 27) Projection.

NOTES

This map is for use in administering the National Flood Insurance Program; it does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size, or all planimetric features outside Special Flood Hazard Areas. The community map repository should be consulted for more detailed data on BFE's, and for any information on floodway delineations, prior to use of this map for property purchase or construction purposes.

Areas of Special Flood Hazard (100-year flood) include Zones A, AE, A1-A30, AH, AO, A99, V, VE and V1-V30.

Certain areas not in Special Flood Hazard Areas may be protected by flood control structures.

Boundaries of the floodways were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the Federal Emergency Management Agency.

Floodway widths in some areas may be too narrow to show to scale. Refer to Floodway Data Table where floodway width is shown at 1/20 inch.

Corporate limits shown are current as of the date of this map. The user should contact appropriate community officials to determine if corporate limits have changed subsequent to the issuance of this map.

This map may incorporate approximate boundaries of Coastal Barrier Resource System Units and /or Otherwise Protected Areas established under the Coastal Barrier Improvement Act of 1990 (PL 101-591).

For community map revision history prior to countywide mapping, see Section 6.3 of the Flood Insurance Study Report.

For adjoining map panels and base map source see separately printed Map Index.

MAP REPOSITORY
Refer to Repository Listing on Map Index

EFFECTIVE DATE OF
COUNTYWIDE FLOOD INSURANCE RATE MAP:
APRIL 15, 1988

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL:
SEPTEMBER 4, 1991 SEPTEMBER 30, 1996

Map revised July 19, 2001 to update corporate limits, to change base flood elevations, to add base flood elevations, to add Special Flood Hazard Areas, to change Special Flood Hazard Areas, to change zone designations, to update map format, to add roads and road names, and to incorporate previously issued Letters of Map Revision.

To determine if flood insurance is available, contact an insurance agent or call the National Flood Insurance Program at (800) 638-6620.

APPROXIMATE SCALE IN FEET
1000 0 1000

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

MARICOPA COUNTY, ARIZONA AND INCORPORATED AREAS

PANEL 1590 OF 4350
(SEE MAP INDEX FOR PANELS NOT PRINTED)

CONTAINS: COMMUNITY	NUMBER	PANEL	SUFFIX
GLENDALE, CITY OF	040045	1590	G
GOODYEAR, CITY OF	040046	1590	G
MARICOPA COUNTY, UNINCORPORATED AREAS	040037	1590	G

MAP NUMBER 04013C1590 G

MAP REVISED: JULY 19, 2001

Federal Emergency Management Agency
~~~

ELEVATION REFERENCE MARKS

REFERENCE MARK	ELEVATION (FEET NGVD)	DESCRIPTION OF LOCATION
RM3013	1149.86	Maricopa County Highway Department brass cap in handhole, Cotton Lane and Northern Avenue, southeast corner section 35, T3N, R2W.
RM3015	1103.31	Brass cap in handhole, Reems Road and Northern Avenue, southeast corner section 31, T3N, R1W.
RM3016	1095.12	Brass cap in handhole, Bullard and Northern Avenues, southeast corner section 32, T3N, R1W.
RM3024	1128.63	Maricopa County Highway Department brass cap in handhole, Cotton Lane and Glendale Avenue, southeast corner section 2, T2N, R2W.
RM3025	1104.82	Maricopa County Highway Department brass cap in handhole, Cotton Lane and Bethany Home Road, southeast corner section 11, T2N, R2W.
RM3026	1083.96	Bolt on top of tee of discharge pipes 20 feet q north of pump at the northeast corner of intersection of Reems Road and Glendale Avenue, near southeast corner section 6, T2N, R1W.
RM3036	1083.57	Maricopa County Highway Department brass cap in handhole, Cotton Lane and Camelback Road, southeast corner section 14, T2N, R2W.



LEGEND

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LEGEND

SPECIAL FLOOD HAZARD AREAS INUNDATED BY 100-YEAR FLOOD

- **ZONE A** No base flood elevations determined.
- **ZONE AE** Base flood elevations determined.
- **ZONE AH** Flood depths of 1 to 3 feet (usually areas of ponding); base flood elevations determined.
- **ZONE AO** Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
- **ZONE A99** To be protected from 100-year flood by Federal flood protection system under construction ; no base flood elevations determined.
- **ZONE V** Coastal flood with velocity hazard (wave action); no base flood elevations determined.
- **ZONE VE** Coastal flood with velocity hazard (wave action); base flood elevations determined.

FLOODWAY AREAS IN ZONE AE

OTHER FLOOD AREAS

- **ZONE X** Areas of 500-year flood; areas of 100-year flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 100-year flood.

OTHER AREAS

- **ZONE X** Areas determined to be outside 500-year floodplain.
- **ZONE D** Areas in which flood hazards are undetermined.

UNDEVELOPED COASTAL BARRIERS

Identified 1983 | Identified 1990 | Otherwise Protected Areas

Coastal barrier areas are normally located within or adjacent to Special Flood Hazard Areas.

- Floodplain Boundary
- Floodway Boundary
- Zone D Boundary
- Boundary Dividing Special Flood Hazard Zones, and Boundary Dividing Areas of Different Coastal Base Flood Elevations Within Special Flood Hazard Zones.
- 513 — Base Flood Elevation Line; Elevation in Feet. See Map Index for Elevation Datum.
- D — D — Cross Section Line
- (EL 987) — Base Flood Elevation in Feet Where Uniform Within Zone. See Map Index for Elevation Datum.
- RM7 × — Elevation Reference Mark
- • M2 — River Mile
- 97°07'30", 32°22'30" — Horizontal Coordinates Based on North American Datum of 1927 (NAD 27) Projection.

NOTES

This map is for use in administering the National Flood Insurance Program; it does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size, or all planimetric features outside Special Flood Hazard Areas. The community map repository should be consulted for more detailed data on BFE's, and for any information on floodway delineations, prior to use of this map for property purchase or construction purposes.

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Boundaries of the floodways were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the Federal Emergency Management Agency.

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This map may incorporate approximate boundaries of Coastal Barrier Resource System Units and /or Otherwise Protected Areas established under the Coastal Barrier Improvement Act of 1990 (PL 101-591).

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For adjoining map panels and base map source see separately printed Map Index.

MAP REPOSITORY
Refer to Repository Listing on Map Index

EFFECTIVE DATE OF
COUNTYWIDE FLOOD INSURANCE RATE MAP:
APRIL 15, 1988

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL:
SEPTEMBER 4, 1991, SEPTEMBER 30, 1995

Map revised July 19, 2001 to update corporate limits, to change base flood elevations, to add base flood elevations, to add Special Flood Hazard Areas, to change Special Flood Hazard Areas, to change zone designations, to update map format, to add roads and road names, and to incorporate previously issued Letters of Map Revision.

To determine if flood insurance is available, contact an insurance agent or call the National Flood Insurance Program at (800) 638-6620.

N

APPROXIMATE SCALE IN FEET
1000 0 1000

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

MARICOPA COUNTY, ARIZONA AND INCORPORATED AREAS

PANEL 1595 OF 4350
(SEE MAP INDEX FOR PANELS NOT PRINTED)

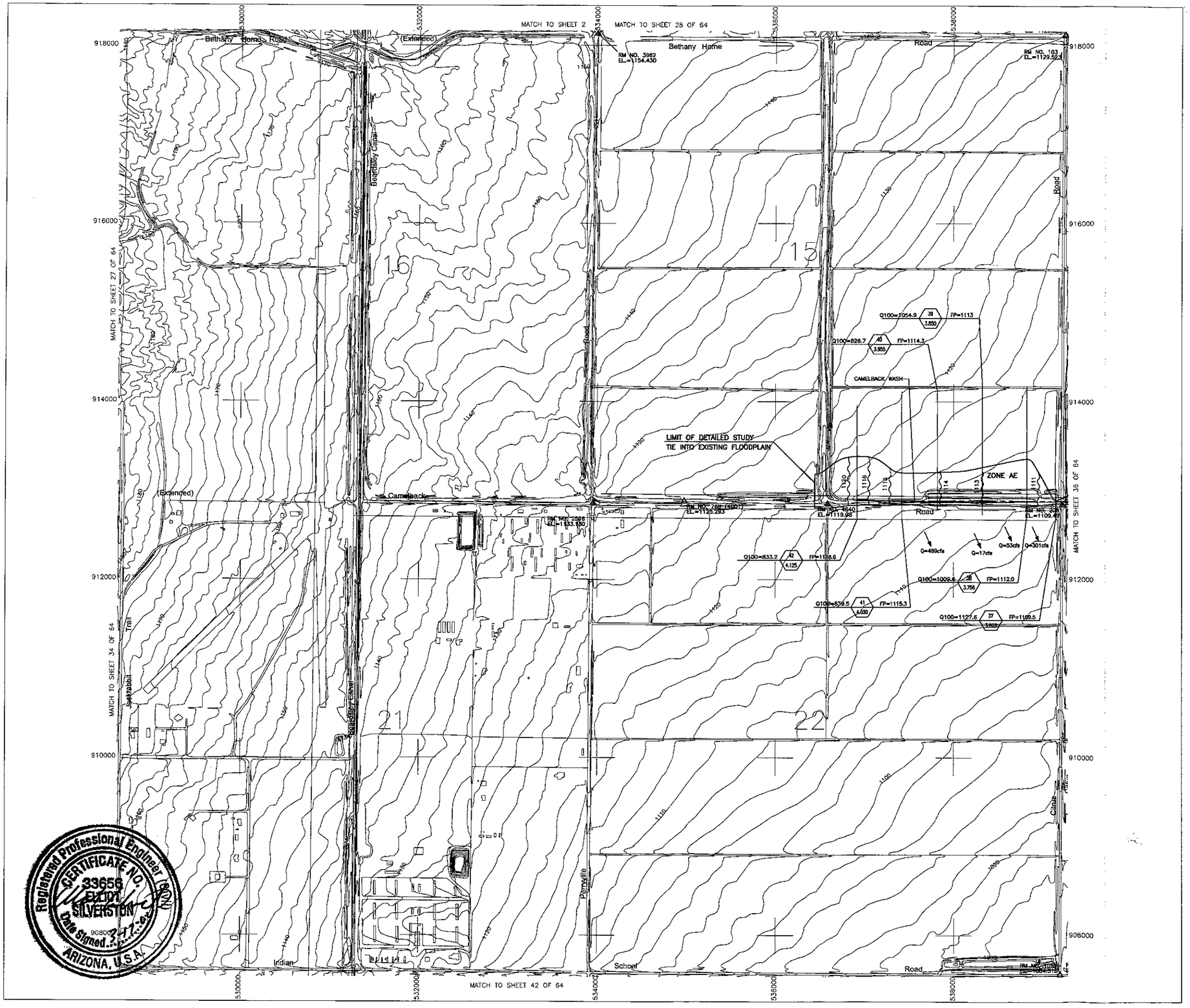
CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
GLENDALE, CITY OF	040045	1595	G
GOODYEAR, CITY OF	040046	1595	G
LITCHFIELD PARK, CITY OF	040128	1595	G
MARICOPA COUNTY UNINCORPORATED AREAS	040037	1595	G

MAP NUMBER 04013C1595 G

MAP REVISED: JULY 19, 2001

Federal Emergency Management Agency



LEGEND

100-YR FLOODPLAIN BOUNDARY	
FLOODWAY BOUNDARY	
HYDRAULIC BASE LINE WITH RIVER MILE	
EROSION SETBACK (WHEN APPLICABLE)	
CROSS SECTION	13 / 4.563 — FP= 1888.74 / FW= 1889.54 / Q = CFS
BASE FLOOD ELEVATIONS	1221
ZONE DESIGNATIONS	ZONE AE
CORPORATE LIMITS	Corporate Limits
COUNTY, PARISH, STATE OR INTERNATIONAL BOUNDARY	County Boundary

NOTES: ALL ELEVATIONS ARE BASED ON **"NATIONAL GEODETIC VERTICAL DATUM OF 1929"**

ALL FLOODPLAINS BY URS ARE BASED ON CROSS SECTIONS FIELD-SURVEYED BY URS.

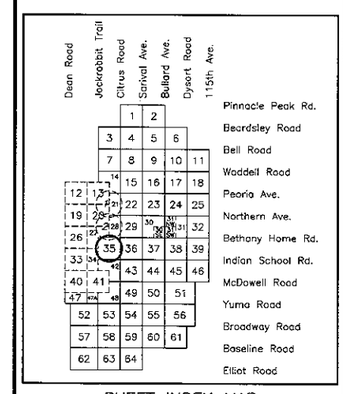
THE TOPOGRAPHIC CONTOURS ARE FROM THE 1989 STUDY PREPARED BY THE WLS GROUP (WITH FLIGHT DATE OF DECEMBER 1989). THEY WERE NOT USED FOR ANY MODELING OF CROSS SECTIONS, AND ARE PROVIDED TO SHOW LOCATIONS OF ROADS, DITCHES, ETC. ONLY.

ELEVATION REFERENCE FOR HYDRAULIC CROSS SECTIONS BY URS, 2001

I.D. NUMBER	ELEVATION (FT)	DESCRIPTION/LOCATION
768 (4001)	1129.293	S.S. ROD IN HAND HOLE WITH ALUMINUM SLEEVE, ±0.2 MI. EAST OF INTERSECTION OF CAMELBACK RD. AND PERRYVILE RD., ±23' NORTH OF CENTERLINE OF CAMELBACK RD.
103	1129.523	2" LP. IN AC. POTHOLE AT INTERSECTION OF BETHANY HOME RD. AND CITRUS RD.
105	1084.318	MARICOPA COUNTY HIGHWAY DEPT. BRASS CAP IN HAND HOLE, INDIAN SCHOOL RD. AND CITRUS RD.
2081	1109.490	MCDOT BRASS CAP IN HAND HOLE, AT INTERSECTION OF CITRUS RD. AND CAMELBACK RD.
3982	1154.430	1" IRON ROD IN POTHOLE AT CENTERLINE OF BETHANY HOME RD. AND PERRYVILLE RD.
2596	1133.130	BRASS CAP IN HAND HOLE AT INTERSECTION OF CAMELBACK RD. AND PERRYVILLE RD.
4640	1119.080	MCDOT BRASS CAP IN HAND HOLE, ±0.5 MI. WEST OF CITRUS RD. IN EAST BOUND LANE OF CAMELBACK RD. (7-10-45 IN CONC.)

NOTES

1- THE HYDRAULIC BASE LINE IS CROSS SECTION STATION 10,000 UNLESS NOTED OTHERWISE



SHEET INDEX MAP

400' 0' 400' 800'

SCALE: 1"= 400'
HORIZONTAL DATUM: NAD 1983
STATEPLANE PROJECTION

NO.	REVISION	BY	DATE
2			
1			

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

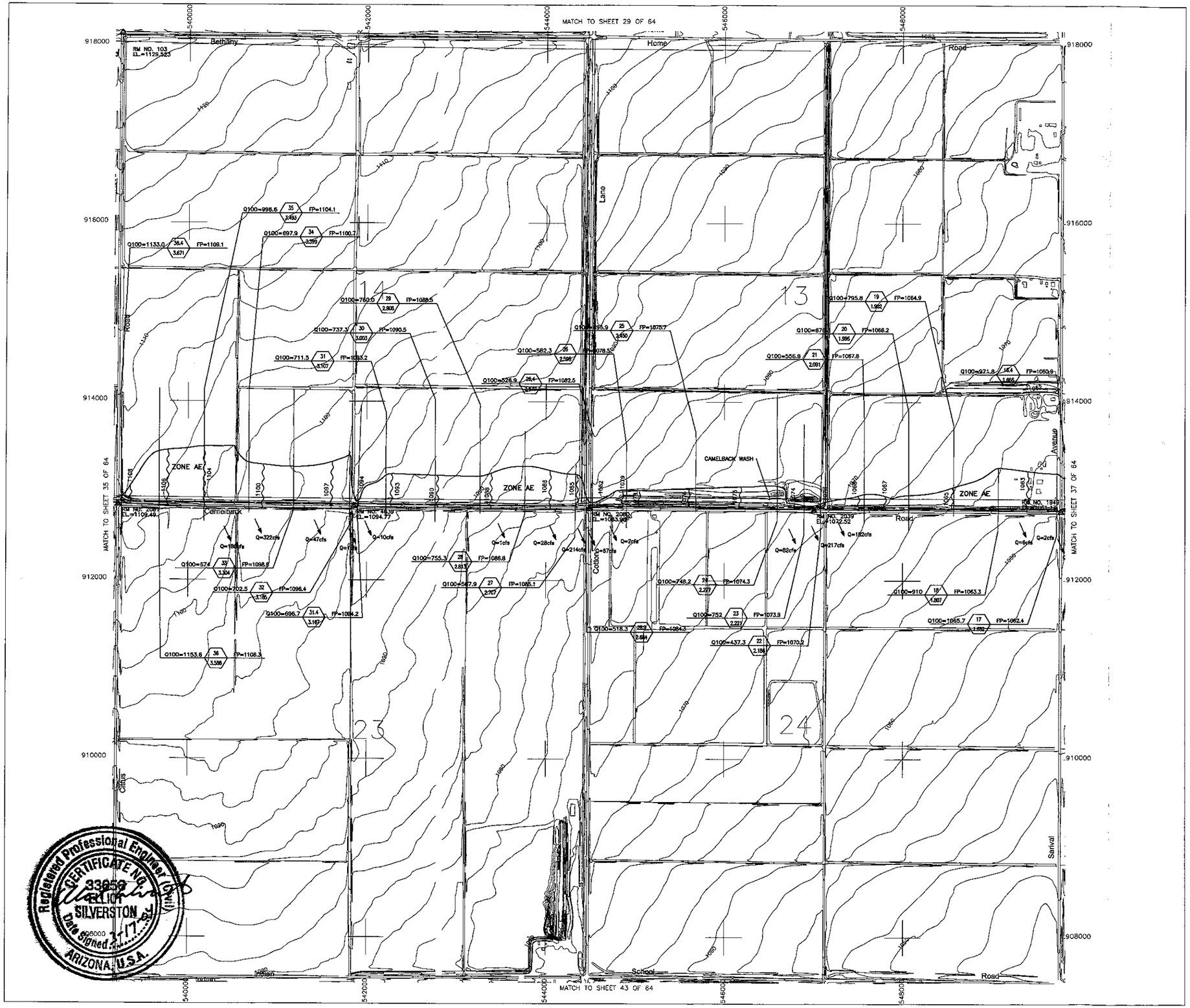
LOOP 303 CORRIDOR/WHITE TANKS
ADMP UPDATE
FLOOD DELINEATION STUDY
F.C.D. CONTRACT NO. 99-40

URS
7720 N. 16th Street
Phoenix, Arizona 85020
(602) 371-1100

	BY	DATE
DESIGN	RLD	10-02
DESIGN CHK.	DL	10-02
PLANS	MH	10-02
PLANS CHK.	RLD	10-02

SHEET 35 OF 64

Registered Professional Engineer (Civil)
CERTIFICATE NO. 33656
ELTON SILVERSTON
Date Signed 3-17-04
ARIZONA, U.S.A.



LEGEND

100-YR FLOODPLAIN BOUNDARY	
FLOODWAY BOUNDARY	
HYDRAULIC BASE LINE WITH RIVER MILE	
EROSION SETBACK (WHEN APPLICABLE)	
CROSS SECTION	13 / 4.563 — FP= 1888.74, FW= 1889.54, Q = , CS=
BASE FLOOD ELEVATIONS	1221
ZONE DESIGNATIONS	ZONE AE
CORPORATE LIMITS	Corporate Limits
COUNTY, PARISH, STATE OR INTERNATIONAL BOUNDARY	County Boundary

NOTES: ALL ELEVATIONS ARE BASED ON, **"NATIONAL GEODETIC VERTICAL DATUM OF 1929"**

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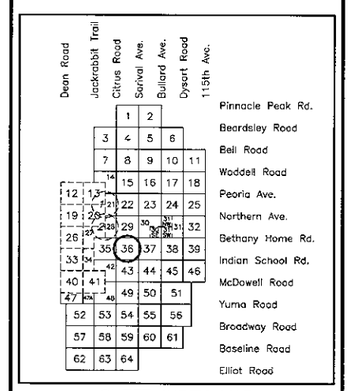
ELEVATION REFERENCE FOR HYDRAULIC CROSS SECTIONS BY URS, 2001

I.D. NUMBER	ELEVATION (FT)	DESCRIPTION/LOCATION
103	1129.523	2" I.P. IN AC. POTHOLE AT INTERSECTION OF BETHANY HOME RD. AND CITRUS RD.
105	1084.318	MARICOPA COUNTY HIGHWAY DEPT. BRASS CAP IN HAND HOLE, INDIAN SCHOOL RD. AND CITRUS RD.
2080	1083.900	CITY OF PHOENIX BRASS CAP IN HAND HOLE, AT INTERSECTION OF COTTON LN. AND CAMELBACK RD.
1949	1081.170	BRASS CAP IN HAND HOLE, INTERSECTION OF CAMELBACK RD. AND SARIVAL AVE.
2039	1072.520	ALUMINUM CAP FLUSH AT INTERSECTION OF CAMELBACK RD. AND LOOP 303
2081	1109.490	MCDOT BRASS CAP IN HAND HOLE, AT INTERSECTION OF CITRUS RD. AND OF CAMELBACK RD.
4639	1094.770	1" I.P. IN POTHOLE, 0.5 MI. WEST OF COTTON LN. IN WEST BOUND LANE OF CAMELBACK RD.

NOTES

1– THE HYDRAULIC BASE LINE IS CROSS SECTION STATION 10,000 UNLESS NOTED OTHERWISE



SHEET INDEX MAP

400' 0' 400' 800'

SCALE: 1"= 400'

HORIZONTAL DATUM: NAD 1983
STATEPLANE PROJECTION

NO.	REVISION	BY	DATE
2			
1			

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

LOOP 303 CORRIDOR/WHITE TANKS
ADMP UPDATE
FLOOD DELINEATION STUDY
F.C.D. CONTRACT NO. 99-40

URS
7720 N. 16th Street
Phoenix, Arizona 85020
(602) 371-1100

	BY	DATE
DESIGN	RLD	10-02
DESIGN CHK.	GL	10-02
PLANS	MH	10-02
PLANS CHK.	RLD	10-02

SHEET 36 OF 64

Registered Professional Engineer (Civil) CERTIFICATE NO. 33059 ELLIOT SILVERSTON Date Signed 11/17/04 ARIZONA, U.S.A.

P:\72040\51.53500\Submittals\Submittal 5-In-Submit\Floodplain Delineation\3-24-04\U.S. Site Drawings\Drawings\FD0040-02.dwg, LAYOUT Elev: 3-12-04
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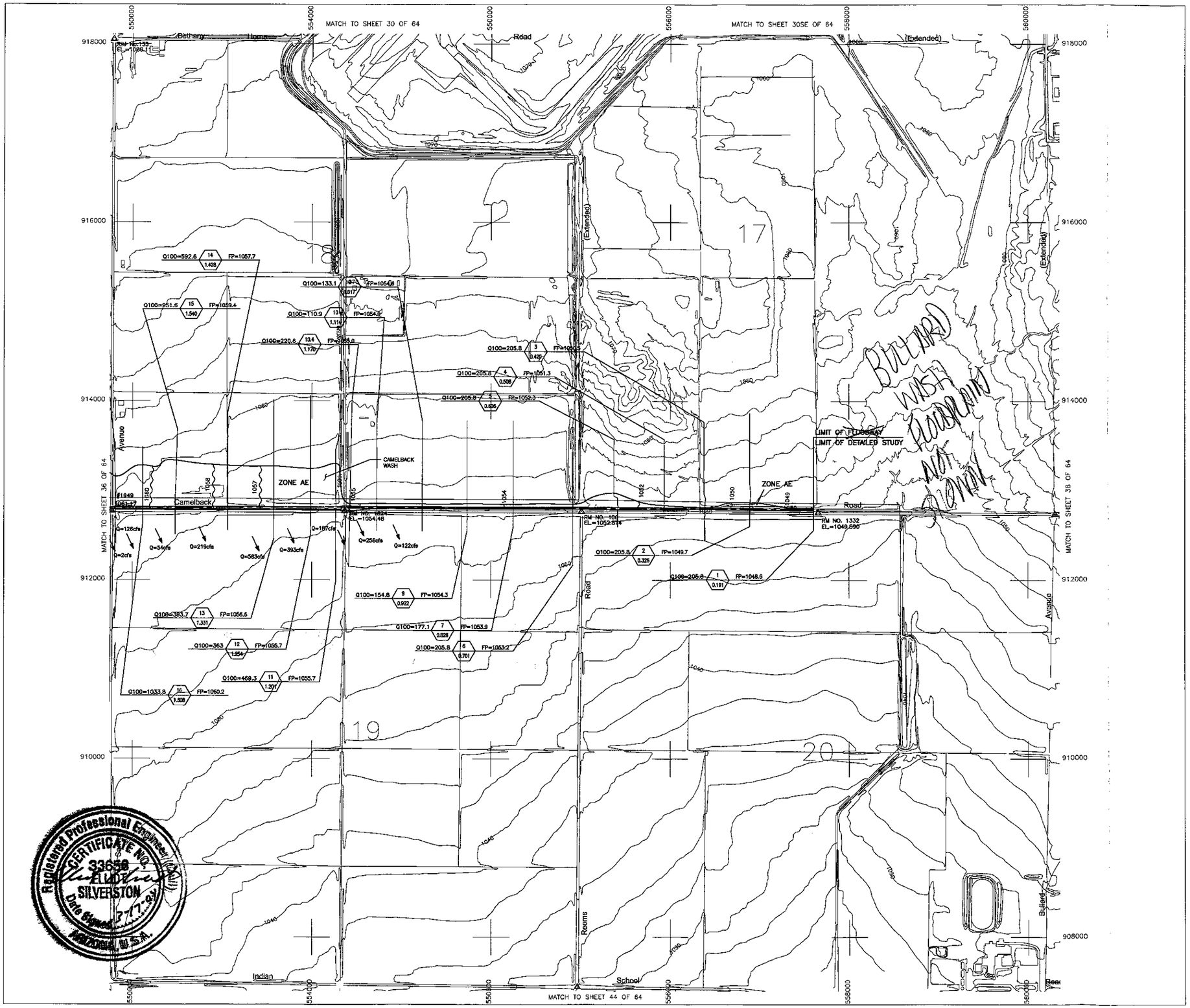

LEGEND

100-YR FLOODPLAIN BOUNDARY	
FLOODWAY BOUNDARY	
HYDRAULIC BASE LINE WITH RIVER MILE	
EROSION SETBACK (WHEN APPLICABLE)	
CROSS SECTION	13 / 4.563 — FP= 1888.74, FW= 1889.54, Q = CFS
BASE FLOOD ELEVATIONS	1221
ZONE DESIGNATIONS	ZONE AE
CORPORATE LIMITS	Corporate Limits
COUNTY, PARISH, STATE OR INTERNATIONAL BOUNDARY	County Boundary

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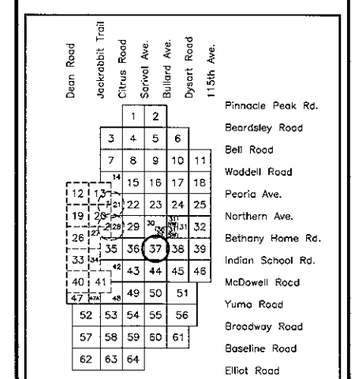
ELEVATION REFERENCE FOR HYDRAULIC CROSS SECTIONS BY URS, 2001

I.D. NUMBER	ELEVATION (FT)	DESCRIPTION/LOCATION
106	1052.874	CITY OF PHOENIX BRASS CAP IN HAND HOLE, REEMS RD. AND CAMELBACK RD.
1332	1049.590	BRASS CAP IN HAND HOLE 0.5 MI. EAST OF REEMS RD. AND CAMELBACK RD.
1824	1054.480	CITY OF PHOENIX BRASS CAP IN HAND HOLE, 159TH AVE. AND CAMELBACK RD.
1949	1061.170	CITY OF PHOENIX BRASS CAP IN HAND HOLE, SAVIRAL AVE. AND CAMELBACK RD.
4643	1052.810	CITY OF PHOENIX BRASS CAP IN HAND HOLE, BULLARD RD. AND CAMELBACK RD.
4647	1087.580	2" IRON PIPE WITH NAIL ±0.5 MI. NORTH OF BULLARD AVE. AND CAMELBACK RD. (AT MISSOURI AVE.)

NOTES

1- THE HYDRAULIC BASE LINE IS CROSS SECTION STATION 10,000 UNLESS NOTED OTHERWISE.



SHEET INDEX MAP

400' 0' 400' 800'

SCALE: 1" = 400'
HORIZONTAL DATUM: NAD 1983
STATEPLANE PROJECTION

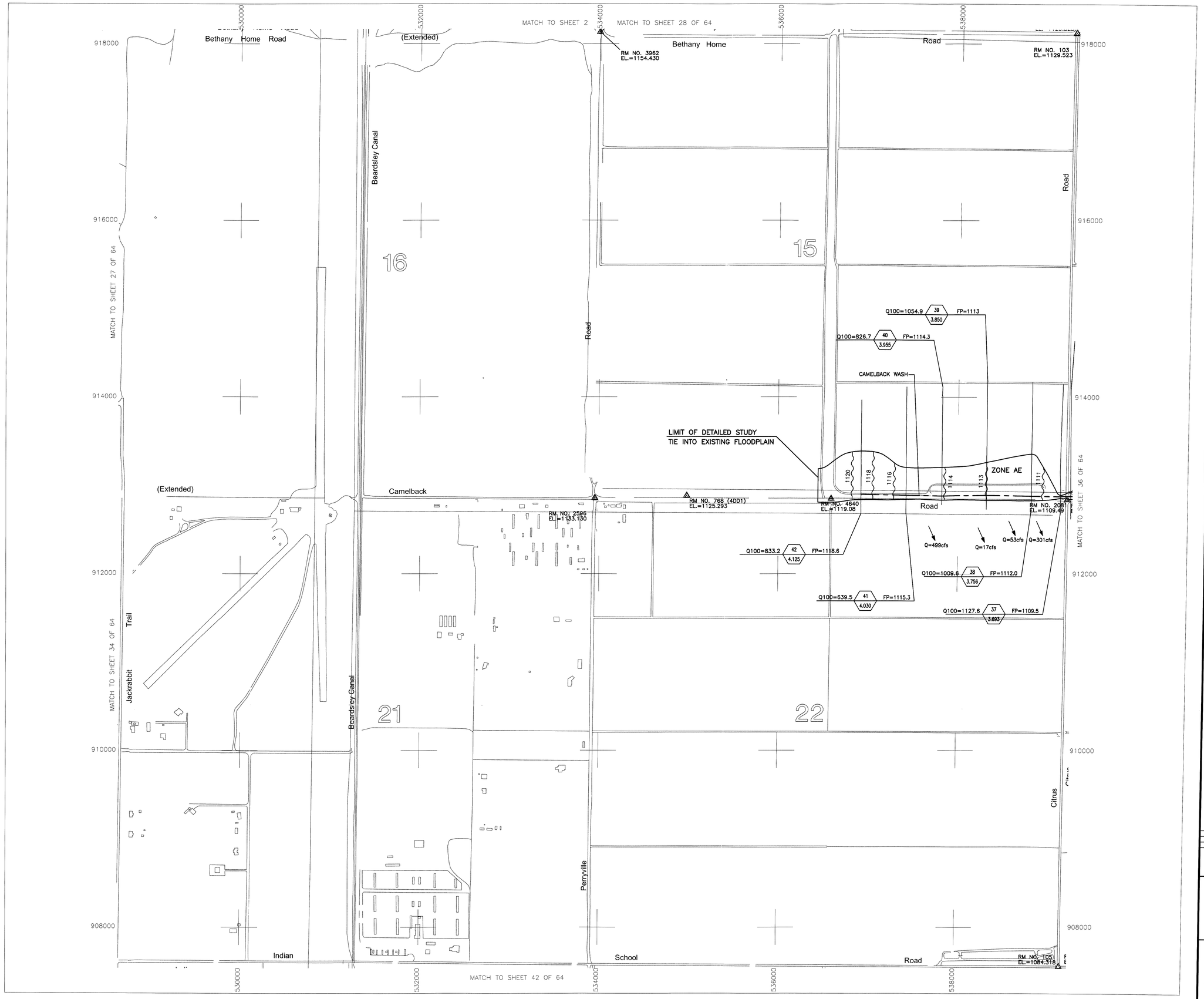
NO.	REVISION	BY	DATE
2			
1			

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

LOOP 303 CORRIDOR/WHITE TANKS
ADMP UPDATE
FLOOD DELINEATION STUDY
F.C.D. CONTRACT NO. 99-40

URS
7720 N. 16th Street
Phoenix, Arizona 85020
(602) 371-1100

	BY	DATE
DESIGN	MR/CL	10-02
DESIGN CHK.	RLD	10-02
PLANS	MDH	10-02
PLANS CHK.	RLD	10-02



LEGEND

100-YR FLOODPLAIN BOUNDARY	
FLOODWAY BOUNDARY	
HYDRAULIC BASE LINE WITH RIVER MILE	
EROSION SETBACK (WHEN APPLICABLE)	
CROSS SECTION	13 / 4.563 — FP= 1888.74 (FLOODPLAIN WATER SURFACE ELEVATION); FW= 1889.54 (ENCROACHED WATER SURFACE ELEVATION); Q = CFS (100 YEAR DISCHARGE); HEC-RAS CROSS SECTION NUMBER; CROSS SECTION STATIONING DESIGNATION
BASE FLOOD ELEVATIONS	1221
ZONE DESIGNATIONS	ZONE AE
CORPORATE LIMITS	Corporate Limits
COUNTY, PARISH, STATE OR INTERNATIONAL BOUNDARY	County Boundary

NOTES: ALL ELEVATIONS ARE BASED ON, **"NATIONAL GEODETIC VERTICAL DATUM OF 1929"**

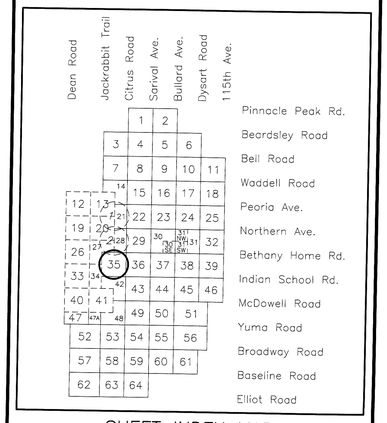
ALL FLOODPLAINS BY URS ARE BASED ON CROSS SECTIONS FIELD-SURVEYED BY URS.

ELEVATION REFERENCE FOR HYDRAULIC CROSS SECTIONS BY URS, 2001

I.D. NUMBER	ELEVATION (FT)	DESCRIPTION/LOCATION
768 (4DD1)	1125.293	S.S. ROD IN HAND HOLE WITH ALUMINUM SLEEVE, ±0.2 MI. EAST OF INTERSECTION OF CAMELBACK RD. AND PERRYVILE RD., ±23' NORTH OF CENTERLINE OF CAMELBACK RD.
103	1129.523	2" I.P. IN AC. POTHOLE AT INTERSECTION OF BETHANY HOME RD. AND CITRUS RD.
105	1084.318	MARICOPA COUNTY HIGHWAY DEPT. BRASS CAP IN HAND HOLE, INDIAN SCHOOL RD. AND CITRUS RD.
2081	1109.490	MCDOT BRASS CAP IN HAND HOLE, AT INTERSECTION OF CITRUS RD. AND CAMELBACK RD.
3962	1154.430	1" IRON ROD IN POTHOLE AT CENTERLINE OF BETHANY HOME RD. AND PERRYVILLE RD.
2596	1133.130	BRASS CAP IN HAND HOLE AT INTERSECTION OF CAMELBACK RD. AND PERRYVILLE RD.
4640	1119.080	MCDOT BRASS CAP IN HAND HOLE, ±0.5 MI. WEST OF CITRUS RD. IN EAST BOUND LANE OF CAMELBACK RD. (7-10-45 IN CONC.)

NOTES

1- THE HYDRAULIC BASE LINE IS CROSS SECTION STATION 10,000 UNLESS NOTED OTHERWISE.



SHEET INDEX MAP

400' 0' 400' 800'

SCALE: 1"= 400'
HORIZONTAL DATUM: NAD 1983
STATEPLANE PROJECTION

NO.	REVISION	BY	DATE
2			
1			

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

LOOP 303 CORRIDOR/WHITE TANKS
ADMP UPDATE
FLOOD DELINEATION STUDY
F.C.D. CONTRACT NO. 99-40

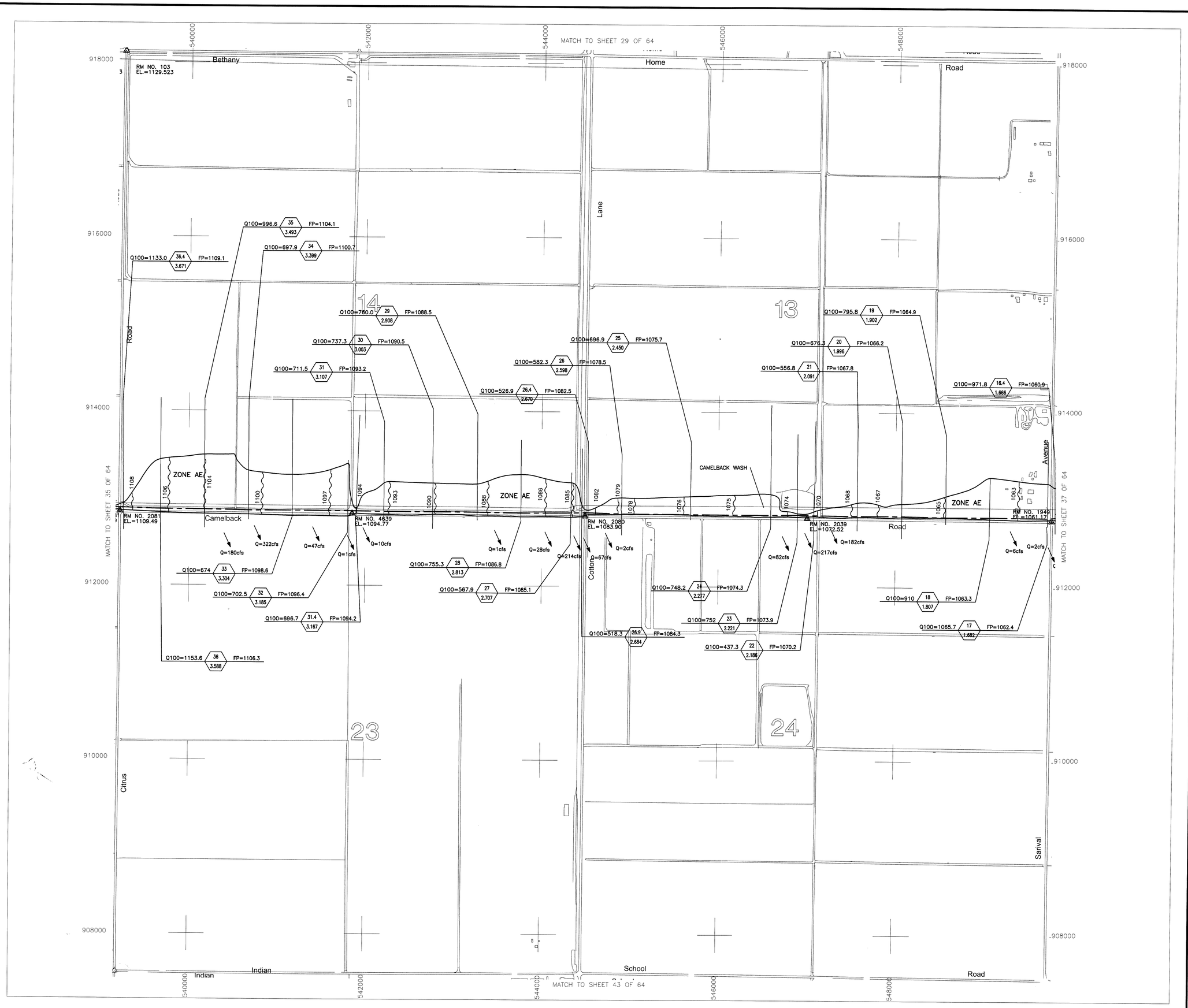
URS
7720 N. 16th Street
Phoenix, Arizona 85020
(602) 371-1100

	BY	DATE
DESIGN	RLD	10-02
DESIGN CHK.	GL	10-02
PLANS	MH	10-02
PLANS CHK.	RLD	10-02

3-27-03

SHEET 35 OF 64

P:\FCDMC\E152600\CADD\MAP SHEETS\FD50DWG-1B.DWG LATEST REV: 2-05-03
XREF: P:\FCDMC\E152600\CADD\MAP SHEETS\XREF\ FEATURE, HYDR1-NO-PERRYVILLE, TOPO_MOD



LEGEND

100-YR FLOODPLAIN BOUNDARY	
FLOODWAY BOUNDARY	
HYDRAULIC BASE LINE WITH RIVER MILE	
EROSION SETBACK (WHEN APPLICABLE)	
CROSS SECTION	13 / 4.563 — FP= 1888.74 (FLOODPLAIN WATER SURFACE ELEVATION); FW= 1889.54 (ENCROACHED WATER SURFACE ELEVATION); Q = CFS (100 YEAR DISCHARGE); HEC-RAS CROSS SECTION NUMBER; CROSS SECTION RIVER MILE DESIGNATION
BASE FLOOD ELEVATIONS	1221
ZONE DESIGNATIONS	ZONE AE
CORPORATE LIMITS	Corporate Limits
COUNTY, PARISH, STATE OR INTERNATIONAL BOUNDARY	County Boundary

NOTES: ALL ELEVATIONS ARE BASED ON, **"NATIONAL GEODETIC VERTICAL DATUM OF 1929"**

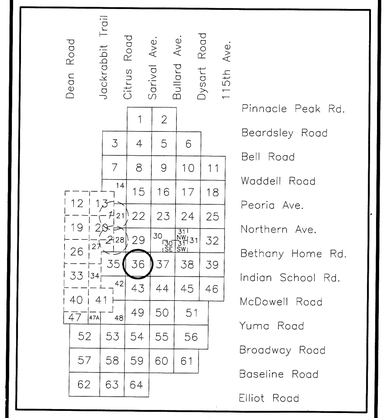
ALL FLOODPLAINS BY URS ARE BASED ON CROSS SECTIONS FIELD-SURVEYED BY URS.

ELEVATION REFERENCE FOR HYDRAULIC CROSS SECTIONS BY URS, 2001

I.D. NUMBER	ELEVATION (FT)	DESCRIPTION/LOCATION
103	1129.523	2" I.P. IN AC. POTHOLE AT INTERSECTION OF BETHANY HOME RD. AND CITRUS RD.
105	1084.318	MARICOPA COUNTY HIGHWAY DEPT. BRASS CAP IN HAND HOLE, INDIAN SCHOOL RD. AND CITRUS RD.
2080	1083.900	CITY OF PHOENIX BRASS CAP IN HAND HOLE, AT INTERSECTION OF COTTON LN. AND CAMELBACK RD.
1949	1061.170	BRASS CAP IN HAND HOLE, INTERSECTION OF CAMELBACK RD. AND SAVIRAL AVE.
2039	1072.520	ALUMINUM CAP FLUSH AT INTERSECTION OF CAMELBACK RD. AND LOOP 303
2081	1109.490	MCDOT BRASS CAP IN HAND HOLE, AT INTERSECTION OF CITRUS RD. AND OF CAMELBACK RD.
4639	1094.770	1" I.P. IN POTHOLE, 0.5 MI. WEST OF COTTON LN. IN WEST BOUND LANE OF CAMELBACK RD.

NOTES

1- THE HYDRAULIC BASE LINE IS CROSS SECTION STATION 10,000 UNLESS NOTED OTHERWISE



SHEET INDEX MAP

400' 0' 400' 800'

SCALE: 1"= 400'

HORIZONTAL DATUM: NAD 1983
STATEPLANE PROJECTION

NO.	REVISION	BY	DATE
2			
1			

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

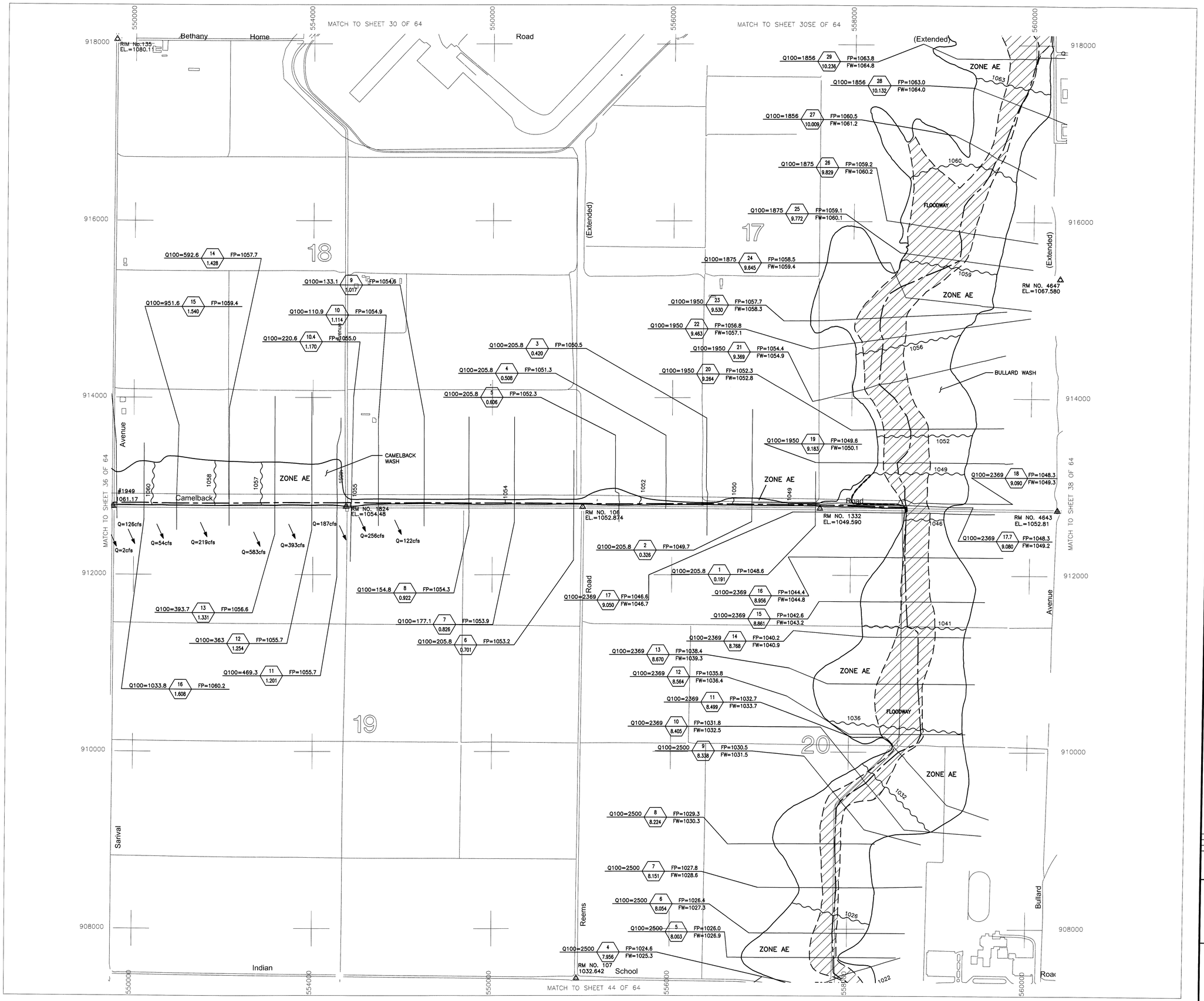
LOOP 303 CORRIDOR/WHITE TANKS
ADMP UPDATE
FLOOD DELINEATION STUDY
F.C.D. CONTRACT NO. 99-40

URS
7720 N. 16th Street
Phoenix, Arizona 85020
(602) 371-1100

	BY	DATE
DESIGN	RLD	10-02
DESIGN CHK.	GL	10-02
PLANS	MH	10-02
PLANS CHK.	RLD	10-02

3-24-03

P:\FCDMC\F.C.D.50600\CADD\ADMP SHEETS\FDSHW_03.DWG LATEST REV: 2-4-03
XREF: P:\FCDMC\F.C.D.50600\CADD\ADMP SHEETS\XREFS\ FS_BASE, FS0001, 1-24-03_MOD



LEGEND

100-YR FLOODPLAIN BOUNDARY	
FLOODWAY BOUNDARY	
HYDRAULIC BASE LINE WITH RIVER MILE	
EROSION SETBACK (WHEN APPLICABLE)	
CROSS SECTION	13 / 4.563 — FP= 1888.74, FW= 1889.54, Q = CFS
BASE FLOOD ELEVATIONS	1221
ZONE DESIGNATIONS	ZONE AE
CORPORATE LIMITS	Corporate Limits
COUNTY, PARISH, STATE OR INTERNATIONAL BOUNDARY	County Boundary

HEC-2DR CROSS SECTION NUMBER — FLOODPLAIN WATER SURFACE ELEVATION — ENCROACHED WATER SURFACE ELEVATION — 100 YEAR DISCHARGE — CROSS SECTION DESIGNATION

NOTES: ALL ELEVATIONS ARE BASED ON, **"NATIONAL GEODETIC VERTICAL DATUM OF 1929"**

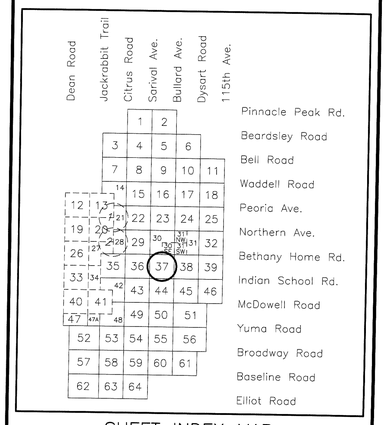
ALL FLOODPLAINS BY URS ARE BASED ON CROSS SECTIONS FIELD-SURVEYED BY URS.

ELEVATION REFERENCE FOR HYDRAULIC CROSS SECTIONS BY URS, 2001

I.D. NUMBER	ELEVATION (FT)	DESCRIPTION/LOCATION
106	1052.874	CITY OF PHOENIX BRASS CAP IN HAND HOLE, REEMS RD. AND CAMELBACK RD.
1332	1049.590	BRASS CAP IN HAND HOLE 0.5 MI. EAST OF REEMS RD. AND CAMELBACK RD.
1824	1054.480	CITY OF PHOENIX BRASS CAP IN HAND HOLE, 159TH AVE. AND CAMELBACK RD.
1949	1061.170	CITY OF PHOENIX BRASS CAP IN HAND HOLE, SAVIRAL AVE. AND CAMELBACK RD.
4643	1052.810	CITY OF PHOENIX BRASS CAP IN HAND HOLE, BULLARD RD. AND CAMELBACK RD.
4647	1067.580	2" IRON PIPE WITH NAIL ±0.5 MI. NORTH OF BULLARD AVE. AND CAMELBACK RD. (AT MISSOURI AVE.)

NOTES

1- THE HYDRAULIC BASE LINE IS CROSS SECTION STATION 10,000 UNLESS NOTED OTHERWISE



SHEET INDEX MAP

400' 0' 400' 800'

SCALE: 1"= 400'
HORIZONTAL DATUM: NAD 1983
STATEPLANE PROJECTION

NO.	REVISION	BY	DATE
2			

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

LOOP 303 CORRIDOR/WHITE TANKS
ADMP UPDATE
FLOOD DELINEATION STUDY
F.C.D. CONTRACT NO. 99-40

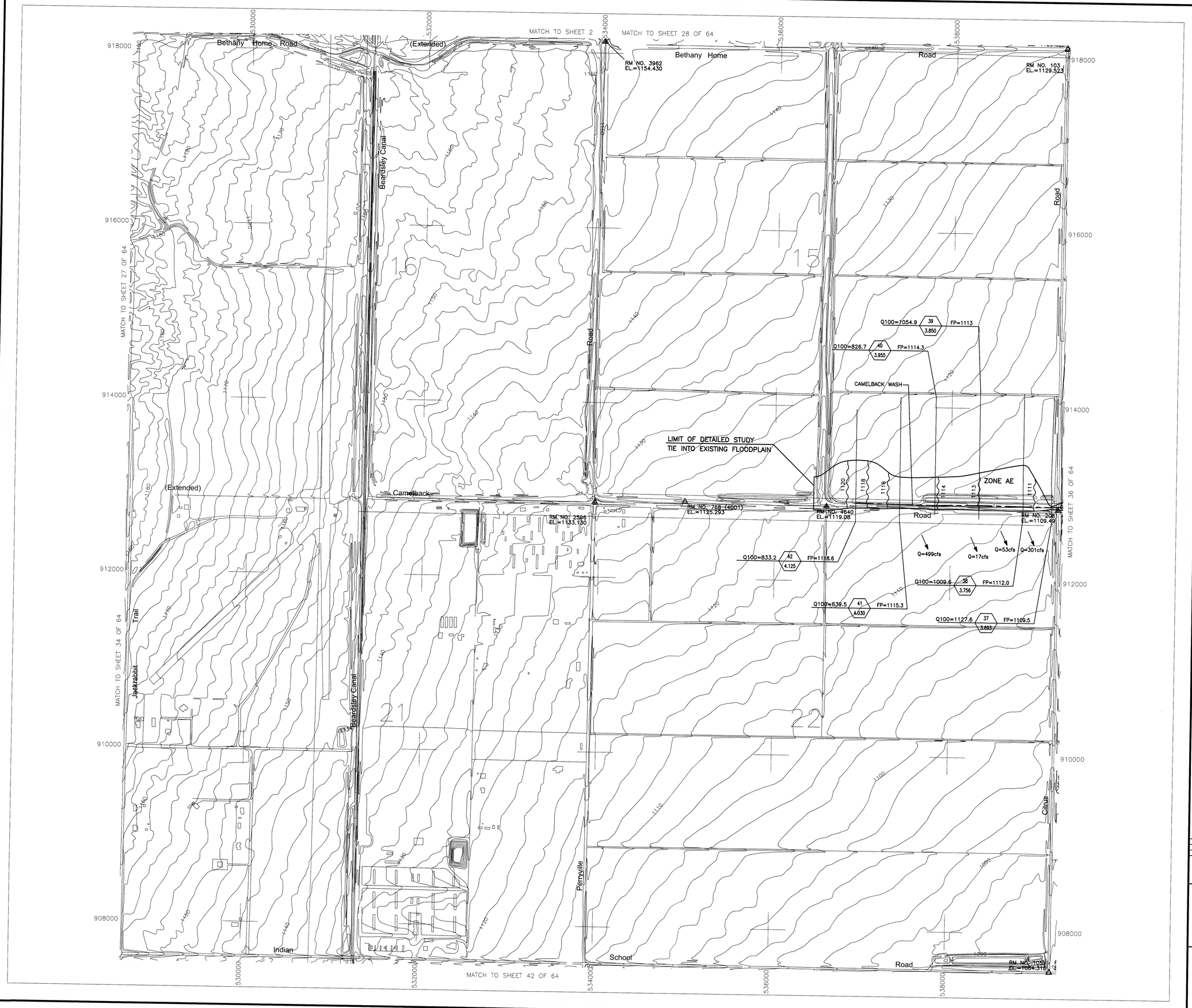
URS
7720 N. 16th Street
Phoenix, Arizona 85020
(602) 371-1100

3-24-03

	BY	DATE
DESIGN	MR/CL	10-02
DESIGN CHK.	RLD	10-02
PLANS	MDH	10-02
PLANS CHK.	RLD	10-02

SHEET 37 OF 64

P:\FCDMC\E1526001\CADD\MAP SHEETS\FDSDWG-38.DWG LATEST REV: 2-4-03
PRINT BY: P:\FCDMC\E1526001\CADD\MAP SHEETS\MRCL FDSUWG_FT1061.TOPO_MOD



LEGEND

100-YR FLOODPLAIN BOUNDARY	
FLOODWAY BOUNDARY	
HYDRAULIC BASE LINE WITH RIVER MILE	
EROSION SETBACK (WHEN APPLICABLE)	
CROSS SECTION	13 / 4.563 — FP= 1888.74 (FLOODPLAIN WATER SURFACE ELEVATION); FW= 1889.54 (ENCROACHED WATER SURFACE ELEVATION); Q = CFS (100 YEAR DISCHARGE); HEC-RAS CROSS SECTION NUMBER; CROSS SECTION DISTANCE MILE DESIGNATION
BASE FLOOD ELEVATIONS	1221
ZONE DESIGNATIONS	ZONE AE
CORPORATE LIMITS	Corporate Limits
COUNTY, PARISH, STATE OR INTERNATIONAL BOUNDARY	County Boundary

NOTES: ALL ELEVATIONS ARE BASED ON, **"NATIONAL GEODETIC VERTICAL DATUM OF 1929"**

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THE TOPOGRAPHIC CONTOURS ARE FROM THE 1989 STUDY PREPARED BY THE WLB GROUP (WITH FLIGHT DATE OF DECEMBER 1989). THEY WERE NOT USED FOR ANY MODELING OF CROSS SECTIONS, AND ARE PROVIDED TO SHOW LOCATIONS OF ROADS, DITCHES, ETC. ONLY.

ELEVATION REFERENCE FOR HYDRAULIC CROSS SECTIONS BY URS, 2001

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

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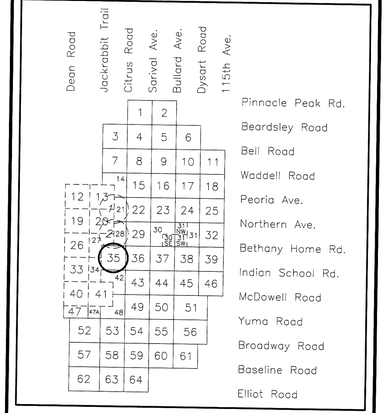


SHEET INDEX MAP

400' 0' 400' 800'

SCALE: 1"= 400'
HORIZONTAL DATUM: NAD 1983
STATEPLANE PROJECTION

NO.	REVISION	BY	DATE
2			
1			

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

LOOP 303 CORRIDOR/WHITE TANKS
ADMP UPDATE
FLOOD DELINEATION STUDY
F.C.D. CONTRACT NO. 99-40

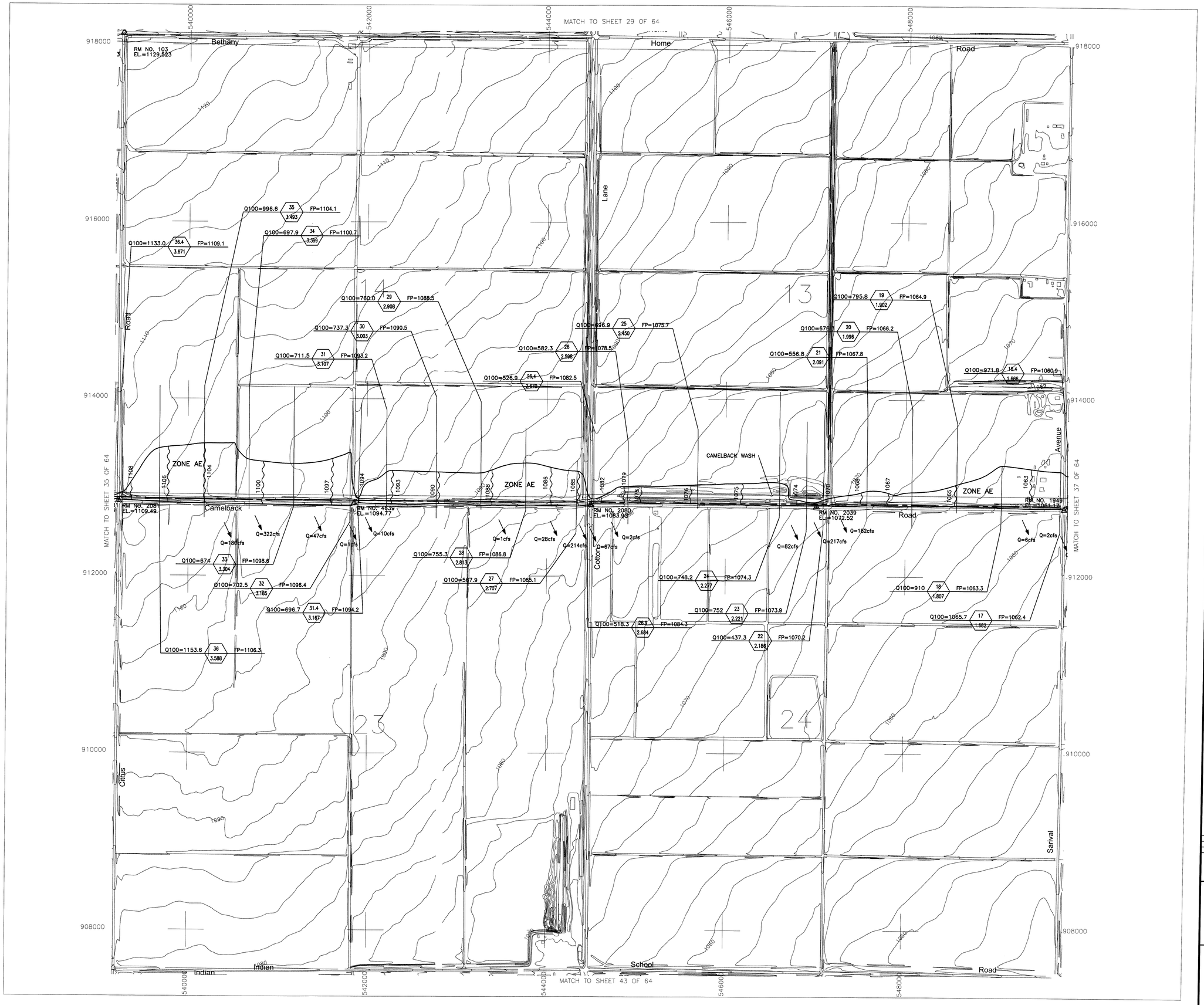
Registered Professional Engineer (Civil) CERTIFICATE NO. 33659 RICHARD L. DUNCAN REVISION Expires 6/30/04 ARIZONA, U.S.A.

URS
7720 N. 16th Street
Phoenix, Arizona 85020
(602) 371-1100

	BY	DATE
DESIGN	RLD	10-02
DESIGN CHK.	GL	10-02
PLANS	MH	10-02
PLANS CHK.	RLD	10-02

SHEET 35 OF 64

P:\FCDMC\E152600\Submittals\Submittals\Re-Submit\Floodplain Delineation\2-24-04\Full Size Drawings\drawings\FTSDWG-18.DWG LATEST REV: 3-19-04
XREF:P:\FCDMC\E152600\Submittals\Submittals\Re-Submit\Floodplain Delineation\2-24-04\Full Size Drawings\XREF\ FEATURE, HYDR1-WO-PERRYVILLE, TOPO_MOD



LEGEND

100-YR FLOODPLAIN BOUNDARY	
FLOODWAY BOUNDARY	
HYDRAULIC BASE LINE WITH RIVER MILE	
EROSION SETBACK (WHEN APPLICABLE)	
CROSS SECTION	13 (HEC-RAS CROSS SECTION NUMBER) 4.563 (CROSS SECTION DISTANCE DESIGNATION) FP= 1888.74 (FLOODPLAIN WATER SURFACE ELEVATION) FW= 1889.54 (ENCROACHED WATER SURFACE ELEVATION) Q = CFS (100 YEAR DISCHARGE)
BASE FLOOD ELEVATIONS	1221
ZONE DESIGNATIONS	ZONE AE
CORPORATE LIMITS	Corporate Limits
COUNTY, PARISH, STATE OR INTERNATIONAL BOUNDARY	County Boundary

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ELEVATION REFERENCE FOR HYDRAULIC CROSS SECTIONS BY URS, 2001

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NOTES

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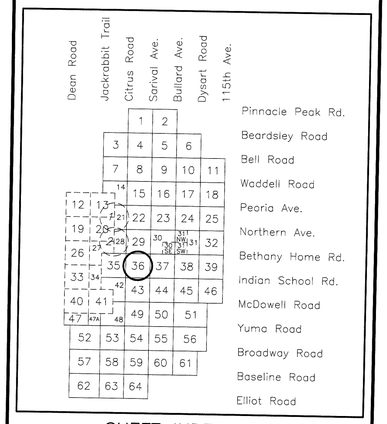

SHEET INDEX MAP

400' 0' 400' 800'

SCALE: 1" = 400'

HORIZONTAL DATUM: NAD 1983
STATEPLANE PROJECTION

NO.	REVISION	BY	DATE
2			
1			

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

LOOP 303 CORRIDOR/WHITE TANKS
ADMP UPDATE
FLOOD DELINEATION STUDY
F.C.D. CONTRACT NO. 99-40

Registered Professional Engineer (Civil) CERTIFICATE NO. 35856 RODNEY G. SILVERSTEIN Date Signed 3-17-04 ARIZONA, U.S.A.

URS
7720 N. 16th Street
Phoenix, Arizona 85020
(602) 371-1100

	BY	DATE
DESIGN	RLD	10-02
DESIGN CHK.	GL	10-02
PLANS	MH	10-02
PLANS CHK.	RLD	10-02

SHEET 36 OF 64

P:\FCDMC\E1526001\Submittals\Submittals\Re-Submit\Floodplain Delineation\2-24-04\Fdl Size Drawings\drawings\TDS\WC-26.DWG - LATEST REV: 3-12-04
XREF: P:\FCDMC\E1526001\Submittals\Submittals\Re-Submit\Floodplain Delineation\2-24-04\Lib Size Drawings\XREF\, FDLTBLE, HYDRL, TOPO_A40